CHAPTER 11: FREIGHT MOVEMENT

Freight movement plays a major role in the economic vitality and quality of life in the Northern Middlesex region. The region is traversed by I-495, a major truck route in the northeastern United States. Railroad lines also cross the region carrying commodities throughout the northeast. A freight system that promotes the efficient movement of goods, safety and security, economic competitiveness, and environmental sustainability is of great importance. The continued globalization of our economy and an increasing reliance on international trade highlights the need for a safe, reliable, and secure freight transportation system.

Freight traffic, by most any measure, is growing faster than passenger travel. In addition, freight is highly intermodal and cannot be addressed in modal pieces as it often crosses over modal boundaries. The commodities, modes, and origins and destinations of freight movement in the region are expected to change little. Highway-based modes are expected to continue to dominate other modes. Trucks carry over 87 percent of freight in the State (measured in tons).

The following challenges to freight transportation will need to be addressed over the next twenty-five years:

- Poor highway performance;
- Inadequate access to freight handling facilities;
- Transportation network constraints; and
- The need for higher security.

Freight mobility is restricted by limitations on the region’s infrastructure for accommodating modern freight transportation operations. Freight movements over both rail and highway systems are restricted in locations where inadequate dimensional envelopes prevent the passage of modern rail cars or truck trailers, e.g. double stacking of rail containers. As a result, logistical companies are required to reroute freight shipments, thereby increasing costs and community impacts. These transportation deficiencies can also result in higher prices for goods and services, which can impact business location decisions, reduce the profitability of existing companies, and otherwise hamper the region’s economic vitality.

NATIONAL FREIGHT POLICY

MAP-21 established a national policy to improve the condition and performance of the national freight network, which will provide the foundation for the United States to compete in the global economy. The policy outlined goals related to:
• Infrastructure improvements;
• Operational improvements;
• Safety, security, and system resiliency improvements;
• Improving state of good repair;
• Increasing use of advanced technology to improve safety and efficiency;
• Incorporating concepts of performance, innovation, competition, and accountability into operation and maintenance of the national freight network;
• Improving economic efficiency; and
• Reducing environmental impacts of freight movement.

The policy also established a national freight network consisting of:
• A primary freight network, as designated by USDOT, that is most critical to the movement of freight;
• Portions of the interstate system designated as part of the primary freight network; and
• Critical rural freight corridors designated by the states.

Other policy items included the preparation of national and state freight plans, the establishment of freight advisory committees, and the development of performance measures and reports to monitor the freight network.

**MASSACHUSETTS FREIGHT PLAN**

In September 2010, MassDOT adopted its first comprehensive multi-modal freight evaluation, known as the *Massachusetts Freight Plan*. An important element of this Plan was to develop a unifying vision, and a set of goals and objectives that can be linked to performance measures and evaluation criteria. The goals for the Massachusetts freight system, as developed in the context of other MassDOT initiatives and its overall strategic plan, are as follows:

• Promote the preservation and improvement of the freight system infrastructure in all modes;
• Facilitate appropriate freight system capacity and redundancy, enhance operational efficiency, and achieve a balanced mix of capacity and connections across all modes;
• Facilitate freight transportation system improvements, policies and investment strategies that will enhance economic development opportunities and manage consumer costs; and
• Ensure that the freight system preserves the environment and contributes to the quality of life in Massachusetts.

To fulfill these goals, the Plan focused on providing transportation infrastructure and services in Massachusetts that: (1) facilitate the movement of goods to consumers efficiently and cost effectively; and (2) support economic prosperity for Massachusetts businesses and a strong quality of life for
Massachusetts residents. The recommended investments and policies of the Plan were developed using a cost-benefit analysis with the following evaluation criteria:

- Congestion reduction and improved transportation system operations;
- Operational costs;
- Last mile connection to intermodal, seaport, and airport facilities;
- Economic development and land use benefits (e.g., jobs and supporting smart growth);
- Environmental considerations, including emissions;
- Local support and consistency with transportation plans;
- Safety and security;
- Partnership and linkage to regional initiatives; and
- Availability of funding from federal, local, and private sources.

**MASSACHUSETTS STATE RAIL PLAN**

As a complementary document to the *Massachusetts Freight Plan*, the 2010 *Massachusetts State Rail Plan* is a 20-year plan for the state’s rail system that describes a set of strategies and initiatives aimed at enhancing both passenger and freight rail transportation to effectively fulfill their critical roles in the state's multimodal transportation network.

According to the plan, MassDOT’s vision for passenger and freight rail service is to “develop an efficient intercity passenger and freight rail system that is the logical mode of choice for travelers and shippers, connects travelers and businesses to the national and global transportation network, encourages sustainable economic growth throughout the state, and enables Massachusetts to compete in the rapidly changing global economy.”

The Plan’s goals were designed to fulfill the above vision and to be linked to performance measures and evaluation criteria. The goals are as follows:

- Maintain the Commonwealth’s rail system;
- Expand the rail system and its capacity to accommodate growth in freight and passenger demand;
- Provide a rail system that is environmentally and financially sustainable;
- Improve intermodal connectivity for both passenger and freight rail facilities and coordination between rail system users;
- Improve the rail system to support sustainable economic growth throughout the state and enable Massachusetts to compete in the rapidly changing global economy; and
- Enhance the safety and security of the rail system.
REGIONAL FREIGHT PLANNING ACTIVITIES

The Northern Middlesex MPO supports the national freight policy and MassDOT’s statewide freight goals for improving infrastructure and promoting the efficient movement of goods along the transportation networks. The UPWP for the Northern Middlesex region contains a freight planning program, which was established to enhance the regional freight system, both within the region and with outside connections to other freight movement networks. Regional freight planning is an ongoing process of system evaluation, supported by data collection activities such as traffic counting and pavement management programs. This system evaluation is used in the development of the RTP and in the identification of projects in the regional TIP.

Many of the infrastructure improvement projects in the Northern Middlesex TIP benefit the freight network and efficient goods movement. In particular, the I-495 bridge bundle project, a bridge rehabilitation and repaving project along I-495 in Lowell, was completed in 2014 to address the need to prevent bridge weight restrictions along the corridor. Freight movement benefitting projects slated for FY 2015 include a resurfacing project along Route 38 in Tewksbury, and bridge replacements on Hunt Road over I-495 in Chelmsford, VFW Highway over Beaver Brook, and Market Street over the Western Canal in Lowell. In FY 2016, Allen Road in Billerica will be reconstructed, and the intersection of Route 110 and Tadmuck Road in Westford will be redesigned and signalized to ease congestion.

REGIONAL FREIGHT NETWORK

In Massachusetts, 239 million tons of goods are moved by truck annually, representing 87% of all freight movements in the state.\(^1\) Whether freight arrives in Massachusetts or leaves the state by rail, ship or air, trucks typically provide the final link between freight terminals, manufacturers or distributors. Truck mobility tends to be most important during the early morning and midday hours, between the commute peak periods. The spreading of peak period congestion and delays due to traffic incidents also affects trucking operations. Table 11.1 on the next page details the top ten truck movements by commodity in Massachusetts in 2007, which represents the most recent data available.

\(^1\) MassDOT Freight Plan, September 2010
In the Northern Middlesex region, I-495 and US Route 3 carry the highest percentage of truck traffic. I-495 is a limited access highway that serves as an outer circumferential ring around the Boston area and allows trucks to access New Hampshire and Maine without traveling through the congested city of Boston. US Route 3 provides north-south truck access from I-95 in Burlington to major cities in New Hampshire, including Nashua, Manchester, and Concord.

### Table 11.1: Top Ten Truck Movements by Commodity in Millions of Tons, 2007

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Truck Tons</th>
<th>% Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary Truck Traffic</td>
<td>38.8</td>
<td>16.2%</td>
</tr>
<tr>
<td>Nonmetallic Minerals</td>
<td>32.8</td>
<td>13.7%</td>
</tr>
<tr>
<td>Petroleum or Coal Products</td>
<td>30.6</td>
<td>12.8%</td>
</tr>
<tr>
<td>Food or Kindred Products</td>
<td>30.5</td>
<td>12.7%</td>
</tr>
<tr>
<td>Chemicals or Allied Products</td>
<td>25.9</td>
<td>10.8%</td>
</tr>
<tr>
<td>Clay, Concrete, Glass or Stone</td>
<td>25.6</td>
<td>10.7%</td>
</tr>
<tr>
<td>Pulp, Paper or Allied Products</td>
<td>11.4</td>
<td>4.8%</td>
</tr>
<tr>
<td>Primary Metal Products</td>
<td>8.7</td>
<td>3.6%</td>
</tr>
<tr>
<td>Lumber or Wood Products</td>
<td>6.4</td>
<td>2.7%</td>
</tr>
<tr>
<td>Fabricated Metal Products</td>
<td>5.5</td>
<td>2.3%</td>
</tr>
<tr>
<td><strong>Total Tons</strong></td>
<td><strong>239.3</strong></td>
<td><strong>90.4%</strong></td>
</tr>
</tbody>
</table>

Source: Global Insight, TRANSRESEARCH 2008 Release

### TRUCK VOLUMES

Map 11.1 on page 263 displays the locations of roadways carrying heavy truck traffic in the Northern Middlesex region, while Map 11.2 on page 265 details those locations in Lowell. When classifying vehicles, FHWA uses the Scheme F Report. Vehicles are classified into one of fifteen categories, with heavy trucks represented in classes 5 through 13. See Appendix N for a description of the various vehicle classifications.

Heavy truck volumes along key roadways in each community are displayed in Table 11.2 on the following page. Lowell experiences the largest amount of daily truck traffic (37.51%) while Chelmsford also experiences a significant amount (27.28%). The more rural communities of Dunstable and Pepperell see the least amount of daily truck traffic in the region.
Table 11.2: Average Daily Truck Volumes by Community

<table>
<thead>
<tr>
<th>Community</th>
<th>Average Daily Truck Volume</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billerica</td>
<td>4,826</td>
<td>6.17%</td>
</tr>
<tr>
<td>Chelmsford</td>
<td>21,329</td>
<td>27.28%</td>
</tr>
<tr>
<td>Dracut</td>
<td>4,306</td>
<td>5.50%</td>
</tr>
<tr>
<td>Dunstable</td>
<td>165</td>
<td>0.21%</td>
</tr>
<tr>
<td>Lowell</td>
<td>29,335</td>
<td>37.51%</td>
</tr>
<tr>
<td>Pepperell</td>
<td>1,334</td>
<td>1.71%</td>
</tr>
<tr>
<td>Tewksbury</td>
<td>11,369</td>
<td>14.54%</td>
</tr>
<tr>
<td>Tyngsborough</td>
<td>3,969</td>
<td>5.08%</td>
</tr>
<tr>
<td>Westford</td>
<td>1,565</td>
<td>2.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>78,198</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


Interstate 495 carries a large amount of heavy truck traffic (38,539 heavy trucks) on a daily basis, representing approximately 49 percent of the total amount of daily heavy truck traffic (78,198) on the major roadways in the region. Route 3 in Chelmsford and Billerica also experiences a great deal of heavy truck traffic (8,612 heavy trucks) each day, representing approximately 11 percent of all daily heavy truck traffic in the region.

The following locations experience heavy truck travel as a percentage of total volume at each location:

- Mammoth Road south of Eighth Avenue (Lowell) – 11.2 percent
- Woburn Street south of I-495 (Lowell) – 10.4 percent
- Central Street south of Jackson Street (Lowell) – 10.0 percent
- Concord Road east of Middlesex Turnpike (Billerica) – 9.7 percent

Table 11.3 on page 267 shows heavy truck volumes on key roadways containing at least 5% daily truck traffic. The table shows Class 5 vehicles (single unit, two-axle, six tires) at 5,880, Class 8 (single trailer with 4 or less axles) at 4,708, and Class 9 (semi-trailer with 5 axles) at 2,685, are the most abundant truck classifications on the region’s major roadways.
Map 11.1: Regional Truck Traffic Percentages by Traffic Count Location (2006-2014)

Truck Traffic Percentage 2006-2014 (as percent of ADT)
128 locations
- 7.0% - 11.2%
- 4.0% - 6.9%
- 2.0% - 3.9%
- 0% - 1.9%

Roads by Functional Classification
- Interstate
- Principal Arterial
- Rural Major Collector/Urban Minor Arterial
- Rural Minor Collector/Urban Collector
- Local Roadway
- Urbanized Area (2010)
- Town Boundary

Sources:
NMCOG, MassDOT/NMCOG (2013 roads; 2010 urbanized areas); MassGIS (town boundaries); MassDEP (water).

Truck traffic count locations are determined by MassDOT Highway. Data provided on this map is not sufficient for either boundary determination or regulatory interpretation.

Produced 6/3/2015 by NMCOG.
Map 11.2: Lowell Truck Traffic Percentages by Traffic Count Location (2006-2014)

Truck Traffic Percentage 2006-2014 (as percent of ADT) (128 locations):
- 11.2% - 12.0%
- 4.0% - 6.9%
- 2.0% - 3.9%
- 0% - 1.9%

Roads by Functional Classification:
- Interstate
- Principal Arterial
- Rural Minor Arterial/Urban Principal Arterial
- Rural Major Collector/Urban Minor Arterial
- Rural Minor Collector/Urban Collector
- Local Roadway
- MassDOT Urbanized Area (2010)
- Town Boundary
- Water

Sources:
NMCOG, MassDOT/NMCOG (2013 roads; 2010 urbanized area); MassGIS (town boundaries); MassDEP (water).

Truck traffic count locations are determined by MassDOT Highway. Data provided on this map is not sufficient for either boundary determination or regulatory interpretation.

Produced 5/11/2015 by NMCOG.
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Table 11.3: Heavy Truck Counts by Vehicle Classification on Roadways with Five Percent or More Daily Truck Traffic

<table>
<thead>
<tr>
<th>Town</th>
<th>Roadway</th>
<th>I</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>Total</th>
<th>ADT</th>
<th>% Truck Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billerica</td>
<td>High Street (south of Mt. Pleasant Street)</td>
<td>71</td>
<td>65</td>
<td>18</td>
<td>6</td>
<td>71</td>
<td>9</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>316</td>
<td>5,200</td>
<td>5.1</td>
</tr>
<tr>
<td>Billerica</td>
<td>Route 3 (South of Treble Cove Road)</td>
<td>2,562</td>
<td>581</td>
<td>238</td>
<td>2,568</td>
<td>106</td>
<td>10</td>
<td>92</td>
<td>30</td>
<td>18</td>
<td>0</td>
<td>19</td>
<td>6,564</td>
<td>94,230</td>
<td>12.1</td>
</tr>
<tr>
<td>Chelmsford</td>
<td>Acton Rd (Rte 27 at Westford TL)</td>
<td>49</td>
<td>16</td>
<td>2</td>
<td>10</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>86</td>
<td>4,383</td>
<td>8.3</td>
</tr>
<tr>
<td>Chelmsford</td>
<td>Gorton Road (Rte 40 at Westford TL)</td>
<td>66</td>
<td>156</td>
<td>40</td>
<td>12</td>
<td>116</td>
<td>36</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>470</td>
<td>12,900</td>
<td>7.1</td>
</tr>
<tr>
<td>Chelmsford</td>
<td>Route 3</td>
<td>747</td>
<td>408</td>
<td>118</td>
<td>944</td>
<td>823</td>
<td>68</td>
<td>102</td>
<td>31</td>
<td>25</td>
<td>0</td>
<td>17</td>
<td>3,283</td>
<td>86,900</td>
<td>12.5</td>
</tr>
<tr>
<td>Chelmsford</td>
<td>Steadman Street (south of Dalton Road)</td>
<td>69</td>
<td>101</td>
<td>54</td>
<td>139</td>
<td>69</td>
<td>14</td>
<td>27</td>
<td>62</td>
<td>54</td>
<td>0</td>
<td>0</td>
<td>589</td>
<td>8,300</td>
<td>6.7</td>
</tr>
<tr>
<td>Dracut</td>
<td>Bridge Street (Lowell City Line)</td>
<td>174</td>
<td>93</td>
<td>5</td>
<td>130</td>
<td>56</td>
<td>6</td>
<td>22</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>199</td>
<td>14,073</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td>Lowell</td>
<td>Central Street (south of Jackson Street)</td>
<td>126</td>
<td>81</td>
<td>54</td>
<td>103</td>
<td>78</td>
<td>33</td>
<td>16</td>
<td>91</td>
<td>217</td>
<td>0</td>
<td>43</td>
<td>884</td>
<td>11,900</td>
<td>9.5</td>
</tr>
<tr>
<td>Lowell</td>
<td>Industrial Ave (south of Rte 110)</td>
<td>57</td>
<td>170</td>
<td>87</td>
<td>108</td>
<td>117</td>
<td>22</td>
<td>42</td>
<td>49</td>
<td>72</td>
<td>0</td>
<td>122</td>
<td>826</td>
<td>12,400</td>
<td>5.5</td>
</tr>
<tr>
<td>Lowell</td>
<td>Industrial Ave East (under Lowell Connector)</td>
<td>105</td>
<td>131</td>
<td>60</td>
<td>93</td>
<td>111</td>
<td>11</td>
<td>26</td>
<td>21</td>
<td>37</td>
<td>0</td>
<td>141</td>
<td>738</td>
<td>12,200</td>
<td>5.1</td>
</tr>
<tr>
<td>Lowell</td>
<td>Rte 38 Rogers Street (North of Boylston St)</td>
<td>642</td>
<td>102</td>
<td>207</td>
<td>174</td>
<td>367</td>
<td>62</td>
<td>66</td>
<td>293</td>
<td>235</td>
<td>0</td>
<td>45</td>
<td>2,193</td>
<td>23,674</td>
<td>13.7</td>
</tr>
<tr>
<td>Lowell</td>
<td>Varnum Avenue (Rte 113 west of Mammoth Rd)</td>
<td>428</td>
<td>174</td>
<td>50</td>
<td>105</td>
<td>114</td>
<td>12</td>
<td>8</td>
<td>29</td>
<td>17</td>
<td>0</td>
<td>13</td>
<td>950</td>
<td>8,200</td>
<td>11.6</td>
</tr>
<tr>
<td>Lowell</td>
<td>Groham Street (1A) (North of Ellsworth St)</td>
<td>390</td>
<td>73</td>
<td>16</td>
<td>83</td>
<td>76</td>
<td>7</td>
<td>81</td>
<td>22</td>
<td>20</td>
<td>0</td>
<td>6</td>
<td>774</td>
<td>17,344</td>
<td>10.1</td>
</tr>
<tr>
<td>Tewksbury</td>
<td>Main Street (East of Pleasant Street)</td>
<td>334</td>
<td>125</td>
<td>24</td>
<td>106</td>
<td>134</td>
<td>8</td>
<td>26</td>
<td>50</td>
<td>41</td>
<td>0</td>
<td>33</td>
<td>881</td>
<td>17,211</td>
<td>13.1</td>
</tr>
<tr>
<td>Tyngsborough</td>
<td>Pawtucket Blvd</td>
<td>80</td>
<td>24</td>
<td>2</td>
<td>57</td>
<td>20</td>
<td>4</td>
<td>0</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>198</td>
<td>8,565</td>
<td>12.0</td>
</tr>
</tbody>
</table>

Total: 5,880,2,500,975,4,708,2,685,140,538,726,754,0,445,19,551,137,482,5.8

Source: NMMPO Traffic Count Program
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WEIGHT RESTRICTED BRIDGES

Many older bridges were designed for loads that no longer meet modern freight demands. As a result, weight restrictions have been placed on the use of these bridges to prevent premature structure failure or excessive damage. Weight restrictions, insufficient vertical clearance, and reduced speed limits on bridges often negatively affect the movement of freight and goods through the region. Beyond the economic impacts, freight drivers must find alternate routes, which extends travel time, uses more fuel, and harms the environment.

Currently, thirteen bridges in the Northern Middlesex region are posted as weight restricted, which represents 6.3% of all bridges in the region. As shown in Table 11.4 below, nine of the weight restricted bridges lie in the City of Lowell, including the Enel-owned spans over canals. Additionally, 24.6% (51) of the bridges in the Northern Middlesex region have posted vertical clearances.

Currently, there are eight privately-owned bridges in Lowell that cross the City’s canal system. Six of these bridges are weight restricted as they are currently in a state of disrepair. Suffolk Street over the Northern Canal has been closed to all traffic. The condition of these bridges adversely impacts public safety, economic development and traffic congestion. Certain vehicles, such as LRTA and UMass Lowell buses, fire trucks and commercial vehicles, are prohibited from using these spans and must find alternative routes, which can be difficult at times. The City of Lowell has negotiated an agreement to acquire the privately-owned bridges from Enel Green Power, assuming that federal and/or state resources can be secured to fund the needed repairs. This initiative is being undertaken through a partnership involving the City, UMass Lowell and Enel Green Power.

<table>
<thead>
<tr>
<th>Community</th>
<th>Bridge Description</th>
<th>Under Bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billerica</td>
<td>Faulkner St.</td>
<td>Concord River</td>
</tr>
<tr>
<td>Billerica</td>
<td>Boston Rd. (Rte. 3A)</td>
<td>Shawsheen River</td>
</tr>
<tr>
<td>Chelmsford</td>
<td>Westford St.</td>
<td>I-495</td>
</tr>
<tr>
<td>Chelmsford</td>
<td>Meadowbrook Rd.</td>
<td>Canal</td>
</tr>
<tr>
<td>Lowell</td>
<td>Lawrence St.</td>
<td>Concord River</td>
</tr>
<tr>
<td>Lowell</td>
<td>Market St.</td>
<td>Western Canal</td>
</tr>
<tr>
<td>Lowell</td>
<td>VFW Highway</td>
<td>Beaver Brook</td>
</tr>
<tr>
<td>Lowell</td>
<td>Pawtucket St</td>
<td>Northern Canal</td>
</tr>
<tr>
<td>Lowell</td>
<td>Pawtucket St</td>
<td>Pawtucket Canal</td>
</tr>
<tr>
<td>Lowell</td>
<td>Central St</td>
<td>Lower Pawtucket Canal</td>
</tr>
<tr>
<td>Lowell</td>
<td>Suffolk St</td>
<td>Northern Canal</td>
</tr>
<tr>
<td>Lowell</td>
<td>Appleton St.</td>
<td>Throtdike St.</td>
</tr>
<tr>
<td>Lowell</td>
<td>Wood St. Extension (Rourke Bridge)</td>
<td>Merrimack River and Boston &amp; Maine Railroad</td>
</tr>
</tbody>
</table>

Source: MassDOT and City of Lowell
Power has committed to improving two of the bridges, the City has applied for a TIGER grant to fund the rest of the bridge rehabilitation program.

**FREIGHT RAIL**

Historically, truck competition and burdensome economic regulations led to a decline in railroad service and, in the case of many northeastern railroads, bankruptcy. However, with the passage of the Staggers Act in 1980, which substantially deregulated the industry, the railroads have made a comeback, hauling 40% more traffic than they did during World War II on over 44% less track. According to the Association of American Railroads (AAR), there were 562 railroads of all sizes in the United States operating over 172,101 miles of track in 2008. Fourteen freight railroads operate in Massachusetts, the largest of which are CSX Transportation, Pan Am Railways, Providence and Worcester Railroad, and New England Central Railroad. These companies provide the major rail connections to the national system along the following corridors:

- The southern east-west route along the CSX Boston line, which connects to the CSX national system in Selkirk, NY, is the most heavily used freight rail corridor in Massachusetts.
- The northern east-west route, operated by Pan Am, connects to the Norfolk Southern Class 1 rail network in Mechanicville, New York, through a major rail yard in Ayer and with connections to New Hampshire and Maine.
- The most heavily used north-south route owned by NECR and P&W connects to the Canadian National rail network through Connecticut and Vermont.
- Short-line railroads such as the Housatonic, Pioneer Valley, Mass Central, and Mass Coastal provide key linkages to rail customers from longer-distance rail corridors.

MassDOT has responsibility for the care and custody of a portfolio of railroad properties, including 100 miles of active rail, 35 miles of inactive right-of-way and 80 acres of railroad property. Massachusetts acquired these properties in the 1980s to preserve rail service and freight lines that otherwise would have been abandoned. Currently, MassDOT has license and operating agreements in place with two railroads for two separate lines. Both of these lines lie outside of the region.

Rail is typically used to ship heavier bulk commodities and other goods over long distances. The delivery of such goods is generally not time-sensitive. Increasingly, many rail companies are able to provide on-time delivery and are expanding into the intermodal container and perishable goods markets. Goods moved by rail account for 6.5% of all freight movements in Massachusetts, according to the *Massachusetts Freight Plan*. Table 11.5 on the following page details rail movements by commodity in Massachusetts in 2007. This is the most recent information available.
Table 11.5: Top Ten Rail Movements by Commodity in Millions of Tons, 2007

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Truck Tons</th>
<th>% Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulp, Paper or Allied Products</td>
<td>2,773</td>
<td>15.5%</td>
</tr>
<tr>
<td>Miscellaneous Mixed Shipments</td>
<td>2,148</td>
<td>12.0%</td>
</tr>
<tr>
<td>Chemicals or Allied Products</td>
<td>2,108</td>
<td>11.7%</td>
</tr>
<tr>
<td>Waste or Scrap Materials</td>
<td>2,049</td>
<td>11.4%</td>
</tr>
<tr>
<td>Food or Kindred Products</td>
<td>1,800</td>
<td>10.0%</td>
</tr>
<tr>
<td>Clay, Concrete, Glass or Stone</td>
<td>1,307</td>
<td>7.3%</td>
</tr>
<tr>
<td>Coal</td>
<td>1,301</td>
<td>7.3%</td>
</tr>
<tr>
<td>Lumber or Wood Products</td>
<td>1,017</td>
<td>5.7%</td>
</tr>
<tr>
<td>Farm Products</td>
<td>958</td>
<td>5.3%</td>
</tr>
<tr>
<td>Transportation Equipment</td>
<td>705</td>
<td>3.9%</td>
</tr>
<tr>
<td><strong>Total Tons</strong></td>
<td><strong>17,942</strong></td>
<td><strong>90.1%</strong></td>
</tr>
</tbody>
</table>

Source: Global Insight, TRANSRESEARCH 2008 Release

The Northern Middlesex Region is directly served by Pan Am Railways (PAR). The region serves as the major connection for freight movement by rail between New Hampshire and Massachusetts. Both raw and completed materials pass through this region on rail lines to their final destinations. Table 11.6 below and Map 11.3 on page 273 detail the active rail lines in the Northern Middlesex region.

Table 11.6: Rail Lines in the Northern Middlesex Region

<table>
<thead>
<tr>
<th>Rail Line</th>
<th>Location</th>
<th>Distance (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Rail Lines Owned by Pan Am</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Former Lowell Secondary Track (out of service)</td>
<td>Lowell CBD to Industrial Avenue</td>
<td>3.8</td>
</tr>
<tr>
<td>Former Tewksbury Branch</td>
<td>Wamesit to Tewksbury Center</td>
<td>1.9</td>
</tr>
<tr>
<td>Billerica Branch (out of service)</td>
<td>Billerica Center to North Billerica</td>
<td>2.4</td>
</tr>
<tr>
<td>Stony Brook Freight Main Line</td>
<td>Willows (Ayer) to North Chelmsford</td>
<td>13.2</td>
</tr>
<tr>
<td>NH Route Branch</td>
<td>North Chelmsford to Lowell</td>
<td>3.2</td>
</tr>
<tr>
<td>Lowell Branch</td>
<td>Bleachery to Lowell Junction</td>
<td>7.9</td>
</tr>
<tr>
<td>NH Route Branch</td>
<td>Bleachery to Lowell</td>
<td>0.7</td>
</tr>
<tr>
<td>Northern Main Line</td>
<td>North Chelmsford to NH line</td>
<td>5.6</td>
</tr>
<tr>
<td><strong>Active Rail Lines with Tonnage Below Three Million Per Mile</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Springfield Terminal Track</td>
<td>Lowell</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>Billerica</td>
<td>2.5</td>
</tr>
<tr>
<td>B &amp; M Track</td>
<td>Lowell and Lawrence</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>Tewksbury</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Source: 2010 MassDOT State Rail Plan

Pan Am Railways (PAR) is a privately held Class II/regional rail carrier with operations in five New England states and New York. Its operational headquarters are located in North Billerica. Pan Am has connections to the New England Central Railroad in Montague and Northfield, and the Providence and Worcester Railroad in Gardner and Worcester. Pan Am exchanges traffic with CSX
Corporation in Worcester. PAR also connects with Pan Am Southern (PAS) in Ayer. It should be noted that CSX does not service Ayer directly; CSX trains from Worcester may be operated by PAS/Springfield Terminal Railroad (ST) crews to Ayer. Norfolk Southern, via the Patriot Corridor, interchanges with PAR/PAS in Ayer. PAR also interchanges with CSX in Worcester.

The PAR/PAS owns approximately 216 miles of active railroad right-of-way in Massachusetts but operates on over 373 miles in the state (some via trackage rights). Rail ownership and operations of PAR are carried out by its subsidiaries, the Boston and Maine Corporation (B&M), which is the property owner, and ST, which operates the railroad and in joint ownership with Norfolk Southern (NS) and Pan Am Southern. The PAR operates via haulage or trackage rights on MBTA-owned tracks and rights-of-way in Lowell and Tyngsborough. Trackage rights allow one railroad to use another railroad’s track via a contract that pays the host railroad a fee for the use. Haulage rights are basically the same, but the host railroad supplies the train crew.

There are three principal freight rail corridors operating in the Northern Middlesex region. The freight main line which runs from Boston northwestward through the region into the Devens area has approximately six trains that operate daily, each carrying between 60 and 75 rail cars. The PAR/PAS Freight Main Line is the railroad’s most important line within the Commonwealth. It runs 475 miles from northern Maine to eastern New York. The freight main line between New Hampshire and Boston is owned by the MBTA. The New Hampshire main line, which branches off from the freight main line in Lowell and runs through Concord, New Hampshire, has approximately four trains traveling in both directions daily, and trains run in both directions from the western portion of the state through Tewksbury and into New Hampshire. Actual figures for the amount of tonnage being moved are not available as the rail company is a private entity, considers the data proprietary.

Existing freight railroad yards in the region are shown in Table 11.7 below. Currently there are no distribution or intermodal freight facilities that serve more than one user. There are many companies throughout the area that use rail for distribution; however, each facility serves only one company. There are few large (over 100 acres) sites available for freight activity inside the I-495 corridor.

<table>
<thead>
<tr>
<th>City/ Town</th>
<th>Name of Facility</th>
<th>General Function</th>
<th>Other Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowell</td>
<td>Turnout Yard</td>
<td>Merchandise Freight</td>
<td>Several tracks near Gallagher Transportation Center used for block swapping and local freight.</td>
</tr>
<tr>
<td>North Billerica</td>
<td>Shop Yard</td>
<td>Merchandise Freight</td>
<td>A number of consignees use various tracks in the old yard where the former B&amp;M shops are located.</td>
</tr>
</tbody>
</table>

Source: 2010 Massachusetts State Rail Plan
Map 11.3: Rail Lines in the Northern Middlesex Region

Sources: MassGIS/CTPS (6/15/2014 rail lines); MassDOT/NMCOG (2013 roads); MassGIS (2005 land use, town boundaries); MassDEP (water).

Data provided on this map is not sufficient for either boundary determination or regulatory interpretation.

Produced 5/11/2015 by NMCOG.
Beyond the region, Ayer has proven to be an excellent location for intermodal transportation and distribution. The implementation of the Patriot Corridor, a joint venture between Norfolk Southern (NS) and Pan Am, will provide infrastructure upgrades such as intermodal facilities in Ayer and Mechanicville, NY. The upgrades significantly improve rail connections with the NS system and the rest of the United States. These improvements will increase competition with CSX and its Boston-Worcester-Selkirk, NY main line. This arrangement also created the Pan Am Southern Railroad, which is operated by Springfield Terminal Railroad (ST), a fully owned subsidiary of Pan Am. This new transportation system and facility benefits freight rail service throughout Massachusetts and helps this region compete with the major facilities in New York, Philadelphia, and Baltimore.

MARITIME AND PORT FACILITIES

The major Massachusetts ports of Boston, Salem, Gloucester, New Bedford and Fall River ship and receive a variety of commodities both domestically and internationally. Goods moved by water account for 4.9 percent of all freight movements in Massachusetts, with the majority of goods consisting of petroleum and coal products. The ports of Boston and Portsmouth, New Hampshire are the major maritime facilities closest to the Northern Middlesex region. The ports are accessible to all Atlantic Ocean sea routes. The principal inland market areas associated with these ports are the mid-Atlantic, northeastern and mid-western states.

The marine terminals in Boston include both publicly and privately owned and operated facilities. The Massachusetts Port Authority (MassPort) is responsible for the overall management, safety, operation, and marketing of these facilities. The principal types of cargo handled by Massachusetts ports include:

- Petroleum and other fuels;
- Dry bulk cargo such as waste, cement, scrap metal, gypsum, salt and stone;
- Containerized cargo including machinery, frozen fish and electronics;
- Non-fuel liquids such as vegetable oils and chemicals; and
- General cargo including automobiles, fresh fruit, waste paper, iron and steel.

Conley Terminal, located in South Boston, serves three of the world’s top 10 container lines and handles nearly 1.5 million metric tons of cargo each year. With the completion of Boston’s Big Dig, access to Conley Terminal is more convenient than ever. A haul road provides easy connections for truckers to the national interstate system, given that I-93, I-90, and I-95 are one mile or less from the terminal.
NATURAL GAS PIPELINES

The U.S. natural gas pipeline network is a highly integrated transmission and distribution grid that can transport natural gas to and from nearly any location in the continental U.S. There is currently one major interstate pipeline located in the region and Kinder Morgan proposes to construct another.

The Maritimes & Northeast Pipeline delivers natural gas from the Sable Offshore Energy Project to markets in Atlantic Canada and the Northeast United States. The Maritimes pipeline system consists of a 670-mile underground pipeline running from Goldboro, Nova Scotia, through Nova Scotia and New Brunswick, to the Canadian-U.S. border near Baileyville, Maine. The pipeline continues through Maine and New Hampshire into Massachusetts, where it connects with the existing North American pipeline grid in Dracut. With the completion of the Maritimes Phase III project, the pipeline now extends from Methuen to Beverly, interconnecting with the Algonquin Gas Transmission Company system. Maritimes is owned by Spectra Energy Partners, ExxonMobil Corporation and Emera, Inc.

Northeast Energy Direct (NED) is a large interstate pipeline project proposed by Kinder Morgan and the Tennessee Gas Pipeline Company. The project, if approved, would include a new 39” high-pressure natural gas transmission line that has a “supply path” from Pennsylvania to New York and a “market path” from New York to Massachusetts. The new pipeline would also include the construction of nine compressor stations and seven lateral lines within Massachusetts, including the 20-inch, 16-mile long Lynnfield lateral which would be partly located in Dracut and Tewksbury. It would transport gas directly from the hydraulic fracting fields of Pennsylvania to the eastern natural gas hub in Dracut, Massachusetts, with a direct connection to the Maritimes & Northeast Pipeline. The NED project would provide up to 2.2 billion cubic feet per day of natural gas. The project is currently in pre-filing phase of the FERC permitting process, and assuming the project is permitted, the pipeline line could go into service in November 2018.

AIR FREIGHT FACILITIES

Air freight is a small but growing mode of transport in Massachusetts, often used for carrying high-value and time-sensitive cargo. Given that the state and the region are centers of high-tech manufacturing in such sectors as biotechnology, nanotechnology, pharmaceuticals, defense and information technology, air freight is critical to future economic prosperity. Air freight is projected to grow more quickly than other modes of goods transport.
All major air freight activities in Massachusetts are handled at Boston’s Logan Airport. In 2012, Logan Airport moved 684,875 tons of cargo, making it the 10th busiest airport in the U.S in terms of cargo. ² Over $7.1 million in international freight leaving the state departed via Logan, while $5.9 million of inbound international air freight was handled there as well.³ While there are no major airports in the Northern Middlesex region, both Logan Airport and Boston-Manchester Regional Airport are within an hour drive. These airports, along with a general aviation airport at Hanscom Field in Bedford, MA, provide air freight connections for the region. Manchester, New Hampshire and Boston are served by major air freight carriers, including FedEx and UPS.

There is one small private airport in the Northern Middlesex region located in Pepperell. It is owned by the Pepperell Airport Trust and prior permission is required for landing.

CURRENT FREIGHT MOVEMENTS

Goods in Massachusetts are typically delivered by truck, rail, air or ship. Massachusetts is a destination for freight given its large consumer markets, relatively high per capita income, and the dominant role of service and high-tech industries. A well performing freight system is essential for the state’s industries, particularly given the importance of receiving bulk products by rail or sea, and shipment of high-value goods to domestic and international markets.

Freight is typically measured by weight in tons; however, the value of freight is also a major consideration. In Massachusetts, as in the nation overall, the value of freight tends to increase more quickly than its weight. Both the value and the weight increase over time as the economy grows. Freight can also be measured in ton-miles, which is the weight multiplied by the miles traveled. When this measure increases more quickly than weight, it indicates that more goods are being shipped further away and that markets are expanding.

A major freight planning challenge at the regional level is the collection of new and robust localized data specific to the region. More specifically, some of the limitations related to local freight data collection include:

- Difficulty in obtaining proprietary data from private sources;

² MassPort

³ Ibid
Privately-maintained data sets are costly and require extensive analysis;
Publicly available data often lacks industry detail due to privacy concerns;
Inaccurate or nonexistent local-level commodity flow data;
Inconsistency of data across different modes of transportation;
Limitations in local applicability of national data, which typically results in less than robust data; and
Discontinuation of certain current data collection processes that could provide critical data at various geographic levels.

As a result of the above limitations, NMMPO staff analyzed commodity flow data for the entire state of Massachusetts available through FHWA’s Freight Analysis Framework. This data tabulation tool integrates data from a variety of sources to create a comprehensive picture of freight movement among states by all modes of transportation. Total flows include those between domestic origins and destinations and includes both domestic and foreign shipments.

Appendix O presents information on Massachusetts freight shipments by weight and mode for 2007 and 2012, and provides projections through 2040. It also provides information by value and mode for the same years. This data indicates that trucks move the vast majority of the weight and value of freight within, from and to Massachusetts. High rates of growth in freight movement indicate continued need for transportation investments. In the future, the majority of commercial goods are likely to move by truck, while some will move by rail. Attention to rail capacity and investment in major highways will be needed to support continued economic growth. High growth in freight shipped abroad is expected, suggesting an increasing importance for establishing intermodal facilities.

Appendix O also details the top commodity groups shipped to, from and within Massachusetts for all modes in 2007, 2012, and projected to 2040, by weight and value. Coal was the top commodity shipped by weight within the state, from the state, and to the state in 2012. Machinery was the top commodity shipped within Massachusetts by value, at $20 billion dollars in 2012. Electronics was the top valued commodity shipped to and from Massachusetts in 2012, at approximately $31 billion.

According to the Massachusetts Freight Plan, Middlesex County experienced the largest volume of freight movements in Massachusetts (over 70 million tons) in 2007 as compared to other counties. The top ten movements in the county were either inbound or internal. Inbound shipments included more than 6 million tons from the surrounding Boston metropolitan area, 4.5 million tons from Norfolk County, nearly 4 million tons from the New York region and Worcester County, and
slightly more than 3.4 million tons from Suffolk County. In the future, the growth in the consumer market, the volume of through traffic, and the specialized shipping needs of high value-added goods could lead to increased goods movement in Massachusetts.

**FREIGHT MOVEMENT CHALLENGES AND OPPORTUNITIES**

Regional freight mobility is driven by broad national and international trends. These include federal deregulation of the carrier industries and related international trade trends. New technologies are being used for container shipping. Business and manufacturing efficiencies now rely on outsourcing such that final assembly of products depends upon precise and reliable delivery schedules.

As the Massachusetts and regional economies become more service-based, freight is increasingly concentrated on high-value, low weight products that are shipped in smaller packages and require faster delivery. Despite a drop in the share of jobs within the manufacturing sector, manufacturing output has increased over the past decade. Much of this growth has been in high-value, low weight products such as electronic instruments and medical devices. This fast growth in value of smaller shipments is supported by just-in-time inventory systems, which reduce inventory carrying costs and overall logistics costs.

Freight concerns largely involve mobility and access issues. Mobility issues focus on efficient and reliable traffic conditions on the region's highways and major arterials, as well as grade crossings on freight railroad lines. Access issues deal with roadway geometrics, intermodal interchanges, bridge clearances, and the need to provide efficient connections to major freight facilities.

According to FHWA, several key challenges face the freight transportation industry including:

1. congestion and expanding capacity; 2. improving systems operations; 3. planning and financing freight projects; 4. safety and environmental effects of freight transport; 5. national security; and 6. building professional capacity in the freight sector. The transportation network capacity has not increased at a rate equivalent to the growth in travel and commerce. When demand exceeds supply, the resulting congestion can have a highly negative effect on freight transportation speed and dependability. This can be devastating for businesses that increasingly rely on tightly integrated operations, limited inventory, and just-in-time manufacturing and retailing.

Existing barriers to and potential opportunities for the efficient movement of goods by highway and rail in the Northern Middlesex region and throughout Massachusetts, as outlined in the *Massachusetts Freight Plan*, include the following:
AGING INFRASTRUCTURE

The age of infrastructure within Massachusetts and the region has resulted in a need for significant improvements to accommodate existing freight movements and to support the heavier loads that are becoming standard in the freight industry. The Association of American Railroads (AAR) estimates that $148 billion is needed nationally for freight rail investment. Support for funding such freight infrastructure projects remains challenging.

BRIDGE DEFICIENCIES

Bridges are a critical link in the highway network. In the Northern Middlesex region, there are 14 bridges listed as structurally deficient out of 199 bridges. Bridge weight limits, overweight route restrictions, municipally imposed truck exclusions, and hazardous material restrictions can result in longer truck routes or the use of less appropriate streets. The MassDOT Accelerated Bridge program has reduced the number of structurally deficient bridges statewide, but in the Northern Middlesex region the number of structurally bridges has doubled since completion of the 2012 RTP four years ago.

LOW VERTICAL CLEARANCE

Many rail corridors do not meet sufficient vertical clearance (20’8”) to support second generation double-stack intermodal container traffic. Containers are now the dominant form of moving finished goods internationally via container ship. There are currently no double stack container routes within Massachusetts. If clearances were to improve, it would make rail more competitive in Massachusetts by increasing efficiency and capacity per trip. According to the Massachusetts Freight Plan, full double-stack vertical clearance on the Pan Am Southern line was identified to have produced a high return on investment.

WEIGHT

Over the years, freight railroads have shifted their weight-on-rail from the traditional standard of 263,000 pounds to a heavier gross weight of 286,000 pounds for individual rail cars. The shift increases competitiveness by allowing for more efficient and cost effective transportation of heavy bulk goods.

Only three railroads in the state have been approved for 286,000 lbs. The entire CSX Boston Line is rated to carry cars weighing up to 315,000 lbs. (although secondary tracks are generally rated at
263,000 lbs). The entire Housatonic Railroad and limited sections of the Providence and Worcester line are rated to carry 286,000 lb. cars.

All other railroad lines in the state, including those in the Northern Middlesex region, are currently rated at 263,000 lbs. However, the creation of PAS (as part of the Patriot Corridor project) is anticipated to increase the allowed weight on this rail line from 263,000 lbs to 286,000 lbs from Mechanicville, New York to Ayer, Massachusetts.

### Railroad Grade Crossings and Freight Safety

Railroad grade crossings present a safety problem throughout Massachusetts. Unsafe or inadequate crossings can increase the risk of train and vehicle collisions resulting in potential loss of life, 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 (AAR). On a national level, FHWA is actively working to address issues related to grade crossing accidents. As of December 2009, the United States had 136,041 public at-grade crossings. Of these crossings, approximately 42,301 had gates, 22,039 had flashing lights, and 1,196 had 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.

The development of a detailed database of rail crossing sites in the Northern Middlesex region would be helpful in identifying existing issues with the rail network and would be crucial in the production of recommendations for future safety improvements.

### Traffic Congestion, Delay, and Bottlenecks

The trucking industry is hindered by the same traffic congestion that affects automobile traffic. Congestion, delays, and “bottlenecks” that occur along roadways and at intersections adversely impact travel time and air quality. It also affects the cost and efficiency of truck transport and, subsequently, the reliability required for just-in-time delivery. Congestion is occurring at a time when the need for reliable truck travel is likely to increase significantly.

According to the *Massachusetts Freight Plan*, traffic congestion continues to grow with over 93 million hours of person delay on Massachusetts highways. 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
Traffic congestion and delay will continue to increase as the region’s traffic volumes grow. Massachusetts moves a high volume of goods by truck and a relatively low volume by rail. Although geographic and market characteristics limit the potential for significant mode shifts, a more diverse multi-modal system would help relieve some roadway congestion problems. In addition, shifting some future freight growth from the highway to rail could produce environmental benefits and reduce energy consumption.

In order to improve freight operations, emphasis is now being placed on better management of public infrastructure and the use of intelligent transportation system (ITS) technologies. As a part of highway and trucking operations, ITS is used to monitor traffic conditions and provide information on traffic incidents. This is important as federal, state, and local policymakers, as well as the private sector, are making major capital investments to eliminate freight bottlenecks and ensure capacity for future growth.

### TRAFFIC DESIGN

Traffic design issues often contribute to a less reliable freight network. For example, turning radii on narrow roads or encroachment of structures may be an issue for shippers and motor freight carriers. Common roadway design considerations for truck activities include intersection design, cross-section and geometric design, signalization, and grade separation.

### TRUCK IMPACTS ON ROADWAYS

The high truck volumes associated with freight transport significantly impact pavement and bridge conditions, require more energy per ton mile traveled, and result in greater emissions as compared to freight shipped by rail. Improving and preserving conditions along existing freight routes would prevent wear and tear on roadways that are not designed to handle such loads, and would lessen community and environmental impact.

### LACK OF TRUCK STOP FACILITIES

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4 2014 NMCOG Traffic Volume Report
A lack of rest areas (or truck stops) can impact safety as a result of driver fatigue. It can also impact logistics due to overcrowding at existing truck stop facilities. Truck parking demand at some rest areas tends to exceed supply, which may also lead to trucks parking in unsafe, poorly lit areas. The Northern Middlesex region contains only one rest area along I-495 in Chelmsford and there are no truck weigh stations within the region.

### RAIL NETWORK DEMAND

While the rail network in Massachusetts represents only 25 percent of the entire rail network in New England, it carries more than 40 percent of all freight moving through New England.

There are increasingly clear benefits to moving goods by rail versus alternative modes. Relatively high fuel prices tend to make freight rail more competitive with trucks as rail has “per ton mile” advantages of lower shipping costs, greater energy efficiency, and less air emissions. Diverting freight to rail will reduce trucks on roadways, which will relieve highway congestion, reduce the number of highway crashes, and lessen pavement damage.

### RAIL ACCESS

Development pressures on land adjacent to rail have reduced the potential pool of rail-served businesses. Many existing businesses along rail lines need to build or upgrade the rail sidings that serve them. Additionally, new industrial sites often lack rail access. This infrastructure expense is generally far higher than most highway connections and thus limits opportunities to ship by rail.

### SHARED USE RAIL NETWORKS

In Massachusetts, much of the freight rail system operates on corridors that also have commuter and/or intercity rail passenger service. While shared use rail operations allow for cost sharing benefits, they also create challenges with finances, liability, 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 sides for the most heavily traveled routes such as on the Northeast Corridor, Worcester-Boston route and the Downeaster route. Privately-owned freight rail providers generally finance rail improvements through current cash flow based on expectations of future demand. As passenger and freight rail needs exceed capacity, conflicts with shared corridors may become more apparent.

### INTERMODAL CONNECTION
Principal intermodal shipments to the state and region are related to container/trailer movements via rail cars. The purpose of these types of shipments is to allow a container/trailer to move from origin to destination without opening the container/trailer for re-handling or repacking. Within Massachusetts, there is a need for improved “last mile” connections to other modes – rail, air, and maritime.

Even though there are no intermodal facilities located in the Northern Middlesex region, the rail-to-truck intermodal traffic generated in Worcester has increased heavy truck traffic along I-495 through the region.

LAND USE CONFLICTS

For freight system users and operators, access to transportation and freight facilities (e.g., warehouses, distribution centers, intermodal yards, and other facilities) is very important and will frequently dictate where and how they locate. Freight system users frequently locate where transportation corridors converge. Communities could work to guide warehouse and distribution center development to appropriate locations for sustainable freight movement by taking into account modal accessibility needs and adjacent land uses. 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.

The Massachusetts Freight Plan recommends that the state adopt a policy on freight-intensive land uses that articulates the state’s intent on preserving existing uses and developing parcels in a manner that does not preclude rail access. In addition, the Plan recommends that MassDOT and the Executive Office of Housing and Economic Development (EOHED) develop a statewide inventory of major parcels (10 or more acres) of statewide strategic importance for intermodal centers, distribution/assembly centers, or freight villages. The plan suggests that MassDOT, EOHED, MassDevelopment and MassEcon collaborate in developing the inventory. The Plan further suggests that Chapter 43D Priority Development Site guidelines be revised to require maintenance of rail access, and that the MEPA process be streamlined for freight-intensive uses. Other recommendations contained in the plan include:

- Greater consideration of goods movement in funding allocations;
- Strategic multi-modal investments in projects of statewide significance;
- Creation of an industrial rail access program to provide funding assistance for construction or improvement of railroad tracks and facilities to serve industrial or
commercial sites where freight rail service is needed or anticipated in the future; and

- Increased public-private partnership opportunities and funding agreements.

PUBLIC-PRIVATE CHALLENGE

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.
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