# CHAPTER 6

# TRANSPORTATION RESOURCES

Transportation resources are the highways, roads, railroad tracks, bus routes, bike paths, and sidewalks that exist within a town. Transportation resources provide people with the means to access jobs, markets and community activities. They also affect the growth and character of local communities and the greater region. When these resources are neglected or modified without consideration of the community needs or environmental consequences, the results can be negative, such as lost opportunities for pedestrian traffic, serious safety issues, or pollution of water resources.

The road infrastructure of Athol is comprised of three state highways (Route 2, Route 2A, and Route 32), and a network of roads serving the town center and the rural residential areas. Cars and trucks are the primary modes of transportation for people and goods. According to the 1990 Census, ninety-two percent (92%) of Athol's working population commuted by car, truck or van to their place of work. The rate of auto ownership in the town is 1.5 autos per household. Relatively low population densities limit the potential for public transit as a travel mode.

State Route 2, or the Old Mohawk Trail, is Athol's principal highway. It is the major east-west highway across northern Massachusetts, linking Boston to the State of New York and providing access to Interstate 91 in Greenfield. It is a controlled access highway through eastern Massachusetts until it reaches Erving. One of the oldest designated tourist and scenic routes in the country, the Mohawk Trail is the gateway to the Connecticut River Valley. Route 2 also links Athol to the employment markets in Gardner, Fitchburg, Leominster and other regions to the east. Route 2 is part of the National Highway System (NHS) and is thus eligible for federal funding.

Route 2A is another east-west roadway that runs parallel to Route 2 through much of the Montachusett and Franklin County regions. In Athol, Route 2A also serves as Main Street, and provides links to the towns of Templeton, Phillipston, and Orange.

Route 32 is a north-south roadway that provides a link between Petersham and the Orange/Royalston area. It forms a junction with State Route 122 in the center of Petersham, and it intersects State Route 68 in Royalston.

Several highways provide connections to the region and beyond. Interstate 190, one of four north-south highways, lies 28 miles east of Athol and links Route 2 in Leominster to Interstate 290 in Worcester and the Massachusetts Turnpike in Auburn. Route 122, a scenic state road, provides direct access between Worcester, Petersham, and New Salem. Smaller highways and local roadways, such as Route 68, usher people to and from Gardner and Worcester. Route 68 also connects the villages of Royalston, providing an important

corridor in a rural area. Originating in New Hampshire, Route 202 joins Route 2 in Phillipston and Athol before continuing on a southwesterly route to the City of Holyoke.

Athol supports over 70 miles of local roadways. The Athol Public Works Department maintains the streets, sidewalks and drainage systems. However, the Town faces a shortfall between the budget necessary to maintain its infrastructure and its ability to generate revenue. Many of the roads and sidewalks are in disrepair. Main Street is the subject of a $2 million Improvement Project. The bridge over the Millers River at South Main Street is structurally deficient and functionally obsolete. Though it is currently under construction, little progress has happened in the last two years.

The Town perceives a need to create more parking to accommodate town government employees, support eco-tourism potential and free up needed on-street parking on Main Street for patrons of local businesses.

Relatively low population densities limit the potential for public transit as a travel mode. Though limited in scope, the G-Link provides transit services for Athol and its nearby neighbors, Orange and Gardner. G-link is a cooperative service of the Franklin Regional Transit Authority (FRTA) and the Montachusett Regional Transit Authority (MART). G-Link provides weekday fixed-route bus service that connects Greenfield, Erving, Orange, Athol, Phillipston, Templeton, and Gardner via Route 2A, and Gardner, Templeton and Winchendon, via Routes 68 and 202. Five stops are located along Main Street in Athol. The service provides 7 trips each way per day between Greenfield and Athol, and 6 trips each way per day between Gardner and Orange. Between Athol and Orange, the service provides 13 trips per day each way, concentrating service frequencies around the morning, mid-day and evening peak travel periods, and providing one trip each way at around 8:00 PM.

G-Link service links with fixed route service in Gardner. The Gardner service consists of two loop routes operating clockwise/counterclockwise on an hourly schedule. G-link also connects with express bus service connecting Mount Wachusett Community College and Gardner center with various points in Fitchburg and Leominster, as well as the Fitchburg Transportation Intermodal Center (ITC). At the Intermodal Transportation Center riders can connect with commuter rail service to Boston and points east. The Mount Wachusett College Express runs two trips daily in each direction throughout the school year. Special service to the Intermodal Center runs year round.

In addition to its scheduled service, MART and FRTA offer dial-a-ride for the elderly and handicapped. Those living in outlying areas or unable to access regular bus stops may use the Dial-a-Ride transportation service provided by Community Transit Services. Through this service, transportation to work, medical appointments, shopping, and other locations is available.

Athol's closest airport is the Orange Municipal Airport, a General Aviation (GA) facility. To the east, the Gardner Municipal Airport in Templeton serves light aircraft. While most of this municipal airport's flights are recreational, approximately 25% of 300 flights per week are business related. Fitchburg Municipal Airport provides charter flights but no commercial

passenger service. Major commercial passenger flights can be boarded at Logan International Airport in Boston, Worcester Municipal Airport in Worcester, T.F. Greene in Providence, Manchester Airport in New Hampshire, and Bradley International Airport in Hartford, Connecticut.

Freight Rail service is provided by Guilford Rail Systems (GRS), a subsidiary of Guilford Transportation Industries (GTI). GRS owns the Boston & Maine, Maine Central, and Springfield Terminal railroads, which are used primarily for freight transport. The Springfield Terminal Railway line (the former Boston and Maine Railroad) parallels Route 2 and provides access to the network of intermodal facilities serving central and eastern Massachusetts, and the Connecticut River Valley.

## Goals:

- To continue to oversee and support safety improvements along the Route 2 corridor.
- To maintain the road infrastructure at existing levels or better.
- To improve traffic patterns and safety at key locations.
- To maintain or expand transportation choices for Athol residents.
- To improve parking conditions and supply in the downtown district.
- To improve the pedestrian and bicycle infrastructure.

## Objectives:

- Identify intersection safety improvements and congestion mitigation measures for Route 2 and main roads.
- Provide or improve sidewalks and crosswalk safety in the village centers.
- Explore the feasibility of providing walking and bicycling trails throughout Athol. (Millers River Greenway).
- Raise awareness of the existing transit service through Town.
- Use available transportation funds judiciously to maintain and improve roads and streets.

**To address these Goals and Objectives the transportation chapter includes discussions of:**

- The TIP process
- Current and potential local road Infrastructure
- A Comprehensive Pavement Management System (PMS) and an analysis of its benefits to Athol. A Comprehensive PMS assesses all maintained paved roadways as to their overall condition, prioritizes repairs, and estimates the funding needed to improve the condition of the road system;
- The findings of the Montachusett Region Congestion Management System.
- Collection of traffic counts for main roads;
- Accident history and analysis;
- Road capacity analysis along important roads (known as Level of Service (LOS);
- Main Street signal warrant analyses and improvement projects;
- Local parking issues;
- The Route 2 Safety Improvement Study
- The condition of Athol's bridges and their relationship to water quality;
- Existing and potential rail service;
- Existing and potential transit service;
- The potential for improving the bicycling and pedestrian network; and
- The Regional Transportation Plan

## Transportation Improvement Program (TIP)

The Transportation Improvement Program (TIP) is a federally required, annually updated, prioritized listing of short-range highway construction and transit projects proposed for implementation during a three to six federal fiscal year cycle. It is a means of allocating scarce federal and state monetary resources across the state to projects that each region deems to be its highest priorities. The TIP must be financially constrained to projections of available federal aid. The Executive Office of Transportation and Construction, moreover, is committed to funding those projects that will be ready for advertisement in Federal Fiscal Year (FFY) 2002 and beyond. To this end the regional TIP contains a financial plan showing the revenue source or sources, current or proposed, for each project, for each anticipated FFY of advertisement.

To receive Federal or State funding, a transportation improvement project must be included in the TIP. Projects listed in the TIP must also conform to the State Implementation Plan (SIP) for Air Quality in accordance with the Clean Air Act Amendments (CAAA), giving special consideration to "regionally significant" projects. Transportation projects funded with Federal funds from other Federal agencies or with local or private resources should be identified in the document to reflect the integrated and intermodal nature of the metropolitan transportation planning process.

The TIP must also be consistent with the current Transportation Plan for the Montachusett Region. In addition the TIP estimates future funding sources for operating and maintaining the current transportation network as well as the costs of capital improvements. The agency responsible for implementing highway projects in the TIP, unless otherwise noted, is the Massachusetts Highway Department and, for transit projects, the Franklin and Montachusett Regional Transit Authorities.

The Montachusett TIP is the product of a comprehensive, continuing and cooperative effort (the 3C Process) to improve the regional transportation system by local officials, the Montachusett Joint Transportation Committee (MJTC), the Montachusett Regional Transit Authority (MART), the Montachusett Regional Planning Commission (MRPC), the Massachusetts Highway Department (MassHighway), and the Executive Office of Transportation and Construction (EOTC). Together these organizations comprise the signatories representing the Montachusett Metropolitan Planning Organization. *(Refer to the Transportation Resources Appendix for a description of the Transportation Improvement Program Development Process.)*

## Road Infrastructure

### Functional Classification

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 mandated two Federal-aid systems: the National Highway System (NHS) and the Interstate system, which is a component of the NHS. In addition, the legislation mandated that all roads should be classified based on the type of service they provide. The Bureau of Transportation Planning and development at MassHighway, working with thirteen regional planning commissions, completed the classification in 1993, using the following general guidelines:

- Arterials provide the highest level of mobility, at the highest speed, for long, uninterrupted travel. The Interstate Highway System is an arterial network. Arterials generally have higher design standards than other roads, often with multiple lanes and some degree of access control.

- Collectors provide a lower degree of mobility than arterials. They are designed for travel at lower speeds and for shorter distances. Collectors are typically two-lane roads that collect and distribute traffic from the arterial system.

- Local roads represent the largest element in the American public road network in terms of mileage. For rural and urban areas, all public road mileage below the collector system is considered local. Local roads provide basic access between residential and commercial properties, connecting with higher order highways.

The functional classification of roadways has a hierarchy based on the level of service they provide. The American Association of State Highway and Transportation Officials (AASHTO) defines seven categories of road classifications:[1]

1. Interstate
2. Rural Principle Arterial and Urban Extensions
3. Rural Minor Arterials and Urban Extensions
4. Other Urban Principle Arterials
5. Rural Major Collectors and Urban Minor Arterials
6. Rural Minor Collectors and Urban Collectors
7. Rural Local and Urban Local

Interstates generally provide a high level of service and local roads a low level of service. The classification system further defines the roads by their context in an urban or rural setting. Urban areas have a population of 5,000 or more. Parts of Athol are considered to be a small urban area with roads of urban character. The remaining roads in the community are designated as rural local roads due to the density of population. Table 6-1 lists the classification of the four numbered routes in Athol. The table also lists the mileage within Athol of each route and the Federal Aid system the route belongs to. (*Please see the Transportation Infrastructure Map.)*

**Table 6-1: Functional Classification of Major Roadways in Athol**

| Numbered Route | Functional Classification | Towns Served in the Montachusett Region |
|---|---|---|
| 2 (NHS) | Principal Arterial (Controlled Access) | Harvard, Lancaster, Leominster, Fitchburg, Westminster, Gardner, Templeton, Phillipston, Athol |
| 2A (Main St) (STP) (5.24 mi.) | Minor Arterial/ Principal Arterial/ Major Collector | Ayer, Shirley, Lunenburg, Fitchburg, Westminster, Gardner, Templeton, Phillipston, Athol |
| 202 (NHS) (5.12 mi.) | Minor Collector/Major Collector | Winchendon, Templeton, Phillipston, Athol |
| 32 (STP) (5.75 mi.) | Minor Arterial/Major Collector | Petersham, Athol, Royalston |

*Source: Montachusett Regional Planning Commission, 2000 Regional Transportation Plan.*

Highway maintenance is funded under three main aid categories, the National Highway System, the Surface Transportation System, and MGL Chapter 90 Section 34.2(a). The first two are federal programs, the third is a reimbursement program managed by the State. The Chapter 90 Program entitles Municipalities to reimbursement of documented expenditures under the provisions of General Laws, Chapter 90, Section 34, Clause 2(a) on approved Projects. The funds provided from Transportation Bond Issues authorize Capital Improvement Projects for Highway Construction, and Preservation and Improvement

[1] AASHTO, A Policy on Geometric Design of Highways and Streets, 1994.

Projects that create or extend the life of capital facilities. Eligible expenditures are as follows:[2]

- Roads (accepted public ways)
- Bridges
- Road Building Equipment
- Related Engineering Services and Expenses

Roadways with a functional classification of Rural Major Collector or higher are eligible for Federal Aid or Non-Federal Aid through the Transportation Improvement Program (TIP) for reconstruction projects. The Town of Athol has maintenance responsibility for nearly 97 miles or roadway, over eighty percent of all the roads in the town. The vast majority of these roads are classified as Local or Rural Local. Local roads and rural minor collectors are not eligible for these funds.

Chapter 90 funds are reimbursed to the towns based upon the miles of town-accepted roads as reported in MassHighway's Road Inventory File (RIF). Often reporting of newly accepted community roads lags behind the acceptance by as much as three or four years. It is important for towns to keep these reports current since it affects their allocation of Chapter 90 funds. Table 6-2 shows the total roadway miles in Athol listed in the RIF as of the year ended 2000, by functional classification and Maintenance Authority. Unaccepted roadways are those maintained by private individuals or organizations, or have been discontinued by the town. The table also shows which classifications of roads are eligible for federal and state aid.

**Table 6-2: Road Mileage by Functional Classification and Maintenance Authority**

| Functional Classification | Maintenance Authority | | | | |
|---|---|---|---|---|---|
| | **MassHighway** | **Town** | **Unaccepted** | **Total Miles** | **Fed/State Eligible*** |
| Local | 0.22 | 70.76 | 2.18 | 70.98 | No |
| Rural Principal Arterial and Urban Extensions | 5.12 | | | 5.12 | Yes |
| Rural Minor Arterial and Urban Extensions | 5.63 | 2.30 | | 7.93 | Yes |
| Urban Minor Arterial or Rural Major Collector | 1.35 | 9.38 | | 10.73 | Yes |
| Urban Collector or | 0.45 | 9.01 | | 14.85 | Yes |
| Rural Minor Collector | | 5.74 | | | No |
| **Total*** | **12.77** | **96.84** | **2.18** | **111.80** | |

*Excludes Route 2.
*Source: Massachusetts Highway Department, Bureau of Transportation Planning and Development, 2000 Year End Massachusetts Road Inventory File.*

[2] http://www.state.ma.us/mhd/stateaid/chap90.htm

Road Maintenance is an expensive component of a community's overall annual budget. Differing levels of maintenance (and costs) are required depending on the age and condition of the road mileage. Table 6-3 shows recent estimates of the costs per road mile of several repair levels. To leverage the best advantage of available maintenance dollars it is important for the community to recognize the condition of its roads and target maintenance efforts at consistently maintaining the condition of the roads in a good state of repair. To that end, many communities have found it advantageous to track the maintenance activities in a Pavement Management System, as described in the section on Management Systems later in this chapter.

**Table 6-3: Typical Costs (1997 $'s) for Levels of Repair and Maintenance**

| Repair Type | Costs per Road Mile |
|---|---|
| Reconstruction | $460,923.05 |
| Rehab (Mill/Overlay) | $54,635.56 |
| Preventive Overlay | $34,745.45 |
| Routine Crack/Local | $22,573.70 |

*Source: Montachusett Regional Planning Commission, 2000 Regional Transportation Plan.*

The topography, road surface type, and distance to nearby water sources all affect the impact that roads can have on water quality. Many rural roads follow the courses of rivers and streams and untreated stormwater runoff discharges to these waterbodies. The runoff from dirt roads can carry debris and sediment. Contaminants from vehicles and summer and winter roadway maintenance can wash into wetlands and water-ways during rainstorms and periods of rapid snow melt. In more urbanized areas, stormwater runoff from paved roads is often channeled to the nearby waterways at greater velocities, carrying silt, road maintenance chemicals, and motor vehicle residue. Excessive debris sediment and stormwater velocity can erode stream banks and destroy valuable habitat.

State Route 2, the Old Mohawk Trail, is one of the oldest designated tourist and scenic routes in the country. In Athol it is the junction of Routes 2 and 202. The highway passes by a number of wetland areas and waterbodies in Athol, and intersects the course of the Millers River across the western border, in Orange. Route 2A meanders through Athol, generally parallel to Route 2, but following the course of the Millers River through the Town center. Route 32 provides a north-south link through Athol between Petersham and Royalston, passing by Lake Ellis and crossing the Millers River to run parallel to the Tully River along the Athol Orange border.

The state road inventory classifies roads according to whether they are paved or unpaved and public or private. Public roads are further classified by jurisdiction: Federal, State, or Local. Paved roads have some type of surface treatment such as asphalt or concrete and they typically have stormwater drainage systems incorporated into their design to improve the safety of the roads. In the past, design standards for stormwater management simply directed the stormwater away from the road and into nearby waterways without treatment. Today, these standards are changing. In urbanized areas stormwater is directed into collection systems and, in some cases is treated before being discharged. Unpaved roads consist of graded earth or gravel and can be subject to erosion. Many of these are old farm roads or

logging trails. Often they traverse areas of steep gradient or cross small streams. Drainage problems can undermine the quality of un-paved roads and degrade the water quality of rivers and streams.

According to the Road Inventory File maintained by MassHighway and MassGIS, the Town of Athol contains over 112.6 miles of roadways. Approximately 12.7 miles (11.2 percent) of these roads are unpaved. Most of these unpaved roads (85.8%) are under the jurisdiction of the Town. Nearly two miles of unpaved roads remain unaccepted by either the State or the Town as listed in Table 6-4.

**Table 6-4: Paved and Unpaved Road Mileage**

| | Paved | Unpaved | Total | Percent |
|---|---|---|---|---|
| **Mass Highway** | 13.8 | | 13.8 | 12.2% |
| **City/Town** | 85.8 | 10.8 | 96.6 | 85.8% |
| **Unaccepted** | 0.3 | 1.9 | 2.2 | 1.9% |
| **Total** | **99.9** | **12.7** | **112.6** | **100%** |
| **Percent** | **88.7%** | **11.2%** | **100%** | |

*Sources: MassHighway Road Inventory File, MassGIS Datalayer..*

A comprehensive guide on protecting water quality through Best Management Practices for unpaved roads was developed by the Berkshire Regional Planning Commission for the Massachusetts Department of Environmental Protection.[3] For unpaved roads, proper design and routine inspection and maintenance must accommodate good drainage systems.

The profile of the road must allow for removal of water from the surface of the road. Proper grading is required to maintain an even surface and alleviate water related surface deformations. Ditches alongside the road should be employed to convey runoff away from the road and to filter sediments and pollutants from the runoff. In areas with steeper slopes, waterbars can effectively channel runoff away from the road and prevent deterioration of the road surface. Proper placement of culverts to drain water away from ditches will help to preserve the road base. Culvert design should accommodate both high water periods and fish passage. Outlet protection should be employed to control the velocity of water in ditches and culverts. Bank stabilization measures should be employed in sloped areas at risk of erosion.

## Buildout Analysis Results

Montachusett Regional Planning Commission conducted a buildout analysis for the Town of Athol in 2000, sponsored by the Executive Office of Environmental Affairs (EOEA) in support of the Community Preservation Act. At the local level, EOEA believes that Community Preservation is about maintaining quality of life in our municipalities by empowering cities and towns to preserve what is important to their individual character. This community preservation effort is also about recognizing the potential negative effects of sprawl development, and the potential for disproportionate growth in certain regions.

[3] Berkshire Planning Commission, Unpaved Roads BMP (Best Management Practices) Manual, Winter 2001.

Buildout analyses illustrate the maximum development permitted as-of-right by the local zoning currently in place. The buildout provides an estimate of the total number of houses and commercial/industrial square footage that could result if every piece of unprotected, buildable land is developed, if no more land is permanently protected within a community, and if zoning remains unchanged.

The buildout methodology defines buildable land as undeveloped, unprotected, upland that does not include transmission lines or land within 100 feet of a stream or river. The analysis reflects a community's zoning and general bylaws and subdivision regulations, especially concerning the way they treat resource areas such as wetlands and floodplains. For example, if wetland areas can be included in gross building lot area minimums, then wetlands are not considered an absolute constraint to development. Yet wetlands may be considered partial constraints if they restrict the density or type of development in a given area. For example, there may be a 25% limit on all impervious surfaces on parcels located within a certain distance of a wetland. The methodology takes this into account.

The work does not consider the more restrictive engineering principles employed by the Board of Health and the Building Code inspector. Lands that may be considered buildable in this analysis may prove to have barriers or limitations upon closer scrutiny. Think of the buildout projection as a maximum limit under current local land use guidelines.

Athol has seven classes of zoning, three of which are exclusively residential, as shown in Table 6-5. The overwhelming majority of the developable land in the town is zoned as a Rural Single-Family Residential District (88.7%), with a one-acre minimum lot size, a frontage requirement of 160 feet, and a right-of-way width of 50 feet. Dimensional requirements for residential development in the residential districts are outlined in Table 6-6. Small percentages of the land area are zoned for smaller house lots with less restrictive frontage requirements or higher density dwelling units.

**Table 6-5: Percentage of Developable Land by Zoning District**

| **Municipal Zoning Districts** | | **Percentage** |
|---|---|---|
| **Zonecode** | **Zoning Districts** | **Of Land Area** |
| RA | Multi-Family Residential District | 2.8% |
| RB | Medium Single-Family Residential District | 6.3% |
| RC | Rural Single-Family Residential District | 88.7% |
| CA | Central Commercial District | 0.1% |
| CB | Neighborhood Commercial District | 0.2% |
| G | General Commercial District | 1.9% |
| I | Industrial District | 0.1% |

*Source: Town of Athol Zoning Bylaws.*

**Table 6-6: Dimensional Requirements of Residential Zoning Districts in Athol**

| Residential Zoning | Minimum Lot Size | Frontage | R.O.W. |
|---|---|---|---|
| Multi-Family Residential (RA) | | | |
| Single Family | 8,000 | 65' | 50' |
| Two Family | 12,000 | 65' | 50' |
| Three Family | 16,000 | 65' | 50' |
| Four Family | 24,000 | 65' | 50' |
| Medium Single-Family Residential (RB) | | | |
| Single Family | 10,000 | 70' | 50' |
| Rural Single-Family Residential (RC) | | | |
| Single Family | 44,000 | 160' | 50' |

*Source: Town of Athol Zoning Bylaws.*

The buildout analysis revealed that Athol has 13,273 acres of potentially developable land zoned residentially. Under current zoning and land use controls, the developable land could potentially yield 11,557 new dwelling units. If all of these units were to be built, the current residential water demand of 944,000 gallons per day would increase by an additional 2,114,908 gallons per day. Some of the water would come from private wells and wastewater would go to private septic systems, but the town would have to consider expansions of the water distribution and wastewater collection systems to fully accommodate the potential demand. In addition, a total of 187 miles of new roads would have to be built based upon the frontage requirements of the Zoning Bylaws.

Over the last three decades, the Montachusett Region and several communities on its borders grew significantly, increasing by nearly 23 percent. Leominster is the fastest growing community in the region, in terms of raw numbers, with an increase of 3,158 people between 1990 and 2000. Communities along I-495 are also growing rapidly, each adding over a thousand people in the ten-year period. By contrast, Athol's population has remained relatively stable since 1970, exhibiting small fluctuations from decade to decade and a net increase of 114 people since 1970.

Proximity to I-190 and I-495, significant growth pressure, and an over-heated housing market in the greater Boston region make eastern Montachusett communities attractive. Available land and distance from Boston make housing more affordable than in communities further east. As more people move to those towns they will either build out under the local constraints, or they will institute measures to limit the growth. As these communities fill up or slow their growth, pressure on communities further west will increase.

The Buildout illustrates the potential growth pressure towns may face. If the Town does not act, and the growth pressure mounts, the Town may have to adopt and maintain many miles of new roads and water/sewer/stormwater systems. Communities can stem the trend through a number of growth management techniques including changes to zoning bylaws, dimensional requirements, allowing for open space residential design either by right or by special permit, or acquisition of large tracts of land for open space protection.

## Management Systems

Section 1034 of the Intermodal Surface Transportation and Efficiency Act of 1991 directed each state to develop, establish, and implement management systems in the following six areas: Pavement for Federal Highways, Congestion, Public Transportation Facilities & Equipment, Intermodal Transportation Facilities, Bridges, and Highway Safety. Subsequently, the federal requirement to develop these Management Systems was dropped. However, Montachusett Regional Planning Commission decided to continue development of the Pavement Management and Congestion Management Systems so that the State and the Montachusett MPO could use the results from the two systems in making project selection decisions.

### Pavement Management System

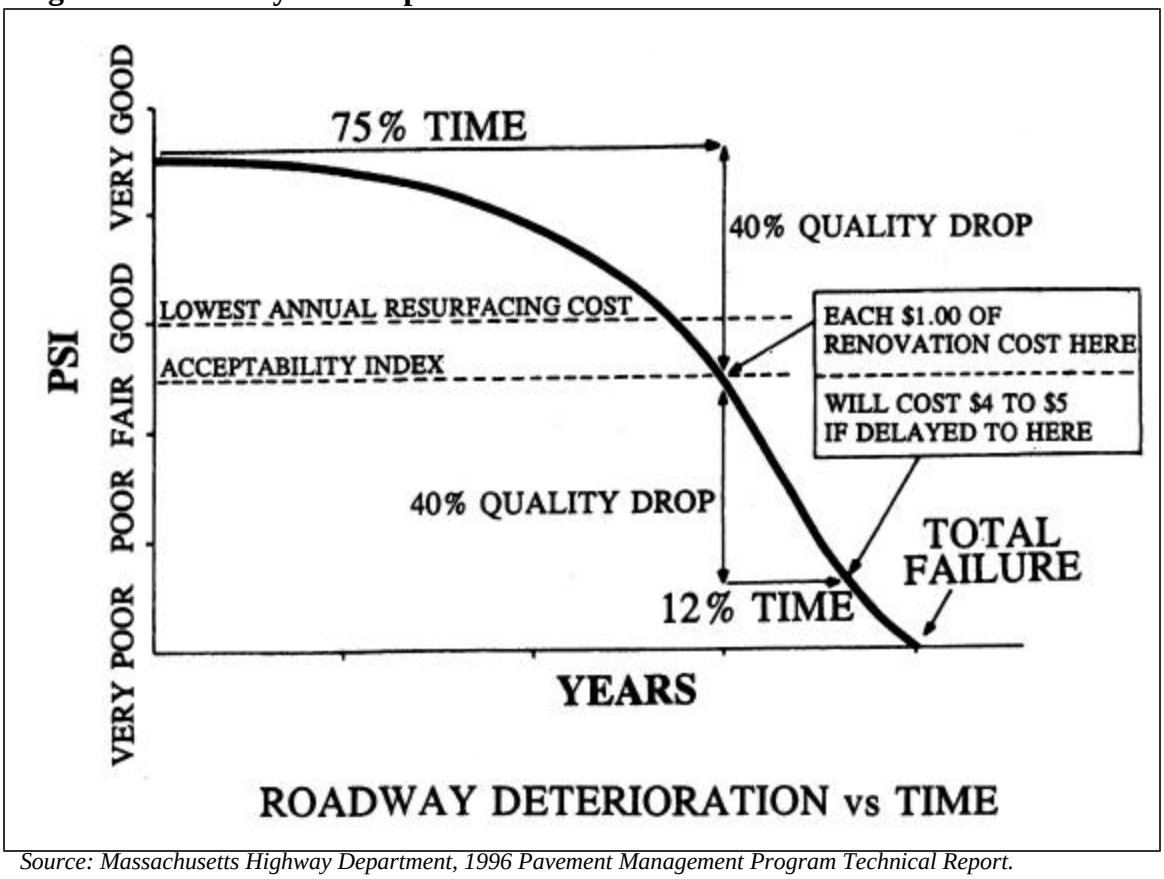
Historically, road maintenance funds were channeled to those roads that were perceived by local highway superintendents to be in the worst condition. Various studies have indicated that a pavement maintained in a perpetual "good" to "excellent" condition, requires one-fourth to one-fifth the investment of a pavement that is poorly maintained and rehabilitated only after it reaches a "poor" or "failed" condition.

The life of a paved roadway varies between ten (10) and twenty (20) years depending on weather conditions and traffic load. Under normal conditions with consistent weather and traffic patterns, a pavement will deteriorate by a forty percent (40%) drop in quality in the first seventy-five percent (75%) of its life. During the next twelve percent (12%) of its life the pavement will deteriorate by a further forty percent (40%). With proper timing of preventative maintenance measures during the first seventy-five percent (75%) of a pavement's life, many years can be added to the functionality of the road at a lower overall cost. Figure 6-1 gives a graphical depiction of the general life cycle of an asphalt pavement.[4]

A Pavement Management System (PMS) as defined by the American Public Works Association (APWA) is "a systematic method for routinely collecting, storing, and retrieving the kind of decision-making information needed (about pavement) to make maximum use of limited maintenance and construction dollars." A PMS provides quantitative information to support repair and budget decisions to maintain roads in a perpetual "good" to "excellent" condition. A formalized PMS improves on the existing practices that most highway departments already employ by enhancing professional judgment through guidelines and a standardized approach. Highway departments and Town officials can use the information to request additional funding either from Town Meeting or State and Federal sources.

[4] Franklin Regional Council of Governments, Erving Master Plan, Transportation Chapter, 2002.

**Figure 6-1: Life Cycle of Asphalt Pavement**




*Source: Massachusetts Highway Department, 1996 Pavement Management Program Technical Report.*

In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) legislation specifically required all federal-aid eligible highways to be placed under a PMS. The federal-aid highway system consists of any roadway that is not functionally classified as local or rural minor collector. These roadways fall into two funding categories, the National Highway System (NHS) and the Surface Transportation Program (STP). The STP category includes all urban arterials, urban collectors, rural arterials, and rural major collectors that are not on the NHS. Local roads and urban minor collectors are not eligible for STP funds. The STP funds construction, signalization and signal timing, widening, restriping, resurfacing, and bus turnouts.

As part of the development of the statewide PMS, the MRPC inventoried the Federal Aid roads within its region. The Montachusett Region contains approximately 603 miles of federal-aid roads, including 82 miles of National Highway System (NHS) roads and 521 miles of Surface Transportation Program (STP) roads. The regional PMS efforts began in the Spring of 1995. Pavement data was collected on a three-year cycle. The MRPC surveyed approximately 175 miles of roads for pavement distress each year.

### *Field Survey*

MRPC inventoried the physical pavement features, such as number of lanes, length of segment, width of pavement, surface type, functional classification, shoulder information and pavement condition. The pavement condition survey included identification of various distresses such as rutting, patching/potholes, alligator cracking, distortion, block cracking, edge cracking, transverse and longitudinal cracking, surface wear and raveling, corrugations, shoving and slippage, asphalt bleeding, and polished aggregate. In addition, staff collected or estimated average daily traffic volumes and vehicle classification and loading data for each roadway segment.

### *"Infrastructure 2000" RoadManager Software*

The MRPC used the "Infrastructure 2000" asset management software developed by Vanasse Hangen Brustlin, Inc. VHB's Infrastructure2000™ software is a collection of desktop PC and Local Area Network (LAN) based software modules that allow users to inventory, track, analyze, and manage:

- Requests, Work Orders, Daily Work Activities
- Roadway Surfaces
- Roadway Features
- Pavement and Sidewalk Budgets
- Roadway Opening Permits
- Vehicles and Equipment

The PMS analysis provides a Pavement Condition Index (PCI) rating for each roadway segment. The PCI is a serviceability rating derived from established measurements of pavement surface condition distresses or deficiencies. The PCI rating was based on a scale from 0-100, as listed below.

**Table 6-7: Pavement Condition Index**

| PCI Rating | Description |
|---|---|
| 100-95 | Pavement is in EXCELLENT condition, with NO maintenance efforts anticipated or required |
| 95-85 | Pavement is in GOOD condition, with MINOR MAINTENANCE required |
| 84-65 | Pavement is in FAIR condition, with MAJOR MAINTENANCE required |
| 60-0 | Pavement is in POOR condition, with RECONSTRUCTION or structural rehabilitation required to restore pavement serviceability |

Using a matrix-based decision process, the PMS software identifies the estimated level of repair treatment for each roadway section, based on the PCI and a number of other factors, such as a Base Index, Average Curb Reveal, Functional Class and Pavement Type.

The State employs five default repair strategies:

(1) Reconstruction: the complete removal and replacement of a failed pavement section, which may include widening, realignment, drainage work, and safety hardware.
(2) Rehabilitation: full or partial depth patching, joint and crack sealing, grouting and undersealing, or grinding and milling in conjunction with overlays over two inches.
(3) Preventative Maintenance: extensive crack sealing, chip sealing, micro surfacing, or overlays less than two inches thick.
(4) Routine Maintenance: crack sealing or pothole patching
(5) No Immediate Maintenance.

Each treatment has an estimated cost based on average market conditions and the area of the segment.

**Table 6-8: Repair Type, Associated Unit Costs, and Estimated Life**

| Repair Number | Repair Name | Unit Cost* (sq. yds.) | Estimated Repair Life (years) | Index Values After Repair |
|---|---|---|---|---|
| 1 | Reconstruction | $30.0 | 20 | 99 |
| 2 | Rehabilitation (Mill/Overlay) | $10.0 | 10 | 99 |
| 3 | Preventive Overlay | $7.5 | 5 | 99 |
| 4 | Routine Crack/Local | $2.5 | 2 | 99 |
| 5 | None Required | $0.0 | 1 | 95 |

** Costs vary with changing economic conditions.*

Finally, the software calculates a "Benefit Value" that reflects the cost effectiveness of conducting repairs on one road section over another. This calculation considers project cost, average daily traffic, change in PCI, and improvement in life expectancy. The PMS Benefit Value (BV) equation is presented below:

$$BV = \frac{365 \times ADT \times \text{Road Section Length} \times \text{Estimated Life of Repair}}{\text{Current Cost} \times \text{Pavement Condition Index}}$$

In general, the software assigns higher priority (better cost effectiveness) to sections requiring routine and preventative maintenance techniques over sections requiring reconstruction. However, a section of road with high traffic volumes that requires reconstruction would likely receive a higher benefit value than a low volume road requiring routine maintenance.[5]

The scope of the MRPC Regional Pavement Management System was sufficiently large that it could only encompass the Federal Aid roadways in each community. The extensive

[5] Franklin Regional Council of Governments, Erving Master Plan, Transportation Chapter, 2002.

network of local roads in the region could not be included at that time. MRPC surveyed 29.3 miles of federal-aid eligible roadways in Athol. Since that time the DPW has done some work on Pleasant Street, from Main Street to Barrett Avenue. In 2000, the DPW put down a base coat under a water main replacement project for a short segment on Pequoig Avenue. Main Street is included in the TIP and is due to go out to bid in 2003 for a widening and infrastructure improvement project. Table 6-9 summarizes the repair type needed and the number of miles applicable to each repair type as of 1998.

**Table 6-9: Summary of Costs for STP Roadways Surveyed 1997-1998**

| Repair Type | Length (miles) | Current Cost |
|---|---|---|
| Reconstruction | 3.08 | $1,419,643 |
| Rehab (Mill/Overlay) | 4.78 | 261,158 |
| Preventive Overlay | 8.91 | 309,582 |
| Routine Crack/Local | 3.46 | 78,105 |
| None Required | 9.07 | 0 |
| **Total** | **29.30** | **$2,068,488** |

*Source: Montachusett Regional Planning Commission, 2000 Regional Transportation Plan.*

The Benefit Value analysis identified preliminary priority listings of roadway improvement needs as shown in the map of Pavement Management Conditions. West Royalston Road was found to require Major Maintenance and may require Reconstruction. Chestnut Hill Avenue, Exchange Street, Pequoig Avenue, Petersham Road, and North Orange Road are all in need of Major Maintenance to restore them to a good state of repair. Lenox Street, Pinedale Avenue, Pleasant Street, South Athol Road, South Main Street, and Templeton Road require Minor Maintenance to restore their condition. Town priorities include North Orange Road, West Royalston Road, and Chestnut Hill Road. The Athol Department of Public Works will seek Chapter 90 funds and an appropriation for a local match.

None of these projects is currently listed on the TIP. The Town will need to establish priorities for the roads to be rehabilitated, and submit project requests to MassHighway District Office 2, along with any supporting documentation. In all likelihood, MassHighway will ask the Town to bear the cost for design of improvement projects that include components such as widening, installation or upgrades to drainage and stormwater management systems, and the like, beyond basic resurfacing.

Continued and expanded pavement analysis would provide the Town of Athol with valuable information on the condition of its paved road network and would allow it to project future conditions under varying funding conditions. It would also assist the Town in setting repair priorities in the short term. To maintain the PMS and maximize the benefits of the program, the town would need to resurvey its road network on at least a bi-annual basis. The MRPC could continue to provide assistance by analyzing the collected data with the RoadManager software.

The MRPC has the technology and is willing to support and assist with the development of a Pavement Management Program for the communities in its region. Technical support could range from data collection to program analysis. Program costs would be based upon the

individual needs of each community. MRPC is also available to help communities assess the suitability of various pavement management programs to their needs.

The Town of Athol can use the results of a pavement management study to secure funding from grant programs, such as the Small Town Road Assistance Program (STRAP), to assist in reconstructing any problematic paved road network.

## Map: Pavement Conditions for the Town of Athol, 1998

## Congestion Management System

The impetus for developing and operating a CMS began in 1991 with the federal Intermodal Surface Transportation Efficiency Act (ISTEA). In 1995, the National Highway System Designation Act made all of the management systems optional at the state level. However, Montachusett Regional Planning Commission opted to continue development of the CMS to provide a base of information for planning decisions in the development of the region's Transportation Plan and its Transportation Improvement Program (TIP).

The goal of the Congestion Management System (CMS) in Massachusetts is to improve the mobility of people and goods and to improve air quality. CMS covers all person trips, on all modes of transportation, except non-auto trips between MPO regions. Transit services are strategies to reduce congestion on roadways and improve transportation mode-choice. Facilities where transfers occur, such as rail and bus stations and park-and-ride lots, are also included in CMS.

### *Congested Roadway Survey*

MRPC adopted a preliminary definition of congested roadways as those with a volume-to-capacity (V/C) ratio greater than 1.0[6]. The Regional Transportation Model was used as a screening tool, using model-generated link volumes for the base year (1996). The regional model used the QRS II computer software for its forecasting analysis. The model is based on census tract level information for land use and socio-economic data and the roadway network as well as 24-hour traffic volumes. The model identified three segments in Athol that were considered to be potentially congested, as listed in Table 6-10.

Travel time and delay surveys were conducted in 1996 and 1997 to verify roadway congestion on the segments identified by the Regional Travel Demand Model. For the field surveys, the selected roadways were traveled during peak hours to determine areas with delay and the length of stop delay. MRPC found that the road segments in Athol originally identified as potentially congested by the Regional Travel Demand Model had no apparent congestion problems, based on the travel time and delay surveys. The overall recommendation was to continue to monitor the locations, and complete a feasibility study for implementing transit service between Gardner and Greenfield.

The scope of the Regional Model was significantly large and could not incorporate all of the roads in each town. If there is anecdotal evidence on the part of the residents or workers in Town that the roads are congested and they suffer significant delay, the Town may wish to consider a similar study confining the model area to the road network within its corporate boundaries.

[6] The Travel Speed Index (TSI) was calculated by dividing the average arterial speed (as determined by the field survey) by the speed limit. The Level of Service (LOS) was calculated based on Table 11-1, "Arterial Levels of Service," in the Highway Capacity Manual.

**Table 6-10: Potentially Congested Roadways in Athol**

| Arterial | From: | To: | V/C Ratio | Problems / Recommendations |
|---|---|---|---|---|
| Crescent Street | Main Street | Chestnut Hill Avenue | >0.99 | Turning Movement count at Main Street with Chestnut Street from 4:00 to 7:00 PM. Bridgework is planned at Chestnut Hill Ave and Main Street. |
| Petersham Road (Route 68) | Route 2 | Route 2A | >0.99 | None apparent from travel time and delay surveys. Continue to monitor. |
| *Route 2A* | *Orange TL* | *Petersham Road* | *>0.99* | Minor delays at traffic signal in town center. Monitor the segment. Gardner to Greenfield transit study to determine feasibility of implementing transit service. Bridgework planned at Chestnut Hill Ave and Main Street. |

*Source: Montachusett Regional Planning Commission, Regional Travel Demand Model, 1998*

### *Regional Park-and-Ride Facilities*

One approach to improving traffic congestion, air quality, mobility, and accessibility is through the use of park-and-ride facilities. Therefore, park-and-ride programs are an integral component of the intermodal transportation management system in the MRPC region. Park-and-ride facilities provide a common location for individuals to park their vehicles and transfer from a low-occupancy mode to a high-occupancy travel mode, such as carpool, vanpool, bus or rail. Individuals may also walk, bicycle, or get dropped off at these park-and-ride lots.

Exclusive park-and-ride lots exist at the MBTA Commuter Rail Stations located at the Intermodal Transportation Center (ITC) in Fitchburg, at Route 13 and Prospect Street in North Leominster, Main Street and Park Street in downtown Ayer, and Front Street and Benjamin Road in downtown Shirley. Additional parking spaces are required at all rail stations.

Based upon the Commuter Rail Passenger Survey conducted by the MRPC, it would appear that these lots are at capacity. Moreover, there is strong interest on the part of residents of both Athol and Gardner for extension of Commuter Rail Service further west than Fitchburg. Potential ridership demand is estimated to be about 100 riders per day one way. Any such extensions would require development of new park-and-ride sites. These sites would need to provide at least 65 new parking spaces. Estimated additional spaces needed for existing facilities are listed in Table 6-11.

**Table 6-11: Existing Montachusett Commuter Rail Park-and-Ride Lots**

| Station | Location of Parking | Spaces | Vehicles Parked | Problem | Estimated Additional Spaces Needed |
|---|---|---|---|---|---|
| Fitchburg | MART ITC-Lower Main St. | 60 * | 32 | Security | 30* |
| Leominster | 18 Railroad Square | 6 | 6 | Full | 40** |
| | 20 Prospect Street | 45 | 55 | Full | |
| Shirley | Front St. | 45 | 70 | Full | 65 |
| Ayer | 61 Main St. | 65 | 79 | Full | 55 |
| Littleton | Foster St. | 80 | 98 | Full | 160 |

**In 2003, a 380-space parking garage will be under construction and will be available to commuters in 2003.*
***In 2003, a 100-space parking garage will be under construction at Nashua Street in North Leominster.*

In the MRPC region, there are shared-use (that is, private) facilities at Searstown Mall in Leominster and at Twin City Mall in Fitchburg/Leominster where individuals transfer to transit buses, carpools or vanpools. There are official MHD Park-and-Ride signs located on Route 2 eastbound and westbound before the Route 13 exit, smaller Park-and-Ridge signs on Route 13 at Mead Street, after Rt. 2 eastbound exit ramp for Rt. 13 before Haws Street, and at the intersection of the ramp and Haws Street. There are no signs on Route 13 at Haws Street or at the intersection of Haws Street and Searstown Mall entrance. MRPC has proposed that signs be placed at those locations.

### *1990 Journey To Work and Population Growth, 2000*

The bulk of the daily traffic and transit trips is comprised of employed residents traveling to work. An understanding of the origin and destination patterns of these travelers can aid in designing the most cost effective transit services and roadway improvement plans. While looking at the travel patterns in a region as far reaching as from Athol to Greenfield may be wide in scope for a Town Master Plan, transit service delivery is dependent upon having a sufficient market to justify the expense of the service. Therefore it is important to consider the regional market potential when designing Athol's transit services.

The main travel corridor throughout the region is Route 2. The magnitude of work trips that could best be served by transit is the sum of the work trips between Athol, Gardner, Petersham, Phillipston, Templeton, Orange, Erving, Montague, Greenfield, and points east.

The 1990 U.S. Census reported a total of 45,779 employed residents in Athol and other nearby communities, as listed in Table 6-12. Of these residents, over 18,000 (39 %) worked in their home town, over 23,000 (50%) worked in Worcester County, and over 15,600 worked in Franklin County. Few workers in Franklin County communities commuted long distances for their employment, whereas 12,093 employed residents of Montachusett Region communities traveled to Worcester County employment outside their home town. Another 2,064 employed residents commuted to Middlesex County. The number of Franklin County

residents who commuted to employment outside of Franklin County was roughly balanced between Worcester County (1,758) and Hampshire County (1,670).

The Census 2000 Transportation Planning Package is due for release at the end of 2002 or early in 2003. Many changes have occurred in the years since 1990. It would be well worthwhile to update the Master Plan after this data is released, to indicate whether the changes warrant reexamining regional transit service delivery policies or indicate a shift in regional highway management priorities.

In 1990, a total of 45,779 of the residents in Athol and other nearby communities were employed (roughly 44%), as reported in the U.S. Census (see Table 6-12). In 2000, the number of reported employed residents had increased to 81,324 (roughly 73% of the population), an increase of 35,545 new employees (roughly 44%). The shift is indicative of some very real social and economic changes throughout the region, and particularly in the Montachusett Region. Since new employed residents far outpace the increase in population, the trend indicates that more families are two-income families than in the past. Such a change may put a strain on the transportation infrastructure as twice as many work trips may be made, and trips for many other purposes may increase as well.

The value of the update from the Census 2000 Transportation Planning Package will be that journey to work information can be calculated for all combinations of origin town and destination town (and for that matter, origin Census tract to destination Census tract). The paths of these origin/destination pairs can be over-laid onto a representation of the highway network to see where the greatest volume of highly traveled links are located. Transit service can then be designed to serve these high volume paths.

## Table 6-12: Journey to Work within Athol and Other Nearby Communities, 1990

| Place of Work | Home Town | Within Massachusetts | | | | | | | | Within New England | | Outside New England | Total Workers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Worcester County | Franklin County | Middlesex County | Suffolk County | Essex County | Hampshire County | Hampden County | Other MA Counties* | Vermont/ NH | Conn,/ RI/ Maine | | |
| **Worcester County** | | | | | | | | | | | | | |
| Ashburnham | 409 | 2,044 | 31 | 395 | 26 | 24 | | | 5 | 82 | 13 | 7 | 2,627 |
| Athol | 2,518 | 3,680 | 537 | 180 | 39 | 76 | 90 | 58 | 12 | 58 | 18 | 13 | 4,761 |
| Gardner | 3,769 | 7,307 | 53 | 702 | 47 | 56 | 25 | 25 | 52 | 128 | 19 | 18 | 8,432 |
| Hubbardston | 136 | 1,121 | 4 | 164 | 7 | 4 | 2 | | 15 | 9 | 9 | | 1,335 |
| Petersham | 157 | 442 | 34 | 19 | 12 | 7 | 7 | 4 | | 2 | 5 | | 532 |
| Phillipston | 57 | 550 | 24 | 64 | 4 | 5 | 3 | 5 | | 11 | 3 | 2 | 671 |
| Royalston | 45 | 371 | 38 | 38 | 6 | 4 | 2 | 2 | 2 | 17 | | | 480 |
| Templeton | 768 | 2,534 | 29 | 213 | 24 | 27 | | 7 | 5 | 53 | 8 | | 2,900 |
| Winchendon | 1,303 | 3,206 | 19 | 289 | 53 | 15 | | | | 292 | 12 | 8 | 3,894 |
| Subtotal | 9,162 | 21,255 | 769 | 2,064 | 218 | 218 | 129 | 101 | 91 | 652 | 87 | 48 | 25,632 |
| **Franklin County** | | | | | | | | | | | | | |
| Erving | 124 | 41 | 542 | * | * | * | 40 | 24 | 9 | 23 | 2 | 0 | 681 |
| Greenfield | 5,715 | 20 | 7,345 | * | * | * | 499 | 362 | 158 | 196 | 27 | 43 | 8,650 |
| Montague | 1,111 | 67 | 2,910 | * | * | * | 673 | 138 | 30 | 41 | 24 | 2 | 3,885 |
| New Salem | 75 | 107 | 180 | * | * | * | 82 | 23 | 16 | 3 | 5 | 2 | 418 |
| Northfield | 512 | 20 | 777 | * | * | * | 73 | 14 | 6 | 21 | 2 | 6 | 919 |
| Gill | 144 | 29 | 1,157 | * | * | * | 83 | 23 | 40 | 130 | 22 | 5 | 1,489 |
| Orange | 1,083 | 1,308 | 1,487 | * | * | * | 127 | 54 | 274 | 21 | 22 | 10 | 3,303 |
| Warwick | 65 | 90 | 192 | * | * | * | 10 | 1 | 6 | 29 | 0 | 0 | 328 |
| Wendell | 85 | 76 | 283 | * | * | * | 83 | 20 | 6 | 4 | 0 | 2 | 474 |
| Subtotal | 8,914 | 1,758 | 14,873 | 0 | 0 | 0 | 1,670 | 659 | 545 | 468 | 104 | 70 | 20,147 |
| **Total** | **18,076** | **23,013** | **15,642** | **2,064** | **218** | **218** | **1,799** | **760** | **636** | **1,120** | **191** | **118** | **45,779** |

*Source: U.S. Census Bureau, 1990 Census of Population and Housing.*

## Traffic Volumes in Athol

For many years the Montachusett Regional Planning Commission and MassHighway have taken traffic counts at numerous locations in Athol, as part of its regional traffic count program. Data from these locations are used by the State to calculate the background growth in regional traffic volumes for use in evaluating the traffic impacts of local developments. The volumes are also used in analyses of traffic accident ratings and signal warrants. Table 6-13 lists the traffic counts taken over the past 10 years by location.

The counts consist of data collected during a period of at least two consecutive weekdays, which are then averaged to obtain an Average Weekday Traffic (AWT) volume. To reflect seasonal differences in traffic volumes, MassHighway produces seasonal adjustment factors based on data collected at more than 200 statewide locations where traffic volume data is collected 365 days of the year. The seasonal adjustment factors are then applied to the AWT volume to produce an Average Annual Daily Traffic (AADT) volume for the location. The AADT volumes are rounded to the nearest 100 for counts more than 1000 and to the nearest 10 for counts less than 1000. For example, August is a high travel month so seasonal adjustment factors for August will decrease the collected AWT volume. On the other hand, March is a low travel month, so the seasonal adjustment factor will increase the collected AWT volume.

For locations where multiple counts have been conducted, an average Annual Growth Rate (AGR) has been calculated. The average AGR is the average rate of change in traffic volume per year. For instance, there were two traffic counts conducted on Chestnut Street, east of Tremont Street, in 1996 (AADT = 2,900) and in 1999 (AADT = 3,868). The difference between these two traffic counts represents an average AGR of eleven percent (11.0%), but over thirty three percent (33.37%) over the three years. This represents exceptionally high annual growth in traffic, and likely represents regional growth pressure rather than local pressure.

Although the methodology for calculating AADT volumes follows standard procedures, a number of factors should be considered when using the data for the purposes of defining average AGRs. It should be noted that the seasonal adjustment factors reflect seasonal variations averaged from locations throughout the State and do not specifically reflect the variations for each location listed below or even for Franklin County conditions. Additionally, variations in traffic volumes occur depending on which days of the week the data is collected. Generally, traffic volumes are at their lowest on Monday's and steadily increase through the week peaking on Friday's. Therefore, to improve the accuracy of calculating the average AGR, it is important to try and compare counts that have been conducted during the same month of the year and days of the week. Unfortunately, this is not always possible even though the MRPC makes every effort to collect data during a similar time period as the previous counts.

## Table 6-13: Athol Traffic Count Data

| Road Name | Location | Past Year Count | | Recent Year Count | | Average |
|---|---|---|---|---|---|---|
| | | Year | AADT | Year | AADT | AGR |
| Abbott Avenue (Rt 2A & 32) | S. of School St | | | 1996 | 4200 | - |
| Chestnut Hill Avenue | N. of Crescent St | | | 1998 | 2314 | - |
| Chestnut Street | E. of Common St | | | 1996 | 2700 | - |
| Chestnut Street | E. of Tremont St | 1996 | 2900 | 1999 | 3868 | 11% |
| Common Street | E. of Chestnut St | | | 1996 | 380 | - |
| Daniel Shays Highway | (blank) | | | 2001 | 6435 | - |
| Daniel Shays Highway | N. of Partridgeville Rd | 1995 | 5200 | 1998 | 6050 | 5% |
| Daniel Shays Highway | S. of S. Main St (Rt 2A) | 1995 | 7000 | 1999 | 8068 | 4% |
| Hapgood Street | W. of Chestnut St | 1995 | 2800 | 1998 | 3152 | 4% |
| Main Street (Rt 2A) | E. of Crescent St | | | 1995 | 8100 | - |
| Main Street | E. of Exchange St | | | 1997 | 12789 | - |
| Main Street | E. of Pleasant St | | | 2001 | 15027 | - |
| Main Street | N.W. of Pleasant St | | | 2001 | 16622 | - |
| Main Street | W. of Crescent St | 1999 | 13998 | 2001 | 13609 | -1% |
| Main Street (Rt 2A & 32) | W. of Petersham Rd (Rt 32) | 2000 | 13328 | 2001 | 13272 | 0% |
| New Sherborn Road | At Petersham T.L. | | | 1998 | 376 | - |
| North Orange Road | At Orange T.L. | | | 1998 | 323 | - |
| Petersham Road (Route 32) | At Petersham T.L. | 1998 | 1900 | 1999 | 2100 | 11% |
| Petersham Road (Route 32) | S. of Main St (Rt 2A & 32) | 2000 | 2821 | 2001 | 2833 | 0% |
| Pinedale Avenue | At Orange T.L. | | | 1998 | 1959 | - |
| Pinedale Avenue | W. of Exchange St | 1994 | 2700 | 1997 | 2800 | 1% |
| Pleasant Street (Route 2A) | N.E. of Main Street (Rt 2A) | | | 2001 | 3566 | - |
| Ramp on and off Rt 2 West Bound | S. of Templeton Rd (Rt 2A) | 1997 | 2191 | 2000 | 2619 | 7% |
| Route 2 & 202 | E. of Orange T.L. | 1998 | 10123 | 1999 | 10401 | 3% |
| School Street | W. of Main St (Rt 2A & 32) | 1996 | 2900 | 1999 | 3854 | 11% |
| South Athol Road | S. of Batchelder Rd (Rt 2 Underpass) | | | 1997 | 1000 | - |
| South Main Street (Rt 2A) | W. of Daniel Shays Hgwy | | | 1997 | 11460 | - |
| South Street | W. of Exchange St | 1995 | 6500 | 1998 | 6516 | 0% |
| Templeton Road (Rt 2A) | E. of Petersham Rd (Rt 32) | 1998 | 8000 | 1999 | 8456 | 6% |
| Tremont Street | W. of Main St (Rt 2A & 32) | 1996 | 2800 | 1999 | 3300 | 6% |

Several locations in Table 6-13 show high rates of growth. It should be noted that these growth rates are considerably higher than the regional factors calculated by MRPC for regional analysis. The growth factor for the Montachusett Region is 1.77% annually, in rural areas the growth factor is 2.08% and in urban areas the growth factor is 1.67%. These factors are based upon counts taken at 420 locations across the region between 1993 and 1998.

## Traffic Accidents in Athol

Traffic accidents are often unpredictable, unavoidable events. Most traffic accidents are the result of driver error, however, driver error can be magnified by poor roadway or intersection design, or by inadequate traffic control measures. When crashes occur in high numbers at a particular location, there is probably a common reason for the accidents related to the design and/or signage of the road. These accidents can be predictable and the conditions that increase the chances for accidents are often correctable. Detailed study of accident records can identify these high-accident locations and lead to design improvements that will reduce the numbers and severity of future accidents.

All accidents resulting in over $1,000 of property damage or resulting in personal injury or death must be reported to the local or state police and the Massachusetts Registry of Motor Vehicles (RMV) within five days of the accident.[7] The RMV records each of these accidents in a statewide database.

In 1998, the MRPC used RMV data from 1993 through 1995 to identify the most hazardous intersections in the MRPC region for the 2000 Regional Transportation Plan. MRMV recorded 979 accidents in Athol during the period from January 1, 1993 to December 31, 1995. These accidents involved 529 injuries and three fatalities. Additional data for the period from January 1996 through October 2001 came from the Athol Police Department. Since 1995, the Police recorded 1,412 accidents. Of these accidents, 44 were reported to be at intersections, 38 involved pedestrians, and 18 involved bicyclists. During the five-year period, 638 people were injured and 5 people were killed. A comparison between the two periods revealed that the roads with the most accidents remained largely the same, as shown in Table 6-14.

The MRMV rates the severity of accident locations statewide, in an effort to prioritize the locations in need of re-engineering. The rating system awards each location a weight of 1 for each accident, 5 for each resulting injury, and 10 for each resulting fatality. Each location with an accident is considered a hazardous location: the more accidents, injuries, and fatalities the higher the rating, the higher the rating the more hazardous the location. Although none of the Athol accident locations appear on the statewide severity list; on a regional level, accidents in Athol are a priority.

Accidents involving fatalities occurred on six roads in Athol during the eight-year period.

- South Main Street (3)
- School Street (1)
- Hapgood Street (1)
- Main St (1)
- D Street at Main Street (1)
- Chestnut Hill Avenue at Gage Road (1)

In 1995, the town had the fourth highest rating for accidents in the Montachusett Region, preceded by Leominster, Fitchburg, and Gardner. Table 6-14 lists the top twenty-five roads for accidents for the two time periods, excluding accidents that occurred at specific

[7] Massachusetts Registry of Motor Vehicles, Massachusetts Driver's Manual.

intersections. Applying the state's rating system criteria to the entire data set from 1993 through 2001, Table 6-14 also lists the accident hazard rating over the eight years (excluding Route 2).

**Table 6-14: Top Twenty-five roads for accidents from 1993 through 2001**

| Street / Location Names | 1993-1995 | 1996-2001 | Total | Avg Annual | Injuries | Deaths | Rating |
|---|---|---|---|---|---|---|---|
| Main St | 62 | 373 | 435 | 54 | 199 | 1 | 1440 |
| South Main St | 75 | 165 | 240 | 30 | 123 | 3 | 885 |
| South Athol Rd | 31 | 75 | 106 | 13 | 70 | | 455 |
| Chestnut Hill Ave | 42 | 51 | 93 | 12 | 41 | 1 | 308 |
| Exchange St | 47 | 42 | 89 | 11 | 34 | | 259 |
| Crescent St | 40 | 29 | 69 | 9 | 31 | | 224 |
| Freedom St | 26 | 31 | 57 | 7 | 11 | | 112 |
| South St | 20 | 36 | 56 | 7 | 29 | | 201 |
| Partridgeville Rd | 26 | 28 | 54 | 7 | 27 | | 189 |
| Daniel Shays Highway | 18 | 32 | 50 | 6 | 33 | | 215 |
| School St | 13 | 35 | 48 | 6 | 15 | 1 | 133 |
| Pleasant St | 19 | 22 | 41 | 5 | 16 | | 121 |
| Brookside Rd | 23 | 15 | 38 | 5 | 35 | | 213 |
| Hapgood St | 18 | 18 | 36 | 5 | 21 | 1 | 151 |
| Chestnut St | 17 | 17 | 34 | 4 | 28 | | 174 |
| Pinedale Ave | 9 | 20 | 29 | 4 | 13 | | 85 |
| Templeton Rd | 6 | 19 | 25 | 3 | 13 | | 90 |
| Petersham Rd | 13 | 11 | 24 | 3 | 17 | | 109 |
| White Pond Rd | 8 | 16 | 24 | 3 | 14 | | 94 |
| Sanders St | 5 | 17 | 22 | 3 | 16 | | 102 |
| W Royalston Rd | | | 21 | 3 | 8 | | 61 |
| Pequoig Ave | 11 | 9 | 20 | 3 | 8 | | 60 |
| New Sherborn Rd | 9 | 10 | 19 | 2 | 9 | | 64 |
| Silver Lake Park | 0 | 19 | 19 | 2 | | | |
| Cottage St | 8 | 7 | 15 | 2 | | | |
| Bickford Dr | 13 | 1 | 14 | 2 | | | |
| Ridge Ave | | | 10 | 1 | 11 | | 65 |
| Walnut St | | | 10 | 1 | 10 | | 60 |
| **Total Accidents** | **559** | **1098** | **1698** | **212** | **832** | **7** | |

*Sources: Massachusetts Registry of Motor Vehicles Accident Database 1993-1995; Athol Police Department Accident Database 1996-2001; Montachusett 2000 Regional Transportation Plan.*

By far, Main Street, South Main Street, and South Athol Road are the roads with the greatest frequency of accidents and the highest severity ranking. On Main Street and South Main Street alone, at least 75 accidents occurred at intersections in the eight-year period. This may be due to the significant volume of traffic. The total daily volume of Main Street traffic in 2001 was 13,500. Two Main Street intersections were ranked among the 25 highest accident locations in the Montachusett Region in 1995: Exchange Street at Main Street was rated 134 out of 927, with 18 accidents, 44 injuries and no fatalities. Crescent Street at Main Street was rated 117 out of 927, with 17 accidents, 32 injuries, and no fatalities. Table 6-15 lists the locations and number of accidents occurring at Main Street intersections. Of these locations, only Main Street at Exchange Street and Main Street at South Main Street are signalized.

The remaining Athol intersection accident locations are listed in the Transportation Resources Appendix.

**Table 6-15: Accidents Occurring at Main Street Intersections, 1993-2001**

| Street / Location Names | # of Accidents | Street / Location Names | # of Accidents |
|---|---|---|---|
| Main St & Exchange St | 10 | Main St & South Main St | 2 |
| Main St & Crescent | 7 | Main St & Spring St | 2 |
| South Main St & Bickford Dr | 7 | South Main St & Mt Pleasant St | 2 |
| Main St & Canal St | 6 | Main St & Bearsden Rd | 1 |
| Main St & Chestnut Hill Ave | 6 | Main St & Common St | 1 |
| Main St & Mechanic St | 4 | Main St & Freedom St | 1 |
| Main St & School St | 4 | Main St & Kennebunk St | 1 |
| Main St & Central St | 3 | Main St & Lake Ellis Rd | 1 |
| Main St & Petersham Rd (Rt 32) | 3 | Main St & Old Main St | 1 |
| South Main Street & Brookside Rd | 3 | Main St & Raymond Pl | 1 |
| Main St & Chestnut St | 2 | Main St & Summer St | 1 |
| Main St & Green St | 2 | Main St & Union St | 1 |
| Main St & Pleasant St | 2 | South Main St & Roosevelt Ave | 1 |

*Sources: Massachusetts Registry of Motor Vehicles Accident Database 1993-1995; Athol Police Department Accident Database 1996-2001; Montachusett Regional Planning Commission, 2000 Regional Transportation Plan.*

The data obtained from the police department is insufficient for accident pattern analysis. Many of the records lack information that pinpoints the location along the roadway. To further pinpoint these locations and determine the causes of the accidents, the accident reports should be investigated and analyzed. Further investigation might reveal a greater rate of occurrences at intersections or a pattern of accidents related to on street parking maneuvers, and lead to recommendations for design improvements to reduce the frequency of accidents and improve the safety of the road.

## Level of Service (traffic volumes to capacity)

The Highway Capacity Manual provides a general methodology for calculating the Level of Service (LOS) for rural two-lane highways. "Level of Service is a qualitative measure describing operational conditions within a traffic stream, generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience and safety."[8] For two-lane highways, LOS is a function of average travel speed, percent time delay and capacity utilization. The Highway Capacity Manual methodology calculates capacity thresholds to reflect these three conditions. Under ideal conditions a two-

[8] Transportation Research Board, Highway Capacity Manual, 1997.

lane highway has a capacity of 2,800 passenger cars per hour (pcph), in both directions. These ideal conditions are:

- Design Speeds greater than or equal to 60 mph
- Lane widths greater or equal to 12 ft.
- Clear shoulders greater than 6 ft.
- No "no passing zones" on the highway
- All Passenger cars in the traffic stream
- A 50/50 directional split of traffic
- No impediment to through traffic due to traffic control or turning vehicles
- Level terrain

The capacity is adjusted down from 2,800 pcph for each roadway segment based on the variations from the above ideal conditions. The resulting capacity thresholds reflect the maximum traffic volume that will maintain the flow conditions for the each of the LOS levels A though F described below:

- LOS A - signifies a road section where motorists are able to drive at their desired speeds (approaching an average of 60 mph in ideal conditions); delays incurred by slow-moving vehicles occur less than thirty percent (30%) of the time; demand for passing is well below capacity; and almost no platoons of three or more vehicles are observed.
- LOS B - signifies a road section where delays incurred by slow-moving vehicles occur up to forty-five percent (45%) of the time; average speeds in ideal conditions exceed 55 mph; demand for passing required to maintain desired speed approximately equals the passing capacity; and the number of platoons forming in the traffic stream increases significantly.
- LOS C - signifies a road section where delays occur sixty percent (60%) of the time; average speeds under ideal conditions exceed 52 mph; demand for passing is in excess of passing capacity; platoons are prevalent, commonly chaining together; and although the traffic flow is stable, it is becoming susceptible to congestion due to turning and slow-moving vehicles.
- LOS D - signifies a road section where the two opposing traffic streams essentially begin to operate separately as passing becomes extremely difficult; average speeds under ideal conditions approach 50 mph even though platoon sizes reach between five and ten vehicles; motorists incur delays up to seventy-five (75%) of the time; and turning or slow-moving vehicles cause major shock waves in the traffic stream.
- LOS E - signifies a road section where speeds under ideal conditions drop below 50 mph and are much lower under less than ideal conditions where passing becomes virtually impossible; delays are incurred greater than seventy-five percent (75%) of the time and "platooning" becomes intense as slower vehicles or other interruptions are encountered.
- LOS F - signifies a road section where traffic demand has exceeded capacity resulting in heavily congested flow.

In general, it is desirable to maintain traffic conditions at a LOS C or better.

The LOS provided by a roadway is determined based on the peak hour traffic volume recorded along the studied segment.

## Intersection Assessments

In recent years, the town conducted two studies for improvements to Main Street. One is a signal warrant analysis of Main Street at Pleasant Street. The other is a design improvement study of Main Street that included reviews of four intersections.[9] Two of these intersections are listed as Main Street accident locations. The report at the twenty five percent design stage did not address specific safety related issues.

## Signal Warrant Analysis: Main Street at Pleasant Street

The recent opening of the Athol/Royalston Middle School on Pleasant Street one mile south of Main Street prompted concerns for safety at the intersection of Main Street (Rt. 2A & 32) and Pleasant Street due to the increase in traffic. The town of Athol requested the Montachusett Regional Planning Commission (MRPC) to perform a Signal Warrant investigation at this location.

Main Street at Pleasant Street is an unsignalized T intersection with one travel lane on each of the three approaches. Pleasant Street intersects Main Street at a curve, resulting in sight distance problems for the vehicles traveling west on Main Street and attempting to turn left onto Pleasant Street.

The Manual on Uniform Traffic Control Devices (1994), published by the U.S. Department of Transportation, provides a procedure to test whether installation of a signal is warranted. The analysis requires an engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location. The procedure includes eleven warrants that assess existing operation and safety at the study location against a set of standard criteria as defined in Table 6-16.

MRPC collected twenty-four-hour counts of the traffic volume on each of the 3 intersection approaches in 15-minute intervals; as listed in the Appendix. The peak hours of travel were between 3:00 and 5:00 PM. Manual turning movement counts (TMC) were conducted from 7:00 to 9:00 AM and 3:00 to 5:00 PM.

Using the Highway Capacity Software, the MRPC analyzed the capacity under existing conditions. The analysis indicated a queue length for Pleasant Street traffic during the AM peak hour (7:00 to 8:00 AM) of less than 1 vehicle, with a delay of 11.2 sec/vehicle (LOS B). Minimal numbers of left turning vehicles on Main Street westbound result in LOS A. During the PM peak hour (3:30 to 4:30 PM) the Pleasant Street queue is 14.5 vehicles and the delay is 236.7 secs./vehicle indicating that the Pleasant Street approach operates at LOS F. Again,

[9] Earth Tech, Basic Design Report: Main Street (Routes 2A and 32).

the low volume of left turns on Main Street, westbound, result in LOS A for the westbound approach.

MRPC also evaluated the traffic safety conditions of the intersection. According to the Athol Police Department, 11 accidents occurred at the intersection between July 1996 and November 2000. Six accidents resulted in injuries to 6 people. In seven cases, the pavement was dry and the weather conditions were clear or overcast. Four accidents occurred in the evening peak, three occurred in the morning peak, and four occurred midday. Two accidents occurred in January under winter rainstorm/ice storm conditions *(See Table 6-17)*. The data shows a pattern of rear-end accidents for westbound vehicles on Main Street. Sight distance problems may leave drivers unprepared for vehicles attempting to turn left waiting for gaps in the Main Street through traffic eastbound.

## Table 6-16: Manual on Uniform Traffic Control Devices – Signal Warrants

**Warrant 1 - Eight-Hour Minimum Vehicular Volume** - For an intersection with one-lane approaches on both major and minor streets, the minimum volume required to satisfy the warrant is 500 vehicles per hour (vph) on both major approaches and 150 vph on the higher volume minor street approach over an 8-hour period.

**Warrant 2 - Four-Hour Vehicular Volume** – The warrant is satisfied when for each of any 8 hours of an average day, the traffic on a single lane major approach and a single lane higher volume minor approach exceed 750 and 75 vph respectively. The traffic volume on the major street is so heavy that traffic on a minor intersecting street suffers excessive delay or hazard in entering or crossing the major street.

**Warrant 3 - Pedestrian Volume** – The warrant is satisfied when the average daily traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

**Warrant 4 - School Crossing** – In cases where a significant number of school children cross the major street of an intersection at an established school crossing, a gap study is done to find the frequency and adequacy of the gaps in the traffic stream compared to the number and size of the school students crossing the major street. A minimum of 20 students must cross the street during the highest crossing hour. Implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing should be considered before installing a traffic signal.

**Warrant 5 - Coordinated Signal System** – Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

**Warrant 6 - Crash Experience** – The warrant is satisfied when five or more accidents of types correctable by traffic signals, each involving personal injury or property damage, have occurred within a 12 month period, and the road has an existing traffic volume of not less than 80% of the required volumes for warrants 1 and 2.

**Warrant 7 - Roadway Network** - Installing a traffic control signal may be warranted at the intersection of two or more major routes to encourage concentration and organization of traffic flow on a roadway network. This warrant is applicable when the total entering volume is at least 1,000 vehicles during the peak hour of a typical weekday, or each of any five hours of a Saturday or Sunday.

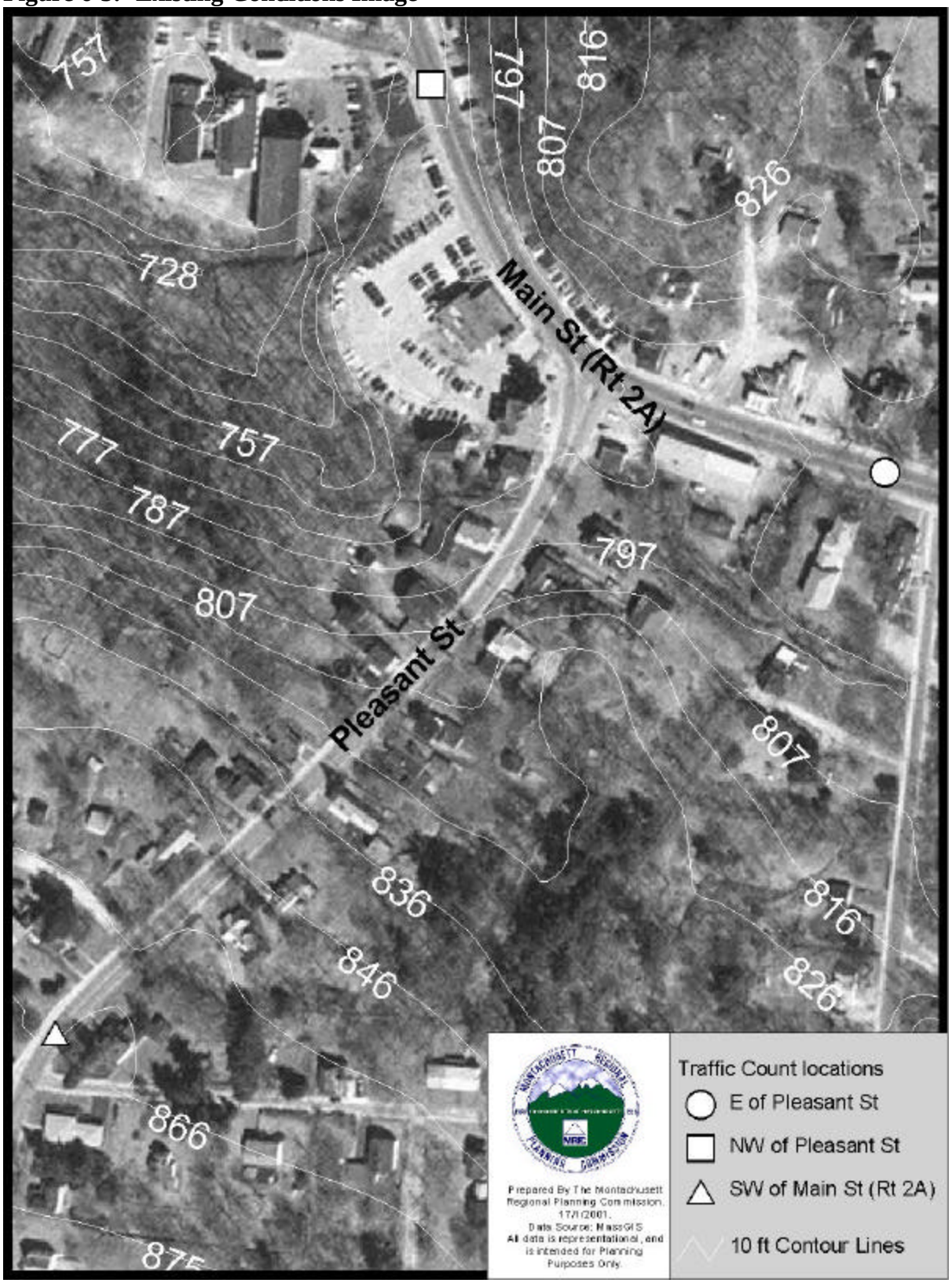
**Warrant 8 - Combination of Warrants** – In some cases, signals may be warranted if 80% of the minimum values of both warrants 1 and 2 combined are satisfied. This translates into 400 vph for the major street and 120 vph for the minor street, for warrant 1, and 600 vph for the major street and 60 vph for the minor street, for warrant 2. These volumes are met for 6 hours for warrant 1 and 13 hours for warrant 2.

**Warrant 9 - Four Hour Volumes** - The four hour volume warrant is satisfied when, for each of any four hours of an average day, the vehicles per hour on the major street (total of both approaches) and the vehicles per hour on the higher volume minor street approach all exceed the threshold defined in the MUTCD for the existing combination of approach lanes.

**Warrant 10 - Peak Hour Delay**– The peak hour delay warrant is satisfied when for one hour of the day, minor street traffic under stop control suffers undue delay in entering or crossing the major street. This occurs when the total delay equals or exceeds four vehicle-hours for a one-lane approach and five vehicle hours for a two-lane approach, and the minor street approach volume equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and the total peak hour entering volume equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches.

**Warrant 11 - Peak Hour Volume** - This warrant is satisfied when the total vehicles per hour on the major street and the vehicles per hour on the higher volume minor street approach for the peak hour of an average day exceed the threshold defined in the MUTCD for the existing combination of lanes. The peak hour volume on the minor street traffic suffers undue delay in entering or crossing the major street.

**Figure 6-3: Existing Conditions Image**



## Table 6-17: Accident Information

| Date | Time | First Street | Second Street | Injuries | Type of Accident | Collision With | Accident Manner | Weather Condition | Surface Conditions |
|---|---|---|---|---|---|---|---|---|---|
| 7/17/96 | 5:25 PM | Main Street | Pleasant Street | 0 | Property Damage | MVTRAF | Straight | Clear | Dry |
| 1/10/97 | 5:30 PM | Main Street | Pleasant Street | 0 | Property Damage | FIXD | Fixed Object | Snow | Snow, Ice, Slush, Rut |
| 4/7/97 | 6:30 PM | Main Street | Pleasant Street | 1 | Personal Injury | HPED | Straight | Clear | Dry |
| 4/19/97 | 1:14 PM | Main Street | Pleasant Street | 1 | Personal Injury and Property Damage | FIXD | Fixed Object | Rain | Wet |
| 1/3/99 | 2:47 PM | Main Street | Pleasant Street | 0 | Property Damage | FIXD | Fixed Object | Rain | Slippery Surface |
| 7/7/99 | 11:59 AM | Main Street | Pleasant Street | 1 | Personal Injury and Property Damage | MVTRAF | Angle | Clear | Dry |
| 3/17/00 | 2:46 PM | Main Street | Pleasant Street | 0 | Property Damage | MVTRAF | Angle | Overcast | Wet |
| 9/23/00 | 7:21 PM | Main Street | Pleasant Street | 1 | Personal Injury | HPED | Straight | Overcast | Dry |
| 10/7/00 | 8:48 AM | Main Street | Pleasant Street | 1 | Personal Injury and Property Damage | MVTRAF | Straight | Clear | Dry |
| 10/27/00 | 5:38 AM | Main Street | Pleasant Street | 0 | Property Damage | MVTRAF | Angle | Clear | Dry |
| 11/22/00 | 7:33 AM | Main Street | Pleasant Street | 1 | Personal Injury and Property Damage | MVTRAF | Straight | Clear | Dry |
| | | | Total Injuries | 6 | | | | | |

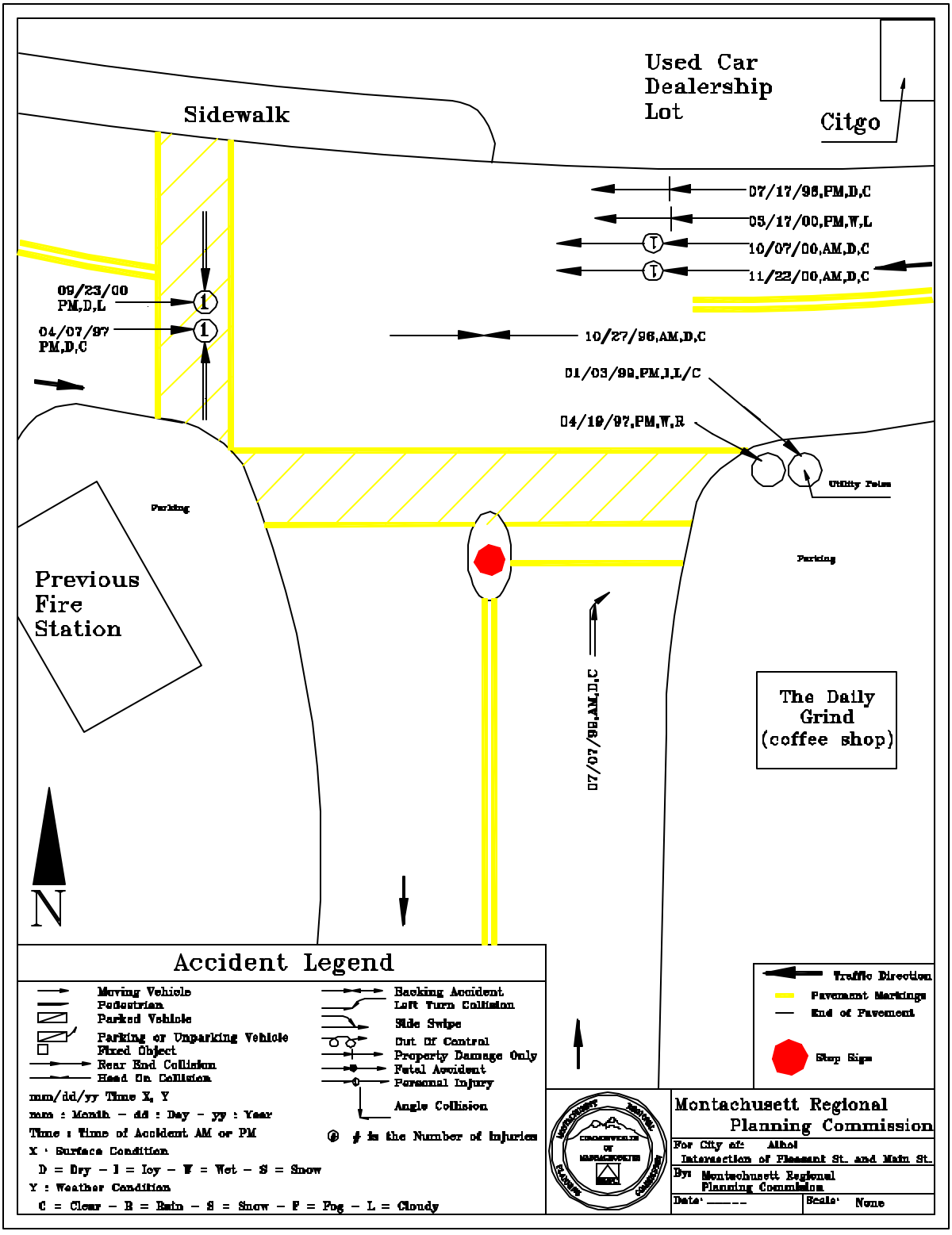
| | |
|---|---|
| MVTRAF | Collision with Motor Vehicle in Traffic |
| FIXD | Collision with Fixed Object |
| HPED | Collision with Pedestrian |

The traffic data and HCS results were applied in the *PC-Warrant* program that corresponds to the MUTCD. Four of the eight applicable signal warrants are satisfied, indicating that the installation of a signal is justified on the basis of traffic volumes. The accident history to date is insufficient to warrant a signal on the basis of safety.

## Table 6-18: Summary of Warrant Analysis for Main Street at Pleasant Street

| Warrant | Outcome | Met Warrant |
|---|---|---|
| Warrant 1 - Minimum Vehicular Volume | Minimum volumes not met. | |
| Warrant 2 - Interruption of Continuous Traffic | Satisfied - Volumes exceeded major and minor street thresholds. | Yes |
| Warrant 3 - Minimum Pedestrian Volume | No data | |
| Warrant 4 - School Crossing | No Established School Crossing | |
| Warrant 5 - Progressive Movement | No coordinated signal system. | |
| Warrant 6 - Accident Experience | Only 3 correctable accidents. | |
| Warrant 7 - System Warrants | Pleasant Street is not a major route. | |
| Warrant 8 - Combination of Warrants | Volumes < 80% of Warrant 1 threshold. | |
| Warrant 9 - Four-Hour Volumes | Total vph exceeds the 4 hour threshold. | Yes |
| Warrant 10 - Peak Hour Delay | Minor Street total delay and volume exceeded thresholds. Peak hour intersection volume exceeded thresholds. | Yes |
| Warrant 11 - Peak Hour Volume | Peak hour volumes on the major and minor approaches exceeded the threshold. | Yes |

## Figure 6-4: Collision Diagram



MRPC evaluated four alternatives for redesign of the intersection; to examine how other possible scenarios might impact the intersection operation without installing a traffic signal.

1. Make Pleasant Street 2 lanes, one lane for left turns and one for right.
2. Make Pleasant Street 2 lanes, and add a left turn lane on Main Street (Westbound).
3. Make Pleasant Street 2 lanes, and add a right turn lane on Main Street (Eastbound).
4. Make Pleasant Street, Main Street Westbound, and Main Street Eastbound all 2 lanes.

Alternatives 1, 2, and 3 significantly improved the queue length and delay conditions on Pleasant Street. Alternative 4 is the most beneficial, decreasing the delay on Pleasant Street by 150 sec/vehicle. Since the intersection has adequate pavement widths it is possible to implement any of the improvements. However, in spite of the benefits, left turns on Pleasant Street continue to operate at LOS F.

A basic design with a signal was tested using Alternative 4. This alternative included 2 lanes in each of the 3 directions, and the installation of a fully actuated signal, with total cycle length of 60 sec. The analysis showed a significant improvement for Pleasant Street left turns (LOS C), making the overall operation of the intersection significantly better for everyone.

Although a traffic signal is justified, installation costs would be greater than the costs of simple geometric improvements. Athol can request MassHighway to reconstruct the intersection and install a signal through the Transportation Improvement Program (TIP). The town would be responsible for the design, environmental survey and right-of-way cost for the improvements. The DPW brought a warrant before Town Meeting in 2002 to appropriate funding for the signal design, but the Townspeople voted it down due to a lack of funds. At the time a developer had proposed to build a new pharmacy on property at the intersection and people felt that the developer should chip in on the funding for the design. Since Main Street and Pleasant Street are under the jurisdiction of the Town of Athol, the town could, according to state regulations, install a traffic signal without approval from MassHighway, provided that the city or town absorbs all the costs of the installation.

## Basic Design Report: Main Street (Routes 2A and 32)

The Town recently contracted with Earth Tech to develop a basic design report addressed to MassHighway for roadway rehabilitation improvements to the segment of Main Street extending from Petersham Road (Route 32) to the bridge over the Millers River at South Main Street. This two lane Rural Minor Arterial has a pavement width that varies from 44 feet in areas with metered on-street parking to 30 feet in areas with no parking and of the roadway. Metered parking extends from Crescent Street to beyond Church Street. Sidewalks are available over most of the roadway segment.

Proposed improvements include upgrading sections of the existing watermain, pavement reconstruction, cold planning and resurfacing, installation of a stress absorbing membrane layer, storm drainage improvements, installation of new curbing, installation of ADA

compliant wheelchair ramps and crosswalks, and sidewalk reconstruction. The finished project will provide for two travel lanes 11.5 feet wide and two parking lanes 8 feet wide from the Bridge over the Millers River to Crescent Street. Existing "bump-outs" will be either removed or reconstructed. From Crescent Street to School Street the project will provide 2 11.5-foot travel lanes and 2 3-foot shoulders. A new sidewalk will be constructed from Crescent Street to Riverbend Street on the south side, and from the railroad bridge to School Street on the north side. From School Street east to Green Street the westbound travel lane will be 14 feet wide with an 8-foot parking lane and the eastbound travel lane will be 11.5 feet wide with a 3-foot shoulder. New sidewalks will be constructed on each side. From Bearsden Road east to Petersham Road, new granite edging will be installed on the north side of the road. In the process, the numerous drive openings will be defined and consolidated.

Signal equipment to be installed includes a new 8DW fully actuated controller with loop detectors on all approaches at the Exchange Street signal. In addition the project will provide conduit for a future signal at Pleasant Street.

The report included signal warrant, capacity, and accident analysis of four Main Street intersections:

- Main Street at Exchange Street – a four-way intersection with a semi-actuated signal operating as a pre-timed signal.
- Main Street at School Street (west junction) – a T intersection with stop control on School Street.
- Main Street at Crescent Street – a T intersection with stop control on Crescent Street.
- Main Street at School Street (East Junction) – a Y intersection with stop control on School Street.

Earth tech evaluated each of the intersections to determine if traffic signals were warranted under Warrant 1 – Minimum Vehicle Volume, and Warrant 2 – Interruption of continuous traffic. The warrant analysis was based on traffic volumes for conditions as of 1998, and for future conditions in 2008, based on a background traffic growth of one half percent per year.

**Table 6-19: Main Street Basic Design Report Signal Warrant Analysis**

| | 1998 | 2008 | Recommendation |
|---|---|---|---|
| Main Street at Exchange Street | Meets Warrant 1 | Meets Warrants 1 and 2 | Continued Signalization |
| Main Street at School Street (west junction) | Meets Warrant 2 | Meets Warrant 2 | Signalization was not recommended |
| Main Street at Crescent Street | Meets Warrant 1 | Meets Warrant 1 | Continue peak police detail, install conduit for future signal. |
| Main Street at School Street (East Junction) | Does not meet Warrants | Does not meet Warrants | Continue Stop Control |

Earth Tech conducted a capacity analysis for each of the intersections under 1998 existing conditions, post build conditions with 1998 traffic volumes, and post-build conditions with 2008 traffic volumes.

**Table 6-20: Main Street Basic Design Report Level of Service Analysis**

| | LOS (Delay measured in seconds) | | |
|---|---|---|---|
| | **1998 Exist** | **1998 Build** | **2008 Build** |
| **Main Street at Exchange Street** | | | |
| AM Peak Hour | B (7.7) | B (7.7) | B (7.8) |
| PM Peak Hour | B (12.7) | B (12.7) | C (16.0) |
| **Main Street at School Street (west junction)** | | | |
| AM Peak Hour | C (11.4) | C (11.4) | C (12.8) |
| PM Peak Hour | D (25.4) | D (25.4) | E (33.2) |
| **Main Street at Crescent Street** | | | |
| AM Peak Hour | D (20.7) | D (20.7) | E (30.3) |
| PM Peak Hour | F (>60) | F (>60) | F (>60) |
| **Main Street at School Street (East Junction)** | | | |
| AM Peak Hour | B (5.6) | B (5.6) | B (5.9) |
| PM Peak Hour | B (8.5) | B (8.5) | B (9.9) |

The signal system at Main Street and Exchange Street operates satisfactorily under existing traffic volumes and signal timings. Under future traffic volumes, the PM peak hour signal timing will need to be revised. Earth Tech recommended installation of fully actuated control with a new controller and detectors on all approaches.

The two intersections of Main Street with School Street are expected to operate satisfactorily without installation of signals both under existing traffic volumes and under future conditions. No action was recommended.

The intersection of Main Street at Crescent Street operates unsatisfactorily both under existing conditions and under the recommended conditions for 2008. Though the intersection meets signal warrants one and two, the police officer control mitigates the condition, and installation of a signal was not recommended at the time of the report. Further analysis of accident patterns and observations of delays are needed.

At present, the project is listed as a highway reconstruction project on MassHighway's Transportation Improvement Projects list for year 2000 (File # 602151). Anticipated cost for the project is $2 million. The price of the project currently exceeds regional funding targets (both federal and non-federal). If possible, the Town may want to work with the Design Engineer and MassHighway to break the project down into smaller components to phase the project and apportion costs over time. This may make the $2 million cost more palatable.

## South Main Street Bridge Project

South Main Street Bridge is a historic landmark that dates back to 1922, located at the western end of Main Street. The bridge is rated as structurally deficient due to cracking of the concrete arch from long term deterioration of the concrete. As a result of the deficiencies, concrete jersey barrier blocks have been placed on the bridge to constrict the flow of traffic passing over the bridge to stabilize the structural integrity by limiting pressure on the spandrel walls retaining the earth fill over the arch until the bridge can be reconstructed.

Millers River Watershed Team representatives have expressed interest in creating a wildlife passage corridor beneath the bridge deck along the banks of the river when the bridge is rebuilt. Such a corridor should, at a minimum, provide enough room along the river banks to permit wildlife to walk along the edge of the river during low water periods. Millers River Greenway enthusiasts have expressed interest in a bicycle corridor along the river. Their vision is that the wildlife passage corridor would be of sufficient size to permit a walkway below the bridge deck. At present such a feature is not part of the design.

The Federal Fiscal Year 2002-2007 Transportation Improvement Program (TIP) for the Montachusett MPO lists the South Main Street Bridge over the Millers River as a regional priority project eligible for special MassHighway funding targeting the structurally deficient bridge infrastructure in the State. The project is MassHighway File # 601089 Bridge Replacement for Bridge Number A-15-006 Route 2A over the Millers River. Project Expediter at MassHighway is Tracy Wu 617-973-7556. The engineering firm developing the replacement design is T.Y.LIN International and the Project Engineer is James S. Gass, P.E. The current anticipated Project Cost is $1.343 million. MassHighway anticipates reviewing the project on September 21, 2002, and plans to put the project out to bid in the spring of 2003, At present, the engineering design is at the 90% design stage and the consultant has prepared their first bridge submission and 75% Highway Submission.

There are several restrictions that would make redesigning the bridge to include a wildlife and bicycle corridor concept a complicated project. There is a lack of right of way, and a steep embankment on the river at the point of the crossing. Property owners own land right up to the embankment. It would be difficult to obtain the right of way.

The priority in the design effort was to maintain the roadway elevation for the intersection at the west side of the bridge. Given this constraint, the design had to keep the structure depth to a minimum to allow for the passage of water below the structure. To change this would significantly affect the intersection and adjacent properties. The longer the span the deeper the structure must be. One alternative design would be to raise the profile of the roadway to allow for a deeper single span structure. This would impact both the intersection and access to properties on either side of the bridge. Another alternative would be to create a two span bridge by placing a pier in the middle of the river. This would allow for shorter spans which would allow the depth of the structure to remain as designed. Both alternatives would likely require right of way takings for properties adjacent to the bridge.

The consultant is trying to replicate the original arch structure of the bridge. Headroom for bicycles would be difficult to obtain. The path would be under water under conditions other than normal water flow. This could limit the ability to stabilize a bike path. In the past there have been major problems with ice flows. Typically, bridge designs with underlying bicycle paths include a fencing system to provide additional protection to cyclists. Such a fencing system would be an issue in managing the ice flow.

A significant issue in the design process was the River Rat canoe race. Access to the river is afforded at a house with an existing driveway, adjacent to the bridge right of way. The property gives one-day permission, for the canoeists to use the driveway, and the Town wanted to make sure the bridge passage and the driveway would be open during construction. There are also some issues with headroom for the canoeists. The upstream dam releases water on the day of the race to attain a specific flow level. The current arch structure allows sufficient headroom for the canoeists to pass under the bridge. The new structure will be a girder system which doesn't provide as much headroom for the canoeists but it will provide a wider opening that allows more canoes to get through at once.

Greenway planners, environmentalists and the DPW would need to broach the subject of a significant redesign with MassHighway, since the inclusion of these design elements would significantly alter the project, and delay the bridge replacement for a considerable length of time. The redesign would also significantly alter the cost of the project.

From an environmental perspective, road and bridge design should always try to accommodate foot traffic and animal passage to preserve habitat connectivity. Road development is one of the most significant barriers for wildlife passage. Habitat connectivity and wildlife passage should be maintained in road and bridge design whenever possible.

## Map: Earth Tech Basic Design Report: Recommended Improvements

## Parking in the Central Business District

Downtown Athol is the core central business district for most of the retail and service businesses in the nine-town North Quabbin Region, which boasts a population of 35,000 people. The region's major banks, insurance agents, accountants, lawyers, household products businesses and restaurants are clustered in this district. This cluster offers residents a local option for acquiring products and services versus leaving the region for other business district clusters in nearby Keene, NH, Gardner, Greenfield, Ingleside, Fitchburg or Leominster. Successful expansion of the economic base is dependant upon the availability and accessibility of parking. A special opportunity to develop a tourism industry in the downtown area is also dependant upon the supply of parking.

### Existing Supply

The Starrett Company provides parking in several areas to its work force that ranges from 800+ to 1,000 people. The recent economic slump caused the company to scale back its workforce. When the economy improves, Starrett's, Inc. will rehire the laid-off employees. At maximum employment, both employee and public parking in the downtown area is strained. The eight Starrett lots are located primarily on Crescent Street, Fish Street, Lake Street, Island Street and Pequoig Avenue.

Most of the private surface lots, other than Starrett's, are comparatively small, serving between ten and thirty cars. A few of these lots are auto dealership or auto repair lots, and are unavailable for the general public. Businesses that have surface lots include Cumberland Farms, Woody's Diner, and the US Post Office on Main Street, a car dealership on Main Street and Walnut Street, a former supermarket on Exchange Street adjacent to the Millers River, The Athol Savings Bank at Church Street and Exchange Street (these spaces serve the businesses on this block), the Athol Press and the Sterling House Association on Exchange Street, and the Athol Clinton Bank Coop on Exchange Street at Main Street.

Public on-street parking is provided on several streets in the downtown area. While some of this parking is in residential neighborhoods and basically serves the residents, the commercial streets have a total of 188 metered spaces. The Town charges $.05 per 20 minutes from 9:00 AM to 6:00 PM. In most cases the meters have a two hour limit. In addition to the metered spaces, there are three municipal public parking lots that contain a total of 415 spaces. There is no charge for these lots. The downtown area also has 19 public Handicapped Parking spaces, most of which are located in the municipal lots. *(See Table 6-21.)*

Employees of service and retail businesses and the local government use the metered parking spaces in the downtown area. The small employee lot at the Town Hall is severely limited and demand exceeds capacity. The Police Department, housed in the Town Hall, must make use of metered spaces nearby for marked cruisers. Patrons of private and public sector enterprises also use both on- and off-street parking provided by the municipality and the businesses. Employees of manufacturers also use these spaces.

**Table 6-21: Public Parking Supply in Downtown Athol**

| Street Segment/Municipal lot | Metered Spaces | Un-metered Spaces | HP Spaces |
|---|---|---|---|
| Main Street from Crescent to School/Traverse | 19 | | |
| Main Street from School St to Exchange St | 48 | | 3 |
| Main Street from Exchange St to Union St | 27 | | 1 |
| Exchange St South St to Main St | 39 | | |
| South St from School St to Exchange St | 21 | 6 | |
| Traverse St from School St to South St | 24 | | |
| School St near Main St | 4 | | |
| Island St | 3 | 5 | |
| Church St | 3 | 5 | |
| Municipal lot behind Main St, access off Exchange St | | 162 | 7 |
| Municipal Lot at Victory Supermarket/CVS | | 190 | 6 |
| Municipal Garage, access off South Street (above Municipal lot behind Main St) | | 37 | 2 |
| **Total** | **188** | **415** | **19** |

The metered on-street parking spaces on Main Street see frequent turnover during the day. Evening visitors to the YMCA for athletic activities and the town hall for meetings, also seek out these spaces. The "municipal lot", accessed via Main and Exchange Streets, sees heavy use during the day, given its location adjacent to the Victory Market and the CVS. Yet the municipal garage fronting School Street (which parallels Main Street) is usually virtually empty during the day. The cluster of private and public sector uses on Main Street draws the "weight" of the parked vehicles to the north side of the "municipal lot", and away from the "garage", where no dense cluster of businesses exists.

Use of the municipal garage on South Street and the municipal lot below, accessed from Exchange Street, suffers from community perception that the lots are unsafe or closed to the public. The enclosed nature of the property and the scant attention paid to the rear of each Main Street building, contribute to the "feeling" of some residents, patrons, visitors and employees that the lots are unsafe. Though the two lots have lighting, access to Main Street is gained by walking down dark, unlit alleys with no windows, again reinforcing the public perception. The police report that cars have been vandalized upon occasion.

There are a number of physical deficiencies to the two municipal lots, as well. The garage deck is one way in and out, there is no ramp to the lower lot. Pedestrians accessing the upper deck of the lot from the lower lot must use a flight of concrete steps that need maintenance. There is no handicap access between the two lots. Individuals in a wheelchair would have to use the sidewalks on the perimeter of the block. Beneath the upper deck the parking spaces are dark, and there is a feeling of deterioration that makes drivers wary of parking there. Most patrons of the YMCA prefer to park near School Street, and some have said they would go out of their way to avoid these two lots.

These two lots would benefit from a comprehensive redesign that takes into consideration a number of objectives. First, both lots would benefit from improvements tailored to wheelchair access. Providing an elevator or direct access to South Street from the lower lot

would aid all patrons. Second, a redesign of the garage structure to include an auto ramp may improve the utilization of the structure.

A façade improvement program for the businesses around the lot could open up Main Street businesses by increasing their appeal from the lower lot. Such a program could also enhance the alleyways by improving the lighting and possibly installing windows in building walls. These features would instill a greater sense of security in the patrons and could also contribute to the economic vitality of the abutting businesses, by creating a pedestrian mall atmosphere. Improved lighting on the lot itself and the introduction of urban furniture, grassed walkways and possibly a shade tree or two would lend the area a park like feeling. This coupled with the façade improvement may make the lot much more desirable.

## Island Street Brownfields Reuse Site

The Town of Athol's Board of Selectmen, Library Trustees and Town Manager wish to acquire a vacant lot located on Island Street somewhat behind the Athol Public Library, to provide space for a proposed expansion of the library (long term) and add to the parking supply for employees and patrons of the town hall and library. The property once housed a multi-story manufacturing building where wallets and other products were made. According to local Assessors records, the building was demolished in 1995.

The Town has several reasons for purchasing the vacant Island Street lot. Converting it to a public use would promote the development of underutilized land, improving the local and regional economy. The removal of contaminants, especially within 100 yards of the Millers River, will remove suspected, threatening contaminants making the area safe for human and wildlife habitation.

With a new lot at Island Street parking will be available for two new employees when the Athol Public Library expands. Parking will also be available for the Town Planner when the Town creates the new position. The creation of additional parking capacity would support employees and patrons of such businesses as the YMCA, Athol House of Pizza, Heritage Insurance and the Athol Credit Union, as well.

MRPC recently hired a consultant to conduct a redevelopment plan for the Island Street lot, funded through the Office of the Attorney General's Brownfields Covenant Program. The project will increase the supply of downtown parking by about forty (40) new parking spaces, and construct the library expansion above the parking lot.[10] The plan includes an open space plan for the downtown district that prioritizes reuse of the riverbank area for recreational purposes.

MRPC staff recently engaged qualified appraisal firms to determine the market value of the Island Street site. Two firms recently completed three appraisals. With these appraisals in hand, the town can commence negotiations with the owners of the lot for eventual acquisition

[10] Montachusett Regional Planning Commission, Draft Comprehensive Redevelopment Plan for the Batchelder Parcel On Island Street, Athol, June 2002.

by the town. Long term, the town wishes to seek grant funds to acquire the site and design and construct a new parking lot. A potential source of grant funds for this project is the Ready Resource Fund (RRF) managed by the Commonwealth of Massachusetts, Department of Housing and Community Development. The RRF grant is Community Development Block Grant (CDBG) program funds under a different name. The use of the CDBG/RRF grant, for this eligible infrastructure and brownfield remediation project, must ensure that at least 51% of the people who benefit through job creation are from households of low- and moderate-incomes, or that slum and/or blighting conditions will be mitigated.

## Potential Parking Demand

A long term goal of area residents is to see a return of passenger rail service to Athol. For some it is viewed with a nostalgic eye that sees the rail era as a better point in time. For others, the dream of the return of passenger rail offers the hope of alleviating a long and tedious commute to employment in the Boston area. For still others, passenger rail is seen as an important linkage for transportation in the region, linking services in the Connecticut River Valley with services in Boston and Central Massachusetts. Such a linkage is viewed as having potential to rekindle the local economy and sparking a fledgling eco-tourism industry. Yet, by today's standards, the return of passenger rail must remain a long term goal, as current population characteristics do not support the costs of providing the service.

Eventually, however, the growth pressure will reach Athol. The wide array of natural resources, opportunities for recreation, low cost of living, comparatively affordable housing stock, overall lack of crime and rural community character, make the Montachusett Region an attractive place to live and continues to grow rapidly. As more people discover the region, it is growing at a pace that is unprecedented. The majority of the new residents are moving from the Greater Boston area, where land and housing prices are out of reach for many families. The eastern half of the region continues to experience growth pressure and is responding with growth management plans. The North Quabbin area has grown much more slowly, likely due to the distance to major employment centers such as Greenfield, Fitchburg, Leominster, and points east. But as the growth is managed in the eastern half of the region, people will seek the North Quabbin region for their homes.

Historically, employment in the North Quabbin area was based in the local manufacturing companies. Today, manufacturing jobs have decreased due to the closing or relocation of traditional industries. In the wake of the industrial decline, the service sector has been growing steadily in the past few decades, as have specialized professional jobs in government, trade, and communications. Many find work in the area's schools as teachers, administrators, and groundskeepers. More and more residents, however, must seek employment in the major employment centers east and west of the North Quabbin region.

Economic leaders are actively working to build a regional tourist economy based upon the valuable natural resources in the region. Both shoppers and business leaders are interested in seeing more stores on Main Street to fill the empty storefronts. As this potential develops, the current parking supply will become a greater issue. In the future, as growth pressures

mount and new residents seek their employment elsewhere, the potential for Commuter Rail Expansion may become viable. When this happens, Athol will need to consider developing more parking facilities to accommodate the commuter parking, so that it does not adversely absorb the parking for the local economy.

## Route 2 Safety Improvement Study

Safety along Route 2 has been a concern for decades. It is a four-lane highway across the majority of Massachusetts, but it drops to two lanes in Phillipston. The highway from Erving west is hilly and winding, has unlimited local access, and at several locations has manufacturing facilities located alongside it.

During the 1960s, Route 2 was widened from two lanes to four lanes between Interstate 495 and Phillipston. The section of Route 2 between the town of Phillipston and the Orange-Wendell town line was reconstructed as a two-lane highway.

Since the 1960s, the state has studied alternatives for improving Route 2 between Phillipston and Greenfield. This segment of the highway is a winding, rolling, two-lane road that runs alongside the Millers River, through the town of Erving. Two options have been considered:

- Widen Route 2 through Erving, (requires significant property acquisition)
- Bridge the Millers River into Orange and build a new road on the south bank of the Millers River, through the Wendell State Forest.

An Environmental Impact Statement dating back to 1982 recommended the south bank alignment as the preferred route. However, neither alternative is viewed as feasible because of unacceptable impacts to Erving Center or the Wendell and Erving State Forests. The two options are highly controversial, and MassHighway opted in the 1990s to take no action until there was local consensus on how to proceed.[11]

In early 1995, the Franklin Regional Planning Board (now FRCOG) sent a letter to Senator Robert Wetmore to establish a public advisory task force and provided recommendations for what to include in the feasibility study.[12]

In September 1995, a Route 2 Task Force, comprised of representatives from Select Boards of affected towns, concerned non-profit groups, and environmental advocates, was formed to address the public participation component of the study. The Task Force was committed to developing a safety improvement plan for the entire Phillipston to Greenfield corridor that would be endorsed by all of the towns along the corridor. Consequently, the Massachusetts Highway Department, the Franklin County Commission (now the FRCOG), the

[11] Route 2 Phillipston to I-91 Greenfield, Unanimous Regional Consensus, June 1995 – a compilation of documents supporting a feasibility study for widening Route 2 from Phillipston to Greenfield.
[12] Ibid.

Montachusett Regional Planning Commission, and the Route 2 Task Force compiled a scope of work for the study.

In May of 1996, Montachusett Regional Planning Commission (MRPC) and FRCOG contracted with Wilbur Smith Associates (WSA) to conduct a detailed operational and safety analysis of traffic conditions on Route 2 between Phillipston and Interstate 91 in Greenfield, and prepare recommendations for safety improvements.

Beginning in July of 1996, WSA conducted extensive data collection and analyses that included traffic volume and turning movement counts, travel time runs, accident data analysis, and capacity analysis. They surveyed the corridor to determine the length and location of the existing climbing lanes, horizontal and vertical roadway alignments, and sight distances from intersecting streets to identify deficiencies in the Route 2 corridor.

WSA presented the information and mitigation proposals at a series of public task force meetings. The Task Force accepted the final report in June of 1997 submitted it to MassHighway for review.[13] WSA concluded that a lack of capacity on the highway is not the cause of the safety problems. They analyzed the capacity of the roadway for the projected traffic volumes to the year 2020, and concluded that there was sufficient capacity through the forecast year. Alternately, a lack of sight distance, tight geometry of the existing alignment of the roadway and ramps, and driver confusion and frustration lead to many of the problems along the corridor.

The study identified a number of general deficiencies along the corridor:

- ***Limited Sight Distance*** - The topography and limited right-of-way makes correcting these sight-distance problems difficult.
- ***Climbing Lanes*** - Only limited areas have climbing lanes.
- ***Entrance and Exit Ramps***. - The tight geometry of the entrance and exit ramps require drivers to reduce their traveling speed from 55-65 mph to 20-25 mph to safely execute the ramps. Most of the ramps have compound curves that are hard to maneuver.
- ***Centerline and Pavement Edge Reflectors*** - Pavement edge reflectors were limited along the corridor.
- ***Rumble Strips*** - Route 2 corridor had no rumble strips along the edge of the pavement throughout the corridor.
- ***Guard Rails*** - Certain areas with steep slopes have inadequate guardrails.
- ***Speed Limits*** - The speed limit varies considerably along the route.
- ***Scenic Pullouts*** - Motorists make abrupt, unexpected exits from the highway when they use several non-designated pullouts to gain access to the river or to enjoy a scenic vista.
- ***Minor Side Streets and Driveways***. - There are numerous residential streets and driveways entering Route 2, especially in Erving and Gill.
- ***Shoulders***. In Erving, the shoulders are either inadequate (less than 4 feet) or non-existent.

[13] FRC, MRPC, Wilber Smith Associates, and the Berkshire Design Group, Final Route 2 Safety Improvement Study Greenfield to Phillipston, June 30, 1997. Mass Highway Contract 96434.

WSA recommended the following improvements for the communities of Phillipston and Athol.

Improvements at the Four Lane to Two Lane Transition Area in Phillipston

- Addition of rumble strips across the two lanes prior to the warning signs to alert the motorist of the impending reduction in the number of travel lanes;

- Addition of seven chevron signs near the merge area, the first set of signs should be placed at 200 feet spacing, and the second set of chevron signs should be placed at 100 feet spacing.

- Addition of a 10-foot-wide unpaved shoulder outside of the existing paved shoulder. This will allow guard rails currently placed at the edge of the shoulder to be moved back creating a wider recovery area. Due to slope requirements this may have an impact on right-of-way needs and wetlands.

Improvements at three interchanges in Athol:

- A new diamond interchange at South Athol Road;

- New auxiliary (climbing) lane at milepost marker 73.0 (approximate);

- Added acceleration and deceleration lanes at the interchange of Route 32 and Route 2 and bridge widening over Route 32; and,

- Improving ramp radii at Route 2A interchange

Based upon input from the Task Force and costs estimates at the time of the final report, WSA ranked the priority of the improvements under one of three implementation phases:

Early Action Improvements - Improvement projects can be readily implemented in a short period of time. In many cases the time period needed to implement these improvements should be minimal and/or primarily a function of procedural matters in completing internal work orders. Costs for most of these improvements are assumed to be within the scope of the typical annual operating and maintenance budget of MassHighway.

Immediate Action Improvements (1-5 years) - These improvements typically require additional time to negotiate, fund, design and construct the recommendations. Most intermediate improvements could be implemented within a 12-month period of time and may be constructed using MassHighway maintenance workers or specialty subcontractors. Improvements include pavement resurfacing and channelization, guard

rail installation and repairs, centerline reflectors, rumble strip installation, construction of additional drainage structures, addition of acceleration and deceleration lanes, coordination of sight line improvements with adjacent property owners, and traffic signal modernization.

Mid-Range Improvements (5-10 years) – These improvements may typically require several years before they can be implemented due to the time necessary to acquire right-of-way or easements, to secure funds from municipal, regional, state, and/or federal sources; and the time needed to conduct feasibility, environmental and/or design studies as may be required by regulatory bodies. These activities include bridge widening, reconstruction or realignments, and preparing plans and specifications.

WSA then established an "order of magnitude" cost estimate for each of the suggested improvements discussed in the report. These order of magnitude cost estimates do not include Right-of-Way acquisition, utility relocation or design costs. The following table was taken from the Final Route 2 Safety Improvement Study report and presents order of magnitude cost estimates for those recommended improvements located within the Montachusett Region only. Improvements for Franklin Regional Council of Governments communities are listed in the full Route 2 Safety Improvement Study.

**Table 6-22: Order of Magnitude Costs Estimates for Route 2 in the Montachusett Region**

| Item | Quantity | Unit | Unit Cost | Regional Cost | Remarks |
|---|---|---|---|---|---|
| **Early Action Improvements** | | | | | |
| Shoulders | 13,400 | L.F. | $100 | - | |
| Center Line Reflectors in Erving | 650 | EA | $20 | - | (1) |
| Rumble Strips | 56 | Miles | $5,000 | $70,000 | (1) |
| Signage, Rumble Strips, in Transition Area | 1 | L.S | $20,000 | $20,000 | |
| Reopening Weigh Stations/Rest Areas | - | | - | Negligible | |
| | | | **Subtotal** | **$90,000** | |
| **Immediate Action Improvements** | | | | | |
| New Passing Lanes | 12,700 | L.F. | $240 | $1,152,000 | |
| Accel/Decel Lanes | 12,800 | Feet | $240 | $1,104,000 | |
| South Athol Road Interchange | 3,800 | L.F. | $500 | $1,900,000 | |
| | | | **Subtotal** | **$4,156,000** | |
| **Mid Range Action Improvements** | | | | | |
| US 202 Bridge | 7,500 | S.F. | $175 | $1,312,500 | |
| Exit 18 | 1,600 | L.F. | $500 | $800,000 | |
| Petersham Rd. Bridge | 10,000 | S.F. | $175 | $1,750,000 | |
| Petersham Rd. Interchange | 1,000 | L.F. | $300 | $300,000 | |
| US 202 Interchange | 1,200 | L.F. | $300 | $360,000 | |
| | | | **Subtotal** | **$4,522,500** | |
| | | | **GRAND TOTAL** | **$8,768,500** | **(2)** |

*Source: Wilbur Smith Associates, Route 2 Safety Improvement Study, June 1997.*
*NOTES: 1. May be completed under MassHighway maintenance contract. 2. Cost Estimates do not include R.O.W Acquisition, Utility Relocation and Design Costs. The Cost Estimates should be increased by approximately 20% to account for these additional costs.*

MassHighway and the Task Force reviewed the final WSA report, and developed a series of improvements for the Route 2 corridor for both the short and long term *(see Table 6-23).*

The short-term phase consists of shoulder widening and installation of "Quick Kurb"® barrier along the centerline of Route 2 from the Athol-Orange Town Line to exit 19 in Phillipston. Route 2 will have a 12-foot travel lane, a 9-foot right shoulder and a 3-foot paved inside shoulder, in each direction. Acceleration and deceleration lanes will be extended and the ramp geometry at Exits 17 and 18 will have improved alignments and better sight distance. New construction will include a climbing lane eastbound from South Athol Road to the just west of Pleasant Street a new truck weigh station and two police pullouts.

**Table 6-23: Route 2 Safety Improvement Projects and Studies, Athol-Phillipston**

| Action | Project |
|---|---|
| Completed | • Installation of variable message board signs.<br>• Resurfacing.<br>• Drainage repairs.<br>• Tree cutting.<br>• Rumble strips and enhanced pavement markings. |
| Current | • Acceleration and deceleration lane improvements at exits 17 and 18 (75% design).<br>• Construction of an eastbound climbing lane from South Athol Road to just west of Pleasant Street (75% design).<br>• Construction of a truck weigh station on the westbound roadway (75% design).<br>• Installation of 2 police pullout areas (75% design).<br>• Shoulder widening (75% design).<br>• Installation of "Quick Kurb" along centerline (75% design). |
| Planned | • Construction of a new interchange at South Athol Road.<br>• Reconstruction of the westbound exit and entrance ramps at the Routes 122, 202, 32, and 2A interchanges.<br>• Improvement of ramp radii and lengthening of acceleration and deceleration lanes near ramp entrances and exits at the Routes 122, 202, 32, and 2A interchanges for the eastbound roadway. |

## Other Route 2 Work Requested by the Town of Athol

Outside of the work of the Route 2 Task Force, and at the request of the Town of Athol, MassHighway has initiated a feasibility study for the construction of an additional 2 lanes of road from the current four lane section in Phillipston to approximately 1 mile west of interchange #15 (Route 122) in Orange. This segment of the roadway is approximately 10 miles in length. Other work which is also being considered is the construction of eight new bridges and one new culvert.

## Bridges

Bridges are a critical component of the roadway network and predominantly come under the domain of MassHighway. The efficient movement of goods and people are reliant upon the condition of these structures. Bridges are regularly inspected and rated according to standards established by the American Association of Highway and Transportation Officials (AASHTO). The AASHTO rating establishes a standard to compare the condition of bridges in a region and across the nation. In general for a bridge to be eligible for reconstruction it must have an AASHTO rating of less than seventy-five (75); and for a bridge to be eligible for replacement it must have an AASHTO rating of less than fifty (50). Bridges may be further classified as "structurally deficient" or "functionally obsolete", which can raise their position on the priority list for reconstruction/replacement.

Bridges are determined to be "structurally deficient" if they fall below specific thresholds. A bridge that is deemed "structurally deficient" may need a vital, but relatively minor, repair or may require more serious rehabilitation. Obviously safety concerns are paramount, so if a bridge requires such a repair to continue safely carrying the volumes and weight of traffic, the "structurally deficient" designation would increase its priority.

Bridges are determined to be "functionally obsolete" when they are inadequate to fulfill the desired function. An example of a "functionally obsolete" bridge would be one that has only two travel lanes, but had a four-travel lane road approaching it. It does not deal with the structural soundness of the bridge itself. Therefore, a determination of "functionally obsolete" is important in that it identifies areas where mobility may be restricted and congestion may be growing, but the bridge is not a safety hazard in and of itself."[14]

Bridges are often susceptible to the geomorphic and hydraulic characteristics of the waterbodies they span. These characteristics affect stream stability and can result in serious scour problems that affect the safety of the bridge. Scouring of the streambed around abutments during flood events can result in bridge failures. Factors affecting bridge failures include stream meandering and the movement of streambed material during turbulent periods such as spring snowmelt and major floods.

The Executive Office of Transportation and Construction (EOTC) and MassHighway maintain a bridge sufficiency list that includes road location, bridge identification number, functional classification of the road, year built, rebuilt date (if applicable), AASHTO rating, and the deficiency status of each bridge. This listing includes culverts, privately owned bridges, state park jurisdiction bridges, pedestrian/bikeway bridges, dummy and permanently closed bridges and railroad bridges. Bridge closings alter traffic patterns by forcing vehicles to find alternate routes, frequently leading through residential streets. The result is increased congestion and pollution, damaged business, and the potential for more accidents. *(See the Transportation Infrastructure Map for the locations of all Athol bridges and the Transportation Resources Appendix for the full bridge listing.)*

[14] Franklin Regional Council of Governments, Erving Master Plan, Transportation Resources chapter.

In 1989, the Federal Highway Administration required states to evaluate the vulnerability of bridges over water to flood damage. To comply with this mandate, MassHighway and the US Geological Survey commenced a project in 1992 to assess the stream stability and streambed scour at all bridges longer than 20 feet.[15] MassHighway used the assessments to prioritize the bridge inventory for addressing scour damage, as listed in Table 6-24. Scour ratings in the Millers River Watershed range from 0.00 to 7.54. A low scour rating means a high vulnerability to scour.

A total of sixteen bridges in Athol have been assessed for scour, as listed in Table 6-24. Four of these bridges are structurally deficient, and two bridges are functionally obsolete. Of these bridge projects, several are projects that appear on the list of functionally obsolete or structurally deficient bridges. The estimated average cost per project was calculated as $917,000, based upon the bridge projects listed within the FFY2001-2006 Montachusett TIP.

MassHighway is attempting to address the structurally deficient bridge infrastructure in the State by targeting funds for their rehabilitation/reconstruction. The funding is independent of the statewide Road and Bridge Program. The Federal Fiscal Year 2002-2007 Transportation Improvement Program (TIP) for the Montachusett MPO lists the South Main Street Bridge over the Millers River as a regional priority project eligible for this funding. The bridge is listed as structurally deficient and has a scour rating of 4.05 (D). The reconstruction project will require $1.343 million of State funding.

The reconstruction of the Chestnut Hill Avenue Bridge (Route 32) over the Millers River is listed as another regional priority project. However, the project is not supported in any current Federal, state or regional budgets and is one of several bridge projects that represent priorities of the Montachusett Region should additional state funding become available. Total cost for the project is expected to be $1 million and will likely be funded as an 80/20 match of Federal and State funds.

Two more bridge projects are listed as priority projects if additional funds become available within the timeframe of the FFY 2002-2007 TIP. These projects are reconstruction of the Crescent Street Bridge over the Millers River and the New Sherborn Road Bridge over Ellinwood Brook. Those projects not advertised will be carried over in subsequent TIPs. Actual federal or non-federal aid funding categories will be determined during the development of subsequent TIPs.

Three more bridges not rated for scour are rated as functionally obsolete. Another ten bridges have both scour ratings and ASSHTO ratings. Among these are three bridges that have either scour ratings or ASSHTO ratings that should place them on the priority list for reconstruction. These bridges are: Washington Avenue over an outlet of South Athol Pond (Scour 1.94), Pinedale Avenue over East Branch Tully River (ASSHTO 50.6), and Daniel Shays Highway over a Lake Rohunta outlet (ASSHTO 73.9).

[15] US Geological Survey, Stream Stability and Scour Assessments at Bridges in Massachusetts, 1997, Open-File Report 97-558.

Contaminants from vehicles and summer and winter roadway maintenance can wash into wetlands and waterways during rainstorms and periods of rapid snow melt. Bridges that span these waterways often contribute significant road related pollutants as runoff drains from bridge decks. Bridge maintenance activities can also contribute pollutants, such as paints, solvents, cleaners and rust.

In an effort to control surface runoff, erosion, and streambed scouring, the US Environmental Protection Agency developed guidance specifying management measures for sources of nonpoint pollution in coastal waters, as required under section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). The guidance establishes management measures for the siting, design, and maintenance of bridge structures so that sensitive and valuable aquatic ecosystems are protected from adverse effects of NPS runoff impacts from bridge decks. Bridge structures should be located in alternative areas where only minimal environmental damage would result.

Measures include minimizing the use of scuppers on bridges, and conveying deck drainage to land for treatment. Scupper drains allow direct discharge of runoff into surface waters below the bridge deck. On bridges with scupper drains, runoff should be treated to reduce pollutant load, and reduction efforts should be applied elsewhere on the project to compensate for the loading discharged off the bridge. Bridge design should account for potential scour and erosion, which may affect bottom sediments and shellfish beds. Bridge decks should be designed to keep runoff velocities low and control pollutant loadings. Runoff waters should be conveyed away from contact with the watercourse and directed to a stable storm drainage system, wetland, or detention pond. Conveyance systems should be designed to withstand the velocities of projected peak discharge. Storm drainage systems should not discharge directly to the watercourse.

## Table 6-24: ASSHTO Ratings and Scour Assessments for Selected Bridges in Athol

| Bridge No. | Serves | Crosses | Functional Class | Year Built | Length (ft) | Scour Rating | Scour Assessment | ASSHTO Rating | OWNER |
|---|---|---|---|---|---|---|---|---|---|
| **Structurally Deficient** | | | | | | | | | |
| A15006 | Route 2A South Main Street | Water - Millers River | Urban Arterial | 1922 | 137.1 | 4.05 | D | 49.8 | MassHighway |
| A15009 | Route 32 Chestnut Hill Ave | Water - Millers River | Urban Minor Arterial | 1850 (Rebuilt 1921) | 109.9 | 4.94 | U | 12.4 | Town |
| A15017 | Logan Road | Water – East Branch Tully River | Rural Local | 1937 | 51.8 | 6.73 | 8 | 36.6 | Town |
| A15030 | Route 2 | Water - Lake Rohunta | Freeway/Expressway | 1955 | 60.0 | 6.59 | 3 | 50.5 | MassHighway |
| **Functionally Obsolete** | | | | | | | | | |
| A15008 | Crescent Street | Water - Millers River | Urban Minor Arterial | 1937 | 77.1 | 7.22 | 8 | 32.9 | Town |
| A15013 | Route 2A Main St | RR - B & M Railroad | Urban Arterial | | | | | | MassHighway |
| A15018 | Route 2A | Water – West brook | Urban Arterial | 1930 | 23.0 | 3.23 | 3 | 77.6 | MassHighway |
| A15033 | Route 2 | Hwy - White Pond Rd | Freeway/Expressway | 1954 | | | | 65.5 | HassHighway |
| A15034 | Route 2 | Hwy - South Athol Rd | Freeway/Expressway | 1954 | | | | 71.9 | MassHighway |
| **Other** | | | | | | | | | |
| A15005 | Washington Ave | Water – South Athol Pond Outlet | Rural Local | 1940 | 30.8 | 1.94 | 3 | 79.5 | Town |
| A15016 | Pinedale Ave | Water – East Branch Tully River | Urban Collector | 1937 | 56.1 | 5.03 | D | 50.6 | Town |
| A15021 | Daniel Shays Highway | Water – Lake Rohunta Outlet | Urban Arterial | 1955 | 71.9 | 5.03 | 3 | 73.1 | MassHighway |
| A15007 | Exchange Street | Water - Millers River | Urban Minor Arterial | 1939 | 154.9 | 5.17 | 8 | 76.3 | Town |
| A15004 | Morgan Ave | Water – South Athol Pond Outlet | Rural Local | 1979 | 42.0 | 5.65 | 8 | 85.5 | Town |
| A15046 | South Street | Water – Mill Brook | Urban Local | 1993 | | 5.65 | | 80.0 | Town |
| A15027 | New Sherborn Rd | Water – Ellinwood Brook | Minor Collector | 1941 | | 6.59 | | 82.7 | Town |
| A15035 | Route 2 | Water - Swamp | Freeway/Expressway | 1954 | 62.0 | 7.22 | 8 | 92.3 | MassHighway |
| A15045 | Canal Street | Water – Mill Brook | Urban Local | 1993 | 22.0 | 7.22 | 8 | 90.2 | Town |
| A15020 | Daniel Shays Highway | Water - Millers River | Urban Arterial | 1935 | 168.0 | 7.54 | 8 | 84.3 | MassHighway |

*Sources: Bureau of Transportation Planning and Development, MassHighway; U.S. Geological Survey, Stream Stability and Scour Assessments at Bridges in Massachusetts, Open File Report 97-558.*

## Rail Service

Passenger rail service does not exist in Athol, however there is freight rail service. Freight rail service in Athol is provided by the Guildford Rail Systems (GRS) a subsidiary of Guilford Transportation Industries (GTI), the largest operator of freight rail lines in the Montachusett region. Their rail service provides connections to an extensive network of freight rail services throughout New England. The line has four stations, accessible by auto or truck along South Athol Road, that serve the downtown commercial and industrial district. One station, the historic Rail Depot, is now used as a base of operations for the Community Transportation Services, a new service providing transit linkages to regional transit services.

### Connections

With the purchase of the Boston & Maine (B&M) in 1983, GTI obtained control of the Vermont and Massachusetts Railroad (V&M), the Freight Main Line (Stony Brook Railroad (SBRR)), and the Springfield Terminal Railway (STR), a B&M subsidiary. The V&M and the SBRR own one track each and they are leased to the B&M. The GTI, through the STR, operates an undisturbed line connecting the Moran Terminal in Charlestown to Mechanicville, New York. Within the region it runs east/west from Ayer to Athol by way of the Fitchburg Main Line and Freight Main Line. In Franklin County, it runs east/west from Athol to Greenfield, through Orange, Erving, Montague, and Deerfield. This rail line runs generally parallel to Route 2 following the course of the Millers River, and is alternatively known as the Vermont and Massachusetts Railroad (V&M). Manufacturers use this line for shipping raw materials and products.

The Freight Main Line (serving Fitchburg, Westminster, Ashburnham, Gardner, Templeton, Winchendon, Royalston, Phillipston, and Athol) and Fitchburg Main Line between Boston and Fitchburg uses tracks owned by the MBTA but permission was granted for the STR to transport freight cargo over these tracks. There is an identified need for better coordination with MBTA to ensure competitive freight rail use of these tracks. West of Fitchburg, the line is owned by the V&M and operated by the Springfield Terminal Railway. Trains operating on the B & M's Freight Main Line (Stony Brook Branch) are able to take an alternate route from Ayer (the Willows) to Boston (Moran Terminal). This route is east of the Freight Main Line (Fitchburg Branch) and connects to Boston via North Chelmsford and Lowell.[16]

Along the Massachusetts northern tier, GTI agreed to combine service with Norfolk Southern (NS) and Canadian National (CN). The GTI and CN service agreement connects the Port of Halifax in Nova Scotia with two intermodal transfer facilities, the Ayer Terminal and the Devens terminal, to accommodate single stack container service. The GTI and NS service agreement allows connection with the NS rail network throughout the Eastern and Midwestern regions of the United States. These facilities serve domestic and international containers, automobiles, bulk freight, and local/regional trucking. This service is restricted to

[16] Source: The Commonwealth of Massachusetts State Rail Plan, 1989; www.csxt.com

"short" double stack container trains (one 9'6'' + one 8'6'' container) or tri-level auto carriers, as well as boxcars and NS triple-crown service (short haul of trailers).

Two freight lines connect the Montachusett region with Worcester. The Providence and Worcester Railroad owns and operates tracks from South Worcester to Gardner through the Gardner Branch. The STR uses freight cars on the B&M's Worcester Route, connecting Ayer with Barre, on a north-south axis. CSX owns and operates the Fitchburg Secondary Track, connecting Fitchburg to Framingham and further east to Boston (Conley Terminal).

In Greenfield the GRS Freight Main line connects with two north south routes (the GRS Connecticut River Main Line and the New England Central (NECR) Palmer Sub), and an east/west north/south connector (the GRS owned Deerfield Loop).

### Regional Needs

In the 2000 Regional Transportation Plan for Franklin County, there is an identified need for transloading facilities. Key conditions that contribute to a good transloading facility include rail access, sufficient length for storage and unloading of trucks, good turnaround space for tractor-trailers, an area for trailer storage, ground storage for some materials, such as lumber, warehousing facilities, good access to the road, and security.

As a means of supporting and encouraging new commercial and industrial enterprises and promoting the vitality of the downtown area, the four rail stations in Athol may offer an opportunity to create a transloading facility that could also serve some of the inter-regional need. This would serve to strengthen the transportation services and assist existing businesses and industries to expand, while providing a needed support for new businesses and industries. Site selection criteria for the siting of a new industrial park should consider access to rail services.

## Transit Service

The 40-mile stretch of the Route 2 corridor between Greenfield and Gardner was without fixed route transit services for many years. In the 1970s, a federally funded program called "Links" provided service in this area, but it was discontinued. In the late 1980s, MART briefly provided service between Athol and Gardner for Mount Wachusett Community College Students. Though the Greenfield-Montague Transportation Area (GMTA) operates several fixed route services in the towns of Greenfield and Montague and the Montachusett Transit Authority (MRTA) provides fixed routes services in the town of Gardner, none of the towns in between had transit services.[17]

In 1999, Congressman John Olver, a member of the House Transportation Appropriations Committee, recognized that much of the North Quabbin region lacked mobility choices, and

[17] Greenfield to Gardner Transit Planning Study, Final Report, June 1999.

that residents were having trouble getting to jobs and accessing medical services. He sought help from Barbara Singleton of the Community Transportation Association of America (CTAA) a group developing a nationwide employment transportation demonstration project and technical assistance program.

Through the coordinated efforts of CTAA, the Montachusett Regional Transit Authority (MART), the Montachusett Regional Planning Commission (MRPC), the Franklin Regional Transit Authority, and the Franklin Regional Council of Governments (FRCOG), a Federal grant was obtained from the Intercity Bus Program to study the feasibility of establishing scheduled bus services for the Greenfield to Gardner area. The agencies contracted Wilbur Smith Associates to conduct the study.

Wilber Smith Associates analyzed the demographics and the existing transit services of the area, comparing them with services in similarly sized systems in Springfield, the Deerfield Valley and the Vermont area. They also surveyed businesses, institutions, transit-service providers and the Chamber of Commerce in the region to assess the schedule and route needs for a potential bus service serving the Route 2 corridor. WSA then examined scenarios for fare structures, service levels, and ridership projections to determine operational costs for the new service.

Communities in the two service areas are economically depressed due to significant manufacturing job erosion over the past several decades. Both Athol and Orange have unemployment rates that are higher than the state and regional averages. The 1990 Census Journey to Work data revealed that over seventy five percent of the employed residents drove to work alone. Over 20 percent of the commuters spent thirty minutes or more traveling to work, and 25 percent worked in counties other than Worcester or Franklin. Many of the residents in the area now commute to distant employment centers in Amherst, Greenfield, Fitchburg, Leominster and eastern Massachusetts.

The Greenfield to Gardner region had a significant percentage of households with no vehicle available. These households included non-driving elderly, and low-income families. The lack of a vehicle limits the mobility of household members, as well as their options for employment, medical care, and shopping.

## G-Link

On October 4, 1999, the two transit authorities commenced a new weekday service called G-Link[18]. The service is a product of the local business community, human service organizations, colleges and educational organizations the two transit authorities, MRPC and FRCOG. The FRTA operates the western portion between Greenfield and Athol, and the MART operates the eastern portion between Gardner and Orange. The two services overlap between Athol and Orange. The Congestion Management/Air Quality Program (CMAQ) funded the services for the first two years of operation. At present the transit authorities are

[18] Franklin Regional Council of Governments, 2000 Regional Transportation Plan.

seeking funding for year three through Access to Jobs funding. After that time the local communities will need to consider funding options to continue the service.

Though limited in scope, G-Link provides weekday fixed-route bus service that connects Greenfield, Erving, Orange, Athol, Phillipston, Templeton, and Gardner via Route 2A, and Gardner, Templeton and Winchendon, via Routes 68 and 202. Five stops are located along Main Street in Athol. The service provides 7 trips each way per day between Greenfield and Athol, and 6 trips each way per day between Gardner and Orange. Between Athol and Orange, the service provides 13 trips per day each way, concentrating service frequencies around the morning, mid-day and evening peak travel periods, and providing one trip each way at around 8:00 PM.

G-Link service connects with fixed route service in Gardner. The Gardner service consists of two loop routes operating clockwise/counterclockwise on an hourly schedule. G-link also connects with express bus service connecting Mount Wachusett Community College and Gardner center with various points in Fitchburg and Leominster, as well as the Fitchburg Intermodal Center. At the Intermodal Center riders can connect with commuter rail service to Boston and points east. The Mount Wachusett College Express runs two trips daily in each direction throughout the school year. Special service to the Intermodal Center runs year round. Table 6-25 lists the ridership characteristics of the G-Link service on a monthly basis over a two year period from October 1999 to November 2001.

## Community Transit Services

In addition to the G-Link service, Community Transit Services (CTS) operates a transit brokerage/provider service out of Athol at the Northern Tier Transportation Center. The service connects local unemployed and under-employed residents in need of transit with available demand-response service for employment trips and human services. The service operates seven days a week and gets people to work on their schedule. It is designed to coordinate with and feed the G-Link services. At present, Community Transit Services, Inc. provides over 2,600 rides a month to residents of the North Quabbin region, which includes the communities of Athol, Gardner, Orange, Phillipston, Templeton, and Winchendon. CTS has plans to expand to Royalston, Petersham, and New Salem in 2003, subject to appropriations.

**Table 6-25: G-Link Ridership Characteristics, FY 2000- FY 2002**

| MART Service | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FY00** | | | | | | | | | | | | | |
| Link Orange | | | | 667 | 757 | 653 | 630 | 776 | 971 | 706 | 738 | 809 | 6,707 |
| Link Winchendon | | | | 213 | 212 | 182 | 128 | 221 | 226 | 215 | 309 | 323 | 2,029 |
| Link Greenfield | | | | | | | | | | | | | |
| **FY01** | | | | | | | | | | | | | |
| Link Orange | 801 | 796 | 987 | 1,065 | 1,127 | 920 | 993 | 991 | 1,018 | 1,158 | 1,149 | 870 | 11,875 |
| Link Winchendon | 313 | 259 | 243 | 330 | 321 | 260 | 331 | 392 | 480 | 390 | 407 | 391 | 4,117 |
| Link Greenfield | 1,060 | 1,126 | 970 | 1,048 | 1,077 | 1,022 | 1,171 | 1,171 | 1,091 | 1,246 | 1,336 | 1,342 | 13,660 |
| **FY02** | | | | | | | | | | | | | |
| Link Orange | 761 | 878 | 875 | 1,009 | 877 | 715 | 727 | 910 | 1,005 | 941 | 787 | 703 | 10,188 |
| Link Winchendon | 433 | 604 | 509 | 625 | 507 | 572 | 567 | 533 | 543 | 461 | 511 | 489 | 6,354 |
| Link Greenfield | 1,342 | 1,242 | 902 | 1,134 | 1,097 | 1,029 | 1,043 | 1,244 | 1,206 | 1,191 | 1,276 | 1,125 | 13,831 |
| **Average Daily Ridership** | | | | | | | | | | | | | |
| Link Orange | 25 | 27 | 31 | 33 | 33 | 26 | 28 | 34 | 33 | 35 | 31 | 26 | 30 |
| Link Winchendon | 12 | 14 | 13 | 15 | 14 | 13 | 14 | 17 | 17 | 14 | 15 | 15 | 14 |
| Link Greenfield | 39 | 38 | 31 | 35 | 36 | 33 | 36 | 43 | 37 | 41 | 42 | 41 | 38 |

The mission of CTS is to identify the "captive" population and meet the needs. They work by coordinating the existing services provided by Councils on Aging, the DMR, Medicaid and similar entities.

The CTS service providers have discussed a number of informational needs that would help them to provide better service to their constituent population. Their consultant, Team, Inc. is helping CTS to understand local perceptions of mobility requirements for quality of life and community growth. The information is necessary to document the need for continued operational funds beyond the initial demonstration project.

They need information on various human services that provide transportation to special needs populations, such as Councils on Aging, Medicaid, and Department of Mental Retardation, to determine whether there are service improvements that can be achieved through consolidation and coordination of the trips each service provides.

Other informational needs include:

1. Census Tract analysis of income/household, cars/family size, Journey to work and mode split to develop strategies.
2. An analysis of population projections, including age cohort trends. He predicts a loss in population from ages 18 through 30 and an increase in the +60 cohort, the +70 cohort, and the +80 cohort.

3. Track the wave of bedroom community phenomena - Where and when does the wave hit the Western part of the region?
4. Who are the major employers within the region and what are the travel patterns from Athol?
5. What are trip purposes of individual potential riders?
6. Where are the catchment areas – those with low incomes and few cars per capita.
7. Identify the special populations in need of services throughout the rural region and what their individual needs are, and coordinate those needs.
8. Map the geographic distribution of those in need of the services.

At present, the Journey to Work data has not yet been released by the U.S. Census Bureau for the 2000 Census. In depth analysis at the level Team, Inc. is hoping for will likely also require conducting a Household-based survey, like those that would be conducted for a regional model. The data will not be available within the time frame of completion of the Athol Master Plan. A separate study of regional needs could possibly be funded through the Executive Office of Transportation and Construction or a combination of other grant programs that address several comprehensive needs at once.

CTS should work with the local communities within its service district to determine its informational needs. It should work with the transit authorities, the Chamber of Commerce, and the local communities to develop a scope for analyzing the data referenced above. Requests for technical assistance must come from through the transit authorities or through Chief elected officials of each community.

The Town of Athol can develop a working relationship with the CTS to develop a scope of work for a planning study to meet these informational needs. The Town should also approach the transit authorities to determine their goals and objectives for meeting the demand.

In addition, various groups coordinating through the Millers River Environmental Center see public transportation as the key to meeting many of their goals and objectives:

- To keep the rural nature of the region and its distinctive sense of place,
- To protect habitat and preserve as much linkage between protected open spaces as is possible,
- To reduce and prevent the creation of impervious surfaces,
- To protect the health of biodiversity by improving the safety of wildlife passage through and increasingly urbanized landscape,
- To revitalize downtown areas.

The North Quabbin Region sees a need to rely on public transportation and the concept of development nodes. These nodes would be places where people can park, congregate, eat, spend the night, access the river, hiking, and biking trails. These environmental groups are interested in creating parking and greenway connections at key access points along the rivers in the region. They would like transit service for these nodes and other ecotourism goals to be included in the categories of service provided by CTS and G-Link.

This idea has the potential to build economies of scale for the success of the transit service, however, a matrix needs to be developed to assess all of the individual needs and measure these against the costs of providing the services to meet the needs. Additional funding sources will likely be required, since there may be limits on who can use the vehicles dictated by the sources of funding. Ecotourism objectives may need to come later in the service development process, once the service routes have been identified the limitations of funding sources are understood.

The Town may want to develop a public/private partnership in identifying funding sources for operating funds for both G-link and the CTS service. As a way to encourage ecotoursim, the Chamber of Commerce may want to hire the transit authorities to provide transit service for new ecotourism ventures.

Finally, the Town may want to consider updating the Master plan as the 2000 Census Transportation Planning Package data becomes available. At present this information is slated for release in the Spring of 2003.

## Intercity Bus Services

Two intercity bus carriers serve the Montachusett and Franklin County Regions, though neither service operates through Athol. Patrons of these services must travel to regional stops in Gardner and Leominster.

Vermont Transit provides intercity service linking Boston, Fitchburg, and Gardner with points north, including Keene, NH, and Brattleboro, Bellows Falls, White River Junction, Ascutney and Rutland, VT. From Gardner, there is one trip toward Boston and one trip north per day. These trips go through Fitchburg Junction (528 North Main Street, Leominster). Boston bound trips leave Gardner at 4:30 pm and arrive in Boston at 6:10 pm. Keene bound trips leave Gardner at 1:10 pm and arrive in Keene at 2:05 pm. G-Link riders who want to connect with this service would need to board trips that arrive in Gardner 20 to 40 minutes earlier to allow themselves time for ticket purchase and baggage transfer.

Peter Pan Bus Company has terminals in Leominster and Greenfield The Leominster Terminal is located at North Main Street Getty, 528 North Main Street, Leominster (Fitchburg Junction). The Greenfield terminal is located at the bus stop in front of Greenfield Town Common. As of this writing, schedule information was unavailable for this service.

These two private intercity carriers may be interested in the efforts of the North Quabbin Ecotourism Task Force to create a tourist industry in the region. It may prove worthwhile to contact these providers and discuss the ridership potential. In the long run it may prove beneficial to the regional mobility along the Route 2 corridor.

## Bikeway Facilities

Increasing concern for air quality and energy conservation is leading to renewed interest in development of adequate facilities for bicycles. Bicycles have found a place on the highway network by default, as have pedestrians. Bicycles mixed with motor vehicle traffic can be dangerous and create traffic delays.

Members of the public strongly support designated bikeways for recreational and commuting traffic. Bikeways are special routes and/or facilities established to facilitate the movement of bicycles as an energy efficient transportation and/or recreation mode of travel. Construction of bikeways will encourage cycle commuting by providing a direct, separate, and safe route between the communities. There are three classifications of bikeways:

**Class I- Bicycle Path**

A completely separated right-of-way designated for the exclusive use of bicycles. Cross-flows by pedestrians and motorists are minimized.

**Class II - Bicycle Lane**

A restricted right-of-way designated for the exclusive or semi-exclusive use of bicycles. Through travel by motor vehicles or pedestrians is not allowed. However, vehicle parking may be allowed. Cross-flows by motorists and pedestrians to gain access to driveways, parking facilities, parked vehicles, bus stops or associated land use, is allowed.

**Class III - Bicycle Route**

A shared right-of-way designated by signs placed on vertical posts or stenciled on the pavement. The bikeway shares its through-traffic right-of-way with moving motor vehicles and pedestrians.

At present there are no formal Bicycle facilities in Athol. However, plans do exist to introduce bicycle/pedestrian paths to the town as part of a regional system. In addition, there are plans for a bicycle path between Athol and Orange. MRPC anticipates that these bikeway projects will be funded through the Transportation Enhancement Program.

### 1997 Regional Transportation Plan Proposed Bikeway System

- Route 2A: This proposed bikeway follows the corridor of Route 2A from the Ayer/Littleton Town Line across the region to the Athol/Orange Town Line, connecting Athol, Phillipston, Templeton, Gardner, Westminster, Fitchburg, Lunenburg, Shirley, and Ayer via a cross-regional route. Future funding needed for the Route 2A bikeway is $270,901 for the design and $3,036,339 for its construction.

- Route 32 Corridor: This proposed bikeway follows the corridor of Route 32 from the New Hampshire line to Petersham where it connects with the Quabbin Reservoir Loop via Athol center. Future funding needed for the Route 32 bikeway is $118,932 for the design and $1,333,027 for its construction.

## Miller's River Greenway

The MRPC approved Transportation Enhancement funds for a proposed six-mile trail that will connect the downtowns of Athol and Orange and other Greenway trails in Worcester and Franklin counties. The Millers River Greenway trail is envisioned as a safe, non-motorized transportation route that will serve as an outdoor classroom for several of the schools in Athol and Orange. As of 1997, design of the Millers River Greenway was expected to cost $43,222.

The main trail runs along East River Street, Partridgeville Road and South Athol Road with three accessory trails and three spurs. The accessory trails are short paths or connections within the Greenway. All accessory trails would be constructed using a natural surface and would be intended for pedestrian use only. These trails have been identified as follows:

- A1 – Cook's Cove: This 1000-foot accessory trail would branch north off the main trail just west of Partridgeville Brook, and would access the fishing areas on the slight ridge above the north side of Cook's Cove.

- A2 – Green's Ridge: This accessory trail would be a 200-foot short loop off the main trail on the steep ridge west of the sewage treatment plant and would access a fine scenic view of the river.

- A3 – Athol Riverfront Park: This 3500-foot accessory trail would loop roughly around the perimeter of the trailhead park in Athol, and would provide river access and a boat-launching site.

The spurs are multi-purpose connections to destinations and other trails outside of the Greenway, serving pedestrians and bicycles in both directions. Two of the three spurs would link population and retail centers on the north side of the river and the third would access a high school. They are:

- S1 – Mahar High School: This spur would branch off the main trail at the East end of the section co-aligned with the sidewalk on East River Street and head south. It would run roughly parallel with Route 122 for approximately 1 mile to the high school.

- S2 – West Brookside Road: This spur would branch off the main trail north and cross the river, passing the north edge of the trailer park just east of Shingle Swamp Road. From there, the spur would meet Brookside Road and the bridge that crosses the railroad tracks.

- S3 – Cass Meadow Crossing: This spur would branch off the main trail, crossing the Miller's River at the railroad bed and following the bed until the Route 202 & Brookside Road intersection.

A number of interesting bike routes through the area are represented in the recently published Central Massachusetts Bicycle and Road Map and Bed and Breakfast Guide by Rubel Bike maps. This map should play a prominent role in marketing the tourism potential of the region. In addition, both the Mohawk Trail and the Johnny Appleseed Trail are documented in tourism information maps. Athol is not well represented in either of these guides. The Chamber of Commerce may want to explore ways to increase the presence of Athol businesses on both of these publications.

## Pedestrian Network

The sidewalk network extends throughout downtown Athol. Sidewalk repair is a priority for the DPW, however a lack of funds constrains their efforts. Top priorities include Pequoig Avenue, South Main Street, and Allen Street. Additional needs and opportunities exist, as well.

For example, senior citizens (over 65 years of age) typically require access to public transportation, delivery services and health care. Elderly individuals often prefer passive recreational facilities such as senior centers, community gardens, parks, walking paths, and fishing areas that are relatively close to home. Yet members of this age group rely on small fixed incomes that limit their ability to afford property tax increases. These townspeople would benefit if the Town could focus on the construction and improvement of more pedestrian-friendly sidewalks in the neighborhoods, and the downtown business district.

Findings of the ADA 504 Self-Evaluation survey for the Athol Open Space and Recreation Plan indicate that the community does not adequately address the recreation needs of handicapped residents. Although Athol launched serious efforts to make the Town's public buildings handicapped-accessible, recreation and conservation lands are largely out of reach to this special interest group. An inventory of facilities at the Bearsden Conservation Area, Silver Lake and Lake Ellis revealed that access to these areas is very limited. Now that public buildings are accessible, the Town should extend its commitment to accommodate the recreation needs of handicapped residents by making at least one beach and one trail at the Bearsden Forest Conservation Area accessible.

In the 2000 Open space and Recreation Plan Survey, respondents hope to see the construction of improved sidewalks for walking/ jogging, the creation of multi-purpose trails for hiking, biking and cross-country skiing, the development of family picnic areas, and the establishment of neighborhood parks and gardens.

Athol is rich in unique features that make the town attractive for recreation, such as the Millers River, Silver Lake, Lake Ellis, Lake Rohunta, the Bearsden Conservation Area,

Petersham State Forest, Cass Meadow Conservation Area, and the Millers River Wildlife Management Area.[19,20] By building on Athol's existing resources and capitalizing on the town's proximity to recreational amenities at Tully Mountain, Harvard Forest, Birch Hill Dam, Lake Dennison, and the Quabbin Reservoir, tourism can help sustain the local economy, provide increased opportunities for self-employment, and enhance Athol residents' pride in their community. One way to do this is to focus on the pedestrian linkages between the local and regional resources.

The North Quabbin Chamber of Commerce is actively promoting and publicizing the regional tourism potential for its nine member communities. The New England Forestry Foundation, the Millers River Environmental Center, the Athol Bird and Nature Club, and the Millers River Watershed Council are all working together to support the development of the tourism potential. Together, these organizations are working together to implement a set of strategies that will build on the natural resource advantages of the region. One strategy is to improve the infrastructure that will support the tourism potential. To this end, planners are seeking to create pedestrian linkages between the major local and regional tourist attractions.

## Banks of the Millers River

The Millers River Watershed Council, in collaboration with the Millers River Greenway, is facilitating a recreational and alternative transportation route between Athol and Orange. The proposed Millers River Greenway Trail will extend from Athol Center to Orange Center along the southern bank of the Millers River, and will provide an important hiking and biking linkage for the two communities connecting with the recently established Tully Mountain Trail, and the Tully Loop Trail.

This project incorporates the Millers River Environmental Center as a gateway and trail-head as well as a walking trail from the Center out to the Millers River through nearby Cass Meadow that is owned by the Division of Fisheries and Wildlife. An interpretive trail brochure will explain the environmental significance of the Millers River and the Cass Meadow flood plain and recharge area, and the historical significance of Millers River Crossing Point I, located at Cass Meadows, and other Indian sites.

A recently completed Downtown Open Space Plan, developed in conjunction with the Bachelder Lot Reuse Plan, recommended creating additional riverfront linkages within the urban center. Such linkageS could include trails that connect the Greenway Trail to Silver Lake and Sportsman's Pond. Athol's Greenway Committee is actively working towards making the greenway a reality by encouraging area landowners to place conservation restrictions on their property.

Potentially, the trail could also include linkages to Lake Rohunta, Gates 31 and 35 on the Quabbin Reservoir, and three State Forests in Petersham. Inside Quabbin gate 35, at the end of South Athol Road off Route 122 in New Salem, an old railroad bed is a favorite trail for an

[19] Athol Conservation Commission, "Land and Waters" booklet.
[20] Athol Bicentennial Commission "Athol History Trail" booklet.

easy hike to the edge of the expansive Quabbin reservoir. Currently, there are no trails linking these features, only back roads. There is some discussion of a bicycle component taking advantage of South Athol Road in the long range project to construct a new interchange at South Athol Road, however, this project is subject to the outcome of environmental review for a project to widen Route 2 to a four-lane divided highway through Athol and Orange.

There are well-maintained trails in the Bearsden Woods Conservation Area in Athol, including a steep trail to the crest of Roundtop (elev. 1,278 ft.), where there's a great view of Mt. Monadnock. Visitors can reserve Paige's Cabin for overnight stays while they enjoy the Bearsden hiking trails. While there, hikers and mountain bikers can enjoy several points of interest such as the Deep Cut, Millers River Crossing Point II, (a Native American Site near where the old Lewis Bridge crossed the Millers River), Indian Cornfield, located east of Round Top Mountain, the Newton Reservoir, the Mud Hut Colony, and the Sunday Walls.

Perhaps potential exists for a pedestrian bridge over the Millers River to link the Bearsden Conservation Area trails with Gulf Road in the Millers River Wildlife Management Area. Such a linkage would make possible pedestrian connections to the Birch Hill Wildlife Management Area, the Tully Trail, Tully Lake Reservation, Doane's Falls, and Spirit Falls.

Tully Lake Recreation Area, on the East Branch of the Tully River in Royalston, Massachusetts and on Route 32 just north of the Athol line, is part of a network of flood control dams on tributaries of the Connecticut River. The recreation area near the dam offers hiking and biking trails, fishing sites, campsites, a small playground, picnic tables, grills, and a boat ramp. There's a rustic campground off Doane's Hill Road at the Tully Lake Recreation Area in Royalston that welcomes canoeists. In the winter, Tully Lake is used for ice fishing and cross-country skiing. The lake can be enjoyed from canoes, kayaks, and motorboats up to 10 horsepower.

There is a hiking and biking trail that travels around the upstream flood control area. Another hiking trail travels around the lake and up Lawrence Brook to Doane's Falls, a spectacular cascade. The Trustees of Reservations maintains a newly developed 20 mile loop trail that follows the East Branch Tully River up through Royalston and over to the Warwick State Forest then back down through Orange along the West Branch Tully River and over Tully Mountain back to the Tully Dam.

The Tully Lake trails and the Bearsden Conservation trails would benefit from improvements to the downtown pedestrian network and from marketing to illustrate the connections.

Petersham State Forest consists of four parcels of land totaling one hundred and fifty-eight (158) acres located on the Petersham border off New Sherborne Road. They are satellite sites to the Otter River State Forest. The property is used primarily for timber harvesting, wildlife habitat management, and extensive recreation including hunting, hiking, and bird watching. There are no formal recreation facilities on site.

Nearby are the one hundred and fifty five-acre Whitney/Hamlet Properties in South Athol, the site of a new Municipal Equine Center. The Board of Selectmen recently authorized a nonprofit equestrian group to pursue a State grant for $300,000 to buy the land, which when added to existing Town-owned property and, possibly, abutting Petersham land, will be developed into the largest equestrian center in New England. A network of trails will serve equine and a variety of human activities, including cross-country skiing and hiking. The property is relatively isolated from other recreational attractions in Athol and the Eco-Tourism proponents may want to explore options for improving pedestrian and bicycle access.

## Regional Transportation Plan

Approval of federally assisted transportation projects is contingent on a federally certified comprehensive, cooperative and continuing transportation planning process administered by the Metropolitan Planning Organization (MPO). Transportation projects and plans must be included in a Regional Transportation Plan in order to receive federal funding for implementation.

The planning process reflects federal, state and local policies, detailed technical data and analysis, and public participation. The Montachusett Joint Transportation Committee (MJTC), a citizens' advisory committee, acts as a liaison between officials and residents of Montachusett communities and the MPO. The Athol Board of Selectmen appointed Phil King as their representative to the MJTC.

The 2000 Regional Transportation Plan for the Montachusett Region was developed based upon requirements established within the Intermodal Transportation Surface Efficiency Act (ISTEA) of 1991 and continued in TEA-21. ISTEA, and subsequently TEA-21, places responsibility for prioritizing transportation projects with the Metropolitan Planning Organizations (MPO's), offering local municipalities input in setting local priorities, and strengthening their role in planning transportation improvements that directly affect them.

Any priority projects for which Athol wishes to obtain federal funding must appear in the Regional Transportation Plan. In 2003, Montachusett Regional Planning Commission will begin development of the next Regional Plan Update. The Town should review the list of recommendations of this chapter and determine a list of priorities for federal funding. Through the MJTC, Athol can coordinate on transportation projects of regional significance that will be incorporated into the Regional Transportation Plan and the Transportation Improvement Plan.

The Regional Transportation Plan identifies both the short and long-range priorities for transportation and air quality improvements. It presents alternatives and makes recommendations that reinforce the goals and objectives for regional development. Within the legislation, specific requirements for transportation planning have been established. Sixteen (16) factors must be considered in the development of the plan. These factors are:

1. Preservation of existing transportation facilities and, where practical, ways to meet transportation needs by using existing transportation facilities more efficiently.
2. Consistency of transportation planning with applicable Federal, State, and local energy conservation programs, goals, and objectives.
3. The need to relieve congestion and prevent congestion from occurring where it does not occur.
4. The likely effect of transportation policy decisions on land use and development and the consistency of transportation plans and programs with the provisions of all applicable short and long-term land use and development plans.
5. The programming of expenditures on transportation enhancement activities (such as bicycle and pedestrian facilities) as required in the appropriate sections of the legislation.
6. The effects of all transportation projects to be undertaken within the metropolitan area, without regard to the source of funding.
7. International border crossings and access to ports, airports, intermodal transportation facilities, major freight distribution routes, national parks, recreation areas, monuments and historic sites, and military installations.
8. Connectivity of roads within metropolitan areas with roads outside of these areas.
9. Transportation needs identified through the use of the management systems.
10. Preservation of rights-of-way for construction of future transportation projects, including identification of unused rights-of-way which may be needed for future transportation corridors and identification of those corridors for which action is most needed to prevent destruction or loss.
11. Methods to enhance the efficient movement of freight.
12. The use of life cycle costs in the design and engineering of bridges, tunnels, or pavement.
13. The overall social, economic, energy, and environmental effects of transportation decisions.
14. Methods to expand and enhance transit services and to increase the use of such services.
15. Capital investments that would result in increased security in transit systems.
16. Recreational travel and tourism.

Additional requirements for the preparation of long-range transportation plans include:

- an inventory of all transportation facilities that should function as an integrated transportation system
- forecasting/planning for a twenty (20) year time period
- a financial plan that demonstrates how the long-range plan will be implemented
- assessing capital investment and other measures necessary to both preserve the existing transportation system and ensure its maximum efficiency
- indicating, as appropriate, proposed transportation enhancement activities such as the construction of bicycle and pedestrian facilities

The Clean Air Act Amendments (CAAA) of 1990, require the Regional Transportation Plan to include an air quality analysis of identified projects and demonstrate how the plan will work to achieve National Ambient Air Quality (NAAQ) standards. This can be a selling point for projects the town wishes to develop.

The RTP is a continually evolving document. The current plan is a revision to the 1997 MRPC Regional Transportation Plan and its subsequent 1999 Addendum. As additional projects and recommendations are developed through various sources, the Montachusett MPO can incorporate needed and desired changes through an amendment to the RTP.

## Recommendations

- Work cooperatively with other communities in the North Quabbin Region, particularly in development of the CTS/G-Link Services. Ensure inclusion on the agendas of the Montachusett Joint Transportation Committee.

- Continue support for Route 2 improvements, and participation on the Route 2 Task Force, including planning for the South Athol Road interchange.

- Participate in the MassHighway feasibility study requested by the Athol Select Board to evaluate the need for and feasibility of widening Route 2.

- Analyze traffic accident data for accidents on Main Street to determine the patterns and causes. Incorporate accident mitigation solutions into the design of the Main Street Improvement Project.

- Consider working with the Design Engineer and MassHighway to break the Main Street Improvement Project down into smaller components to phase the project and apportion costs over time.

- Consider developing a pavement management system to assess existing pavement conditions and plan for needed maintenance and repairs while obtaining the maximum life with cost effective investment.

- Seek financing for needed roadway and sidewalk repair for Athol's existing local roads. Examples could include Enhancement funds, public/private partnership projects, CDBG for eligible areas.

- Canvas local residents for perceptions of roadway congestion. Consider conducting travel-time and delay surveys if residents indicate there is congestion. Monitor the segment of Route 2A (Main Street/South Main Street) from the Orange Town Line to Petersham Road.

- Conduct an Assessment of Stormwater / Meltwater Drainage Design. Include the following components.
  1. Investigate stormwater management design on roads nearest water bodies to determine if the design is effective or deteriorating, or in need of upgrade.
  2. Determine discharge points for existing stormwater management systems. If stormwater discharge directly to waterbodies, consider redesigning to redirect water for filtering before discharging to receiving waters.
  3. Investigate areas showing scour and siltation for evidence of habitat loss and road/vehicle related chemical residue.
  4. Conduct water quality monitoring to assess potential impacts from storm water run off and snow melt.
  5. Devise a management plan and determine costs of improving storm water/melt water design using best management practices as described by EPA, DEP, Mass Highway.
  6. Investigate unpaved roads under Town jurisdiction to assess level of storm water impact and implement best management practices for unpaved roads.

- Explore the potential of the Rail Stations on the Freight Main Line (Vermont and Massachusetts) to serve as a regional transportation loading facility to support economic growth goals and revitalize the downtown district.

- Analyze the market segments and potential demand for CTS and G-Link services when the Census Transportation Planning Package is made available in December, 2002.

- Update relevant sections of the Master Plan when the Census Transportation Planning Package is released in FY 2003.

- Explore financing options for continuing and developing CTS and G-Link services to serve Eco-Tourism objectives.

- Encourage the North Quabbin Ecotourism Task Force to contact Vermont Transit and Peter Pan Bus Company and discuss the ridership potential of eco-tourist industry in the North Quabbin Region.

- Explore financing options for installation of signal systems at Main Street/Pleasant Street, and Main Street at Crescent Street, which will improve pedestrian safety and provide gap opportunities for side street traffic.

- Encourage the State to further investigate the structure, function, and scour ratings of key bridges in Athol, and to make these bridges a funding priority.

- Improve the supply of parking by acquiring the Bachelder Lot on Island Street.

- Examine the feasibility of revitalizing the Municipal Parking Garage and parking lot south of Main Street adjacent to the garage.

- Acquire appropriate properties in the downtown area to establish additional public access points to the Millers River that meet the criteria of the Public Access Board to create parking for between four to six cars and safe access in and out of the waterbody. Assign a responsible authority willing to maintain the site (e.g.: Town Department of Public Works).

- Make the neighborhoods, especially the downtown, more pedestrian-friendly through the construction and rehabilitation of sidewalks. (Department of Public Works, ongoing) Incorporate current design standards for ADA compliance.

- Recruit volunteers, including the boy scouts, to improve facilities in the Bearsden Conservation Area. A low-impact loop trail, additional picnic areas, privies, and a metal observation tower at the Round Top summit would enhance recreational opportunities there. (Conservation Commission, ongoing)

- Work with neighboring communities and regional entities to establish a regional trail network that would ultimately link Athol to recreational opportunities in Orange and Petersham. (Greenway Committee, ongoing)

- Evaluate the potential future transportation infrastructure requirements illustrated by the recent EOEA Buildout Analysis to determine the impacts on future town budgets, and the capacity of future tax revenue to accommodate this level of development. Adjust Town Zoning Bylaws and subdivision regulations accordingly (for example: reduce frontage requirements and increase Open Space set asides to encourage infrastructure friendly development patterns).