CHAPTER 5

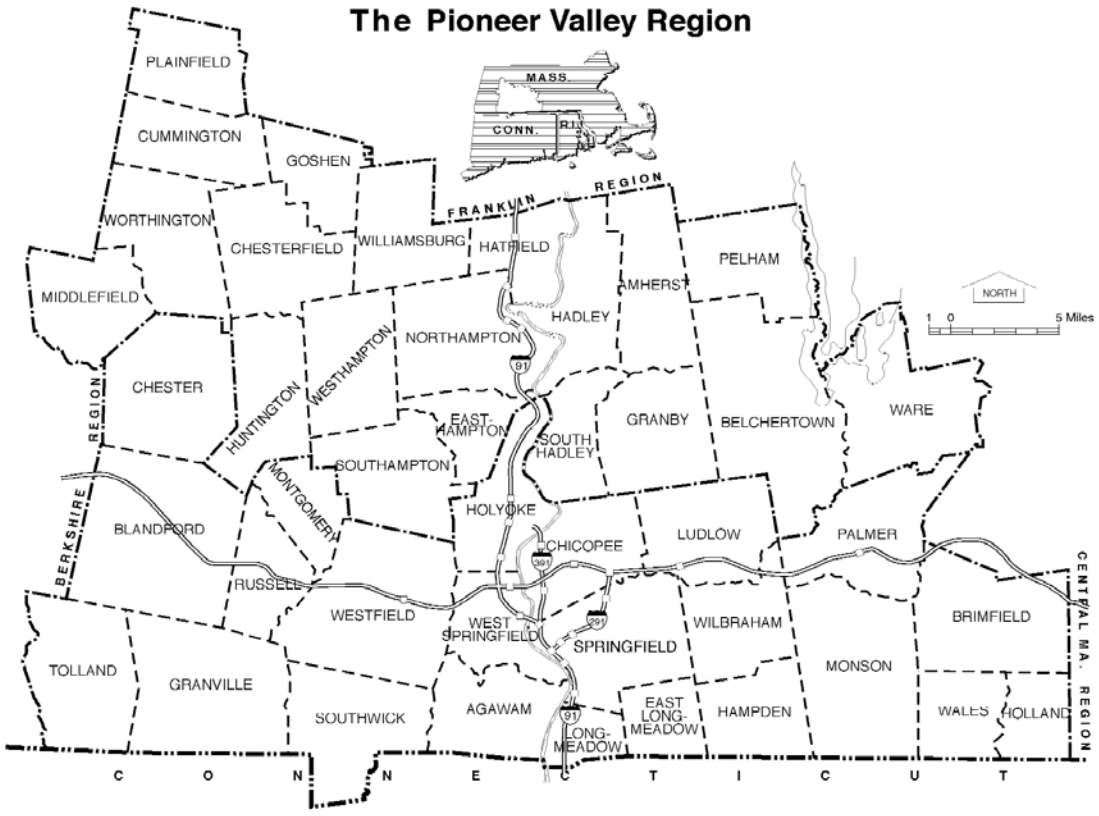
REGIONAL PROFILE

Social and economic trends can have significant implications on transportation planning. This chapter presents a profile of the region's physical, socioeconomic, demographic and environmental characteristics as they relate to transportation planning and construction.

A. PHYSICAL CHARACTERISTICS

The Pioneer Valley Region is located in the Midwestern section of Massachusetts. Encompassing the fourth largest metropolitan area in New England, the region covers 1,179 square miles. The Pioneer Valley is bisected by the Connecticut River and is bounded on the north by Franklin County, on the south by the State of Connecticut, on the east by Quabbin Reservoir and Worcester County and on the west by Berkshire County.

Figure 5-1 – Pioneer Valley Region Map



The Pioneer Valley Region, which is comprised of the 43 cities and towns within the Hampden and Hampshire county areas, is home to more than 608,000 people. Hampden County, the most populous of the four western counties of Massachusetts, is approximately 635 square miles. Hampden County is made up of 23 communities including the Springfield-Chicopee-Holyoke urbanized area. Hampshire County is situated in the middle of Western Massachusetts and includes an area of 544 square miles.

The third largest city in Massachusetts, Springfield is the region's cultural and economic center. Springfield is home to several of the region's largest employers, including Massachusetts Mutual Life Insurance Company, Baystate Medical Center, Mercy Hospital Incorporated, Solutia, Smith & Wesson Company, and Verizon. Major cultural institutions include the Springfield Symphony, City Stage, Springfield Civic Center, Quadrangle Museums, the Basketball Hall of Fame, and the new Dr. Seuss National Memorial Sculpture Garden.

The cities of Chicopee and Holyoke were the first planned industrial communities in the nation. Merchants built an elaborate complex of mills, workers' housing, dams, and canal systems that evolved into cities. While many historic mills and industries are now gone, a number of 19th and 20th century structures are maintained and improved through municipal preservation and revitalization initiatives.

Unique within the Commonwealth of Massachusetts, the Pioneer Valley region contains a diverse economic base, internationally known educational institutions, and limitless scenic beauty. Dominant physical characteristics include the broad fertile agricultural valley formed by the Connecticut River, the Holyoke Mountain range that traverses the region from Southwick to Pelham, and the foothills of the Berkshire Mountains. Prime agricultural land, significant wetlands, and scenic rivers are some of the region's premier natural resources. Choices in lifestyle range from contemporary downtown living to stately historic homes, characteristic suburban neighborhoods, and rural living in very small communities—a variety that contributes to the diversity and appeal of the region. Its unique combination of natural beauty, cultural amenities, and historical character make the Pioneer Valley region an exceptional environment in which to live and work.

B. HIGHWAY

1. Access

The Pioneer Valley area is considered the crossroads of transportation in Western Massachusetts. Situated at the intersection of the area's major highways, Interstate 90 (Massachusetts Turnpike) traveling east-west and

Interstate 91 traveling north-south, the region offers easy access to all markets in the Eastern United States and Canada. Major southern New England population centers are accessible within hours.

Table 5-1 – Driving Distance and Time from Springfield

Destination	Distance	Time
Albany, NY	85 miles	1.5 hours
Boston, MA	91 miles	1.5 hours
New York City, NY	140 miles	3.0 hours
Philadelphia, PA	260 miles	5.0 hours
Montreal, Quebec	301 miles	5.5 hours
Washington DC	400 miles	8.0 hours

The interstate expressways (I-90/I-91) link most of the major urban centers in the region. The basic highway network including interstate highways, U.S. numbered routes and state routes, along with other traffic arteries, provides access to all municipalities in the region, both urban and rural. The pattern of principal arterial highways in the region is radial, extending outwards from each of the region's major centers, a consequence of development and topographic influences.

Table 5-2 – Regional Interstate Highways

Interstate Highways	Principal Orientation	# of In- Region Interchanges	In-Region Mileage	Toll Road?
I-90	East/West (Mass. Turnpike)	6	46.08	Yes
I-91	North/South	22	31.17	No
I-291	Connector (Springfield to I-90)	6	5.44	No
I-391	Connector (I-91 to	6	3.82	No

The highway network is composed of various facilities that are separated into systems within the federal-aid highway program by the Massachusetts Highway Department on the basis of their functional classification which takes into account the various functions and uses of the roads. The federal-aid highway program in Massachusetts is a state administered program. The program consists of three separate federal aid systems, the National Highway System (NHS), the Interstate System and the Surface Transportation Program.

The Federal-Aid highway system in the Pioneer Valley region consists of approximately 1,364 miles, of which approximately 346 miles are on the National Highway System (NHS), and approximately 1,000 miles belong to the Surface Transportation Program (STP). The STP is a block grant type

program that includes NHS roadways which primarily consist of Interstate routes and a large percentage of urban and rural principal arterials. The Federal-Aid highway system consists of any roadway that is not functionally classified as a rural minor collector or local roadway. Local roads constitute approximately 66% of the total roadway system.

The roadway mileage in the Pioneer Valley has remained fairly consistent over the last several years, since the construction of Interstate 391. New roadway construction has become more difficult in recent years as a result of rising construction costs and the requirements of the Clean Air Act Amendments of 1990. The last major new roadway to be constructed in the region occurred in 1996 when a portion of Route 57 was relocated in Agawam. This project extended the existing limited access portion of Route 57 out to Route 187.

2. Functional Classification

The Federal-Aid Highway Act of 1973 required the use of functional highway classification to update the Federal-Aid Highway system and identify the National Highway System. Both of these highway systems are used as inventory mechanisms and funding eligibility criteria for our nation's roadway network.

In 1992, the PVPC, under the direction of the Massachusetts Department of Transportation (MassDOT), began the reclassification process to update the federal-aid network in the Pioneer Valley Region. The region's roadways were grouped into classes according to the service they are intended to provide. The region's urbanized area is updated as a result of the 2010 census. In 2005, the PVPC solicited information on roadway classification changes from local officials in order to identify existing roadways that have been permanently closed to through traffic in response to enhanced regional security or changes in local traffic flow and develop a proposed new functional classification scheme to maintain a comprehensive and continuous network of functionally classified roadways in the region.

The seven functional classifications adopted by Massachusetts are summarized below:

Interstate - Freeways service as principal arterials providing service to substantial statewide and interstate travel.

Rural Principal Arterials - Major highways that serve corridor movements having trip length and travel density characteristics that indicate substantial statewide or interstate travel. Principal Arterials include the Interstate system.

Rural Minor Arterial - Roadways with statewide significance that link cities and large towns forming an integrated network of intracounty importance.

Rural Major Collectors and Urban Minor Arterials - Those roads that provide service to cities, towns and other traffic generators not served by the arterial system; roads that link these places with the arterial system; and roads that serve the more important intracounty travel corridors.

Rural Minor Collectors and Urban Collectors - Roads that bring traffic from local roads to collector roads; roads that provide service to small communities and link local traffic generators to the rural areas.

Local Roads - Roads that provide access to adjacent land; roads that provide service to relatively short distances. Local roads include all roads not classified as part of the principal arterial, minor arterial, or collector system.

Other Urban Principle Arterials - Roadways with significance that service access to and within the urbanized area. Connections to interstate and rural principle arterials are typical.

After local and state reviews, a final federal-aid network was completed for the Pioneer Valley Region. Table 5-3 summarizes the roadway mile by functional classification for each community. The functional classification of a roadway may be upgraded or downgraded based on changes in land use, population, and vehicular volume. Communities can request a change in the functional classification through a written request to the PVPC. If PVPC concurs, that a change is warranted, the request is submitted to MassDOT Planning for their approval. Once approved by MassDOT, the change requires endorsement by both the MPO and the FHWA before the functional classification can be officially changed.

Table 5-3 – Miles of Roadway by Community and Functional Classification

		Functional Classification					
Community	**Total**	**Interstates**	**Urban Arterials**	**Rural Arterials**	**Urban Collectors**	**Rural Collectors**	**Local Roads**
Agawam	152.0	0.0	29.1	0.0	27.8	0.0	95.1
Amherst	136.4	0.0	42.1	0.0	5.2	1.4	87.7
Belchertown	163.1	0.0	25.9	7.5	9.5	8.7	111.5
Blandford	87.8	8.5	0.0	0.0	0.0	33.5	45.8
Brimfield	79.5	2.9	0.0	8.8	0.0	17.1	50.7
Chester	66.1	0.0	0.0	6.5	0.0	22.3	37.3
Chesterfield	58.2	0.0	0.0	7.6	0.0	15.6	35.0
Chicopee	258.9	11.2	39.8	0.0	15.6	0.0	192.3
Cummington	61.2	0.0	0.0	12.9	0.0	9.4	38.9
East Longmeadow	100.3	0.0	21.4	0.0	9.4	0.0	69.5
Easthampton	92.1	0.5	25.1	0.0	5.0	0.0	61.5
Goshen	42.6	0.0	0.0	5.4	0.0	8.3	28.9
Granby	68.9	0.0	16.8	1.0	12.3	6.0	32.8
Granville	73.9	0.0	0.0	9.0	0.0	17.6	47.3
Hadley	81.5	0.0	18.5	4.1	4.3	10.9	43.7
Hampden	54.7	0.0	5.8	0.0	2.5	7.2	39.2
Hatfield	59.0	3.7	4.4	0.0	0.0	10.2	40.7
Holland	37.5	0.1	0.0	0.0	0.0	11.6	25.8
Holyoke	174.3	9.9	37.5	0.0	20.9	0.0	106.0
Huntington	54.3	0.0	0.0	11.2	0.0	11.7	31.4
Longmeadow	99.2	3.3	14.2	0.0	5.0	0.0	76.7
Ludlow	136.6	5.9	25.1	0.0	10.0	1.6	94.0
Middlefield	38.4	0.0	0.0	0.0	0.0	7.5	30.9
Monson	110.3	0.0	13.2	3.3	0.9	16.9	76.0
Montgomery	30.7	0.1	0.0	0.0	0.0	8.3	22.3
Northampton	178.9	6.1	48.3	0.0	16.1	0.0	108.4
Palmer	114.8	7.6	30.7	1.6	7.1	9.4	58.4
Pelham	46.0	0.0	2.7	5.7	0.0	8.4	29.2
Plainfield	48.8	0.0	0.0	0.0	0.0	17.7	31.1
Russell	36.3	4.0	7.8	0.0	1.3	6.8	16.4
South Hadley	104.7	0.0	17.9	0.0	10.2	0.0	76.6
Southampton	78.5	0.0	10.8	0.0	7.9	1.4	58.4
Southwick	85.1	0.0	16.3	2.9	10.8	7.7	47.4
Springfield	496.8	11.2	99.6	0.0	46.6	0.0	339.4
Tolland	41.9	0.0	0.0	5.7	0.0	5.4	30.8
Wales	28.8	0.0	0.3	0.0	0.0	13.1	15.4
Ware	117.5	0.0	13.9	4.8	9.0	5.5	84.3
West Springfield	143.7	6.3	31.0	0.0	8.9	0.0	97.5
Westfield	248.0	6.7	47.0	0.0	20.1	0.0	174.2
Westhampton	47.6	0.0	0.0	0.0	0.0	22.4	25.2
Wilbraham	114.7	1.1	20.2	0.0	12.4	4.6	76.4
Williamsburg	51.1	0.0	2.7	7.0	0.0	12.9	28.5
Worthington	64.4	0.0	0.0	10.3	0.0	10.6	43.5
Pioneer Valley Region	**4,365.1**	**89.1**	**668.2**	**115.3**	**278.8**	**351.7**	**2,862.1**

Source: MassDOT

3. Jurisdiction

There are over 4,365 miles of road in the region. As of 2013, city and town governments administered 81 percent of the road miles and the MassDOT was responsible for approximately eight percent. The Massachusetts Turnpike Authority, the Department of Conservation and Recreation, the Federal Government, various park systems and the state colleges and universities administered a small number of roadway miles. Table 5-4 gives an inventory of the region's roadway miles according to the governmental unit responsible for maintaining them.

Table 5-4 – Miles of Roadway by Community and Administrative Unit

Community	Total	Mass DOT	City/ Town Accepted	DCR	State Park	State Institutional	County Institutional	Unaccepted	Combined Federal
Agawam	151.9	14.2	121.7	0.0	3.9	0.0	0.0	12.1	0.0
Amherst	136.4	5.3	100.4	0.0	0.0	8.2	0.0	22.5	0.0
Belchertown	163.0	15.3	127.1	7.9	0.0	2.0	0.0	10.7	0.0
Blandford	87.9	18.2	62.5	0.0	3.6	0.0	0.0	3.6	0.0
Brimfield	79.5	15.1	64.3	0.0	0.0	0.0	0.0	0.1	0.0
Chester	66.1	6.5	57.1	0.0	1.1	0.0	0.0	1.4	0.0
Chesterfield	58.2	0.1	53.3	0.0	0.2	0.0	0.0	4.7	0.0
Chicopee	258.7	17.1	153.4	0.0	1.2	0.0	0.0	71.4	15.6
Cummington	61.3	9.6	48.7	0.0	0.0	0.0	0.0	2.2	0.8
East Longmeadow	100.4	0.0	96.7	0.0	0.0	0.0	0.0	3.7	0.0
Easthampton	92.3	3.0	83.0	0.0	2.6	0.0	0.0	3.7	0.0
Goshen	42.7	7.2	25.6	0.0	5.0	0.0	0.0	4.9	0.0
Granby	68.9	7.7	58.1	0.2	0.0	0.0	0.0	2.9	0.0
Granville	73.9	0.1	64.7	0.0	1.2	0.0	0.0	7.9	0.0
Hadley	81.4	8.1	64.6	0.0	1.2	3.8	0.0	3.7	0.0
Hampden	54.7	0.0	53.7	0.0	0.0	0.0	0.0	1.0	0.0
Hatfield	59.1	7.6	50.5	0.0	0.0	0.0	0.0	1.0	0.0
Holland	37.4	0.1	35.4	0.0	0.0	0.0	0.0	1.9	0.0
Holyoke	174.4	16.9	132.6	0.0	5.1	1.8	0.0	18.0	0.0
Huntington	54.4	11.8	37.1	0.0	0.0	0.0	0.0	1.8	3.7
Longmeadow	99.0	3.3	84.9	0.0	0.0	0.0	0.0	10.8	0.0
Ludlow	135.7	6.1	122.6	0.1	0.3	0.0	0.0	6.6	0.0
Middlefield	38.4	0.0	38.4	0.0	0.0	0.0	0.0	0.0	0.0
Monson	110.3	7.1	100.4	0.02	0.0	0.6	0.0	2.1	0.0
Montgomery	30.7	0.1	30.6	0.0	0.0	0.0	0.0	0.0	0.0
Northampton	179.0	13.9	148.9	0.0	0.0	2.7	0.0	11.2	2.3
Palmer	114.8	23.3	87.9	0.0	0.0	0.0	0.0	3.6	0.0
Pelham	46.0	5.7	22.8	14.7	0.8	0.0	0.0	2.0	0.0
Plainfield	48.7	0.0	47.9	0.0	0.0	0.0	0.0	0.8	0.0
Russell	36.2	13.5	22.6	0.0	0.0	0.0	0.0	0.1	0.0
South Hadley	104.7	8.4	85.6	0.0	0.6	0.0	0.0	10.1	0.0
Southampton	78.4	5.4	69.1	0.0	0.0	0.0	0.0	3.9	0.0
Southwick	85.0	7.2	67.9	0.0	0.0	0.0	0.0	9.9	0.0
Springfield	496.7	13.0	424.6	0.0	6.7	1.4	0.0	51.0	0.0
Tolland	42.0	0.2	40.2	0.0	1.6	0.0	0.0	0.0	0.0
Wales	28.8	5.1	23.7	0.0	0.0	0.0	0.0	0.0	0.0
Ware	117.3	11.3	86.0	17.0	0.0	0.0	0.0	3.1	0.0
West Springfield	143.7	15.2	117.3	0.0	0.0	0.0	0.0	11.2	0.0
Westfield	247.9	16.3	185.5	0.0	0.0	0.4	0.0	45.7	0.0
Westhampton	47.6	0.01	44.1	0.0	0.0	0.0	0.0	3.5	0.0
Wilbraham	114.7	6.1	100.3	0.0	0.0	0.0	0.0	8.3	0.0
Williamsburg	51.1	5.7	42.1	0.0	0.0	0.0	0.0	3.3	0.0
Worthington	64.4	6.0	58.1	0.0	0.2	0.0	0.0	0.1	0.0
Pioneer Valley Region	**4363.5**	**336.5**	**3,541.9**	**39.9**	**35.5**	**21.0**	**0.0**	**366.4**	**22.5**

Source: MassDOT

4. Bridges

Among the existing transportation facilities in the Pioneer Valley Region major bridge crossings remain a focal point for regional transportation concerns, as many streets and highways converge into a limited number of crossings over the Connecticut, Westfield and Chicopee Rivers. Table 5-5 lists the bridges by community according to the governmental unit responsible for maintaining them.

5. Vehicle Miles Traveled

In general, traffic on the region's roadways has been increasing. The estimated number of daily vehicle miles traveled (DVMT) in the Pioneer Valley Region experienced periods of fluctuation between increase and decline in the period between 2003 and 2015. There was an overall increase of 128,000 miles per average weekday between 2003 and 2015. A short lived decrease in DVMT is expected thereafter followed by a steady increase over the next decade and half before starting to decrease again. The magnitude of increase is shared in the region's rural areas as well. Table 3-6 presents the Pioneer Valley's estimated urban DVMT by functional class for the years 2003 through 2040. Changes in total DVMT from 2003 – 2040 is displayed in Figure 5-2.

Figure 5-2 – Estimated Daily Vehicle Miles Traveled

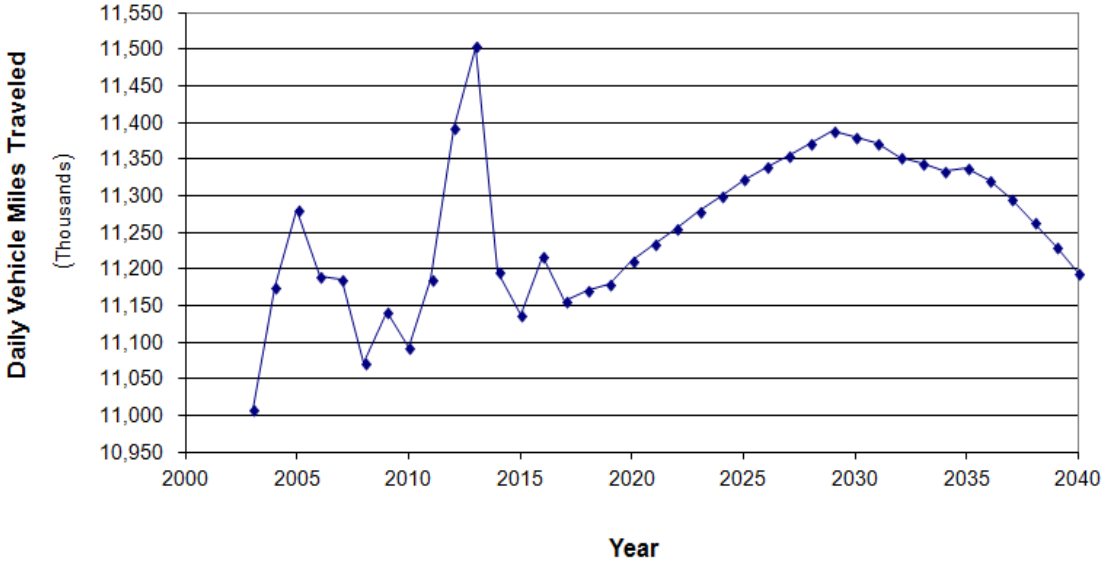


Table 5-5 – Number of Bridges by Community and by Administrative Unit

Community	Total Bridges	MassDOT	Municipal	Other State Agencies
Agawam	18	17	1	
Amherst	15	5	10	
Belchertown	12	4	8	
Blandford	12	6	6	
Brimfield	26	10	16	
Chester	25	9	16	
Chesterfield	9	3	6	
Chicopee	50	45	5	
Cummington	13	7	6	
Easthampton	19	9	10	
East Longmeadow	0	0	0	
Goshen	4	2	2	
Granby	8	1	7	
Granville	8	3	5	
Hadley	10	6	4	
Hampden	8	0	8	
Hatfield	15	10	5	
Holland	1	0	1	
Holyoke	49	40	9	
Huntington	8	6	2	
Longmeadow	4	4	0	
Ludlow	22	15	7	
Middlefield	9	0	9	
Monson	23	9	13	1
Montgomery	5	1	4	
Northampton	43	23	20	
Palmer	31	23	8	
Pelham	3	0	3	
Plainfield	2	0	2	
Russell	15	11	4	
South Hadley	11	7	4	
Southampton	10	2	8	
Southwick	3	2	1	
Springfield	59	48	11	
Tolland	0	0	0	
Wales	1	0	1	
Ware	16	7	8	1
West Springfield	26	26	0	
Westfield	36	25	11	
Westhampton	14	1	13	
Wilbraham	4	2	2	
Williamsburg	17	7	10	
Worthington	14	5	9	
Total 2014	678	401	275	2

Table 5-6 – 2000 - 2012 Estimated Urban Daily Vehicle Miles of Travel in the Pioneer Valley (in thousands)

Year	Interstate Highway	Other Urban Principle Arterials	Urban Principal Arterials and Rural Minor Arterials	Urban Minor Arterials and Rural Major Arterials	Urban Collectors and Rural Minor Collectors	Local Roads	Total
2003	3,223	593	2,574	2,568	624	1,427	11,008
2004	3,272	602	2,612	2,607	633	1,448	11,175
2005	3,303	608	2,637	2,631	639	1,462	11,280
2006	3,276	603	2,616	2,610	634	1,450	11,189
2007	3,275	603	2,615	2,609	634	1,450	11,186
2008	3,242	597	2,589	2,583	627	1,435	11,072
2009	3,262	601	2,605	2,599	631	1,444	11,141
2010	**3,248**	**598**	**2,594**	**2,588**	**629**	**1,438**	**11,094**
2011	3,275	603	2,615	2,609	634	1,450	11,185
2012	3,336	614	2,663	2,657	645	1,476	11,392
2013	3,368	620	2,689	2,683	652	1,491	11,503
2014	3,278	603	2,618	2,612	634	1,451	11,196
2015	3,261	600	2,603	2,598	631	1,443	11,136
2016	3,285	605	2,623	2,617	636	1,454	11,218
2017	3,267	601	2,608	2,602	632	1,446	11,156
2018	3,271	602	2,612	2,606	633	1,448	11,171
2019	3,274	603	2,614	2,608	633	1,449	11,180
2020	**3,283**	**604**	**2,621**	**2,615**	**635**	**1,453**	**11,212**
2021	3,289	606	2,626	2,620	636	1,456	11,234
2022	3,296	607	2,632	2,626	638	1,459	11,256
2023	3,302	608	2,637	2,631	639	1,462	11,278
2024	3,309	609	2,642	2,636	640	1,464	11,300
2025	3,315	610	2,647	2,641	641	1,467	11,322
2026	3,320	611	2,651	2,645	642	1,469	11,339
2027	3,325	612	2,655	2,649	643	1,472	11,355
2028	3,330	613	2,659	2,653	644	1,474	11,372
2029	3,335	614	2,662	2,656	645	1,476	11,388
2030	**3,332**	**613**	**2,661**	**2,655**	**645**	**1,475**	**11,381**
2031	3,330	613	2,659	2,653	644	1,474	11,372
2032	3,324	612	2,654	2,648	643	1,471	11,352
2033	3,321	611	2,652	2,646	643	1,470	11,343
2034	3,319	611	2,650	2,644	642	1,469	11,334
2035	3,320	611	2,650	2,644	642	1,469	11,337
2036	3,315	610	2,646	2,641	641	1,467	11,320
2037	3,307	609	2,641	2,635	640	1,464	11,295
2038	3,298	607	2,633	2,627	638	1,460	11,263
2039	3,288	605	2,625	2,619	636	1,455	11,230
2040	**3,278**	**603**	**2,617**	**2,611**	**634**	**1,451**	**11,195**

Sources: Massachusetts State HPMS (Highway Performance Monitoring System) Submittals to FHWA, Massachusetts Road Inventory Data, Massachusetts Statewide Travel Demand Model

The increase in DVMT is the result of several growth trends identified in the Pioneer Valley as well as other areas of the state and nation. Vehicle ownership is on the rise as vehicle occupancy rates decline. Generally speaking, this puts more single occupant vehicles on the roadway system, which increases the total daily vehicle miles of travel. There was a decrease in DVMT in the last two years from 2013 to 2015. After an increase in traffic volume of 0.97% in 2013, a decrease of -2.67% in 2014 followed. Another decrease of -0.54% is expected in 2015 before it starts increasing. This reflects the continued trend fluctuation presented above.

6. Average Daily Traffic Counts

The Pioneer Valley Planning Commission (PVPC) monitors traffic levels throughout the Region. Conducting close to 200 roadway segment counts annually as well as compiling counts from various local traffic studies; the PVPC continuously expands the data base. This information is used to measure Average Daily Traffic (ADT), Daily Vehicle Miles Traveled (DVMT), and identify seasonal, daily and hourly trends related to vehicle travel.

In addition to the selective ground counts conducted throughout the region, there are fourteen permanent monitoring stations maintained by MassDOT. The MassDOT locations collect counts hourly, 365 days a year. These permanent count locations are shown in Table 5-7.

Table 5-7 – MassDOT Permanent Count Stations in the Pioneer Valley

Community	Road	Location	Years Available
Longmeadow	I-91	South of Springfield City Line	1994-1997,1999,2006-2012
Chicopee	I-391	South of I-90 at Route 116	1995-2012
Chicopee	I-391	North of I-90	1994, 1996-2012
Chicopee	I-391	At Connecticut River Bridge	2005-2012
Chicopee	I-391	North of I-91	2002-2012
Northampton	Route 5/10	South of Hatfield Town Line	1996-2012
Northampton	I-91	North of King Street Interchange	2002-2012
Northampton	I-91	Between Route 9 and Damon Road	2002-2012
Northampton	I-91	Between Routes 5 and 9	2002-2012
Springfield	I-291	South of Roosevelt Avenue	2003-2012
Springfield	I-291	At Chicopee City Line	1993-2012
Springfield	I-291	West of Saint James Avenue	1993-2012
Brimfield	Route 20	0.8 km East of Holland Road	1993-2012
West Springfield	Route 5	At the Holyoke City Line	1998-2012
West Springfield	I-91	North of Route 5	1994-2012
Huntington	Route 112	South of Route 66/112	1995-2012
Goshen	Route 112	0.6 km South of Ashfield Town Line	1996-2012
Russell	Route 20	1.0 km West of Route 23	1998-2005,2001-2012
Hatfield	I-91	North of Chestnut Street	2002-2012

Source: MassDOT

Table 5-8 provides information on the percent change in traffic volumes at the above mentioned interstate locations.

Table 5-8 – Percent Change in Interstate Highway Traffic Volumes

Community	Road	Location	Range for % Change	% Change
Longmeadow	I-91	South of Springfield City Line	2002-2012	-1.21%
Northampton	I-91	North of King Street Interchange	2008-2012	-4.68%
Northampton	I-91	Between Route 9 and Damon Road	2007-2012	-5.05%
Northampton	I-91	Between Routes 5 & 9	2008-2012	-0.70%
West Springfield	I-91	North of Route 5	2011-2012	-5.94%
Hatfield	I-91	North of Chestnut Street	2002-2012	1.86%
Springfield	I-291	South of Roosevelt Avenue	2003-2012	3.24%
Springfield	I-291	At Chicopee City Line	2007-2012	0.31%
Springfield	I-291	West of Saint James Avenue	2010-2012	2.24%
Chicopee	I-391	South of I-90 at Route 116	2011-2012	14.46%
Chicopee	I-391	At Connecticut River Bridge	2011-2012	16.75%
Chicopee	I-391	North of I-90	2010-2012	3.76%
Chicopee	I-391	North of I-91	2002-2012	6.77%

By examining the change in traffic volumes at the permanent count stations, information can be developed on the amount of growth occurring at specific locations throughout the region. Locations have been grouped by the functional classification of the roadway and are shown in Figures 5-3 through 5-7. The functional classification of the roadway is an indication of the type and amount of traffic a roadway is expected to serve.

Figure 5-3 – Average Annual Traffic for I-91

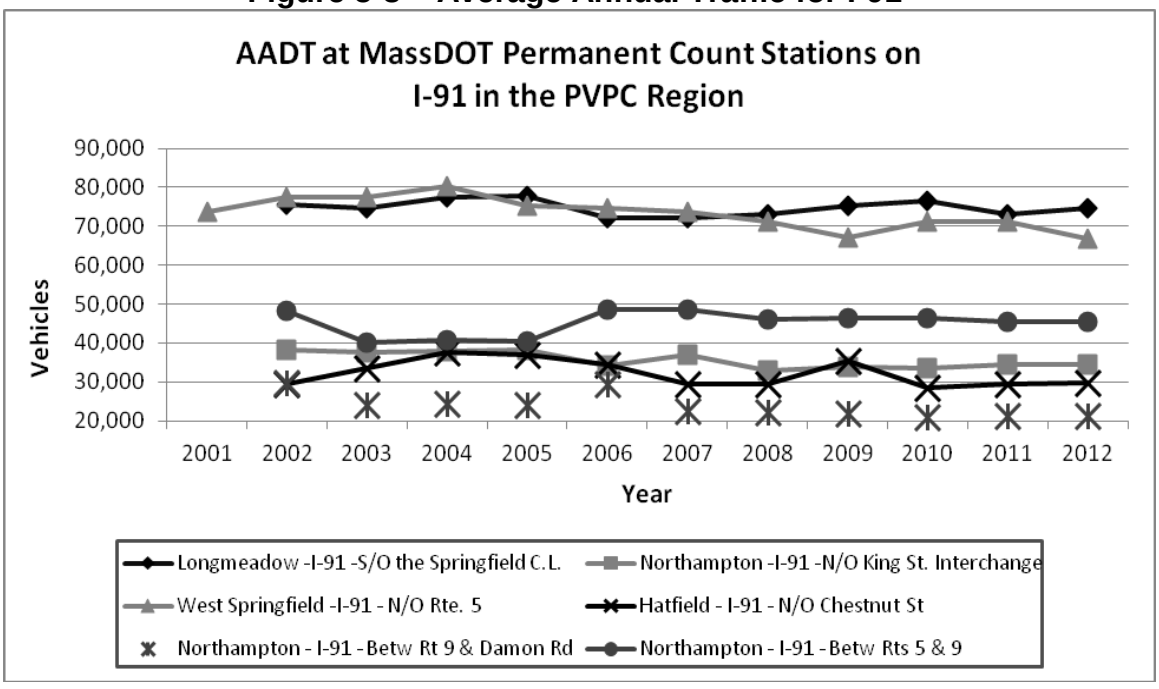


Figure 5-4 – Average Annual Traffic for I-391

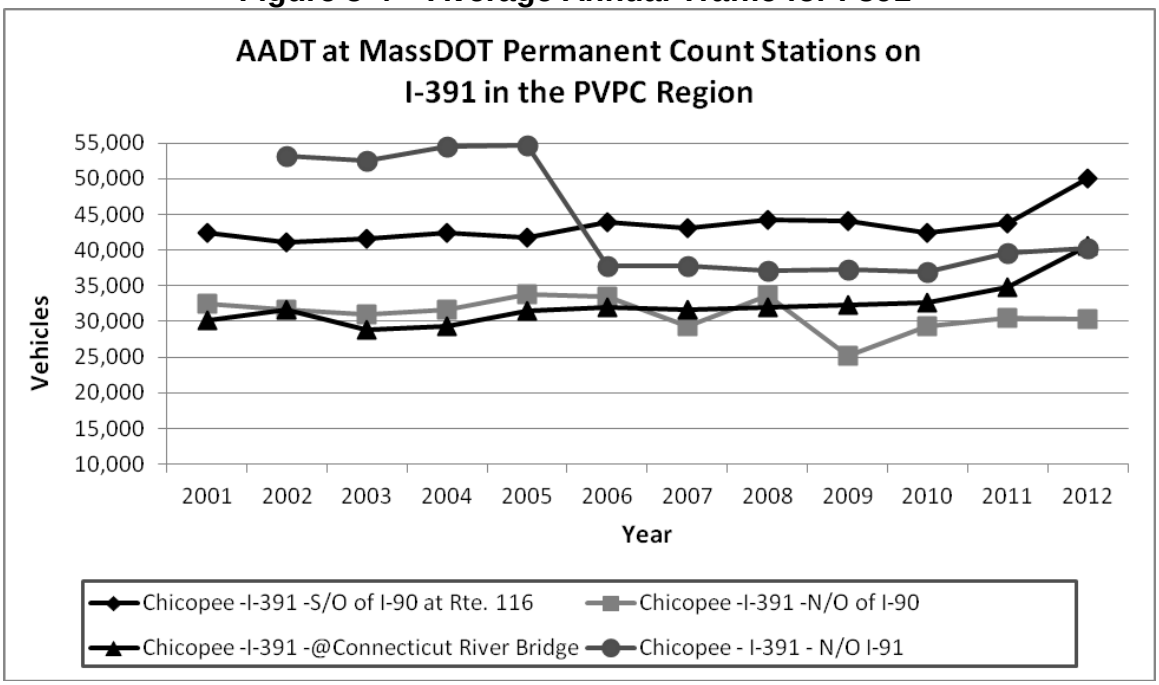


Figure 5-5 – Average Annual Traffic for I-291

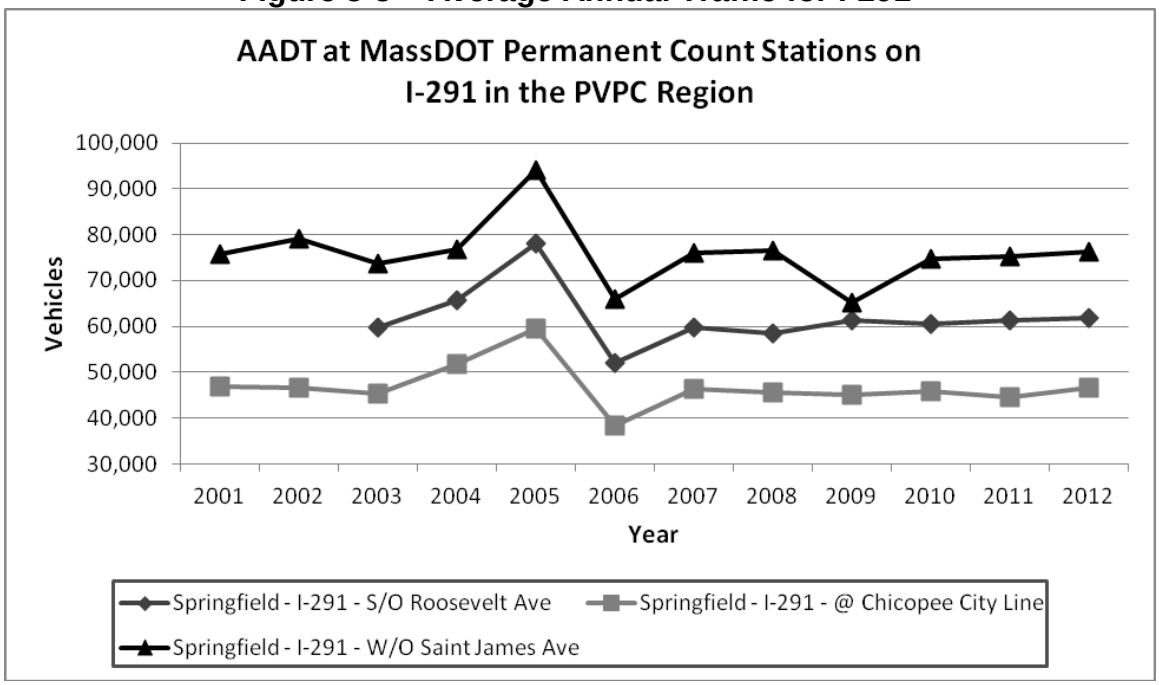


Figure 5-6 – Average Annual Daily Traffic for Arterial Roadways

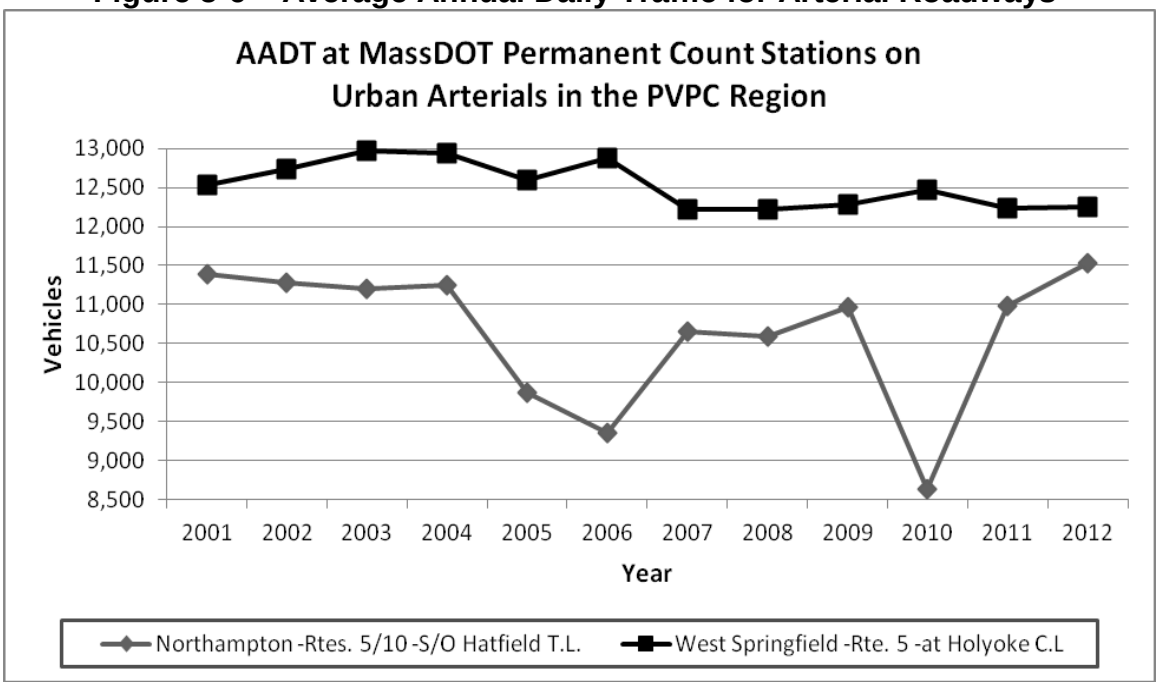
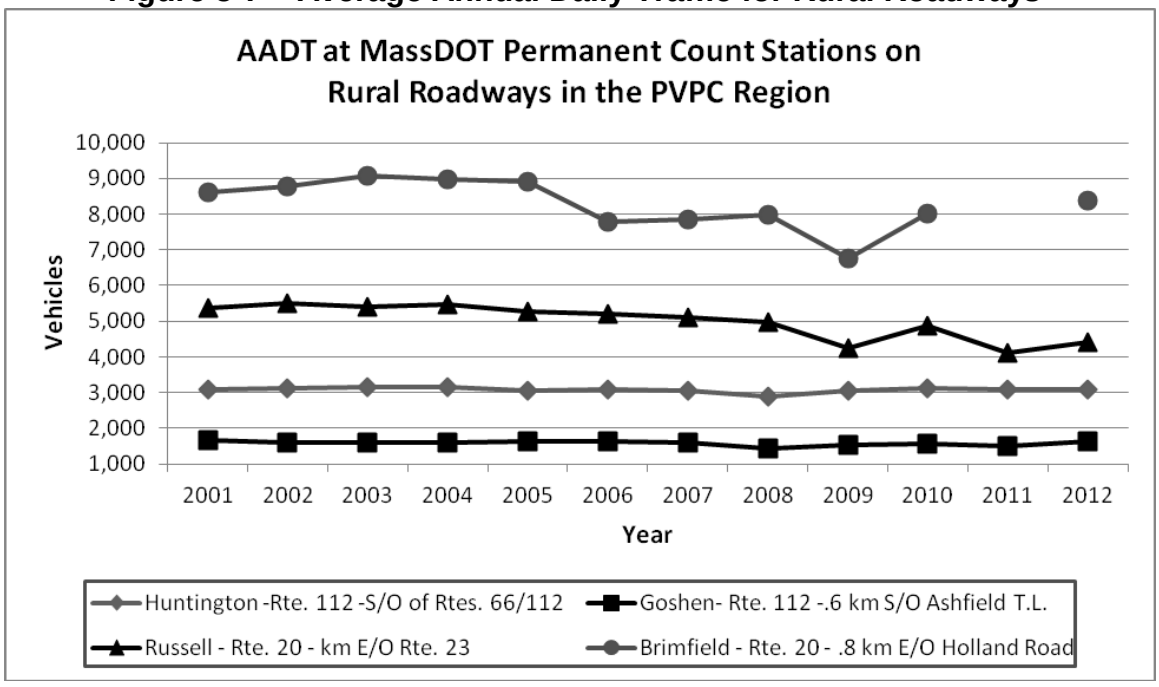


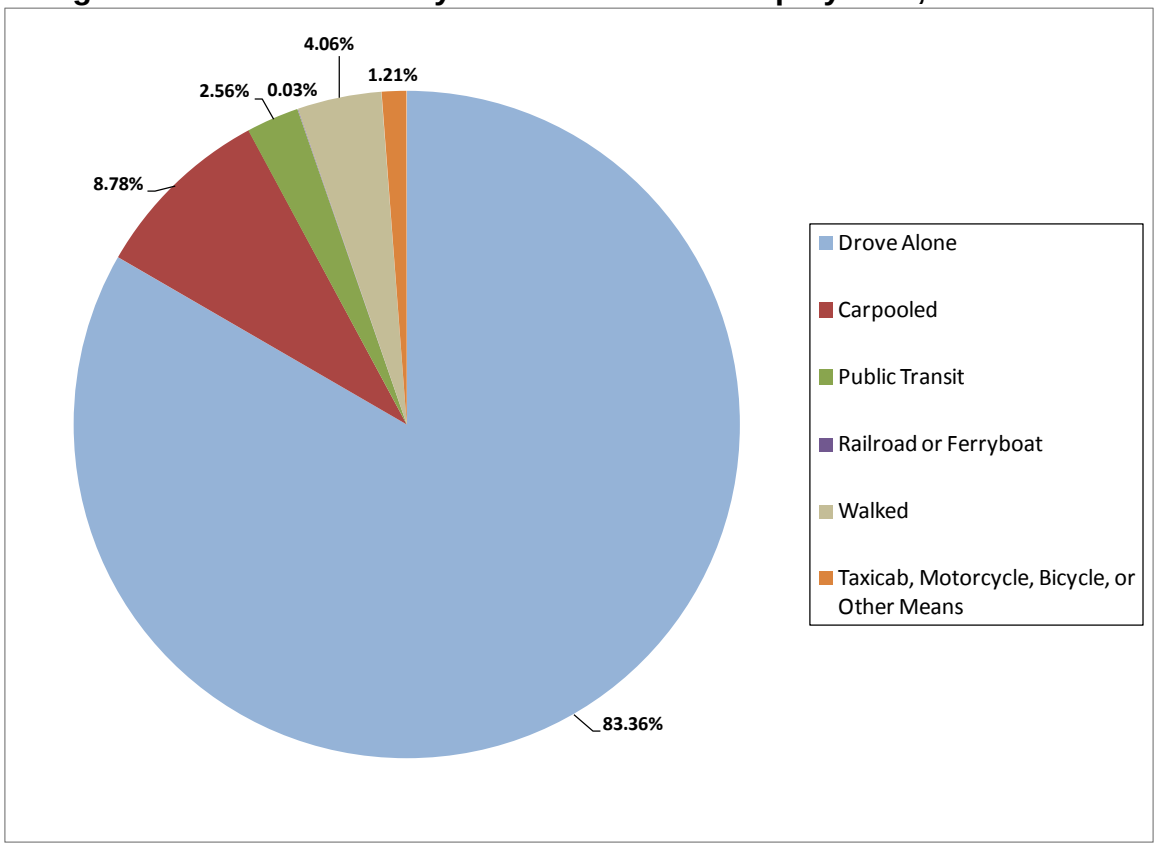
Figure 5-7 – Average Annual Daily Traffic for Rural Roadways



7. Mode Share

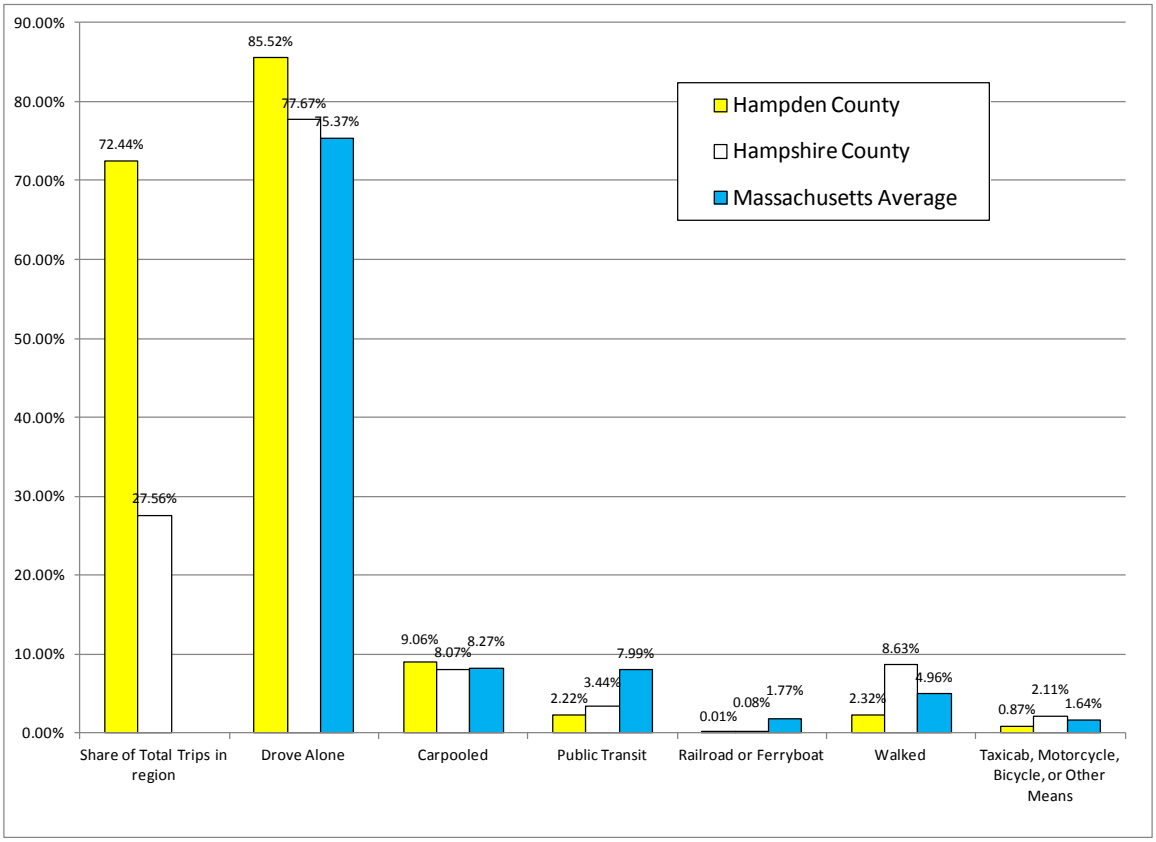
The mode of travel in the region skews heavily towards private autos. The 2009 – 2013 American Community Survey (ACS), which provides the most recent information on mode share, finds that approximately 84% of commuters in the region drive alone to work while only 2.5% take public transit. A summary of the mode share information by mode and county is provided in Figures 5-8 and 5-9.

Figure 5-8 – Pioneer Valley Travel Modes for Employment, 2009 - 2013



The mode share differences between Hampden and Hampshire Counties are significant. One reason may be a result of the commuting patterns of the students and faculty that attend the University of Massachusetts in Amherst who may have more travel options to campus. Significantly more people walk to work in Hampshire County, nearly double the state average. On a whole, the region is lagging the state average for railroad and public transit modes. This is a result of the extensive service options provided by the Massachusetts Bay Transportation Authority (MBTA) for commuters travelling to the Boston area.

Figure 5-9 – Hampden and Hampshire County Employment Travel Modes 2009 - 2013



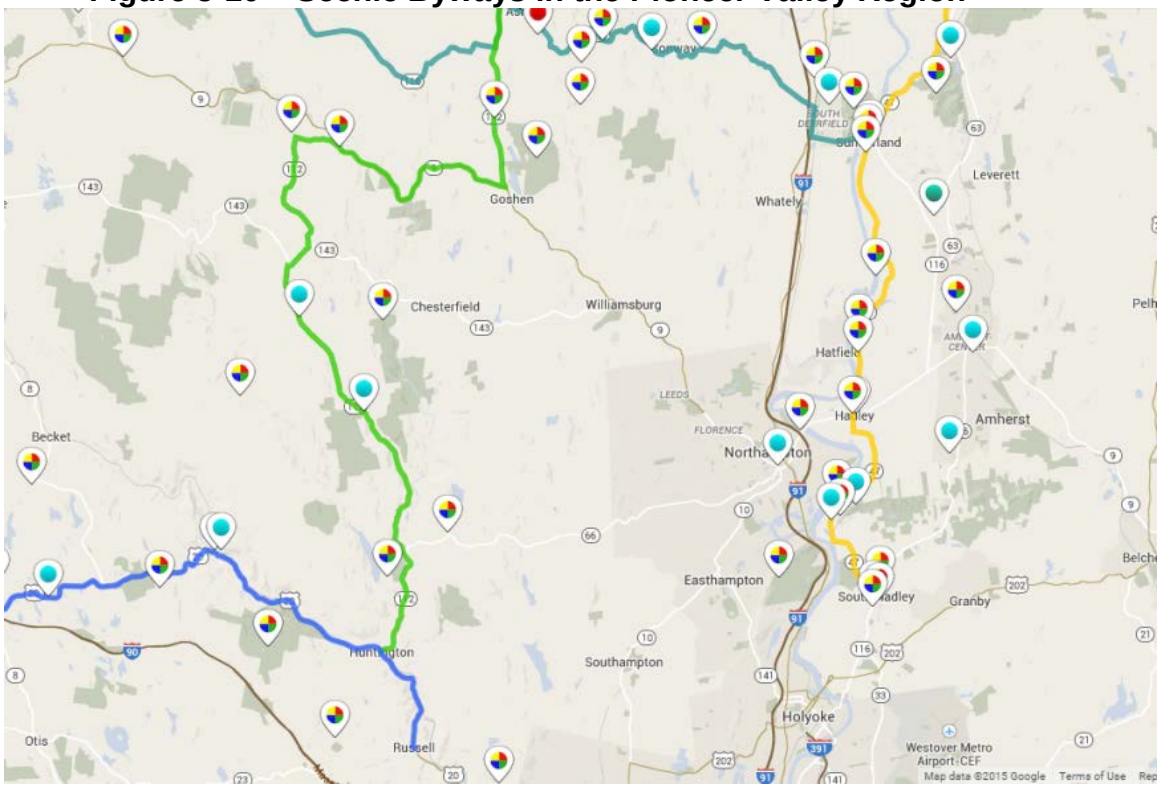
8. Scenic Byways

The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration. The program is a collaborative effort to help recognize, preserve and enhance selected roads throughout the United States. Projects included in this program focus on the betterment of the services and facilities that attract and please the traveling public. Over the last fifteen years, the PVPC has taken an active role in the development of planning studies and project development to support the preservation of scenic roadways in the Pioneer Valley region. There are currently four designated scenic byways in the Pioneer Valley Region:

- The Jacob's Ladder Trail which follows Route 20 from Russell to Lee.
- The Route 116 Scenic Byway which follows Route 116 from Sunderland to Adams.
- The Route 112 Scenic Byway which follows Route 112 and part of Route 9 from Huntington to the Vermont State Line.
- The Connecticut River Scenic Byway which follows Route 47 and 63 from South Hadley to the Vermont State Line

More information on scenic byways, including an interactive mapping tool, in the Pioneer Valley region is available at: http://www.bywayswestmass.com/.

Figure 5-10 – Scenic Byways in the Pioneer Valley Region



9. Travel Time Contours

Travel Time Contours are a great visual tool for showing average travel times from a specific location within the Pioneer Valley Region. The following section summarizes the new travel time contour data. Travel time contours were developed for the Pioneer Valley Region based on the location of centers of employment in the region. A total of six employment centers were selected because of their significance and to achieve geographic diversity. Many employment centers were not selected due to their close proximity to a site that was already mapped. Travel contours are broken down into 15, 30, 45, and 60 minute intervals.

Pioneer Valley Region Travel Time Contours were created using the EsriArcGIS Online Spatial Analysis Use Proximity Tool Set - Create Drive-Time Areas. Create Drive-Time Areas identifies areas that can be reached within a specified drive time or drive distance. The tool measures out from up to 1,000 roadway points to create drive time buffers. Drive time buffers are calculated using the street location, density, and other physical/use attributes. They take into account one-way streets, stop signs, traffic signals, traffic volume, speed limit, physical barriers, and terrain. The information for both

the original contours (circa 2001) and the new contours (2014) are shown in the tables below. The latest Pioneer Valley Region Travel Time Contours are shown in Figures 5-11 – 5-16.

Table 5-9 – Travel Time Comparison Northbound Routes (2001 and 2015)

Northbound	2001 (Minutes)	2015 (Minutes)
North End Bridge Rotary	2.25	3.86
I-91 Exit 9 (Route. 20 - North End Bridge)	2.03	4.33
I-91 Exit 10 (Birnie Ave)	0.65	0.78
I-91 Exit 12 (I-391 - Chicopee)	1.05	1.09
I-91 Exit 13A (Route 5 - West Springfield	0.58	0.79
I-91 Exit 14 (Massachusetts Turnpike)	2.38	2.54
I-91 Exit 15 (Holyoke - Ingleside)	0.65	0.90
I-91 Exit 16 (Holyoke - Route 202)	1.48	1.60
I-91 Exit 17A (Holyoke - Route 141)	1.17	0.81
I-91 Exit 18 (Northampton - Route 5)	6.17	7.55
I-91 Exit 19 (Northampton - Route 9)	1.80	1.91
I-91 Exit 21 (Hatfield/Northampton)	2.10	2.32
I-91 Exit 22 (North Hatfield)	2.37	2.61
I-91 Exit 24 (Deerfield/Whately)	7.12	4.40
I-91 Exit 26 (Greenfield - Route 2A)	10.47	7.74
I-91 Exit 27 (Greenfield - Route 2)	2.37	2.58
I-91 Exit 28 (Bernardston)	4.12	4.67
Vermont State Line	4.17	4.13
I-91 VT Exit 1 (US Route 5)	6.93	6.88
Total	**59.85**	**61.49**

As can be seen in the tables, with the exception of southbound travel, the average travel times in the region over the past 15 years have not changed significantly. Travel times on average where measured to be approximately 45 seconds slower overall than in 2001 (not including southbound data.) This can be attributed to the fact that infrastructure improvements made in the past have been offset by an increase in vehicular volumes on the roadways. The significant decrease in travel times on roadways in the southbound direction can be attributed partially to less roadway congestion but also to better data. The 2001 data was manually collected by PVPC staff. The new data as discussed previously is calculated using GIS software and is based on a larger sample size. Westbound times also show a minor decrease in travel times while eastbound and northbound times have increased slightly.

Table 5-10 – Travel Time Comparison Southbound Routes (2001 and 2015)

Southbound	2001 (Minutes)	2015 (Minutes)
Memorial Bridge Rotary	5.10	1.86
I-91 Exit 3 (Route 5/57 - South End Bridge)	2.53	3.01
I -91 Exit 2 (Longhill Street)	0.37	0.89
I-91 Exit 1 (Route 5 - Longmeadow)	0.63	0.12
I-91 CT Exit 49 (US Route 5)		3.77
I-91 CT Exit 48 (CT Route 220)	1.27	1.53
I-91 CT Exit 47 (CT Route 190)	2.08	0.41
I-91 CT Exit 46 (US Route 5)	2.30	2.57
I-91 CT Exit 45 (Bradley Airport)	8.22	2.16
Total	**22.50**	**14.46**

Table 5-11 – Travel Time Comparison Eastbound Routes (2001 and 2015)

Eastbound	2001 (Minutes)	2015 (Minutes)
I-291 Exit 2 (Dwight/Chestnut Streets	4.67	5.51
I-291 Exit 3 (Armory Street)	0.73	0.68
I-291 Exit 4 (St. James Avenue)	1.07	1.37
I-291 Exit 5 (Page Boulevard)	1.72	1.76
I-291 Exit 6 (Shawinigan Drive)	1.38	1.26
I-90 Exit 6 (Chicopee/Springfield)	2.03	2.01
I-90 Exit 7 (Ludlow)	4.27	3.20
I-90 Exit 8 (Palmer)	5.88	7.02
I-90 Exit 9 (Sturbridge)	14.12	14.71
I-90 Exit 10 (Auburn/Worcester)	10.67	10.87
Total	**46.53**	**48.39**

Table 5-12 – Travel Time Comparison Westbound Routes (2001 and 2015)

Westbound	2001 (Minutes)	2015 (Minutes)
I-90 Exit 4 (Holyoke/West Springfield	12.78	10.73
I-90 Exit 3 (Westfield)	5.45	4.43
I-90 Exit 2 (Lee)	27.23	28.12
I-90 Exit 1 (West Stockbridge)	7.63	8.14
Total	**53.10**	**51.42**

Figure 5-11 – Travel Time Contours for the Springfield Central Business District

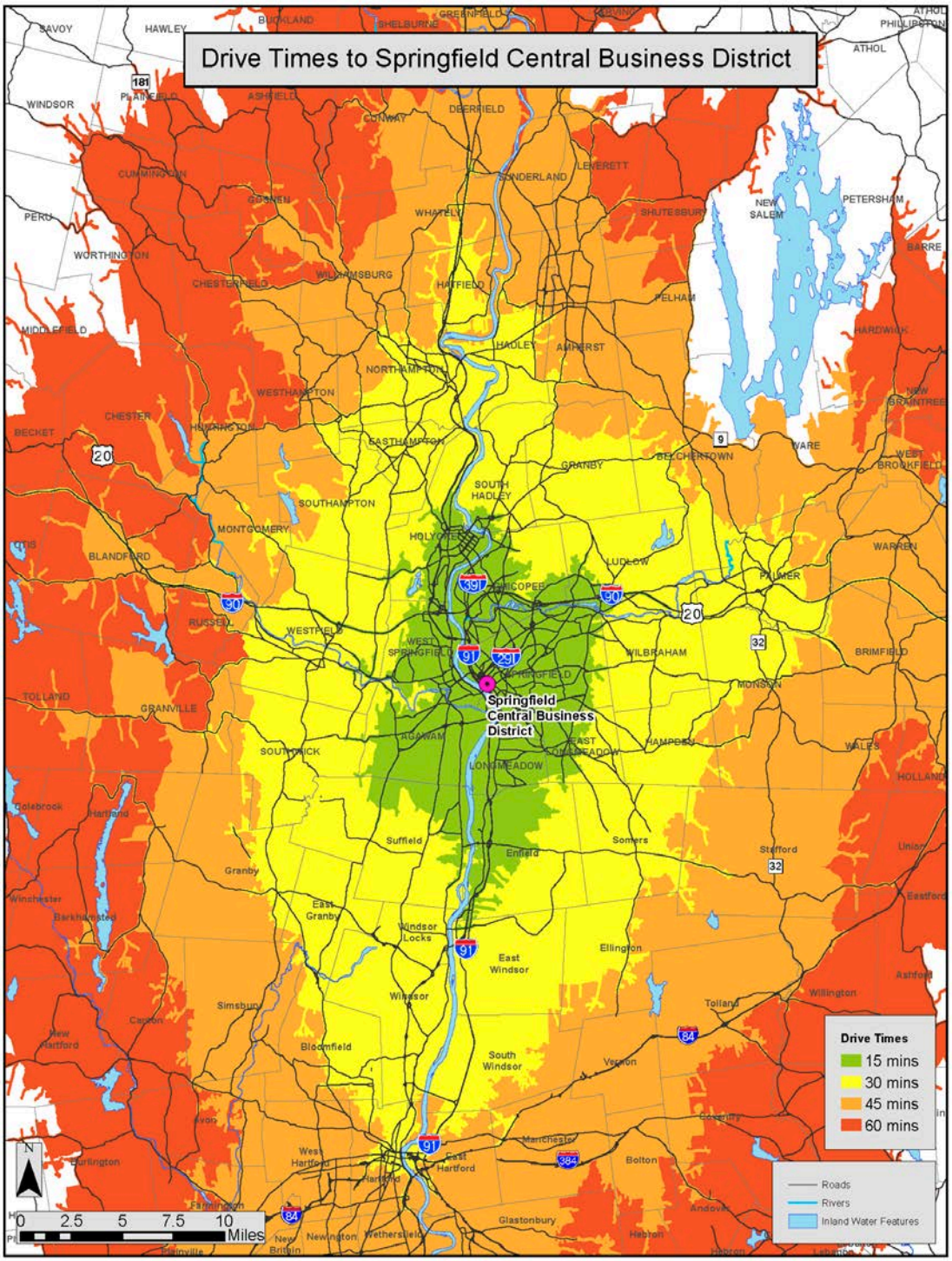


Figure 5-12 – Travel Time Contours for the University of Massachusetts - Amherst

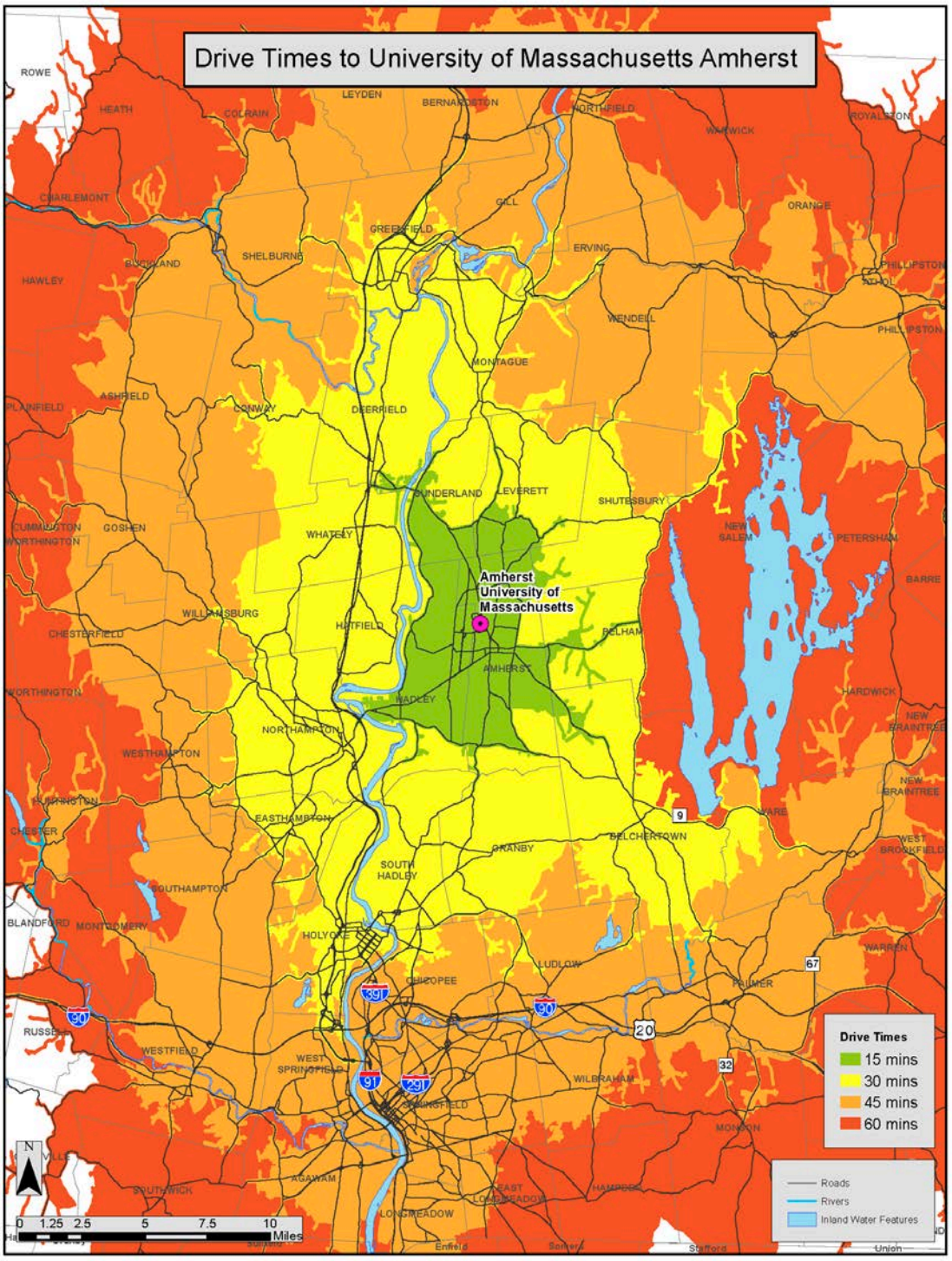


Figure 5-13 – Travel Time Contours for the East Longmeadow Industrial Park

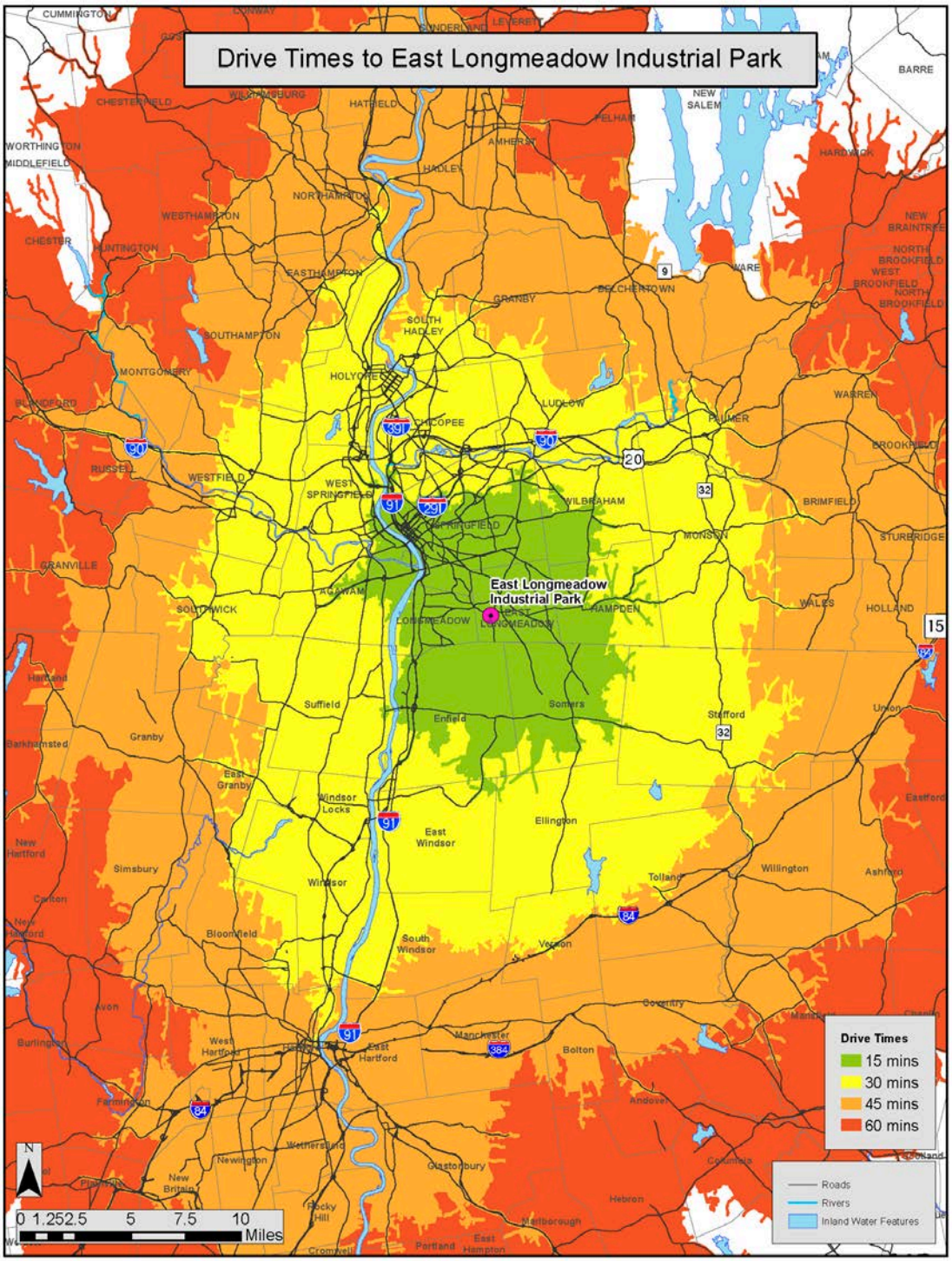


Figure 5-14 – Travel Time Contours for the Northampton Central Business District

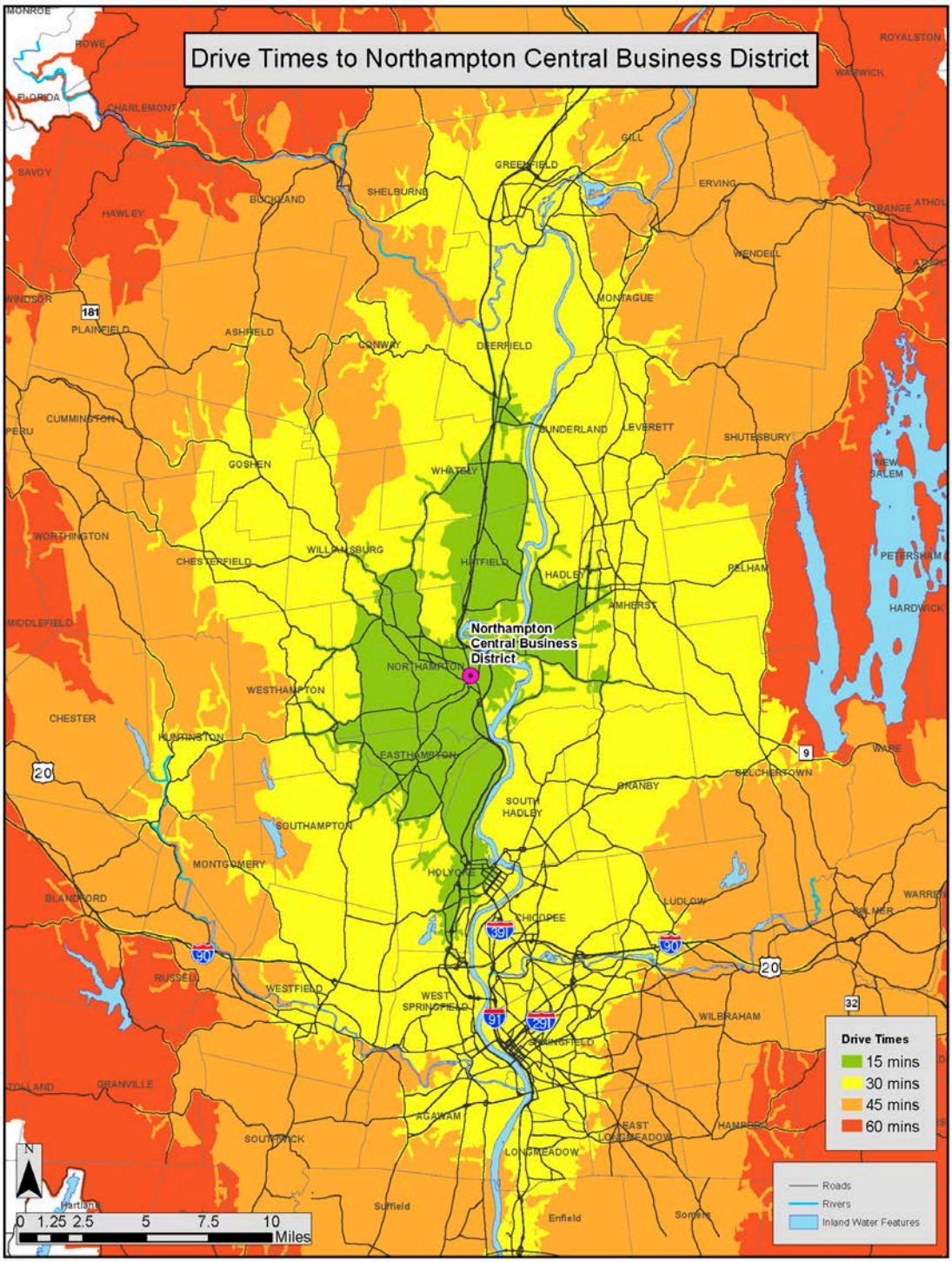


Figure 5-15 – Travel Time Contours for the Palmer Four Corners

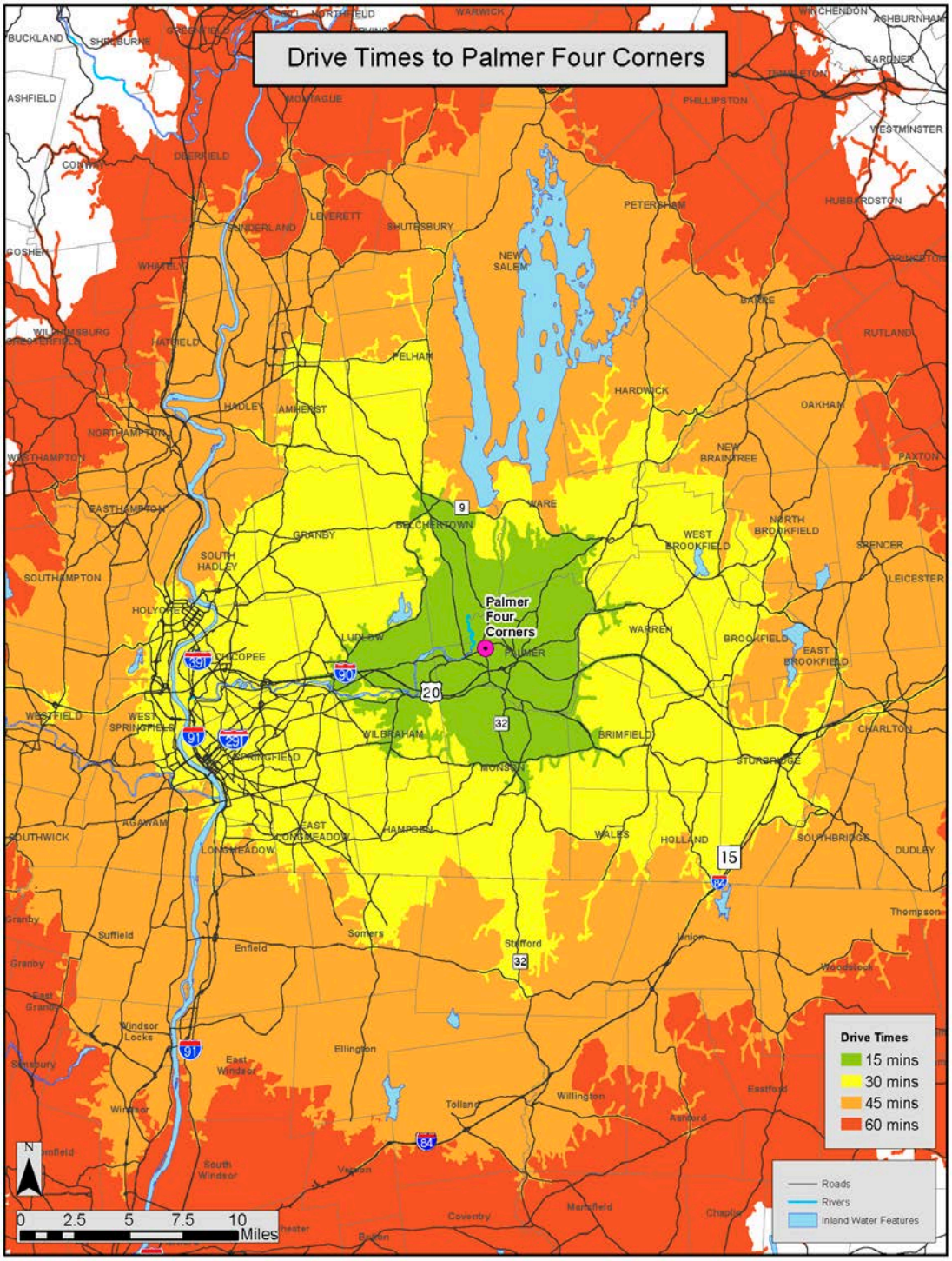
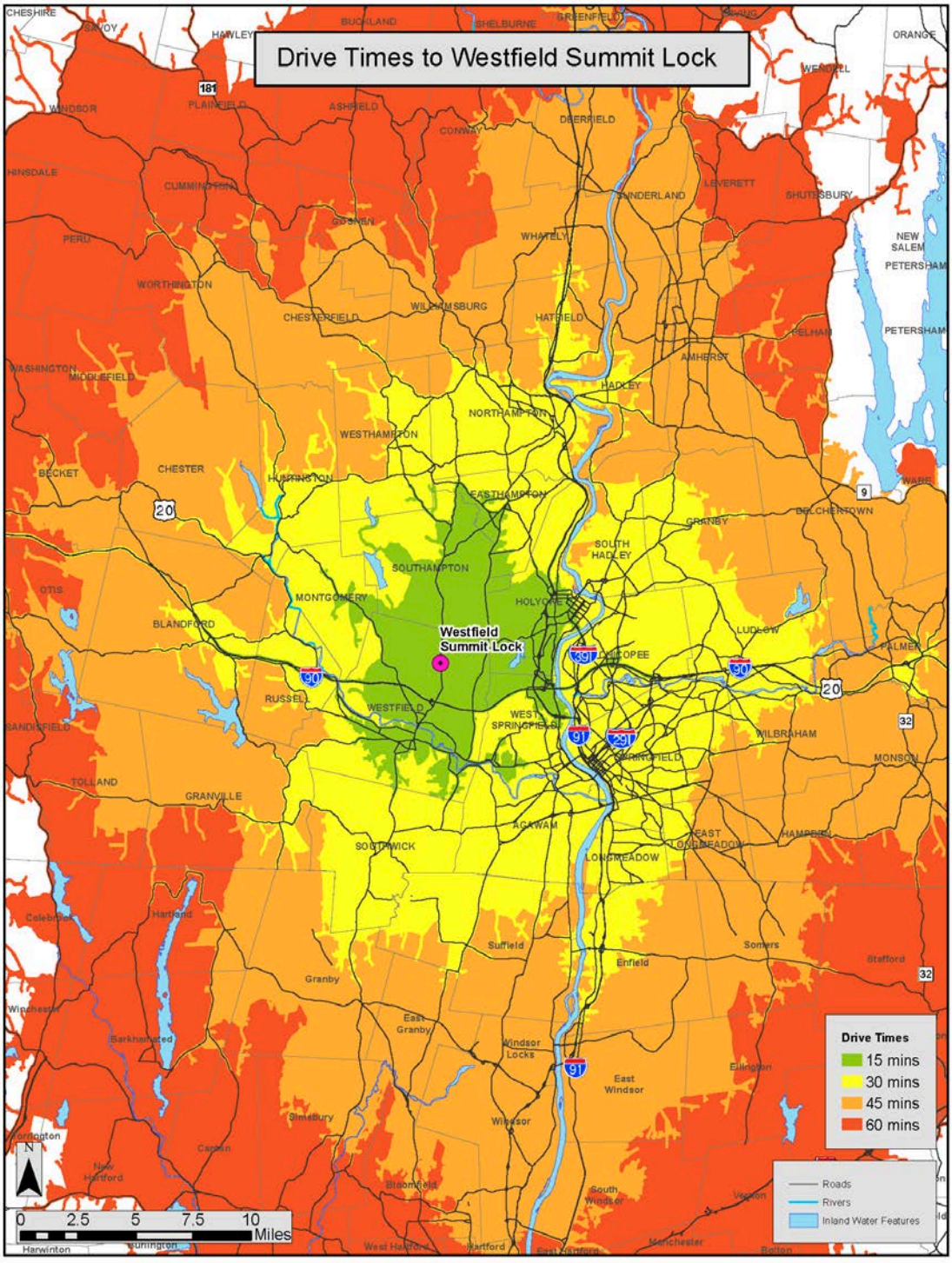


Figure 5-16 – Travel Time Contours for Westfield Summit Lock



C. PASSENGER TRANSPORTATION

The Pioneer Valley is home to an extensive transit system that offers many different modes of public transportation. Intra-county and Intercity buses, van service for seniors and disabled riders, ridesharing, and park and ride lots are all vital to the mobility of the regions residents. What follows is a summary of these services.

- Public buses operating on fixed routes and schedules
- Vans for disabled residents and senior citizens better known as Paratransit
- Commercial scheduled bus service within the region, as well as to destinations outside it
- Commercial and non-profit van shuttles, charter buses and taxis
- Passenger rail

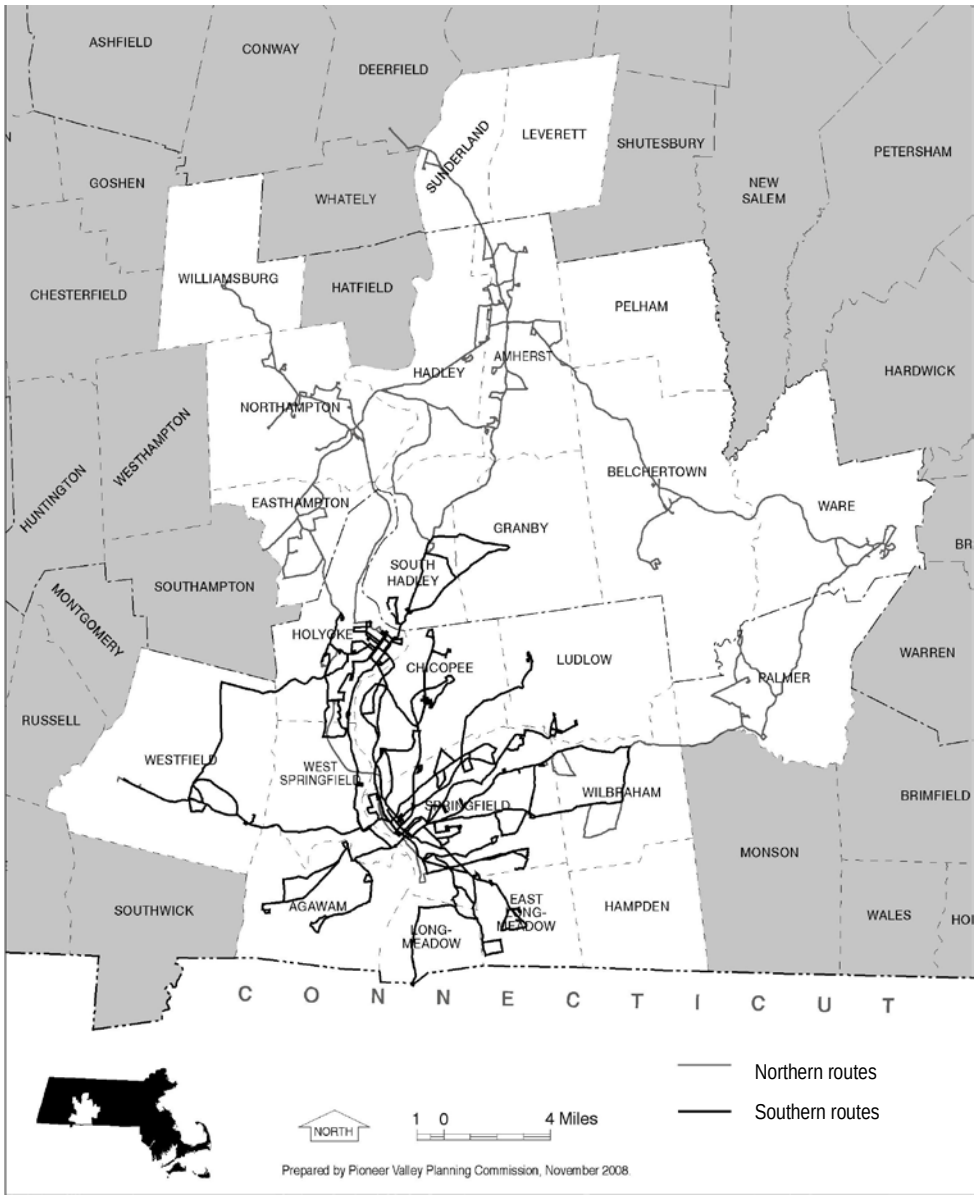
1. Pioneer Valley Transit Authority (PVTA) Bus and Paratransit Service

PVTA, located in western Massachusetts is the largest regional transit authority in the state. PVTA's service area begins at the Connecticut state line and stretches north to Sunderland. PVTA has 43 scheduled or fixed bus routes and on-demand paratransit van service in 24 communities with a total population of 538,827 (2013 U.S. Census estimate).

Funding for PVTA comes from several sources: federal, state and local governments; passenger fares; and advertising. The authority's operating budget in FY14 is $39.9 million. Member cities and towns contribute an annual assessment to PVTA based on the level of service that operates in their community. Passenger fares cover about 18% of the total cost of the service. Funds for capital improvements are received through various state and federal grant programs.

PVTA is prohibited from directly operating transit services so they contract with three private management companies: **First Transit** operates fixed bus routes based in Springfield and Northampton; **UMass Transit Services** operates fixed bus routes based at the University of Massachusetts serving the Amherst area; and **Hulmes Transportation** operates all paratransit van services, as well as community mini-bus shuttles in Easthampton, Palmer, and Ware.

Figure 5-17 – PVTA Service Communities and Scheduled Bus Routes



The following cities and towns make up PVTA's service area:

Agawam	Granby	Ludlow	Sunderland
Amherst	Hadley	Northampton	Ware
Belchertown	Hampden	Palmer	West Springfield
Chicopee	Holyoke	Pelham	Westfield
Easthampton	Leverett	South Hadley	Wilbraham
E. Longmeadow	Longmeadow	Springfield	Williamsburg

In 2014 PVTA contracted with a consultant to do a system-wide Comprehensive Service Analysis (CSA) of all of PVTA's fixed route service. The recommendations of that survey were implemented in the fall of 2014. Most of PVTA's routes were affected in some way. Three new routes were implemented, the X90 Inner Cross Town and the X92 MidCity Crosstown in the southern service area, and the X98 CrossTown Northampton in the northern service area. To read the complete CSA copy and paste the following link into your browser:

http://pvta.com/media/pdfs/PVTA_CSA_FinalReportAppendicesJune2014.pdf

PVTA's basic fare is $1.25 per ride. Transfers cost an extra 25 cents and are good for 90 minutes from time of purchase. Reduced fares of 60 cents per ride are offered for elderly and disabled customers, as well as Medicaid card holders (transfers are 10 cents). The fare for children age 6 to 12 is 75 cents; children younger than age 6 ride free with an adult. Monthly unlimited ride passes are $45, with a discounted price of $22 for elderly, disabled, and Medicaid card holders. PVTA also offers 1-day unlimited ride passes for $3 and 7-day passes for $12.50.

Fares for routes serving the University of Massachusetts are collected under a "proof of payment" system in cooperation with the University and other Five Colleges institutions (Smith, Mount Holyoke, Hampshire and Amherst Colleges). Instead of onboard collection, fares on these routes are collected through activity fees that are paid by students, as well as subsidies from the institutions. Students, faculty and staff of these institutions must be prepared to show their current school ID cards as proof of fare payment when riding the bus. Riders who are not affiliated with the 5 Colleges must purchase multi-ride passes or single ride tickets. Cash is not collected aboard UMass Transit buses in the Amherst area.

a) PVTA Bus Riders

Surveys have found that about half of all PVTA riders use the bus to commute to work or school. The remaining trip purposes are shopping, attending social and recreational events, and medical appointments. Nearly three-quarters of riders report earning less than $20,000 per year; three of every five riders say they do not own a car; and four of five riders say they have no other way to make their trip other than using PVTA.

Table 5-13 – PVTA Bus Route Ridership

Fiscal Year	Passenger Trips	% Change
2003	10,427,793	-6.51%
2004	9,221,309	-11.57%
2005	9,071,913	-1.62%
2006	9,108,550	0.40%
2007	9,435,885	3.47%
2008	9,722,016	2.94%
2009	9,897,009	1.77%
2010	9,743,568	-1.57%
2011	10,152,139	4.02%
2012	10,872,898	6.63%
2013	11,128,713	2.30%

Fiscal year: July 1 through June 30 Source: PVTA

Capital and service improvements implemented by PVTA during the 1970s-1990s resulted in a ridership peak of nearly 13 million in 1985. However, state-imposed budget reductions in 2002 necessitated deep service cuts, eliminating nearly one-fifth of bus service, including many Sunday trips. Ridership fell during the following two years to about 9 million rides. In the last 8 years PVTA has reinstituted all the service that it cut in 2002 and more. Since 2006, ridership held steady at approximately 10 million rides per year. Beginning in 2010 ridership has made modest gains with 2013 coming in at just over 11 million rides.

Because transit customers typically ride the bus or van every day (or at least most days), and usually make at least two trips per day (going to and from their destinations), the actual number of transit customers per year is actually much less than annual "ridership." Using survey information on rider frequency, PVPC estimates that there are 15,000 to 20,000 regular bus riders in the region; however, this varies widely, depending on whether or not school is in session.

b) PVTA Bus Fleet

PVTA's bus fleet consists of 176 vehicles from four manufacturers: 109 Gillig low-floor clean diesel vehicles manufactured after 2006, 8 General Motors Rapid Transit Series (RTS) diesel vehicles manufactured in the mid to late 1990, 56 late model New Flyer buses, and 3 late model Ford Mini buses. All buses provide comparable passenger amenities: all are air conditioned and equipped with wheelchair lifts or ramps. PVTA's buses are based at three garages, as shown in Table 5-14.

Table 5-14 – PVTA Bus Fleet

Bus Model	Springfield Garage (Southern Area)	Northampton Garage (Northern Area)	UMass Garage (Northern Area)	**Totals**
Gillig	82	9	18	**109**
RTS	*8	0	0	**8**
New Flyer	30	9	17	**56**
Ford Mini Bus	0	3	0	**3**
Totals	**120**	**21**	**35**	**176**

*The 8 RTS buses have exceeded their rated 12-year useful life and are outdated. These are the last of the buses that were purchased in the 1990's. They are scheduled to be retired as soon as conditions permit.

c) PVTA Paratransit Service

Paratransit is demand response door-to-door van service that is scheduled by the rider. PVTA's fleet consists of 145 vans. These vans are equipped with wheelchair lifts and other special equipment to insure the safety of disabled riders. As the average age of the region's residents continues to rise, the need and demand for paratransit services will increase substantially. Paratransit fares typically cover only about 10% of the service cost.

This section describes the two types of paratransit van service that PVTA provides to residents of its 24 member communities. Total ridership for the service is presented below.

Table 5-15 – PVTA Annual Paratransit Ridership

Fiscal Year	Annual Rides	% Change
2003	548,363	3.92%
2004	407,430	-25.70%
2005	373,622	-9.05%
2006	373,448	-0.05%
2007	299,529	-24.68%
2008	308,787	3.00%
2009	308,323	-0.15%
2010	317,733	2.96%
2011	318,869	0.36%
2012	316,208	-0.84%
2013	312,015	-1.34%

Fiscal year July 1 through June 30 *Source: PVTA*

The ridership numbers for FY 2012 and 2013 are actually going down when the number of seniors using the service is going up. A possible explanation for why ridership is going down is that the PVTA discovered that they were counting the "primary care attendants" (PCA's) as passengers when in fact they should not have been counted. They have since discontinued the counting of PCA's as riders.

- **Americans with Disabilities Act (ADA) Service --** Federal law requires that public transit providers offer paratransit service that is comparable to their fixed route bus service to disabled customers who are unable to use regular buses. Customers must be eligible to use the service, and an application and approval process is required. Trips must be scheduled at least one day in advance. ADA paratransit service is available only within three-quarters of a mile of a fixed bus route, and the trip must start and be completed during the same hours that the nearest regular bus route operates. The fare is $2.50, $3.00, or $3.50 per ride, depending on pickup and drop off locations.
- **Senior Dial-A-Ride Service --** PVTA also provides van service to people age 60 and over in its 24 member communities. This service is operated on a space-available basis Monday through Friday from 8:00 AM to 4:30 PM. Fares are $2.50, $3.00 and $3.50 per ride depending on the pickup and drop off locations. Tickets are available from local senior centers and the PVTA Information Center in $0.50 or $2.50 denominations and discounts are often available.

PVTA conducts quarterly Paratransit rider meetings. Meetings are held in both the southern and northern regions – usually within a day or two of each other. PVTA provides free rides to those who wish to attend these meetings. PVTA uses these meetings to pass on any new information to their Paratransit riders and to get feedback from them regarding any issues they may have with the service.

Councils on Aging (COAs) and Senior Centers in the PVTA service area also provide transportation to their senior residents. Below is a table showing the level and type of service provided by each COA.

Table 5-16 – Councils on Aging and Senior Centers in the PVTA Service Area

City or Town	Transportation Provided?	# of Vehicles	Hours of Service
Agawam	Yes	1 car	8:00-12:00 T-F
Amherst	Yes	No vans - volunteers	Varies
Belchertown	Yes	1 van	8:00 4:30
Chicopee	Yes	2 cars 2 vans	8:30-3:30
East Longmeadow	Yes	1 van	9:00 - 3:00
Easthampton	Yes	1 van	8:30 - 3:30
Granby	Yes	1 van 1 car	9:00 3:00
Hadley	Yes	1 van	Thursday only
Hampden	Yes	1 van	9:00 - 3:00
Holyoke	Yes	2 cars	8:00-4:00
Leverett	info not available		
Longmeadow	Yes	1 van	varies
Ludlow	Yes	3 vans	8:00 - 4:00
Northampton	Yes	No vans - volunteers	Varies
Palmer	Yes	2 vans	8:00 - 3:30
Pelham	info not available		
South Hadley	Yes	1 van	9:00 - 3:00 in town
Springfield	No		
Sunderland	No		
Ware	Yes	1 van	9:00 - 12:00
West Springfield	Yes	1 van	8:00 - 4:30
Westfield	No		
Wilbraham	Yes	1 van	varies
Williamsburg	Yes	No vans - volunteers	8:30-1:30 M-T

2. Franklin Regional Transit Authority (FRTA) Paratransit Service

There are 14 additional towns in the PVPC region that are not members of PVTA and instead contract with the Franklin Region Transit Authority (FRTA), based in Greenfield, for paratransit service. These towns are: Blandford, Chester, Chesterfield, Cummington, Goshen, Huntington, Middlefield, Montgomery, Plainfield, Russell, Southampton, Southwick, Westhampton, and Worthington.

Because these communities are located in the furthest western and southern portions of the PVPC region, they are not within the ¾ mile buffer of any fixed route bus service in the region and therefore no ADA paratransit service is available. Senior dial-a-ride service is offered for persons age 60 and older through municipal senior centers. In some cases, pre-certification of eligibility is required. Days, hours of operations, fares and service frequency vary by town. The FRTA paratransit fare varies by route. It is double the fare for the fixed route service. FY2013 ridership for these towns was 6,884 trips.

3. Regional Coordinating Councils

Massachusetts enacted Executive Order 530 in 2011 to enhance the efficiency of community and paratransit transportation services in the Commonwealth. The order seeks to align the paratransit needs of the Commonwealth with current levels of service and assess if the current services conform with federal and state requirements. A major product of Executive Order 530 was the Community, Social Service and Paratransit Transportation Commission Report. This report recommended the formation of Regional Coordinating Councils (RCC) to identify and address existing service gaps at the local level. RCCs are voluntary advisory bodies that seek to:

- Identify unmet service needs
- Develop regional priorities
- Coordinate existing services to serve more people at the local level
- Report unmet needs to the appropriate government agency (i.e. MassDOT)
- Raise awareness of the important role community transportation services play for all

More information on both RCC's in the Pioneer Valley region is provided in Table 5-17.

Table 5-17 – Regional Coordinating Councils in the Pioneer Valley

RCC	Coverage Area	Contact	Meeting Schedule
Pioneer Valley	Agawam, Amherst, Chicopee, East Longmeadow, Easthampton, Granby, Hadley, Hampden, Hatfield, Holyoke, Longmeadow, Ludlow, Monson, Northampton, South Hadley, Springfield, West Springfield, Westfield, Wilbraham	Theadora Fisher, HST	Every 4th Tuesday at the office of the Pioneer Valley Planning Commission
Hilltowns	Becket, Blandford, Chester, Chesterfield, Cummington, Dalton, Florida, Goshen, Granville, Haydenville, Hinsdale, Huntington, Middlefield, Williamsburg	Theadora Fisher, HST	Meeting dates and times vary

4. Commercial Scheduled Bus Service

The Pioneer Valley is served by three major commercial bus passenger carriers that provide scheduled service to destinations within the region, as well as cities and towns throughout New England and North America. These carriers serve three bus terminals and other stops in the region.

a) Bus Terminals and Service Locations

- **Springfield Bus Terminal –**Located at 1776 Liberty Street in downtown Springfield, this terminal is the regional hub for commercial bus service. The terminal is owned and operated by Peter Pan Bus Lines. It has 16 boarding gates, eight of which are leased to PVTA, and a limited number to other commercial carriers. There are waiting areas, a ticket counter and concession vendors for passengers. There are approximately 150 commercial bus departures serving an estimated 2,000 commercial passengers on weekdays, and approximately 7,500 PVTA customers traveling on some 550 public bus departures each weekday.
- **Northampton Bus Terminal –** This three-story building at One Roundhouse Plaza behind City Hall accommodates two intercity buses and includes an enclosed waiting area (PVTA service is available one block west at the Academy of Music). Approximately 12-15 trips per day depart this terminal. The building also contains commercial offices and a restaurant. The terminal was built in 1984 as a project of Peter Pan Bus Lines and the former Western Mass Bus Lines. Today, it is operated by Peter Pan and is also served by Greyhound.

- **Holyoke Intermodal Center –** This transit hub is located at 206 Maple Street in downtown Holyoke. It replaced the old Veterans Park location. The center opened in September 2010 and has six bus bays for PVTA, Peter Pan and Megabus vehicles. PVTA has 8 routes servicing the Holyoke Transportation Center. Each weekday there are 137 departures It has an enclosed waiting area, ticket and information desk and a coffee shop. It is a joint project of PVTA, Peter Pan and the City of Holyoke. Community and education facilities are located on the upper floors.
- **Other Commercial Bus Service Locations –** Frequent service provided by Peter Pan (typically every two hours) is available from the University of Massachusetts and Amherst Center via the Northampton Bus Terminal and Holyoke Mall. Daily service is available to South Hadley and Hampshire College.

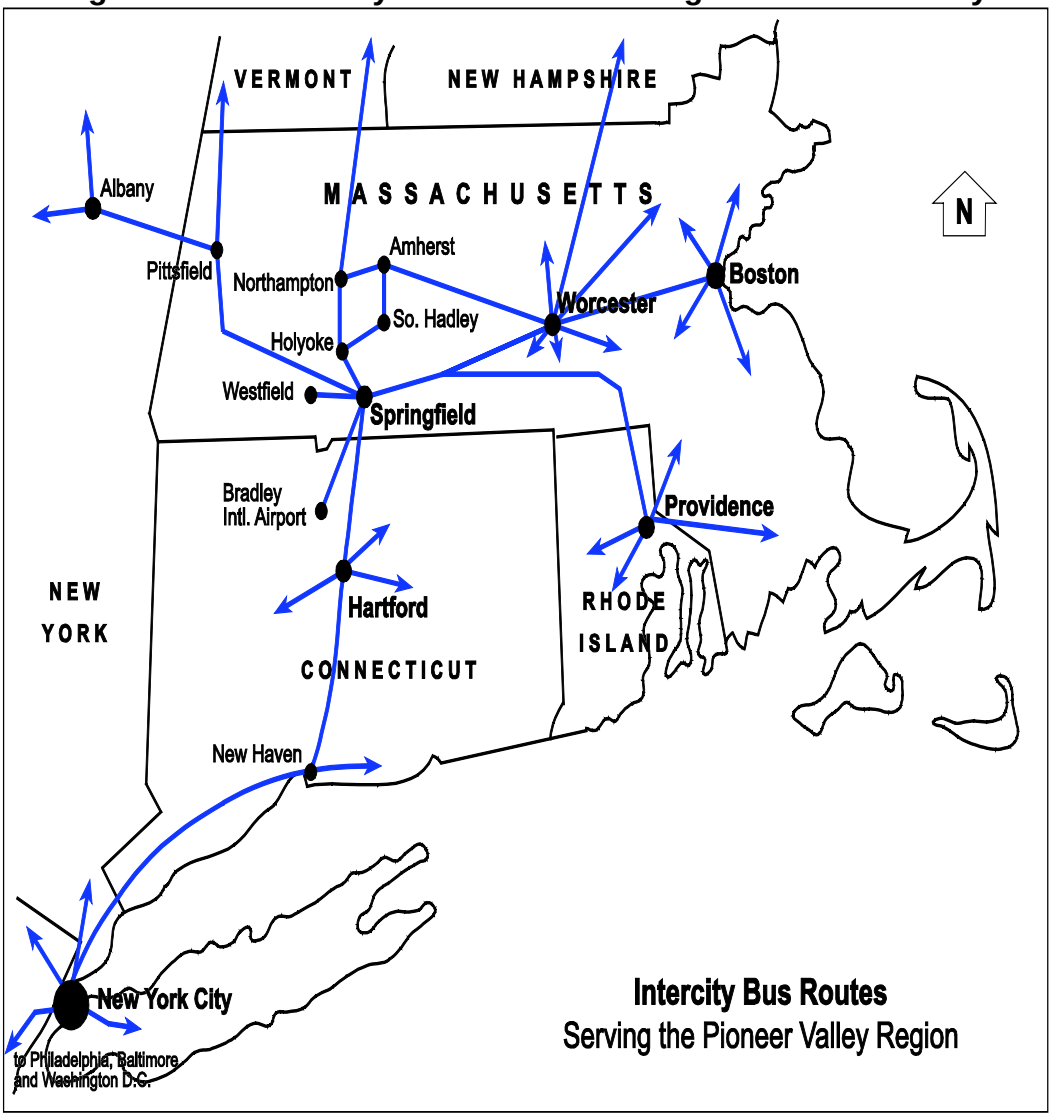
b) Commercial Carriers

The commercial bus passenger market in New England is highly competitive. In the Pioneer Valley, there are three intercity carriers. These are described below.

- **Peter Pan Bus Lines** has served the region for more than 75 years. The company carries the most commercial passengers in the region, providing frequent service to destinations within and outside the Pioneer Valley. The carrier has two primary routes with hourly service: Amherst to Boston (via Springfield), and Springfield to New York City. An average of 23 buses per day run in each direction on these two routes. Peter Pan also operates east-west service between Boston and Albany, New York. Travelers can obtain convenient connections from Amherst, Northampton, Springfield, Worcester, and Boston. Peter Pan also operates 16 nonstop trips per day between Springfield and Hartford, Connecticut via I-91, with a travel time of 35 minutes. Six of these 16 daily buses continue on to New Haven, Connecticut. Service is also provided to Foxwoods Casino in Ledyard, Connecticut and Washington DC.
- **Greyhound Lines, Inc.,** based in Dallas, Texas, serves approximately 3,700 destinations in North America. Greyhound is owned by the Scottish company FirstGroup. Greyhound acquired Vermont Transit Lines of Burlington, Vermont in 2008 and now operates those routes as part of its network. Greyhound has a reciprocal ticketing agreement with Peter Pan Bus Lines to offer riders hourly service between major destinations in the region. Through its own network and a shared ticketing agreement with Peter Pan, Greyhound offers service from the following locations in the region: Amherst Center, University of Massachusetts Amherst, Chicopee Park Inn, Hampshire College, Holyoke Mall, Northampton, Palmer (limited), South Hadley, and Springfield.

- **Megabus.** This UK-owned carrier began service from the Hampshire Mall to New York City via Hartford in 2010. The number of trips per day in each direction currently varies from two to four. Service is operated by DATCO of Connecticut.

Figure 5-18 – Intercity Bus Routes Serving the Pioneer Valley



5. Shuttles, Charters and Taxis

There are a variety of transportation services in the region that are geared to help people make trips for tourism, recreation or other special purposes. These are summarized below.

a) Shuttles

Van shuttles serve an important segment of the region's transportation market by serving destinations for which demand maybe relatively frequent; or involve passengers with special needs or schedule requirements. Commercial shuttle operators include Valley Transporter, which focuses on service to and from airports and rail stations in New England. Service to Bradley International Airport is provided hourly from most locations the Pioneer Valley. Service to Boston, Providence, and New York is also provided, though not on a scheduled basis. Non-profit organizations also operate shuttles, typically for their clients. Examples include municipal councils on aging, day care providers and social service agencies.

b) Charters and Tours

Charter and tour bus services in the region provide special trips for tourism and other purposes within and outside the region. Commercial companies offer package trips and private party excursions to many attractions throughout the Pioneer Valley, including Yankee Candle Company in South Deerfield, Basketball Hall of Fame in Springfield, gambling casinos in Connecticut, Six Flags Amusement Park in Agawam, senior tours to Atlantic City, and other recreational trips. Major charter and tour providers in the region include Peter Pan Bus Lines, King Ward Coach Lines and Laidlaw, Inc.

c) Taxis

There are more than 20 taxi companies operating in the region. Approximately half of these companies are based in Springfield, with another 9 operating in the Amherst/Northampton area, and one company each in Easthampton, Holyoke and Chicopee. Taxi companies provide a vital link in the transportation system by offering mobility during times and at locations where other transportation is not available.

d) Uber

Uber is a ridesharing application available in many major cities in the United States. Drivers register with the company and advertise their availability to provide rides through the smartphone app. Similarly, people looking for a ride can request one through the smartphone app. The pricing structure is similar to metered taxis, but is billed completely through credit cards via the smartphone app. Uber became available for communities in western Massachusetts in 2015.

6. Ridesharing

The Pioneer Valley has a number of facilities, organizations and programs to help people share rides, either on public transportation or by private autos.

Ride sharing is increasingly popular as more facilities and programs for it become available and the price of auto fuel fluctuates. There are several opportunities for ride sharing in the Pioneer Valley. These are summarized below.

- **MassRides** is a private non-profit organization working with MassDOT. The MassRides Employer Partner Program helps businesses and their employees cut commuting costs, shorten travel times, and improve the quality of commutes. MassRides holds commuter events at a participating business's worksites to provide information to employees. Also, MassRides can help set up carpooling, vanpooling, preferential parking, transit, teleworking, flexible work hour programs, or other cost-saving programs, such as pre-tax payroll deductions of transit costs. MassRides Partner Program participants currently include Westfield State College, Solutia, Mass Mutual, Holyoke Community College and PVPC.
- **NuRides** has partnered with MassRides to offer rewards to people who take greener trips. It provides ride matching services for people that would like to carpool to similar destinations.
- **UMASS Rideshare** helps University of Massachusetts employees and students form carpools, use the bus, or find other ways to get to campus. The goal of the program is to reduce the number of private cars on campus; UMass has approximately 11,000 on campus parking spaces (not including metered spaces), but 12,000 to 15,000 vehicles come to campus each day. The service is free to employees and students and includes carpool matching, reduced parking fees, preferred parking spaces, free one-day passes, guaranteed rides home, and information on alternative commuter options.
- **The Route 9 Corridor Transportation Management Association (TMA)** is an organization composed of the University of Massachusetts, Cooley-Dickenson Hospital, the City of Northampton and private businesses in the area that offers transportation and carpooling incentives to member employees.
- **Carpooling matching services** in the area help people find fellow travelers who are traveling to similar destinations so they may share rides—either for regular daily commutes within the region, or for one-time long distance trips. One of the region's leading such services is RideBuzz (www.ridebuzz.org); many other people use online bulletin boards, such as CraigsList, to find carpooling partners.
- **Commercial car sharing** provides a much needed alternative for private vehicle ownership to people desiring to live car free either by

choice or necessity. While rural public transit provides its users with mobility through the Pioneer Valley, it faces limitations in frequency and access to outlying areas. Nationwide, car-sharing companies are considering partnerships with local organizations and community centers to help meet the needs of the low-income population. In our region, car sharing has been established in partnerships with academic institutions to mainly serve their student population and reduce demand for parking on college campuses. The car sharing program in our region is offered by Zipcar, a Massachusetts based car rental company. Currently their local fleet includes 31 vehicles scattered about the Pioneer Valley with the majority located within the Five Colleges area in Hampshire County. Zipcar vehicles are currently available in Amherst, Northampton, South Hadley, Holyoke, and Springfield. Depending on vehicle availability, members can rent by the hour or by the day. The Zipcar Company maintains a policy which gives its members access to any car available in their system at any location in the United States, Canada, and select cities around the world. Members can access the reservation system through a variety of ways including phone, internet, and text messaging.

7. Park and Ride

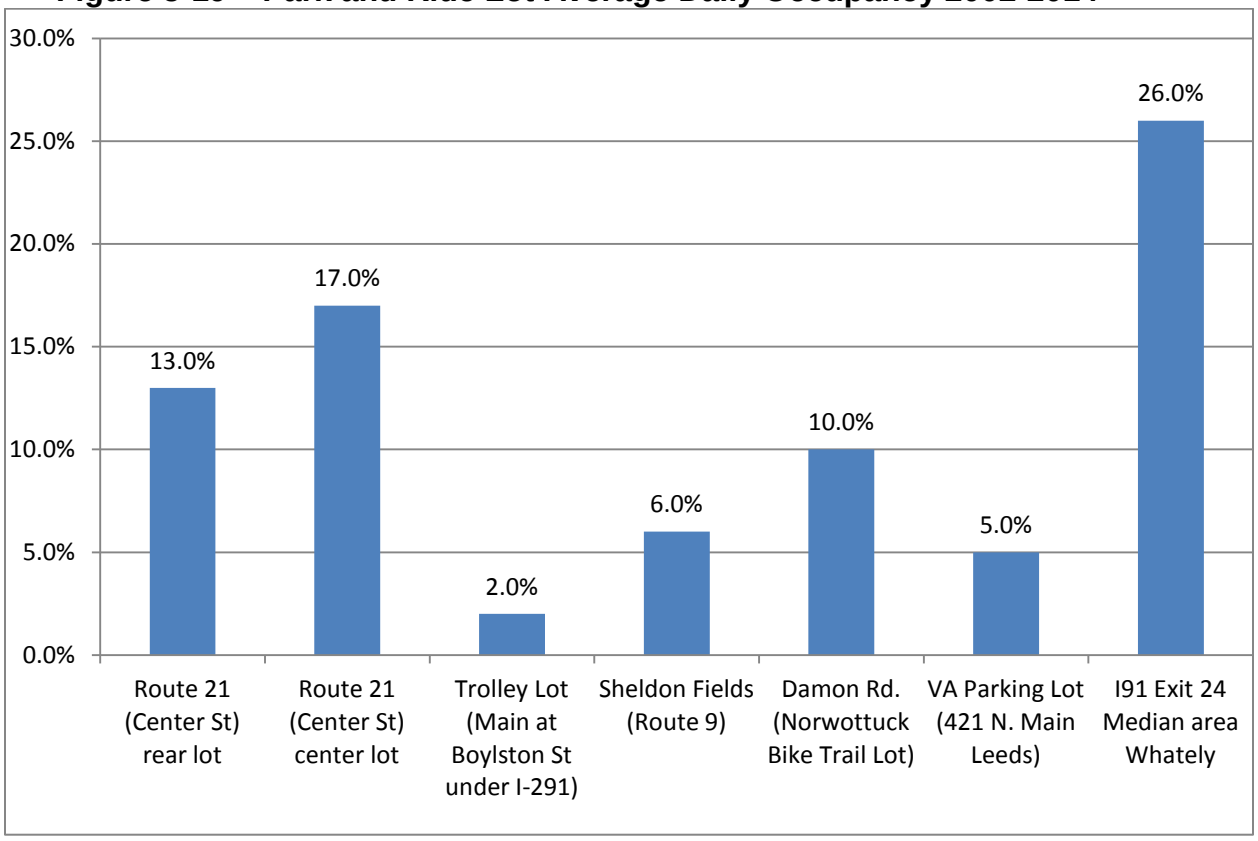
In the Pioneer Valley, there are several officially designated and "informal" park and ride lots. Those using these lots may be leaving their cars to board a PVTA bus for a local trip, catch a Peter Pan bus for an intercity trip, or join a carpool for a local or long distance trip. These lots are described below.

- **Northampton Sheldon Field Lot**—Bridge Street at Day Street. Connection with PVTA B43, M40 and 39. Designated by City of Northampton.
- **Northampton Norwottuck Rail Trail Lot**—Damon Road near Bridge Street (Route 9). Mainly used for carpooling; no convenient PVTA stop. Informal.
- **Northampton Veterans Administration Lot**—421 N. Main St. Leeds. Designated by City of Northampton.
- **Springfield Trolley Park Lot**—Main Street at Boylston Street. Connection with PVTA G1, G2, B4, G19, P20, P21). This lot is also near the intersection of I-91 and I-291, making it attractive for regional commuters who may not wish to drive in downtown Springfield. Designated by City of Springfield.
- **Ludlow MassPike Exit 7**—Center Street (Route 21) at Cherry Street near MassPike (I-90) Exit 7. Two lots near the rear and center areas of the McDonalds parking lot. Used principally for carpooling and those parking to ride Peter Pan buses to Boston. Rear lot is formally designated; center lot is informal.
- **I-91 Exit 24**— Median area in Whately near South Deerfield Center. Connection with PVTA Route 46. Formally designated.

There are also numerous “informal” park and ride lots, often at shopping malls and commercial businesses near major highway access points.

A summary of average weekday park and ride usage at known lots is presented below:

Figure 5-19 – Park and Ride Lot Average Daily Occupancy 2002-2014



8. Passenger Rail

The Springfield Union Station is currently served by 11 trains daily providing extensive service in the northeastern U.S. and connections nationwide. Passenger Rail service is provided on both East-West routes and North-South Routes through the region. Work is currently underway to restore the main terminal building of the station and to move the PVTA bus station as well as the Peter Pan buses to a single intermodal facility at Union Station. In addition, new train platforms are currently being constructed in Holyoke and Northampton to accommodate the realignment of the Vermonter service.

a) North - South Services

Most trains in Springfield are part of Amtrak's Northeast Corridor Business unit. This service includes six daily departures between 5:30 AM and 3:00 PM, and six arrivals between 10:00 AM and 10:30 PM. Amtrak provides frequent daily service between Springfield and Washington D.C., with major

stops at Hartford, New York City and Philadelphia. PVPC has been working with officials from the Connecticut Department of Transportation (ConnDOT) on expanded passenger rail service between New Haven Hartford and Springfield. Track improvements currently underway in Connecticut will allow trains to operate up to 110 mph. New service on this line is expected to begin by late 2016 and will reduce travel time between Springfield and New Haven to 79 minutes. When the service is launched in 2016, Springfield will see southbound trains every 45 minutes during the morning and evening peak hours and every 90 minutes during off-peak periods. When all the planned improvements are completed, trains will operate every 30 minutes during peak periods.

b) Vermonter

The Vermonter travels once a day in each direction between Washington D.C. and St. Albans Vermont. Massachusetts was successful in securing federal funding to return the Vermonter to its original Connecticut River alignment. Improvements to that line have been completed and service in expected to switch from the current alignment (CSX/NECR with stop in Amherst) in December of 2014. The return of the Connecticut River alignment will allow for stops in Holyoke, Northampton and Greenfield. This expansion of intercity passenger rail has the potential to be a major component in producing economic revitalization, spurring job creation, improving air quality, increasing overall mobility and reducing vehicular traffic congestion.

c) Commuter Rail

The Massachusetts State Legislature recently identified expansion of passenger rail in the Pioneer Valley region as a priority and secured $30 million in the Transportation Bond Bill to support this effort. It is envisioned that these funds will be used to rehabilitate surplus MBTA equipment that will then be used to operate service between Greenfield and Springfield. This new service would not begin before 2016.

d) East - West Service

In addition to the Northeast Corridor service, there is also a long distance train that serves the region. The *Lake Shore Limited* serves Springfield by providing daily service between Chicago and New York. Unlike all other Northeast Corridor trains out of Springfield, the Lake Shore Limited requires reservations.

The Pioneer Valley's East-West service is limited by a situation common to many Amtrak routes. Amtrak leases the tracks it must use from a local freight railroad. Amtrak owns the trains but does not own the track and physical infrastructure that they travel on. The track and ultimate control over trains is

held by the host freight railroad. Here in the Pioneer Valley CSX is the host freight railroad. Since CSX runs its own freight trains over tracks that are also used by Amtrak, opportunities for expanding service on the East-West line may be limited.

Despite the challenges, the Massachusetts Department of Transportation and the Vermont Agency of Transportation, in collaboration with the Connecticut Department of Transportation, are conducting a study to examine the opportunities and impacts of more frequent and higher speed intercity passenger rail service on two major rail corridors known as the Inland Route and the Boston to Montreal Route. The study of these two rail corridors has been designated the Northern New England Intercity Rail Initiative. The consulting firm HDR in Boston has been retained to conduct this study which is expected to be complete by 2015.

9. PVTA Performance Measures

As part of a Comprehensive Service Analysis developed by PVTA in conjunction with Nelson Nygaard, Service and Performance Guidelines were developed to bring clarity and consistency in developing, improving and adjusting transit services in the region. The full report can be found at http://www.pvta.com/media/pdfs/PVTA_CSA_FinalReportAppendicesJune2014.pdf

a) PVTA Services

PVTA services have been categorized into a hierarchy of route classifications to help better serve an array of travel markets and customer needs. These categories include:

- Bus Rapid Transit/ Key Regional Routes: Tier I
- Key Regional Routes: Tier II
- Urban Radial Routes
- Campus Services - Shuttles
- Campus Services - Five College Routes
- Village Connectors
- Community Circulators / Flex Services
- Express Routes

The above mentioned categories apply only to PVTA's fixed route services. Complementary ADA paratransit services must adhere to specific federal guidelines and therefore are not included in these service guidelines.

b) Bus Rapid Transit (BRT) / Key Regional Routes: Tier I

BRT and Tier I routes are considered the "backbone" of the PVTA system. These routes provide connections to four of the system's primary hubs(Springfield, Holyoke, Amherst, Northampton). Bus Rapid Transit

requires increased investment for corridor improvements such as transit signal priority and/or queue jump lanes. The Comprehensive Service Analysis has recommended corridors along State Street in Springfield and Route 9 between Amherst and Northampton as possible candidates for BRT implementation. Tier I routes offer high frequency and consistent weekday service with additional weekend service depending on needs of communities.

c) Key Regional Routes: Tier II

Tier II routes also have high ridership but service slightly less dense corridors and also a slightly lower frequency. Existing routes that traveled on these corridors are expected to increase service to a reliable seven days a week while operating at a slightly lower frequency than Tier I routes.

d) Urban Radial Routes

Urban radial routes typically operate to and from downtown Springfield. The primary function of these routes are to serve downtown Springfield. Some urban radials may extend to neighboring urban centers such as Holyoke, Westfield, Ludlow, etc. These urban radial routes come together in several high intensity transit corridors such as State Street, Liberty Street, Main Street, etc.

e) Campus Services - Shuttles

The majority of campus shuttle routes service the University of Massachusetts - Amherst campus, with the exception of the R10 and R10S shuttles serving Westfield and Westfield State's campus. These routes provide frequent connections between dormitories, residential areas, campus buildings, and Amherst's town center. Campus shuttle routes typically exhibit high ridership during the day due to a high student population, with higher frequency to accommodate this demand. Evening and weekend service is also provided where there is demand and late night service is also provided on some routes to ensure the safety of students. While these routes have a fare, students, faculty, and staff of any of the Five Colleges (Amherst College, UMass Amherst, Hampshire College, Mount Holyoke College, and Smith College) can ride the routes for free.

f) Campus Services - Five College Routes

Five College routes connect riders between UMass, Smith College, Mount Holyoke College, Hampshire, and Amherst College. While Five College routes behave similarly to Key Regional routes, they also adhere to specific guidelines to meet the needs of students and the college market. This results in service levels that reflect academic calendars, providing reduced or no service on various times of the year such as academic breaks and summer

time. Five college routes are similar to campus shuttles by offering free service to Five College students, faculty, and staff.

g) Village Connectors

Village Connectors operate primarily outside of Springfield. While some of these routes service the Springfield Bus Terminal, the primary function is to serve passengers outside of Springfield (e.g. Holyoke - Chicopee).

h) Community Circulators / Flex

Community Circulators and Flex services provide transportation and circulation within individual communities and lower density areas with a particular focus on areas with high senior and/or ADA paratransit users. These routes are typically more flexible than traditional fixed-routes and some may even be able to deviate from their designated path(by reservation). Passengers also have the ability to "flag down" an approaching vehicle anywhere along the route. The primary intention of these routes are to provide connections to Village Connectors and Key Regional Routes in incorporate rural areas with larger PVTA service areas.

i) Express Routes

Express routes primarily provide fast and direct service to commuters and others between the region's key urban and high activity centers. Express routes provide high speed service by traveling on freeways and major arterials, allowing for direct connections and faster more predictable trips. While these routes typically only provide service on weekday peak hours, demand may warrant some routes to operate for longer hours or during mid-day periods.

j) Service Design Guidelines

Service design guidelines have been developed to provide minimum thresholds that must be met in communities of various sizes and densities to ensure an attractive and effective service is provided in these areas. These guidelines can accurately assess whether additional service is required to meet minimum thresholds, and conversely reduction of service if minimum thresholds are not met. According to the new service design guidelines, PVTA service should be simple and easy to understand, fast and direct, minimize deviations, have appropriately spaced bus stops, provide symmetrical routes, serve well-defined markets by eliminating duplicative service, maximize service efficiency, assign appropriate vehicle sizes, be well-coordinated, consistent, and have major routes operate along major roadways/arterials.

k) Service Level Guidelines

Service level guidelines incorporate service design guidelines while also defining specifically when services are provided and how often they are provided. Four types of service level guidelines are used:

- Service Coverage
- Minimum Span of Service
- Minimum Service Frequencies
- Maximum Passenger Loadings

l) Service Coverage

The PVTA service area has a wide range of population densities from rural low population towns to large urban cities with high populations. To help determine service coverage, population and employment densities are two of the strongest indicators of potential transit demand. Typically once densities exceed three to six households per acre or four jobs per acre, fixed route bus services become more viable. According to PVTA's Comprehensive Service Analysis, increasing levels of density warrant different types of service as shown in Table 5-18.

Table 5-18 – Transit Supportive Population and Employment Densities

Population and Employment Density	Recommended Transit Mode
5 households/acre or 15 jobs/acre	Frequent Bus
10 households/acre or 20 jobs/acre	Bus Rapid Transit(BRT)
20 households/acre or 25 jobs/acre	Commuter Rail
20 households/acre or 25 jobs/acre	Rapid Streetcar
30 households/acre or 50 jobs/acre	Light Rail

m) Minimum Span of Service

The hours of operation that any given route runs has a significant role in determining how effective the service will be for a transit user. Minimum span of service guidelines are presented in Table 5-19 and define the minimum hours of operation different types of service are expected to run.

n) Minimum Service Frequencies

Service frequency is the time interval between two vehicles traveling in the same direction on the same route. Service frequency has a major impact on transit ridership, with high frequency being attractive to transit users. However, frequency has a direct correlation with operating costs. Service frequency is determined based on existing or potential transit demand. If scheduled correctly established frequencies provide enough vehicles to accommodate passenger volumes while still adhering to maximum load standards, which will discussed later in this section. Table 5-20 below presents the minimum service frequencies based on type of service.

Table 5-19 – Minimum Span of Service Guidelines

	BRT/ Key Regional Tier I	Key Regional Tier II	Urban Radial	Campus Shuttles	Five Colleges	Village Connectors	Community / Flex	Express
Weekdays								
Begin	6:00 AM	6:00 AM	6:00 AM	8:00 AM	7:00 AM	7:00 AM	8:00 AM	6:00 AM
End	10:00 PM	9:00 PM	7:00 PM	10:00PM*	9:00 PM	6:00 PM	5:00 PM	7:00 PM
Saturdays								
Begin	6:00 AM	7:00 AM	7:00 AM	8:00 AM	10:00AM	8:00 AM	-	-
End	9:00 PM	8:00 PM	6:00 PM	10:00PM*	9:00PM*	5:00 PM	-	-
Sundays								
Begin	9:00 AM	10:00AM	9:00 AM	8:00 AM	7:00 AM	-	-	-
End	5:00 PM 6:00 PM (BRT)	5:00 PM	5:00 PM	10:00PM	9:00PM	-	-	-

Notes: The beginning span of service refers to the departure of the first inbound trip, and the ending span of service refers to the departure time of the last peak direction trip. A black or "-" indicates that the guideline does not apply.

** Varies by night (i.e. Thursday, Friday and Saturday night may warrant later schedules).*

Table 5-20 – Minimum Service Frequency Guidelines (Minutes)

	BRT/Key Regional Tier I	Key Regional Tier II	Urban Radial	Campus Shuttles	Five Colleges	Village Connectors	Community / Flex	Express
Weekdays								
Early AM	30	60	60	60	60	60	-	60*
AM Peak	15/20	30	30	15	60	60	60	60*
Midday	15/20	30	60	15	60	60	60	60*
PM Peak	15/20	30	30	15	60	60	60	60*
Night	30	60	60	60*	60*	60	-	60*
Saturday								
Day	30	30	60	60	60	60	-	-
Night	30	60	60	60	60	60	-	-
Sunday								
All Day	60	60	60	60	60	-	-	-

Note: "-" indicates that the guideline does not apply.

** Varies by route (i.e. Thursday, Friday and Saturday night may warrant higher frequencies).*

o) Vehicle Loading

Vehicle Loading guidelines are designed to keep passengers on PVTA vehicles at a comfortable level, maintaining loads within the limits of safety. This may require passengers to stand during peak periods, while offering a seat to every passenger during non-peak periods. Two techniques that are commonly used by transit systems to keep passenger loads at acceptable levels are:

- Match vehicle types with ridership levels by providing larger vehicles on higher ridership routes.
- Provide more frequency on high demand times by providing more buses on higher ridership routes.

Tables 5-21 and 5-22 represent the loading maximums based on service level and also detailing the capacity of each vehicle type offered by the PVTA system.

Table 5-21 – Average Vehicle Loading Maximums

	BRT/Key Regional Tier I	Key Regional Tier II	Urban Radial	Campus Shuttles	Five Colleges	Village Connectors	Community / Flex	Express
Peak	120%	120%	120%	120%	120%	120%	100%	100%
Off-Peak	100%	100%	100%	100%	100%	100%	100%	-

Note: Maximums are averages over one-hour periods; individual trips may exceed averages

Table 5-22 – Vehicle Capacities

	60' Articulated Bus	40' Bus	35' Bus	30' Bus	24' Mini-Bus
100% of Seating Capacity	55	40	32	23	18
120% of Seating Capacity	66	50	39	28	22

p) Performance Guidelines

While Service Level Guidelines dictate how the PVTA system should be structured, it does not adequately provide measures of performance. Performance guidelines have been developed to accurately measure the productivity and cost-effectiveness of its various services. Productivity is measured by "Passengers per Revenue Vehicle Hour" for most services, and "Passengers per Trip" for Regional and Express services. Regional and Express services use a different measure of productivity because passengers typically travel for long distances with little to no turnover. The minimum productivity levels are detailed in Table 5-23.

Table 5-23 – Minimum Productivity Levels (Passengers per Revenue Hour/Passengers per Trip)

	Passengers Per Revenue Service Hour					Passengers Per Trip		
	Urban Radial	**Campus Shuttles**	**Five College**	**Village Connectors**	**Community / Flex**	**BRT / Key Regional Tier I**	**Key Regional Tier II**	**Express**
Weekdays								
All Day	20	20	15	15	5	20	20	25
Early AM	10	10	10	15	5	15	15	15
Late Night	10	10	10	15	5	15	15	15
Saturdays								
All Day	15	15	10	10	5	15	15	-
Early AM	10	10	10	10	5	15	15	-
Late Night	10	10	10	10	5	15	15	-
Sunday								
All Day	15	15	10	10	5	15	15	-
Early AM	10	10	10	10	5	15	15	-
Late night	10	10	10	10	5	15	15	-

Notes: "Early AM" and "Late Night" refers to service before and after the minimum span of service. "All Day" refers to the complete span of service, including early morning and late night service. "-" indicates that the standard does not apply. Productivity for Regional and Express routes is measured as a minimum number of passengers per trip.

Cost-Effectiveness, also known as Farebox Recovery is the percentage of operating expenses that are recouped by farebox revenues. The expected minimum farebox recovery percentages are detailed in Table 5-24.

Table 5-24 – Minimum Farebox Recovery

	BRT / Key Regional Tier I	Key Regional Tier II	Urban Radial	Campus Shuttles	Five Colleges	Village Connectors	Community / Flex	Express
Weekday	20%	20%	20%	n/a	n/a	20%	5%	n/a
Saturday	15%	15%	15%	n/a	n/a	15%	5%	n/a
Sunday	15%	15%	15%	n/a	n/a	15%	5%	n/a

Note: Campus Shuttles and Five College are noted as "n/a" because a fare is not collected on these services. Express is also noted as "n/a" for they are currently not measured for farebox recovery at this time or data cannot be distinguished for non-express farebox recovery of the same route.

D. INTELLIGENT TRANSPORTATION SYSTEMS

Intelligent Transportation Systems (ITS) utilizes technology in traffic control, communications, computer hardware and software to improve the performance of an existing transportation system. Through the dissemination of real-time travel information many benefits can be realized including increased safety, more efficient travel, and reduced congestion levels.

The Intelligent Transportation Systems (ITS) Strategic Deployment Plan for the Metropolitan Springfield and Pioneer Valley Region was completed in 1998. This project developed a plan of recommended ITS strategies and applications for the Pioneer Valley as well as a regional architecture to identify the various transportation management systems and the linkages between these systems.

In March of 2005, the Commonwealth of Massachusetts developed a Regional Intelligent Transportation Systems Architecture for Western Massachusetts. This Regional ITS Architecture identifies the existing and planned ITS components in the region and how they will interface. Key transportation agencies and other stakeholders provided input during this process to develop an architecture that represents a vision of an integrated transportation system for the Western Massachusetts region and the interagency agreements required to support it. An update to the regional architecture was completed in 2010. The webpage for the Western Massachusetts Regional ITS Architecture is located at: http://www.massdot.state.ma.us/regionalitsarchitecture/western/index.htm

1. Regional Traveler Information Center (RTIC)

The University of Massachusetts - Amherst and the Massachusetts Department of Transportation are also cooperating in a federally funded project that developed a Regional Traveler Information Center (RTIC) for the Pioneer Valley. The RTIC is located in the UMass Transit Operations Facility

and is responsible for the collection and dissemination of traffic, public transportation and travel advisory information. Currently, 24 cameras are positioned at the following locations:

- Route 9 in Downtown Northampton, facing East
- Route 9 at Bridge Road, Northampton, facing Eastbound
- Route 9 at Bridge Road, Northampton, facing Westbound
- Bridge Road at Route 9, Northampton, facing East
- Route 9 at the Coolidge Bridge, Hadley, facing West
- Route 9 at the Coolidge Bridge, Northampton, facing East
- I-91 Exit 19 off ramp at Route 9, Northampton, facing South
- Route 9, near Mt. Farms Mall, facing West
- Route 9 at Middle Street, Hadley, facing West
- Route 9 at West Street, Hadley, facing West
- Route 9 at Bay Road, Hadley, facing East
- Route 9 at Bay Road, Hadley, facing West
- Bay Road at Route 9, Hadley, facing South
- Damon Road at Bike Path, Northampton, facing North
- Damon Road at Bike Path, Northampton, facing South
- Damon Road near the I-91 overpass, Northampton, facing Route 9
- Damon Road near the I-91 overpass, Northampton, facing King Street
- UMass - Commonwealth Avenue at Mass Avenue, facing North
- UMass Commonwealth Ave/Holdsworth Way facing South
- UMass Governors Drive at North Pleasant Street facing West
- UMass North Pleasant Street at Governors Drive facing North
- UMass North Pleasant Street at Eastman Lane facing East
- Route 116 Amherst, near Waterfield Farms, facing North
- Route 116 Amherst, near Waterfield Farms, facing South

Real-time travel time information is also collected in both directions along Route 9 over a distance of 3.8 miles between the Mountain Farms Mall and Damon Road. Travel speed data for Route 9 is provided in the vicinity of the intersection of Route 9 with West Street in Hadley. RTIC also provides information on commuting alternatives, upcoming events, and current construction projects in the region. The RTIC website is: www.masstraveler.com.

2. I-91 ITS Project

MassDOT initiated a project to design and deploy a communications infrastructure and Intelligent Transportation System (ITS) along the entire length of Interstate 91 and portions of Interstate 291. This project was completed in 2011 and includes:

- 33 closed circuit television cameras (CCTV) and 17 Variable Message Signs
- A fiber-optic communications network connecting the field devices to the District Traffic Operations Center (DTOC) in MassDOT District 2 Headquarters, and to the Statewide Traffic Operations Center (TOC) in Boston,
- I-91 camera monitoring equipment in the State Police facilities in Springfield, Northampton and Shelburne,
- The development of additional capacity to address the needs of regional stakeholders via the installation of 4 empty conduits within the communications network, and
- Communications shared resource infrastructure to support future private telecommunications initiatives.

3. Pioneer Valley Transit Authority ITS Equipment

All PVTA vehicles are equipped with a mobile data terminal, global positioning system (GPS) locator, data radio and emergency alarm. Paratransit vans also have audible and visual navigation assistance. Significant features of PVTA vehicles as a result of ITS technology include:

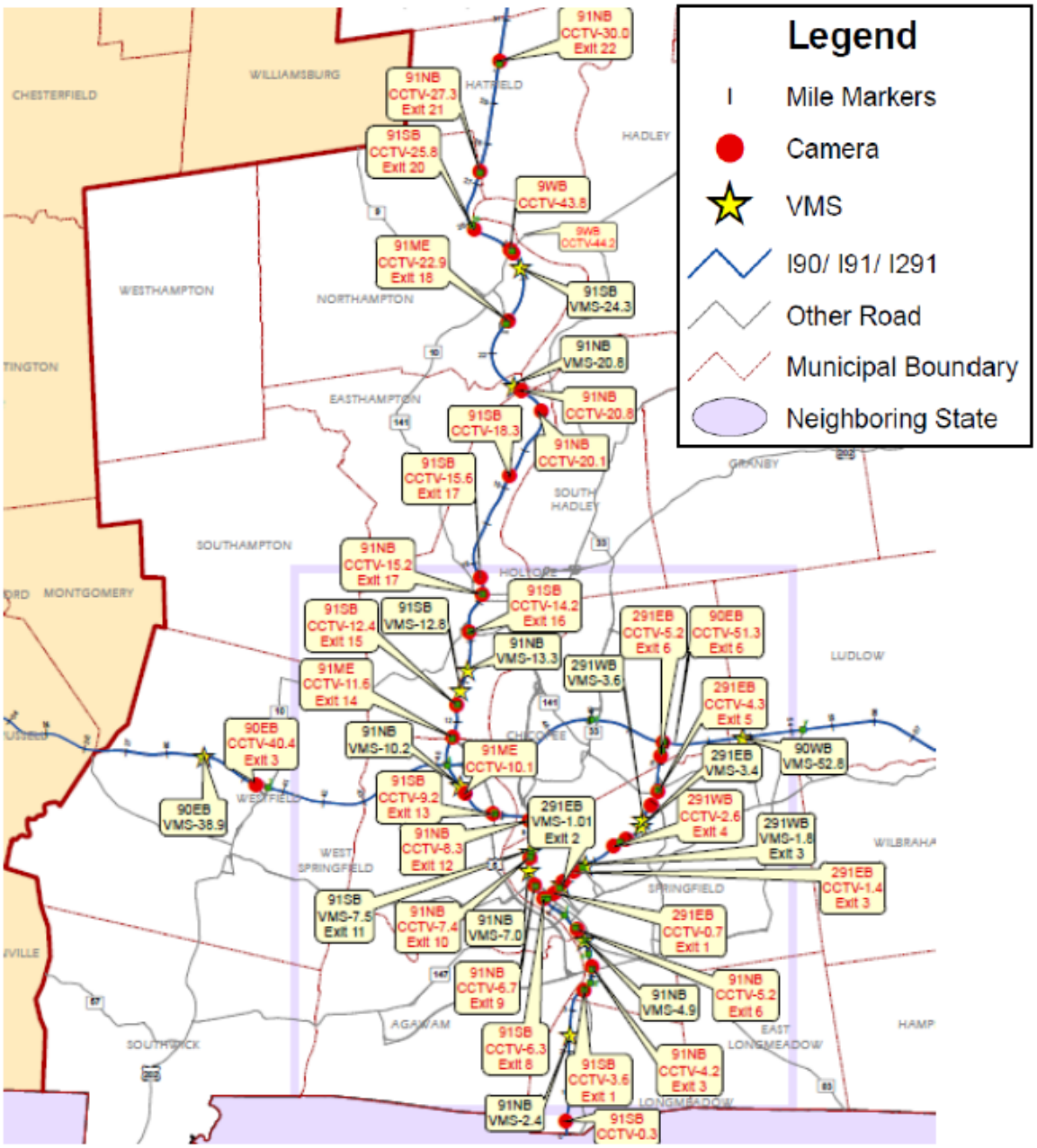
- Automatic audio and visual stop announcements
- Automatic passenger counters
- Video and audio monitoring

Each vehicle transmits its GPS location, passenger data and vehicle performance information via radio to the dispatch center. A central computer then processes the data from all vehicles to create a real time view of fleet operations and schedule adherence. In emergencies, real-time information is available for public safety responders. The audio and visual stop announcements make the PVTA system easier and safer for sight- and hearing-impaired passengers, as well as the general public.

Real time passenger information is on the status of existing transit routes is now available at both the Springfield Bus Terminal and Holyoke Transportation Center. PVTA also provides real time information on each bus route through the following website: http://bustracker.pvta.com/infopoint/

By increasing the availability of real-time customer information and generating new information on ridership and usage, PVTA will dramatically enhance the overall quality of public transit in the region and make the system more accessible to people who do not ride now.

Figure 5-20 – ITS Equipment Along I-91 in the Pioneer Valley



4. 511

On March 8, 1999, The U.S. Department of Transportation (USDOT) petitioned the Federal Communications Commission (FCC) to designate a nationwide three-digit telephone number for traveler information. On July 21, 2000 the Federal Communications Commission designated "511" as the single traffic information telephone number to be made available to states and local jurisdictions across the country. Access to 511 services for Massachusetts residents is available free of charge at:

http://www.mass511.com. Mass511.com allows drivers to set up custom travel alerts and receive real-time traffic information for all major routes. The website also includes a map with live-traffic conditions, planned construction events, and traffic incident updates.

5. Smart Work Zone Management

MassDOT utilizes portable ITS devices to monitor, measure and evaluate traffic conditions so as to provide real-time information to the public and control operations within the work zone. Smart Work Zones (SWZ) apply construction and traffic monitoring devices such as traffic and speed detectors measure performance and calculate traffic delays through existing work zones. Cameras and Variable Message Signs are also deployed to enable MassDOT personnel to gauge the impact of construction on traffic and greatly enhance the safety and efficiency of the work zones. The use of SWZ technology is determined on a project-by-project basis. SWZ technology will be utilized as part of the I-91 Viaduct project in Springfield.

E. NON-MOTORIZED TRANSPORTATION

Bicycling and walking are inextricably linked to quality of life in our communities. The Pioneer Valley region affords some of the best environments for walking and bicycling in Commonwealth. An expanding network of off-road trails, vibrant downtowns laced with sidewalks and scenic shared-use roadways create an unmatched potential. As a destination or as a place to call home, the Pioneer Valley offers a wide range of transportation choices. A central focus of this plan is to design and implement facilities that are safe and appropriate for all ages and abilities.

Interest and enthusiasm for walking and bicycling is reshaping many of our communities and not just through traditional infrastructure improvements. The walking school bus is an everyday reality for Jackson Street Elementary School in Northampton where parents and the administrator have implemented a “Safe Routes to School” program. Students and faculty at Springfield’s Alice Beal Elementary have installed bike racks and improved sidewalk connections to their school. Springfield’s Renaissance School has opened a bike coop to repair and re-circulate bicycles to the community, and students there have actively participated in Pioneer Valley Bike Week.

The support for bicycling and walking is not without its challenges. The most significant challenge for advancing regional goals for these modes is funding. While new state guidelines are “friendlier” to bicycle and pedestrian needs and federal programs are recognizing the importance of “inclusive” investments in transportation, infrastructure needs are growing while funding options are dwindling. The most dramatic impact has been at the municipal

level. Many of our communities have serious transportation funding gaps. Sidewalks, bridges and locally maintained roads have fallen into disrepair and gaps in the maintenance of these infrastructure needs are widening. Because bicycling and walking is inherently dependant on short local trips this degradation is a real threat to creating “walkable” or “bikeable” communities.

Another trend has been the increase in the use of single occupancy vehicles. While the region’s population remained fairly stable between 1990 and 2000, vehicle ownership increased 26% to an average of 0.81 vehicles per person. While many communities such as Springfield and Amherst have very "walkable" downtown areas, the traffic volumes in and around suburban communities can create significant obstacles and challenges for those bicycling or walking.

To get more people walking and biking PVPC has developed a strategic plan of policy-related actions and physical projects on which municipal and regional officials and citizens can collaborate to improve conditions for pedestrians and bicyclists in the Pioneer Valley. The Plan includes information and recommendations on incorporating bicycle and pedestrian features into road reconstruction projects, using zoning and development tools to help create environments that support bicycling and walking, increasing bicycle and pedestrian safety, and promoting bicycling and pedestrian activities as alternative transportation choices. The plan was developed by the Bike-Pedestrian Sub-Committee of the Pioneer Valley Planning Commission’s (PVPC) Joint Transportation Committee as the bicycle and pedestrian component to the Regional Transportation Plan.

1. Complete Streets

Streets are a vital part of livable, attractive communities. Regardless of age, ability, income, race, or ethnicity, everyone is served by safe, comfortable, and convenient access to community destinations and public places–whether walking, driving, bicycling, or taking public transportation. Complete Streets integrates people and place in the planning, design, construction, operation, and maintenance of our transportation networks.

In 2006 MassDOT completed an overhaul of the state’s highway design manual and with the new “Project Development and Design Guide” the Commonwealth instituted a comprehensive shift in policy. The “Design Guide’ has become a national model for developing better road and bridge projects through a “Complete Streets” approach that balances the need for access and mobility through context sensitive design solutions. The manual “ensures that the safety and mobility of all users of the transportation system (pedestrians, bicyclists and drivers) are considered equally through all phases

of a project so that even the most vulnerable (e.g. children and the elderly) can feel and be safe within the public right of way." In 2014 MassDOT announced a $5 million pilot project for the Complete Streets Certification Program. Cities and towns will be able to apply for funding to make local streets safer and more inviting for people to walk, run, and bike. This will result in better health for Massachusetts residents, who will have more opportunities to be active, thus reducing chronic disease.

Locally, many Pioneer Valley communities have followed MassDOT's lead by incorporating "Complete Streets" concepts into the planning and design of local road projects. In 2014 the City of Holyoke joined Northampton in formally adopting a Complete Streets Policy. Other communities currently developing or actively exploring a policy initiative in include Springfield, Easthampton, and Longmeadow.

2. Bicycle Facilities

The Pioneer Valley has much to offer for bicycling including; bike lanes, shared use paths, striped shoulders, wide curb lanes, bike racks on transit, bike lockers, bike parking racks, employer sponsored shower facilities, bike repair shops, maps and online rider resources, community bike share programs, bike rentals, organized rides, and sponsored races. Not far from the region's urban core, the rural roads of Western Massachusetts offer a vast array of quite scenic New England country roads that can be explored for days on end. At the same time, our communities face challenges in meeting public expectations in expanding and connecting the Region's bikeway network. Many of the off-road and on-road facilities are disconnected are hampered by pinch points that include bridges.

a) On-road Infrastructure

There are 4,364 miles of functionally classified roadway in the Pioneer Valley. Massachusetts law requires that bicyclists and pedestrians be accommodated on all roadways except limited access or express state highways. Currently there are 45 miles of designated on-road bicycle facilities. These include bike lanes and designated bike lanes and bike routes Agawam, Amherst, Brimfield, Holland, Wales, Holyoke, Monson, Granby, Springfield, South Hadley, and Northampton. Many more of these bicycle design treatments are in the planning stages as communities work to implement "complete street" approaches to design.

A major concern for pedestrians and bicyclists are the many bridges in the region. While most new or reconstructed bridge projects have followed state and federal guidelines for improving pedestrian and bicycle access, many bridges still lack sidewalks, and adequate shoulder width. The design and

maintenance of these bridges directly influences the ability of people to walk or bicycle.

b) Bicycle Compatibility Index

PVPC frequently uses the FHWA Bicycle Compatibility Index (BCI) to evaluate road conditions for bicyclists. The BCI uses data collected on the roadway including travel lane width, shoulder width, vehicle speed, traffic volume and parking along each roadway segment. The FHWA analysis tool assigns an alphanumeric score to each roadway segment ("A" through "F"). "A" roads represent "perfect" roads for bicycling and "F" is the least favorable. In the Pioneer Valley Region data has been collected for all the federal aid roadways. The BCI data is a useful tool for bicycle coordinators, transportation planners, traffic engineers, and others to evaluate existing facilities in order to determine what improvements may be required as well as determine the geometric and operational requirements for new facilities to achieve the desired level of bicycle service.

The BCI model has been used for the following applications in the Region:

- Springfield Complete Streets Bicycle and Pedestrian Plan
- South Hadley Bicycle and Pedestrian Plan
- Granby Master Plan
- Southampton Route 10 Corridor Study
- Pioneer Valley Regional Bicycle Map

c) Bicycle Parking Improvements

The PVPC has worked with local communities to upgrade and expand existing opportunities for bicycle parking. Through a series of Transportation Demand Management funding commitments, PVPC has worked with local communities to install parking for more than 700 bicycles. Parking racks have included “U” style racks, ribbon racks, “rib” racks and bicycle lockers. In 2014 PVPC purchased institutional bicycle racks for several “Save Routes to School” partner schools in Springfield. In 2015 PVTA initiated a bike rack purchase program to locate bike racks at high frequency bus stop locations. PVPC also coordinated the purchase of bike lockers for use at park-and-ride facilities.

To assist in the installation of bike racks PVPC created a series of training videos. These and other videos are available on the PVPC YouTube page: https://www.youtube.com/watch?v=um6oagL7bfk

d) Existing Bike Share and Bike Rental Programs

Bike sharing programs are increasingly popular in North America and around the world. As of April 2013, there were around 535 bike-sharing programs

globally, with an estimated fleet of 517,000 bicycles. Similarly several bike share and rental programs are in operation in the Pioneer Valley. While these programs have different cost structures, equipment, and rental times than a public bike share system, they demonstrate that Pioneer Valley residents and visitors are interested in using bicycles without having to make a permanent purchase. Current programs include:

- Private rental companies – Two bicycle shops in the Pioneer Valley offer bike rentals. Northampton Bicycle offers rental of town bikes for $25 for 1 day, $50 for 3 days, and $90 for 7 days, and road bike rentals for $35 for 1 day, $70 for 3 days, $130 for 7 days. Hampshire Bicycle Exchange in Amherst offers rentals of $35 for 1 day or $70 for 7 days if the bicycle has a price less than $350. For bicycles that cost greater than $350, the cost is 10 percent of the price per day, or 25 percent of the cost of the bike per week. Because the Hampshire Bicycle Exchange both buys and sells used bicycles, it is possible to "rent" a bicycle for a few months by purchasing and selling it back to the store. Both shops provide a lock and helmet with the cost of the rental.
- Smith College Bike Kitchen – the Bike Kitchen, open since 2005, offers Smith students and faculty with maintenance service, bike rentals, and safety education. Rentals are available for $20 per semester and include a lock and helmet. The program's 40 bicycles are in high demand and there is a waitlist to use the program.
- University of Massachusetts – Amherst – Since the fall of 2011, UMass has made available a fleet of 25 bikes to students. The program offers free rentals to students of up to 24 hours and provides helmets and locks. The bicycles, stored at the student union, were purchased through a gift from the Class of 2010. The program is currently supported by the Student Government Association and the Sustainable UMass program. The University is currently investigating implementation of a more formal bike share program on campus. Such a system could potentially be integrated with a regional public bike share system.
- Pioneer Valley Riverfront Club – The PVRC offers children and adult bicycle rentals for $5 per hour. Because the rentals are on an hourly basis, they are primarily meant for short-term, recreational use on the Connecticut River Walk, which is adjacent to the PVRC. Three-wheeled bicycles are also available for those who cannot ride a bike.

e) Bicycle Accommodations on Transit

The Pioneer Valley Transit Authority's bikes on bus program "Rack and Roll" has dramatically improved access for bicyclists to transit and given thousands of people another choice in their mode of travel. In 2010 PVTA expanded the popular program from the northern tier to its entire fixed route system. In 2014 PVTA's operator reported 55,030 trips using the bike racks. Increased marketing and promotion for the service included an instructional video to acclimate new users. The video is available online at: https://www.youtube.com/watch?v=pNcW-ZaoEfg

Installation of a bicycle on a PVTA bus

f) Pioneer Valley Commuter Bike Map

In May of 2008, PVPC released an update to the 2005 commuter bike map. The Pioneer Valley Regional Bike Map is designed to be a tool for active use by area cyclists. In addition to popular on-road cycling routes and bike paths in the region, the map shows popular destinations and local landmarks, along with safety and commuting information. These maps were produced as part of a MassDOT funded Transportation Demand Management program. Maps were distributed to the public at no charge through bike shops and select locations throughout the Pioneer Valley region and during at Pioneer Valley Bike Commute Week events.

g) Off-road Infrastructure (Bikepaths and Multi-use Trails)

Off-road facilities include multi-use trails and traditional bikepaths or rail trails. The Norwottuck Rail Trail, the region's largest bikeway project, opened in 1993. The Norwottuck was reconstructed by MassDOT in 2014 and connects the communities of Northampton, Hadley, Amherst, and Belchertown. The route facilitates travel between the communities, educational facilities, downtown commercial areas, and major employment centers. Volume counts on the trail range from 600 to 1200 per day during the peak season. A summary of on and off road bicycle facilities is included in Table 5-25.

The popularity of multiple use trails in the Pioneer Valley has brought new challenges and opportunities to those that use and manage these facilities. Interest in year round use has pushed many communities to explore options for snow removal, and while recreation use still dominates trail activity many

residents increasingly use the facilities for non-recreational trips. A Norwottuck trail survey in 2002 showed 25 percent of weekday trail use was for commuting to work, school or shopping. Many of these trips replaced travel that would otherwise have been made with a motor vehicle.

Off-road facilities including bike paths and multi-use trails have been popular in the region for a number of reasons. The facilities allow new users to be introduced to the benefits of walking and bicycling while isolating them from potential conflicts with motorized traffic. The facilities provide economic benefits through increased tourism; and increase the percentage of bicycling and walking trips. The census block groups in Northampton and Amherst where four off-road facilities exist averaged 23.7 percent of commuter trips by bike or on foot, compared to only 5.4 percent for the region as a whole.

Table 5-25 – Existing On and Off-road Infrastructure in the Pioneer Valley Region

Pioneer Valley Bicycle Facility	Communities	on/off road	Length (in miles)	Date Opened
CT. River Riverwalk and Bikeway	Agawam	off	1.50	9/17/04
Amherst Bike Route	Amherst	on	1.00	
Amherst Bikeway (Route 116)	Amherst	off	3.50	
Five College Bikeway	Amherst	on	6.00	
South Pleasant St. Bike Lanes	Amherst	on	0.25	7/15/01
UMass Connector Bikeway	Amherst	off	1.90	5/15/03
Norwottuck Belchertown Extension	Amherst/Belchertown	off	1.20	5/12/00
Chicopee Center Canal Walk	Chicopee	off	0.20	5/21/10
Redstone Rail Trail	East Longmeadow	off	1.57	9/9/10
Manhan Rail Trail	Easthampton	off	4.20	6/19/04
Dwight Street Bike Lanes	Holyoke	on	0.50	6/12/05
Hampden Street Bike Lanes	Holyoke	on	0.60	5/13/04
Route 5 Bike Lanes	Holyoke	on	1.20	7/8/06
Holyoke Canalwalk	Holyoke	off	0.30	6/25/10
Route 5 Bike Route	Holyoke/Northampton	on	8.00	6/25/86
Springfield (Ludlow) Reservoir Trail	Ludlow	off	3.10	
MBW Trail	Monson, Brimfield, Wales	on	17.00	6/10/98
Elm Street Bike Lanes	Northampton	on	0.80	6/15/00
Manhan Rail Trail Earl Street thru downtown	Northampton	off	2.10	7/1/05
Northampton Bike Path (Ryan Bikeway)	Northampton	off	2.50	6/6/84
Northampton Manhan Ice Pond Spur	Northampton	off	0.50	
Norwottuck Damon Road to Woodmont	Northampton	off	0.80	5/1/08
Norwottuck Look Park Extension to Grove St	Northampton	off	2.00	7/1/05
South Street Bike Lanes	Northampton	on	1.10	9/10/03
William P Nagle Walkway	Northampton	off	1.00	9/26/89
Norwottuck Rail Trail	Northampton/Hadley/Amherst	off	8.50	5/15/93
Southwick Rails to Trails Phase I	Southwick	off	3.14	5/3/10
CT. River Riverwalk and Bikeway	Springfield	off	3.70	7/18/03
Westfield Riverwalk	Westfield	off	2.00	4/16/98
116 Five College Bike Lane Extension	Granby/South Hadley	on	.25	4/25/15
Total Mileage			**80.56**	

Table 5-26 – Proposed Bikepaths for the PVPC Region

Pioneer Valley Bicycle Facility	Communities	on/off road
Agawam Connector Loop Bikeway	Agawam	on/off
North Campus Bikeway Extension	Amherst	on/off
Amherst Bike Route	Amherst	on
Five College Bikeway (including Notch)	Amherst, Granby, South Hadley	on/off
Brimfield Trail Expansion	Brimfield	on/off
CT. River Riverwalk and Bikeway	Chicopee	off
Chicopee Center Canal Walk	Chicopee	off
Redstone Rail Trail Extension	East Longmeadow	off
Route 47 Scenic Farm Bikeway	Hadley, South Hadley	on
CT River Greenway (River Run to Elm Court)	Hatfield/Northampton	off
Appleton Street Bikeway Improvements	Holyoke	on
Holyoke Canalwalk (segments 2 and 3)	Holyoke	off
Holyoke Canalwalk Route 5 extension	Holyoke/Northampton	on/off
Ludlow Mills Riverwalk	Ludlow	off
Elm Street Bikeway Extension	Northampton	on/off
Manhan Route 10 Spur to Burts Pit Rd	Northampton	off
Village Hill to Northampton High School	Northampton	off
Damon Road bicycle lanes and sidewalks	Northampton	on
Tunnel Norwottuck Manhan Rail Trail	Northampton	off
Southampton Greenway	Southampton	off
McKnight Neighborhood Trail	Springfield	off
Ware River Valley Rail Trail	Ware	on/off
CT. River Riverwalk and Bikeway	West Springfield	off
Columbia Greenway (segment 2, 3 and 4)	Westfield	off
Western Avenue Bikeway	Westfield	on/off

h) Bicycle Signage Projects

Manhan Rail Trail guide sign

PVPC has worked with MassDOT and local partners to install bike route signs along Route 5 in Holyoke, install "share the road" signs in on many popular cycling routes, installed directional signs in Northampton, and installed signs on the Connecticut Riverwalk and Bikeway. PVPC also partnered with MassDOT and DCR on the installation of "Bay State Greenway" signs on the Manhan Rail Trail, the Southwick Rail Trail, Norwottuck Rail Trail and sections of Route 9 in Williamsburg.

i) Pioneer Valley Share the Road Program


Share the Road video screen capture

The Pioneer Valley Planning Commission partnered with the Franklin Regional Council of Governments to produce a series of public service announcement and informational video on bicycling and bicycle safety entitled "Enjoy the Ride: Share the Road in the Connecticut River Valley" The effort is part of a promotional campaign to encourage bicycling instead of driving. The FRCOG and PVPC received $150,000 in funding to enhance bicycling in the regional, increase accessibility and awareness for commuting by bicycle in Franklin, Hampshire, and Hamden Counties. The goal of the project is to reduce the number of automobile trips by encouraging transportation by bicycle instead.

The videos were aired annually on local cable access channels during Bay State Bike Week and can be viewed here: https://youtu.be/b_0aJ61T8Ug

https://www.youtube.com/watch?v=3Eiye4XHMh8&feature=youtu.be

j) Massachusetts Bicycle Plan

The Massachusetts Bicycle Plan was updated by MassDOT in 2008. In 2014 the Massachusetts Bicycle and Pedestrian Advisory Board in coordination with MassDOT began the process of revising and updating both the Bicycle Plan and the Pedestrian Plan. The plan prioritizes on- and off-road bicycling improvements and identifies a statewide bicycling network. The network improves multi-modal transportation generally and bicycle transportation specifically, as well as recreation, tourism, and economic vitality. The Bay State Greenway was developed as a part of the plan to identify high priority corridors and bicycle connections.

3. Pedestrian Circulation

Pedestrian access and circulation are typically better in town or city centers due to the physical design of such places. Shops, offices, restaurants and

other amenities are generally clustered together and connected by a pedestrian network which is often more accessible and efficient than the vehicle network. The central business districts of Amherst, Northampton and Springfield offer good examples of downtowns sensitive to pedestrian circulation and access. Sidewalks and walkways are extensive; crosswalks are signalized and access points for persons with disabilities are incorporated.

Sidewalks are the most common infrastructure feature devoted to pedestrian circulation. Whether or not sidewalks are provided in a community can influence the area's overall character and function. In addition to the sidewalks themselves, crosswalks and points of access for persons with disabilities can influence the degree to which these pedestrian networks facilitate circulation. The provision of sidewalks in the region varies with respect to location, quality and function. Many communities in the Pioneer Valley have realized the benefit of encouraging walking through infrastructure improvements. The Town of Ludlow constructed sidewalks within a mile of every elementary school. With children walking to school the town revamped its crossing guard program and saved money on busing. With local funding sources in short supply, many communities have had to “get smart” when it comes to pedestrian improvements. To lower costs, East Longmeadow developed a prioritized sidewalk infrastructure improvement plan and began incorporating the cost of sidewalk improvements into larger roadway re-construction projects. In the Forest Park neighborhood of Springfield, public works officials replaced painted crosswalks with new long wearing thermoplastic designs. While more expensive initially, the new crosswalks will last 5 times as long as painted crosswalks.

a) Safe Routes to School

The Massachusetts Safe Routes to School program promotes healthy alternatives for children and parents in their travel to and from school. The program aims to reduce congestion, air pollution, and traffic conflicts near participating schools, while improving health and mobility of school-aged children population . Safe Routes to School is a national movement to create safe, convenient, and fun opportunities for children to bicycle and walk to and from schools. The program's goal is to reverse the decline in children walking or biking to schools. Nationally, only 15 percent of schoolchildren walk or bike to school compared to 50 percent in the 1950’s. The vast majority of parents prefer to drop their children off at school using their personal automobile. The result is often increased congestion and higher vehicle emissions around the schools.

Massachusetts Safe Routes to School logo

In 2014 PVPC purchased bike racks through the Live Well Springfield Community Transformation Grant to support the "The Safe Routes to School Program" in Springfield. The Springfield Safe Routes to School program is coordinated by the Springfield Safe Routes to School Alliance and is supported by the Springfield Housing Authority, the Talk/Read/Succeed program, Baystate Health Safe Kids program and Brightwood Health Center, the state Department of Public Health, Springfield Health and Human Services, Mass in Motion, Partners for a Healthier Community, the YMCA of Greater Springfield and other groups.

Statewide the Massachusetts Safe Routes to School program supports a number of initiatives. These initiatives include "Walking School Bus", "Footloose Fridays", "Fuel up to Play" and several educational campaigns.

The following Pioneer Valley schools are partners in the Safe Routes to School program:

- Amherst- Crocker Farm Elementary, Fort River Elementary, Wildwood Elementary
- Easthampton- The Center School, Neil A. Pepin School, Maple School, White Brook Middle School
- Hadley- Hadley Elementary School, Hopkins Academy
- Hatfield- Hatfield Elementary School
- Holyoke - HB Lawrence, Marcella Kelly Elementary School, Maurice A. Donahue Elementary, Sullivan School, William R. Peck School
- Longmeadow - Center Street School, Blueberry Hill, Wolf Swamp Road School, Williams Middle School, Glenbrook Middle School, Blueberry Hill
- Northampton - Bridge Street Elementary School, Jackson Street Elementary School, JFK Middle School, Leeds Elementary School, RK Finn Ryan Road School
- Palmer - Converse Middle School, Old Mill Pond School, Palmer High School
- South Hadley - Mosier Elementary
- Southampton - William E. Norris Elementary School
- Springfield - Elias Brookings Elementary School, Milton Bradley Elementary School, Dorman Elementary School, Edward P. Boland Elementary School, Mary Lynch Elementary School, Alice B. Beale Elementary School, Brightwood Elementary School, Rebecca M Johnson School, Gerena Community School, Indian Orchard Elementary.
- Westfield- Gibbs Elementary School, Southampton Road School

Schools who wish to participate in the program are asked to complete the form and return it to MassRides. The form, which can also be found on the MassRides website at www.commute.com, allows schools to select a level of participation within the Safe Routes to School Program. Schools have the opportunity to indicate their primary interests, identify stakeholders, and also report on the makeup of the student body. After the Safe Routes to School coordinators receive an application, a decision is then made on whether or not the school is a good fit for the program. Selected schools become partners with the program and can begin planning events and activities with the help of a Safe Routes to School coordinator.

The Massachusetts Safe Routes to School Program is a central source of Safe Routes services to all interested schools in the state and currently provides services to 43% of public K-8 schools. The program provides safety trainings, classroom visits, presentations to parents and community members, special events, encouragement programs, free promotional items, infrastructure improvements and summer programs.

4. Recreational Activities

Nestled among the forests, farmland, and mountains on the banks of the Connecticut River, the Pioneer Valley is ideally suited for recreational hiking and biking. Our small towns and larger city neighborhoods are where you find great coffee shops, historically preserved buildings, fun music, crowds of young and the young at heart, a strong local food movement, first-rate museums and art galleries, eccentric shops, eclectic restaurants, and residents eager to get outdoors in any season.

a) Regional Hiking Trail Map and Other Guides

The popularity of bicycling in the Pioneer Valley has led to the creation of a several guidebooks specific to the region including the Rubel Bike Map to Western Massachusetts, Bicycle Touring in the Pioneer Valley (Nancy Jane), Bicycling the Pioneer Valley (Marion Gorhan), Touring Jacob's Ladder by Bicycle or Car (PVPC) and Jacob's Ladder Trail Western Region Off-road Bicycle and Trail Guide (PVPC).

The “Pioneer Valley Trails: A Hiking and Biking Guide,” was released for sale at area book stores and outdoor recreation retailers in 2010. The guide retails for $7.99 and shows the locations of many hiking and biking trails in Hampden and Hampshire counties. The guide features a map on one side, showing the locations of 47 trails. The reverse side includes descriptions of each of the trails, including their location, whether they are paved or off-road, the length, types of permitted uses, and parking information. The guide is available at Broadside Books, Don Gleason Camper’s Supply and Booklink

Booksellers in Northampton; Amherst Books and Food for Thought Books in Amherst; New Horizons Sports in Westfield; Colorado Ski and Bike Shop in West Springfield and Nick's Sport Shop in Palmer. The guide is also available online at (http://www.pvpc.org/sites/default/files/2010-trail-hike-guide-sml.pdf)

b) Tourism and Commerce

The popularity of regional cycling clubs such as the Franklin-Hampshire Freewheelers, the Springfield Cyclonauts, MassBike, and Northeast Sport Cyclists are testimony to the unique quality and growing popularity of bicycling in the Pioneer Valley. The region is also home to a local fixed base touring company "Ride Noho" (http://www.ridenoho.com/welcome.html), located in Northampton providing cycling events and instructional training camps since 2000. Local bicycle shops provide a critical supporting role and many are active advocates and partners in the community. In 2015 Family Bike provided bike tune-ups for bike week events in Agawam, Highland Hardware, Colorado Ski and Bike and Mickey's hosted bike breakfasts, while New Horizons Bikes in Westfield hosted numerous events and activities. Joe's Garage in Haydenville, Competitive Edge, Northampton Bicycle, Full Circle Bike Shop, Peak Performance Bicycles, Pro Bike, FJ Roberts, Valley Bike & Ski Werks, Hampshire Bicycle Exchange, New England Bicycle, Southampton Bicycle, Custom Cycle Bike Shop and Laughing Dog Bicycles are just a few of the many bike shops that play a critical role in supporting a vibrant cycling economy.

5. MassDOT's ADA/Section 504 Transition Plan

MassDOT is undertaking a comprehensive re-evaluation of its policies, programs, services and facilities to determine the extent to which individuals with disabilities may be restricted in their access to these services and activities. MassDOT's ADA/Section 504 Transition Plan guides the planning and implementation of necessary program, activity and facility modifications over the next several years, which will expand on previous work. This work has included an extensive inventory of sidewalk ramps on jurisdictional roadways (over 35,000 ramps) as part of the ADA/Section 504 Self Evaluation and Prioritization. The data from this inventory is available on Cartegraph's VersaView.

F. AVIATION

The Pioneer Valley is well served by air transportation facilities located within or adjacent to the region. Most air travel from the region goes through Bradley International Airport in Windsor Locks, Connecticut situated 15 miles south of the City of Springfield.

Within the Pioneer Valley there are also a number of airports, the largest of which is the Westover Air Reserve Base and Metropolitan Airport facility in Chicopee and Ludlow. The second largest airport in the region is Westfield-Barnes Airport located and operated by the City of Westfield. It is the third busiest airport in Massachusetts, a general aviation facility home of the Air National Guard 104th Tactical Fighter Group.

The remaining airport in the region, the Northampton Airport, is privately owned and operated with much smaller and less sophisticated facilities. This airport serves both business and recreational uses.

1. Public Airports

a) Bradley International Airport

Bradley Airport located in Windsor Locks, Connecticut, is a state-owned facility that is operated by the Connecticut Department of Transportation and the Bureau of Aviation and Ports. It is New England's second largest airport, serving Connecticut, Massachusetts, New York, Vermont and New Hampshire, and was designated as a medium hub airport by the Civil Aeronautics Board. The airport opened as an Army Air Corps Base in 1941. After World War II it was taken over by the State of Connecticut and was converted to a commercial facility under the name Bradley Field. The name was changed to Bradley International Airport in the 1960s after a 9,500 foot paved runway was opened to accommodate jet aircraft. There are currently three runways and 17 taxiways. The total land area of the airport is 2,358 acres.

The airport, located 15 miles south of the City of Springfield, is the principal commercial airport serving people traveling to and from the Pioneer Valley Region. Survey data indicates that 30 percent of air travelers using Bradley are from the Springfield/Holyoke/Chicopee area and that about four out of five of the region's commercial air travelers use the Airport.

The nine major airlines that currently serve Bradley Airport are Air Canada, American Airlines, American Eagle, Delta, Jet Blue, Southwest, United Airlines, US Airways, and US Airways Express. Approximately 198 (2014) daily flights make Bradley the second busiest New England Airport Behind Logan International Airport in Boston. The airport served 5,421,975 in 2013 which is 89,643 more than the 5,332,332 travelers in 2009. There are no

landing/takeoff limitations or nighttime operational curfews. The airport can handle all types of commercial aircraft including Boeing 747, Concorde, and the Russian-built Antonov, the largest passenger aircraft in the world.

Table 5-27 – Bradley Airport Operational Statistics

Aircraft Based on Field	55	Aircraft Operations: Average Per Day	281*
Single Engine Airplanes	1	Commercial	52%
Multi Engine Airplanes	7	Air Taxi	29%
Jet Airplanes	26	Transient General Aviation	15%
Helicopters	4	Military	4%
Military Aircraft	17	Local General Aviation	<1%
		* for 12-month period ending 30 June 2012	

Source: http://www.airnav.com/airport/KBDL

The State of Connecticut employs approximately 100 people at Bradley Airport. Salaries are paid through the Bradley Enterprise Fund, which does not use taxpayer funds. Approximately 27,000 jobs are directly or indirectly dependent on airport operations. Bradley Airport generates 4 billion in economic activity yearly with $1.2 billion being in the form of wages.

Since 1982, funds for improvements have been provided through the Bradley Enterprise Fund. No state tax receipts are used in operating Bradley. Operating revenues are obtained from airline landing, parking and facility fees, airport owned parking facilities, land rental revenues from tenants, and fees from various airport concessions. Some of the accomplishments under this program are: a new terminal with ten boarding gates, the renovation of the existing terminal, the renovation of the concourse C, increased short and long term parking, and reconstruction of the main runway. Future plans include construction of a new terminal and concourse to replace terminal B which has been closed since April 2010 (Demolition of Terminal B and the roadway viaduct official started in December of 2014). The plan includes the construction of a 24 gate terminal consisting of two 12 gate concourses. A third phase of the plan will construct a west concourse which will connect the new Federal Inspection Station (FIS) facility to the rest of the airport.

In October 2008, the Embraer Executive Jet Service Center opened a 47,700 square foot center. The $10,000,000 center is one of three in the U.S. The center employs 60 highly skilled aircraft technicians to maintain and repair Embraer's line of business jets.

Bradley provides regular International service to two cities in Canada; Montreal and Toronto, as well as international flights to San Juan, Puerto Rico and Cancun, Mexico (seasonal). Direct international charter flights are presently available. International service facilities include customs, immigration and agriculture inspection services that are available for

international arrivals in the new Federal Inspection Station. A foreign trade zone is located adjacent to the airport.

Bradley Airport is well located to provide easy air access to both the Springfield and Hartford metropolitan areas. For more information on the airport please visit their website http://www.bradleyairport.com/index.shtml.

b) Westfield-Barnes Municipal Airport

Westfield-Barnes is a public airport operated by the City of Westfield and is the home base for the Massachusetts Air National Guard 104th Fighter Wing. The Region's second largest airport is located within the boundaries of the City of Westfield, north of Westfield's central business district and adjacent to the Massachusetts Turnpike (I-90). The airport is also within minutes of I-91. A total of about 1200 acres are owned by the facility. Approximately 600 acres are presently developed with pavement, hangers and airport buildings.

The airport is classified by the Massachusetts Airport System Plan as a general aviation airport providing general aviation service. It serves virtually all aircraft, including commercial jet liners and large, heavy and wide body aircraft. It is capable of handling precision instrument approach operations. The airport consists of two asphalt runways: 02/20 and 15/33. Runway 15/33 is a visual runway that is 5,000 feet long and 100 feet wide. It is equipped with medium intensity runway lights. The primary runway 02/20 is 9,000 feet long and 150 feet wide and equipped with high intensity runway lighting and precision instrument approaches.

Table 5-28 – Barnes Airport Operational Statistics

Aircraft Based on Field	148	Aircraft Operations: Average Per Day	142*
Single Engine Airplanes	112	Transient General Aviation	49%
Multi Engine Airplanes	7	Local General Aviation	38%
Jet Airplanes	11	Military	12%
Military Aircraft	18	Air Taxi	1%
		Commercial	<1%
		* for 12-month period ending 31 December 2012	

Source: www.airnav.com/airport/KBAF

Land-side development is concentrated in three quadrants: The Southwest quadrant, houses general aviation functions as well as fixed-base operators, based aircraft storage facilities, transient aircraft parking, and airport and Federal Aviation Administration administrative facilities.

The Northwest quadrant consists of the land leased to the Massachusetts Air National Guard (MANG) and Army Aviation Services. Located within this quadrant are the MANG facilities, aircraft parking aprons, alert facilities,

hangars, operations buildings, and office space. The F-15's on base now have a 24/7 air sovereignty alert mission. An industrial park is also planned for this area of the airport. In addition, the army aviation support facility operates here with two large hangars, 6 Blackhawk helicopters and 2 operations buildings.

Up until September 2007, the 131st Fighter Squadron (131 FS), 104th Fighter Wing (104 FW) of the Massachusetts Air National Guard at Westfield, operated 25 A-10 Thunderbolt II aircraft until they were realigned through the Department of Defense Base Realignment and Closure (BRAC) of 2005. The 104th changed its mission from Close Air Support to Air Superiority, and its A-10 aircraft were redistributed to other fighter units as a result of BRAC. The 104 FW has now received 15 F-15 Eagles from the former 102nd Fighter Wing.

The Northeast quadrant is the home of General Dynamics Aviation Services, a subsidiary of Gulfstream, which provides a full service maintenance facility to corporate aircraft with its four hangars and one support facility.

For more information on the airport please visit their website http://www.barnesairport.com

c) Westover Air Reserve Base and Metropolitan Airport

Westover is a joint-use civilian and military airport. Located in the City of Chicopee the Westover Airport is strategic to the state and federal aviation systems. Situated in the heart of the "Knowledge Corridor" in Western Massachusetts, with a population of 600,000 within a thirty mile radius, Westover Airport is a unique public use airport. While Westover's main runway is large enough to have been on the list of backup locations for landing the Space Shuttle, the airfield remains spacious enough for virtually any type of aircraft. It's also flexible enough to welcome the emergence of the very light jet era and all other general aviation air traffic.

Opened originally in 1940 as a World War II training base geographically positioned for European missions, the airport is one of the nation's most successful joint-use, civilian and military facilities. Westover continues its military use as home to the Air Force Reserve's 439th Airlift Wing. Under the joint-use agreement the Air Force Reserve retains the responsibilities for the runways, two Instrument Landing Systems (ILS), and a state-of-the-art air traffic control tower. The Westover Airport (civilian) has responsibility for three taxiways, its 13 large hangars, a fully equipped passenger terminal and overall civilian aviation operations.

Westover Airport is a navigational hub, located between Boston, Albany and the greater New York City region. By air, all major North American and

Western European cities can be reached within hours. The global marketplace is within easy reach of the Westover Airport. Westover Airport proudly demonstrates daily its importance to our region's economy and the state's transportation system.

Table 5-29 – Westover Airport Operational Statistics

Aircraft Based on Field	36	Aircraft Operations: Average Per Day	70*
Single Engine Airplanes	12	Military	72%
Multi Engine Airplanes	3	Transient General Aviation	21%
Jet Airplanes	2	Local General Aviation	5%
Helicopters	1	Air Taxi	2%
Glider Airplanes	2	Commercial	<1%
Military Aircraft	16	* for 12-month period ending 31 December 2013	

Source: http://www.airnav.com/airport/KCEF

Westover Airport runway system is long enough to accommodate all types of aircraft. Its primary runway 5-23 is 11,597 feet long by 300 feet wide and includes two Instrument Landing Systems. The Airport's second runway, 15-33, is 7,081 feet long by 150 feet wide. These runways provide pilots with a safe approach during variable wind and weather.

The Westover Metropolitan Development Corporation (WMDC) is the civil airport authority which holds the FAA Part 139 Airport Operating Certificate. The WMDC was organized in 1974 to facilitate the conversion of former military property at Westover to constructive civilian re-use. It is a public non-profit corporation governed by an autonomous 10 member Board of Directors. Over the past forty years WMDC has successfully developed three industrial airparks in both the Town of Ludlow (Airpark East) and the City of Chicopee (Airparks/North & West). The three airparks have more than 55 industries employing over 4,000 skilled workers. A new airpark consisting of 88 acres of land owned by WMDC and located south of the airport is currently in the early stages of site development.

The Westover Airport facilities include a passenger terminal with adjacent parking lots for 260 vehicles with plenty of room for expansion. On the airfield side of the terminal building there is a reinforced concrete apron over five acres in size to handle aircraft parking for arrivals and departures. Also there are 13 large aircraft hangars, ranging in size from 28,600 to 30,000 square feet with 28 foot high doors to accommodate based aircraft and transients.

The WMDC has proactively initiated efforts to protect the air space around Westover through participation in a FAA Part 150 Noise Study Program. A Noise Exposure map has identified the properties most impacted by aircraft noise and the program gives those eligible property owners the option to participate in the voluntary acquisition of their property. A total of 54 parcels

and 207 acres have been acquired through 2014. The funding of the program is provided by the FAA, MassDOT Aeronautics Division and a local matching share from WMDC. WMDC plans to continue the Noise Program into the future which will also have a sound insulation component.

For more information on the airport please visit their website at http://www.westoverairport.com/

2. Private Airports

a) Northampton Airport

The Northampton Airport, operating under the names of both Paradise City Aviation and Pioneer Valley Balloons in the past, is privately owned and operated. In August 2004, a local corporation, Seven Bravo Two, LLC purchased the assets of the airport. Along with this purchase, a new flight school/FBO office was established at the airport know as Northampton Aeronautics, Inc. The airport has been running since the early 1920's and became an official airport on April 1, 1929. It is classified as a Basic Utility II airport that serves general aviation uses, both business and recreational. Located in the City of Northampton, the airport covers 55 acres, has one asphalt runway 3,365 feet long and 50 feet wide with variable high intensity, pilot operated runway lighting. Northampton Airport has an estimated 73 flights per day and estimated 60 based aircraft. The runway underwent a $1.2 million reconstruction in 2000. In spring of the 2010 the ramp in front of the maintenance hangar was expanded allowing for more operating space. A new hangar is also currently under construction as of July 2010. Northampton Airport offers 24 hour self service fueling, and minor and major maintenance service. The airport is closed to aircraft and helicopters with a gross operating weight in excess of 12,500 lbs. Seaplanes can operate on the Connecticut River, which is parallel to the runway.

Table 5-30 – Northampton Airport Operational Statistics

Aircraft Based on Field	80	Aircraft Operations: Average Per Day	84*
Single Engine Airplanes	71	Local General Aviation	95%
Multi Engine Airplanes	7	Transient General Aviation	3%
Ultralights	2	Military	1%
		Air Taxi	<1%
		* for 12-month period ending 31 December 2011	

Source: http://www.airnav.com/airport/7B2

The Northampton Airport normally employs between 15 and 17 employees with as many as 30 during the peak summer months. Besides its large commercial business the airport has chartered flights flying 24 hours a day, 7 days a week to destinations all over the country. It also has an FAA approved

part 141 flight school, which is the largest flying school in Western Massachusetts.

For more information on the airport please visit their website at http://www.northamptonairport.com/

G. TRANSPORTATION OF GOODS

The major interstates and rail lines in the Pioneer Valley Region enable the quick delivery of goods to some of the world's largest economies of New York, Boston, and Philadelphia. The regions economics are also influenced by the surrounding mid sized cities such as Albany, Hartford, Worcester, and New Haven. The proximity of these major and middle sized cities allows goods from the Pioneer Valley to be quickly transported to competitive markets. With the emergence of the European Union and the Free Trade Agreement with neighboring Canada and Mexico, the region is uniquely positioned to take advantage of the growing international trade. In 1960 the international market accounted for 10% of the United States GDP. In 2006, the international market had increased to 28% of the United States GDP. To participate successfully in this new economy, the region must maintain an efficient road and rail network while encouraging the creation of an efficient multimodal transportation network. Enhancement and preservation of these multi modal connections with these cities is important as the regional, national and global market continue to evolve and integrate.

Freight is moved in and out of the Pioneer Valley primarily by truck with rail, air and pipeline carrying the remaining goods. Exporting and importing of goods in the Pioneer Valley region is accomplished by the use of one of these modes, or a combination of several modes. The Freight Analysis Framework (FAF) integrates data from a variety of sources to summarize freight movement by state and by mode. Freight shipments within, from, and to the state of Massachusetts are summarized in Table 5-31 by domestic mode share for 2007 and 2012. Truck continues to be the dominate mode for transporting freight.

In 2008, MassDOT (formerly the Executive Office of Transportation and Public Works) identified challenges within the freight industry in the Pioneer Valley. One of the first identified challenges was the lack of intermodal regional transportation links, where goods can be transferred from one mode to another. The region has two transloading facilities which is one method to attain this intermodal relationship. The region's freight movement is dominated by trucking. Expanding and maintaining rail service with the region's class one shippers of Pan Am and CSX potentially could reduce the amount of trucking currently required to transport goods in the region. The

region's intermodal facilities are based and are expected to continue to focus on truck and rail. The Connecticut River is not adequate to serve as a major waterway to transport goods. Furthermore, the region does not have a major airport to move goods. The lack of these alternate modes limits the intermodal facility choice. The changing economic landscape of the state has also affected the practices of freight movement. The state and its regional economies have transitioned from a manufacturing based to a service based economy. The freight sent with this type of economic base will typically ship smaller packages and are high value commodities. The service industry runs on the "just in time" model, where freight is delivered to vendors as consumer demand dictates. This reduces vendors carrying costs, inventory required and overall logistical costs. This model places a heavy reliance on the current freight network to transport goods that the local economy requires.

Table 5-31 – Shipments Within, From, and To Massachusetts by Domestic Mode Share

			Within		From		To	
State	Trade	Mode	2007	2012	2007	2012	2007	2012
Massachusetts	Domestic	Truck	98.98%	98.98%	79.84%	79.58%	72.19%	71.39%
		Rail	0.09%	0.10%	4.90%	4.31%	6.99%	7.06%
		Water	0.00%	0.00%	0.05%	0.05%	0.23%	0.24%
		Air (include truck-air)	0.00%	0.00%	0.08%	0.09%	0.13%	0.13%
		Multiple modes & mail	0.12%	0.12%	2.30%	2.23%	2.55%	2.44%
		Pipeline	0.00%	0.00%	11.65%	12.58%	16.99%	17.86%
		Other and unknown	0.81%	0.80%	1.18%	1.16%	0.91%	0.89%
	Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Imports	Truck	70.08%	69.79%	95.60%	94.91%	70.24%	71.58%
		Rail	0.00%	0.01%	0.13%	0.14%	23.25%	20.90%
		Water	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%
		Air (include truck-air)	0.00%	0.00%	0.00%	0.00%	0.07%	0.04%
		Multiple modes & mail	0.10%	0.14%	4.00%	4.60%	5.25%	6.13%
		Pipeline	29.01%	29.15%	0.00%	0.00%	0.00%	0.00%
		Other and unknown	0.81%	0.92%	0.26%	0.34%	1.19%	1.36%
	Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Exports	Truck	66.82%	67.48%	80.15%	80.40%	68.07%	68.28%
		Rail	0.06%	0.06%	5.83%	6.10%	2.31%	2.23%
		Water	0.00%	0.00%	0.03%	0.04%	0.00%	0.00%
		Air (include truck-air)	0.00%	0.00%	0.26%	0.22%	0.02%	0.02%
		Multiple modes & mail	3.45%	3.51%	8.35%	8.76%	23.37%	23.45%
		Other and unknown	29.68%	28.95%	5.37%	4.49%	6.23%	6.02%
	Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: FAF Version 3.5

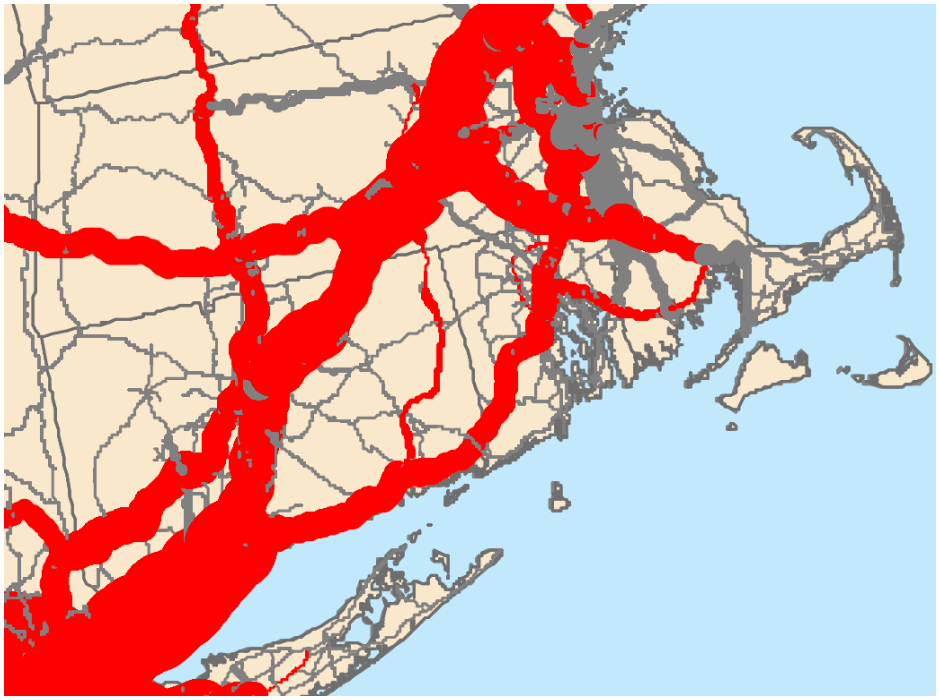
The freight within the Pioneer Valley is further influenced by global economic trends. Fuel prices continue to be a growing issue for truck freight shipments. Fuel is one of the largest costs for freight companies; this commodity is an important variable in predicting costs. This particular commodity has had large price fluctuations in recent years. The industry is continuing to develop and improve as technology advances. Freight loads are increasing the ability to carry more freight and facilities are improving their efficiency. Governmental influence such as federal deregulation of the carrier industry would have massive impacts on the freight industries ability to generate capital.

1. Trucking

Trucking is the dominant mode for moving freight in the Pioneer Valley. Urbanized communities in the region have at least one trucking firm, the majority of these carriers are small, short haul carriers handling feeder and distribution traffic. They provide both full truckload and less than truckload deliveries. This mode has the ability to transport goods to the northeastern United States and southeastern parts of Canada by overnight service. These freight companies carry goods for a variety of industries outside Hampden and Hampshire County. Franklin County possesses few freight companies and often employ/hire Hampden and Hampshire based trucking companies to transport their goods. Essentially, this transportation service sector is exported to other areas, in turn producing regional income. The future competitiveness of the industry hinges on the investment in the maintenance and development of interstate, state and local roadways, multimodal facilities and all related infrastructure.

Truck traffic is expected to grow throughout the state over the next twenty years (Figure-5-21). This increase in freight trucking movement will occur mainly on Interstate 91 and Interstate 90. These highways already carry the largest volumes of freight movement in the two counties. These routes currently carry freight trucks, however as regional production and demand of goods is expected to increase, the volume of freight trucks needed will also increase. The modal split of freight movement is expected to rely on trucking more in the future. Even if freight is imported or exported by rail or air in the region, trucks typically provide the final trip between freight terminals, manufacturers or distributors.

Figure 5-21 – Long Haul Freight Traffic on the National Highway System - 2040 Forecast



Source: Freight Analysis Framework Data.

A portion of freight goods the Pioneer Valley exports stays within the state's borders. A 2009 TRANSEARCH report to MassDOT quantified that 99% of all in-state shipments are performed by trucks. This reliance on in-state truck shipments is mainly due to the short distance between origin and destination of the commodities. The Greater Boston area is the destination for the largest share of these goods originating in the Pioneer Valley. The top commodities transported by truck to the Greater Boston area include (percent share of goods in parentheses): Rubber or miscellaneous plastics (31%) Fabricated Metals (31%), Food/Kindred Products (30%), Clay, Concrete, Glass or Stone (17%) and Nonmetallic minerals (14%). The Worcester area also receives 19% of the total share of Clay, Concrete, Glass and Stone produced in the Pioneer Valley. Some freight is moved within the borders of the Pioneer Valley. Similar to in-state shipments, the freight moved within the two counties is transported almost entirely via trucking. Approximately 63% of the non metallic minerals that originate in the region are transported within the region. Lumber and chemical or allied products have 13% and 11% of their total product respectively moved internally in the valley.

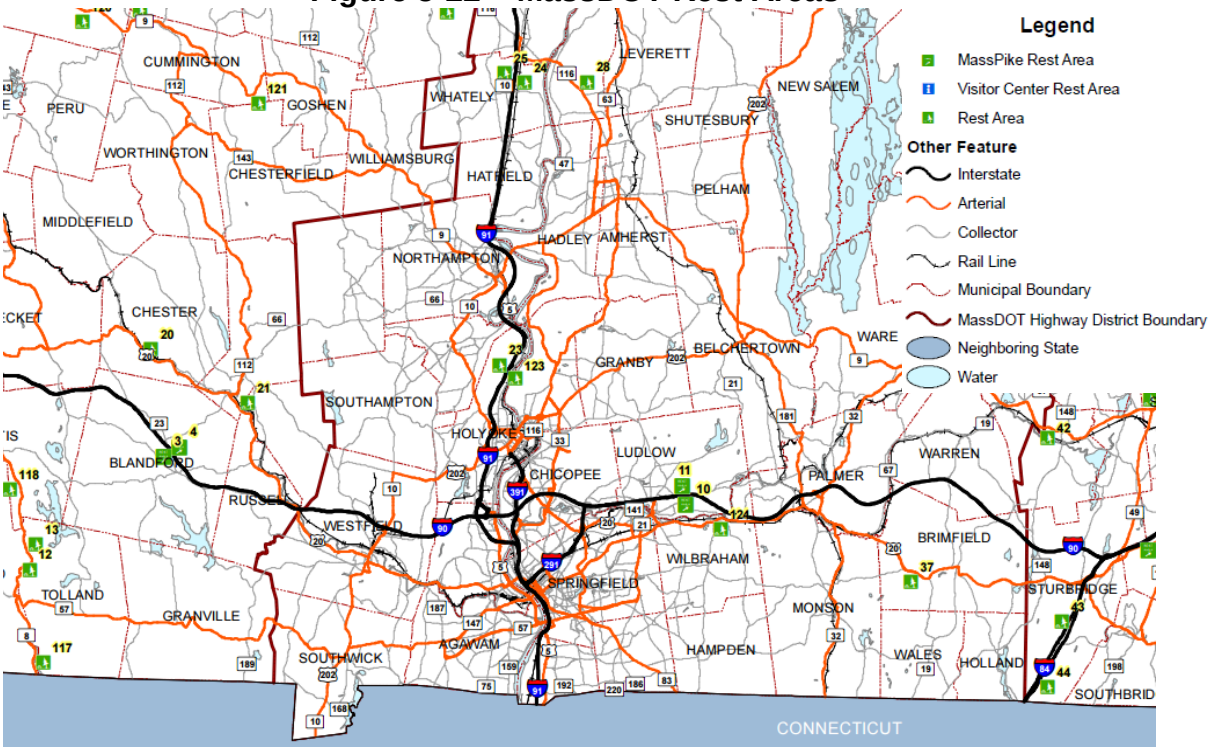
a) Rest Stops

Drivers of commercial motor vehicles must follow strict hours of service regulations established by the Federal Motor Carrier Safety Administration

(FMCSA). As a result, safe, convenient rest areas are important for long-haul drivers to meet hours of service regulations. MassDOT rest areas in the Pioneer Valley region are show in Figure 5-22.

In addition, the Pride Traveler Center is located on Burnett Road in the City of Chicopee off Massachusetts Turnpike Exit 6. Another private truck stop with an associated rest area is proposed in the City of Westfield off Massachusetts Turnpike Exit 3.

Figure 5-22 – MassDOT Rest Areas



Source: MassDOT

2. Rail

Five rail carriers provide freight service in the Pioneer Valley Region: CSX Transportation, Pan Am Southern, New England Central, Pioneer Valley Railroad, and MassCentral Railroad.

a) CSX Transportation

In June 1999 the assets of Conrail were split between CSX and Norfolk Southern. The break-up of Conrail ended its virtual monopoly on northeastern rail service and allowed new opportunities for price and service competition for the regions rail shippers. CSX took over Conrail's operation in Massachusetts and now owns and operates the east-west mainline between

Selkirk, New York and Boston. CSX also owns and operates a spur line between Springfield and Ludlow.

Height clearances above the rail on the Boston and Albany Main line through the region allow for short double stack container service (9'6''+ 8'6") to both West Springfield and Palmer. Clearance improvements would be needed to allow full double stack service (9'6''+ 9'6") in the region.

b) Pan Am Southern Railways

In 2008, the Surface Transportation Board approved the merger between Pan Am Railways and Norfolk Southern Railway creating a new joint venture railroad consisting of a portion of Pan Am Railways in New York, Vermont, Massachusetts, and New Hampshire. Pan Am Southern Railways now owns the Boston & Maine Railroad (B&M) and its subsidiary Springfield Terminal Railway Company (STRC). B&M is the region's second largest rail carrier, operating a north-south mainline along the Connecticut River from Springfield, to East Deerfield. Pan Am Southern also owns secondary lines that run from Chicopee to Chicopee Falls and from Holyoke to Westover Industrial Airpark in Chicopee. Lying north of the region, but also important to the region's rail system is the B&M east-west mainline. This Pan Am Southern line is now known as the Patriot Corridor and provides Norfolk Southern the opportunity to compete with CSX for New England Traffic.

c) New England Central.

The New England Central Railroad (NECR) is owned by RailAmerica and offers freight service between St. Albans, Vermont near the Canadian border, and New London, Connecticut via the eastern portion of the Pioneer Valley region. Although the line is not heavily traveled, it has been rehabilitated and operates profitably.

d) Pioneer Valley Railroad

The Pioneer Valley Railroad (PVRR) is owned by the Pinsly Company and provides short line service on tracks formerly owned by Conrail. The PVRR took over two lines in 1982, each approximately 15 miles long, connecting Westfield with Holyoke and Northampton. The PVRR can accommodate intermodal transfers at the ends of each route, has 48-state motor carrier authority, and directly connects to both CSX and the B&M railroads.

e) MassCentral Railroad

MassCentral (Massachusetts Central Railroad Corporation) is an independent firm based in Palmer, Massachusetts. The operation of the railroad is

managed by the Finger Lakes Railroad. Like PVRR, MassCentral Railroad provides short line service on a former Conrail line. Since 1979 this railroad has operated the former Ware River secondary line, which runs 24 miles from Palmer, through Ware, to North Barre, Massachusetts. MassCentral connects with CSX in Palmer. After abandonment by Conrail, the line was purchased and rehabilitated by the Commonwealth of Massachusetts. The Commonwealth maintains ownership of the majority of the line and leases the tracks to MassCentral.

f) Yards Terminals

The region's major freight and intermodal yard is located in West Springfield (CSX). CSX is currently making significant infrastructure improvements to the West Springfield facility. Another major freight and switching yard important to the region but located outside the region, is B&M's East Deerfield Yard in Franklin County. Within the Pioneer Valley other smaller freight yards are located in Holyoke, Palmer, and Westfield

g) Services

Much of the freight moved in Massachusetts is interstate traffic with either Selkirk, New York (CSX) or Mechanicville, New York (Pan Am Southern) providing connections to long haul lines. In addition to traditional general freight (boxcar) service, all of the region's railroads offer contract rates for volume shipments, consultation services for custom-designed transportation packages, and intermodal freight facilities allowing the transfer of goods from rail to truck and vice versa. The geographic location of the Pioneer Valley at the crossroads of interstate highways (I-90 and I-91) and long-haul rail lines (CSX and B&M) creates a strategic and attractive location for businesses and industry participating in the local or international marketplace.

3. Air Freight

Air freight serves particular markets, which are primarily focused on time-sensitivity issues and accommodating high-value commodities (typically light weight). Due to this limited market, this mode typically carries a much smaller share of goods than truck or rail, however air freight annually generates billion of dollars. The air freight industry is the most expensive method of freight movement. Air cargo needs to be light and high value to maximize profits. Lighter weight goods require fewer resources to transport which reduces overall shipping costs. Traditionally retail, service and manufacturing sectors are more likely to use air freight.

Air freight can be sent in two different methods. The first option would be to transport air freight by companies which own and maintain their own all-cargo

aircraft fleet, such as AirNet or DB Schekner. The second option is via scheduled passenger aircraft for which the shipper places the cargo with a freight forwarding (pooling) company. The forwarder contracts for blocks of space on commercial airlines for specific routes. According to the U.S. Department of Transportation, for identification purposes, air freight services are categorized into whether goods are time sensitive, or less time sensitive; whether they are sent by integrated or nonintegrated providers; or by the major type of cargo carrier, which are identified as being one of the following: express carrier, scheduled, mail or chartered air service providers.

Currently there are no major air freight facilities in the region. This lack of this particular regional shipment method does not limit the air freight and package services options for Pioneer Valley residents. Air freight inbound or outbound of the region typically travels through these airports: Bradley International Airport in Windsor Locks, Connecticut, Logan Airport in Boston, or New York City's metropolitan airports. Westover Metropolitan Airport in Chicopee, MA seldom has automotive or large machine parts shipments. This limited amount of freight is not tracked or reported by the airport.

Bradley International Airport is a medium-hub airport located 15 miles southwest of Springfield, MA, in Windsor Locks, CT. Bradley's convenient location near Interstate 91, and air cargo facilities, make it the primary choice for the regions shippers. In 2012, more than 122,000 tons of air cargo enplaned or deplaned at Bradley International. Airport choice for air cargo transport is dependent on a number of factors, including destination coverage/schedule factors, tariff structure, logistical and contractual considerations, and access time and distance of individual airports. Therefore, some of the region's shippers may choose Boston's Logan airport, or one of New York City's metropolitan airports for air cargo services.

4. Pipeline

There are presently three pipelines serving the Pioneer Valley. One provides natural gas, while the other two provide petroleum products. Pipeline goods are critical to the national and regional economy. These lines provide energy resources for buildings, motor vehicles and power plants to maintain the economy and existing infrastructure. The Research and Innovative Technology Administration predict that the role of pipelines will remain critical as freight demand is anticipated to increase.

a) Natural Gas

Natural gas pipelines, owned by Tennessee Gas Pipeline Company (An El Paso Corporation Company), runs along the region's southern edge. The

system's trunk lines originate in the southern Louisiana/Texas/Gulf of Mexico area, travels northeast through the country and region, divides in Hopkinton, Massachusetts, and terminates in Gloucester, Massachusetts, Providence, Rhode Island and Concord, New Hampshire. The main lines cut through ten area communities from Tolland in the west to Holland in the east. These mainlines are 24-inch and 30-inch diameter pipelines.

A lateral line also runs north from Southwick to Northampton. This lateral is 8-inch diameter pipeline and becomes a 12-inch diameter pipeline north of Cook Road in Easthampton. This lateral serves Berkshire Gas, Holyoke Gas, Westfield Gas and Bay State Gas Companies. Additionally, Tennessee Gas has two laterals originating from its compressor station in Agawam, MA: a 10-inch lateral that feeds Bay State Gas in Agawam, MA and an 8-inch lateral that feeds the Berkshire Power plant located in Agawam, MA.

The Federal Energy Regulatory Commission (FERC) approves expansion plans based on a demonstrated increase in demand, with approval limited to only the facilities necessary to satisfy any increased demand. The current system is operating at capacity.

There are several natural gas distribution companies in the Pioneer Valley providing service to the region's communities via their own network of pipelines. Identification of these individual pipeline networks is outside the scope of this report. All, however, are fed by the main Tennessee Gas trunk lines.

b) Jet Fuel

Buckeye Pipeline Company is a common carrier of petroleum products within the states of Connecticut and Massachusetts. Buckeye Pipeline Company is a wholly owned subsidiary of Buckeye Partners, L.P. (NYSE: BPL). Buckeyes' local office is located in East Hartford, Connecticut, but management control is directed from Brenigsville, Pennsylvania.

The Buckeye Pipeline Company system includes a trunk line of approximately 111 miles in length. Of this, 93 miles are 12-inches in diameter, 7 miles are 10-inches in diameter, and 11 miles are 8-inches in diameter. There are also a number of spur lines to individual shippers that vary in length and diameter. Petroleum products enter the system at Buckeye Pipeline Company's New Haven Harbor receiving terminals. These products originate from refineries at various locations including the East and Gulf Coast of the United States. The trunk line terminates in Ludlow, Massachusetts.

The products can be taken off at any of the several delivery locations located along the line, plus three branch lines. The delivery locations are (in order

traveling northward along the trunk line) Portland, Rocky Hill, Wethersfield, East Hartford, Hartford, Melrose, Enfield, (all in Connecticut) Springfield and Ludlow (both in Massachusetts). The branch lines extend to the Kleen Energy power plant in Middletown, CT, Bradley International Airport in Windsor Locks, CT, and Westover Air Force Base in Chicopee, MA

c) Gasoline, Kerosene, Distillates

Mobil Pipeline Company, Inc. operates a petroleum product pipeline between Providence, Rhode Island and Western Massachusetts. The branch office that operates this pipeline is located in East Providence, Rhode Island. The branch office has limited authority and the pipeline is primarily managed at the Mobil Pipeline Company's main headquarters, located in Houston, Texas. The pipeline located in the Pioneer Valley is 6-inches in diameter. Petroleum products are generally delivered to the pipeline by water at Providence, Rhode Island. The products then travel in a northwest direction and terminate in Springfield, Massachusetts

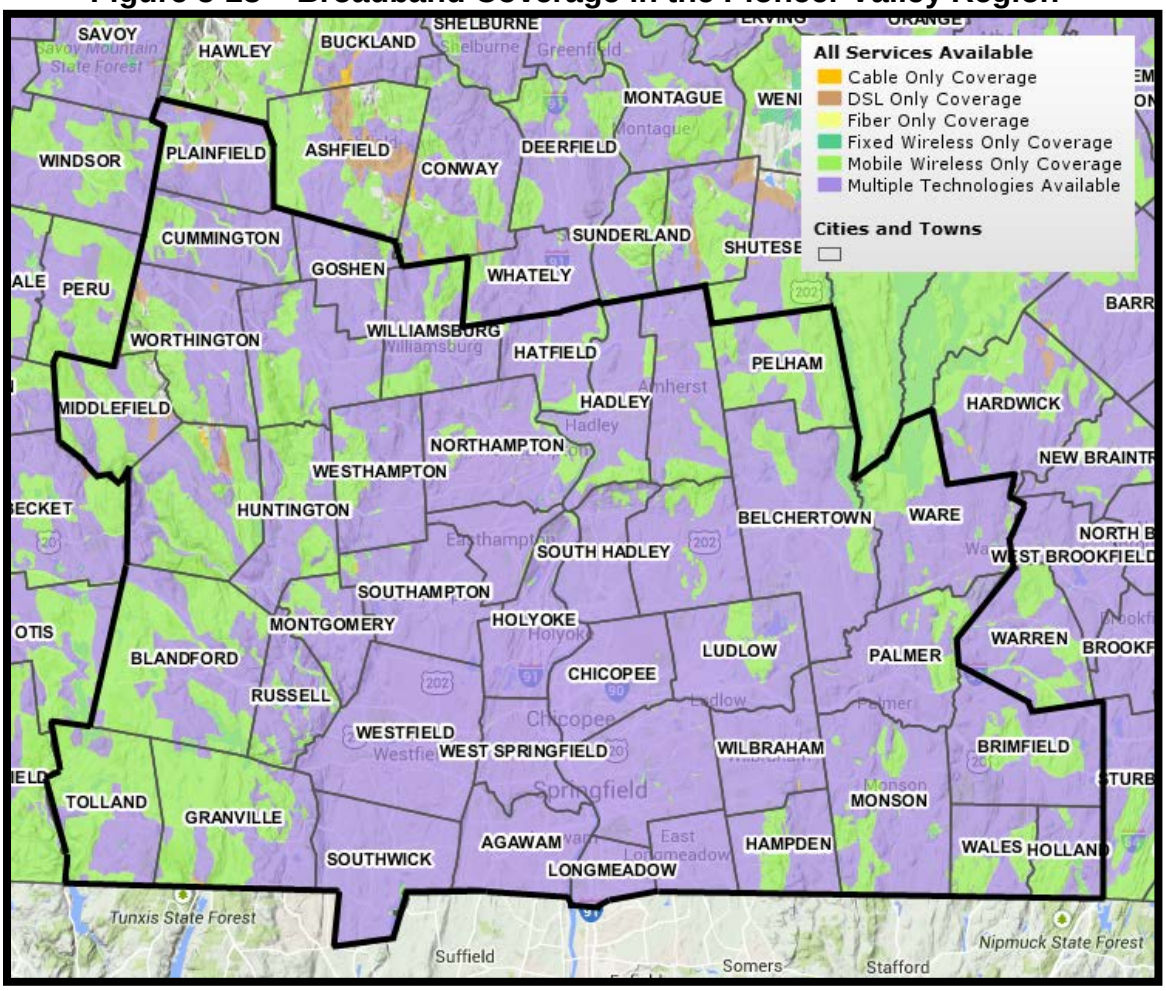
H. INTERNET INFRASTRUCTURE

The availability of reliable, high-speed internet service is important to enhance the connectivity and economic vitality of the Pioneer Valley region. The Massachusetts Broadband Institute (MBI) has been working since 2008 to connect those that are currently unconnected to broadband internet access. A map of broadband coverage in the Pioneer Valley Region is shown in Figure 5-23.

1. Western MA Connect

WesternMA Connect, Inc. (formerly Berkshire Connect, Inc. and Pioneer Valley Connect) is a regional non-profit organization with the mission to provide affordable, reliable and redundant high capacity broadband services throughout Berkshire, Franklin, Hampden and Hampshire counties. Previously, both Berkshire Connect and Pioneer Valley Connect worked independently to encourage the deployment of infrastructure and access to broadband services for businesses, governments, and residents in unserved areas. A formal collaborative effort of the two organizations began in 2005 to address broadband access inequity in western Massachusetts. In 2009, Pioneer Valley Connect dissolved and secured representation on the Berkshire Connect Board of Directors. To better reflect the magnitude of the region it serves and the scope of its activities, Berkshire Connect, Inc. changed its name to WesternMA Connect, Inc. This also resulted in the creation of the Massachusetts Broadband Institute as a regional solution to achieve more efficient and effective results in providing high-speed internet access to all.

Figure 5-23 – Broadband Coverage in the Pioneer Valley Region

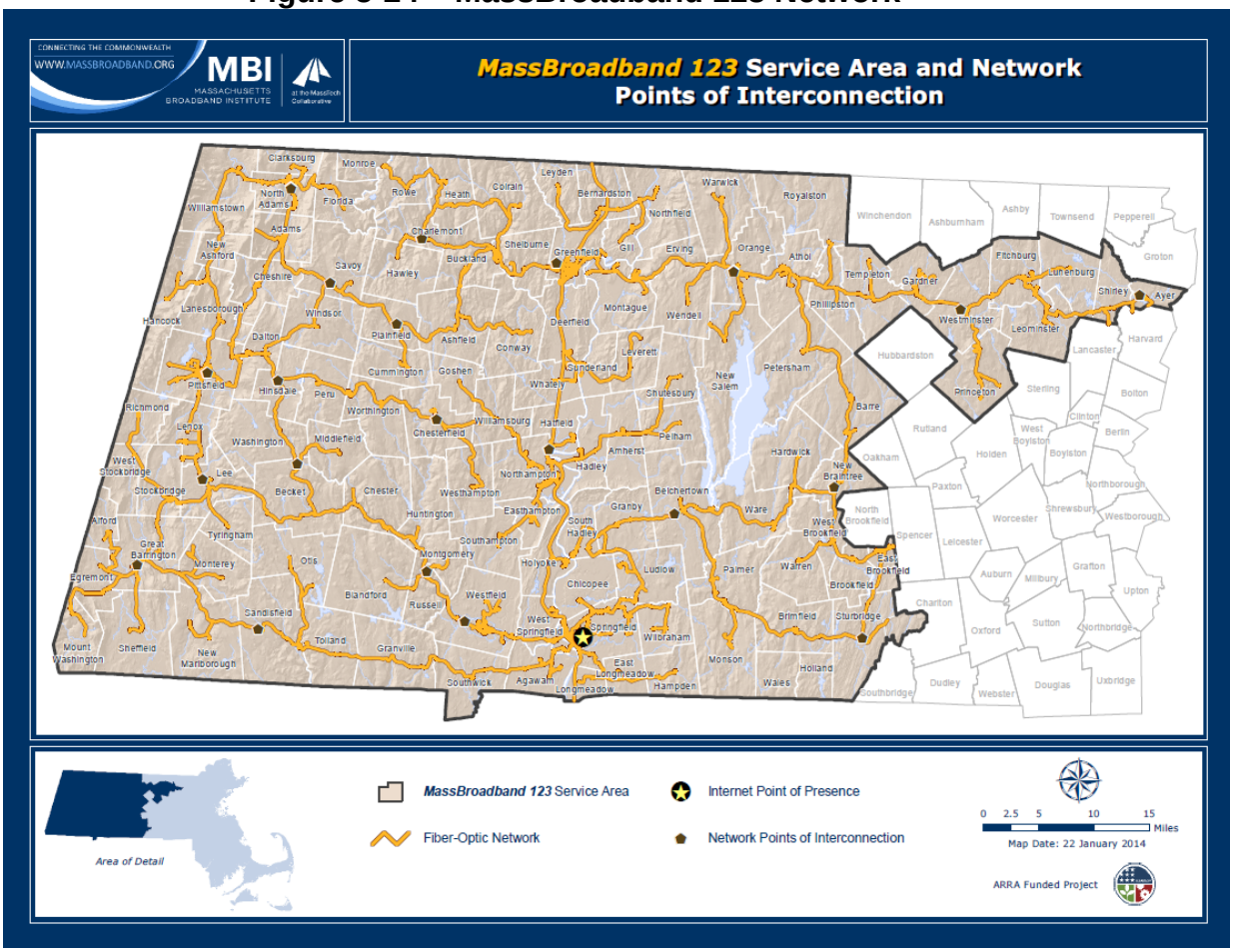


Source: MBI

2. Commonwealth of Massachusetts

The Commonwealth of Massachusetts is the owner of the ***MassBroadband 123*** network, which is operated by Axia NGNetworks USA. The ***MassBroadband 123*** network is open access to allow any broadband service provider to connect and offer its services, which will increase competition and affordability of options. The MBI signed an agreement with Axia NGNetworks USA to serve as the network operator for the ***MassBroadband 123*** network. Axia will provide wholesale services to broadband service providers on the ***MassBroadband 123*** network and maintain and refresh the fiber optic network to ensure its operability and efficiency.

Figure 5-24 – MassBroadband 123 Network



Source: MassBroadband 123 Map Dated January 22, 2014

a) Massachusetts Broadband Institute

The Massachusetts Broadband Institute (MBI) is working to improve affordable high-speed Internet access across the Commonwealth. Governor Patrick and the Legislature created the Massachusetts Broadband Institute when signing the Broadband Act into law in August 2008. The Act gives the MBI the authority to invest up to $40 million of state bond funds in necessary and long-lived infrastructure assets, such as conduits, fiber-optic cable and wireless towers.

The MBI built the MassBroadband 123 network to expand broadband connectivity to over 120 communities in western and north central Massachusetts. The network will provide the necessary broadband infrastructure to foster economic growth, improve health care and education, and strengthen public safety.

The MBI is continually collecting, verifying and mapping detailed information about broadband availability in Massachusetts. This information will be used to gain new investments for broadband coverage in underserved homes and business in the state of Massachusetts.

In early 2014, the MBI completed its MassBroadband 123 1,200 mile fiber optic backbone project. The completion of this project will connect over 120 communities in western and north central Massachusetts. The network will expand high-speed Internet access to improve the lives of residents, close the digital divide and bring new economic opportunities to the region.

b) Axia Networks

The MBI signed an agreement with **Axia NGNetworks USA (Axia),** to serve as the network operator for the ***MassBroadband 123*** fiber-optic network. Axia will manage and maintain the Internet backbone network that the MBI has developed in western and central Massachusetts

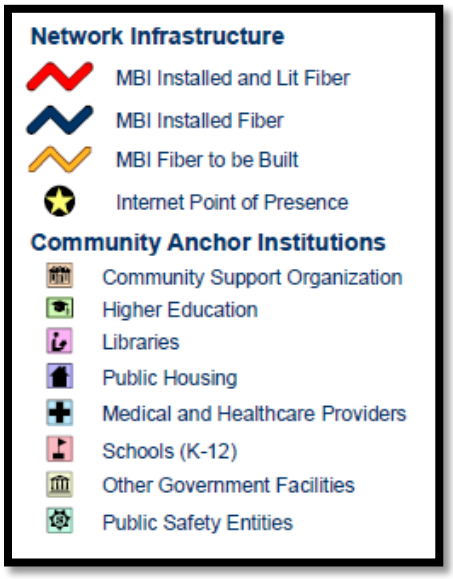
Axia was selected through an open, rigorous and highly-competitive process. Axia will offer wholesale services to broadband service providers using its proven, open access, "do not compete with your customer" approach. This fundamental digital economy infrastructure will spur investment by broadband service providers and generate economic growth in the region. Axia will invest in the ongoing operations of MassBroadband 123 and provide fiber extensions to the network in response to market demand.

c) The MassBroadband 123 Network

The MassBroadband 123 network connects over 1,200 public safety entities, community colleges, libraries, medical facilities, and town halls. All total, it serves 333,500 households and 44,000 businesses over a geographic area covering over one-third of Massachusetts with more than one million residents. This network provides the necessary broadband infrastructure to foster economic growth, improve health care and education, and strengthen public safety.

Information on the location and proposed locations of MassBroadband 123 fiber is provided on their website. This information is mapped by community along with the fiber status and the location of community anchor institutions to be connected in that community. The link to the MBI website is: http://broadband.masstech.org/news-and-updates/map-gallery/massbroadband-123-maps-data. Each map is based on the legend shown in Figure 5-25. A summary of the status of fiber for PVPC communities is provided in Table 5-32.

Figure 5-25 – Key to MassBroadband 123 Network Municipal Maps



Currently, only two communities, the Towns of Holland and Wales do not have any proposed projects to install fiber. Eight communities were reported to have at least apportion of their fiber network installed and lit as of January 2014. Eighteen were reported as having at least a portion of their fiber network installed, while fifteen are still waiting for their fiber network to be built.

Table 5-32 – MassBroadband 123 Fiber Status by PVPC Community

Community	Fiber Installed and Lit	Fiber Installed	Fiber to Be Built	No Information
Agawam		X		
Amherst			X	
Belchertown			X	
Blandford			X	
Brimfield			X	
Chester			X	
Chesterfield		X	X	
Chicopee	X		X	
Cummington		X		
East Longmeadow		X	X	
Easthampton	X		X	
Goshen		X		
Granby			X	
Granville		X		
Hadley		X	X	
Hampden		X		
Hatfield	X	X		
Holland				X
Holyoke	X		X	
Huntington			X	
Longmeadow	X	X	X	
Ludlow			X	
Middlefield			X	
Monson			X	
Montgomery			X	
Northampton	X	X	X	
Palmer		X	X	
Pelham		X		
Plainfield		X		
Russell			X	
South Hadley			X	
Southampton			X	
Southwick		X		
Springfield	X		X	
Tolland		X		
Wales				X
Ware		X		
West Springfield	X	X	X	
Westfield			X	
Westhampton		X		
Wilbraham		X		
Williamsburg		X	X	
Worthington		X		

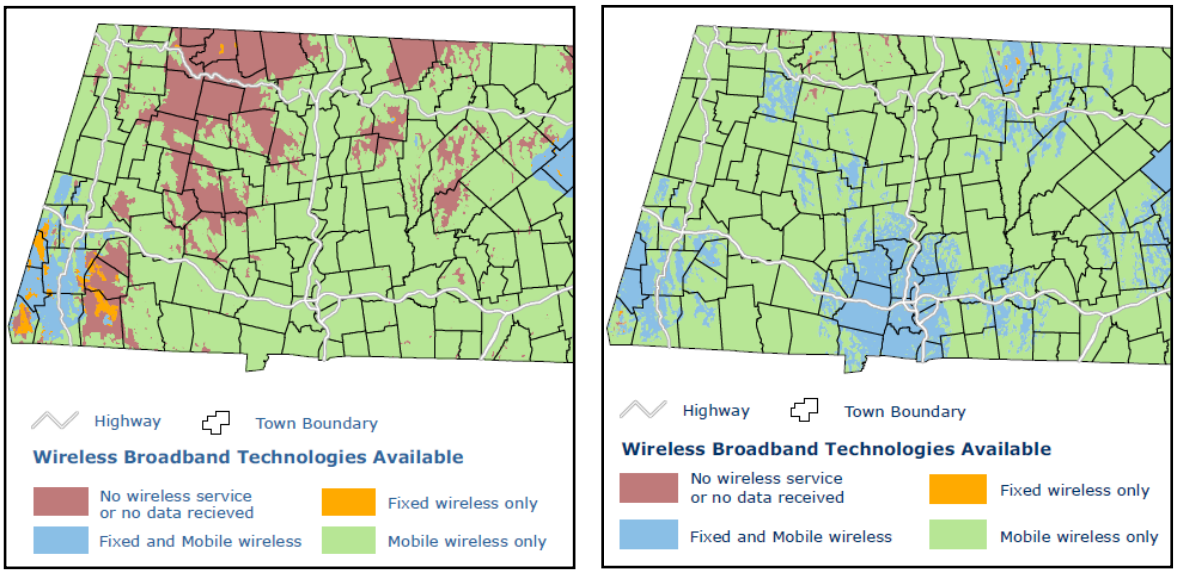
Source: MBI Maps January 22, 2014

3. Last Mile Grant Program

The MBI's Last Mile Broadband Solutions Program provides grants that help municipalities and broadband service providers deploy new high-speed Internet access in the western and north central parts of the State. Providers will use a wide array of broadband technologies and utilize existing infrastructure, and eventually ***MassBroadband 123***. In 2011, the MBI issued $335,000 in competitive grant awards as part of ongoing efforts to advance last mile solutions and expand broadband connectivity in underserved areas of Massachusetts. The grant recipients were selected through an open, rigorous, and highly competitive process. The MBI funded broadband planning and deployment grants up to a maximum of $50,000 per provider and project, supported by a 25% funding match from the grant recipient.

Figure 5-26 compares the availability of wireless technology in western Massachusetts from June 2010 to June 2014. As can be seen from the figure, there has been a significant reduction in the areas designated as having no wireless service.

Figure 5-26 – Change in Wireless Broadband Coverage 2010 - 2014



June 2010 June 2014

I. POPULATION

1. Trends

While the population in the Pioneer Valley region grew at a modest rate during the 1980s—increasing 3.6% to 602,878 residents—population growth slowed to a trickle in the 1990s. Between 1990 and 2000, the region's population grew by 0.9 percent, reaching 608,479 persons. This is compared to a 5.5 percent increase for the Commonwealth of Massachusetts and a 13.2 percent increase for the nation as a whole. Between 2000 and 2010, the region's population grew by 2.4%. Population growth has remained steady since 2010.That the population of the Pioneer Valley region grew at all is a direct result of foreign immigration. Every year of the 1990s the region experienced a net loss in domestic migration (more people moved away to other parts of the country than moved into the region from other parts of the country). Apart from the arrival of 16,025 foreign born persons in the 1990s, the region would have experienced a 1.7 percent loss in population during the decade. Table 3-33 shows the region's population in the last seven decades. While population grew in the early part of the 2000s to reach 627, 125 in 2009, almost 4,000 people had left by 2010, for an effective growth rate of 2.4%. Massachusetts growth rate for this same period of time was higher at 3.4%.

Table 5-33 shows the shift of population from urban areas to suburban and rural areas over the past 50 years. Suburbanization of the region became prominent in the 1950's when the communities adjacent to the urban core cities experienced unprecedented rates of growth. In the 1990's, with ongoing expansion, the highest rates of growth were found at the edges of the traditional suburbs, in the region's rural communities. Belchertown, for example, which has the largest land area of any community in the region had a population increase of 22.6 percent between 1990 and 2000.

Suburban growth has continued in the 2000s in towns like Belchertown and East Longmeadow, which grew by 12.9 percent and 11.7 percent respectively. More rural towns such as a Goshen, Montgomery and Tolland have also seen significant population increases (16.6%, 28.2% and 13.3 %). Interestingly, since 2000 urban core communities have seen more modest growth; Springfield and Holyoke have seen increases of 1.06% and 1.03% respectively. Northampton's population has declined slightly. The population of Amherst, on the other hand, has grown by 11.6%. These trends have continued since 2000 with communities such as Montgomery, Belchertown, Brimfield, Southampton, and Granville experiencing sizable population change between 2000-2013 (up 31.2 percent, 13.7 percent, 11 percent, 11 percent, and 6 percent respectively). .

Table 5-33 – Pioneer Valley Region Population Change

	1950	1960	1970	1980	1990	2000	2010	2013
Agawam	10,166	15,781	21,717	26,271	27,323	28,144	28,452	28,705
Amherst	10,856	13,781	26,331	33,229	35,228	34,873	38,689	38,919
Belchertown	4,487	5,186	5,936	8,339	10,579	12,968	14,645	14,735
Blandford	597	636	863	1,038	1,187	1,214	1,234	1,246
Brimfield	1,182	1,414	1,907	2,317	3,001	3,339	3,616	3,708
Chester	1,292	1,155	1,025	1,123	1,280	1,306	1,338	1,360
Chesterfield	496	556	704	1,000	1,048	1,201	1,226	1,239
Chicopee	49,211	61,553	66,676	55,112	56,632	54,653	55,264	55,717
Cummington	620	550	562	657	785	1,004	872	867
East Longmeadow	4,881	10,294	13,029	12,905	13,367	14,100	15,746	16,022
Easthampton	10,694	12,326	13,012	15,580	15,537	15,994	16,040	15,971
Goshen	321	385	483	651	830	903	1,053	1,058
Granby	1,816	4,221	5,473	5,380	5,565	6,132	6,237	6,290
Granville	740	874	1,008	1,204	1,403	1,521	1,570	1,612
Hadley	2,639	3,099	3,750	4,125	4,231	4,793	5,248	5,271
Hampden	1,322	2,345	4,572	4,745	4,709	5,171	5,143	5,179
Hatfield	2,179	2,350	2,825	3,045	3,184	3,249	3,275	3,282
Holland	377	561	931	1,589	2,185	2,407	2,483	2,495
Holyoke	54,661	52,689	50,112	44,678	43,704	39,838	39,902	40,249
Huntington	1,256	1,392	1,593	1,804	1,987	2,192	2,179	2,168
Longmeadow	6,508	10,565	15,630	16,301	15,467	15,633	15,807	15,882
Ludlow	8,660	13,805	17,580	18,150	18,820	21,209	21,147	21,451
Middlefield	295	315	288	385	392	580	521	528
Monson	6,125	6,712	7,355	7,315	7,776	8,359	8,566	8,722
Montgomery	157	333	446	637	759	656	841	862
Northampton	29,603	30,058	29,664	29,286	29,289	28,978	28,616	28,495
Palmer	9,533	10,358	11,680	11,389	12,054	12,497	12,140	12,157
Pelham	579	805	937	1,112	1,373	1,403	1,320	1,319
Plainfield	228	237	287	425	571	576	648	650
Russell	1,298	1,366	1,382	1,570	1,594	1,655	1,776	1,789
South Hadley	10,145	14,956	17,033	16,399	16,685	17,196	17,712	17,740
Southampton	1,387	2,192	3,069	4,137	4,478	5,387	5,802	5,984
Southwick	2,855	5,139	6,330	7,382	7,667	8,835	9,509	9,634
Springfield	162,399	174,463	163,905	152,319	156,983	152,082	153,451	153,703
Tolland	107	101	172	235	289	428	485	489
Wales	497	659	852	1,177	1,566	1,737	1,841	1,875
Ware	7,517	7,517	8,187	8,953	9,808	9,708	9,868	9,844
West Springfield	20,438	24,924	28,461	27,042	27,537	27,899	28,354	28,684
Westfield	20,962	26,302	31,433	36,465	38,372	40,072	41,115	41,301
Westhampton	452	583	793	1,137	1,327	1,468	1,606	1,603
Wilbraham	4,003	7,387	11,984	12,053	12,635	13,473	14,225	14,477
Williamsburg	2,056	2,186	2,342	2,237	2,515	2,427	2,481	2,466
Worthington	462	597	712	932	1,156	1,219	1,157	1,167
Pioneer Valley Region	**456,059**	**532,708**	**583,031**	**581,830**	**602,878**	**608,479**	**623,200**	**626,915**
Massachusetts	**4,691,000**	**5,149,000**	**5,689,170**	**5,737,037**	**6,016,425**	**6,349,097**	**6,563,26**	**6,692,82**

Table 5-34 – Rate of Population Change by Community

	1950 to 1960	1960 to 1970	1970 to 1980	1980 to 1990	1990 to 2000	2000 to 2010	2010 to 2013
Agawam	55.2%	37.6%	21.0%	4.0%	3.0%	1.1%	0.9%
Amherst	26.9%	91.1%	26.2%	6.0%	(1.0%)	10.9%	0.6%
Belchertown	15.6%	14.5%	40.5%	26.9%	22.6%	12.9%	0.6%
Blandford	6.5%	35.7%	20.3%	14.4%	2.3%	1.6%	1.0%
Brimfield	19.6%	34.9%	21.5%	29.5%	11.3%	8.3%	2.5%
Chester	(10.6%)	(11.3%)	9.6%	14.0%	2.0%	2.5%	1.6%
Chesterfield	12.1%	26.6%	42.0%	4.8%	14.6%	2.1%	1.1%
Chicopee	25.1%	8.3%	(17.3%)	2.8%	(3.5%)	1.1%	0.8%
Cummington	(11.3%)	2.2%	16.9%	19.5%	27.9%	(13.1%)	(0.6%)
East Longmeadow	110.9%	26.6%	(1.0%)	3.6%	5.5%	11.7%	1.8%
Easthampton	15.3%	5.6%	19.7%	(0.3%)	2.9%	0.3%	(0.4%)
Goshen	19.9%	25.5%	34.8%	27.5%	8.8%	16.6%	0.5%
Granby	132.4%	29.7%	(1.7%)	3.4%	10.2%	1.7%	0.8%
Granville	18.1%	15.3%	19.4%	16.5%	8.4%	3.2%	2.7%
Hadley	17.4%	21.0%	10.0%	2.6%	13.3%	9.5%	0.4%
Hampden	77.4%	95.0%	3.8%	(0.8%)	9.8%	(0.5%)	0.7%
Hatfield	7.8%	20.2%	7.8%	4.6%	2.0%	0.8%	0.2%
Holland	48.8%	66.0%	70.7%	37.5%	10.2%	3.2%	0.5%
Holyoke	(3.6%)	(4.9%)	(10.8%)	(2.2%)	(8.8%)	0.2%	0.9%
Huntington	10.8%	14.4%	13.2%	10.1%	10.3%	(0.6%)	(0.5%)
Longmeadow	62.3%	47.9%	4.3%	(5.1%)	1.1%	1.1%	0.5%
Ludlow	59.4%	27.3%	3.2%	3.7%	12.7%	(0.3%)	1.4%
Middlefield	6.8%	(8.6%)	33.7%	1.8%	48.0%	(10.2%)	1.3%
Monson	9.6%	9.6%	(0.5%)	6.3%	7.5%	2.5%	1.8%
Montgomery	112.1%	33.9%	42.8%	19.2%	(13.6%)	28.2%	2.5%
Northampton	1.5%	(1.3%)	(1.3%)	0.0%	(1.1%)	(1.2%)	(0.4%)
Palmer	8.7%	12.8%	(2.5%)	5.8%	3.7%	(2.9%)	0.1%
Pelham	39.0%	16.4%	18.7%	23.5%	2.2%	(5.9%)	(0.1%)
Plainfield	3.9%	21.1%	48.1%	34.4%	0.9%	12.5%	0.3%
Russell	5.2%	1.2%	13.6%	1.5%	3.8%	7.3%	0.7%
South Hadley	47.4%	13.9%	(3.7%)	1.7%	3.1%	3.0%	0.2%
Southampton	58.0%	40.0%	34.8%	8.2%	20.3%	7.7%	3.1%
Southwick	80.0%	23.2%	16.6%	3.9%	15.2%	7.6%	1.3%
Springfield	7.4%	(6.1%)	(7.1%)	3.1%	(3.1%)	0.9%	0.2%
Tolland	(5.6%)	70.3%	36.6%	23.0%	48.1%	13.3%	0.8%
Wales	32.6%	29.3%	38.1%	33.1%	10.9%	6.0%	1.8%
Ware	0.0%	8.9%	9.4%	9.5%	(1.0%)	1.6%	(0.2%)
West Springfield	21.9%	14.2%	(5.0%)	1.8%	1.3%	1.6%	1.2%
Westfield	25.5%	19.5%	16.0%	5.2%	4.4%	2.6%	0.5%
Westhampton	29.0%	36.0%	43.4%	16.7%	10.6%	9.4%	(0.2%)
Wilbraham	84.5%	62.2%	0.6%	4.8%	6.6%	5.6%	1.8%
Williamsburg	6.3%	7.1%	(4.5%)	12.4%	(3.5%)	2.2%	(0.6%)
Worthington	29.2%	19.3%	30.9%	24.0%	5.4%	(5.1%)	0.9%
Pioneer Valley	**16.8%**	**9.4%**	**(0.2%)**	**3.6%**	**0.9%**	**2.4%**	**0.6%**
Massachusetts	**9.8%**	**10.5%**	**0.8%**	**4.9%**	**5.5%**	**3.4%**	**2.0%**

Source: U.S. Census Bureau

2. Ethnic and Racial Diversity

The Pioneer Valley region's ethnic and racial diversity continues to grow. Continuing an established trend, the region's Hispanic and Latino population grew by 53% between 2000 and 2013, a rate of growth that was significant, though slightly lower than that of the state and slightly higher than the national rate. While the rate of growth in the Hispanic and Latino population has been slightly slower than that of the state, at approximately 17.6% of the total population, the Hispanic and Latino population is actually slightly higher than that of the nation. In this sense, the Pioneer Valley region looks less like the rest of the state as a whole and more like nation-wide demographics. Conversely, the proportion of the Pioneer Valley region population identifying exclusively as White (70.7%) is closer to that of the state (74.6%) than to the nation (62.4 percent).

While the proportion of people who identify as White (of any ethnicity) in the Pioneer Valley region is now just over 80%, slightly higher than that of Massachusetts as a whole, the breakdown of people who identified as races other than White were varied somewhat.

The Pioneer Valley region was nearly identical to the state in the proportion of people who identify as African Americans (7.6%), Native Americans or Pacific Islander (0.1%), 3% lower in the proportion of people who identify as an Asian race (2.7) and 2.1%% higher in the proportion of people who consider themselves a race other than the main five classifications recognized by the U.S. Census Bureau (6.3% of the region's population identify this way).

The region's population who identify other than white and non-Hispanic continue to be concentrated in either the urban core area or its surrounding communities. With the region's population increase attributed primarily to growth in minority groups, it can be inferred that the bulk of new residents are located in or around the Springfield-Chicopee-Holyoke urbanized area. Given that the core cities diminished in population, this implies a significant out-migration of white people from the urban core. In addition, the average annual income for persons of color is, generally, less than that for white persons. Combined, these factors indicate that the region's urban area may experience an increase in demand for transit service.

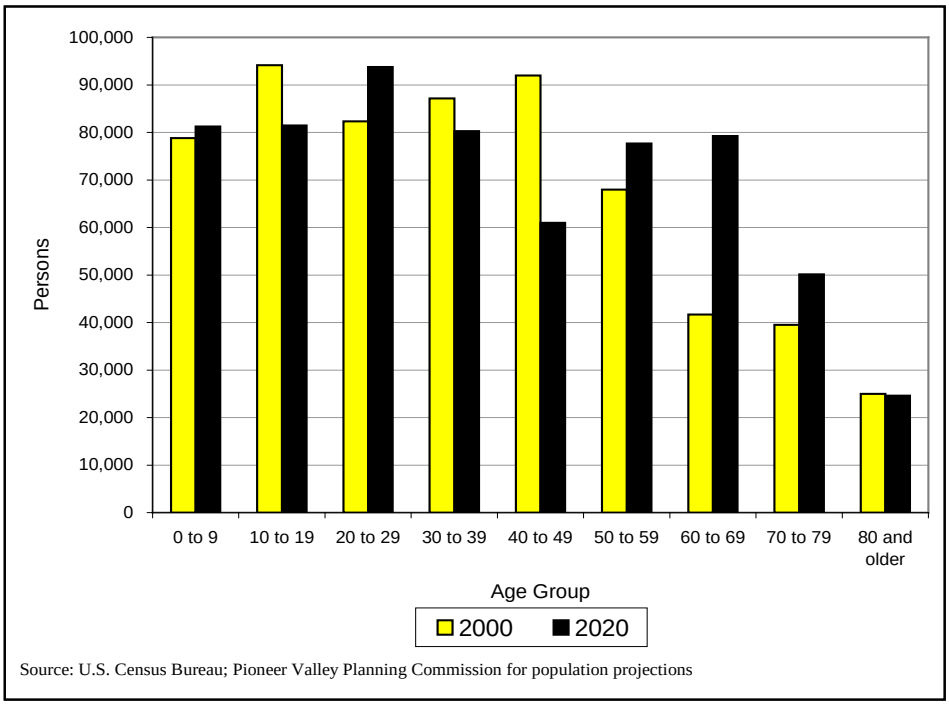
3. Age

Reflecting a national trend, the Pioneer Valley region's population is aging. In 1990, the region's median age was 32.8, had risen to 35.9 in 2000, and reached 37.8 in 2013. This trend is projected to continue for the next several decades because fertility rates are low and baby boomers are becoming seniors. Figure 5-27 shows the actual 2000 population and the projected

2020 population by age group. All four age groups over age 50 show increases in population between 2000 and 2020.

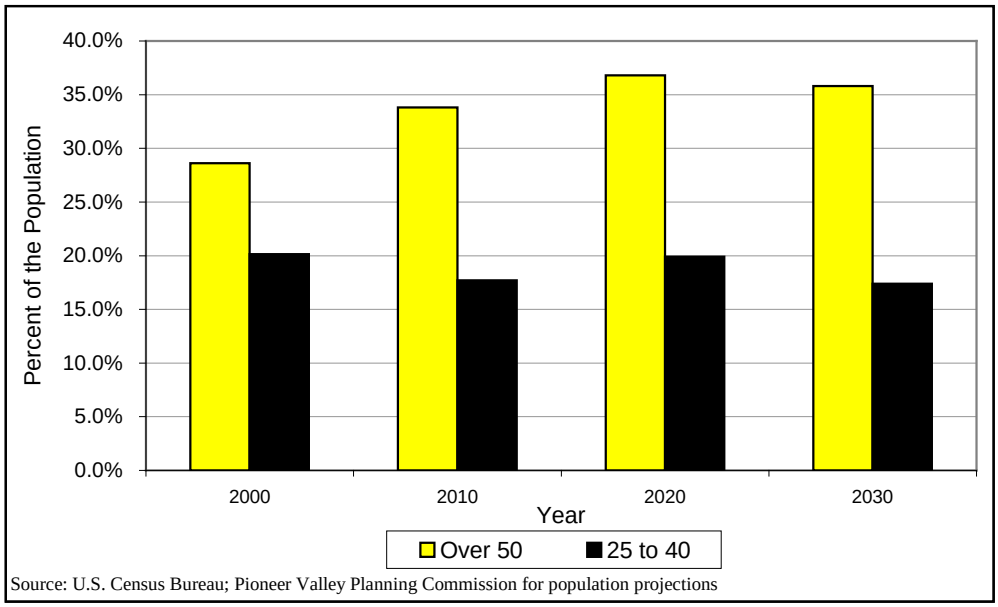
Decreases in the size of the region's young adult population are also expected to continue. Figure 5-28 contrasts the change in the elder population with that of the 25 to 40 year old population.

Figure 5-27 – Projected Population by Age Group for the Pioneer Valley Region



Source: U.S. Census Bureau; Pioneer Valley Planning Commission for population projections

Figure 5-28 – Projected Percent of the Population in select Age Groups



Source: U.S. Census Bureau; Pioneer Valley Planning Commission for population projections

J. HOUSING

1. Household growth

Population growth of 2.4 percent between 2000 and 2010 also resulted in an increase in the number of households in the Pioneer Valley. Between 2000 and 2010, the number of households increased from 231,430 to 238, 629, a 3.1 percent rise. Households are defined as persons who occupy a housing unit in which the occupants live and eat separately from any other persons in the building and they have direct access to the unit from outside of the building or through a common hall. Between2000 and 2010, Montgomery and Westhampton had the largest percentage increase in households (28.4 percent and15.6 percent respectively), while Holyoke and Northampton experienced more modest increases of 2.4 percent and 1.2 percent. Springfield experienced the greatest decrease during this time of .7 percent. . (See Table 3-35). Since 2010, many towns experienced notable declines in the number of households; these contribute to the overall .76 percent decline in the number of households in the Pioneer Valley. Blandford, Amherst, Huntington and Williamsburg have experienced the largest drops, with 10.16 percent, 7.3 percent, 5.07 percent and 5.19 percent respectively.

Table 5-35 – Total Households, 1980-2013

	Total Households					Percent Change			
	1980	1990	2000	2010	2013	1980 to 1990	1990 to 2000	2000 to 2010	2010 to 2013
Agawam	9,355	10,432	11,271	11,664	11,497	11.5%	8.0%	3.5%	(1.4%)
Amherst	7,606	8,477	9,150	9,259	8,583	11.5%	7.9%	1.2%	(7.3%)
Belchertown	2,824	3,825	4,904	5,595	5,798	35.4%	28.2%	14.1%	3.6%
Blandford	343	424	460	492	442	23.6%	8.5%	7.0%	(10.2%)
Brimfield	820	1,078	1,252	1,429	1,478	31.5%	16.1%	14.1%	3.4%
Chester	409	464	490	543	547	13.4%	5.6%	10.8%	0.7%
Chesterfield	368	360	446	511	492	(2.2%)	23.9%	14.6%	(3.7%)
Chicopee	20,353	22,625	23,115	23,739	23,003	11.2%	2.2%	2.7%	(3.1%)
Cummington	259	317	406	404	443	22.4%	28.1%	(0.5%)	9.7%
East Longmeadow	4,271	4,670	5,236	5,851	5,798	9.3%	12.1%	11.7%	(0.9%)
Easthampton	5,715	6,170	6,859	7,224	7,295	8.0%	11.2%	5.3%	1.0%
Goshen	204	301	368	416	455	47.5%	22.3%	13.0%	9.4%
Granby	1,703	1,939	2,259	2,374	2,547	13.9%	16.5%	5.1%	7.3%
Granville	404	483	542	608	607	19.6%	12.2%	12.2%	(0.2%)
Hadley	1,511	1,633	1,895	2,107	2,084	8.1%	16.0%	11.2%	(1.1%)
Hampden	1,490	1,620	1,823	1,898	1,908	8.7%	12.5%	4.1%	0.5%
Hatfield	1,075	1,266	1,378	1,483	1,544	17.8%	8.8%	7.6%	4.1%
Holland	542	791	900	994	1,017	45.9%	13.8%	10.4%	2.3%
Holyoke	16,562	15,850	15,000	15,361	15,846	(4.3%)	(5.4%)	2.4%	3.2%
Huntington	611	703	813	868	824	15.1%	15.6%	6.8%	(5.1%)
Longmeadow	5,020	5,360	5,738	5,741	5,720	6.8%	7.1%	0.1%	(0.4%)
Ludlow	5,975	6,957	7,666	8,080	8,223	16.4%	10.2%	5.4%	1.8%
Middlefield	139	146	219	218	213	5.0%	50.0%	(0.5%)	(2.3%)
Monson	2,373	2,642	3,099	3,279	3,403	11.3%	17.3%	5.8%	3.8%
Montgomery	204	250	257	330	342	22.5%	2.8%	28.4%	3.6%
Northampton	10,235	11,164	11,863	12,000	11,538	9.1%	6.3%	1.2%	(3.9%)
Palmer	4,227	4,781	5,090	5,099	4,968	13.1%	6.5%	0.2%	(2.6%)
Pelham	383	492	537	549	575	28.5%	9.1%	2.2%	4.7%
Plainfield	153	209	247	269	264	36.6%	18.2%	8.9%	(1.9%)
Russell	540	557	598	656	629	3.1%	7.4%	9.7%	(4.1%)
South Hadley	5,242	5,884	6,584	6,793	7,126	12.2%	11.9%	3.2%	4.9%
Southampton	1,353	1,543	1,966	2,249	2,306	14.0%	27.4%	14.4%	2.5%
Southwick	2,464	2,713	3,312	3,710	3,623	10.1%	22.1%	12.0%	(2.3%)
Springfield	55,158	57,769	57,178	56,752	55,894	4.7%	(1.0%)	(0.7%)	(1.5%)
Tolland	90	108	183	197	214	20.0%	69.4%	7.7%	8.6%
Wales	378	550	660	736	723	45.5%	20.0%	11.5%	(1.8%)
Ware	3,381	3,836	4,020	4,120	4,394	13.5%	4.8%	2.5%	6.7%
West Springfield	10,488	11,485	11,866	12,124	11,703	9.5%	3.3%	2.2%	(3.5%)
Westfield	12,409	13,823	14,798	15,335	15,028	11.4%	7.1%	3.6%	(2.0%)
Westhampton	379	442	539	623	630	16.6%	21.9%	15.6%	1.1%
Wilbraham	3,893	4,474	4,941	5,309	5,377	14.9%	10.4%	7.4%	1.3%
Williamsburg	798	933	1,031	1,118	1,176	16.9%	10.5%	8.4%	5.2%
Worthington	318	412	471	522	541	29.6%	14.3%	10.8%	3.6%
Pioneer Valley Region	202,025	219,958	231,430	238,629	236,818	8.9%	5.2%	3.1%	(0.8%)

Source: U.S. Census Bureau, Decennial Census 1990, 2000, 2010, and ACS 2009-2013 5 year estimates

2. Size

While the number of households has declined and population grown, , the average size of households in the region has remained relatively stable between 2000 and 2010 (See Table 5-36). Household size has been decreasing throughout the nation over the past forty years. In 1970, 47 percent of households had one or two people, by 2000 this number increased to 60.1 percent of all households. Large households (5 or more people) decreased from 20.1 percent of all households in 1970 to 7.7 percent of all households in 2013.

The trend toward more and smaller households (particularly single person households), and increased development in the region's rural areas, indicates increases in the total number of commuters as well as those inclined to commute alone, the number of vehicles, and the number of vehicle miles traveled. Table 5-37 shows the number of households in each community by type (family, non-family) and person size.

Another important factor in housing size is the number of dwelling units per household. The communities of the region represent a wide range of situations. In the urban areas, such as Springfield and Holyoke, there is a high density of multi-family dwellings, while some rural and suburban communities are almost exclusively single family homes. Of the total housing units in the region, [157,772, or 62.1 percent], are single family and [93,606, or 36.8 percent, are multi-family]. The communities of Amherst and Northampton are an exception to the pattern described above. These communities have high college student populations which results in a disproportionate concentration of multi-family homes.

Table 5-36 – Household Size, 1960 to 2013

Year	Number of Households						
	1 Person	2 People	3 People	4 People	5 People	6 or more People	Total
1960	21,425	42,454	31,047	28,406	18,306	15,232	156,870
	13.7%	27.1%	19.8%	18.1%	11.7%	9.7%	
1970	32,998	50,799	31,071	27,378	17,644	18,092	177,982
	18.5%	28.5%	17.5%	15.4%	9.9%	10.2%	
1980	47,036	62,661	35,616	31,060	15,514	10,393	202,280
	23.3%	31.0%	17.6%	15.4%	7.7%	5.1%	
1990	55,863	68,760	39,324	34,276	14,429	7,306	219,958
	25.4%	31.3%	17.9%	15.6%	6.6%	3.3%	
2000	65,759	73,290	37,960	32,613	14,334	7,474	231,430
	28.4%	31.7%	16.4%	14.1%	6.2%	3.2%	
2010	70,040	76,617	39,531	31,384	13,304	7,753	238,629
	29.4%	32.1%	16.6%	13.2%	5.6%	3.2%	
2009-2013	69,988	77,483	38,218	32,763	11,865	6,501	236,819
	29.6%	32.7%	16.1%	13.8%	5.0%	2.7%	

Source: U.S. Census Bureau

Note: 2013 value is the 2009-2013 American Community Survey estimate.

Table 5-37 – Number of Households by Type and Size, 2013

	Family Households by Size							Nonfamily Households by Size								Total All Households
	2 People	3 People	4 People	5 People	6 People	7 or more People	Total	1 Person	2 People	3 People	4 People	5 People	6 People	7 or more People	Total	
Agawam	3,174	1,676	1,793	475	67	178	7,363	3,664	450	14	0	0	6	0	4,134	11,497
Amherst	2,123	904	879	203	76	40	4,225	2,177	840	500	700	72	69	0	4,358	8,583
Belchertown	1,688	1,048	1,053	334	55	0	4,178	1,295	289	19	17	0	0	0	1,620	5,798
Blandford	139	112	72	8	0	0	331	82	25	4	0	0	0	0	111	442
Brimfield	424	315	156	116	0	0	1,011	378	71	12	6	0	0	0	467	1,478
Chester	146	104	92	41	14	0	397	117	33	0	0	0	0	0	150	547
Chesterfield	188	79	66	20	5	0	358	117	14	3	0	0	0	0	134	492
Chicopee	6,097	3,180	2,729	1,041	339	217	13,603	7,743	1,523	134	0	0	0	0	9,400	23,003
Cummington	109	80	42	18	2	2	253	170	20	0	0	0	0	0	190	443
East Longmeadow	1,908	993	953	300	177	54	4,385	1,296	108	9	0	0	0	0	1,413	5,798
Easthampton	2,069	1,074	857	283	0	0	4,283	2,235	690	87	0	0	0	0	3,012	7,295
Goshen	139	68	81	19	2	2	311	126	18	0	0	0	0	0	144	455
Granby	651	483	412	95	53	25	1,719	712	104	12	0	0	0	0	828	2,547
Granville	220	80	83	40	31	6	460	119	28	0	0	0	0	0	147	607
Hadley	440	335	254	95	11	26	1,161	692	140	38	41	12	0	0	923	2,084
Hampden	670	446	306	62	21	33	1,538	357	13	0	0	0	0	0	370	1,908
Hatfield	399	265	177	23	0	11	875	563	106	0	0	0	0	0	669	1,544
Holland	333	128	121	46	20	3	651	251	111	4	0	0	0	0	366	1,017
Holyoke	4,014	2,418	2,098	731	346	115	9,722	5,059	964	69	32	0	0	0	6,124	15,846
Huntington	244	161	91	35	23	15	569	218	37	0	0	0	0	0	255	824
Longmeadow	1,822	1,022	959	434	126	30	4,393	1,195	132	0	0	0	0	0	1,327	5,720
Ludlow	2,438	1,508	1,202	398	55	17	5,618	2,174	389	22	12	0	8	0	2,605	8,223
Middlefield	83	35	25	2	0	0	145	54	14	0	0	0	0	0	68	213
Monson	885	526	490	219	13	6	2,139	830	367	67	0	0	0	0	1,264	3,403
Montgomery	138	49	64	15	7	0	273	55	14	0	0	0	0	0	69	342
Northampton	2,684	1,403	1,087	369	118	64	5,725	4,351	1,288	95	46	33	0	0	5,813	11,538
Palmer	1,346	775	688	174	94	62	3,139	1,604	203	22	0	0	0	0	1,829	4,968
Pelham	194	95	48	48	5	0	390	141	31	13	0	0	0	0	185	575
Plainfield	97	27	23	13	8	0	168	57	37	0	2	0	0	0	96	264
Russell	251	64	130	31	8	3	487	115	27	0	0	0	0	0	142	629
South Hadley	2,179	884	634	361	66	30	4,154	2,593	379	0	0	0	0	0	2,972	7,126
Southampton	856	355	574	96	13	0	1,894	368	44	0	0	0	0	0	412	2,306
Southwick	1,105	698	663	134	25	41	2,666	708	217	18	14	0	0	0	957	3,623
Springfield	13,507	9,158	7,106	3,573	1,510	1,012	35,866	16,694	2,774	217	282	61	0	0	20,028	55,894
Tolland	83	48	29	14	0	0	174	34	6	0	0	0	0	0	40	214
Wales	263	114	77	60	6	2	522	174	27	0	0	0	0	0	201	723
Ware	1,335	608	498	249	57	0	2,747	1,467	153	14	0	0	13	0	1,647	4,394
West Springfield	3,237	1,581	1,633	458	242	102	7,253	3,814	574	32	0	12	18	0	4,450	11,703
Westfield	4,133	2,588	2,110	599	245	249	9,924	4,278	608	119	85	14	0	0	5,104	15,028
Westhampton	196	106	108	27	8	2	447	124	47	12	0	0	0	0	183	630
Wilbraham	1,743	799	895	331	107	49	3,924	1,229	154	70	0	0	0	0	1,453	5,377
Williamsburg	343	179	123	47	26	0	718	401	48	5	4	0	0	0	458	1,176
Worthington	230	36	41	24	0	10	341	157	43	0	0	0	0	0	200	541
Pioneer Valley Region	**64,323**	**36,607**	**31,522**	**11,661**	**3,981**	**2,406**	**150,500**	**69,988**	**13,160**	**1,611**	**1,241**	**204**	**114**	**0**	**86,318**	**236,818**

K. EMPLOYMENT

1. Type

The region's economic base continues to demonstrate the transition from the manufacturing to the service industry. Manufacturing once dominated the Valley's economy, employing over 28 percent of the work force in 1980. By 1990, nearly one-quarter of those manufacturing jobs had been lost or relocated out of the Region. This trend continued into the 1990s as the number of manufacturing jobs decreased by 25.3 percent between 1990 and 2000. By 2013, manufacturing accounts for only 8.4 percent of jobs in the region. At the same time service employment has increased. Today, services employ more of the region's work force than manufacturing, with services comprising more than half of all jobs in 2013. Table 5-38 shows employment in the region's communities by employment sector, total payroll, and average wage for 2013. At $51,480, Springfield has one of the highest average annual wages within the region because it is home to many of the region's largest and most successful employers.

Several important implications for transportation can be derived from this information. First, the shift from primarily manufacturing jobs to high paying service jobs means that during that period the average annual income for many of the region's residents was increasing. This, in turn, has improved residential flexibility and choice for residents. Since the cost of housing in urban areas is typically less than that for suburbs or outlying areas, residents with increased incomes can afford to live outside the urban core and commute. This was clearly shown in Census 2000 data as population decreases in the urban core are accompanied by increases in outlying suburbs and rural towns. The trend is beginning to reverse, as higher gasoline prices and the 2008-09 recession encouraged workers to live closer to employment centers by the 2010 Census.

Finally, increases in the number of two-income households and the number of women in the work force indicate increases in the number of vehicles and vehicle miles traveled. Often the workers in a two income household are unable to share a commute due to the distance or time inconveniences. Therefore, the number of vehicles and miles traveled increases. In addition to more trips to and from work, the number of incidental or side trips also increases (particularly during rush hour) as children are taken to and from day care facilities and errands are combined with the commute. Due to the need to access child care, retail and business facilities during the workday, the single occupant vehicle remains the primary choice for transportation of the region's work force. Employer-based childcare facilities could enhance the opportunity for many people to use an alternative to the single occupant

vehicle. Likewise, the provision of retail and business establishments near employment centers (such as drug stores, banks, restaurants) could reduce the need for all employees to have cars in order to take care of personal business during the work day.

5. Growth

As Figure 5-29 illustrates, the early 1990s saw sharp decreases in employment levels across the Pioneer Valley region, largely the result of economic recession. Consequently, people began leaving the region, provoking a steep drop in the size of the region's labor force between 1990 and 1996. This had potential to be disastrous for growth in the region as employers grew frustrated at the lack of qualified workers to fill open positions. However, declines in employment and labor force size leveled off in the second half of the 1990s and, beginning in 2000, both measures appeared to be sharply increasing. About a year after the March 2001 return of recession, employment levels in the Pioneer Valley began to fall again, and then more extremely during the 2008-2009 recession. Neither employment levels nor the labor force have recovered fully from the recession, though they do seem to be headed in the right direction now. While the unemployment rate has dropped since 2009, it remains elevated at 7%,

The recession of 2008-09 resulted in a net decrease in employment between 2000 and 2010. Sectors that managed to grow included state and local government (8.9 percent), education (31.8 percent) and health care (29 percent). Projected growth will likely take place in the health care, education and construction industries as the economy recovers (BLS, Employment Projections, Table 2. Employment by Major Industry Sector, 2012 - national) [Manufacturing employment will most likely continue to decrease, though perhaps not as quickly as it has in the last two decades.]

Table 5-38 – Pioneer Valley Regional Employment by Industrial Sector, 2013

	Agriculture, Forestry, & Fishing	Utilities	Con-struction	Manufact-uring	Whole-sale Trade	Retail Trade	Transport & Ware-housing	Inform-ation	Finance & Insurance	Real Estate and Rental/ Leasing	Prof-essional & Technical Services	Manage-ment of Companies and Enterprises	Adminis-trative & Waste Services	Edu-cational Services	Health Care and Social Assistance	Arts, Entertain-ment, & Recreation	Accomo-dation & Food Services	Other Services	Public Adminis-tration	Total Employ-ment	Establish-ments	Average Annual Wage
Agawam	19		659	2,234	672	902	190	32	153	114	721	54	722		1,893		717	260		11,850	787	$42,068
Amherst	66		178	47	39	819	100	200	188	234	316		103	8,960	1,557	545	1,568	388	359	15,701	950	$47,112
Belchertown			85	83	157	262	517		62	24	87		139		350		163	76	204	2,713	310	$35,204
Blandford			8								12									217	19	$16,224
Brimfield			70		8	38	35		9	8	4		28		37		31	15		513	83	$37,388
Chester			11												6					110	24	$29,692
Chesterfield			21												28					148	24	$24,024
Chicopee			1,322	2,806	1,105	2,533	928	468	379	215	187	111	449	2,085	2,271	121	1,833	594	1,240	18,764	1,424	$41,444
Cummington							11							67	8					183	27	$31,460
East Longmeadow			302	1,760	317	771	184	115	224	80	324		150		1,485	152	540	370		7,647	583	$43,836
Easthampton	21		325	757	83	398			196	112	113		321	611	610	40	424	205		4,760	419	$38,012
Goshen			15												34					162	26	$25,792
Granby			92		47	86		7	16		34		62		62	5	77	17		883	142	$33,072
Granville			13												9			5		162	30	$27,560
Hadley	132		145	30	90	1,901	37	68	106	37	395		86	1,104	490	97	878	109		6,070	358	$36,192
Hampden			72	20	2	60	8		14		37		73		148		131	22		824	129	$35,828
Hatfield	94		66	60	899	90	56				98		142		268	20	60	23		2,110	120	$43,056
Holland						18									4					124	26	$32,292
Holyoke		696	603	1,705	448	3,807	229	66	435	247	422	238	828	2,591	6,386	198	1,534	494	752	21,679	1,815	$41,132
Huntington			12			24									86		26	7		397	44	$34,944
Longmeadow			83		21	424			220	43	84		55	927	1,025	209	360	75		3,699	346	$38,688
Ludlow			718	555	302	610	88		150	42	95		586		621	68	575	167		6,501	506	$42,120
Middlefield																				42	7	$21,840
Monson			112	163	48	123	60				18		46		87		85	42		1,276	182	$39,208
Montgomery			12																	41	12	$27,248
Northampton		45	697	1,146	169	2,180	144	404	418	179	662	243	413	2,074	4,984	297	1,839	739	1,048	17,688	1,240	$42,692
Palmer			290	600	137	588	131	140	63	21	212	120	127	443	1,143	27	439	136	161	4,781	420	$41,080
Pelham			15								7				18					132	30	$25,636
Plainfield															4		11			47	18	$25,116
Russell			13			18									8					147	29	$33,748
South Hadley			263	157	197	362	82	48	109	42	70	37	140	1,686	532		399	156	191	4,529	370	$40,404
Southampton	17		161	83	32	311	17		20	5	49		13		49		127	30		1,115	134	$32,292
Southwick	122		107	448	35	411	38	15	45	26	14		53		193	116	328	101		2,577	283	$35,100
Springfield		440	1,457	3,952	1,322	5,684	3,251	1,654	5,818	857	2,124	1,456	3,085	8,373	26,014	616	4,915	2,776	3,322	77,122	6,488	$51,480
Tolland*																				34	5	$24,960
Wales			7												7					147	38	$29,848
Ware			66	363	20	757	38	15	73		31		58		480	11	231	53		2,640	252	$38,740
West Springfield			727	1,506	629	3,666	679	229	602	299	495	54	1,266		3,001	436	1,965	561		17,382	1,237	$39,104
Westfield			860	3,108	540	2,230	1,527	247	167	191	667	202	348	2,228	2,621	198	1,194	600	1,022	18,027	1,149	$44,200
Westhampton			18										17		8			17		313	37	$34,528
Wilbraham			154		175	608		26	122	28	190	10	159	781	741	85	340	105		4,829	376	$37,544
Williamsburg			97	54		86					30			153	15		69	22		584	82	$28,808
Worthington			13																	204	34	$28,236
Pioneer Valley Region	**471**	**1,181**	**9,869**	**21,637**	**7,494**	**29,767**	**8,350**	**3,734**	**9,589**	**2,804**	**7,498**	**2,525**	**9,469**	**32,083**	**57,283**	**3,241**	**20,859**	**8,165**	**8,299**	**258,874**	**20,615**	**$41,890**

Source: Massachusetts Division of Career Services and Division of Unemployment Assistance, 2009

Note: Blanks indicate that the data is suppressed to preserve confidentiality.

Figure 5-29 – Pioneer Valley Region Labor Force, Employment, and Unemployment

2. Median Household Income

The recession negatively affected wages also; median household incomes decreased between 2000 and 2010 by an average of 12.9% throughout the Pioneer Valley region. Hampden County suffered a more significant drop than Hampshire County, a trend that appears to be slowing between 2010 and 2013.

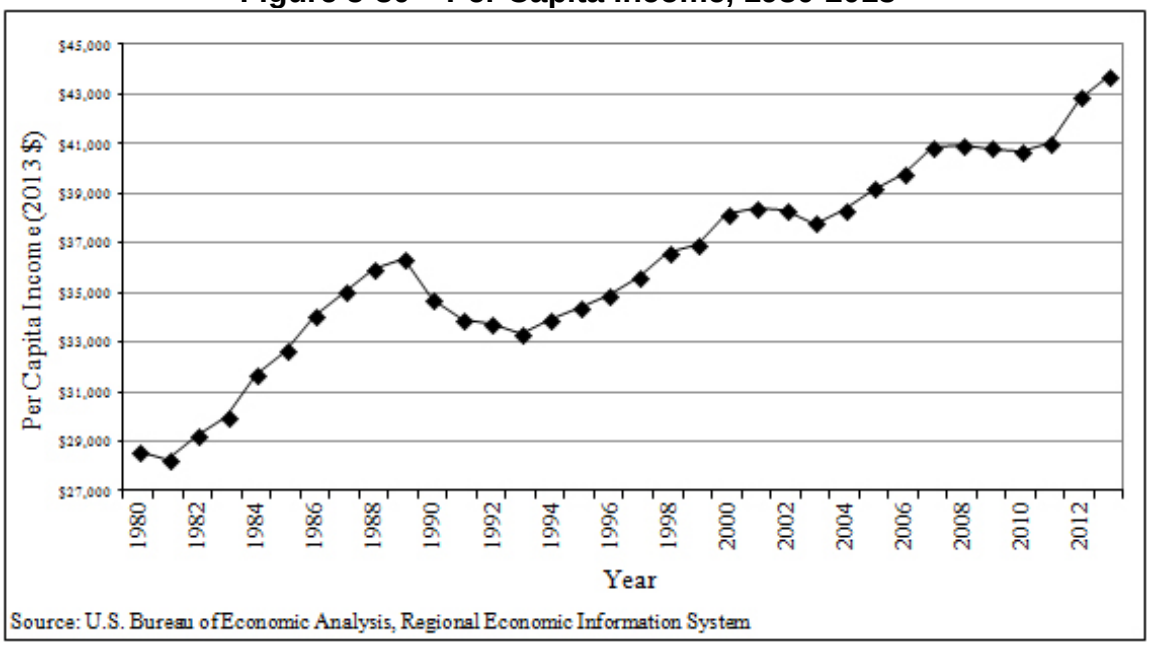
Though median household income has declined, per capita income (see Figure 5-30) in the Pioneer Valley region, except for slight losses between 1989 and 1993, had been increasing steadily since 1980. Despite two recessions in the 2000s, per capita wages continue to increase. Overall, declining household income coupled with rising average wages and per capita income is likely indicating that there are fewer wage earners per household now than in the past. This conclusion is also supported by our finding of shrinking average household sizes.

Table 5-39 – Median Household Income

	Median Household Income (2013 dollars)					Percent Change			
	1980	1990	2000	2010	2013	1980 to 1990	1990 to 2000	2000 to 2010	2010 to 2013
Hampden County	$59,256	$63,273	$58,122	$49,460	$49,094	6.8%	(8.1%)	(14.9%)	(0.7%)
Hampshire County	$61,122	$69,486	$67,459	$62,240	$61,227	13.7%	(2.9%)	(7.7%)	(1.6%)
Pioneer Valley Region*	**$59,665**	**$64,687**	**$60,380**	**$52,601**	**$52,108**	**8.4%**	**(6.7%)**	**(12.9%)**	**(0.9%)**

Source: U.S. Census Bureau Note: 2013 value is the 2009-2013 American Community Survey estimate.
* Median household income for the region is a weighted average based on the number of households.

Figure 5-30 – Per Capita Income, 1980-2013



L. VEHICLE REGISTRATION AND OWNERSHIP

Based on information available from 2012, a total of 532,188 vehicles were registered in the Pioneer Valley region. This translates into approximately 0.85 vehicles per person and is a decrease of 1.6 percent from 2008. Most of this decrease can be attributed to significantly fewer registered automobiles. Between 2008 and 2012, automobile registrations dropped by over 15 percent. Light truck and SUV registrations also decreased, but by far less (.04 percent). Automobile registrations appear to have peaked in 2008, at 304,425. Despite record-high gasoline prices between 2008-2012, light trucks and SUVs continue to comprise almost one-third of registered vehicles.

This decrease in automobile ownership is notable. The decrease in car ownership may be a result of the reduced workforce, and families not needing a second car. Alternatively, car owners may opt to use public transit to reduce transportation expenses, and avoid car maintenance costs altogether.

The City of Springfield has the most registered vehicles with 103,621 recorded in 2012. This translates to 24.5 percent of registered vehicles in the region. Outlying communities—including Belchertown, Brimfield, Chesterfield, Goshen, Holland, Plainfield, Tolland and Westhampton—had the largest increase in registered vehicles between 1996 and 2012 (an increase of more than 50 percent in each case). However, in the light truck and SUV category, the region's wealthiest town, Longmeadow, had the largest increase in registrations at 183.4 percent (going well beyond doubling the number of light trucks and SUVs registered in Longmeadow at a time when the population increased by only 1.6 percent). Tables 5-40 and 5-41 summarize the number of registered motor vehicles in the Pioneer Valley by community and type of vehicle for 1996 and 2012. Table 5-42 highlights the percent change in registrations between 1996 and 2012 by type of vehicle and community.

Table 5-40 – Registered Motor Vehicles in the Pioneer Valley – 1996

	Automobiles	Trailers	Light Trucks (& SUVs)	Heavy Trucks	Motorcycles	Other	Total
Agawam	16,476	1,060	4,609	488	227	310	23,170
Amherst	12,018	409	2,256	133	137	274	15,227
Belchertown	6,067	666	2,621	170	139	192	9,855
Blandford	614	84	399	17	21	13	1,148
Brimfield	1,581	185	755	80	48	87	2,736
Chester	615	89	452	27	23	17	1,223
Chesterfield	481	57	348	16	9	21	932
Chicopee	29,027	1,723	7,357	880	401	680	40,068
Cummington	458	57	284	12	17	24	852
East Longmeadow	8,405	582	2,232	207	94	203	11,723
Easthampton	8,735	482	2,726	116	169	219	12,447
Goshen	396	43	267	24	15	12	757
Granby	3,186	403	1,467	109	64	99	5,328
Granville	789	108	436	44	22	28	1,427
Hadley	2,610	263	1,012	110	29	82	4,106
Hampden	2,723	343	1,105	83	52	78	4,384
Hatfield	1,962	359	883	275	36	74	3,589
Holland	1,097	102	544	26	39	26	1,834
Holyoke	17,775	537	3,547	204	195	297	22,555
Huntington	954	117	597	24	27	43	1,762
Longmeadow	10,036	282	1,594	43	64	97	12,116
Ludlow	10,658	765	3,321	316	161	206	15,427
Middlefield	221	21	173	9	13	10	447
Monson	3,986	446	1,938	156	124	140	6,790
Montgomery	386	59	237	15	12	10	719
Northampton	15,174	725	3,943	309	203	293	20,647
Palmer	6,578	575	2,479	224	164	195	10,215
Pelham	814	66	259	14	10	27	1,190
Plainfield	270	31	178	7	5	13	504
Russell	776	153	424	19	16	17	1,405
South Hadley	8,918	639	2,623	208	110	191	12,689
Southampton	2,677	377	1,266	89	48	124	4,581
Southwick	4,511	526	2,077	164	115	146	7,539
Springfield	68,264	2,875	13,165	1,474	761	1,734	88,273
Tolland	190	23	114	12	10	7	356
Wales	857	86	442	24	33	32	1,474
Ware	4,675	384	1,901	123	122	101	7,306
West Springfield	15,968	1,037	3,926	525	211	383	22,050
Westfield	19,163	1,563	6,204	534	300	467	28,231
Westhampton	700	86	410	25	16	26	1,263
Wilbraham	7,933	657	2,026	206	111	201	11,134
Williamsburg	1,375	113	679	62	20	48	2,297
Worthington	597	71	356	22	17	44	1,107
Pioneer Valley Region	**300,696**	**19,229**	**83,632**	**7,625**	**4,410**	**7,291**	**422,883**

Source: Massachusetts Registry of Motor Vehicles

Table 5-41 – Registered Motor Vehicles in the Pioneer Valley – 2012

	Automobiles	Trailers	Light Trucks (& SUVs)	Heavy Trucks	Motorcycles	Other	Total
Agawam	13,864	1,764	9,316	806	658	2,586	28,994
Amherst	9,574	546	4,049	175	183	1,823	16,350
Belchertown	6,592	1,226	5,601	298	500	1,304	15,521
Blandford	483	138	628	37	63	93	1,442
Brimfield	1,636	417	1,620	124	162	330	4,289
Chester	483	140	637	39	73	94	1,466
Chesterfield	488	158	603	32	53	99	1,433
Chicopee	24,701	2,188	15,494	865	1,010	3,787	48,045
Cummington	435	76	375	34	51	87	1,058
East Longmeadow	7,483	940	5,322	344	312	1,740	16,141
Easthampton	7,872	793	5,203	171	396	1,167	15,602
Goshen	404	122	481	59	50	96	1,212
Granby	2,796	715	2,664	178	228	485	7,066
Granville	705	210	760	72	93	138	1,978
Hadley	2,665	464	1,835	158	99	546	5,767
Hampden	2,314	516	2,140	191	189	544	5,894
Hatfield	1,732	421	1,362	305	102	382	4,304
Holland	1,157	265	1,034	38	107	204	2,805
Holyoke	14,455	746	8,561	303	425	2,244	26,734
Huntington	838	223	1,065	52	79	169	2,426
Longmeadow	7,688	461	4,517	167	168	2,502	15,503
Ludlow	9,283	1,418	7,094	671	509	1,893	20,868
Middlefield	188	54	271	15	19	40	587
Monson	3,662	952	3,682	359	360	670	9,685
Montgomery	347	130	422	30	43	79	1,051
Northampton	13,414	897	6,621	379	427	2,297	24,035
Palmer	5,912	998	4,687	407	440	936	13,380
Pelham	726	102	418	28	33	177	1,484
Plainfield	327	53	310	15	21	50	776
Russell	630	153	773	37	73	133	1,799
South Hadley	7,618	959	4,997	325	301	1,441	15,641
Southampton	2,782	678	2,581	174	226	537	6,978
Southwick	4,340	925	3,954	325	345	989	10,878
Springfield	55,603	2,623	31,967	1,624	1,551	10,253	103,621
Tolland	212	84	243	19	21	41	620
Wales	844	182	802	39	93	149	2,109
Ware	4,050	644	3,779	169	315	686	9,643
West Springfield	13,151	1,201	8,279	730	462	2,413	26,236
Westfield	16,516	2,339	12,984	866	845	3,309	36,859
Westhampton	698	187	794	57	67	142	1,945
Wilbraham	7,027	922	5,035	310	323	1,865	15,482
Williamsburg	1,324	200	1,077	82	85	238	3,006
Worthington	568	140	572	28	62	105	1,475
Pioneer Valley Region	257,587	28,370	174,609	11,137	11,622	48,863	532,188

Source: Massachusetts Registry of Motor Vehicles

Table 5-42 – Percent Change in Registered Motor Vehicles, 1996-2012

	Automobiles	Trailers	Light Trucks (& SUVs)	Heavy Trucks	Motorcycles	Other	Total
Agawam	(15.9%)	66.4%	102.1%	65.2%	189.9%	734.2%	25.1%
Amherst	(20.3%)	33.5%	79.5%	31.6%	33.6%	565.3%	7.4%
Belchertown	8.7%	84.1%	113.7%	75.3%	259.7%	579.2%	57.5%
Blandford	(21.3%)	64.3%	57.4%	117.6%	200.0%	615.4%	25.6%
Brimfield	3.5%	125.4%	114.6%	55.0%	237.5%	279.3%	56.8%
Chester	(21.5%)	57.3%	40.9%	44.4%	217.4%	452.9%	19.9%
Chesterfield	1.5%	177.2%	73.3%	100.0%	488.9%	371.4%	53.8%
Chicopee	(14.9%)	27.0%	110.6%	(1.7%)	151.9%	456.9%	19.9%
Cummington	(5.0%)	33.3%	32.0%	183.3%	200.0%	262.5%	24.2%
East Longmeadow	(11.0%)	61.5%	138.4%	66.2%	231.9%	757.1%	37.7%
Easthampton	(9.9%)	64.5%	90.9%	47.4%	134.3%	432.9%	25.3%
Goshen	2.0%	183.7%	80.1%	145.8%	233.3%	700.0%	60.1%
Granby	(12.2%)	77.4%	81.6%	63.3%	256.3%	389.9%	32.6%
Granville	(10.6%)	94.4%	74.3%	63.6%	322.7%	392.9%	38.6%
Hadley	2.1%	76.4%	81.3%	43.6%	241.4%	565.9%	40.5%
Hampden	(15.0%)	50.4%	93.7%	130.1%	263.5%	597.4%	34.4%
Hatfield	(11.7%)	17.3%	54.2%	10.9%	183.3%	416.2%	19.9%
Holland	5.5%	159.8%	90.1%	46.2%	174.4%	684.6%	52.9%
Holyoke	(18.7%)	38.9%	141.4%	48.5%	117.9%	655.6%	18.5%
Huntington	(12.2%)	90.6%	78.4%	116.7%	192.6%	293.0%	37.7%
Longmeadow	(23.4%)	63.5%	183.4%	288.4%	162.5%	2479.4%	28.0%
Ludlow	(12.9%)	85.4%	113.6%	112.3%	216.1%	818.9%	35.3%
Middlefield	(14.9%)	157.1%	56.6%	66.7%	46.2%	300.0%	31.3%
Monson	(8.1%)	113.5%	90.0%	130.1%	190.3%	378.6%	42.6%
Montgomery	(10.1%)	120.3%	78.1%	100.0%	258.3%	690.0%	46.2%
Northampton	(11.6%)	23.7%	67.9%	22.7%	110.3%	684.0%	16.4%
Palmer	(10.1%)	73.6%	89.1%	81.7%	168.3%	380.0%	31.0%
Pelham	(10.8%)	54.5%	61.4%	100.0%	230.0%	555.6%	24.7%
Plainfield	21.1%	71.0%	74.2%	114.3%	320.0%	284.6%	54.0%
Russell	(18.8%)	0.0%	82.3%	94.7%	356.3%	682.4%	28.0%
South Hadley	(14.6%)	50.1%	90.5%	56.3%	173.6%	654.5%	23.3%
Southampton	3.9%	79.8%	103.9%	95.5%	370.8%	333.1%	52.3%
Southwick	(3.8%)	75.9%	90.4%	98.2%	200.0%	577.4%	44.3%
Springfield	(18.5%)	(8.8%)	142.8%	10.2%	103.8%	491.3%	17.4%
Tolland	11.6%	265.2%	113.2%	58.3%	110.0%	485.7%	74.2%
Wales	(1.5%)	111.6%	81.4%	62.5%	181.8%	365.6%	43.1%
Ware	(13.4%)	67.7%	98.8%	37.4%	158.2%	579.2%	32.0%
West Springfield	(17.6%)	15.8%	110.9%	39.0%	119.0%	530.0%	19.0%
Westfield	(13.8%)	49.6%	109.3%	62.2%	181.7%	608.6%	30.6%
Westhampton	(0.3%)	117.4%	93.7%	128.0%	318.8%	446.2%	54.0%
Wilbraham	(11.4%)	40.3%	148.5%	50.5%	191.0%	827.9%	39.1%
Williamsburg	(3.7%)	77.0%	58.6%	32.3%	325.0%	395.8%	30.9%
Worthington	(4.9%)	97.2%	60.7%	27.3%	264.7%	138.6%	33.2%
Pioneer Valley Region	**(14.3%)**	**47.5%**	**108.8%**	**46.1%**	**163.5%**	**570.2%**	**25.8%**

Source: Massachusetts Registry of Motor Vehicles