CHAPTER IV

Transportation Modes
Introduction

The transportation system in the CMMPO region is a multimodal network of roads, bridges, transit services, freight facilities, bicycle routes, pedestrian facilities and intermodal connections that need to work as an integrated system throughout the 40 communities and beyond.

The transportation system is maintained by a number of different entities, including MassDOT, the Worcester Regional Transit Authority (WRTA), Massachusetts Bay Transportation Authority (MBTA), Massachusetts Port Authority (MassPort), private intercity bus carriers, private freight rail carriers, Department of Conservation & Recreation, Army Corps of Engineers, various local/regional/state entities and local communities. Mobility2040 recognizes that all of these stakeholders must work in a coordinated fashion to ensure seamless accessible connections between modes, with the result of providing access to the essential services of employment, health care, education, and recreation for all modal users.

In 2009, transportation reform legislation containing the Massachusetts Healthy Transportation Compact was signed into law. The Healthy Transportation Compact was designed to create a balance in transportation decisions so that all network users would have expanded mobility, access to essential services, a cleaner environment, and improved public health. MassDOT formalized its commitment to the Healthy Transportation Compact in September of 2013 when it issued a policy directive supporting the statewide mode shift goal. The Healthy Transportation Policy Directive ensures that all MassDOT projects are designed and implemented in a way that all customers have access to safe and comfortable healthy, active transportation options at all MassDOT facilities and in all services provided. This directive reflects USDOT’s Accommodating Bicycle and Pedestrian Travel: A Recommended Approach, a policy statement that calls for expanded focus on bicycle and pedestrian accommodation.

On 2010, the Massachusetts Department of Transportation launched GreenDOT; a comprehensive environmental responsibility and sustainability initiative making MassDOT a national leader in “greening” the state transportation system. One of the three primary goals of GreenDOT is to promote the healthy transportation options of walking, bicycling, and public transit. GreenDOT contains a section related to Complete Streets, which requires bicycle and pedestrian accommodation as part of the MassDOT Project Development and Design Guide.

The following sections provide a brief background of each mode and the associated performance management goals. For each mode, an analysis of gaps was performed and an assessment of
need (including an analysis of how well it provides access to essential services) was completed. Finally, a prioritization strategy to address the needs is presented.

**Pedestrian**

**Background**

Healthy, active transportation options are becoming increasingly important in the United States, especially among younger residents. According to *Millennials and Mobility* (APTA), nearly seventy percent (70%) of people 18 to 34 use multiple travel options several times or more per week. Even residents who travel primarily by private automobile are, at some point throughout the day, a pedestrian. Pedestrian travel is a healthy activity that is beneficial to the environment and low cost. It is imperative that safe, easy to use facilities are available where there is a high level of pedestrian activity. For CMRPC planning purposes, a pedestrian is any person travelling on foot or wheelchair (manual or motorized). According to the 2010-2011 Massachusetts Household Travel Survey, approximately 3.2% of CMRPC planning region residents commute to work by walking, while 10.1% of students travel to school via the same mode. Walking can be more efficient, affordable, and convenient than travelling by vehicle on congested streets. Furthermore, there are populations within the region that do not have access to a vehicle as a primary mode of transport, making walking a necessary part of their travels.

Adequate pedestrian infrastructure is essential to providing residents access to essential services. Not only does infrastructure need to exist in areas where there is demand, it also needs to be maintained in a proper manner so that it is accessible to the entire population. Maintenance is especially important in an area such as Central Massachusetts, which experiences harsh winter weather, impairing the travel of pedestrians. In addition, the connection of bicycle and pedestrian infrastructure with transit systems is essential to increasing the mobility of Central Massachusetts residents. The interconnection with the Worcester Regional Transit Authority and the Massachusetts Bay Transportation Authority provides residents with a higher level of multi-modal transportation options, as well as greater opportunities for active living.

**Performance Management**

As discussed in Chapter II of this report, MAP-21 requires performance based planning related to federal emphasis areas. CMRPC has adopted goals and objectives related to pedestrians for the Mobility2040 Long Range Transportation Plan.

**Goal: Reduce Congestion and Improve Mobility for all modes**

**Objective 4 – Improved Transportation Accessibility for all modes**
• Increase the number of ADA-compliant roadways and intersections. 2 locations every 5 years.
• Improvement in the bicycle and pedestrian network within ½ mile of transit stations – for the top 10 high boarding and alighting locations. 2 locations every 5 years.

Goal: Increase Transportation Options and Promote Healthy Modes

Objective 1 - Increase the share of transit, bicycling & walking in the region
• Triple walk/bike/transit share in Worcester by 2040
• Double walk/bike/transit share in urbanized areas outside of Worcester by 2040

Objective 2 - Expand the walk/bike network in the region
• Improve pedestrian network within 1/2 mile of high activity transit stops
• Identify bicycle/pedestrian/transit gaps in the region

Objective 3 - Work with member communities to implement Complete Streets policies
• 10% of communities in the region have a local Complete Streets policy over 10 years.

Goal: Equitable Transportation for all populations

Objective 1 - Provide access to essential services; minimize burdens and maximize benefits associated with low-income and minority areas
• Increase the number of ADA-compliant intersections by 10% over 10 years
• Inventory the bicycle and pedestrian network within a ½ mile of the top ten boarding/alighting transit locations in the next two years

Goal: Improve Economic Vitality and Freight Movement

Objective 2 – Increase access to major employment centers
• Improve the bicycle and pedestrian network near 2 major employment centers every 5 years.

Analysis

Regional Count Program
As part of the Central Massachusetts Regional Bicycle and Pedestrian plan, completed in 2011, staff initiated a pilot bicycle and pedestrian count program to monitor biking and walking trips within the region’s existing trail network. The intent of the inaugural count program was to
collect raw data and monitor regional trail usage. In 2012 and 2013, the program was expanded to include specific roadways within the City of Worcester that have marked on-road bicycle lanes. The purpose of including these roadways was to determine overall usage and commuting patterns from various points in Worcester. In 2014, the program was broadened to conduct counts at a community requested location. Staff selected locations that would allow the host community to make full use of the data; to assist a project design with bicycle and pedestrian elements, to complement communities’ future plans for enhancements such as adding a sidewalk or a crosswalk, or for general knowledge.

**Neighborhood SAFE**

Neighborhood SAFE is a new, proactive approach that CMRPC is undertaking in order to provide communities with small area infrastructure assessments from a pedestrian and bicyclist safety perspective. CMRPC has launched this effort to achieve the following objectives:

- Increase awareness of bicycling and walkability in communities throughout the region
- Identify safety issues that pedestrians and bicyclists face
- Provide neighborhood safety analysis for all users of the transportation system
- Generate enthusiasm for healthy, active transportation options

**Additional Efforts**

- **WalkBike Worcester:** Staff collaborates extensively with WalkBike Worcester to promote pedestrian projects and policy in the City of Worcester, and increasingly, the CMRPC region. Technical support and analysis is provided for initiatives, including snow removal efforts during the winter and Complete Streets promotion.
- **Safe Routes to School:** Staff is a key member of the Worcester Safe Routes to School Taskforce, has participated in extensive fieldwork and technical support efforts for the last two years of planning and execution.
- **PARK(ing) Day:** Staff participated in the first PARK(ing) Day celebration in Worcester, along with WalkBike Worcester, Worcester Department of Public Health, and other organizations.

**Needs Assessment**

The Central Massachusetts Regional Bicycle and Pedestrian Plan was last updated in 2011, this plan serves as a starting point for bicycle and pedestrian network development in the region. Since the completion of the previous plan in 2011, the region has seen significant interest and growth in improving existing facilities and providing new pedestrian and bicycle facilities. CMRPC staff will update the Regional Bicycle and Pedestrian Plan during 2015-2016 with
further analysis and extensive stakeholder/public outreach. For the purposes of Mobility 2040, preliminary analysis has taken place regarding bicycle and pedestrian related crash clusters as well as sidewalk condition and shoulder width on Federal Aid Eligible roadways in the region.

**Safety**

The Massachusetts Department of Transportation generates a listing of Highway Safety Improvement Program (HSIP) eligible Auto, Bike, and Pedestrian clusters for the Commonwealth. A list of HSIP eligible locations for the CMRPC planning region was derived from the statewide list. Ten (10) pedestrian crash clusters have been identified as HSIP eligible for the region. (It should be noted that mainline Interstate crash clusters have been removed from consideration due to jurisdictional issues.) Communities that wish to pursue HSIP funding for a project to improve safety at any of these locations will need to perform a Road Safety Audit (RSA). The Federal Highway Administration defines a Road Safety Audit (RSA) as the formal examination of an existing or future road or intersection by an independent, multidisciplinary team. The purpose of an RSA is to identify potential safety issues and possible opportunities for safety improvements considering all roadway users. Communities can contact CMRPC for further assistance regarding this requirement.

**Sidewalk Inventory & Management**

In conjunction with CMRPC’s regional bicycle and pedestrian planning and pavement management efforts, staff has launched the development of a regional sidewalk inventory. Data collection efforts are performed in tandem with the regional pavement data collection schedule and are observed through a visual inspection. The inventory includes detailed information such as the location of sidewalks along federal-aid eligible roads, direction along the roadway, sidewalk width, type of material, and general condition. In 2012, staff established the criteria and conducted a pilot study for one of the regions communities and as a result refined the data collection process to gather future sidewalk condition data. The regional sidewalk inventory will be updated on a three-year cycle, with the initial data of the entire region to be completed during the 2015 data collection season. Ongoing efforts include the digitization of observed sidewalk segments into GIS, including ramps and crosswalks and an updated table to “score” the overall condition of each segment.

In 2009, CMRPC staff conducted a visual survey of the existing walking and bicycling infrastructure and accommodations in the city and town centers of the MPO’s 40 community region. The purpose of the survey was to acquire a base inventory of these facilities within higher density areas and to take a cursory examination of what accommodations exist within the region.
**Prioritization**

In the CMRPC Region there are ten (10) High Priority HSIP Eligible Pedestrian Crash Locations (See Table IV-1). For the purposes of the Long Range Transportation Plan, the crash clusters that are HSIP eligible are considered highest priority. There is a large concentration of bicycle and pedestrian HSIP clusters within a half mile of the intersection located at Main Street and Chandler Street/Madison Street in Worcester. This intersection is also located within feet of the highest ranking automobile cluster in the region (#8 Statewide). A recent Road Safety Audit concerning the Main Street/CBD project in Worcester analyzed this high crash location. Furthermore, a MassDOT project to reconstruct the Belmont Street Bridge over Interstate 290 is currently underway. A Road Safety Audit was performed at this location, and the results of that exercise have been incorporated into the reconstruction effort. The only HSIP eligible pedestrian cluster outside of the City of Worcester is located in the center of the Town of Spencer. Figure IV-1 has been provided on the following page to provide additional information regarding HSIP eligible clusters in the Worcester Central Business District. Please see the 2009-2011 CMRPC Regional Safety Report for expanded discussion regarding other non-HISP eligible bicycle crash clusters.

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<th>Crash Count</th>
<th># Fatal</th>
<th># Injury</th>
<th># Non-Injury</th>
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**Access to Essential Services**

CMRPC is working toward promoting interconnected, multimodal transportation networks for all road users. FHWA has made bicyclist and pedestrian safety a high priority, along with providing a network that allows for access to essential services in an efficient manner. FHWA provides the following guidance in regards to this initiative: As part of the transportation planning process, identify transportation connectivity gaps in access to essential services. Essential services include housing, employment, health care, schools/education, and recreation. This emphasis area could include identification of performance measures and analytical methods to measure the transportation system's connectivity to essential services and the use of this
Figure IV-1  Central Worcester HSIP Clusters
information to identify gaps in transportation system connectivity that preclude access of the public, including traditionally underserved populations, to essential services. It could also involve the identification of solutions to address those gaps.

**Next Steps**

CMRPC staff will begin working on the update to the Regional Bicycle and Pedestrian Plan in the summer of 2015. This update will coincide with the completion of data collection related to sidewalk conditions along federal aid eligible roadways in the region. With Federal Planning Emphasis (PEA) Area Access to Essential Services as an overarching guide, staff will work with regional stakeholders to identify areas where gaps are present in the system. The updated Regional Bicycle and Pedestrian Plan will serve as the foundation for the development and expansion of a multimodal network that provides for all users. Gaps or deficiencies in the pedestrian network will be identified and prioritized in order to develop a listing of potential projects that could be funded with Congestion Mitigation Air Quality (CMAQ) or Transportation Alternative Program (TAP) funding sources.

**Bicycle**

**Background**

While recreation has been the preferred use for bicycling in the past, it is increasingly becoming the primary mode of transportation for everyday activities. As mentioned in the previous section, millennials are increasingly using multiple modes, including cycling, to travel on a daily basis. Nationwide, communities large and small are turning to bicycling to complete short trips, this holds true for the CMMPO region. According to the 2010-2011 Massachusetts Household Travel Survey, approximately 0.5% of CMRPC planning region residents commute to work via bicycle, while 0.2% of students travel to school via the same mode. Cycling can be more efficient, affordable, and convenient than travelling by vehicle on congested streets. Furthermore, there are populations within the region that do not have access to a vehicle as a primary mode of transport, making cycling a necessary part of their travels. The connection of bicycle and pedestrian infrastructure with transit systems is essential to increasing the mobility of Central Massachusetts residents.
Performance Management

As discussed in Chapter II of this report, MAP-21 requires performance based planning related to federal emphasis areas. CMRPC has adopted goals and objectives related to bicycling for the Mobility2040 Long Range Transportation Plan.

Goal: Reduce Congestion and Improve Mobility for all modes

**Objective 4 – Improved Transportation Accessibility for all modes**
- Improvement in the bicycle and pedestrian network within ½ mile of transit stations – for the top 10 high boarding and alighting locations. 2 locations every 5 years.

Goal: Increase Transportation Options and Promote Healthy Modes

**Objective 1 - Increase the share of transit, bicycling & walking in the region**
- Triple walk/bike/transit share in Worcester by 2040
- Double walk/bike/transit share in urbanized areas outside of Worcester by 2040

**Objective 2 - Expand the walk/bike network in the region**
- Expand bicycle infrastructure in the region by 50 miles by 2040
- Increase bicycle parking at public facilities in the next five years
- Identify bicycle/pedestrian/transit gaps in the region

**Objective 3 - Work with member communities to implement Complete Streets policies**
- 10% of communities in the region have a local Complete Streets policy over 10 years.

Goal: Equitable Transportation for all populations

**Objective 1 - Provide access to essential services; minimize burdens and maximize benefits associated with low-income and minority areas**
- Inventory the bicycle and pedestrian network within a ½ mile of the top ten boarding/alighting transit locations in the next two years

Goal: Improve Economic Vitality and Freight Movement

**Objective 2 – Increase access to major employment centers**
- Improve the bicycle and pedestrian network near 2 major employment centers every 5 years
Analysis

Regional Count Program
As part of the Central Massachusetts Regional Bicycle and Pedestrian plan, completed in 2011, staff initiated a pilot bicycle and pedestrian count program to monitor biking and walking trips within the region’s existing trail network. The intent of the inaugural count program was to collect raw data and monitor regional trail usage. In 2012 and 2013, the program was expanded to include specific roadways within the City of Worcester that have marked on-road bicycle lanes. The purpose of including these roadways was to determine overall usage and commuting patterns from various points in Worcester. In 2014, the program was broadened to conduct counts at a community requested location. Staff selected locations that would allow the host community to make full use of the data; to assist a project design with bicycle and pedestrian elements, to complement communities’ future plans for enhancements such as adding a sidewalk or a crosswalk, or for general knowledge of the importance of bicycle commuting within a community.

Neighborhood SAFE
Neighborhood SAFE is a new, proactive approach that CMRPC is undertaking in order to provide communities with small area infrastructure assessments from a pedestrian and bicyclist safety perspective. CMRPC has launched this effort to achieve the following objectives:

- Increase awareness of bicycling and walkability in communities throughout the region
- Identify safety issues that pedestrians and bicyclists face
- Provide neighborhood safety analysis for all users of the transportation system
- Generate enthusiasm for healthy, active transportation options

Bicycle Parking Program
The Central Massachusetts Metropolitan Planning Organization (CMMPO) has committed $100,000 in Transportation Alternatives Program (TAP) funding for installation of bicycle parking racks in the 2015-2018 Transportation Improvement Program (TIP). This program will allow municipalities to expand bicycle parking at a reduced cost. Currently in the planning stage, this program is expected to roll out in 2015 and 2016.

Needs Assessment
The Central Massachusetts Regional Bicycle and Pedestrian Plan was last updated in 2011, this plan serves as a starting point for bicycle and pedestrian network development in the region.
Since the completion of the previous plan in 2011, the region has seen significant interest and growth in improving existing facilities and providing new pedestrian and bicycle facilities. CMRPC staff will update the Regional Bicycle and Pedestrian Plan during 2015-2016 with further analysis and extensive stakeholder outreach. For the purposes of Mobility 2040, preliminary analysis has taken place regarding bicycle and pedestrian related crash clusters as well as shoulder width on Federal Aid Eligible roadways in the region.

**Shoulder Width**

Preliminary shoulder width analysis via the CMRPC Pavement Management Program has identified over 150 miles of roadway in the region with shoulders wide enough for bicycle accommodation. Staff will use this along with safety-related data to develop baseline analysis for the upcoming update of the Regional Bicycle and Pedestrian Plan.

**Safety**

The Massachusetts Department of Transportation generates a listing of Highway Safety Improvement Program (HSIP) eligible Auto, Bike, and Pedestrian clusters for the Commonwealth. A list of HSIP eligible locations for the CMRPC planning region was derived from the statewide list. Six (6) bicycle crash clusters have been identified as HSIP eligible for the region. (It should be noted that mainline Interstate crash clusters have been removed from consideration due to jurisdictional issues.) Communities that wish to pursue HSIP funding for a project to improve safety at any of these locations will need to perform a Road Safety Audit (RSA). The Federal Highway Administration defines a Road Safety Audit (RSA) as the formal examination of an existing or future road or intersection by an independent, multidisciplinary team. The purpose of an RSA is to identify potential safety issues and possible opportunities for safety improvements considering all roadway users. Communities can contact CMRPC for further assistance regarding this requirement.

**Other Efforts**

- **Walk Bike Worcester**: Staff collaborates extensively with Walk Bike Worcester to promote bicycle projects and policy in the City of Worcester, and increasingly, the CMRPC region. Technical support and analysis is provided for Walk Bike Worcester initiatives, including snow removal efforts during the winter and Complete Streets promotion.

- **Safe Routes to School**: Staff is a key member of the Worcester Safe Routes to School Taskforce, has participated in extensive fieldwork and technical support efforts for the last two years of planning and execution.
Prioritization

In the CMRPC Region there are six (6) High Priority HSIP Eligible Bicycle Crash Locations (See Table IV-2). For the purposes of the Long Range Transportation Plan, the crash clusters that are HSIP eligible are considered highest priority. There is a large concentration of bicycle and pedestrian HSIP clusters within a half mile of the intersection located at Main Street and Chandler Street/Madison Street in Worcester. This intersection is also located within feet of the highest ranking automobile cluster in the region (#8 Statewide). A recent Road Safety Audit concerning the Main Street/CBD project in Worcester analyzed this high crash location. Furthermore, a MassDOT project to reconstruct the Belmont Street Bridge over Interstate 290 is currently underway. A Road Safety Audit was performed at this location, and the results of that exercise have been incorporated into the reconstruction effort. Please see the 2009-2011 CMRPC Regional Safety Report for expanded discussion regarding other non-HISP eligible bicycle crash clusters.

Table IV-2: 2009-2011 High Priority Bicycle Clusters in the CMRPC Region

<table>
<thead>
<tr>
<th>Crash Count</th>
<th># Fatal</th>
<th># Injury</th>
<th># Non-Injury</th>
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<th>Street # 1</th>
<th>Street #2</th>
<th>Town</th>
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</table>

Access to Essential Services

CMRPC is working toward promoting interconnected, multimodal transportation networks for all road users. FHWA has made bicyclist and pedestrian safety a high priority, along with providing a network that allows for access to essential services in an efficient manner. FHWA provides the following guidance in regards to this initiative: As part of the transportation planning process, identify transportation connectivity gaps in access to essential services. Essential services include housing, employment, health care, schools/education, and recreation. This emphasis area could include identification of performance measures and analytical methods to measure the transportation system's connectivity to essential services and the use of this information to identify gaps in transportation system connectivity that preclude access of the public, including traditionally underserved populations, to essential services. It could also involve the identification of solutions to address those gaps.
Next Steps

CMRPC staff will begin working on the update to the Regional Bicycle and Pedestrian Plan in the summer of 2015. This update will coincide with the completion of data collection related to shoulder width conditions along federal aid eligible roadways in the region. With Federal Planning Emphasis (PEA) Area Access to Essential Services as an overarching guide, staff will work with regional stakeholders to identify areas where gaps are present in the system. Addressing gaps could include the development and funding of a bicycle sharing program with Congestion Mitigation Air Quality Improvement Program (CMAQ) or Transportation Alternatives Program (TAP) monies. The update Regional Bicycle and Pedestrian Plan will serve as the foundation for the development and expansion of a multimodal network that provides for all users.
Public Transit and Passenger Rail

Public transportation options serve the needs of both commuters and transit-dependent populations. In addition to riders who can choose transit or auto travel, for the transit-dependent populations (those who do not drive or cannot afford a car), public transportation is the only option and it is vitally important to their quality of life. Public transportation includes fixed route bus service, public and client-based paratransit services, taxi and livery services. Intercity public transportation options include intercity bus, commuter rail, and intercity passenger rail. While commuters in the CMMPO region had become less reliant on public transportation over the past 20 years, in recent years that trend appears to be reversing, first associated with improved frequency of commuter rail service, and now commuters returning to local public transit (see Figure IV-2). The trend of associated with this renewed interest in public transit are an aging population, increased cost of gas, and a nationwide trend in being healthy and using sustainable transportation. While there is a national trend toward millennials using more public transportation, that trend has not yet borne out in local transit. The WRTA is intensively working with colleges and schools, but there is not yet data to suggest a shift in mode by these groups. In addition, it is important to recognize the importance that transit can play in making communities more livable.

Figure IV-2

<table>
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<th>WRTA Fixed-Route Ridership</th>
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<td>22.8% Increase in Ridership Since FY07</td>
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<td>FY07</td>
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<td>2,200,000</td>
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The demand for increased multi-modal healthy, active travel options are being heard by the state and local officials. State operating assistance for local transit service has begun to stabilize after years of cutbacks in service, and local transit officials have made strides in upgrading infrastructure and service features. The state is also in the process of completing transactions with CSX Corporation that will allow for more rail capacity to be available between Worcester and Boston, and plans for more passenger trains in the near future.

**Fixed Route Congestion / On-Time Performance**

**Background**

Transit's impact on traffic is greater than its small 0.5% share of total travel would indicate due to the fact that the fixed route system is radially oriented and concentrated along the traffic corridors leading into the Worcester Central Business District (CBD). Given the eastern Massachusetts area's maintenance status for air quality, the City of Worcester’s maintenance status for carbon monoxide, and the recent development activities in Downtown Worcester (including the City Square project and the recent MBTA commuter rail service expansion), transit is a viable alternative to auto travel for trips destined to this potentially congested area. The nature of the market segment served by transit is the second reason for transit's important role in the regional transportation system.

**Performance Management**

As discussed in Chapter II of this report, MAP-21 requires performance based planning related to federal emphasis areas, one of which is congestion. The CMMPO has drafted a number of goals for the Mobility2040 Long Range Transportation Plan, one of which is congestion related. The objectives for these goals are as follows:

**Goal: Reduce Congestion and Improve Mobility for all modes**

**Objective 1 – Coordinate Improved Incident Management**
- Facilitate 1 meeting per year with identified agencies to improve incident detection and clearance time

**Objective 2 – Improve Corridor Management Integration**
- Reduce average travel delays along 2 identified congested major roadway segments every 5 years
- Improve 2 of the top 20 congested intersections every 5 years to a Level of Service of
Objective 3 – Reduce GHGs Generated by Motor Vehicles in the Region

- Institute one new Park-and-Ride lot in each five year period for Transit & TDM along congested corridors

Analysis

Current Conditions/Congestion Causes

There are many causes of congestion. Some are recurring, such as insufficient capacity, unrestrained demand, or poor signal timing, and some are non-recurring, such as collision incidents, poor weather, work zones, or emergencies. Most of the congestion in the CMMPO region is concentrated in the City of Worcester and the neighboring urban towns. Congestion can be found on local roads, highways, and Interstates.

As stated in the Auto Travel Section on page IV-56, CMMPO staff has completed over 30 Travel Time and Delay studies, analyzed 150 intersections, monitored five Park-and-Ride lots, conducted over 500 traffic counts, and studied nine identified local “Bottleneck” roadway segments since 2010. The analyses of all these data collection activities are compiled and included in yearly progress reports.

Traffic Volumes: Traffic volumes are a major cause of congestion in the region. The highest traffic volumes are on the Interstate highways, especially Interstates 90, 290, and 495. Daily volume surpasses 115,000 vehicles a day on sections of Interstate 290 in Worcester and over 90,000 vehicles a day use Interstate 90 between Sturbridge and Hopkinton. Routes 9, 20, and 146 are lower volume roadways, but still carry between 20,000 and 40,000 vehicles a day on some sections in the urban towns. Rural towns in the western part of the CMMPO region have no roadways with over 10,000 vehicles per day. Transit travels mostly on local roads but Route 9 through the city is a major transit route and congestion is exacerbated by narrow street widths in this area. Transit outside of Worcester also includes use of Routes 9, 20 and 146.

Travel Time Data: Using CMMPO staff’s Travel Demand Model, a number of roadway segments throughout the region were identified as “congested” or “projected” to be congested by 2040. Travel Time and Delay studies analyze the speeds on the roadways and how long it takes to get from one place to another. Slower travel speeds are most often located in urban and densely built up areas where congestion occurs. Vehicle speeds fluctuate at different times of the day.
day as well as different days of the week. When roadway usage exceeds capacity, travel speeds tend to slow significantly, impacting the ability of transit to meet on-time performance.

**Turning Movement Counts (TMCs):** AM & PM peak periods are analyzed to determine the amount of delay for vehicles traveling through the intersection. A Level of Service (LOS) is calculated for each studied intersection, with an “A” being given to the location with minimal delay progressing downward to an “F” assigned to an intersection with excessive delays or where the demand far exceeds capacity. Many intersections in the planning region have a poor LOS during peak travel periods in the morning and evening. These locations are concentrated in communities with high volume roadways: Auburn, Shrewsbury, Westborough, and Worcester. In addition to regular SUV travel, the amount of heavy vehicles traveling through intersections and on roadway segments can at times decrease speeds while increasing delays.

**Bottlenecks:** CMMPO staff has analyzed a total of nine bottleneck areas in our Localized Bottleneck Reduction Program with the help of our Transportation Management Systems and Transportation Model. A “traffic bottleneck” is a localized constriction of traffic flow, often on a highway segment that experiences reduced speeds and inherent delays, due to recurring operational influence or a nonrecurring impacting event. A bottleneck can be on high or low volume roadways. Between 2011 and 2014, nine bottleneck locations were analyzed in the region and all of them are served by transit (see Table IV-4 on page IV-62 in the Auto Travel Section).

Weather conditions and construction projects also generate non-recurring congestion and incidents in the region and can greatly affect the daily performance of the local transit system.

**Relationship to On-Time Performance (OTP)**

The WRTA monitors on-time performance utilizing outside auditors, street supervisors, Automatic Vehicle Locator (AVL) technology and through periodic checks of the on-board vehicle camera surveillance system. The WRTA staff shares its current performance with the WRTA’s Advisory Board on a monthly basis.

As noted earlier, several elements contribute to the on-time performance, or non-performance, of transit service:

- General traffic delays
- Mechanical failures
- Poor schedule design
- External emergencies
• Inclement weather
• Construction projects
• Inadequate operator training and control

The WRTA often has little control over external emergencies, inclement weather and construction projects. However, it does have direct responsibility for mechanical failures, schedule design, and operator training and control.

Although traffic delays are beyond its immediate jurisdiction, route schedules are constructed so that sufficient time is available under normal traffic conditions to complete the trip on time. Where street traffic varies, either seasonally or by day of the week and hour of the day, schedules are adjusted accordingly. In addition, MassDOT sponsored projects are becoming increasingly sensitive to the needs of transit along congested corridors, as evidenced by the addition of bus bulbs included on the recent Route 12/20 project. MassDOT can also assist in community sponsored projects in helping to make the design more friendly to the needs of transit to travel in congested areas.

In instances where schedule adherence becomes difficult during peak periods by reason of general traffic volume, modifying the schedules for that particular situation or taking steps to avoid the traffic problems causing the congestion are applied. Disruptions due to mechanical failure of equipment cannot be eliminated but should be minimized within the economic limits of sound maintenance practices.

Short headway, heavily traveled routes are less likely to adhere to schedule than longer headway "off peak" service. Accordingly, as headways increase, service should operate closer to scheduled times. This standard, therefore, provides for different schedule adherence based on headway.

### Table IV-3 Schedule Adherence

<table>
<thead>
<tr>
<th>Operating Period</th>
<th>30 Minutes and Less Headway</th>
<th>Over 30 Minutes Headway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Peak Period</td>
<td>85%</td>
<td>95%</td>
</tr>
<tr>
<td>Base (Non-Peak)</td>
<td>95%</td>
<td>95%</td>
</tr>
<tr>
<td>Saturday, Sunday and Holiday</td>
<td>95%</td>
<td>95%</td>
</tr>
</tbody>
</table>

While this is the current standard for schedule adherence, this standard may change now that the WRTA has moved to a real-time data to measure schedule adherence. As such, because of the down to the minute accuracy for on-time performance and the factors described earlier like
traffic delays and others, it is difficult for a small system like the WRTA to maintain 95 percent accuracy in off-peak service.

**Action Steps to Address On-time Performance and Congestion**

Actions to be taken to maintain or improve on-time performance include:

- Continue to improve method of data collection to accurately monitor and report on the standard for different operating periods of the day
- Enforcement of rules and regulations currently in existence
- Improving initial and continuing operator training
- Consideration of route and scheduling changes
- Changes in equipment assignments (e.g. vehicle rotation)
- Continue to improve communication protocols between WRTA dispatchers, inspectors and operators, as well as local public works departments and local police departments, to minimize service disruptions due to external emergencies, inclement weather and/or construction projects

**Needs**

There are many congestion improvement options to consider in an effort to maintain on-time performance. Short-term improvements include adjusting signal timing and phasing, maintaining traffic control signage and pavement markings, maintaining good pavement, trimming overgrown vegetation along roadways that impair vehicle sight lines, maintaining roadway drainage structures, and access management techniques. For communication purposes, upgrading or developing electronic systems (radio, telephone, internet) to communicate within the WRTA and among various organizations, as well as developing/updating protocols for how internal and external communications should occur. These improvements can be quickly implemented at a lower cost.

Long-term options that are more costly and take longer to implement include intersection realignment, installation of a modern roundabout, lengthening existing dedicated turn lanes, and incorporating Intelligent Transportation Systems (ITS) capabilities or tools.

**Prioritization/Monitoring of Roadways with Fixed Bus Routes**

In concert with the goals and objectives drafted by the CMMPO, there are certain roadways and intersections that should be improved first. These prioritized locations should have improvements that will alleviate congestion and reduce travel time, particularly where they impact high transit routes. Performance Measures help determine if a project should be
undertaken as a result; a project that benefits multiple modes or management systems will get a higher priority over a proposed project that only helps one element.

Using various data acquired by the WRTA through its manual and AVL technology will assist in maintaining or improving schedules that meet on-time performance. Identifying the location of critical peak hour delay intersections can help determine which roadway segments should undergo improvements to reduce travel time and potential bottlenecks. Most of the critical locations are in the city of Worcester and the town of Shrewsbury. The remaining few are in the towns of Sutton, Upton, and Webster, of which only Webster is served by fixed route transit.

Improvement of existing Park-and-Ride facilities and the possible addition of more facilities that are connected to transit can help meet the goals of a 5% total automobile VMT reduction and the long term creation of five new Park-and-Ride locations. Further, rideshare programs such as MassRIDES and NuRide will also help with VMT reduction by encouraging travelers to use healthy, active options such as public transit. Travel demand management (TDM) is another way to reduce traffic congestion by including transit options for commuters.

The following are high volume corridors for fixed-route transit as well as primary corridors for roadway congestion during peak travel hours: Main Street, West Boylston Street, Belmont Street, Lincoln Street, Gold Star Boulevard, Grove Street, Highland Street, Chandler Street, Southbridge Street and Pleasant Street. Park Avenue is also a high volume corridor that is not currently used by fixed-route transit in its entirety, but has been identified in the CSA for potential transit service.

**Fixed-Route Safety and Security**

**Background**

Safety and security are the two most important aspects of transit service in the region. Safety and security are paramount in all WRTA activities. The WRTA is committed to developing, implementing, and improving strategies, management systems and processes to ensure that all their public transportation activities uphold the highest level of safety and security performance.
Performance Management

As discussed in Chapter II of this report, MAP-21 requires performance based planning with a federal emphasis area of Safety and Security. Mobility2040 recognizes the importance of the Transportation Security and measure progress to achieve the following goals and objectives:

**Goal:** Improve the Safety and Security of the region

**Objective 2:** Achieve Industry standards for preventable accidents for transit
- Reduce preventable accident rate (accidents per 100,000 miles) by 10% in 5 years. A preventable accident is defined as one where a driver did not do everything reasonable to avoid the accident.

**Objective 3:** Enhance Transportation Security Coordination Region wide
- Conduct one regional workshop/tabletop exercise every year to advance evacuation Planning
- Continue involvement with MRPC & Statewide Evacuation Planning efforts

**Figure IV-3:**

![WRTA Preventable Accidents](image)

*Industry standard for Preventable Accidents is 1/100,000 miles*
Current Conditions

WRTA Safety Management System (SMS)

The SMS is an organized approach to managing safety, including the necessary organizational structures, safety goals and performance targets, responsibilities and authorities, accountabilities, policies, and procedures for integrating safety into day to day operations.

The SMS has three defining pillars

1. A comprehensive approach to safety that sets the tone for the management of safety, embraces the organization’s safety goals, objectives and policies, and, most importantly, senior management’s commitment to safety.

2. Structure and tools to deliver the necessary activities and processes to advance safety.

3. A formal system for safety feedback to confirm continuing fulfillment of safety goals, objectives, policy, and standards.

The WRTA fixed route operator, Central Mass Transit Management, Inc. (CMTM), has developed a SMS. The SMS offers a means of preventing accidents by integrating safety into all aspects of CMTM’s activities, from planning to operations to maintenance. SMS builds on the following four elements:

- A planned approach to system safety program tasks
- Qualified personnel to accomplish the tasks.
- Authority to implement the tasks through all levels of management.
- Appropriate financial and personnel resources to accomplish the tasks.

WRTA Safety and Security Program Plan (SSPP)

To establish the importance of security and emergency preparedness in all aspects of its organization, the WRTA has developed a Safety and Security Program Plan (SSPP). The SSPP outlines the process to be used by the WRTA to make informed decisions that are appropriate for operations, passengers, employees and communities regarding the development and implementation of a comprehensive security and emergency preparedness program.

The purpose of the plan is to help establish and maintain the Safety and Security Program. It serves as a detailed blueprint for all security activities by:

- establishing how security activities are organized;
• outlining employee and department responsibilities with respect to security;
• instituting threat and vulnerability identification, assessment, and resolution methodologies; and
• setting goals and objectives (including periodic drills and audits of the plan).

Elements included in the SSPP are Emergency Action Plan, Homeland Security, Relocation Procedures, Evaluation of Emergency Preparedness, and Security Committee. The plan is updated continually to record and evaluate past security performance of the system, to identify modifications that are needed, and to establish objectives for the upcoming year.

a) See Something, Say Something™

The “See Something, Say Something™” campaign provides direction on detecting and reporting suspicious behaviors or objects around transit stations and equipment. It is a national campaign that is funded by the Department of Homeland Security and partners with transit agencies to bring awareness to transit users about strange and suspicious activity at stations, platforms and on vehicles. Various media, including public service announcements, posters, pamphlets and videos, are used to spread the message of the campaign and promote a safer and secure transit experience.

Continuity of Operations (COOP) Plan

The Continuity of Operations (COOP) plan for the WRTA presents a management framework, establishes operational procedures to sustain essential functions, and guides the restoration of full functions if normal operations in one or more of the WRTA’s locations are not feasible.

The plan was prepared in accordance with Department of Homeland Security (DHS) Headquarters Continuity of Operations (COOP) Guidance Document, dated April 2004, which provides a structure for formulating a COOP plan; Presidential Decision Directive–67, “Ensuring Constitutional Government and Continuity of Government Operations,” which requires all Federal departments and agencies to have a viable COOP capability; and Commonwealth of Massachusetts Executive Order No. 144, which requires all Commonwealth agencies to prepare for emergencies and disasters and to provide emergency liaisons to Massachusetts Emergency Management Agency/Organization for coordinating resources, training, and operations.

The document focuses on the basic COOP elements: essential functions, critical systems, alternative facilities, orders of succession, delegations of authority, and vital records. Development of procedures that address the basic COOP elements and work in concert with business continuity and disaster recovery plans allows for uninterrupted delivery of the WRTA’s essential functions. This document applies to the full spectrum of threats and emergencies that
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may affect the WRTA. Specifically, this COOP plan is based on an event scenario that disrupts the WRTA’s essential functions.

**Worcester County Evacuation Plan**

CMRPC staff, in conjunction with Montachusett Regional Planning Commission (MRPC) under the guidance of the Central Region Homeland Security Advisory Council (CRHSAC), is working on an Evacuation Plan for all of Worcester County. The overall goal of the Evacuation Plan is to provide Worcester County emergency management personnel with a comprehensive Regional Evacuation Plan. Phase 1 was primarily a data gathering procedure. Phase 2 is anticipated to include identification of evacuation scenarios, modeling of evacuation impacts against current conditions, and identification of recommendations for prioritization and implementation of a County-Wide Evacuation Plan. Phase 3 is anticipated to be development of a County-wide Evacuation Plan based on Phase 2 data and recommendations, as well as involvement of stakeholders. Phase 3 would include establishment of communications protocol, and implementation of publicity of such outcomes, including perhaps coded signage and development of standard messaging systems.

**Analysis**

**Safety/Security**

As outlined in the Highway Safety section, thirty six (36) of the region’s top forty four (44) Highway Safety Improvement Program (HSIP) eligible auto/bike/pedestrian clusters are located in the City of Worcester. Fourteen (14) of the thirty six (36) clusters located in the City of Worcester are along the MA-9 corridor. An additional twelve (12) clusters are located along the MA-122/122A corridor. These three (3) state routes contain “super clusters” of auto/bike/pedestrian crashes that have been collated into the three top crash corridors for the CMRPC region. Within these “super clusters”, 22 of the WRTA’s 31 fixed-route buses either operate along the corridors or crossover at specific intersections:

- **MA-9 (Belmont/Highland St): West St to Rodney St** (WRTA Routes 3, 24, 24A, and 34 operate along Belmont and Highland Streets for their primary routing. WRTA Routes 8, 14, 18, 23, 26, 30, and 31 cross this corridor at Lincoln Square)

- **Main Street: MLK to May Street** (WRTA Routes 8, 18, 19, 27, and 33 operate along Main Street for their primary routing. WRTA Routes 2, 3, 6, 7 and 9 cross Main Street at various intersections within this cluster)

- **MA-9/12 (Park Ave): Elm St to Chandler St** (No WRTA route operates along Park Avenue, however Routes 2, 6 and 9 cross Park Avenue at the Pleasant Street and Chandler Street intersections)
• MA-122/122A (Vernon/Madison/Chandler): I-290 to Park Ave (No WRTA route operates along Madison Street. WRTA Routes 11 and 22 operate through Kelley Square and along Vernon Street. WRTA Routes 6 and 7 operate along Chandler Street. WRTA Routes 4 and 25 cross this cluster at Kelley Square and Madison/Southbridge Streets)

**Future Needs**

**Safety**

In 2015, the WRTA will be updating its Safety and Security Program Plan (SSPP). In addition, the WRTA will also update its COOP Plan from its last update in 2009, as well as its SMS to include not only the fixed route system, but also the paratransit system, fixed facilities and vehicle fleet. Development of a full Emergency Response Plan will also be started in 2015. Lastly, implementation of Complete Streets techniques that may occur with roadway projects in the region that will also address safety improvement at bus stop waiting areas will be reviewed as part of a potential project design.

**Security**

CMRPC and MRPC staff will continue Phase 2 Evacuation planning efforts. Phase 2 will aid jurisdictions in practical application and use of the “Tool Kit”. Phase 2 will continue to align the CRHSAC Evacuation Plan strategies and goals with state evacuation plans.

**Fixed Route State of Good Repair**

**Background**

Keeping the regional transit system in a State of Good Repair (SOGR) requires good people, efficient use of funding and management of assets that provide reliable and safe service year-round. SOGR is a key priority at the WRTA and for the CMMPO and both are committed to ensuring the best in safe, reliable, cost-effective and responsive transit services.

**Performance Management**

As discussed in Chapter II of this report, MAP-21 requires performance based planning on federal emphasis area of Safety and Security. Mobility2040 recognizes the importance of the Transportation Security and measure progress to achieve the following goals and objectives:

**Goal:** Achieve State of Good Repair

**Objective:** Maintain fixed route and paratransit vehicles in state of good repair
Performance Measure:
- Replace WRTA fixed route vehicles on a 12-year replacement schedule
- Replace WRTA paratransit vehicles on a five-year replacement schedule

Asset Inventory

Vehicle Fleet
The fixed route provider under contract to the WRTA is Central Mass Transit Management, Inc. CMTM currently operates 53 full size (30’, 35’ and 40’) buses along with an additional 50 vans which are used for paratransit purposes. Of these 53 full size buses, six are brand new Proterra all-electric vehicles. These vehicles are owned by the WRTA.

Figure IV-4: WRTA Proterra All-Electric Bus

Fixed Facilities
a) Union Station Hub

The WRTA constructed a new “hub” next to Worcester’s Union Station. The opening of the Hub completed the vision of Union Station being a true intermodal campus where connections between MBTA commuter rail, Peter Pan/Greyhound bus service, Amtrak and local taxi service could be made with ease. The new Hub has an enclosed waiting area, restroom facilities, next bus arrival and departure displays and announcements, ticket vending machines, a Customer Service window, and a Dunkin’ Donuts. The building also houses WRTA Administration and PBSI paratransit brokerage staff. The platform area can accommodate up to eight buses at a time and also includes seating, and ticket vending machines.
b) Maintenance and Operations Center

The WRTA’s existing maintenance and operations facility is at 287 Grove Street. In operation since the late 1920s when it was built as a trolley barn, the existing facility performs all of the requirements to keep the fleet in operation. The single-story facility houses CMTM operations, dispatch and maintenance staff offices, six bay bus storage for all 53 buses internally, has 14 Garage Bays and body shop additions, two fuel bays, two wash bays and a van storage facility.

In 2007, state and federal transportation officials discouraged the WRTA from undertaking any large-scale capital improvements on the property and instead encouraged the WRTA to pursue other options. The Federal Transit Administration (FTA) has also told the WRTA that the facility is far outdated and that any additional large-scale capital maintenance should not be undertaken. In August 2007, the WRTA applied to participate in the FTA sponsored Environmental Management System (EMS) Implementation Institute at Virginia Tech seeking EMS ISO 14001 Certification. In June 2010, the WRTA EMS was audited by representatives of the Institute and deemed ready for the ISO Certification process, a testament to the WRTA commitment to environmental accountability.
c) Bus Shelters and Stops

The WRTA has 1,377 bus stops and 42 shelters in its system. Bus stops and shelters are the first physical access points to the bus system. Their placement and condition either entice or deter passengers from using the system.

Figure IV-7: WRTA Bus Shelter
Technology

The WRTA has invested in new technologies for improved service performance and customer information. These technologies include automated passenger counting (APC), automated vehicle announcements (AVA), automatic vehicle locators (AVL) and automatic vehicle maintenance (AVM).

Analysis

A major concern in past years (as reflected in past Regional Transportation Plans) has been the adequacy of Federal Section 5307 monies to meet WRTA capital needs requirements. However, in contrast with ISTEA and TEA 21 levels, but consistent with SAFETEA-LU levels, MAP-21 apportionment levels have been maintained and have allowed the WRTA to complete a very much needed fixed route bus replacement program. While capital monies available to the WRTA are higher than in past years, it also needs to be recognized that the WRTA has had to program capital funds as much as possible to preventive maintenance in order to make up for limited state and local operating assistance.

Average Fleet Age

One measure of SOGR is the average age of the bus fleet. The Federal Transit Administration (FTA) recommends that a transit authority have an average fleet age of six years. In 2014, the WRTA has an average fleet age of 3.18 years. The average fleet age is low because the WRTA purchased a number of new buses in 2008 and 2009, followed by a second round in 2012, 2013 and 2014.

Fixed Facility Condition

Another measure of SOGR is condition of fixed facilities. Preventative maintenance efforts help maintain these assets in good, operating condition for many years, or decades, of service.

a) Union Station Hub

Because the Union Station Hub is a year and a half old, keeping the facility in a SOGR is minimal with preventative and general maintenance efforts.

b) Maintenance and Operations Facility

Because of the deteriorated conditions of the existing Grove Street maintenance and operations facility, the WRTA’s largest effort is the design and construction of a new facility to replace the existing garage. In FY 2010, the WRTA received a federal State of Good Repair grant of $39 million, the second largest in the nation, to build the new facility. This new facility will replace the functionally obsolete existing 86 year old facility and, more
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importantly, allow for the increased environmental mitigation at the Grove Street site once they have moved to the new location. The new site is located at 42 Quinsigamond Avenue in Worcester and the new facility will be completed in fall 2016. The new site will also be located closer to Union Station and will decreasing deadhead travel time for more efficient operations.

c) Bus Shelters and Stops

Because bus stops and shelters are the first physical access points to the bus system, the WRTA makes sure that the shelters are inspected on a monthly basis and any repairs that are needed are made quickly. Bus stops are inspected less frequently but are reported for repair by riders, drivers and/or inspectors. Examples of repair include sign replacements, pole replacements, glass panel replacement in shelters, benches, and full shelter replacement.

Future Needs

With the completion of the WRTA’s new maintenance and operations facility, the major capital improvement projects for the system’s operation will be complete. Future SOGR efforts for fixed-facilities will focus on maintaining these for many years, even decades, of good service and system reliability.

Replacement, or possible expansion, of the WRTA’s existing bus fleet will be the primary focus of new equipment in the coming years. In FY 2016 and FY 2017, the WRTA has programmed six new buses, three in each fiscal year, for fleet expansion. Beginning in FY 2020, the WRTA is expecting to begin replacing its 2008 fixed-route buses.

Fixed-Route Intelligent Transportation Systems (ITS)

Background

Since summer 2012, the WRTA has implemented a state-of-the-art, Intelligent Transportation Systems (ITS) technology as the result of funding received from the American Recovery & Reinvestment Act (ARRA) in 2009. The new system has been installed for both fixed route and paratransit systems, and includes tools for improving the management of the system and tools for riders to obtain real-time information for trip planning and riding. The tools include:

- Automatic Vehicle Locator System
- Data Communications System
- Automatic Vehicle Announcements
- Automatic Passenger Counter System
• Dynamic Message Signs
• Customer Service Online System
• Maintenance Management System
• Web Interface for Real-Time Information

Taken as a whole, the technology implementation has helped the WRTA improve schedule reliability, reduce federal reporting costs, provide detailed information to assist in route planning, and assist the riding public in obtaining real-time information about their trip. Also, the WRTA has implemented a scheduling software program (HASTUS) to improve efficiency and has upgraded its telephone system to take advantage of new computer technology and improved customer service.

Performance Management

As discussed in Chapter II of this report, MAP-21 requires performance based planning. Mobility2040 recognizes the importance of ITS and measures progress to achieve the following goals and objectives:

Goal: Reduce Congestion and Improve Mobility for all modes

Objective 2 - Enhanced Traveler Information (ITS)
• Facilitate the installation of information systems/kiosks at major intermodal locations, such as Union Station. 2 locations every 5 years.
• Expand I-290 ITS Real Time Traffic Management (RTTM). RTTM on I-395 and Route 146 also. Install 2 Variable Message Boards (VMB) every 5 years.

Objective 3 - Improve Corridor Management Integration
• Increase % of overall bus trips with an on time % greater than 90% (leaving hub and end of line). 10% increase over 10 years.
• Install Transit Signal Priority – 5 signals every 5 years.
• Reduce average travel delays along identified congested major roadway segments. 2 every 5 years.
• Improve 2 of the top 20 congested intersections every 5 years to a LOS of “D” or better.
Analysis

New Technologies

Assuring that WRTA passengers are kept informed with the latest information and service updates is crucial to maintaining good public relations and attracting new passengers. These technologies have provided improved information dissemination to bus passengers and include the following:

- **Automatic Vehicle Announcements (AVA)** – AVA provides clear audio and visual messages for specific stops and locations along a bus route. These announcements can be broadcasted in multiple languages and assist passengers with hearing or visual impairments when riding the bus.
- **Variable and Dynamic Message Signs (V/DMS)** – The signs located at specific WRTA bus stops throughout the WRTA system and at Union Station provide real-time bus arrival notices to passengers waiting for a bus.
- **Automatic Vehicle Locator (AVL)** – The AVL system allows bus users, operators, and dispatchers to use mobile device and PC software applications to see where buses are located along its route and when it will arrive at specific stops, to improve schedule adherence.

Technologies Related to Improved System Operations

Passengers expect on-time service when using transit. These technologies provide for improved bus operations, on-time performance and reduction in bus passenger boarding times:

- **Contactless Fare Collection** – Contactless fare collection technology, known locally as “Charlie Card” technology, allows passengers to use pre-paid “smartcards” that can be read by a bus fare box to pay the fare, thereby reducing waiting times to board buses at stops.
- **Automatic Vehicle Monitoring (AVM)** – AVM measures, monitors, and reports the status of critical systems and components for every bus in the WRTA fleet, allowing the WRTA to meet increased ridership demands through greater operational efficiency.
- **Transit Signal Priority (TSP)** - TSP technology provides bus service travel time extensions at signalized intersections using devices that communicate with each other. Transit Signal Priority can reduce bus travel times and open congested corridors for future transit service consideration.
Technologies Related to Passenger Data Collection

Obtaining data about the number of passengers on a bus is a crucial performance measure of a specific route. Obtaining this data manually is time consuming and labor intensive. Using Automated Passenger Counting (APC) has allowed the WRTA to obtain accurate data more quickly, counting the number of passengers that board or alight from a bus at a given stop along the route. APC data has provided WRTA planners and operations staff more accurate passenger information by route over a daily, weekly, monthly and yearly period, as well as provide accurate passenger information for National Transit Database (NTD) reporting. This information, along with AVL and other operations data, is being used to determine the performance of a given route and where adjustments may need to occur.

Figure IV-8: WRTA’s RideCheck Plus APC Program

Specific Locations for These Technologies

The technologies outlined above were installed on the WRTA’s fleet of 52 buses in spring 2013. These include AVA, AVL, AVM, APC and “Charlie Card” technologies. V/DMS technologies were installed at the new Union Station “bus hub” that was completed in May 2013. TSP has a longer planning horizon, but has been tested at a specific intersection in Worcester, and can be expanded, pending funding availability.
**Needs**

During the update to the Central Massachusetts Regional ITS Architecture in 2011, the regional transportation stakeholders identified key regional needs for fixed route transit among other modes. These needs, specific to Central Massachusetts, are:

- Congestion Management
- Transit Efficiency
- Efficient Use of Existing Infrastructure
- Economic Development
- Safety and Security
- Communications Infrastructure
- Traveler Information
- Use of ITS Data

Multi-function Program Areas were also developed as part of the ITS Architecture Implementation Plan and they include:

- **Electronic Toll Collection Integration for Parking** – Future initiative for MassDOT, MBTA, and community parking facilities that have controlled access.
- **Regional Fare Card Integration for Parking** – Future initiative for MassDOT, MBTA, and community parking facilities that have controlled access.
- **CAD/AVL (Computer Aided Dispatch/Automated Vehicle Locator) for Transit Vehicles** – Currently being deployed by the Worcester Regional Transit Authority (WRTA)
- **Traffic Signal Priority** – A future initiative for reducing congestion delays for WRTA buses.
- **Regional Fare Card** – Deployed in spring 2012, this initiative provides an interoperable fare medium allowing riders to use the WRTA, MBTA and other participating RTAs.

It is expected that the recently formed Regional ITS Planning and Coordinating Committee will be actively working to prioritize and explore implementation strategies for these Multi-function Program Areas.

**Prioritization**

As identified in the 2011 Worcester Regional Mobility Study, Transit Signal Priority (TSP) is a valuable Intelligent Transportation Systems option for Central Massachusetts’ urban core. TSP would help reduce vehicle emissions through more efficient bus system operations and added potential for drivers to avoid congested routes thus creating less gridlock for buses that have to
travel these routes. More efficient (and potentially more expansive) bus service provides a benefit to EJ populations along routes where TSP is implemented. Businesses along these corridors could benefit from TSP implementation through added transit service. While additional corridors, such as Park Avenue and Shrewsbury Street, are being assessed by the WRTA, City of Worcester and the CMMPO for future TSP implementation, a final strategy has yet to be determined.

Fixed-Route Access to Essential Services

Background

Transit access to essential services such as employment, education, health care, public services, access to food and recreational activities is one of the WRTA’s primary goals. The WRTA’s recently revised Service Standards include the following statement: “It shall be the policy of the WRTA to space routes such that within approximately 90% of the densely populated areas of the core city, Worcester, residents shall reside within one quarter (1/4) of a mile from a bus route.” In order to accomplish this, the service standards include the guidelines for route design. The following factors are considered essential for route design: population density (4,000 persons per square mile), employment density (200 employees or more), route and corridor spacing, demographics, service equity, interline enhancement, route directness, proximity to trip generators and destinations, and intermodal connectivity.

The CMMPO completed a Coordinated Public Transit-Human Services Transportation Plan (CPT-HST). Since the completion of this plan, MassDOT has been working with CMMPO staff and the Central Massachusetts Regional Coordinating Council (RCC) to implement portions of the CPT-HST plan in the region.

The new WRTA Hub at Union Station provides easier intermodal connections to intercity bus (Peter Pan / Greyhound), intercity rail (Amtrak) and commuter rail (MBTA), expanding transit access within and outside the region. The new Hub has administrative offices for the WRTA, customer service space, waiting areas, ticket / pass machines and restrooms. The facility holds up to eight full-size buses at a time and provides improved accessibility and transfer capabilities between fixed-route and paratransit service from its previous hub location at Worcester’s City Hall.

Furthermore, WRTA is actively engaging the community, including riders, community groups, colleges and major employers; as a result, WRTA service is more tailored to patron’s identified needs. Also informational materials have been tailored to each group, as an example: (1) routing
information for college students with key destinations; (2) combination schedules showing multiple routes for major employers; (3) employee address matching to provide personalized routing information; (4) improved opportunities for riders to obtain schedules and passes; (5) mapping of social service agencies in relation to the fixed route system; (6) travel training of personnel, particularly human resource and resident advisor staff, in using the bus; (7) surveys, either to employers or riders on how to improve or expand fixed-route service.

Performance Management
As discussed in Chapter II of this report, MAP-21 requires performance based planning related to federal emphasis areas, one of which is livability and access to essential services. Staff has developed the following goals and objectives that address access to essential services for all of the region’s transportation modes:

Goal 1: Reduce Congestion and Improve Mobility for All Modes

Objective 4: Improved Transportation Accessibility for all modes
- Increase the number of ADA-compliant roadways and intersections. Two locations every five years.
- Improvement in the bicycle and pedestrian network within ½ mile of transit stations – for the top 10 high boarding and alighting locations. Two locations every five years.
- Increase average frequency on core-routes to 10 minutes. Two routes every five years.

Goal 6: Equitable Transportation for all populations

Objective 1: Provide access to essential services; minimize burdens and maximize benefits associated with low-income and minority areas
- Increase the number of ADA-compliant intersections by 10% over 10 years
- Improve traveler information at Union Station complex by installing Information Systems/Kiosks
- Increase access to essential services for EJ areas within 45 minutes of travel time by 10% over 10 years
- Inventory the bicycle and pedestrian network within a ½ mile of top boarding transit locations in the next two years

Objective 2: Consider Geographic Equity of transportation projects across the region
- Maintain an average fleet age of 5-6 years for transit vehicles in the region
- Equity (based on distribution of projects) in sub-regional project programming (by mode) at least one TIP project over each five year period
• Equity for Environmental Justice identified areas (by mode). One project that benefits an EJ area over each five year period

Analysis

In 2014-15, the WRTA conducted a Comprehensive Service Analysis (CSA) which was completed by URS Corporation. The CSA included a transit market analysis, which relates socio-economic data with population density, vehicle availability, land use and employment locations within WRTA’s service region, as well as a number of service improvement recommendations. A route by route analysis showed that “overall WRTA’s service is deployed to accommodate the transit needs of the region’s workforce.” URS recognized that there are areas where service could benefit from modifications to better meet demand and improve access to employment. In that regard, URS mentioned the benefits of having late night service and the desirability to expand weekend service to better suit current employment trends.

The major themes that came from the service recommendations of the CSA were the following:

• Elimination of specific routings (partial segments or full routes) due to low performance and re-focusing existing operating funds into more productive routes
• Development of a concept to better integrate and streamline service along Main Street
• Extended hours and increased frequency to create “clock face schedule”, specifically on weekend service days
• Establishment of fixed-route service along Park Avenue
• Establishment of “cross-town” routes from the east and west side of Worcester
• Creating routes with more direct service between origins and destinations (e.g. QCC to UMASS)

As identified in the CSA analysis, the WRTA provides fixed-route service to all but five areas of its region with a current or future potential for high transit demand. These five areas are located in the towns of Barre, Douglas, Dudley, Holden and West Brookfield. All of them exhibit clusters of current or future employment activity, service agencies and schools. Several of these towns have higher than average percentage of households without a vehicle, low income populations and elderly populations. Most of these towns do not meet the density threshold favorable for transit service and will require further analysis to determine when transit service should be implemented in these areas.
TRANSPORTATION MODES – INTERCITY TRANSPORTATION

Needs

Based on the CSA’s recommendations and analysis, there is an expressed need to increase the number of routes operating for weekend service, as well as schedule improvements along mainline corridors for improved access to essential services that are only available now on weekdays. In this regard, the WRTA has identified Main Street and Lincoln Street as mainline corridors that could benefit from higher frequencies. Doing so would require adjusting route schedules of mainline core routes, which are currently interlined/paired together. Also, the WRTA has identified the need for more “cross-town” opportunities beyond the current bus pairings and outside the “hub-and-spoke” alignment of routes.

Other service opportunities exist on the fringe of the current fixed-route system. These options would increase mobility options, provide more access to essential services and create new mode options not currently available. A potential transit corridor has been identified in the southernmost part of the region, connecting the towns of Dudley, Southbridge, Sturbridge and Webster. Input gathered for the CSA from multiple public meetings, surveys and meetings with community organizations coincide with the need to connect these towns.

Other areas with identified needs are the towns of North Brookfield, Ware and West Brookfield. In the CMRCP Rural 11 Prioritization Project study, the Town of Warren was identified by community leaders as a potential connection hub for the Pioneer Valley Transit Authority (PVTA) and the WRTA. A rural route connecting Ware and the Brookfields was also identified. Work done by the Central Massachusetts Regional Coordinating Council (RCC) also identified the need for more transit service in the western part of the region, mainly for access to job opportunities. The CSA also supplements this perceived need by also recommending a connection with the PVTA’s Ware Shuttle from West Brookfield.

Lastly, improved transit services for college students were also identified as a need in the CSA. The Higher Education Consortium of Central Massachusetts (HECCMA), a consortium of the 10 colleges in the WRTA region, is currently in conversations with the WRTA to improve transit access to select colleges in Worcester.

Next Steps and Prioritization

The travel demand model will be used to analyze recommendations from the CSA. New bus routes, existing route expansions and route changes will be coded into the model to understand the new ridership and the travel behavior of the commuters. The results of the model will be used
to prioritize the implementation of the recommendations. Funding availability will play a major role in the timeframe for implementation.

**Paratransit**

**Overview**

Extensive paratransit services are offered in the region by the WRTA. The WRTA offers two types of paratransit services: one is paratransit service as required by the Americans with Disabilities Act (ADA) and the second is non-ADA paratransit service. ADA paratransit service, as required in areas surrounding WRTA fixed route bus services, is offered through the WRTA’s van division and through contracts with local Councils on Aging (COAs), private non-profit providers and one for-profit provider (Yellow Cab). The WRTA offers non-ADA paratransit service to elders and people with disabilities outside of the ADA service area that extends to the most rural parts of the WRTA service area through similar contracts. While ADA paratransit service mirrors hours and days of fixed-route service, non-ADA level service is offered on weekdays generally from 8am-4pm. Changes in demographics, housing trends, advances in medical technology, and the passage of the Americans with Disabilities Act (ADA) in 1990 have impacted the availability, need, and value of paratransit to the Central Massachusetts region.

Since 2010, federal New Freedom and state Community Transit Grant funds have allowed moderate expansion of WRTA paratransit service hours in the suburbs including Shrewsbury, Millbury, and Mendon as well as rural areas of central Massachusetts offering midday service to Worcester. Additional transportation services are offered through Rehabilitative Resources Inc. of Sturbridge during periods of time when vehicles are not in use for their own programs. ReadyBus, operated by SCM Elderbus, also offers expanded service hours in their rural service area to accommodate work trips. All of these efforts were grant funded using both New Freedom and Job Access Reverse Commute (JARC) funding. Additional smaller services also exist but they are either client/program based or payment is required for the full cost of service.

Efforts of the South Central Massachusetts Regional Coordinating Council (RCC) are helping to further identify gaps in service by assembling key parties in the paratransit, employment, elder, disability, and other special interest groups to discuss common problems and possible solutions. The RCC has identified both employment transportation and rural transportation as significant service gaps.
The WRTA has also worked with the MetroWest Regional Transit Authority (MWRTA) to provide reciprocal paratransit trips for passengers travelling just over RTA boundaries. This arrangement allowed passengers to maintain employment in areas along neighboring WRTA and MWRTA communities. Similar arrangements can be made with any of the neighboring transit authorities.

Five communities in the Blackstone Valley area are not part of any regional transit authority, but provide limited paratransit service. This service is provided through the local COA during town business hours on weekdays through volunteer or town-employed drivers.

Paratransit Congestion

Background/Current Conditions

Congestion in paratransit often has two meanings; one is congestion to the passenger and the other is congestion of the roadway. Regarding congestion to the passenger, this means that multiple pick-ups or drop offs are done at one location (a hospital for example) with minimal effort made to use the vehicles to their highest potential. While a paratransit system should be using their vehicles to their maximum potential and have (at a minimum) 2.5 passengers per hour, often it is lower than this. Regarding congestion of the roadway, the main causes of this are insufficient roadway widths/lanes, poor signal timing and non-recurring items such as collision incidents, poor weather, work zones or emergencies. These factors contribute to decreased on-time performance for paratransit, while also limiting the number of trips that can be delivered, increasing the cost of service delivery and impacting rider experience.

Analysis

The WRTA has made extensive progress in reducing site congestion of paratransit trips by incorporating more communities into their Mobility Management Model (MMM). Originally piloted by two Councils on Aging, this program has expanded to include eight communities: Auburn, Boylston, Leicester, Northborough, Oxford, West Boylston Westborough, and Worcester. Successes in this effort have helped WRTA to gain efficiencies and reduce overall costs by attempting to maximize use of the existing WRTA infrastructure.

The WRTA has been able to leverage the availability of paratransit service by receiving funding from the New Freedom program to encourage passengers to switch some of their paratransit trips to the more cost-effective fixed route system. The WRTA offers a Travel Training program that is designed to assist a rider’s transition to the fixed route system. The one-on-one instruction
program is offered free of charge and available to all members of the public. One goal is to motivate people to try using the fixed route service for some or all of their trips versus paratransit. Fixed-route service fares are less expensive and also offer the convenience of not needing to pre-schedule trips.

Because paratransit trips are scheduled by pick-up and drop off, on-time performance is important to provide good service. As noted earlier and in the fixed-route section, several elements contribute to the on-time performance, or non-performance, of paratransit service:

- General traffic delays
- Mechanical failures
- Poor scheduling/dispatching of trips
- Inadequate operator training and control
- External emergencies
- Inclement weather
- Construction projects

Operators, including the WRTA often have little control over external emergencies, inclement weather and construction projects. However, it does have direct responsibility for mechanical failures, scheduling/dispatching of trips and operator training and control. Although traffic delays are beyond its immediate jurisdiction, trips are scheduled so that sufficient time is available under normal traffic conditions to complete the trip on time. Since street traffic varies by season, day of week and hour of day, trip times may be adjusted accordingly.

In instances where trip schedules become difficult during peak periods by reason of general traffic volume, vehicles can modify their routing and can take steps to avoid the traffic problems causing the congestion. Disruptions due to mechanical failure of equipment cannot be eliminated but should be minimized within the economic limits of sound maintenance practices.

**Steps to Address On-time Performance and Congestion**

- Improvements to method of data-collection which monitors and reports on the standard for different operating periods of the day
- Enforcement of rules and regulations currently in existence
- Improvements to initial and continuing operator training
- Prepare schedule for changes in equipment assignments (e.g. vehicle rotation)
TRANSPORTATION MODES – INTERCITY TRANSPORTATION

• Improve communication protocols between WRTA dispatchers, inspectors and operators, as well as local public works and local police departments, to minimize service disruptions due to external emergencies, inclement weather and/or construction projects
• Encourage reduced use of single occupant vehicles, and increased use of multi-modal, healthy, active transportation options, to reduce overall roadway congestion

Needs

Continued success of the MMM depends on further automation of the scheduling and dispatching responsibilities, in addition to a well trained staff.

There are many congestion improvement options to consider in an effort to maintain on-time performance. These short-term and long-term improvements are explained in detail in other chapters and are will additionally improve the delivery of paratransit service.

Paratransit Safety and Security

Background

Safety and security are the two most important aspects of transit service delivery in the region. Safety and security are paramount in all WRTA activities. Just like for the fixed-route system, the WRTA is committed to developing, implementing, and improving strategies, management systems and processes to ensure that paratransit service is upheld to the highest level of safety and security performance.

Current Conditions

WRTA paratransit drivers are trained to proficiency on Accessible Lift Use and Securement, Defensive Driving and Disability Awareness. This is done by in house trainers or through the Massachusetts Rural Transit Assistance Program. A newly developed program attempts to standardize paratransit driver training throughout the State.

The WRTA Safety Management System, developed by Central Mass Transit Management (Inc.), offers a means of preventing accidents by integrating safety into all aspects of CMTM’s activities, from planning to operations to maintenance. Further, the WRTAs Safety and Security Program Plan serves as a detailed blueprint for all security activities. Additionally, the Continuity of Operations Plan (COOP) for the WRTA presents a management framework, establishes operational procedures to sustain essential functions,
and guides the restoration of full functions if normal operations in one or more of the WRTA’s locations are not feasible. Finally, the CMRPC staff, in conjunction with Montachusett Regional Planning Commission (MRPC) under the guidance of the Central Region Homeland Security Advisory Council (CRHSAC), is working on an Evacuation Plan for all of Worcester County. The overall goal of the Evacuation Plan is to provide Worcester County emergency management personnel with a comprehensive Regional Evacuation Plan.

More information about these efforts is available in the fixed-route section.

Analysis

As outlined in the Highway Safety and Fixed-Route Transit sections, three state routes contain “super clusters” of auto/bike/pedestrian crashes that have been collated into the three top crash corridors for the CMRPC region. Within these “super clusters”, almost all of the WRTA’s paratransit services either operate along the corridors or crossover at specific intersections.

Needs

In 2015, the WRTA will be updating its Safety and Security Program Plan (SSPP). In addition, the WRTA will also update its COOP Plan from its last update in 2009, as well as its Safety Management System (SMS) to include not only the fixed route system, but also the paratransit system, fixed facilities and vehicle fleet. Lastly, development of a full Emergency Response Plan will also be started in 2015. CMRPC and MRPC staff will continue Phase 2 Evacuation planning efforts. Phase 2 will aid jurisdictions in practical application and use of the “Tool Kit”. Phase 2 will continue to align the CRHSAC Evacuation Plan strategies and goals with state evacuation plans.

Paratransit State of Good Repair

Background/Current Conditions

Keeping the paratransit system in a State of Good Repair (SOGR) requires efficient use of funding and management of assets that provide reliable and safe service year-round. SOGR is a key priority at the WRTA and for the CMMPO and both are committed to ensuring the best in safe, reliable, cost-effective and responsive paratransit services. The paratransit fleet is operated through a number of sub-contractors with the WRTA including Central Mass Transit Management, Inc., SCM Elderbus and ten local Councils on Aging (COAs). There are 50 vans
which are used for paratransit purposes. All of these vehicles are owned by the WRTA. The average fleet age of a paratransit van in FY 14 was 3.58 years, far below the recommended 5 years.

Figure IV-9: WRTA Paratransit Van

The WRTA has invested in new technologies for improved service performance and customer information. These technologies include Strategen ADEPT software for paratransit reservations and scheduling and Mentor Ranger for GPS, vehicle location and communication.

Analysis

Just as for fixed-route service, a major concern in past years (as reflected in past Regional Transportation Plans) has been the adequacy of Federal Section 5307 monies to meet WRTA capital needs requirements. However, in contrast with ISTEA and TEA 21 levels, but consistent with SAFETEA-LU levels, MAP-21 apportionment levels have been maintained and have allowed the WRTA to complete a very much needed paratransit replacement program. While capital monies available to the WRTA are higher than in past years, it also needs to be recognized that the WRTA has had to program capital funds as much as possible to preventive maintenance in order to make up for limited state and local operating assistance.

One measure of SOGR is the average age of the van fleet. The Federal Transit Administration (FTA) recommends that a transit authority have an average fleet age of five years. In 2014, the WRTA has an average van fleet age of 3.58 years. The average fleet age is low because the WRTA purchased a number of new vans in 2008, 2009, 2010, 2011, 2013 and 2014.
Needs

Replacement, or possible expansion, of the WRTA’s existing van fleet will be the focus of new equipment in the coming years. WRTA has requested six new replacement vans in 2015 to replace vans that have exceeded their useful life in an effort to keep the fleet age below five years.

The WRTA has a well-established policy of maintaining a state of good repair with their paratransit vans by establishing a schedule for both routine maintenance and vehicle replacement. The WRTA makes efforts to keep the average van fleet age below five years. Funding for replacement vans comes from MassDOT through their Community Transit Grants program or through WRTA 5307 capital funds.

Paratransit Intelligent Transportation Systems (ITS)

Background/Current Conditions

StrataGen ADEPT platform is being used to schedule, route, dispatch and report paratransit service. Additionally, the Mentor Ranger is being used as a GPS for the driver and an automatic vehicle locator. It is also used to provide drivers with real-time and updated passenger pick-up information. The WRTA has also formalized its customer service reporting by using Sales Force as its complaint filing and follow up system.

Analysis

Mentor Ranger, the vehicle location technology, has improved service delivery by allowing reservationists, schedulers and dispatchers the ability to ‘see’ where the vehicles are so they can redirect vehicles to a pick up location if needed. This is especially useful when there is road congestion. On time pickups can be improved overall using this technology.

StrataGen ADEPT is critical for obtaining data about trips, and hours and miles of service. Obtaining this data manually is time consuming and labor intensive. Using Strategen ADEPT has allowed the WRTA to collect and verify this information in a timely and reliable manner for daily planning and for monthly and annual reporting to National Transit Database.

Needs

Further expansion of the Mobility Management Model to more paratransit providers would allow for more efficiencies. Expansion to neighboring communities should be a priority.
Paratransit Access to Essential Services

Background/Current Conditions

As part of the Governor’s Executive Order 530, Massachusetts formed the Statewide Coordinating Council on Community Transportation to address transportation issues. From that Council, regional coordinating councils were formed including the South Central Massachusetts Regional Coordinating Council (RCC). The RCC was able to identify four gaps in service to address: information dissemination, employment transportation, rural transportation, and service with more assistance. The RCC prepared a listing of available transportation resources within its service area and locations of information dissemination.

Paratransit service allows people with disabilities and elders’ access to essential services such as medical and employment along with recreational activities. Currently the RCC has formed subcommittees to address the needs of employment transportation and rural transportation while recognizing that there may be overlap in service needs. Without closing these gaps, access to essential services remains limited.

The WRTA recently built a new Hub of operations which serves as the focal point of most WRTA routes and houses the paratransit eligibility, call taking, reservations and scheduling. This is also the home of the customer service center. As the focal point of input from the public, the office is responsible for gathering information and forwarding it to the proper department for follow up. Response time is monitored closely. The Hub is located next to Union Station in Downtown Worcester, which serves as an intermodal transportation center with access to the MBTA commuter rail, intercity bus, and intercity train. Information on these services is discussed in greater detail in the appropriate sections.

In response to public input, WRTA began four deviated fixed route services in Grafton, Northbridge, Paxton and Westborough. These deviations deviate up to ¾ mile for ADA eligible people with disabilities and will soon be deviating for the general population. Deviations are limited to two per trip.

Analysis

Using the StrataGen ADEPT system, tracking performance such as on time performance, late pick-ups, cancelled trips, and no-shows becomes much easier. Using Sales Force, the WRTA Customer Service staff can track and respond to complaints in a more efficient way which reduces duplication of efforts and is particularly helpful in monitoring suggested new service locations.
In 2014-15, the WRTA conducted a Comprehensive Service Analysis (CSA) which was completed by URS Corporation. While the primary focus of the CSA was on the WRTA’s fixed-route system, URS included a transit market analysis, which relates socio-economic data with population density, vehicle availability, land use and employment locations within WRTA’s service region, as well as a number of service improvement recommendations. URS recognized that there are areas where service could benefit from modifications to better meet demand and improve access to employment, particularly for transportation disadvantaged populations.

As identified in the CSA analysis, the WRTA provides fixed-route service to all but five areas of its region with a current or future potential for high transit demand. These five areas are located in the towns of Barre, Douglas, Dudley, Holden and West Brookfield. All of them exhibit clusters of current or future employment activity, service agencies and schools. Several of these towns have higher than average percentage of households without a vehicle, low income populations and elderly populations. Most of these towns do not meet the density threshold favorable for fixed-route transit service and will require further analysis to determine when and what type of transit service should be implemented in these areas, including possible paratransit type services.

**Needs**

Currently, the towns of Hardwick and Ware have expressed a need to improve access to essential services and have discussed these issues at RCC meetings. As towns at the edges of RTAs and not within the WRTA, both are isolated from the core of their respective service areas. Additionally, both are rural towns with limited service which significantly adds to the vehicle hours and miles, and reduces efficiencies. Working to change and improve the service will require assistance at the local, regional, and state levels.

Other service opportunities exist on the fringe of the current fixed-route system. These options would increase mobility options, provide more access to essential services and create new mode options not currently available. A potential transit corridor has been identified in the southernmost part of the region, connecting the towns of Dudley, Southbridge, Sturbridge and Webster. Input gathered for the CSA from multiple public meetings, surveys and meetings with community organizations coincide with the need to connect these towns.

The WRTA has also developed five distinct ADA paratransit eligibility applications in an effort to simplify the process for applicants and ask targeted questions about how the applicant’s disability prevents them from using the fixed route service. With hope of having one application
for all Massachusetts RTAs, MassDOT has formed a Common Application committee. This application is currently under review.

WRTA is also planning on joining other RTAs on Ride Match software to improve online service information dissemination in a one-stop-shopping model. Ride Match would provide the public information on available public and private alternatives to get from point A to point B within communities and across the state.

**Intercity Bus**

Transit travel between cities is of great importance to the Central Massachusetts region because of the area’s density, and its geography within New England. The Central Massachusetts region is the second largest urbanized area in the state and the third largest urbanized area within New England, behind Boston and Providence, respectively. The region is significant to intercity transit travel as a trip generator with the City of Worcester serving as a focal origin and destination point for travelers. Union Station, located within downtown Worcester, serves as the regional intermodal center for passengers taking the MBTA commuter rail, Amtrak passenger rail, and Peter Pan and Greyhound intercity bus routes. Directly adjacent to Union Station is the WRTA regional transit hub, which links the local public transportation provider to the other intercity transit connections.

**Background**

The providers of intercity bus service compete for passengers directly against airlines, passenger rail, and single-occupancy vehicles. This service is particularly important to rural areas and smaller communities that lack nearby air and passenger rail service. According to industry officials, intercity bus routes are gaining riders due to lower fares than the alternatives, and bus carriers are responding by adding routes and schedules to accommodate ridership demand. Such as the case with Union Station in Worcester, intercity buses operate from centrally located terminals, offering frequent service between major cities to make bus travel more convenient.

**Peter Pan Bus Lines – Background and Current Conditions**

Peter Pan Bus Lines, Inc., a private carrier based in Springfield, Massachusetts, is one of two major intercity carriers providing service in the Central Massachusetts region. One of the largest privately owned intercity bus companies in the country, Peter Pan is among the most innovative with express service and passenger amenities such as e-ticketing and online schedules. New buses in its fleet offer enhanced technological equipment that provides passengers with access to
on-board Wi-Fi, electrical outlets, and additional “leg room”. The company expanded its ITS capabilities to include on-board GPS, ticket scanners, and security cameras for bus drivers. At its terminals, real-time information updates using scrolling LED signs and monitors and auditory announcements are made for customers to stay informed while traveling.

**Figure IV-10: Peter Pan Bus**

![Peter Pan Bus Image](source: www.peterpanbus.com)

**Greyhound Lines – Background and Current Conditions**

Greyhound Lines, Inc. is the second major intercity carrier providing service in the Central Massachusetts region and serves over 3,800 destinations throughout North America. Greyhound has partnerships with a number of independent bus lines throughout the country, which provide complementary service to Greyhound’s existing schedules and link to many of the smaller towns and rural areas within its national route system.

**Figure IV-11: Greyhound Bus**

![Greyhound Bus Image](source: abcnews.go.com)
TRANSPORTATION MODES – INTERCITY TRANSPORTATION

Analysis

Between Peter Pan and Greyhound, service is provided to regional destinations at certain times of the day by either carrier from Central Massachusetts. Service is available to most major cities in the Northeast, with frequency of service varying from hourly service to Boston to only two roundtrip trips per day to Providence. For example, there are 15 one-way trips from Worcester to Boston starting at 5:45am and the last trip departing at 10:35pm. Intercity public transportation bus services are available from Worcester to Fitchburg and Leominster, operated by the Montachusett Regional Transit Authority (MART) utilizing Worcester’s Union Station as an origin and destination point.

At the State level, the MassDOT Rail and Transit Division formed the BusPlus+ program, in which MassDOT provides new buses to private operators in exchange for expanding intercity and commuter transportation options. The operators provide improvements to regional transportation services and are responsible for all maintenance and operating costs. Peter Pan and Greyhound, as recipients of BusPlus+ funding, expanded services to increase commuter trips from Sturbridge to Boston in early 2014 and Worcester to Boston in September 2014.

Future Needs

Due to Peter Pan and Greyhound operating as private carriers versus public transportation, the CMMPO is not aware of their most pressing future needs. Like other public transportation, providing funding for maintaining operations is vital and determines system preservation and any plans for potential expansions.

Areas of importance to regional bus mobility are to fill gaps in the existing system and expansion to meet growth in future demand. Some geographic areas and times of day could benefit from bolstered or added service in the Central Massachusetts region, such as:

- Increase service from Worcester to Providence, specifically at times which would benefit potential commuters.
- Alter the current Worcester to Boston schedule to service its Sturbridge stop in the AM for potential commuters in the CMMPO West (the Brookfields, Spencer, Warren) and Southwest (Charlton, Southbridge, Sturbridge) sub-regions; the current schedule provides trips only in the mid-day and evening time periods.
- Consider a ‘Park and Ride’ stop in Palmer along the Worcester to Springfield route, which would provide access to intercity bus service for communities in the CMMPO West sub-region (the Brookfields, Hardwick, Warren).
Further statewide needs and other potential services for both public transportation and regional bus services were identified in the *Massachusetts Regional Bus Study*, completed by CTPS in 2013.

**Intercity Rail**

**Background**

**MBTA**

Under contract with the MBTA since July 1, 2013, Keolis Commuter Services runs commuter trains throughout Eastern Massachusetts. The MBTA’s Framingham-Worcester commuter rail line operates between Worcester’s Union Station and Boston’s South Station, about 44 miles in length. Worcester’s Union Station serves as the hub of passenger rail activity in the Central Massachusetts region. Of the seventeen stations on this commuter rail line, three are located within the CMMPO region in North Grafton, Westborough, and Worcester. In 2012, CSX moved their freight operations from Allston to Worcester and transferred ownership of the Framingham to Worcester track segment to the MBTA. With complete control of the line, the MBTA has increased the amount of trips from Boston to Worcester, implemented a new schedule, installed a third track to allow for the expansion, and announced plans to perform track maintenance to improve on-time performance.

![Figure IV-12: MBTA Commuter Rail](source: Jonathan Wiggs/Boston Globe Staff)

**Amtrak**

Amtrak provides intercity passenger rail service nationwide, serving more than 500 destinations in 46 states over 21,000 miles. Similar to other passenger railroad systems, Amtrak receives
public funding for capital costs and operating expenses, but is managed as a for-profit corporation. The only Amtrak service that operates through Central Massachusetts is the Lake Shore Limited, which begins its route in Chicago and travels eastbound through Cleveland, Buffalo, Albany, Springfield, Worcester, and concludes in Boston.

![Amtrak Siemens Electric Locomotive](http://blog.amtrak.com/2013/05/new-amtrak-locomotives-the-facts/0513_siemens_pressday_highrez_img_8746/)

**Figure IV-13: Amtrak Siemens Electric Locomotive**

**Analysis**

As noted in the 2012 RTP document, there were a number of issues concerning commuter rail service in Central Massachusetts, from limited opportunities for reverse commuting to poor on-time performance. As part of an overall state effort to continue investing in multi-modal, healthy, active transportation options, the Framingham-Worcester commuter rail line saw an expansion in recent years. In 2014, responding to customer feedback and continuous increases in ridership, the MBTA expanded the amount of round trips between Worcester and Boston to 20 on weekdays and nine on weekend service. The overall schedule was altered to add service during peak times and accommodate reverse commuting (Boston to Worcester).

According to MBTA ridership statistics, in FY2013 the Framingham-Worcester commuter rail line was second out of 14 commuter rail lines for total (inbound and outbound) boardings on a typical day with 16,293 boardings. Worcester’s Union Station ranked eighth out of 133 commuter rail stations ranked by inbound (Worcester to Boston) boardings on a typical weekday (1,475). This results in a 22% increase in inbound boardings on a typical weekday from November 2012 statistics (1,206). Between Worcester, Grafton (724), and Westborough (759),
the Central Massachusetts stations represent 26.8% of a typical weekday for inbound boardings on the Framingham-Worcester commuter rail line (11,044).\(^1\)

The *Lake Shore Limited* only serves Worcester’s Union Station twice a day, once in the mid-day as it departs from Boston towards Chicago, and once in the evening as it departs from Chicago towards Boston. According to Amtrak ridership statistics, the *Lake Shore Limited* served 373,331 passengers in FY14, a 5.6% decrease versus FY13 adjusted. In FY14, Worcester’s Union Station served 8,439 passenger trips (inbound boardings and outbound alightings). Out of the eleven stations in Massachusetts, Worcester ranks ninth in station usage, ahead of Pittsfield (7,541), and Framingham (2,154), respectively.\(^2\)

**Future Needs**

As referenced earlier, providing funding for maintaining operations is vital and determines system preservation and any plans for potential expansions. While the CMMPO does not program funding for either the MBTA commuter rail or Amtrak, they are actively involved in passenger/commuter rail discussions and any future expansion studies/plans.

The Framingham-Worcester commuter rail line continues to have issues with on-time performance. In the past six months (May-October 2014), the line averages an 86% on-time adherence (81.7% May-July, and 90% August-October).\(^3\) The line suffers from summertime speed restrictions due to the steel tracks “de-stressing”, the inability to withstand heat. MassDOT unveiled plans to improve travel times on the line, with work begun in 2014 between Worcester and Grafton and is anticipated to be completed in 2016.

In addition to the MBTA, passenger/commuter rail service between Worcester and Providence has been discussed. The Boston Surface Railroad Co. and the Providence and Worcester Railroad are in the initial stages of conducting a study with the purpose of creating a commuter rail service between the two cities. The projected route would include only one additional stop in Woonsocket, Rhode Island and is anticipated to be a 70-minute trip time.

MassDOT has partnered with its sister agencies in Vermont and Connecticut to initiate a study of the “Inland Route”, which would examine a second passenger rail service from Boston to Worcester, Springfield, Hartford, and New Haven, Connecticut. The study would likely include

---

potential improvements and recommendations for upgrades to the existing route for higher-speed standards, similar to Amtrak’s Lake Shore Limited.

Although the MBTA commuter rail service area covers 175 communities, some geographic areas and times of day could benefit from expanded or added service in the Central Massachusetts region, such as:

- Connections to other Regional Transit Authorities (RTA’s) at suburban MBTA commuter rail stations are non-existent and would promote inter-modality in the region. For example, the WRTA operates community shuttles to the Grafton and Westborough stations, and would benefit to foster a connection with the MWRTA at either the Westborough or Southborough station.
- Extension of commuter rail service from Worcester to Springfield.
- Examination of passenger/commuter rail service from Worcester to Providence.
- Improved on-time performance.
Auto Travel

Congestion

Background

MassDOT predecessor agencies, the MPOs, the MBTA, other RTAs and a prior ride share contractor initially developed the Massachusetts Congestion Management Process (CMP) (previously called Congestion Management “System”) as a cooperative effort. The team was charged with the responsibility for the overall design of the Commonwealth’s CMP as well as the development and evaluation of various strategies or improvement options. The Technical Team also selected standard performance measures and congestion monitoring techniques to be used statewide. Although considered a statewide system, CMMPO staff has been responsible for both developing and maintaining the planning region’s CMP within the flexible framework originally established by the Technical Team.

The CMP is a systematic approach, collaboratively developed and implemented throughout a metropolitan region that provides for the safe and effective management and operation of new and existing transportation facilities through the use of demand reduction and operational management strategies. The CMP provides information to decision-makers on system performance and the effectiveness of implemented strategies. Although major capital investments are still needed to meet travel demand, the CMP also develops lower cost strategies that complement capital investment recommendations. The result is a more efficient and effective transportation system, increased mobility, and a leveraging of resources. The intent of the CMP is not only to address existing congestion, but also to prevent congestion from occurring elsewhere. The CMP includes other programs and activities such as the Localized Bottleneck Reduction Program (LBRP) and MassDOT Park-and-Ride Lot Usage monitoring.

CMMPO staff conducts the preparatory work and scheduling needed to collect all pertinent data necessary to maintain the region’s ongoing CMP program. Travel Time and Delay studies are conducted on identified CMP focus roadway segments, defined either analytically or through the public outreach process. Data needed to analyze the operations of the critical intersections identified along the focus roadway segments is also collected through the CMP effort. Peak period Turning Movement Counts (TMCs) are conducted at critical intersections in the planning region.
Performance Management

As discussed in Chapter II of this report, MAP-21 requires performance based planning related to federal emphasis areas, one of which is congestion. The CMMPO has drafted a number of goals for the Mobility2040 Long Range Transportation Plan, two of which are congestion related. The objectives for these goals are as follows:

**Objective 1 – Coordinate Improved Incident Management**
- Facilitate one meeting per year with identified agencies to improve incident detection and clearance time

**Objective 2 – Improve Corridor Management Integration**
- Reduce average travel delays along 2 identified congested major roadway segments every 5 years
- Improve two of the top 20 congested intersections every 5 years to a Level of Service of “D” or better

**Objective 3 – Reduce GHGs Generated by Motor Vehicles in the Region**
- One percent vehicle miles traveled (VMT) reduction in each 5 year period
- Institute one new Park-and-Ride lot in each five year period for Transit & TDM along congested corridors

**Analysis**

Since 2010, CMMPO staff has completed over 30 Travel Time and Delay studies, analyzed 150 intersections, monitored five Park-and-Ride lots, conducted over 500 traffic counts, and studied nine identified local “Bottleneck” roadway segments. The analyses of all these data collection activities are compiled and included in yearly progress reports. The most recent progress reports can be found at http://www.cmrpc.org/transportation-planning-documents.

**Traffic Volumes:** As shown in Figure IV-14, the highest traffic volumes are on the Interstate highways, especially Interstates 90, 290, and 495. Daily volume surpasses 115,000 vehicles a day on sections of Interstate 290 in Worcester. Also, over 90,000 vehicles a day use Interstate 90 between Sturbridge and Hopkinton. Routes 9, 20, and 146 are lower volume roadways, but still carry between 20,000 and 40,000 vehicles a day on some sections in the urban towns. Rural towns in the western part of the CMMPO region have no roadways with over 10,000 vehicles per
Figure IV-14 Average Daily Traffic Volume

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), MassDOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.

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day. For additional traffic volumes see CMMPO staff’s Daily Traffic Volume report or visit the MassDOT website.

**Travel Time Data:** Using CMMPO staff’s Travel Demand Model, a number of roadway segments throughout the region were identified as “congested” or “projected” to be congested by 2040. Travel Time and Delay studies analyze the speeds on the roadways and how long it takes to get from one place to another. Slower travel speeds are most often located in urban and densely built up areas where congestion occurs. Vehicle speeds fluctuate at different times of the day as well as different days of the week. When roadway usage exceeds capacity, travel speeds tend to slow significantly. Figures IV-15 & IV-16 show observed travel speeds for roadway segments that were studied between 2010 to 2014.

**Turning Movement Counts (TMCs):** Numerous intersections have been studied by CMMPO staff over the years. The AM & PM peak periods are analyzed to determine the amount of delay for vehicles traveling through the intersection. A Level of Service (LOS) is calculated for each studied intersection, with an “A” being given to the location with minimal delay progressing downward to an “F” assigned to an intersection with excessive delays or where the demand far exceeds capacity. Many intersections in the planning region have a poor LOS during peak travel periods in the morning and evening. These locations are concentrated in communities with high volume roadways: Auburn, Shrewsbury, Westborough, and Worcester. In addition to regular single-occupant vehicle (SOV) travel, the amount of heavy vehicles traveling through intersections and on roadway segments can at times decrease speeds while increasing delays.

**Bottlenecks:** In 2008, FHWA and FTA recommended that MPOs identify the top three bottleneck areas in their region. Since then, CMMPO staff has analyzed a total of nine bottleneck areas in our Localized Bottleneck Reduction Program with the help of our Transportation Management Systems and Transportation Model. A “traffic bottleneck” is a localized constriction of traffic flow, often on a highway segment that experiences reduced speeds and inherent delays, due to recurring operational influence or a nonrecurring impacting event. A bottleneck can be on high or low volume roadways. Table IV-4 shows the bottleneck locations that CMMPO staff has studied since 2011.
Figure IV-15 Observed AM Peak Hour Travel Speeds

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), massDOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.

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Observed AM Peak Hour Average Speeds by Segment, 2010-2014 *

- <10 mph
- 10 - 19 mph
- 20 - 29 mph
- 30 - 39 mph
- 40 - 49 mph
- >49 mph

*Based on observations recorded on select sample days within this time period.
Figure IV-16 Observed PM Peak Hour Travel Speeds

Observed PM Peak Hour Average Speeds by Segment, 2010-2014 *

- <10 mph
- 10 - 19 mph
- 20 - 29 mph
- 30 - 39 mph
- 40 - 49 mph
- >49 mph

*Based on observations recorded on select sample days within this time period.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), MassDOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.

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Figure IV-16 Observed PM Peak Hour Travel Speeds
Table IV-4: Localized Bottleneck Reduction Program

<table>
<thead>
<tr>
<th>City/Town</th>
<th>Location</th>
<th>Year Analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northbridge</td>
<td>Route 122 @ Church Street</td>
<td>2011</td>
</tr>
<tr>
<td>Spencer</td>
<td>Route 9 @ Route 31</td>
<td>2011</td>
</tr>
<tr>
<td>Worcester</td>
<td>Belmont Street @ I-290 Ramps (Exit 17)</td>
<td>2011</td>
</tr>
<tr>
<td>Charlton</td>
<td>Route 20: Between Route 169 &amp; Route 31</td>
<td>2013</td>
</tr>
<tr>
<td>Oxford</td>
<td>Route 12 @ Sutton Avenue @ Charlton Street</td>
<td>2013</td>
</tr>
<tr>
<td>Westborough</td>
<td>Route 9 @ Lyman Street</td>
<td>2013</td>
</tr>
<tr>
<td>Auburn</td>
<td>Auburn Street: Between I-290 (Exit 9) &amp; Brotherton Way</td>
<td>2014</td>
</tr>
<tr>
<td>Grafton</td>
<td>Route 122/140: Between Snow Road &amp; Providence Road</td>
<td>2014</td>
</tr>
<tr>
<td>Worcester</td>
<td>Route 12 @ East &amp; West Mountain Street</td>
<td>2014</td>
</tr>
</tbody>
</table>

**Park and Ride:** CMMPO staff has been monitoring the Berlin Park-and-Ride lot usage since 1999. In 2013, analysis began on an additional four lots. Table IV-5 shows the five Park-and-Ride lots that have been studied. Three of the lots have over 100 spaces and the remaining two have fewer than 50. All lots are well utilized and are located near major highways and interstates. Additional Park-and-Ride information can be found on the MassDOT website at http://www.massdot.state.ma.us/highway/TrafficTravelResources/ParkandRideMap.aspx.

Table IV-5: MassDOT Maintained Park-and-Ride Lots in the CMRPC Region

<table>
<thead>
<tr>
<th>Community</th>
<th>Location/Address</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berlin</td>
<td>Rte 62 at I-495, Exit #26</td>
<td>45</td>
</tr>
<tr>
<td>Auburn</td>
<td>Mid State Drive Adjacent to I-90, Exit #10</td>
<td>135</td>
</tr>
<tr>
<td>Millbury/Worcester</td>
<td>Rte 20 at I-90, Exit #10A</td>
<td>446</td>
</tr>
<tr>
<td>Millbury</td>
<td>Rte 122 at I-90, Exit #11</td>
<td>140</td>
</tr>
<tr>
<td>Sturbridge</td>
<td>Rte 131 at I-84, Exit #3 (Bethlehem Lutheran Church Lot)</td>
<td>50</td>
</tr>
</tbody>
</table>

**Needs Assessment**

As the analysis of intersection and roadway segments are completed, the resulting data is added to CMMPO staff’s list of encountered peak hour delay. This table ranks the intersections based on the total number of minutes that drivers as a group wait at the intersection during the AM + PM hours. Currently, 287 intersections are included in the list. The average total peak hour delay calculated from the list is 1,588 in-car minutes per hour. 74 of the 287 intersections caused delays that were above average. Based on the above mentioned data collection activities, there
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are various roadway deficiencies that need to be further analyzed and improvements that should be made, whether they are short-term or long-term in nature. The complete list of encountered delays for the 287 intersections can be found in the latest CMP Progress Report.

Park-and-Ride lots are used to reduce the number of vehicles on the roadways. The more people that carpool, the fewer vehicle miles traveled. The Auburn, Berlin, and Sturbridge lots are heavily used and are usually near capacity. The remaining two lots in the town of Millbury are only half utilized.

There are many causes of congestion. Some are recurring, such as insufficient capacity, unrestrained demand, or poor signal timing, and some are non-recurring, such as collision incidents, poor weather, work zones, or emergencies. Most of the congestion in the CMMPO region is concentrated in the City of Worcester and the neighboring urban towns. Congestion can be found on local roads, highways, and Interstates. There are many improvement options to consider. There are short-term improvements such as adjusting signal timing and phasing, maintaining traffic control signage and pavement markings, maintaining good pavement, trimming overgrown vegetation along roadways that impair vehicle sight lines, maintaining roadway drainage structures, and access management techniques. These improvements can be quickly implemented at a low cost. Also for consideration are other options that are more costly and take longer to implement. Some of these are intersection realignment, installation of a modern roundabout, building additional lanes to increase capacity, and incorporating Intelligent Transportation Systems (ITS) capabilities or tools. See CMP Mitigation Toolbox for other ideas on relieving congestion (http://www.cmrpc.org/congestion-management-process), all of which may be considered in the region from time to time.

Prioritization

In concert with the goals and objectives drafted by the CMMPO there are certain roadways and intersections that should be improved first. These prioritized locations should have improvements that will alleviate congestion and reduce travel time. Performance measures help determine if a project should be undertaken as a result; a project that benefits multiple modes or management systems will get a higher priority over a proposed project that only helps one element.

Using the peak hour delay table for critical intersections in the planning regions, we find the top 20 locations that should be considered top priority for the region. Figure IV-17 shows the locations of these top 20 congested intersections as well as the Park-and-Ride lots and bottleneck locations. The location of these intersections can also help determine which roadway segments
Figure IV-17 CMP Focus Locations

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), massDOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, InformationTechnology Division.

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should undergo improvements to reduce travel time and potential bottlenecks. The following table only includes what CMMPO staff has analyzed to date. There could potentially be other congested intersections in the region that will be on a future priority list. Most of the critical locations are in the City of Worcester and the town of Shrewsbury. The remaining few are in the towns of Sutton, Upton, and Webster. Ten of these locations should be addressed by 2040 along with ten nearby congested roadway segments. Table IV-6 is the list of the top 20 congested intersections. The total peak hour delay included in the table represents the total number of minutes that drivers as a group wait at the intersection during the AM + PM peak hours. By addressing the congestion issues at these intersections, travel flow for the nearby roadway segments would potentially be alleviated.

<table>
<thead>
<tr>
<th>Community</th>
<th>Intersection</th>
<th>Total Peak Hour Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worcester</td>
<td>Belmont St/Lake Ave</td>
<td>12275</td>
</tr>
<tr>
<td>Webster</td>
<td>I-395 NB Ramps/Route 16/Sutton Rd</td>
<td>12080</td>
</tr>
<tr>
<td>Worcester</td>
<td>Foster St/Francis J McGrath/Franklin St/Green St</td>
<td>10908</td>
</tr>
<tr>
<td>Upton</td>
<td>High St/Hopkinton Rd/School St/Westboro Rd</td>
<td>10862</td>
</tr>
<tr>
<td>Worcester</td>
<td>Chandler St/Mower St/Pleasant St</td>
<td>10656</td>
</tr>
<tr>
<td>Upton</td>
<td>Route 140/Hartford Ave/Maple Ave</td>
<td>10601</td>
</tr>
<tr>
<td>Worcester</td>
<td>Cambridge St/Southbridge St</td>
<td>10501</td>
</tr>
<tr>
<td>Shrewsbury</td>
<td>Route 9/South St</td>
<td>9819</td>
</tr>
<tr>
<td>Worcester</td>
<td>Park Ave/Salisbury St</td>
<td>9388</td>
</tr>
<tr>
<td>Sutton</td>
<td>Route 146/Boston Rd</td>
<td>9340</td>
</tr>
<tr>
<td>Westborough</td>
<td>Route 9/Lyman St</td>
<td>8907</td>
</tr>
<tr>
<td>Worcester</td>
<td>Cambridge St/Main St/Webster St</td>
<td>8800</td>
</tr>
<tr>
<td>Shrewsbury</td>
<td>Main St/N Quinsigamond Ave/Holden St</td>
<td>8563</td>
</tr>
<tr>
<td>Worcester</td>
<td>Route 20/Massasoit Rd</td>
<td>8381</td>
</tr>
<tr>
<td>Westborough</td>
<td>Route 30/Church St/School St</td>
<td>7795</td>
</tr>
<tr>
<td>Worcester</td>
<td>Route 20/Sunderland Rd</td>
<td>7611</td>
</tr>
<tr>
<td>Worcester</td>
<td>Plantation St/Lincoln St</td>
<td>7306</td>
</tr>
<tr>
<td>Westborough</td>
<td>Route 9/Otis St</td>
<td>6976</td>
</tr>
<tr>
<td>Shrewsbury</td>
<td>Route 140/Main St</td>
<td>6802</td>
</tr>
<tr>
<td>Shrewsbury</td>
<td>Route 20/Lake St</td>
<td>6803</td>
</tr>
</tbody>
</table>

Improvement of existing Park-and-Ride facilities and the possible addition of more areas can help meet the goals of a 5% total VMT reduction and the long term creation of five new Park-and-Ride locations. Further, rideshare programs such as MassRIDES and NuRide will also help
with VMT reduction by encouraging travelers to use options such as ridesharing, vanpooling, public transit, bicycling, and walking. Travel demand management (TDM) is another way to reduce traffic congestion. Managing traffic demand is about providing travelers, regardless of whether they drive alone, with travel choices, such as work location, route, time, mode, and variable pricing.

**Safety**

**Background**

The Central Massachusetts Metropolitan Planning Organization recognizes the importance of transportation safety planning for all agencies and users of the regional transportation system. The organization’s transportation safety planning efforts employ a multi-modal strategy: encompassing roadway, transit, bicycle, pedestrian, and rail travel throughout the Central Massachusetts region.

Starting in 2007, states were required to have a State Highway Safety Planning Program (SHSP) that identified and analyzed safety problems and opportunities in order to use Highway Safety Improvement (HSIP) funds for new eligible activities under 23 USC 148. Moving Ahead for Progress in the 21st Century (MAP-21), the current Federal transportation appropriations bill, continues HSIP in order to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State owned public roads and roads on tribal lands. The HSIP program requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. According to MassDOT, an HSIP eligible activity is any strategy, activity or project on a public road that is consistent with the data-driven SHSP and corrects or improves a hazardous road location or feature, or addresses a highways safety problem.

The Massachusetts Strategic Highway Safety Plan (SHSP) was developed in consultation with Federal, state, regional, local, and private sector safety stakeholders, and uses a data-driven, multidisciplinary approach involving the 4 Es of safety (e.g., engineering, education, enforcement, and emergency response) to identify the plan’s statewide goals, objectives, and emphasis areas. The Massachusetts SHSP was originally released in 2006, as a comprehensive safety plan/framework for reducing fatalities and serious injuries related to the surface transportation network. In 2012, the Commonwealth undertook a revision to expand and improve upon the significant accomplishments in traffic safety and reductions in fatalities and serious injuries Massachusetts has achieved since the plan was first developed.
The updated Massachusetts SHSP is consistent with requirements outlined in the most recent Federal transportation legislation, MAP-21. One requirement in MAP-21 is to establish goals and performance measures. Goals in the Massachusetts SHSP include:

- Reduce motor vehicle fatalities and hospitalizations by 20 percent in the five-year period following adoption of the SHSP (Short-Term Goal);
- Halve the number of fatalities and serious injuries by 2030 (Interim Goal); and
- Move Toward Zero Deaths and eliminate fatalities and serious injuries on the roadways (Long Term Goal).

**Performance Management**

As discussed in Chapter II of this report, MAP-21 requires performance based planning related to federal emphasis areas, one of which is safety. New safety performance measures have been proposed related to MAP-21 as the five year rolling averages for total number of fatalities and serious injuries, and rates of fatalities and serious injuries per one hundred million Vehicle Miles Travelled (VMT), and are applicable to all public roads regardless of ownership or functional classification.

Following in the footsteps of MAP-21 emphasis areas and the Commonwealth’s SHSP, CMRPC has adopted draft safety goals for the upcoming Mobility2040 Long Range Transportation Plan.

**Objective 1 - Reduce the number & rate of Fatal & Injury crashes in the region**

- Reduce number of fatalities by 10% in 10 years
- Reduce number of serious injuries by 10% in 10 years
- Reduce rate of fatalities (fatalities per 100 million VMT) by 10% in 10 years
- Reduce rate of serious injuries (serious injuries per 100 million VMT) by 10% in 10 years

**Objective 2 - Achieve Industry standards for preventable accidents for transit**

- Reduce preventable accident rate (accidents per 100,000 miles) by 10% in 5 years

**Analysis**

From 2009-2011 there were approximately 32,500 crashes in the CMRPC region. Forty-two (42%) percent of the region’s crashes occurred within the City of Worcester. This compares with forty-five percent (45%) of the region’s crashes occurring in Worcester from 2006-2008. Eighty-
six percent (86%) of all crashes were located in the Census designated Urbanized Area. This compares with an urbanized area share of ninety one percent (91%) of all crashes in 2006-2008.

Figure IV-18: Regional Highlights

Regional Highlights

- Worcester (42%)
- Shrewsbury (6%)
- Auburn (5%)
- Southbridge (3%)
- Oxford (3%)
- Northborough (3%)
- Webster (2%)
- Westborough (2%)

An initial take away from the data shows that crashes are taking place outside the City of Worcester at a greater rate than in previous time periods. Additionally, rural crashes have an increased share of the regional total.

Figure IV-19: Fatal vs. Injury Crashes

The tables below show that injuries and fatalities have increased at a slight rate between the two time periods. Overall, crashes have increased from 31,800 to 33,500, which is about a 2.2% increase in crashes during the two time periods.
Needs Assessment

The Massachusetts Department of Transportation generates a listing of HSIP eligible Auto, Bike, and Pedestrian clusters for the Commonwealth. A list of HSIP eligible projects for the CMRPC planning region was derived from the statewide list. One hundred and seventy six (176) automobile, six (6) bicycle, and ten (10) pedestrian clusters have been identified as HSIP eligible for the region. (It should be noted that mainline Interstate crash clusters have been removed from consideration due to jurisdictional issues.) Communities that wish to pursue HSIP funding for a project to improve safety at any of these locations will need to perform a Road Safety Audit (RSA). Road Safety Audits have been held for all projects receiving HSIP funding in the CMRPC region. Through the RSA process, HSIP funding has been utilized to improve intersection design and safety across the CMRPC region. Current examples of HSIP funded projects can be found in the CMMPO Transportation Improvement Program (TIP). When data becomes available, future efforts will include returning to project locations for a follow-up RSA in order to measure the effectiveness of HSIP driven safety upgrades. Communities can contact CMRPC for further assistance regarding this requirement.

Prioritization

High Priority HSIP Eligible Automobile Crash Locations are as follows:

- CMRPC Region - Statewide Top 200 Automobile Clusters (28)
- CMRPC Region – HSIP Eligible Automobile Clusters Tier II (88)
- CMRPC Region – HSIP Eligible Automobile Clusters Tier III (60)

For the purposes of the Long Range Transportation Plan, crashes from the CMRPC region’s share of the statewide Top 200 are considered highest priority. Please see the 2009-2011 CMRPC Regional Safety Report for expanded discussion regarding Tiers II & III, as well as other non-HISP eligible crash clusters.

A Note on Road Safety Audits:

The Federal Highway Administration defines a Road Safety Audit (RSA) as the formal examination of an existing or future road or intersection by an independent, multidisciplinary team. The purpose of an RSA is to identify potential safety issues and possible opportunities for safety improvements considering all roadway users.
Pavement and State of Good Repair

Background

CMRPC staff collects pavement condition data on town maintained federal-aid eligible roadways on a three year cycle across the entire region. A team of two technicians perform a windshield survey gathering detailed information in nine categories of pavement distresses. The technicians also collect length and width of a segment and score the drainage infrastructure and the comfort of the ride. Staff entered the data collected in the field into Cartegraph, an asset management software package developed and supported by Cartegraph Systems Incorporated, used to inventory, quantifiably rate and analyze pavement distress information. Using Cartegraph, staff determined an Overall Condition Index (OCI) for each segment based upon the pavement ratings and nature of the distresses. The OCI is a score used to rate each segment inspected on a scale from 100 to 0. An OCI of 100 indicates optimal pavement conditions, while an OCI of 0 indicates that a road is in very poor condition and in need of extreme repair measures. The score is calculated by subtracting a series of deduct values associated with the severity and extent of the various pavement distresses described above. Cartegraph’s deduct values are determined through a series of deduct curves, which were developed by pavement engineers using years of research on pavement performance. The resulting OCI is a quantified rating of pavement condition. The state Department of Transportation collects data on state-maintained roads. This data is incorporated into the CMRPC database to create a comprehensive map of all federal-aid eligible roadways condition in the region. The table below depicts the OCI range related to pavement conditions ratings and cost associated with the recommended action for the pavement in each of the categories.

Table IV-7 below shows that the OCI scores are separated into five categories ranging from “excellent” to “very poor.” Each category is associated with a general maintenance or repair strategy recommended for pavement segments scored in that range. These recommended actions are used in budget scenarios to create maintenance and rehabilitation plans.
As discussed in Chapter II of this report, MAP-21 requires performance based planning on federal emphasis area, which includes asset management – pavement preservation. Mobility2040 recognizes the importance of pavement preservation and the Goal set by the CMMPO to address this area is “Maintain the condition of the regions roadways”

The performance measures that have been set-up to measure this goal are:

- Rehabilitate 25 miles of pavement that are in poor or failed pavement condition, including roadways that accommodate bicycle lanes.
- Improve sidewalks that are in poor or very poor condition by 10%

**Table IV-7: Overall Condition Index and Recommendations**

<table>
<thead>
<tr>
<th>OCI Range</th>
<th>Pavement Condition</th>
<th>Recommended Action</th>
<th>Cost/Sq. Yard</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 24</td>
<td>Very Poor</td>
<td>Base Rehabilitation – represents roads that exhibit weakened pavement foundation base layers. Complete reconstruction and full depth reclamation fall in this category</td>
<td>$50.00</td>
</tr>
<tr>
<td>25 - 47</td>
<td>Poor</td>
<td>Structural Improvement – when the pavement deteriorates beyond the need for surface maintenance applications, but the road base appears to be sound. These include structural overlays, shim and overlay, cold planeing and overlay, and hot in-place recycling.</td>
<td>$20.00</td>
</tr>
<tr>
<td>48 - 67</td>
<td>Fair</td>
<td>Preventive Maintenance - slightly greater response to more pronounced signs of age and wear. This includes crack sealing, full-depth patching, and minor leveling, as well as surface treatments such as chip seals, micro-surfacing, and thin overlays.</td>
<td>$8.00</td>
</tr>
<tr>
<td>68 - 87</td>
<td>Good</td>
<td>Routine Maintenance - used on roads in reasonably good condition to prevent deterioration from the normal effects of traffic and pavement age. This treatment category would include either crack sealing or local repair (pot hole, depression, poorly constructed utility patch, etc.), or minor localized leveling.</td>
<td>$0.75</td>
</tr>
<tr>
<td>88 - 100</td>
<td>Excellent</td>
<td>Do Nothing - used when a road is in relatively perfect condition and prescribes no maintenance.</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

**Performance Management**

As discussed in Chapter II of this report, MAP-21 requires performance based planning on federal emphasis area, which includes asset management – pavement preservation. Mobility2040 recognizes the importance of pavement preservation and the Goal set by the CMMPO to address this area is “Maintain the condition of the regions roadways”

The performance measures that have been set-up to measure this goal are:

- Rehabilitate 25 miles of pavement that are in poor or failed pavement condition, including roadways that accommodate bicycle lanes.
- Improve sidewalks that are in poor or very poor condition by 10%

**Analysis**

**Existing Condition**

**Region:** Using the OCI scores calculated from the data collected, CMRPC staff determined that the regional network OCI is 60.06. About 212 miles of the region’s 1,103 mile federal-aid eligible road network are in “excellent” condition, 400 miles are in “good” condition, 243 miles are in “fair” condition, 177 miles are in “poor” condition, and 40 miles are in “very poor” condition.
Subregion: As mentioned in the previous section, the network OCI for the entire region is approximately 60.06, placing the region’s pavement in “fair” condition. The Central Massachusetts planning region is separated into 6 subregions. Figure IV-21 summarizes the OCI score for each of these subregions. The West and North subregions each have a network OCI that is greater than that of the entire region. The Northeast, Southwest, Southeast, Central, and West subregions each have network OCIs below that for the entire region. It is interesting to note that the North has the highest network OCI at 77.63, placing it in the “good” category. All of the other subregions are in the fair category.
Once the condition of the network is established, determining the cost to repair and maintain the network is the next step. In the CMRPC pavement management program, the OCI ranges are associated with a recommended repair action and a repair cost. The table below shows the OCI ranges along with an activity description and the cost. The cost is per square yard and is applied against the area of a segment to determine an estimated repair cost.

Using these tools, staff estimates that it would cost $335.4 million today to bring all of the roads in the federal-aid eligible network to “excellent” condition. To maintain the current network condition going forward would require approximately $38 million per year, while improving the network to a “good” condition would require investing approximately $40-$45 million per year.
**Needs Assessment**

Figure IV-22 below displays a break down by responsible jurisdiction of the maintenance costs from the previous page. The towns are responsible for 846 miles of roadway with a backlog of $200 million. The state DOT is responsible for 257 miles of roadway with a backlog of $66 million.

![Figure IV-22: Regional Backlog by Condition](image)

In the Central Massachusetts planning region, the largest burden for road maintenance rests with the towns. Funding to maintain these roadways comes through the TIP, Chapter 90 funding, or from the towns themselves. CMRPC staff has identified an approximate $10 million annual funding shortfall to maintain the current federal-aid system, as these same resources are stretched to address congestion, safety, and other transportation issues. The towns have the added burden of local roads that are ineligible for federal aid funding. Even with Chapter 90 apportionment, Massachusetts Highway Association (MHA) identified an approximate $30 million annual funding shortfall for towns to maintain their roadways.
When we think of road repair we tend to think of a “worst first” approach. Our natural inclination is to prioritize the repair of the most beat up roads in our network. However, as Figure IV-24 so clearly displays, a “worst first” approach requires a large portion of available funding. It costs 66 times more money to reconstruct a roadway from the ground up than to perform routine maintenance on roadways. If our approach only prioritizes the repair of the worst roads, our limited funding will not stretch to address maintenance of roads in better conditions. The result will be increased overall cost to repair the entire network as road conditions continue to deteriorate and repair strategies become more intensive.

In order for the region’s network OCI to be maintained additional funding must be allocated. Using CarteGraph it was determined that about $30 million dollars per year would be required to maintain an OCI in the “fair” category. To achieve this, 40%-50% of the region’s Chapter 90 money would need to be spent on Federal-aid eligible roads. In addition to the needed Chapter 90 money approximately $5-$8 million dollars per year would need to be spent by the state to maintain the current network condition, not including money spent as part of the TIP. Of the money spent on State maintained roads 40%-45% would need to be spent on preventative and routine maintenance activities while the rest would be spent on structural improvement and base rehabilitation activities. Approximately $9 million dollars per year will need to be spent through the TIP. Since roads only requiring maintenance activities have a lower cost burden than those requiring structural improvement or base rehabilitation it is important to prioritize the roadways that will need this type of treatment. The CMRPC staff developed a priority list using the principles that have been highlighted so far in this report. For the current listing of priority, areas please see the reference materials.
Figure IV-24: Cost Comparison of Pavement Repair Strategies
Intelligent Transportation Systems (ITS)

Background

Technology has found its way into nearly every aspect of our lives, and so it should come as no surprise that it is now being used extensively in ways that improve everyday mobility. From traffic signals to toll collectors to transit fare payment systems, technology is spreading quickly in ways that increase the efficiency of the transportation system. Intelligent Transportation Systems, or ITS, is the use of electronics, communications, or information processing to improve the efficiency or safety of transportation systems.

Because ITS transportation solutions are real-time solutions, they are a natural fit for improving the management and operations of transportation systems. Management and operations encompass daily roadway actions, such as reconstruction and maintenance, snow plowing and salting, providing real time traveler information, and traffic signalization. It also encompasses special circumstances like preparing and responding to accident-related congestion, planned special events, and unplanned security concerns.

By focusing on the evolving technology of ITS and the day-to-day activities of management and operations, transportation planners have a greater opportunity of providing more efficient and effective solutions to the region's transportation problems. In addition, ITS applications used by the WRTA have proven beneficial to riders and have contributed to growth in mode shift to transit.

Performance Management

As discussed in Chapter II of this report, MAP-21 requires performance based planning related to federal emphasis areas, one of which is congestion. The CMMPO has drafted a number of goals for the Mobility2040 Long Range Transportation Plan, two of the congestion-related goals and one freight movement goal are focused on ITS. The objectives for these goals are as follows:

Goal: Reduce congestion and improve mobility for all modes

Objective 1 - Coordinate Improved Incident Management (Highway & Transit).

- Facilitate group to improve incident detection & clearance time. Have 1 meeting per year.
Objective 2 - Enhanced Traveler Information (ITS).

- Facilitate the installation of information systems/kiosks at major intermodal locations, such as Union Station. 2 locations every 5 years.
- Expand I-290 ITS Real Time Traffic Management (RTTM). RTTM on I-395 and Route 146 also. Install 2 Variable Message Boards (VMB) every 5 years.

Goal: Improve Economic Vitality and Freight Movement

Objective 1 - Reduce delay along identified Freight Routes.

- Expand ITS Real Time Traffic Management (RTTM) to include identified freight routes. Install 2 VMBs every 5 years.
- Reduce average travel delays along roadway segments of major freight routes. 2 every 5 years.

Analysis

Federal law requires all intelligent transportation systems (ITS) projects funded through the Highway Trust Fund be compliant with a Regional ITS Architecture. Staff participated as part of the Central Massachusetts Regional ITS Planning and Coordination Committee (RIPCC) to implement the Statewide ITS Strategic Plan.

MassDOT has implemented Real Time Travel Message Signs (RTTMs) on the Turnpike through the Central Massachusetts region. These signs have been very helpful in detecting reoccurring and non-reoccurring congestion and help travelers to identify better routes to avoid congestion. MassDOT will be implementing cameras along I-290 from the Masspike to the I-495 which will be monitored at the Highway Operations Center in Boston to alert MassDOT staff and state police of any incidents or congestion issues. State police and local police departments will also be provided access to the live video feed. These cameras will be followed by RTTMs along I-290 in the future. Staff worked with MassDOT Boston and District 3 to facilitate plan the implementation of the cameras for I-290. Staff brought stakeholders together to assist in designing and locating the cameras along this corridor.

Using ITS for automobile parking applications will be reviewed over time as parking becomes more constrained in Worcester. At present, parking is not constrained in terms of availability or price, although downtown Worcester is experiencing tremendous economic growth and that may strain parking in the future.
Needs Assessment

In 2004, the Executive Office of Transportation-Office of Transportation Planning (now MassDOT) led the effort to develop a Central Massachusetts Regional ITS Architecture. This effort was updated in 2010. CMRPC coordinated by building local involvement and support for the effort. During the needs analysis step of the Regional Architecture development process, the Guidance Committee identified key regional needs and major themes for the Regional ITS Architecture. These findings helped shape the architecture to the unique circumstances of Central Massachusetts. The four regional needs, unchanged since 2004, were: congestion management; transit efficiency; efficient use of existing infrastructure; and economic development. The three major themes expressed by participants in 2004 were: transit demand and revenue; traffic congestion and traveler information. In 2010 the use of ITS data was added as a major theme. From these expressed regional needs and major themes came four statewide Near-Term Multi-Agency Initiatives that were recommended by the Guidance Committee for Central Massachusetts. They are:

- **Event Reporting System**: Internet-based tool that serves as a centralized repository for information on events affecting the transportation network.
- **Expansion of the Massachusetts Interagency Video Integration System (MIVIS)**: Expansion of video sharing and distribution system to allow sharing of real-time video feeds among a larger group of agencies.
- **511 Travel Information System**: Public travel information system, covering the roadways and transit services in the region.
- **Planning Data Archive**: System for coordinating the planning data archives for the transportation agencies in the region.

These statewide initiatives are largely dependent on MassDOT implementation, and when eventually implemented, will require an expansive effort to involve regional agencies beyond MassDOT to become effective and have a significant effect on regional conditions.

Prioritization

As identified in the 2011 Worcester Regional Mobility Study, Transit Signal Priority (TSP) and Roadway Variable and Dynamic Message Signs (V/DMS) are valuable Intelligent Transportation Systems options for Central Massachusetts’ urban core. Both TSP and V/DMS would help reduce vehicle emissions through more efficient bus system operations and added potential for drivers to avoid congested routes thus creating less gridlock for buses that have to travel these routes.
Complete the implementation of the cameras along I-290 and implementation of the RTTMS along this corridor will be the top priority for the Central Massachusetts region. The expansion of the Real Time Message Signs (RTTMs) along I-495 and Rte 146 will also be a priority for the region.

Other regional priorities include:

- Working with MassDOT District 3 to identify significant regional projects which affect the commuting traffic during construction to assist with the traffic management plans and identifying locations for placement of message boards regarding construction related delays and detours.
- Continuing to work with the WRTA and the Worcester DPW staff to identify critical intersections and bus routes for Transit Signal Priority implementation in the future.
- Expanding RTTM technology to include I-395, I-190 and other major state maintained arterials such as Rte 9 and 20 will benefit the region to improve mobility in the future.
- Ensuring that the recently implemented WRTA ITS system remains up to date over time.
Travel Demand Model

Background

The Regional Travel Demand Forecast Model is an important planning tool both for the evaluation of proposed regional transportation improvements and the projection of mobile source air emissions for significant regional projects. The model is the most effective and comprehensive way to project transportation needs within a twenty-year planning horizon as required by Federal regulation.

In the regional travel demand model, traffic volumes are forecast through the interaction of transportation demand and supply. Traffic zones are defined to encompass areas of development that represent the demand, while the actual road network represents the supply. A network is developed consisting of a series of points, or nodes, that graphically show locations of roadway intersections and other elements of the network. Connections between nodes are called links. Links represent highway segments and contain information such as speed and road capacity. Traffic zones contain demographic and employment information, and are represented by special nodes called centroids. Each zone is attached, or “loaded,” onto the network by specialized links called centroid connectors.

Each traffic zone produces and attracts person trips based on its land use. Information entered into the model for each zone (such as population, households, income and employment) determines the amount of trips produced and attracted to that zone. Households are the primary producer of trips, while employment sites are the primary attractors. These productions and attractions are converted to vehicle trips that enter and leave each zone. The fact that people make trips for different purposes (work, shopping, school, personal business, recreation, etc.) – and have different vehicle occupancy rates in doing so – is also calculated into the model.

Performance Management

As discussed in Chapter II of this report, MAP-21 requires performance based planning on federal emphasis areas, which includes using the travel demand model to assess the condition of the roadway network. Mobility2040 recognizes the importance of the model to establish baseline data and measure progress to achieve the following goals and objectives:

**Goal:** Reduce Congestion and Improve Mobility for all Modes

**Objective:** Improve Corridor Management Integration

**Performance Measure:** Reduce average delays along identified congested major roadway segments; 2 delay areas every 5 years.
**Goal:** Reduce Greenhouse Gas and Promote Sustainable practices

**Objective:** Reduce GHGs generated by Auto and Transit in the region

**Performance Measure:** One percent VMT reduction in each 5 years period

**Analysis**

The regional travel demand model was used to generate the Daily Vehicle Miles Travelled and Total Daily Auto Person Trips for the current “2015” and Future “2040” years. Please see the table below for comparison.

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2040</th>
<th>Percent Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Vehicle Miles Travelled</td>
<td>19,171,695</td>
<td>21,292,110</td>
<td>11%</td>
</tr>
<tr>
<td>Total Daily Auto Trips</td>
<td>2,136,828</td>
<td>2,258,052</td>
<td>6%</td>
</tr>
</tbody>
</table>

The table above shows that there will be an increase of about 6% of daily auto trips, and vehicle miles travelled increases by 11%. Given the increase in both the daily person trips and the VMT, it is obvious that the congestion on the roadway network will only get worse in the year 2040. Please see Figure IV-25 which shows the comparison of congested locations for current and future conditions. As mentioned above all the major roadways such as the interstates and state numbered routes in the urban area of the region will be congested by the year 2040.

**Needs Assessment**

Given the limited funding to expand the transportation system, there is a need to look at innovative ways to reduce congestion by looking more deeply at transportation demand management techniques. Transit, walking and bicycling are modes that can improve livability and public health. Some of the initiatives that could help alleviate congestion are investing in increasing and promoting transit use and investing in programs that reduce single occupancy vehicle use such as MassRIDES, Park and Ride lots, expansion of sidewalks and bike lanes. Intelligent Transportation Systems can also be used for both recurring and non-recurring congestion like construction and accident delays.
Prioritization and Next Steps

Staff will continue efforts to keep the model current with network and landuse data. The model will be use to assist with the following tasks:

- Develop model capabilities to measure key Performance Measure metrics developed as part to this Plan.
- Generate model outputs to assist with TIP project scoring.
- Analyze the benefits of ramp metering on I-290 ramps. Use the Transmodeler micro-simulation to aid in the effort.
- Model the WRTA’s comprehensive service analysis recommendations to help prioritize the implementation of the recommendation.
- Improve the model’s capability to more accurately reflect freight (truck) travel.
- Develop enhanced transit reports and highway related measures to understand the impacts of projects on environmental justice areas.
- Aid in the traffic management plan development during the construction of major regional projects.
Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), massDOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.

Produced by the Central Massachusetts Regional Planning Commission (CMRPC)
3 Washington Square, Union Station
Worcester, MA 01604

Figure IV-25 Current (2010) and Future No-Build (2040) Congestion Locations
Freight (Rail and Trucking)

Background

Freight movement in the planning region is anticipated to both increase and evolve. Existing intermodal activity will continue between highway and railroad freight. Freight movement has a direct relationship to regional economic vitality. Through connections to the national freight network, the ability of rural communities to access national and international trade markets is strengthened which, in turn, supports regional economic development.

National Efforts

US DOT plans to issue guidance for freight investment, initially targeting the nation’s highway system. Another future effort will focus on the nation’s extensive network of freight railroads. US DOT is soon to finalize and, pending Congressional approval, potentially expand the initial National Freight Network of roadways required under MAP-21. At this time, the draft network appears somewhat limited and disjointed in the greater New England area. Performance measures for the movement of freight on a national basis are also under development at US DOT, with early release materials discussed below. Freight system reliability is also an important US DOT focus area. Multi-modal stakeholder advisory committees are suggested where necessary to help guide investment in infrastructure that is critical to the movement of freight. Within the planning region, this role is served by the CMMPO Advisory Committee.

FHWA Freight Performance Measures (FPM) Initiative

The FHWA Office of Freight Management & Operations, through a research partnership with the American Transportation Research Institute (ATRI), has developed performance measures for the nation’s highway system through the Freight Performance Measures (FPM) Initiative. System performance measurement is at the forefront of the national transportation discussion as various agencies at all levels seek to monitor existing infrastructure, identify investment needs and quantify costs and benefits of improvement.

One element of the FPM initiative is a data processing tool that determines average operating speeds for trucks that travel on the Interstate Highway System. These averages are calculated using onboard data from several hundred thousand trucks. By accessing this system, transportation data analysts, researchers and other practitioners can determine where, when and how efficiently trucks are moving on selected Interstate highways.
**US Environmental Protection Agency SmartWay Program**
The US Environmental Protection Agency’s (EPA) SmartWay Program encompasses a range of efforts aimed at boosting fuel efficiency in business enterprise while reducing emissions that degrade air quality. One sector targeted by SmartWay is the nation’s trucking industry. The EPA website, in addition to providing program highlights, displays many links to a range of SmartWay resources including finance programs, shipper and carrier/logistics-oriented materials and strategies, sample partner profiles and case studies, and SmartWay outreach materials that can be used to inform the business public about potential savings and environmentally-sound practices that may be adopted.

**Regional Challenges**
Typically, the CMMPO does not directly influence the movement of freight within and through the greater region. The planning staff periodically informs the CMMPO of the range of challenges facing the providers of freight transportation, both highway and railroad. Reducing congestion and increasing safety on the nation’s primary freight routes is a known emphasis area of US DOT. Regional planning efforts seek to minimize trucking delays as well as decrease crash incidents resulting in both fatalities and injuries. The planning staff has also conducted a multimodal community freight-hosting pilot study effort with rail freight provider Providence & Worcester Railroad and the host communities of Auburn and Oxford. This study considered the needs of trucking movements on local and regional highways between rail served sites and the Interstate System. Further, working with the Regional Chamber of Commerce, staff developed a Freight-Based Economic Development Site Selection Inventory that could be served by trucking originating at the CSX Intermodal Yard on Franklin Street in Worcester. On a statewide basis, the activities of the Mass Motor Truck Association (MMTA) are followed by the staff through the group’s periodic newsletter.

**Performance Management**

Freight is an important component of the region’s economic development. As such, it was included in Mobility2040 goal to Improve Economic Vitality and Freight Movement. The measures for this goal are the following:

**Objective 1 - Reduce delay along identified Freight Routes.**

- Expand ITS Real Time Traffic Management (RTTM) to include identified freight routes. Install 2 VMBs every 5 years.
TRANSPORTATION MODES – FREIGHT

- Reduce average travel delays along roadway segments of major freight routes. 2 every 5 years.

**Objective 3 - Improve Safety along Freight Routes.**

- Reduce injuries and fatalities along freight routes. 10% every 10 years.

**Analysis**

**Current Conditions**

**The Region’s Primary NHS Freight Routes**

The region’s primary National Highway System (NHS) freight routes serve major intermodal facilities and are a focus of ongoing freight planning efforts in the region. These priority freight routes, in many cases, provide a connection between major Interstate highways and major intermodal terminals, particularly in the region’s core. The primary routes were previously established through ongoing freight planning efforts and documented in earlier LRTPs and Management System Progress Reports. Tables IV-9 and IV-10 (located on pages IV-88 and IV-89) provide a summary of facts, observations and deficiencies on the Primary NHS freight routes within the planning region:

**Primary NHS Freight Routes: Facts and Observations**

Table IV-9 includes facts and observations for the primary NHS freight routes for five major intermodal terminals in the planning region. Four of the locations are in the City of Worcester while the other is in the town of Westborough. All are truck-railroad freight facilities with the exception of the Worcester Regional Airport. Most of these NHS freight routes are functionally classified as a minor or principal arterial. Traffic volumes range from as low as 3,700 daily vehicles near the Worcester Intransit Container Incorporated (ICI) facility to as much as 18,000 daily vehicles in vicinity of the Worcester Regional Airport. The only at-grade railroad crossings are in the ICI facility. The majority of adjacent land uses near these major intermodal facilities are business, industrial, or manufacturing, with some residential.

In regards to pavement, it is in “good” or “excellent” condition for the four locations in Worcester. The Westborough CSX Yard is the worst, with an average Overall Condition Index (OCI) of 59, which is considered to be in “fair” condition. For safety data, documented “crash clusters” along the primary freight routes were analyzed. The data shown in the table indicate the severity of crashes in the identified clusters over a three-year sample period. The route serving the ICI terminal in Worcester did not have any crash clusters, therefore no crashes are listed. The Westborough CSX intermodal facility had only 13 crashes. However, the routes
serving the three remaining Worcester facilities each had about 100 crashes over the three year analysis period.

There is at least one bridge along the established freight routes for all five terminals. Most of the bridges had a minimum rating of 70.0 with the exception of the structure near the Worcester CSX terminal and one of the bridges along the primary freight route to the Regional Airport. There are two P&W Railroad-owned structures over Southbridge Street in Worcester. Bridge 69.74A is a potential candidate for future year rehabilitation. At this location, bridge column piers on the curb of Southbridge Street would be modified to increase lateral clearance for the roadway. Further, the railroad has indicated that Bridge 42.48/Track 1, constructed in 1892 and 1911, needs to be replaced at a cost of approximately $1.75M. When replaced the structure would be lengthened, thus eliminating the travel lane reduction beneath the bridge that currently exists on Southbridge Street. Lastly, there are no guide signs for three of the facilities and minimal signs for the Westborough CSX yard, although there are numerous guide signs for the Worcester Regional Airport.

**Primary NHS Freight Routes: Observed Deficiencies**

Included in Table IV-10 are the observed deficiencies along the primary NHS freight routes for the five major terminals in the planning region. In regards to geometric/physical features, tight turning radii is a problem at some intersections along most of the established freight routes. There is also measurable pavement distress along some roadways as well as a narrow bridge underpass on Southbridge Street near Lafayette Street, adjacent to the P&W’s freight terminal. The final two columns in the table address the safety/delay deficiencies on either a connector roadway or at a connector/NHS junction. As for the connector roadways, all experience some level of congestion in the AM/PM periods and trucks have difficulty making turns during these peak periods. Also, there are two intersections along these roadways that lack defined turning lanes. In regards to the connector/NHS junctions, lengthy delays and heavy congestion have been observed in the field. The Route 9 interchange with Computer & Research Drives is utilized by trucking serving the Westborough CSX yard. For the Worcester CSX yard, peak period congestion occurs at the Washington Square roundabout. Further, there is a recurring congestion issue observed along the “J” ramp at MassPike (I-90) interchange #10A in Millbury that needs to be monitored.
<table>
<thead>
<tr>
<th>Community (Area type)</th>
<th>Terminal name</th>
<th>Facility Type</th>
<th>Facility ID</th>
<th>NHS Freight Route Description &amp; mileage</th>
<th>Functional Class</th>
<th># Lanes</th>
<th>Typical Daily Vol</th>
<th>At Grade RR Crossings</th>
<th>Adjacent Land Use</th>
<th>CMP Segment</th>
<th>PMS OCI</th>
<th>Safety: Cluster Crashes in 3-yr sample period</th>
<th>Bridges</th>
<th>BMS Ratings</th>
<th>Guide Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westborough (Small Urban)</td>
<td>Westborough CSX Yard</td>
<td>Truck/Rail Facility</td>
<td>MA61R</td>
<td>R1: Yard to Flanders Rd to Computer Dr to Route 9 ramps (.25 mi); R2: MA61R1 to Research Dr to Route 9 ramps (.15 mi)</td>
<td>Minor Arterial; Minor Collectr; Local</td>
<td>Varies; Two to Four</td>
<td>7400 VPD '10</td>
<td>HV: 10.1%</td>
<td>None</td>
<td>Industrial, manufacturing and warehousing; Other</td>
<td>N/A</td>
<td>59; 87; 31 Avg= 59.0</td>
<td>Property damage = 10</td>
<td>Personal injury = 3</td>
<td>Fatalities = 0</td>
</tr>
<tr>
<td>Worcester (Urbanized)</td>
<td>Worcester CSX Yard - Franklin St (Grafton St Entrance)</td>
<td>Truck/Rail Facility</td>
<td>MA70R</td>
<td>Yard to Grafton St to Summer St to I-290 WB (.50 mi)</td>
<td>Minor Arterial</td>
<td>Two</td>
<td>9100 VPD '14</td>
<td>HV: 6.9%</td>
<td>None</td>
<td>High density business; Industrial, manufacturing and warehousing</td>
<td>#27</td>
<td>75</td>
<td>Property damage = 80</td>
<td>Personal injury = 16</td>
<td>Fatalities = 0</td>
</tr>
<tr>
<td>Worcester (Urbanized)</td>
<td>Worcester P&amp;W Yard - Southbridge St</td>
<td>Truck/Rail Facility</td>
<td>MA67R</td>
<td>R1: Yard to Southbridge St to Cambridge St (.45 mi)</td>
<td>Minor Arterial</td>
<td>Two to Four</td>
<td>14100 VPD '12</td>
<td>HV: 9.3%</td>
<td>None</td>
<td>High density business; High density residential</td>
<td>#24 &amp; #45</td>
<td>95</td>
<td>Property damage = 81</td>
<td>Personal injury = 29</td>
<td>Fatalities = 0</td>
</tr>
<tr>
<td>Worcester (Urbanized)</td>
<td>Worcester ICI Yard - Wiser Ave (Blackstone River Rd Entrance)</td>
<td>Truck/Rail Facility</td>
<td>MA68R</td>
<td>R1: Yard to Blackstone River Rd NB to Route 146 (.8 mi) R2: Yard to Blackstone River Rd SB to Route 146 (.25 mi)</td>
<td>Minor Arterial</td>
<td>Two</td>
<td>3700 VPD '12</td>
<td>HV: 7.3%</td>
<td>905790K; 871885A; 871883L; Adel on Millbury St near Saint Anthony St</td>
<td>Low density commercial; Industrial, manufacturing and warehousing; Low density residential</td>
<td>#37</td>
<td>97; 73 Avg= 85.0</td>
<td>Property damage = 0</td>
<td>Personal injury = 0</td>
<td>Fatalities = 0</td>
</tr>
<tr>
<td>Worcester (Urbanized)</td>
<td>Worcester Regional Airport</td>
<td>Airport</td>
<td>MA65A</td>
<td>Airport Drive to Bailey St to Pleasant St to Highland St to Rt 9/12/122A (.4 mi)</td>
<td>Principal Arterial; Minor Arterial</td>
<td>Varies; Two to Four</td>
<td>18000 VPD '12</td>
<td>HV: 11.8%</td>
<td>None</td>
<td>High density commercial; High density residential</td>
<td>#28 &amp; #41</td>
<td>92; 80; 95; 69; 71; 65; 87; 99; 48 Avg= 78.4</td>
<td>Property damage = 86</td>
<td>Personal injury = 24</td>
<td>Fatalities = 0</td>
</tr>
</tbody>
</table>

**TABLE IV-9**

Primary NHS Freight Routes: Facts and Observations
### TABLE IV-10
Primary NHS Freight Routes: Observed Deficiencies

<table>
<thead>
<tr>
<th>Community</th>
<th>Terminal name</th>
<th>Geometric/Physical Feature Deficiencies (relative extent of area)</th>
<th>Safety/Delay Deficiencies on Connector Roadway (AM/PM or Terminal peaks)</th>
<th>Safety/Delay Deficiencies at Connector/NHS Junction (AM/PM or Terminal peaks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westborough</td>
<td>Westborough CSX Yard</td>
<td>Tight turning radii at intersections (some) Road deterioration on Walkup Dr (most)</td>
<td>Heavy traffic/congested (AM/PM) Long delays at traffic signals (AM/PM) Pedestrian crossing markings faded (AM/PM)</td>
<td>Highly utilized interchange w/ Rte 9: Heavy traffic/congested (AM/PM) Long delays at traffic signals (AM/PM) Pedestrian crossing markings faded (AM/PM)</td>
</tr>
<tr>
<td>Worcester</td>
<td>Worcester CSX Yard - Franklin St (Grafton St Entrance)</td>
<td>Tight turning radii at intersections (some) Pavement distress (some)</td>
<td>Heavy traffic/congested (AM/PM) Difficulty making turns (AM/PM)</td>
<td>Heavy traffic/congested (AM/PM): Peak period congestion observed at Washington Sq. roundabout</td>
</tr>
<tr>
<td>Worcester</td>
<td>Worcester P&amp;W Yard - Southbridge St</td>
<td>Tight turning radii at intersections (some) Narrow bridge underpass near Lafayette St (one) Drainage/Flooding (most)</td>
<td>Roadway width varies (AM/PM) Heavy traffic/congested (AM/PM) Difficulty making turns (AM/PM) Lack of turning lanes at intersections (AM/PM)</td>
<td>Heavy traffic on mainline NHS (AM/PM) Tight turning radii at intersections (AM/PM) Lack of turning lanes (AM/PM)</td>
</tr>
<tr>
<td>Worcester</td>
<td>Worcester ICI Yard - Wiser Ave (Blackstone River Rd Entrance)</td>
<td>Surrounding roadway system reconstructed in last decade as part of Rte 146 major infrastructure improvement project</td>
<td>Regional and local traffic flows now separated - congestion in area (AM/PM) reduced</td>
<td>Reconstructed roadways and interchanges need to be monitored for peak period congestion and/or safety deficiencies (current issue noted on &quot;J&quot; ramp at MassPike Interchange 10A in Millbury)</td>
</tr>
<tr>
<td>Worcester</td>
<td>Worcester Regional Airport</td>
<td>Tight turning radii at intersections (some) Pavement distress (some)</td>
<td>Heavy traffic/congested (AM/PM) Difficulty making turns (AM/PM) Lack of turning lanes at intersections (AM/PM)</td>
<td>Northern corridor east-west arterial mobility improvements at key locations to address congestion and safety</td>
</tr>
</tbody>
</table>
Inefficiencies to Movement of Freight

Inefficiencies to the movement of freight along the region’s highway network have been observed and documented within the planning region, as summarized below.

**Low Bridge Structures**
Older bridge infrastructure, some in excess of 100 years in age, lacks necessary vertical clearance for modern vehicles and associated equipment. There are a number of low bridges in town of Westborough and city of Worcester, and on other lesser traveled roadways in the planning region. When large trucks get inadvertently stuck beneath low bridges, quite often vehicle damage results, and there are traffic delays associated with clearance operations of the stuck and often disabled vehicles as well as impacts to surrounding businesses. Over-size vehicle detection equipment has been considered and installed at specific low bridge locations that have a history of clearance issues. Methods include enhanced warning signage, hanging barriers, and lasers which detect excess height vehicles.

**Substandard Roadway Geometry**
Tight turning radii exists at older highway interchanges and intersections, and there are sharp curves where rollovers have a tendency to occur and other substandard roadway geometry. Modern chevron-style warning signs can be installed on identified high hazard roadway curves where rollovers have been documented. These signs can also be supplemented by selective vegetation removal. Further, High Friction Surface Treatments (HFST) should also be considered for sharp roadway curves with a significant crash history.

**Freight Policy**
Policy-related issues are formidable. These include local restrictions on delivery times, neighborhood commercial vehicle exclusions, and a lack of adequate commercial loading zones, truck parking and turning facilities, particularly in the more urbanized areas. Ongoing planning efforts attempt to balance neighborhood preferences with the need to move goods.

Truck parking issues exist on a wide basis in greater New England. Truck-oriented facilities are somewhat limited in comparison to other areas of the country. Truckers, who travel long distances, need places to park, rest, eat and bathe. As demand for goods is anticipated to remain high, the needs of the trucking community must be addressed to ensure the continued safe flow of freight on the highway network.

Despite a range of challenges, MassDOT efforts to install select Intelligent Transportation System (ITS) components statewide [including an All Electronic Tolling System (AETS) on the MassPike (I-90)] are anticipated to decrease the known inefficiencies of the highway network in the greater region. This will help to reduce delays in the movement of freight. Further, consolidated truck permitting for all of the New England states is being considered on the federal
level so as to streamline highway freight movement in the geographically compact six-state region.

**Freight Railroad Providers Operating in the Planning Region**

This section of Mobility 2040 provides an overview of the freight rail transportation providers operating in the greater region. Six railroads are active in the planning region. General information concerning each is summarized. One, the North Brookfield, is currently being resurrected from dormancy.

- CSX
- East Brookfield & Spencer Railroad
- Grafton & Upton Railroad
- MassCentral Railroad
- North Brookfield Railroad
- Pan Am Railways
- Providence & Worcester Railroad

Central Massachusetts is a significant freight intermodal hub for the state of Massachusetts and the greater New England region. A map of railroads and major intermodal facilities in the region is shown in Figure IV-26.
Figure IV-26  Highway and Railroad Freight Network with Major Intermodal Facilities
Needs Assessment

Various improvements to the multimodal transportation infrastructure in the greater region that would enhance the freight movement across the system have been identified. These improvements range from the restoration of existing infrastructure, to new construction, to the deployment of various technologies. For the purposes of this summary, the “freight system” is viewed to consist of the region’s network of major highways and railroads. In addition, planning efforts also focus on the region’s previously identified, primary National Highway System (NHS) freight routes serving major intermodal facilities, particularly in the region’s core. Further, some focus is also placed on the major federal-aid roadways serving the region’s rural areas that are also important to the movement of freight.

Highway

Interstate Maintenance (IM) Program
The FHWA first became involved with funding for maintenance activities on the Interstate System as a result of the Federal-Aid Highway Act of 1976 that established the 3R program to fund Interstate resurfacing, restoration and rehabilitation. The Federal-Aid Highway Act of 1981 expanded the program by adding a fourth “R”, reconstruction.

The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) terminated the I-4R program, except for a small discretionary set aside, and established a new IM program and a separate NHS program which includes the Interstate System. The IM funds may be used on the Interstate System for 3R work and for reconstruction of bridges, interchanges and overcrossings along existing Interstate routes, but may not be used for the construction of new travel lanes other than high occupancy vehicle lanes or auxiliary lanes. The 1998 Transportation Equity Act for the 21st Century (TEA-21) expanded eligibility for funding under the IM program to the 4th R, reconstruction. As a result, the addition of new interchanges, new rest areas, new noise walls, etc. became eligible for IM funding. However, IM funding of added lanes, except HOV and auxiliary lanes, are not allowed.

In the greater region, likely future Interstate highway interchange reconstruction is anticipated at I-495/Route 9 in Westborough and, the MAPC planning region, I-495/MassPike (I-90) in Hopkinton and I-495/I-290 in Marlborough. In Worcester, future envisioned projects include the reconstruction of the I-290/Vernon Street interchange and the potential expansion of the I-290/Route 12 (Hope Avenue) interchange to accommodate all movements. At this time, traffic cannot exit I-290 eastbound nor enter I-290 westbound. Further, at this time, the reconstruction of the Route 9 (Belmont Street) bridge over I-290 is currently underway. A host of construction
period mitigation measures are included as part of this major project which will result in a widened Route 9 bridge over I-290.

Deployment of Intelligent Transportation System (ITS) Technologies
MassDOT is now in the process of finalizing the design for the installation of real-time guide signs on I-290 and other roadways to inform the travelling public of travel times in the greater region. In particular, MassDOT’s now underway I-290 Intelligent Transportation System (ITS) Implementation Project includes 16 Closed Circuit Television (CCTV) cameras and 4 overhead Changeable Message Signs (CMSs) from the MassPike (I-90) to I-495. Another aspect of the I-290 project includes the installation of Real Time Travel Monitoring (RTTM) devices. (The RTTM signs will be different from those on the MassPike; they will be in the form of a green Guide sign.) Eventually, similar technologies are anticipated for deployment along I-395 and other major roadways.

All Electronic Toll System (AETS) on the MassPike (I-90)
MassDOT is currently in the process of converting and replacing the MassPike (I-90) cash and electronic EZ Pass toll collection systems with a new system of tolling relying only on All Electronic Tolling (AET). The project will include both roadway tolling infrastructure and toll collection system technology. With the planned removal of existing toll booths, vehicle delay may be reduced at a number of MassPike interchanges, including those in the planning region.

Regional Management Systems: Congestion, Pavement & Safety
The Management Systems maintained by the CMRPC transportation planning staff monitor both the usage and condition of the region’s federal-aid network of major roadways. The congestion, pavement and safety management systems have been ongoing and continually evolving for the past two decades. Observations are made in the field, data is collected, a range of analysis is conducted and annual progress reports are compiled. Based on the findings, a range of improvement projects are proposed for future year consideration for implementation.

**Congestion:** roadway segment travel time and delay monitoring, critical intersection Level-of-Service operations assessment, and identification of high delay locations. Program now includes FHWA-required Local Bottleneck Reduction Program (LBRP).

**Pavement:** windshield roadway distress surveys, subsequent analysis, determination of Overall Condition Index (OCI) and compilation of maintenance plans.
**Safety**: crash data compilation, GIS analysis identifying top crash locations as well as “crash clusters”. Staff now regularly participates in MassDOT sponsored “Roadway Safety Audits (RSA).

At this time, the Management Systems are evolving to meet the US DOT requirement for the transition to performance-based planning. Those projects that have the greatest return on the investment of transportation improvement funding will be identified and moved towards implementation by the CMMPO.

**“Complete Streets”: Designing for All Modes**
A “Complete Street” is one that provides safe and accessible options for all travel modes - pedestrian, bicycle, public transit, autos and trucks - and for all ages and abilities. While many existing roadways are designed to optimize auto travel, Complete Street efforts have sought to increase the role of non-motorized and transit options by providing continuous sidewalks, bicycle lanes, or wide roadway shoulders. Instead of simply focusing on main streets or downtown corridors, a Complete Street policy creates a safe, accessible environment throughout a transportation network.

Increasing the role of the pedestrian and bicyclist in roadway design and operation standards, Complete Street policies are meant to ensure that safe travel options exist for all users. MassDOT’s *Project Development & Design Guide* embraces this approach to roadway design, and serves as a useful guide on how to implement the Complete Streets design approach. As such, designers, planners, public officials and advocates have a responsibility to promote and improve public health, reduce traffic congestion, make places safer and more livable, while reducing environmental impacts.

Designing a Complete Street can be challenging without first identifying all the factors that may influence the design. Other than funding some of these factors include: number and type of users, available right-of-way, safety amenities, community needs and desires, parking needs, utilities, public transit, and sensitive land uses. Accordingly, the needs of trucking serving local businesses in the greater region need to be accounted for early in the planning process.

**CMMPO Transportation Improvement Program**
One implementation option for highway-related improvement projects is the annual Transportation Improvement Program (TIP) administered by the Central Massachusetts Metropolitan Planning Organization (CMMPO). The CMMPO is the transportation policy and project selection for the planning region. Each year, eligible projects are selected for programming using the federal-aid funding targets provided by MassDOT. The TIP must be
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financially constrained for each of the listing’s four fiscal years. The TIP includes roadway, bridge, intermodal and bicycle & pedestrian projects. At this time, the TIP continues to evolve, transitioning to performance-based planning in an attempt to maximize the return on investments made in the region’s multi-modal transportation network.

Railroad

Overview
In general, opportunities for expansion of the rail system in the greater region were considered broadly in both a micro and macro scale. Focusing on the major intermodal facilities located throughout the region, some identified opportunities are Worcester centric while others have the potential to directly pertain to the host communities of intermodal transload facilities.

Industrial Rail Access Program
Most improvements to the infrastructure of the railroads are privately funded. However, MassDOT’s Industrial Rail Access Program, known as “IRAP”, provides infrastructure improvement funding for modest-sized rail access projects. Recent recipients in the region included the Grafton & Upton Railroad and the Providence & Worcester Railroad. Funding awarded within the planning region included the following useful projects that were implemented using a combination of public and private funding:

- G&U Railroad: improvements to the Hopedale yard, constructing a switching lead and several sidings, $221K state ($552K total)
- P&W Railroad: “Cargill Bridge” replacement, $313K state ($522K total)

In December 2014, the P&W submitted another application for IRAP funding for the proposed rehabilitation of an approximately four hundred linear foot (400’) “wye” track (and three (3) switches) connecting P&W’s Norwich Branch and Main Line track in the Worcester classification yard. The project will facilitate a head-on move of Unit Trains, alleviating a freight rail bottleneck while also enhancing safer operating conditions.

CSX
CSX operations in Massachusetts now feature full Phase II double stack container freight due to recent clearance increases. CSX recently expanded and modernized the Worcester Intermodal Facility located along Franklin Street. The expansion of the Worcester yard represents an investment in excess of $100 million. The Worcester facility mainly handles domestic containers and trailers on flatcar. Similarly, in nearby Westborough, another intermodal freight yard was improved within its existing footprint to handle bulk materials transloading. Materials handled include corn syrup, chemicals, pellets and other commodities. Economic spin-off is anticipated
from the presence of both modernized CSX yards. In response to a request from the Regional Chamber of Commerce, a parallel CMRPC agency effort has focused on the potential for rail served freight opportunities within a 20-mile radius of the Worcester yard.

**East Brookfield & Spencer Railroad (EB&S RR)**

East Brookfield & Spencer Railroad (EB&S RR) serves as the switching railroad for the New England Automotive Gateway (NEAG) located in the namesake host communities. Since the site was developed as a major automotive rail-to-truck transload facility serving all of southern New England, a range of mitigation measures have been implemented. Recent site improvements included expansive earthwork to provide additional railroad track capacity for railcar staging and storage. At the site, the EB&S RR works to unload the railcars and ready them for the return trip to automotive plants. Final “last mile” delivery of the finished vehicles throughout the greater New England area is completed by a number of trucking companies that serve the NEAG site. Clearance improvements along the CSX Boston Line will allow for “AutoMax” railcars to serve the site, increasing capacity. Also, EB&S worked closely with CSX to reduce the number of train whistle blasts in vicinity of the yard using a radio & flag person arrangement. It is likely that other future improvement projects are planned for the NEAG site.

**Grafton & Upton Railroad (G&U RR)**

The Grafton & Upton Railroad (G&U) is a short line railroad operating in the region. Following the resolution of recent litigation with the host community of Grafton, the railroad is proceeding with the construction of a new propane transfer facility in North Grafton. Other efforts by the G&U include work to reestablish a severed rail connection to CSX in Milford. This would allow the railroad to transfer freight with CSX in Milford in the south in addition to CSX in North Grafton. Further, freight yard improvements are ongoing in both Hopedale and West Upton.

**MassCentral Railroad (MC RR)**

Rural carrier MassCentral Railroad (MC), operating in the Ware River Valley between Palmer and South Barre, recently benefited from state-funded track improvement work. The MassCentral operates over trackage owned by the Commonwealth. Various rail-related activities continue at the South Barre industrial park known as Phoenix Plaza. This facility allows for convenient last mile delivery in this rural part of the planning region.

**North Brookfield Railroad (NBRR)**

The North Brookfield Railroad (NBRR), long dormant, is planning to restore track infrastructure and reestablish operations in its namesake community. The NBRR is viewed as the resurrection of a community-owned rail line dormant since the 1970’s. In order to generate railcar traffic, a number of line side industries are envisioned. As an example, perhaps a paving stone manufacturer located along the line’s right-of-way would one day reinstitute rail service. As part
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of the rail line’s envisioned restoration, an at-grade crossing over Route 9 in East Brookfield will need to be reestablished.

Pan Am Southern (PAS)
The P&W Railroad may determine the need to implement clearance increases on the carrier’s line between Worcester and Gardner. In Gardner, the P&W interchanges with Pan Am Southern (PAS). PAS is a freight rail carrier operated jointly by Pan Am Railways and Norfolk Southern (NS). Along the PAS line in the northwest corner of Massachusetts is the Hoosick Tunnel, 5 miles in length. Engineering studies are now underway to determine the effort necessary to undertake a project to increase clearances in the tunnel to accommodate full double stack service. Preliminary estimates indicate an investment ranging from $30-50 million. When the envisioned improvements are completed, double stack trains from the west could be interchanged in Gardner and then proceed to Worcester on the P&W. With the planned Hoosick Tunnel double stack clearance improvements, as well as necessary clearance improvements on the Gardner Branch, P&W will have the ability to receive containers from both CSX and NS.

Providence & Worcester Railroad (P&W RR)
Regional freight carrier the Providence & Worcester Railroad (P&W) is headquartered in Worcester. The P&W’s namesake rail line in the Blackstone Valley requires the replacement of five (5) aging bridge structures in excess of 100 years in age. These bridges are worn due to years of constant use and repetitive loading. They cannot be effectively maintained due to archaic assembly methods no longer used or supported. The replacement of the structures is necessary to accommodate fully loaded modern freight cars weighing 286,000 pounds. At this time, freight cars must be “light loaded” in order to pass over the line. The cost of replacing these structures is estimated at $30M. The P&W has been unsuccessful in obtaining US DOT TIGER funding for this project on the national level. As such, other opportunities for funding the replacement of the five bridges are being investigated.

The planning staff has also provided limited assistance with two P&W RR applications for improvement funding through MassDOT’s Industrial Rail Access Program (IRAP) grant program. One focused on the replacement of a small bridge structure serving an active set of switching tracks worn after decades of service. The other IRAP application, pending at the time of writing, seeks the rehabilitation of an approximately 400 foot “wye” track and three switches connecting P&W’s Norwich Branch and Main Line track, located at opposite sides of P&W’s Southbridge Street yard. The project will facilitate a head-on move of unit trains from the Norwich branch to the main line, alleviating a freight rail bottleneck for unit trains as well as the hundreds of other railcars moving through P&W’s yard facility on a daily basis.
In addition, other P&W lines may need to be cleared in order to accommodate full double stack container service in the future, increasing system capacity. For example, in the host community of Auburn, the under-clearance of the Route 20 bridge over the P&W Railroad is insufficient to accommodate full double stack service. Should double stack trains use this line in the future, clearance increases would be required for this structure. Elsewhere on the P&W rail network in the greater region, modest improvements are planned, such as the repair, replacement or installation of switches and rail sidings.

**Intransit Container Incorporated (ICI)**

Intransit Container Incorporated (ICI) operates the Wiser Avenue intermodal container yard in the city of Worcester. The ICI facility is served by the P&W Railroad. ICI’s focus is international container traffic from around the globe. The site is a customs-bonded, inland port. Yard expansion at the Wiser Avenue site is underway and many recent improvements have been made. In addition to more property for container and chassis storage, the yard will also have improved lift capabilities, speeding operations. Overhead power lines on the site are planned for burial, increasing the maneuverability of the lift equipment. Further, along with the expansion, ICI has implemented a range of mitigation measures, including an impressive wall shielding site operations as well as environmental work associated with identified wetlands.

**Regional Strategies to Reduce Impact of Multimodal Freight Movement**

**Overview**

In order to reduce the local impacts from expanded freight capability in the Central Massachusetts planning region, the following suggested improvement options were previously compiled as part of ongoing freight planning activities. The options are provided for further consideration by host communities, intermodal facility operators, area freight transportation providers, and the CMMPO.

- Prohibit on-street vehicle parking adjacent to and across from intermodal facility site drives.
- Keep site drive areas clear of all obstacles such as large signs, street furniture, utility poles and overgrown vegetation.
- Provide adequate truck turning radii at major intersections, optimally to fully accommodate the movement of 53 foot international intermodal containers.
- Maintain and resurface roadway pavement surfaces as deemed appropriate.
- Maintain all traffic control signs, signals and pavement markings.
Consider identification and designation of “Preferred Truck Routes” throughout the greater region. Such an effort could be pursued by the host communities of intermodal transload facilities. As an example, officials in the host community of Oxford have indicated that trucking activities in the community attempt to avoid the intersection of Route 12 with Sutton Avenue in the town center.

A “Supplemental Guide Sign” plan should be considered for the region’s primary National Highway System (NHS) freight routes serving major intermodal facilities. These roadways provide access between the Interstate System, major regional highways and major intermodal terminals. Such Supplemental Guide Signs (as included in the Manual on Uniform Traffic Control Devices [MUTCD]) would assist truckers and others unfamiliar with the area in following the primary NHS freight routes connecting to the region’s intermodal facilities. Supplemental Guide Signs are considered “trail blazing” or “wayfarer” signs. As indicated in the MUTCD, Supplemental Guide Signs can be used to provide information regarding destinations accessible from an interchange, over and above those shown on standard signing. An example of this type of sign is shown in Figure IV-27.

WRMS Improvement Options for Multimodal Freight Movement
The Worcester Regional Mobility Study (WRMS) is a multi-modal transportation report that focused on the region’s core community of Worcester and the immediate surrounding towns. The WRMS was completed in 2011. Freight-related improvement options to reduce the local impacts from expanded freight capability in the region’s core included in the WRMS are summarized as follows:

- **Supplemental Guide Sign Plan**: Improve “wayfarer” or “trail blazing” on I-290 to/from the city’s major truck-rail intermodal yards. This includes the CSX Franklin Street yard, P&W’s Southbridge Street yard and Intransit Container’s (ICI) Wiser Avenue yard.

- **Route 122 Kelly Square Bypass**: A conceptual plan has been suggested to minimize regional car and truck traffic in this identified bottleneck location. Potential routing for the Bypass would use an extension of Winter Street adjacent to the elevated CSX railroad tracks to Gold Street, continuing to Madison Street. This option would serve to reduce regional traffic volumes and heavy vehicles from both Water and Harding Streets, thus reduces associated turning movements in the heart of Kelly Square.

- **Potential “Truck Routing” Assessment**: Suggested by the WRMS as a future effort, this proposed regional study would identify “Preferred Truck Routes”, identified bottlenecks to avoid, residential areas to avoid, low bridge clearances and other impediments to the efficient movement of freight. Pertinent examples in the city
Worcester include the low bridge on Cambridge Street as well as periodic flooding on Southbridge Street. Outreach to major trucking stakeholder UPS is anticipated.

**Site-Specific Mitigation for Multimodal Freight Movement**
In order to reduce the local impacts from expanded freight capability, the following suggested site-specific mitigation options were compiled based on various examples found in the greater region. They are included for the consideration of host communities and intermodal facility operators.

- Install noise attenuation walls and/or earthen berms to reduce noise while also shielding site operations.
- Use vegetation and other plantings to not only beautify but also to shield site operations and reduce noise.
- Consider facility hours of operation, the implementation of “quiet times” as well as procedures to reduce truck trip generation.
- When considering overhead lighting fixtures, attempt to reduce light “spillover” to adjacent sites.
- Consider use of “hostler” trucks to move trailer, chassis and containers internally on site, minimizing the need for full size trucking maneuvers, reducing both noise and emissions.
- At rail served sites, consider the use of low emissions locomotives and Auxiliary Power Units (APUs) to reduce emissions and unnecessary idling while improving local air quality.

**Prioritization**

Based on the above discussion, the following top freight-related needs, from both the highway and railroad modes, have been prioritized for further study or implementation.

**Highway Trucking**
The following lists priority trucking-related projects identified in the planning region. These should be considered along with the Major Infrastructure projects for highways identified elsewhere in Mobility 2040. The financially-constrained highway-related Major Infrastructure projects all address various needs of the trucking industry, such as increasing roadway safety and reducing recurring congestion. Others could be implemented by the private sector using private funding, such as full service rest stops catering to trucking. Others may be able to benefit from a
public-private funding scenario, where private funding is used to leverage designated public monies.

- Initiative to consider implementation of full service rest stops in the region serving the trucking industry (private venture). As noted, the trucking community often lacks adequate facilities to park, rest, bathe, eat, purchase fuel and make repairs.

- Consider improvements for trucking associated with UPS distribution facility in Shrewsbury. A recent Road Safety Audit (RSA) was conducted at the adjacent intersection of US Route 20 and Grafton Street. Route 140 is also located adjacent to the UPS site. A prior study of Route 20 through the entirety of Shrewsbury had identified improvements at the Route 20/Grafton Street intersection that addressed congestion, pavement condition, safety as well as freight movement.

**Freight Rail**

The following lists priority freight rail projects identified in the planning region. Some will be implemented by the private sector using private funding. Others may be able to benefit from a public-private funding scenario, such as the state’s Industrial Rail Access Program (IRAP), where private railroad funding is often used to leverage additional public monies.

**East Brookfield & Spencer Railroad**

- Various future expansion activities, including potential IRAP-funded track improvements.

**Grafton & Upton Railroad**

- Implementation of various at-grade highway crossing improvements along southern segment of the line.

**MassCentral Railroad**

- Ongoing track maintenance & various at-grade highway crossing improvements. The MC RR right-of-way is largely owned by the Commonwealth.

**North Brookfield Railroad**

- Revitalization effort to restore freight service to dormant five-mile railroad while providing opportunities for new line-side industry.

**Providence & Worcester Railroad**

- Investigate further potential for IRAP-funded track improvements in Worcester Yard.
- Replace substandard railroad bridge over Southbridge Street to accommodate both roadway widening and bridge strengthening for heavier railcars.
- Initiative to consider viability of hosting Worcester-Providence passenger rail service operated by an outside contractor.
Airport

The region's airports are an essential component of the overall transportation system in Central Massachusetts. They serve a variety of purposes, including personal, business, and recreational travel as well as freight movement. Both people and goods are moved by air transportation. Although the number of passengers and the volume of freight moved by air may be relatively small compared to that of other modes serving the region, air transportation plays an important role.

The five airports located within the Central Massachusetts region are illustrated in Figure IV-28. The airports shown are Hopedale Industrial Park Airport, Southbridge Municipal Airport, Spencer Airport, Tanner-Hiller Airport in New Braintree, and Worcester Regional Airport. All five have been designated by the Massachusetts Aeronautics Commission (MAC) as part of the statewide airport system. The purpose of the statewide airport system is to ensure that all areas of Massachusetts are accessible by air. With the exception of Worcester Regional Airport, these sites are all utility airports that are designed to accommodate smaller, lighter, general aviation aircraft. Worcester Regional Airport is classified as a "General Transport Airport".

Worcester Regional Airport

Existing Condition and Future Needs

Worcester Regional Airport is relatively sparsely used today in comparison to its own recent past and to the levels of other major regionals. The reasons for this are many, and it is unclear which holds the greatest weight. Pricing has always been a problem, yet low-cost service has not thrived. It is sometimes challenging to locate and travel to Worcester airport, but over the years, people have been able to “get there from here”, at least locally. Many believe that improved access would help generate increased passenger service; others take the point of view that other market forces would need to encourage the provision of new service which would in turn spur the need for appropriate ground linkages. It is noted that the advent of GPS access to drivers has diminished some of the need to have major access roadways, particularly since a very large share of the market is local and coming from multiple directions. In general, today’s smaller airports do not generate enough traffic to fill larger planes multiple times a day, thus failing to attract and retain the low-fare airlines that select and survive in markets with larger volumes.
Figure IV-28 Locational Map of the Region's Airports

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), MassDOT/Office of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division. Produced by the Central Massachusetts Regional Planning Commission (CMRPC)
2 Washington Square, Union Station
Worcester, MA 01604

Connecticut
Rhode Island
At one time, the future use of the site of Worcester Airport was unclear. But now, with Massport’s financial and business investment, it will be retained as an air facility, with cargo/general aviation emphasis, while setting the stage for the day when the local flying public begins to seek an easier, more convenient, less congested outlet with a suitable flight selection for long-range travel. Abandonment of the site as a functioning airport, as had once been discussed, would require the repayment of millions of dollars of aviation-associated grants over recent years. Now the future direction of the facility has been determined, and it will be led by an agency which is in the transportation business.

Massport once said that Worcester could someday be a major air transportation center under the right conditions, carrying up to a million passengers a year, ten times what it did a few years ago and three times its best year ever. The New England Regional Airport System Plan (NERASP) suggested that Worcester Regional Airport could eventually handle 1.5 million passengers – if infrastructure and access were improved and airlines were in fact willing to offer service to popular destinations. Current medium-growth planning scenario updates estimate a passenger activity level of nearly 300,000 by 2030.

Regarding access, Massport, MassDOT, the City of Worcester and the CMMPO developed a plan for improving directional signage to ORH for the near-term. Due to the fact that a large percentage of Worcester Regional Airport users come from the local Worcester area, there is no one preferred route. Instead, it has been recognized that multiple routes are needed to serve current demand. Six primary routes that travelers now use to access the airport were identified. MassDOT and Massport consulted with local jurisdictions in which the signs would be placed, and MassDOT installed signs that they fabricated. A total of eighty signs were installed on the six primary routes. These consistent signs should be of great help to those seeking quick ground access routes within the area.

An opposing local factor that may be hard to change is the weather. While it has been said that “the perception of the weather issue is worse than the reality here”, Worcester airport’s siting is not conducive to good flying weather. Its relatively high elevation puts it into fog and clouds often, as well as keeping temperatures about five degrees colder in an area which is very much impacted by winter weather effects. While it is true that flight delay rates are not substantially higher than other locations, the fact remains that landings are often forced to divert to other area airports (at a recent rate of ranging from 3-5% of scheduled arrivals), and departures are often affected by icing conditions not experienced at other nearby regionals.
Enhanced landing equipment in recent years, and the possibility of the installation of a Category III landing system being considered by the FAA for the future, is encouraging. A tree-clearing effort in 2013 resulted in an extended runway visual range with an ability for commercial airlines to land in lower visibility than previously was possible. CAT III systems involve special lighting and aircraft signaling, and many major airlines and pilots are qualified to use them. They technically allow for landing in almost any weather condition. But the timeframe for system installation appears to extend over many years.

It is generally recognized that a viable, functioning airport may be critical to the city and the region’s long-term economic development. Every effort should be made to envision, plan and build a total working infrastructure that will make economic contributions in the present as well as when general passenger demand grows again in the future. The general business and governmental community has worked in recent years to overcome the various obstacles.

Other Airports in the Region

Characteristics and Inventory

In addition to Worcester Regional Airport, four other airports serve the Central Massachusetts region. The Southbridge Municipal Airport in Southbridge, the Hopedale Industrial Park Airport in Hopedale, the Tanner-Hiller Airport in New Braintree, and Spencer Airport in Spencer are utility airports that are designed to accommodate smaller, lighter, general aviation aircraft. Table IV-11 lists some of the characteristics of these area airports, along with those of the larger Worcester facility.

As shown in Table IV-11, the majority of the operations at these smaller airports consist of general aviation flights. However, air taxi services are offered at the Hopedale Industrial Park Airport and Southbridge Municipal Airport. Also, a relatively small number of military flights occur at all of these locations.

Of the four utility airports in the region, Southbridge Municipal Airport is utilized the most and has been designated by MAC as part of the statewide airport system. Southbridge Municipal Airport is owned and operated by the Town of Southbridge. The airport is located three miles northwest of downtown Southbridge and approximately five miles from the regional highway system in Sturbridge. The Massachusetts Turnpike (I-90), Interstate 84, and US Route 20 are all accessible via State Route 131 west to Sturbridge.
Table IV-11: Airport Characteristics

<table>
<thead>
<tr>
<th>Location</th>
<th>HOPEDALE INDUSTRIAL PARK AIRPORT</th>
<th>SOUTHBRIDGE MUNICIPAL AIRPORT</th>
<th>SPENCER AIRPORT</th>
<th>TANNER-HILLER AIRPORT</th>
<th>WORCESTER AIRPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>269 Ft</td>
<td>699 Ft</td>
<td>1040 Ft</td>
<td>589 Ft</td>
<td>1009 Ft</td>
</tr>
<tr>
<td>Runway</td>
<td>18/36</td>
<td>02/20</td>
<td>01/19</td>
<td>06/24</td>
<td>11/29, 15/33</td>
</tr>
<tr>
<td>Runway Dimensions</td>
<td>3172’x90’</td>
<td>3500’x75’</td>
<td>1950’x50’</td>
<td>3027’x40’</td>
<td>7000’x150’, 5000’x100’</td>
</tr>
<tr>
<td>Runway Lighting</td>
<td>Low Intensity</td>
<td>Medium Intensity</td>
<td>Low Intensity</td>
<td>No</td>
<td>High/Medium Intensity</td>
</tr>
<tr>
<td>Airport Attended</td>
<td>Dawn-Dusk, Mon-Fri</td>
<td>8 AM-Dusk</td>
<td>9 AM-6 PM, Mon-Sat</td>
<td>8 AM-6 PM M-F 8 AM-4 PM Sat</td>
<td>Continuous</td>
</tr>
<tr>
<td>Operations Per Year</td>
<td>6,000</td>
<td>31,000</td>
<td>12,000</td>
<td>600</td>
<td>48,000</td>
</tr>
<tr>
<td>% Air Taxi</td>
<td>4%</td>
<td>3%</td>
<td>0</td>
<td>0</td>
<td>3%</td>
</tr>
<tr>
<td>% Local General Aviation</td>
<td>48%</td>
<td>48%</td>
<td>83%</td>
<td>86%</td>
<td>40%</td>
</tr>
<tr>
<td>% Transient General Aviation</td>
<td>48%</td>
<td>48%</td>
<td>17%</td>
<td>12%</td>
<td>55%</td>
</tr>
<tr>
<td>% Military</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
<td>&lt;1%</td>
<td>2%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>% Commercial</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1%</td>
</tr>
</tbody>
</table>

Existing Condition and Future Needs

In the late 1990s, the Tri-community area of Charlton, Southbridge and Sturbridge undertook a Corridor Planning Study. The goal of the study was to identify projects that might alleviate transportation problems in the area bounded roughly by Route 131, Route 169, and US Route 20. Ultimately only Southbridge supported the construction of a “Northern Connector” from US Route 20 in Charlton to a proposed access road which connects to Route 169 in Southbridge. This approach was not favored by either the Charlton or Sturbridge groups because of potential negative impacts to nearby residents and potential environmental and societal impacts.
Southbridge favored this approach as the one providing the greatest reduction of Route 131 traffic and improved access to the regional highway system. Since that time, a link from Route 169 to the Airport/industrial park has been constructed. This link, called Commercial Drive, was completed and opened in 2011. It serves as access to Casella Waste Systems on Barefoot Road as well as being a more convenient, direct link to the airport from the north. The host community hopes that further industrial development can occur on this new roadway as well.

In early 2011 Southbridge Airport was in the midst of undergoing an update to its Airport Master Plan. Additionally, the potential installation of solar energy generation equipment on the site was being pursued with the FAA and other concerned parties.

On June 1, 2011, severe local weather in the form of two tornadoes affected the south-central portion of Massachusetts. One of these travelled to the east just far enough to cross Airport property. Hangars were damaged, some totally, and many aircraft were strewn about as well. Up to $3 million in damage occurred. As this particular area of the storm path was deemed ineligible for federal assistance, insurance and town money needed to be allocated to any rebuilding effort. The FAA hoped to fast-track the master plan update effort in recognition of the need to resume normal operations as quickly as possible.

In mid-2013 Southbridge began exploring alternative uses for the now money-losing facility. Later that year the town began to take steps to evict the airport operator due to failure to meet requirements and funding issues. In March of 2014 consultants were hired to start planning a rebuild of the facility. The town recaptured operation of the airport in May 2014. The state allocated $1 million towards airport renovation at that time as well.