



Freight Movements





FREIGHT MOVEMENTS

Introduction

An efficient and cost effective system that allows for the movement of freight and services is essential to the economic vitality of the Montachusett Region and Massachusetts. All aspects or components of a transportation network work together in the delivery of these goods. From rail and highways to airports and seaports, maintaining these systems to insure an effective and efficient network produces benefits that often reach beyond the borders of a region and a state.

The Commonwealth has developed the *Massachusetts Freight Rail Plan* (September 2010) which “provides a comprehensive evaluation of the Commonwealth’s freight transportation system, its operations, and its effect on economic development and quality of life.” This chapter will review freight and goods movement from the overall state perspective through the *Freight Plan* as it relates to the Montachusett Region as well as an examination of regional issues and concerns. The *Freight and Rail Plan* can be found at the following website: www.massfreightandrailplan.com.

Massachusetts Freight Plan

The Massachusetts Freight Plan was completed in September 2010 and encompasses all modes of freight within the Commonwealth. A multi disciplined consultant team, examined conditions, issues, policies and impacts to and associated with the economic development and quality of life for the state.

Statewide Goals

Within the context of MassDOT policies and initiatives, the following goals were identified for the Freight Plan:

- Infrastructure – Promote the preservation and improvement of the freight system infrastructure in all modes
- Operations – Facilitate appropriate freight system capacity and redundancy, enhance operational efficiency, and achieve a balanced mix of capacity and connections across all modes
- Economic Development – Facilitate freight transportation system improvements, policies and investment strategies that will enhance economic development opportunities and manage consumer costs
- Environment and Quality of Life – Ensure that the freight system preserves the environment and contributes to the quality of life in Massachusetts



Existing Conditions – Massachusetts Freight System

The Massachusetts freight system is a critical connection of highway, rail, sea and air infrastructure that maintains an economy that in 2006 “employed approximately 122,000 people ...producing \$13.7 billion in economic output.” Massachusetts also consumes more goods than it exports and as a result “the volumes of freight shipped within, through, and out of Massachusetts are significant and are expected to continue growing.” (Massachusetts Freight Rail Plan)

Massachusetts Highway Infrastructure

The majority of freight in the state (as well as the Region) travels by truck, thus an efficient and viable highway network is critical to the economical movement of goods. According to the *Freight Plan* “Massachusetts currently has a 7,058-mile system of Interstate highways, state highways, and arterial roadways that connect all major cities and freight facilities. The highway system in eastern Massachusetts is focused on serving the Boston metropolitan area with two major east-west routes (I-90 and Route 2), three major routes from the north (I-95, I-93, and Route 3) and three major routes from the south (I-95, Route 3, and Route 24).”

For the Montachusett Region the critical roads as identified above would be Route 2, which traverses the entire MRPC jurisdiction and I-190 an interstate highway running north-south from Route 2 to Worcester and I-290 and eventually I-90.

Massachusetts Rail Infrastructure

The rail system in Massachusetts consists of 1,153 miles of tracks that carry both freight and passenger services. The *Freight Plan* states, “Thirteen freight railroads operate in Massachusetts, the largest of which are CSX Transportation, Pan Am Railways, Providence & Worcester Railroad, and New England Central Railroad. These four railroads provide the major rail connections to the national system along three corridors.

- The southern east-west route is provided by the CSX Boston Line which connects to the CSX national system at Selkirk, NY. This is the most heavily used freight rail corridor in the Commonwealth.
- The northern east-west route operates over the Pan Am Railways Freight Main Line connecting to the Norfolk Southern Class 1 rail network at Mechanicville, NY with major rail yard facilities in Ayer and connections to New Hampshire and Maine.
- The most heavily used north-south route utilizes rail owned by both NECR and P&W to connect to the Canadian National rail network through Connecticut and Vermont.
- Short-line railroads such as the Housatonic, Pioneer Valley, Mass Central, and Mass Coastal also provide key freight rail linkages to rail customers from these primary, longer-distance rail corridors.”

Passenger service is limited to Amtrak and the MBTA (Massachusetts Bay Transit Authority). Amtrak operates intercity, long distance services while the MBTA operates a commuter rail



service into and out of Boston. Within the Montachusett Region, the Fitchburg Commuter Rail Line is the MBTA service currently in operation.

Massachusetts Air Infrastructure

Within Massachusetts, Boston's Logan Airport handles all major freight operations. Several smaller airports are prevalent across the Commonwealth but are limited to passenger service exclusively. "Logan Airport moved 218,965 tons in 2007, and has the most domestic tonnage for all of New England...Over \$7.1 million of international air freight leaving Massachusetts departed via Logan Airport in 2007 with \$5.9 million of inbound international air freight handled at Logan." Refer to the *MA Freight Plan* for additional data related to air freight operations.

Trends, Initiatives, and Constraints for Massachusetts

The following section from the *Freight Plan* summarizes various issues and trends identified through the plan development process. For complete information regarding these issues and trends, please see the full MA Freight Plan (www.massfreightandrailplan.com).

Trends

- The growth in freight demand out-pacing other economic and demographic indicators in Massachusetts is consistent with the national trend of global trade increasing as a percentage of GDP.
- An analysis of regional industry concentrations shows that education and health services have a relatively high industry concentration in all regions of the Commonwealth. At the same time, the Pioneer Valley, Central Massachusetts, Southeast, and Northeast regions all show relatively high concentrations in manufacturing sectors relative to the overall U.S. economy.
- (A) manufacturing shift to high-value, low-weight products.
- Large-scale distribution activities are increasingly expanding beyond the Boston metropolitan area. ...Regional distribution facilities that serve New England (are) increasingly located outside of Boston but near the I-495 corridor. Similarly, there are few large (100 acres plus) sites available for freight-intensive activity such as intermodal rail-truck terminals in Massachusetts and are often not located east of I-495. And often the new distribution sites that are developed either lack multi-modal transportation access or are configured without taking advantage of existing rail lines. This trend implies that distribution centers are being located further away from the consumer markets, resulting in longer truck travel to final destinations.
- Freight transportation demand and infrastructure needs vary greatly by long-distance and short-distance goods movement.
- The largest movement of commodities in Massachusetts by tonnage, regardless of direction, is petroleum and coal products. With more than 41 million tons, petroleum and coal products accounts for 14.8 percent of all freight. These energy products are primarily imports to Massachusetts and are a necessary commodity to support the consumption focused economic and residential activity within the Commonwealth. This category is



followed by secondary traffic and nonmetallic minerals, which account for 14.0 percent and 12.6 percent of all movements, respectively.

- Freight volumes are projected to increase by 70 percent by 2030. Growth in Massachusetts as a consumer market, along with significant through traffic and specialized shipping needs of our high value-added economy are projected to result in goods movement growth, notwithstanding the current economic downturn.
- The majority of freight will continue to be shipped by truck. Nationally truck activity accounts for 82 percent of all goods movement on a tonnage basis. In Massachusetts, the truck share of goods movement is even higher at 87 percent.
- Expected growth corridors in freight volumes. Freight moved by trucks is highest on the Massachusetts Interstate system, particularly the corridors moving east from I-84 to I-90 into the Boston metropolitan area. The volumes on I-290 reflect large volumes of through-trips that use that route to connect between I-495 and I-90. In contrast, freight rail volumes tend to be highest in the western half of the Commonwealth and despite fewer shipping routes are significantly smaller than truck volume densities. The lessening freight rail volumes in eastern Massachusetts present a significant challenge in serving consumer markets and businesses as inbound freight rail, especially the intermodal container traffic, transitions from rail to truck to access distribution centers, wholesale trade facilities, and retailers.

Initiatives

Freight related initiatives in the Commonwealth include:

- Massachusetts Accelerated Bridge Program: In August 2008 Governor Patrick signed legislation creating the Accelerated Bridge Program (ABP). Over the next 8 years, nearly \$3 billion in funding will be accelerated to improve the condition of bridges in every corner of the Commonwealth... This program will greatly reduce the number of structurally deficient bridges in the Commonwealth, improve safety, and create thousands of construction jobs on bridge projects. These improvements will also reduce weight restrictions along rail lines which will improve freight movements throughout the region.
- Major Highway Projects: MassDOT is progressing on a number of targeted highway investment projects that will add capacity to the highway system, address key bottlenecks, and improve the flow of freight trucks. These projects include:
 - Widening of Route 128/I-95 from the Mass Turnpike (I-90) to I-93 on the southern side of the beltway.
 - Intelligent Transportation System (ITS) improvements on I-91 in the Pioneer Valley.
 - Replacing the current traffic signal intersection at Crosby's Corner on Route 2 in Concord with a limited access system for continuous traffic flow.
 - Major interchange improvements at I-495 and I-290, I-95 and I-93 north of Boston, and I-495 at Marston Street. Ramp reconstruction projects include I-91 in Northampton and the I-495 South on-ramp from Route 40.
- CSX Transaction: MassDOT and CSX recently announced an agreement to relocate and consolidate the Beacon Park intermodal yard, in Boston, in conjunction with planning to



provide second generation (20'8") doublestack vertical clearance between Westborough and the western border with New York. Second generation double-stack vertical clearance allows for two maximum height intermodal containers stacked together.

- **Pan Am Southern:** Pan Am Railways and Norfolk Southern have partnered to establish the Pam Am Southern (PAS) railroad. PAS operates on the rail lines that include the "Patriot Corridor" that begins in Mechanicville, New York, continuing into northwestern Massachusetts and terminating in Ayer. PAS was formed to provide an improved rail connection in Massachusetts that provides additional options for connections to a Class 1 railroad. Recent track and infrastructure improvements by PAS will provide for 286,000 pound (286k) weight-on-rail capacity between Ayer and the western border with New York. Track speeds will be increased and improvements to the intermodal facilities at Ayer are predicted to increase container traffic handled at that location. The vertical clearance of 19'6" of the Hoosac Tunnel in western Massachusetts will limit intermodal container to single stacked container or double stacked containers with less than maximum height containers.
- **Federal Stimulus Funded Rail Projects:** The 2009 American Recovery and Reinvestment Act (ARRA) led to additional rail funding opportunities in Massachusetts through the High Speed Intercity Passenger Rail (HSIPR) and Transportation Investment Generating Economic Recovery (TIGER) programs. Two rail projects awarded ARRA stimulus funding with freight-related benefits in Massachusetts include:
 - **Knowledge Corridor** – The Federal Railroad Administration awarded MassDOT \$70 million in the first round of the competitive HSIPR program to rehabilitate 49 miles of track and construct two stations for the Vermonter train service in Western Massachusetts.
 - **South Coast Rail Bridges TIGER Project** – Massachusetts was awarded TIGER Discretionary funds to reconstruct three structurally-deficient bridges immediately north of the planned Whale's Tooth Station in New Bedford for the South Coast Rail project.

Constraints

A number of infrastructure issues and constraints were identified within the Freight Plan that could limit "modal choices for shippers and receivers of goods."

- **Freight transportation infrastructure is aging.** Massachusetts' older infrastructure is in need of improvement to continue to accommodate existing freight movements and support the larger, heavier, and more cost-efficient loads that are becoming the standard in the freight industry. Examples include the following:
 - Of 5,018 bridges in the Commonwealth, 2,572 are structurally deficient. The Accelerated Bridge Program will address this challenge and reduce the number of structurally deficient bridges, but there will still be a large number of bridges in need of rehabilitation or replacement.
 - Traffic congestion and delay continues to grow with over 93 million hours of person delay on Massachusetts highways.



- Many of the Commonwealth's freight rail corridors lack either 286k weight-on-rail capacity and/or second generation double-stack capacity – critical capacity factors for competitiveness.
- The Commonwealth's seaports are seeking funding support to deepen the port navigational depths for greater domestic and international shipping opportunities and to improve truck and rail access to their facilities. Greater navigational depth will allow for larger ships at marine terminals which is a competitive factor in today's maritime shipping markets.
- Freight transportation activity often conflicts with other land uses. Implementing regulatory changes with sustained policy incentives to preserve and strategically locate freight activities has been challenging.
- Most freight transportation issues are linked to passenger transportation. Many rail corridors are subject to complex ownership and operation agreements between private freight railroads and public passenger services by Amtrak or the MBTA. This shared usage of tracks presents the challenge of scheduling to avoid bottlenecks, but also provides an opportunity for public-private partnerships to fund improvements. Additionally, the trucking industry is hindered by the same traffic congestion that affects auto traffic in the Commonwealth.

Additional Constraints/Challenges in Massachusetts

Highway and Trucking

- Highway Congestion and Bottlenecks - Trucks are rarely more than 15 percent of traffic volume on Massachusetts highways, and are estimated to be less than 9 percent of all traffic on key Boston metropolitan area highways. Traffic bottlenecks of concern with heavy truck and auto volumes include most sections of I-93, I-90 from Westfield to Boston, sections of I-495, I-290, and I-95 as well as some other select truck bottlenecks near Lee and Pittsfield, along Route 2 near intersections with I-495 and I-190, and sections of Route 3 and Route 24.
- Bridge Deficiencies - Highway bridges in Massachusetts are a critical link in the Commonwealth's highway infrastructure.
- Truck Impacts - High truck volumes impact pavement and bridge conditions, require more energy per ton mile traveled, and result in greater emissions.
- Intermodal Connection - Need for improved "last mile" connections to other modes – rail, air and maritime.
- Truck Route Restrictions - Bridge weight limits, overweight route restrictions, municipally imposed truck bans, and hazardous material restrictions can result in longer truck routes or use of less appropriate roadways.
- Lack of Truck Stop Facilities - Massachusetts has relatively few truck stop rest area facilities (especially in the Central Massachusetts area between I-84 to I-495) and thus the existing ones are over-crowded, resulting in safety and security issues.

**Freight Rail**

- Rail Network - The Commonwealth's rail network represents about 25 percent of the entire network in New England although it carries more than 40 percent of all freight rail moving through New England.
- Rail Impacts - Freight shipped by rail rather than truck can reduce highway traffic congestion, emissions, and pavement impacts.
- Vertical Clearances - Vertical clearance is the envelope of space available between top of rail and the lowest point of an overhead structure of a rail line. Significant attention is now paid to "Second Generation" double-stack intermodal container traffic and the need to clear 20'8" on rail corridors. A key element of the CSX transaction with the Commonwealth is to partner to provide full double-stack clearance from the New York border to Westborough, MA to take advantage of the cost efficiencies of that intermodal container service. Thus, increasing vertical clearances to provide a better networked freight rail system linked to regional and national corridors presents an opportunity to improve the competitiveness of rail in the Commonwealth.
- Weight Restrictions - Over many years, the freight railroads have been transitioning from the traditional standard of 263k weight-on-rail to a heavier gross weight of 286k for individual rail cars. This transition allows for more efficient and cost-effective transportation of heavy bulk goods. Only three railroads in Massachusetts have any significant amount of trackage that is approved for 286k weight-on-rail. Certain limited portions of the Providence & Worcester are rated to carry 286k weight-on-rail cars, and the entire Housatonic Railroad (in Massachusetts and Connecticut) is rated at 286k. The entire CSX Boston Line exceeds the 286k weight-on-rail capacity and is rated to carry cars weighing up to 315,000 pounds, though the secondary tracks (branch lines) are generally rated at 263,000 pounds. The PAS freight main line from Mechanicsville, NY to Ayer will be upgraded to 286k weight-on-rail capacity as part of the Patriot Corridor project. All other railroads in the Commonwealth are currently rated at 263k weight-on-rail.
- Rail Access - Many businesses along rail lines need to build or upgrade the rail sidings that serve them. This infrastructure expense is generally far higher than most highway connections and thus limits opportunities to ship by rail. Development pressures on rail adjacent land have also reduced the potential pool of rail-served businesses and many new industrial sites do not have rail access.
- Shared Use, Rail Congestion, and Competing Demands - Much of the freight rail system operates on corridors that also have commuter and/or intercity rail passenger rail service. Shared use rail operations creates challenges for scheduling and dispatch, safety, and the need for suitable switching and signal equipment. Shared use operations often require investment to install double-tracking and passing sidings for the most heavily traveled routes such as on the Northeast Corridor, Worcester-Boston route and the Downeaster route. The principal conflict with shared corridors comes when the combined use by passenger and freight rail needs exceed capacity. In Massachusetts, current and planned shared use corridors have the ability to provide sufficient capacity for near-term needs on most rail corridors.



Freight Investment Scenarios

Based upon the data gathered and input received, five investment scenarios were developed within the *MA Freight Plan* to address the issues and initiatives identified within the Commonwealth. These scenarios were then evaluated through an extensive cost-benefit analysis. From this analysis a series of project and policy recommendations were developed that seek to establish “investment opportunities with a high expected return on investment and policy issues and recommendations to support a more competitive freight system in Massachusetts.”

In addition, an assumption was made that a “baseline” of planned transportation improvements would be implemented within a five to ten year period. These baseline projects are part of each evaluated scenario.

- Baseline Scenario of Planned Freight Transportation Improvements – CSX east-west double-stack project from the New York border through Worcester to Westborough; the Pan Am Southern Patriot Corridor 286k pound weight-on-rail upgrade; dredging activities to maintain existing depths at key Massachusetts ports; MassDOT acquisition of CSX properties; I-95/Route 128 widening; I-91 ITS improvements; Knowledge Corridor rail improvements on the Connecticut River Line; the South Coast Rail Project; major interchange improvements at I-495 and I-290, I-95 and I-93 north of Boston, and I-495 at Marston Street; ramp reconstruction projects at I-91 in Northampton and the I-495 South on-ramp from Route 40.

The following investment scenarios were developed as part of the *MA Freight Plan*.

- Truck Freight Improvements – Recognizing the continued prevalence of truck and highway-oriented goods movement, this scenario examines major highway capacity expansions throughout the Commonwealth, primarily on the Interstate system, to attempt to accommodate growth in freight truck activity along key corridors. This includes:
 - Capacity improvements are along the major Interstate facilities including I-90, I-84, I-290, I-495, I-95, and I-93.
 - Improvements to key system bottleneck interchanges with substandard operations.
 - Truck access improvements to freight rail yards and seaports.
 - Improvements to the interchanges primarily consist of lengthening and widening ramps, rebuilding bridges and reconstructing existing toll plazas.

Time frame: 2014 to 2024. Estimated costs: approximately \$7.3 billion (\$4.7 billion in present value).

- Northern Tier Rail Improvements – This scenario provides enhanced freight rail corridor connections from the New York border to Ayer, and from Ayer to Maine with emphasis on 286k weight-on-rail and “second generation” double-stack rail capacity upgrades. Such



improvements enhance intermodal operations in Ayer and possibly to Maine, and rail connections to Worcester and Springfield. Specific projects include:

- 286k weight-on-rail upgrades to rail corridors connecting to/from the Patriot Corridor;
- Second generation double-stack clearance (to handle maximum height containers) from Mechanicville, NY to the New Hampshire border via the Patriot Corridor;
- An enhanced intermodal facility in Ayer to facilitate truck-rail transfers of containers.

Time frame: 2010 to 2014. Estimated costs: approximately \$100.6 million (\$89.4 million in present value).

- South Coast Multi-Modal Freight Improvements – This multi-modal scenario examines improvements to port, rail, transload, and highway facilities in Southeastern Massachusetts. Specific improvements are targeted at the Fall River and New Bedford ports to handle increased cargo throughput, with coordinated investment in truck and rail access to/from the ports, 286k weight-on-rail from the CSX Boston Line through the region, and new transload operations in the region. Projects include:
 - Marine terminal facility improvements at the Fall River State Pier and expansion of the New Bedford North Terminal;
 - Navigational dredging projects in New Bedford;
 - Improved truck access to New Bedford via Route 18 and JFK Highway improvements and a reconstructed Route 6 bridge to allow larger ships access to the North Terminal;
 - 286k weight-on-rail capacity enhancements from the CSX Boston Line from Framingham south to the Taunton area; and
 - Other track improvements to Fall River and New Bedford (coordinated with the South Coast Rail project);
 - Expanded transload and distribution center operations in the region to handle, warehouse, and exchange goods between rail and truck.

Time frame: 2010 to 2018. Estimated costs: approximately \$158 million (\$126.5 million in present value).

- Central and Western MA Rail Improvements – This scenario focuses on second generation double-stack and weight-on-rail north-south rail linkages on Pioneer Valley, New England Central, Pan Am Southern, and Providence & Worcester railroad corridors, in addition to improved truck access to intermodal and aviation facilities, and a fullservice truck stop. Improvements include:



- Upgrades to 286k weight and Second Generation double-stack clearance on the northsouth rail corridors in the region (New England Central Railroad and Providence & Worcester);
- 286k weight-on-rail and improved speeds on the Pan Am Connecticut River Line (coordinated with the planned Knowledge Corridor passenger rail improvements);
- 286k weight-on-rail upgrade on the Pioneer Valley Railroad and Housatonic rail corridors;
- Improved truck access to the West Springfield intermodal facility and the Worcester Airport;
- A new truck stop facility along I-90 between Worcester and the I-84 interchange.

Time frame: 2010 to 2014. Estimated costs: approximately \$74.2 million (\$66.1 million in present value).

- **Boston Core Multi-Modal Freight Improvements** – This scenario concentrates on facilitating goods movement distribution in Boston through improvements in, to, and around the Port of Boston. In particular, this scenario includes a major channel deepening project in Boston with supporting truck and rail landside access improvements. Improvements include:
 - A number of roadway improvement projects connecting to the Port of Boston in South Boston including:
 - A one mile dedicated truck haul road for Conley Terminal from Farragut Road to Summer/L Street;
 - Extension of Cypher Street from D Street, across E Street and rejoining with Pappas Way;
 - The reconstruction of E Street to become the primary north-south truck connector for the area south of Summer Street; and
 - New connections between Summer Street and the Massport Haul Road realigning Pappas Way to accommodate a development parcel.
 - A major deep draft navigational project providing greater marine shipping capacity at Conley Terminal and deeper channels near Charlestown, East Boston and Chelsea;
 - On-dock rail preservation for Track 61 providing rail access to the planned bulk cargo facilities at North Jetty;
 - Policy and regulatory initiatives for heavy load truck routing from the Port to inland distribution centers and preservation of freight and industrial land uses near Logan Airport (e.g., Rt. 1A in Lynn) and South Boston.

Time frame: 2012 to 2016. Estimated costs: approximately \$358.4 million (\$286.4 million in present value).

For the Montachusett Region, the Northern Tier Rail Improvements and the Central and Western MA Rail Improvements scenarios would appear to have the most direct impact to freight movement.



Freight Plan Recommendations

Final findings and recommendations within the Freight Plan include projects and policy issues based upon the evaluation conducted. Projects recommendations were based upon their expected return on investment (ROI) while policy issues were based upon how to best utilize the “existing freight transportation system...and to support potential investments.”

High Return Projects

Through the cost-benefit analysis, projects within each scenario were examined to determine an expected ROI. From this the following table of freight projects with the highest ROI was developed.

Project Name	Investment
Mechanicville to Ayer	Double-stack Clearance
Ayer to Maine	Double-stack Clearance & 286k Weight-on-Rail Capacity
Worcester to Ayer	286k Weight-on-Rail Capacity
PVRR Westfield to Holyoke	286k Weight-on-Rail Capacity
NECR (VT border to CT border)	286k Weight-on-Rail Capacity
P&W (Worcester Connections)	Double-stack Clearance & 286k Weight-on-Rail Capacity
Framingham to Taunton (CSX)	286k Weight-on-Rail Capacity
Taunton to NB & FR	286k Weight-on-Rail Capacity
Boston Harbor	Deep Draft Dredging
South Boston Port Access	Road
New Bedford North Terminal Expansion	Harbor Freight Terminal

Most of the recommended investments are to the rail network by improving north/south and east/west connections as well as upgrades to the 286k weight-on-rail capacity and double-stack clearance improvements where needed.

For the Montachusett region, these improvements would include double-stack upgrades to the Pan Am (Pan Am Southern (PAS)) line from Ayer to Mechanicville, NY, double-stack and weight upgrades to the Pan Am line from Ayer to Maine and double-stack and weight upgrades to the Providence and Worcester (P&W) lines between Worcester and Ayer and Worcester and Fitchburg.

The estimated total cost of these identified investments listed in the above table is approximately \$402.9 million (present value). Benefits associated with the investments included “Reduced shipping costs from transporting more freight by lower cost rail and water modes...enhance(d)...competitiveness of the Massachusetts economy, reduce(d) consumer costs to residents, and...environmental benefits. These projects also provide significant roadway congestion benefits to both trucks and autos, resulting in reduced emissions and accident costs.”

**Policy Issues**

In addition to specific projects, various policies and initiatives were identified to assist the Commonwealth in utilizing its existing freight network. These policies, as stated in the *MA Freight Plan*, are as follows:

- **Freight-Intensive Land Use Policy** - A policy on freight-intensive land uses should be adopted by MassDOT and the Executive Office of Housing and Economic Development (EOHED) that articulates the Commonwealth's interest in preserving land for freight-intensive uses and developing parcels in a manner that does not foreclose rail access. This policy would define freight-intensive use and set forth criteria for determining if a parcel is of strategic importance for these uses. The policy and its criteria would be used to:
 - Develop a statewide inventory to identify major parcels of strategic statewide importance suitable for intermodal centers, distribution/assembly centers, or freight villages, as well as in evaluating local industrial-incentive areas...that are proposed by municipalities.
 - Explicitly include freight-intensive uses as eligible elements of Chapter 43D Priority Development Sites, and as qualifying uses under the Growth District Initiative. This could be addressed by having the Interagency Permitting Board under Chapter 43D make a simple revision to its guidelines to address freight-intensive use. Maintaining rail access would become a requirement for such parcels under both programs.

This policy would be considered in MEPA review in a manner similar to the Commonwealth's ten sustainable development principles and would be instrumental in pre-review under MEPA. This aspect of the policy should be articulated through development guidelines for parcels with rail access. The guidelines could also be adopted by local planning boards as part of their subdivision regulations where applicable.

- **Statewide Inventory of Sites** - In order to target specific sites for a freight-intensive use policy, MassDOT and EOHED in collaboration with their partners, including MassDevelopment and MassEcon, should identify sites of at least 10 acres suitable for large-scale freight uses such as intermodal and/or large distribution facilities. The inventory should also identify a second tier of smaller sites that have good multimodal transportation access and can support freight-intensive uses that contribute to the Massachusetts economy. MassEcon has begun similar work by engaging with the Massachusetts Railroad Association to qualify rail-served sites from their SiteFinder database. Completing this work with input from the railroads and economic development officials would provide a strong foundation (for) the inventory of sites.
- **Freight-Intensive Land Use Development and Preservation** - Many parcels of the size, location, amenities, and access characteristics suitable for freight rail operations are currently threatened by development that could threaten their freight use. For example, many of these parcels are simply being converted or rezoned to non-industrial use.



Others are being reduced to a size that is not adequate for freight uses due to “encroachment” of other land uses. Still others are being isolated by development that blocks access to the freight transportation network. Similar issues occur on waterfront parcels in or near ports, although these areas often enjoy greater regulatory protections, such as Designated Port Areas and Chapter 91 regulations, than rail-accessible parcels.

- Pre-Review of Freight-Intensive Development under MEPA - Preserving freight-intensive land uses across the Commonwealth would help reduce air emissions and their associated pollutants. This result is in line with many of the goals of MEPA. MassDOT should work with the Executive Office of Energy and Environmental Affairs to develop a streamlined MEPA process for freight-intensive development.

Funding Issues

Funding to address the investments and policies outlined in the *MA Freight Plan* is critical to improving and expanding the state’s freight network. The following recommendations relate to funding options for consideration:

- Greater consideration of goods movement in funding allocations;
- Strategic multi-modal investments in projects of statewide significance;
- Creation of an industrial rail access program (IRAP);
- Increased public-private partnership opportunities and funding.

Please refer to the complete MA Freight Plan for further information and more detailed description and analysis related to all aspects of the above referenced items.
(www.massfreightandrailplan.com)

Freight in the Montachusett Region

Within the Montachusett Region, freight movement makes use of all of the regular modes and networks available in the Commonwealth with the exception of sea and air. As outlined in the state Freight Plan, the economic vitality of the Region is dependent on an efficient and effective network that links the rural and urban communities. Improvements to these systems are highlighted and documented in the *MA Freight Plan* for the entire Commonwealth and in some cases specific improvements can be related directly to this region.

Existing Conditions in the Montachusett Region

As stated above, the primary network for the movement of goods in the region consists of the highway and rail systems. Air freight does not play a role in the operation of the three airports located in the Montachusett Region in Fitchburg, Gardner and Sterling. The following section provides examines the highway and rail networks for the region.



Highway Infrastructure

Within the Montachusett Region, the highway network operates as the primary system for the distribution and movement of goods, services and individuals. This network links the urban and rural communities of the area through a series of roads from the limited access interstate I-190 (functionally classified as a principal arterial) to Route 2 (another limited access principal arterial and the major east-west thoroughfare for the region) to important arterials and collectors such as Routes 12, 13, 117, 119 and 140. Please refer to the Highway Systems chapter of this RTP for a more detailed breakdown of the network.

The following table provides a breakdown of the Region's roadway functional classification mileage.

	URBAN						RURAL				
	Interstate	Arterial	Collector	Local	Total		Interstate	Arterial	Collector	Local	Total
Ashburnham					0.00			9.50	22.71	65.63	97.84
Ashby					0.00			6.69	17.05	40.98	64.72
Athol		18.15	8.59	48.07	74.81			1.66	9.89	24.94	36.49
Ayer		10.65	6.07	32.34	49.06						0.00
Clinton		13.39	4.18	34.03	51.60			0.02	0.01		0.03
Fitchburg		43.52	21.88	134.51	199.91						0.00
Gardner		28.49	13.13	73.30	114.92						0.00
Groton		22.73	7.35	56.06	86.14			0.04	3.76	21.05	24.85
Harvard	1.47	1.73	0.54	1.74	5.48			10.89	10.91	50.07	71.87
Hubbardston					0.00			8.31	19.93	56.41	84.65
Lancaster	2.03	10.82	6.19	24.99	44.03			5.59	6.76	13.36	25.71
Leominster	1.70	41.59	18.28	115.43	177.00						0.00
Lunenburg		17.63	7.13	45.93	70.69			1.53	7.58	15.47	24.58
Petersham					0.00			12.47	14.16	52.42	79.05
Phillipston					0.00			2.97	21.14	27.88	51.99
Royalston					0.00				24.73	47.39	72.12
Shirley		7.69	1.80	16.40	25.89			2.48	7.92	12.54	22.94
Sterling	4.45	13.80	12.79	23.59	54.63		2.20	2.76	15.60	31.62	52.18
Templeton		16.99	8.71	43.61	69.31			2.59	12.22	17.46	32.27
Townsend		12.72	3.61	30.49	46.82			4.98	4.35	39.37	48.70
Westminster		17.47	5.74	24.03	47.24			4.46	16.72	40.93	62.11
Winchendon		8.36	6.64	29.55	44.55			8.64	8.13	53.79	70.56
TOTAL	9.65	285.73	132.63	734.07	1162.08		2.20	85.58	223.57	611.31	922.66

Rail Infrastructure

Within the Montachusett Region, three major freight rail carriers operate, CSX Transportation, Pan Am Railways and the Providence & Worcester Railroad.

- CSX Transportation - According to their website (www.csx.com), CSX Corporation, "based in Jacksonville, Fla., is one of the nation's leading transportation suppliers...with a network



(that) encompasses about 21,000 route miles of track in 23 states, the District of Columbia and the Canadian provinces of Ontario and Quebec...More than two-thirds of Americans live within CSX's service territory, accounting for about three-quarters of the nation's consumption." Within the region, CSX owns a rail line between Clinton north into Leominster and Fitchburg and maintains track rights from Clinton north into Ayer. The *Massachusetts State Rail Plan* indicates "CSX is the state's largest private owner of rail property and only Class I freight rail operator with direct services within the state. Within Massachusetts, CSX owns about 231 miles of active rail ROWs, and operates over a total of 410 route miles."

- Pam Am Railways (PAR)/Pan Am Southern (PAS) - Formerly Guildford Transportation Industries (GTI), Pan Am is the largest operator of freight rail lines in the Montachusett region. PAR is a "Class II rail carrier with operations in five New England states and New York...and has connections to...the P&W in Gardner and Worcester. PAR exchanges traffic with CSX in Worcester and Ayer. PAR also connects with PAS at Ayer." (*MA State Rail Plan*) In 2008, Pan Am Railways and Norfolk Southern Railway Company joined forces to create the "Patriot Corridor" defined as an "improved rail route between Albany, N.Y., and the greater Boston, Mass., area"...with "investments in the Patriot Corridor ...expected to improve track quality and customer service, boost train speed and reliability, and increase capacity on the route." This new rail company entitled "Pan Am Southern (PAS)" includes the transfer by Pan Am the "155-mile main line track that runs between Mechanicville (Albany), N.Y., and Ayer, Mass., along with 281 miles of secondary and branch lines, including trackage rights, in Connecticut, Massachusetts, New Hampshire, New York, and Vermont." Norfolk Southern "has agreed to transfer cash and other property valued at \$140 million to the joint venture, \$87.5 million of which is expected to be invested within a three-year period in capital improvements on the Patriot Corridor, such as terminal expansions, track and signal upgrades." As outlined in the *State Rail Plan*, "The partnership includes rehabilitation of 138 miles of track, replacement ties, and adding just over 35 miles of new rail. The \$47.5 million effort that began in 2009, and expected to be completed in 2010, is one of the largest new private investments in the Commonwealth's rail system in decades. A new intermodal and auto terminal will be constructed in Mechanicville, NY, and expansions and improvements will be made to the auto and intermodal facilities in Ayer...The investments in the Patriot Corridor have increased capacity and reliability to Ayer, Massachusetts, opening up future opportunities and connectivity throughout the region."
- Providence and Worcester Railroad Company (P&W) – As stated in the *State Rail Plan*, P&W is "a publicly traded Class II regional freight railroad operating in Massachusetts, Rhode Island, Connecticut, and New York with headquarters in Worcester. The P&W's rail system extends over approximately 516 miles of track regionally, of which it owns approximately 163 miles. The company has the right to use the remaining 353 miles pursuant to perpetual easements and long-term trackage rights agreements. The P&W owns and operates about 95 miles of rail ROW in the Commonwealth, including lines emanating from Worcester to Gardner, and to the state line on routes to Providence,



Rhode Island and Norwich, Connecticut...The P&W also connects with PAS in Gardner and with both CSX and PAR in Worcester.”

The following table summarizes the approximate miles of track owned by each rail operator in the Montachusett Region.

Operator	Rail Line Mileage
CSX	20.7
Pan AM	102.8
P&W	25.2
Total	148.7

The following is from the *MA State Rail Plan*.

“Based on rail volumes and interstate connections, there are four major rail corridors into and out of Massachusetts. Freight rail connections with the North American rail network are primarily accomplished by means of three corridors: the Boston Line; the PAR/PAS Freight Main Line; and the NECR Main Line. The two primary east-west routes that connect New England with the national rail system at Albany, New York, are Boston Line and the PAS/PAR Freight Main Line. The NECR Line crosses the state from north to south connecting northern Vermont and Canada with southern New England, terminating at New London, Connecticut. While other routes can be used to connect to the general rail network, the three routes cited are the primary and most direct routes. The fourth line, the Northeast Corridor, is the primary passenger route between Boston and Washington, D.C.

The PAR/PAS Freight Main Line - The PAR/PAS Freight Main Line is a corridor linking northern Maine, New Hampshire, and northern Massachusetts to connections with New York State. The Freight Main Line serves up to 5 million tons annual of freight on the line between eastern Massachusetts and Mechanicville and Rotterdam, New York, near Albany. The route has 160 miles of the PAR Freight Main Line in Massachusetts. It is an important rail link for the paper and lumber industries located in northern New England and the Canadian Maritimes, and supports intermodal traffic destined for Ayer, Massachusetts, as well as general merchandise traffic for eastern Massachusetts. The PAR/PAS split on the Freight Main Line is in Ayer with the route west in the PAS joint venture.

This route is generally parallel to the Route 2 corridor and connects Boston, Fitchburg, Ayer, Greenfield, and North Adams, Massachusetts with the Albany, NY, area. The PAR Freight Main Line has fewer and less severe grades than the CSX-owned Boston Line, in part, because it travels through, rather than over, the Berkshire Mountains via the nearly 6-mile long Hoosac Tunnel. The East Deerfield Yard is a major facility located on the route, and is partially owned Commonwealth (MassDOT) but subject to permanent easement for railroad uses by PAS. MBTA commuter rail service operates over the Freight Main Line between Fitchburg and Ayer and into Boston via the Fitchburg Main Line.



Within the Freight Main Line, the portion of the route from Mechanicville, NY to Ayer is included as part of the new PAS railroad. This section of the Freight Main line is known as the Patriot Corridor. The Patriot Corridor route, as a condition of the PAS creation, will realize a significant investment in improvements for track, signals and facilities under the Patriot Corridor program jointly funded and operated PAR and NS. Planned improvements include upgrading the corridor to handle 286,000 pound rail cars to Ayer from the west as well as enhanced automotive handling capacity.”

Refer to the rail system map at end of the chapter.

Terminals

According to the Massachusetts State Rail Plan, terminals are defined as locations where freight routes connect and/or terminate. Due to the reduction of boxcar use, most major terminals in the state have been reduced in size. The following table lists the existing rail yards and their general function within the Montachusett Region:

City/Town	Name of Facility	General Function	Other Information
Ayer	PAS Auto Site	Automotive	Inactive
Ayer	Hill Yard	General Freight	Supports, intermodal and merchandise traffic
Ayer	Intermodal Yard	Intermodal	Intermodal terminal handling mostly containers and some trailers
Ayer	Ayer Auto Facility (formally known as San-Vel Site)	Automotive	Opened on 1/8/10 and is used as an auto-uploading terminal
Lunenburg	East Fitchburg Yard	Merchandise Freight	Primarily plastic resin transload and some local freight
Gardner	Gardner Yard	Merchandise Freight	Interchange with Providence and Worcester RR

The Ayer PAS facility has completed a second automotive uploading facility and enhanced the intermodal container/trailer facility.

Trends, Initiatives & Constraints for the Montachusett Region

Trends and Initiatives

Within the Montachusett Region, traffic data has shown increases along some of the major highway network, i.e. Route 2 and I-190. MassDOT count station information has shown a growth rate of approximately 1.38 percent per year on Route 2 and 3.35 percent on I-190. Individual counts conducted by the MRPC on various roadways throughout the Region have show significantly less traffic growth over the last 4 years (2006 to 2010). Growth rates were negative for both urban and rural roads as well as the region as a whole (-0.46%, -1.42% and -0.81%, respectively). This can be attributed to the general slow economic times currently underway in the Commonwealth and the nation. Please refer to the RTP chapter of Highway Systems for a more detailed discussion on traffic growth rates in the MRPC.



Montachusett Annual Traffic Growth Rates

	No. of Count Locations	2006 Total Volume at All Locations	2010 Total Volume at All Locations	Avg. Annual Growth Rate per Year 2006-2010
Total (Urban & Rural)	93	749,935	725,959	-0.81%
Urban	41	478,081	469,255	-0.46%
Rural	52	271,854	256,704	-1.42%

Within the Montachusett region, significant investments have been or are planned to be made along the Fitchburg Commuter Rail line into Boston. This line is part of the PAR/PAS Freight Main Line. Federal and state funding totaling \$150 million is allocated to major improvements that will benefit the commuter rail line as well freight traffic. Additionally, the construction of a new commuter rail station in west Fitchburg entitled Wachusett Station will also contain a new layover facility for MBTA and commercial freight train engines. Refer to the Transit chapter of this RTP for a more detailed description of these improvements.

Constraints

Existing constraints to freight and rail in the Montachusett region include such items as outlined in the State Rail Plan as shared use rail networks, insufficient clearance and weight restrictions. In addition, other constraints related to the road network that impact freight movement include congested roads and bottlenecks, poor infrastructure (i.e. pavement and bridges) and safety issues at railroad at grade crossings.

Shared use rail networks

Throughout the state many rail lines are shared by passenger and freight rail operators. These are great for cost sharing benefits but there are often restrictions and complex issues that arise when it comes to scheduling, finances, and liability. Within the Montachusett Region, there is a shared use line along the PAR/PAS Freight Main Line and the MBTA commuter service to Wachusett.

Clearance

Many rail corridors do not meet sufficient clearance to support the highest intermodal container full double stack cars, in fact, Massachusetts does not have any rail lines that can handle such height. If clearances were to improve it would increase the capacity per trip and improve efficiency. According to the Massachusetts State Rail Plan, full double-stack vertical clearance on the PAS line was identified to have produced a high return on investment.

Weight

Over time shippers have increased the weight of their shipments from 263,000 (the minimum amount a rail line must be able to handle) to 286,000 pounds. The 286,000lb rail cars provide a more efficient and cost saving method to ship goods. Only three railroads in the state have been approved for 286,000lbs.



- The entire CSX Boston Line – rated to carry cars weighing up to 315,000lbs (although secondary tracks are generally rated at 263,000 lbs)
- Limited sections of the P&W line are rated to carry 286,000lb cars
- The entire Housatonic Railroad (in MA & CT) are rated at 286,000lb.

All other railroads in the state are currently rated at 263,000lbs. Upgrades are currently going on – such as the creation of PAS which is anticipated to have the ability to increase the allowed weight on this rail line from 263,000lb to 286,000lb from Mechanicville, NY to Ayer, MA.

Congestion/Bottlenecks

Congestion occurs at intersections and along road segments throughout the region adversely impacting commuter travel, the efficient movement of goods and air quality. Traffic “bottlenecks” are specific physical locations on roadways that routinely and predictably experience congestion because traffic volumes exceed highway capacity. Within the Montachusett Region, several locations are impacted by these conditions. A system analysis review outlined in the Congestion chapter of this RTP (Page 6-1) has identified a number of these locations as well recommendations and projects to address them.

Railroad Grade Crossings & Safety

Railroad grade crossings present primarily a safety problem throughout the region. Unsafe or inadequate crossings can increase the risk of train and vehicle collisions resulting in potential loss of life as well as in equipment, goods and time. Prior studies have shown that about half of the accidents occur at crossings that are equipped with active warning device, bells, gates and lights (Association of American Railroads (AAR)). State departments of transportation and railroads have programs to help prevent grade crossing accidents. On a national level, the Federal Highway Administration (FHWA) is actively working to address issues related to grade crossing accidents. From the FHWA Safety Facts website, reports the following data:

- As of December 2009, the United States had 136,041 public at-grade crossings. Of these crossings, approximately 42,301 have gates, 22,039 have flashing lights, and 1,196 have highway traffic signals, wigwags, and bells.
- In 2009, there were 1,896 incidents at public highway-rail crossings in the United States that resulted in 247 deaths, and 705 injuries.
- In 2009, 431 people were killed and 343 were injured while trespassing on railroad rights-of-way and property.

Using prior data, as well as Federal Railroad Administration (FRA) information on rail crossings, a listing of rail crossings sites within the Region was developed.

Chapter 8 – Freight Movements



Public At-Grade Crossings on Active Rail Lines in the Montachusett Region

City	Total No. Public At Grade Crossings	Street	Type of Warning				Total Tracks	Daily Trains	ADT	Railroad
Ayer	9	Willows Rd	Gates				1	27	4,900	B&M
		Snake Hill Rd	Gates				2	28	300	MBTA
		Sandy Pond Rd	Gates				2	37	3,800	Amtrak
		Groton-Harvard Rd	Gates				2	28	4,000	MBTA
		Brook St		Cross bucks			1	0	560	B&M
		Bishop Rd		Cross bucks			1	0	1,700	B&M
		Fitchburg Rd		Cross bucks			1	0	8,500	B&M
		Groton Shirley Rd		Cross bucks			1	0	1,200	B&M
		Willows Rd	Gates				2	12	4,400	B&M
			5	4	0	0				
Clinton	1	Sheehans X-Ing			Flashing lights		1	5	1,400	B&M
			0	0	1	0				
Gardner	6	Donlan St		Cross bucks			1	0	1,700	B&M
		Main St		Cross bucks			1	0	9,100	B&M
		West Broadway			Flashing lights		1	2	6,700	P&W
		South Main St			Flashing lights		1	2	630	P&W
		Upper So. Main St			Flashing lights		1	2	1,300	P&W
		Whitney St			Flashing lights		1	2	500	P&W
					0	2	4	0		
Groton	1	West Groton Rd				Stop signs	1	0	4,300	B&M
			0	0	0	1				
Harvard	1	Still River X-Ing			Flashing lights		1	5	40	B&M
			0	0	1	0				
Hubbardston	4	Morgan Rd			Flashing lights		1	2	630	P&W
		Old Westminster Rd			Flashing lights		2	2	420	P&W
		New Westminster R			Flashing lights		1	2	2,500	P&W
		Lampheres Rd			Flashing lights		1	2	10	P&W
			0	0	4	0				
Lancaster	11	Pine Hill Rd				Stop signs	1	5	520	B&M
		Damons X-Ing			Flashing lights		1	5	13,800	B&M
		Neck Rd. No.			Flashing lights		1	5	370	B&M
		Packard St			Flashing lights		1	5	170	B&M
		Neck Road So.			Flashing lights		1	5	440	B&M
		Center Br.Rd.			Flashing lights		1	5	2,500	B&M
		Mill St			Flashing lights		1	5	2,100	B&M
		Chace Hill Rd			Flashing lights		1	1	610	CSX
		Deershorn Rd			Flashing lights		1	1	320	CSX
		Sterling Rd			Flashing lights		1	0	3,200	CSX
		Sterling Rd			Flashing lights		1	0	3,840	CSX
			0	0	10	1				
Leominster	3	Willard St			Flashing lights		1	1	4,300	CSX
		Litchfield St	Gates				2	1	9,200	CSX
		Mechanic St			Flashing lights		1	1	10,900	CSX
			1	0	2	0				



Public At-Grade Crossings on Active Rail Lines in the Montachusett Region (cont.)

City	Total No. Public At Grade Crossings	Street	Type of Warning				Total Tracks	Daily Trains	ADT	Railroad
Royalston	1	So Royalston Rd	Gates				2	12	1,400	B&M
			1	0	0	0				
Shirley	7	Walker Rd	Gates				2	16	1,700	MBTA
		Ayer Rd	Gates				2	16	2,200	MBTA
		Ayer Rd	Gates				1	2	890	MBTA
		Phoenix St	Gates				2	18	3,000	MBTA
		Main St	Gates				2	24	2,200	MBTA
		Center Rd	Gates				2	24	4,000	MBTA
		Catacunemaug Rd	Gates				2	24	1,700	MBTA
			7	0	0	0				
Sterling	5	Newell Hill Rd	Gates				1	5	210	B&M
		Gates Rd			Flashing lights		1	5	1,400	B&M
		Pratts Jct. Rd			Flashing lights		1	1	3,500	CSX
		Albright Rd			Flashing lights		1	1	960	CSX
		Pratts Jct. Rd			Flashing lights		1	1	3,200	CSX
			1	0	4	0				
Total	49		15	6	26	2				

Source: Federal Railroad Administration – safetydata.fra.dot.gov

Regionwide – Safety Improvement Recommendations

Public at grade rail crossings in the region were examined to determine if they were gated or had advanced warning signs or pavement markings. There are forty-nine (49) active public at grade crossings in the region. Fifteen of the 49 crossings have gates, six (6) have “cross buck” warning signs, 26 have flashing lights and 2 have stop signs. A review of the data reported at these crossings show that 25 crossings have an average daily traffic (ADT) under 1,000 vehicles per day and no daily train activity. Of the remaining 24 locations, 12 have gates currently installed. Therefore, 12 locations were assumed to be able to benefit from gates.

The following table lists these 12 locations.



Recommended Locations for Gate Installation – At Public Crossings

City	Street	Current Type of Warning	Total Tracks	Daily Trains	ADT	Railroad
Clinton	Sheehans X-Ing	Flashing lights	1	5	1,400	B&M.
1						
Gardner	West Broadway	Flashing lights	1	2	6,700	P&W
	Upper So. Main St	Flashing lights	1	2	1,300	P&W
2						
Hubbardston	New Westminster R	Flashing lights	1	2	2,500	P&W
1						
Lancaster	Damons X-Ing	Flashing lights	1	5	13,800	B&M
	Center Br. Rd.	Flashing lights	1	5	2,500	B&M
	Mill St	Flashing lights	1	5	2,100	B&M
3						
Leominster	Willard St	Flashing lights	1	1	4,300	CSX
	Mechanic St	Flashing lights	1	1	10,900	CSX
2						
Sterling	Gates Rd	Flashing lights	1	5	1,400	B&M
	Pratts Jct. Rd	Flashing lights	1	1	3,500	CSX
	Pratts Jct. Rd	Flashing lights	1	1	3,200	CSX
3						
Total		12				

The following public at-grade crossings currently have gates or flashing lights but based upon site visits were thought to benefit from advanced warning signs, pavement markings or both.

Locations in Need of Advanced Warning Signs and/or Pavement Markings

City	Street	Current Type of Warning	Advanced Warning Signs	Pavement Markings
Ayer	Sandy Pond Road	Gates	N	N
Ayer	Snake Hill Road	Gates	N	N
Ayer	Willows Road	Gates	Y	N
Ayer	Groton-Harvard Road	Gates	Y	N
Lancaster	Neck Road North	Flashing lights	Y	N
Leominster	Litchfield Street	Gates	N	N
Shirley	Ayer Road	Gates	N	N
Sterling	Newell Hill Road	Gates	N	N

Although, the crossings listed below have been identified as having no train movements, they are still considered active and due to the ADT volumes for the crossing street, it is also recommended those crossings be considered for proper signage and/pavement markings.



Additional Locations in Need of Advanced Warning Signs and/or Pavement Markings
No Current Active Daily Trains vs Significant ADTs

City	Street	Current Type of Warning	Advanced Warning Signs	Pavement Markings	ADT
Ayer	Bishop Road	Cross bucks	Y	N	1,700
Ayer	Fitchburg Road	Cross bucks	Y	N	8,500
Ayer	Groton Shirley Road	Cross bucks	N	N	1,200
Groton	West Groton Road	Stop signs	N	Y	4,800

Future Projects/Recommendations

Based upon the information outlined in this chapter from the State Rail and Freight Plan as well as local conditions, a series of recommendations for the Montachusett Region have been developed.

- Conduct a Goods Movement Survey of Montachusett business and industries to assess local concerns and problems related to the movement of goods and services. Areas of emphasis should include: problem locations, i.e. roads, bridges, intersections, etc.; facilities; and types of modes utilized.
- Continued maintenance, upgrade and improvement to the region's bridges, intersections and pavement along the highway network. The condition of the infrastructure directly affects the ability to move freight, as well as individuals, across the region and the state. Improvements to eliminate deficient bridges and pavement, congested road segments and intersections and unsafe roads and crossings will create benefits to all users of the regions road system. Additional information related to the condition of the area's infrastructure as well as recommendations can be found in Chapters 5 Infrastructure, 6 Congestion and 12 Safety.
- Implementation of improvements and upgrades to the rail lines and infrastructure as outlined in the *MA State Freight and Rail Plan*. In addition, continued improvements to the commuter rail line should be maintained and implemented as outlined in this chapter and Chapter 7 Transit of this RTP.
- In order to improve the marketability of the region as a viable industrial area, rail improvements to industrial sites should be encouraged. Effective and usable spur lines will enhance communities and developers ability to attract and retain business by providing multiple alternatives to receive and deliver their goods.
- Improve safety at railroad crossings located throughout the Region through the installation of reflectorized gates, signage, advanced warning signs and pavement markings at identified locations in the region.



Costs to implement are estimated based on the following assumptions:

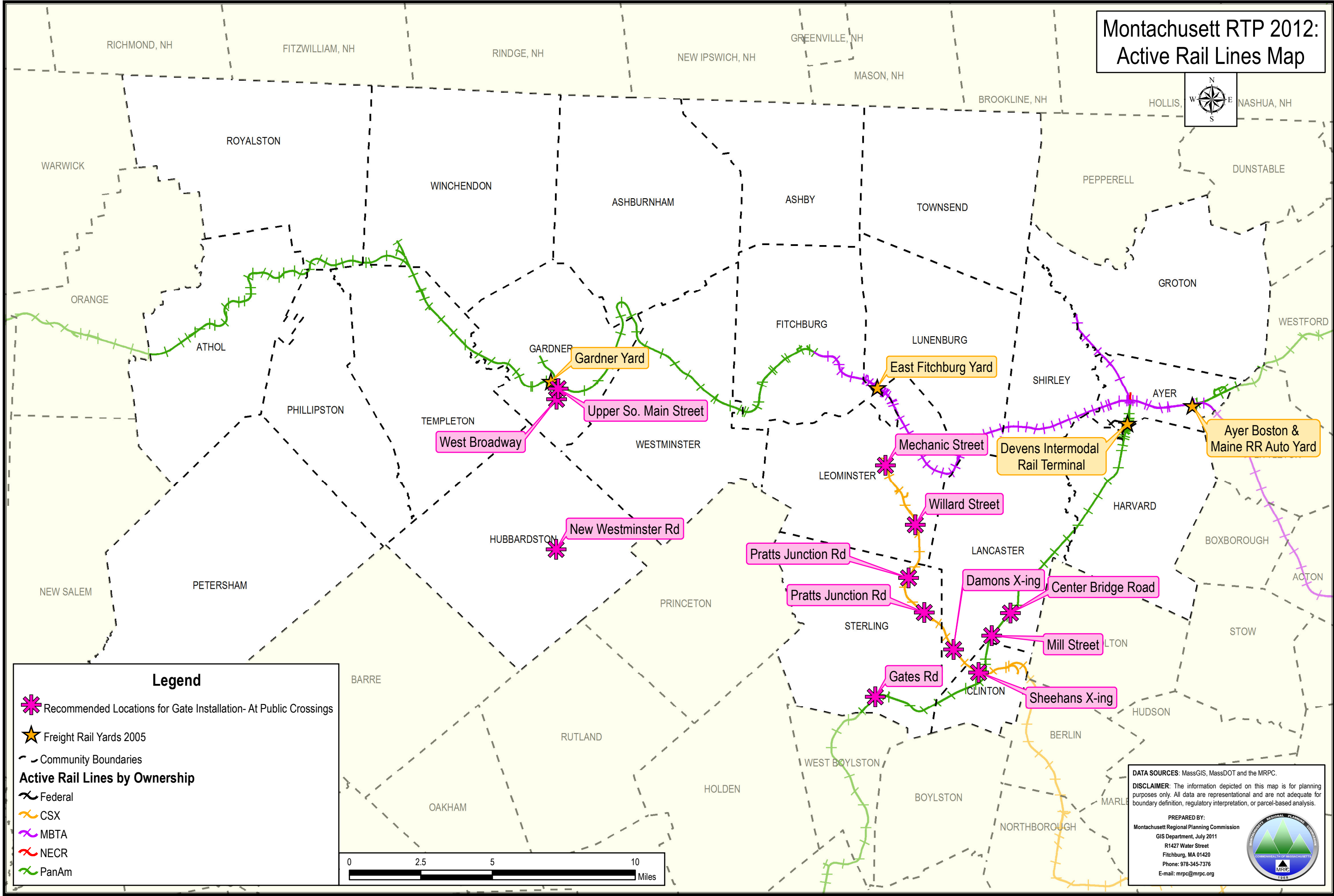
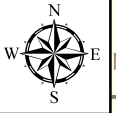
- Installation of reflectorized gates would cost in the same magnitude as traffic control signals at an intersection with minor curbwork and paving. MassDOT Highway Division has provided generalized unit costs of approximately \$200,000 to 250,000 per intersection. A median figure of \$225,000 is estimated for the identified 12 locations in need of gates.
- Installation of pavement markings and advanced warning signs is estimated to cost approximately \$15,000 per location.

Total estimated project costs are as follows:

Estimated Project Recommendation Costs

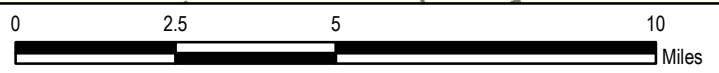
City	Street	Type of Improvement	Est Cost
Ayer	Sandy Pond Road	Advanced Warning Signs/Pavement Markings	\$15,000
	Snake Hill Road	Advanced Warning Signs/Pavement Markings	\$15,000
	Willows Road	Pavement Markings	\$15,000
	Groton-Harvard Road	Pavement Markings	\$15,000
	Bishop Road	Pavement Markings	\$15,000
	Fitchburg Road	Pavement Markings	\$15,000
	Groton Shirley Road	Advanced Warning Signs/Pavement Markings	\$15,000
Clinton	Sheehans X-Ing	Installation of Gates	\$225,000
Gardner	West Broadway	Installation of Gates	\$225,000
	Upper So. Main Street	Installation of Gates	\$225,000
Groton	West Groton Road	Advanced Warning Signs	\$15,000
Hubbardston	New Westminster Road	Installation of Gates	\$225,000
Lancaster	Damons X-Ing	Installation of Gates	\$225,000
	Center Br. Road	Installation of Gates	\$225,000
	Mill Street	Installation of Gates	\$225,000
	Neck Road North	Pavement Markings	\$15,000
Leominster	Willard Street	Installation of Gates	\$225,000
	Mechanic Street	Installation of Gates	\$225,000
	Litchfield Street	Advanced Warning Signs/Pavement Markings	\$15,000
Shirley	Ayer Road	Advanced Warning Signs/Pavement Markings	\$15,000
Sterling	Gates Road	Installation of Gates	\$225,000
	Pratts Jct. Road	Installation of Gates	\$225,000
	Pratts Jct. Road	Installation of Gates	\$225,000
	Newell Hill Road	Advanced Warning Signs/Pavement Markings	\$15,000
Total			\$2,880,000

Montachusett RTP 2012: Active Rail Lines Map



Legend

- Recommended Locations for Gate Installation- At Public Crossings
- Freight Rail Yards 2005
- Community Boundaries
- Active Rail Lines by Ownership**
- Federal
- CSX
- MBTA
- NECR
- PanAm



DATA SOURCES: MassGIS, MassDOT and the MRPC.

DISCLAIMER: The information depicted on this map is for planning purposes only. All data are representational and are not adequate for boundary definition, regulatory interpretation, or parcel-based analysis.

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