

## Chapter 5: Roadway and Bridge Infrastructure

### *Introduction*

It is important to acknowledge that due to Franklin County's rural development pattern, single occupancy vehicles are the prevalent mode of transportation in Franklin County. The Franklin County Transportation Planning Organization (FCTPO) actively promotes the use of alternative transportation, but also recognizes the important role that automobiles and trucks play in maintaining a healthy regional economy and the livelihood of its residents.

However, there are sections of Franklin County that are more densely developed and, therefore, could benefit from increased transportation alternatives. The development of safe, cost effective and convenient alternative transportation is challenging, and it remains an important part of the FCTPO's ongoing regional transportation planning efforts. The goal of these efforts is to reduce dependence on single occupancy vehicles. In addition, the FCTPO recognizes the importance of transportation alternatives to meet the needs of the region's poor and under represented populations.

The goal of this chapter is to identify existing concerns and future regional needs based on quantitative data related to road use and safety, projections of future regional transportation necessities, and public input received during the development of the plan. This chapter includes a description of the road network in Franklin County including a breakdown of local mileage and functional classification. In addition, traffic volumes, bridge ratings, pavement management analysis, crash data, congestion and intersection analyses are detailed. The final section of the chapter includes details of programs and projects that are being planned or implemented to maintain and improve the safety and quality of the road network in Franklin County.

### *Existing Conditions*

Within Franklin County almost 80% of the roads are owned and maintained by the Towns, while MassHighway owns and maintains almost 11% of the roads. The remaining 9% of the roads are owned by various other entities or classified as unaccepted. Table 5-1 details the breakdown of roadway jurisdiction within each of the towns.

**Table 5-1: Roadway Centerline Mileage by Maintenance Authority**

Town	Maintenance Authority						Town Totals
	Mass Highway	Town	State Forest or Park	DCR* (Other)	State College	Un-accepted**	
Ashfield	10.97	71.38	0.36	0.00	0.00	0.48	83.19
Bernardston	15.20	41.83	0.00	0.00	0.00	1.03	58.06
Buckland	6.04	42.47	0.00	0.00	0.00	1.36	49.87
Charlemont	12.00	43.12	1.63	0.00	0.00	0.80	57.55
Colrain	3.99	79.12	1.18	0.00	0.00	2.30	86.59
Conway	6.53	64.11	0.00	0.00	0.00	0.32	70.96
Deerfield	19.97	77.78	1.16	0.00	0.00	1.53	100.44
Erving	13.60	17.14	7.43	0.00	0.00	1.00	39.17
Gill	3.94	34.92	0.13	0.00	0.00	4.59	43.58
Greenfield	18.81	102.21	0.00	0.00	1.42	8.57	131.01
Hawley	0.00	44.82	3.49	0.00	0.00	0.22	48.53
Heath	0.00	52.18	1.55	0.00	0.00	5.81	59.54
Leverett	5.44	34.55	0.00	0.00	0.00	3.04	43.03
Leyden	0.00	35.54	0.00	0.00	0.00	2.64	38.18
Monroe	0.00	16.72	1.67	0.00	0.00	0.00	18.39
Montague	5.73	103.94	0.56	0.00	0.00	5.30	115.53
New Salem	11.94	38.13	0.20	51.27	0.00	2.23	103.77
Northfield	11.18	65.52	0.06	0.00	0.00	6.89	83.65
Orange	12.28	84.52	0.55	0.00	0.00	4.60	101.95
Rowe	0.00	35.89	0.00	0.00	0.00	0.35	36.24
Shelburne	9.33	49.77	0.00	0.00	0.00	0.08	59.18
Shutesbury	3.16	31.20	0.00	4.86	0.00	2.73	41.95
Sunderland	4.48	38.94	2.90	0.00	0.00	0.00	46.32
Warwick	0.00	56.27	6.64	0.00	0.00	1.63	64.54
Wendell	0.31	48.42	16.49	0.00	0.00	1.26	66.48
Whately	8.72	31.18	0.00	0.00	0.00	8.41	48.31
<b>County Totals</b>	<b>183.62</b>	<b>1341.67</b>	<b>46.00</b>	<b>56.13</b>	<b>1.42</b>	<b>67.17</b>	<b>1696.01</b>

Centerline Miles refer to the linear length of a road segment. For divided highway, only the length of one side of the roadway has been counted.

\* - Department of Conservation and Recreation. State parks and forests are also under the jurisdiction of DCR.

\*\* - Unaccepted Roadways consist of roads open to public travel but not formally accepted by a city or town, as well as some private ways.

Source: Executive Office of Transportation, Road Inventory Year-End Report 2005.

## Functional Classification

Functional classification is the categorization of highways and roadways in terms of the service that the roads provide within the regional network. This categorization was mandated under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Roads are defined by their function. Additionally, Functional Class has both rural and urban designations based on the US Census population figures. The urban boundaries were recently updated based on the revised population figures available from the 2000 U.S. Census. All the urban areas in Franklin County are defined as “urban clusters” (Census block groups with a population density of 5,000 to 50,000). New urban clusters in Deerfield, Sunderland, and Orange, as well as expansions to previously defined urban areas in Montague and Greenfield were added with this latest update. The new urban boundaries were adopted in the Spring of 2004. The majority (84%) of the road mileage in Franklin County is defined as “rural”, with almost 16% now being defined as “urban”. The changes in the urban boundaries has resulted in an approximately 8% shift in road mileage defined as “rural” to “urban”. The breakdown of road miles in Franklin County according to functional classification is summarized in Table 5-2. A map of the functional classification of the roads in the region and a map showing the defined urbanized areas, are located at the end of this chapter.

**Table 5-2: Roadway Centerline Mileage by Functional Class**

Functional Classification	Total Centerline Mileage	Percentage of Total
1. Rural Interstate	15.99	0.94%
Urban Interstate	7.83	0.46%
2. Rural Principal Arterial	29.85	1.76%
Urban Extension	13.60	0.80%
3. Rural Minor Arterial	52.37	3.09%
Urban Principal Arterial	20.31	1.20%
5. Rural Major Collector	226.32	13.34%
Urban Minor Arterial	43.00	2.54%
6. Rural Minor Collector	118.50	6.99%
Urban Collector	23.52	1.39%
7. Rural Local	983.79	58.01%
Urban Local	160.93	9.49%
<b>Total</b>	<b>1696.01</b>	<b>100.00%</b>

Centerline Miles refer to the linear length of a road segment. For divided highway, only the length of one side of the roadway has been counted.

Source: Executive Office of Transportation, Road Inventory Year-End Report 2005.

Federal-Aid money is available for improvements and maintenance to both urban and rural defined roadways in categories 1 to 5 and to the Urban Collectors in category 6. Approximately 26% of the roads in the Franklin County’s road network are classified in

categories 1 through 5 and Urban Collectors in category 6. With the new urban boundaries an additional 6.7 miles of roadway has become eligible for Federal-Aid money. The remaining 74% of the county's roads are functionally classified as "rural minor collector" or "local" and depend on Chapter 90 funding from the State for improvements and maintenance.

### **Traffic Volumes and Growth Trends**

In Franklin County, traffic volume data has been collected at almost 670 different locations since 1991, the majority of which have been conducted by the FRCOG and MassHighway. The FRCOG maintains a database of this traffic volume data and annually produces a Booklet listing the Average Annual Daily Traffic (AADT) for all counted locations in Franklin County since 1991. This booklet is available online from the publication page of the FRCOG website ([www.frcog.org/pubs/](http://www.frcog.org/pubs/))

Traffic volumes on Franklin County's roadways vary from over 30,000 vehicles per day on sections of Interstate 91 to less than 100 vehicles per day on a number of the local roadways located throughout the county. The most heavily traveled roadway in Franklin County is Interstate 91 where AADT volumes vary between 28,000 and 32,000 vehicles per day south of Exit 26 in Greenfield to between 16,000 and 20,000 vehicles per day north of Exit 26. Along Route 2, AADT volumes vary between 23,000 vehicles per day directly to the west of the Greenfield Rotary to less than 2,500 vehicles per day near the Charlemont/Savoy Town Line in the west of the County. Other high volume corridors of note include Route 116 between the Sunderland/Amherst Town Line to Route 5&10 in Whately, which carries AADT volumes as high as 18,000 vehicles per day (over the Sunderland Bridge), the Route 5/10/116 corridor between I-91 Exits 24 and 25 in Whately and Deerfield which carries AADT volumes as high as 14,000 vehicles per day and the Route 5/10 corridor in Greenfield that carries AADT volumes as high as 15,000 vehicles per day. A map which depicts the traffic volumes at selected count locations on the major roadways in Franklin County is located at the end of this chapter.

Using data collected between 2000 and 2005 at MassHighway's four Permanent Count Stations (traffic volume data collected 24 hours a day, 365 days per year) plus 10 locations where the FRCOG annually collects (over one week) data as part of the Highway Performance Monitoring System, an annual average growth rate (AGR) for traffic was calculated to equal 1.00%. This average growth rate is generally used to account for background traffic growth when analyzing the impacts of new development or when designing improvements to the road infrastructure.

### **Bridges**

Bridges are a critical component of the Franklin County roadway network. Maintaining the safety and functionality of bridges in Franklin County is a top priority. Bridges are predominantly under the domain of the State and are inspected by MassHighway and ranked according to standards established by the American Association of State Highway and Transportation Officials (AASHTO). The purpose of the AASHTO rating is to provide a standard to compare the status of bridges in a region and across the country. Many factors are considered when developing the rating of a bridge, such as its structural

integrity, the road's functional classification, the designed purpose of the bridge, etc. The AASHTO rating may allow some generalized assumptions, however, because so many factors are rating determinants it is important to research each bridge individually for specific information. In general, for a bridge to be eligible for reconstruction it must have an AASHTO rating of less than 75; and for a bridge to be eligible for replacement it must have an AASHTO rating of less than 50. Bridges may be further classified as “structurally deficient” or “functionally obsolete”, classifications that can raise a bridge’s position on the priority list for repair/replacement.



**Bissell Bridge is one of a number of covered bridges in Franklin County**

Bridges are determined to be “structurally deficient” if they fall below specific thresholds. “Structurally deficient” bridges may indicate that a vital, but relatively minor, repair is needed or that a bridge is in need of more serious rehabilitation. Obviously, safety concerns are paramount. If a bridge is in need of significant repair work in order to continue safely carrying the volume and weight of vehicles using it, the bridge with “structural deficiency” designation should be high on the priority list. Statewide, priority for funding is given to structurally deficient bridges.

Another descriptor of bridges is the determination of being “functionally obsolete.” This is when the bridge is inadequate to fulfill its current function, such as a four-lane road leading to a two-lane bridge. The bridge itself may be structurally sound; however, its use is limited in some capacity. Therefore, a determination of “functionally obsolete” is important in that it identifies areas where mobility may be restricted and congestion may be growing, but the bridge is not a safety hazard in and of itself. This classification should be used as additional information to help identify an appropriate place in the priority list.

Similarly, information regarding whether a bridge is posted with a particular weight limit, is important in assessing a region's transportation network. Weight restrictions on bridges may be set because of a bridge's deteriorating condition or may simply be a reflection of its original use. For example, a bridge constructed fifty years ago may be in good condition but simply was not designed with the expectation to carry the heavy freight loads of today. Weight restrictions are important determinants affecting freight routes and should be addressed to improve a region's accessibility to goods, people and economic opportunities. Bridges with posted weight limitations are another classification to be considered when prioritizing transportation projects.

MassHighway maintains a listing of all bridges that meet the National Bridge Inventory (NBI) criteria set by FHWA. This criterion identifies bridges as publicly owned highway bridges longer than twenty feet located on public roads. Railroad and pedestrian bridges are not included in the NBI, nor are bridges that have been closed for more than 10 years. Bridges that are not listed in the NBI are not eligible to receive Federal bridge replacement funding<sup>1</sup>.

As of April 2006, a total of 291 bridges in Franklin County were included on the NBI. This bridge listing includes the year the bridge was built or rebuilt, the AASHTO rating from the most recent bridge inspection, and whether the bridge is structurally deficient or functionally obsolete. The MassHighway District offices have provided information on bridges with weight restrictions and closures, and the TIP has been reviewed to identify those bridges that have been programmed for funding. All this information has been included in the bridge listing included in the appendices. It should be noted that bridges that cross over a town line is only listed once and in the town that is first alphabetically. Information on Franklin County bridges and their current classification are also shown in a map at the end of this chapter.

An analysis of the MassHighway April 2006 bridge listing for Franklin County found 49 bridges with a structurally deficient designation and 40 bridges with a functionally obsolete designation. There are weight restrictions posted on 52 bridges and three of the bridges on the NBI list are currently closed. This analysis indicates that the need for substandard bridge improvement funding will continue through the year 2030.

For the last several years MassHighway has prioritized the reconstruction and replacement of the Commonwealth's bridges to improve the approximately 500 structurally deficient bridges that were cataloged. Improving bridges will continue to be a priority for transportation planning and funding, and during the past 3 years Franklin County has had over a dozen bridges removed from the structurally deficient category through replacement or reconstruction.

Two extremely important bridges in the region that are still in need of reconstruction are the Gill-Montague Bridge (G-04-010) in Turners Falls and the General Pierce Bridge (G-12-020) between Greenfield and Montague. The cost and scope of the projects are

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<sup>1</sup> <http://www.fhwa.dot.gov/bridge/nbis/#10>

substantial. The Gill-Montague Bridge over the Connecticut River in Turners Falls is currently estimated at \$34.5 million and has reached the 75% design stage. This bridge is currently listed in the TIP in the 2008 and 2009 years. The General Pierce Bridge recently underwent some repairs that are expected to extend the life of the bridge an additional 5 years to ensure that the timing of its reconstruction (estimated at \$15 million) does not coincide with the reconstruction of the Gill-Montague Bridge which is only a few miles away. These are important regional projects that will require a significant commitment from the Commonwealth to complete, given their enormous cost estimates.

Franklin County has a number of covered bridges, unfortunately none currently are open to vehicular traffic, although two, the Bissell Bridge (C-05-005) in Charlemont and the Eunice Williams Bridge (G-12-010) in Greenfield are slated to be reconstructed and once again opened to vehicular traffic. The Burkesville Bridge in Conway and the Arthur D. Smith Bridge in Colrain were recently reconstructed and reopened as bicycle and pedestrian bridges.

### **Pavement Management Analysis**

A Pavement Management System (PMS) as defined by the American Public Works Association (APWA) is “a systematic method for routinely collecting, storing, and retrieving the kind of decision-making information needed (about pavement) to make maximum use of limited maintenance and construction dollars.” Various studies have indicated that a pavement maintained in a perpetual “good” to “excellent” condition, requires one-fourth to one-fifth the investment of a pavement that is un-maintained and rehabilitated once it reaches “poor” or “failed” condition. A PMS is designed to provide quantitative information to support repair and budget decisions which reflect this more recent thinking.

Under normal conditions of consistent weather and traffic patterns, a pavement will deteriorate by 40% in the first 75% of its life. During the next 12% of its life the pavement will deteriorate by a further 40%. With proper timing of preventative maintenance measures during the first 75 percent of a pavement’s life, many years can be added to the functionality of the road at a lower overall cost. With limited availability of transportation funding, it is more important than ever to make cost-effective decisions. A formalized PMS improves the existing practices that most highway departments already employ by enhancing professional judgment through guidelines and a standardized approach. It also provides highway departments and town officials with information that can be used to levy additional funding either from Town Meeting or State and Federal sources.

The FRCOG has been involved in pavement management since the early 1990s. In 1997 the FRCOG concluded a three-year contract with the MassHighway that included the survey and analysis of nearly 500 miles of Federal-Aid and State Transportation Program (STP) funded roads in the 26 Franklin County communities. Since the completion of that contract, the FRCOG has continued its commitment to assist Franklin County communities who are interested in establishing a Pavement Management System for their community. Since 1997 the FRCOG has completed pavement management studies for the

towns of Ashfield, Buckland, Colrain, Conway, Heath, Gill, Orange, Shelburne, Shutesbury, Whately and most recently Montague.

The work completed as part of these pavement management studies has included a visual assessment of the pavement conditions; a quantitative analysis of the condition; and a projection of future conditions based on varying levels of investment in repairs and maintenance. The visual assessment involves logging information on the extent and severity of pavement distresses. The future projection scenarios considered include examining ten years at current spending levels as well as looking at the cost to bring the road up to excellent conditions.

The results of the pavement management analyses completed over the past five years have found that funding levels have not kept pace with the sharp increases in the cost of asphalt. The majority of towns rely on Chapter 90 funds as the sole source of road maintenance funding, and until recently this was annually distributed at a \$100 million statewide level. This has resulted in the decline in the overall condition of the paved road network with many towns now reaching a critical stage in the life cycle of the paved roads where they are quickly going to deteriorate past the stage where low cost maintenance is required to where the substantially more expensive rehabilitation and reconstruction repairs would be required. Even with the supplemental Chapter 90 distributions of around \$50 million each of the last three years, this additional funding has been offset by the increases in asphalt costs, which has doubled in cost each of the last two years.

The most recent study completed in July, 2006 for the Town of Montague found that the town's 93 miles of paved road was in an overall Fair condition with a \$5.7 million backlog of repairs. Three funding scenarios were analyzed to project the potential future impacts of each on the condition of the paved road network. The first two scenarios modeled Chapter 90 funding at \$100 million and \$155 million statewide levels. Both indicated a continued decline in the paved road network as neither would be sufficient to keep pace with all the low cost routine and preventative repairs. As a result, more and more of the paved road network deteriorates to a poor condition and requires the higher cost repairs. The third analysis tried to identify a funding level that would be required to maintain the paved road network at its existing fair condition. This analysis indicated that funding over the ten year period would have to be double that of what is received under the \$100 million level, but for every \$1 spent, \$2 would be saved in future repair costs.

The FRCOG will continue to be available on a fee-for-service basis to assist towns in completing their own pavement management analyses. The FRCOG can either collect pavement distress data, or can train town personnel to collect it themselves. The FRCOG can then use its pavement management software to complete the analysis of the collected data and provide a personalized report.



## Safety Studies

### *Identification of the Most Hazardous Intersections in Franklin County*

Approximately every three years, the FRCOG conducts an analysis of crash data to determine high crash locations in Franklin County. All crashes resulting in estimated property damage in excess of \$1,000, injuries or fatalities must be reported to and recorded by local or State police. Those involved in the crash or the investigating police officer must complete a standard report form and forward it to the Massachusetts Registry of Motor Vehicles. Based on these reports, the Registry of Motors Vehicles records each crash in a database. This data is provided to MassHighway, who distributes then it to the Regional Planning Agencies.

The data analyzed for this study was for the three-year period from 2002 to 2004 during which 4,340 crashes were recorded in the 26 communities of Franklin County. To determine the hazardousness of each intersection, a nationally recognized measure called “Equivalent Property Damage Only” (EPDO) was applied to each crash. EPDO assigns points to each crash based on its severity. There are three crash severity levels: property damage only which is assigned one point (1), injury which is assigned five points (5) and fatality which is assigned ten points (10). Only one point category is assigned to each crash reflecting the most serious crash level. For example, a crash that involved three cars and resulted in property damage to all three cars and two injuries would receive an EPDO rating of 5 reflecting the injuries as a result of the crash.

Locations experiencing less than 4 crashes and an EPDO total of less than 15 were discarded. This brought the number of locations to receive further analysis down to 51. A major factor in the frequency of crashes at intersections, where the majority of crashes involve two or more vehicles, is the traffic volume; the higher the traffic volume the greater the probability a crash will occur. To rank the most hazardous intersections relative to the others in the region, traffic volumes were taken into account. This is achieved by using a formula that calculates the number of crashes or EPDO per million entering vehicles (MEV).

The equation used in the MEV calculation is:

$$MEV_{(EPDO)} = \frac{1,000,000 \times EPDO}{365 \times T \times AADT}$$

Where:      EPDO = Equivalent Property Damage Only Total  
                   T = Time Frame of Analysis, years  
                   AADT = Average Annual Daily Traffic Entering Intersection

Using the results of this calculation, the top fifty most hazardous intersections were ranked and the results are contained in Tables 5-3 and 5-4 and shown on a map at the end of the chapter. It can be seen from the map that the vast majority of the identified intersections are located within the most populated and/or most heavily traveled corridors in the county.

Table 5-3: Rank 1 – 25 of the Top Fifty Most Hazardous Intersections in Franklin County, 2002 – 2004

Rank	Town	Intersection	Number of Crashes	EPDO Total	MEV <sub>EPDO</sub> Rate	MEV <sub>Crash</sub> Rate	Type of Control
1	Greenfield	I-91/Route 2 Rotary	121	297	9.83↑	4.00	Yield
2	Greenfield	Conway St./Devens St.	13	33	8.37↑	3.30	Stop
3	Erving	Route 63/Semb Dr./Forest St.	8	28	7.31	2.09	Stop
4	Greenfield	Davis St./Norwood St.	9	25	6.72↓	2.42	Stop
5	Whately	Route 5&10/Christian Ln.	11	35	5.66↑	1.78	Stop
6	Shutesbury	Route 202/Prescott Rd.	5	21	4.76	1.13	Stop
7	Greenfield	Conway St./Grove St.	7	19	4.69↓	1.73	Stop
8	Greenfield	Wells St./Allen St.	11	31	3.85↓	1.37	Stop
9	Deerfield	Route 5&10/North Main St.	23	47	3.82↑	1.87	Stop
10	Greenfield	Conway St./Allen St.	7	23	3.36↓	1.02	Traffic Signal
11	Greenfield	Silver St./Country Club Rd.	11	31	2.95↑	1.05	Stop
12	New Salem	Route 202/Route 122	6	22	2.85	0.78	Stop
13	Montague	Route 63/North Leverett Rd.	7	19	2.82↓	1.04	Stop
14	Greenfield	Colrain Rd./College Dr.	9	25	2.75	0.99	Stop
15	Greenfield	High St./Sanderson St.	11	35	2.69	0.84	Stop
16	Greenfield	Route 2/Big Y Plaza Driveway	21	57	2.56	0.94	Stop
17	Greenfield	Main St./Federal St.	22	50	2.52↓	1.11	Traffic Signal
18	Greenfield	Route 2/Route 5&10	20	48	2.49	1.04	Stop
19	Greenfield	Deerfield St./Cheapside St.	12	36	2.42↓	0.81	Stop
20	Greenfield	Federal St./Silver St.	27	51	2.34↓	1.24	Traffic Signal
21	Montague	Turners Falls Rd./Millers Falls Rd.	7	23	2.28	0.69	Stop
22	Buckland	Route 2/Route 112 South	5	17	2.28	0.67	Stop
23	Greenfield	Route 2A/River St.	20	52	2.22	0.85	Traffic Signal
24	Montague	Montague City Rd./Turnpike Rd.	5	21	2.17	0.52	Stop
25	Deerfield	Route 116/I-91 Exit 25 SB Off-Ramp	8	20	2.18	0.86	Stop

↑ - MEV<sub>EPDO</sub> Rate higher than seen in the Top 50 Most Hazardous Intersection list (1999-2001 data)

↓ - MEV<sub>EPDO</sub> Rate lower than seen in the Top 50 Most Hazardous Intersection list (1999-2001 data)

☞ - MEV<sub>Crash</sub> Rate is greater than the MassHighway average MEV<sub>Crash</sub> Rate [Unsignalized = 0.85, Signalized = 0.94]

👉 - Intersection where safety has been or is being reviewed or where improvements have been completed since 2004

Table 5-4: Rank 26 –50 of the Top Fifty Most Hazardous Intersections in Franklin County, 2002 – 2004

Rank	Town	Intersection	Number of Crashes	EPDO Total	MEV <sub>EPDO</sub> Rate	MEV <sub>Crash</sub> Rate	Type of Control
26	Orange	South Main St./East River St.	6	18	2.13↓	0.71	Traffic Signal
27	Sunderland	Route 116/7-11 Plaza👉	10	30	1.84	0.61	Stop
28	Greenfield	Route 2/Colrain Rd.👉	27	51	1.83↓	0.97🚦	Traffic Signal
29	Deerfield	Route 5&10&116/Elm St.	13	37	1.79↑	0.63	Traffic Signal
30	Greenfield	High St./Maple St.	8	24	1.78↓	0.59	Stop
31	Greenfield	Deerfield St./Meridian St.👉	8	20	1.77↓	0.71	Traffic Signal
32	Greenfield	High St./Beacon St.	5	21	1.73↓	0.41	Stop
33	Greenfield	Main St./Chapman St.	10	30	1.70↓	0.57	Stop
34	Greenfield	Deerfield St./Bank Row/Mill St.👉	10	26	1.59	0.61	Traffic Signal
35	Orange	South Main St./West Main St.	15	23	1.45	0.94🚦	Traffic Signal
36	Greenfield	Federal St./Pleasant Street	8	20	1.38	0.55	Stop
37	Deerfield	Route 116/Sugarloaf Street	8	28	1.37↓	0.39	Traffic Signal
38	Greenfield	Federal St./Maple St.	8	24	1.31	0.44	Stop
39	Greenfield	Montague City Rd./Mountain Rd.	5	17	1.29	0.38	Stop
40	Deerfield	Route 116 (north)/Route 5&10	18	26	1.28↓	0.89	Traffic Signal
41	Greenfield	Federal St./Pierce St.👉	15	23	1.27	0.83	Traffic Signal
42	Greenfield	Route 2/Adams Rd.	11	23	1.25↓	0.60	Traffic Signal
43	Greenfield	Main St./Conway St.	9	21	1.23↓	0.53	Stop
44	Greenfield	Federal St./CVS & Wendy's👉	9	21	1.17	0.50	Stop
44	Shelburne	Route 2/Colrain-Shelburne Rd.👉	7	15	1.17	0.54	Stop
46	Whately	Route 116 (south)/Route 5/10	17	25	1.09↓	0.74	Traffic Signal
47	Whately	Route 5&10/I-91 Exit 24 NB Off-Ramp	9	17	0.99↓	0.52	Stop
48	Gill	Route 2/Main Road	7	15	0.91↓	0.43	Traffic Signal
49	Deerfield	Route 116/River Road	8	20	0.91↓	0.36	Stop
50	Sunderland	Route 116/Route 47	10	18	0.83↓	0.46	Traffic Signal

↑ - MEV<sub>EPDO</sub> Rate higher than seen in the Top 50 Most Hazardous Intersection list (1999-2001 data)

↓ - MEV<sub>EPDO</sub> Rate lower than seen in the Top 50 Most Hazardous Intersection list (1999-2001 data)

🚦 - MEV<sub>Crash</sub> Rate is greater than the MassHighway average MEV<sub>Crash</sub> Rate [Unsignalized = 0.85, Signalized = 0.94]

👉 - Intersection where safety has been or is being reviewed or where improvements have been completed since 2004

The most hazardous intersection in Franklin County based on this analysis is the Greenfield Rotary at Exit 26 of Interstate 91 and Route 2 with a  $MEV_{EPDO}$  rate of 9.83 and an EPDO total of 297 in 121 crashes. The Greenfield Rotary has constantly been the location where the highest number of crashes has occurred and has been listed in the top 5 of the last two hazardous intersection lists<sup>23</sup> created. For these reasons, in 2004, the FRCOG staff initiated a safety study of the Rotary in collaboration with MassHighway District 2, as part of the Route 2 West Safety Study. This study has resulted in the design of improvements that include adding additional lanes to the busiest entries, providing lane markings on the circulating roadway, and directional pavement markings and signage. These improvements are intended to reduce delays and vehicle speeds which in turn should reduce the instances of rear-end crashes (by far the most common crash at this location). The design is complete and is currently out to bid with construction scheduled in 2007.

In total, 28 (56%) of the 50 most hazardous intersections are located in Greenfield, which is by far the most populated and densely developed community in Franklin County. In addition to the Rotary, five other Greenfield intersections are included in the top ten. All five of these intersections are located in the neighborhoods north of Main Street. Three of these intersections are located along Conway Street, at Devens Street [Rank = 2], Grove Street [Rank = 7] and Allen Street [Rank = 10]. The Devens Street and Grove Street intersections are 2-way stops, and it appears, based on the number of “angle” type crashes noted in the RMV database, that drivers may be thinking that the intersections are 4-way stop and that approaching vehicles on Conway Street are going to stop. A similar situation may be occurring at the intersection of Wells Street and Allen Street [Rank = 8]. If this is the case, this situation may be resolved by placing a supplemental sign below the stop signs indicating that the cross traffic does not stop. A more detailed analysis of the actual crash reports should be made before any final determination of cause and solutions is made. The intersection of Conway and Allen Streets is a signalized intersection and the number of “angle” type crashes indicates a potential “red light running” problem at the intersection. The intersection of Davis Street and Norwood Street was previously a 2-way stop that was converted to a 4-way stop in 2005.

The intersections of Route 63/Semb Drive/Forest Street in Erving [Rank = 3] and Route 202 and Prescott Road in Shutesbury [Rank = 6] appear on the list for the first time. Both of these intersections do not have an especially high number of crashes with 8 and 5 respectively over the three-year period, however, the fact that the majority of the crashes resulted in injury combined with the relatively low traffic volumes results in them receiving a high ranking. Without more details about the crashes it is difficult to speculate about the causes or a potential solution. However, it should be noted that a realignment of the Semb Drive and this intersection is under design as part of the Route 2 Safety Improvements and is expected to be under construction in 2007 or 2008.

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<sup>2</sup> FRCOG, Identification of the Most Hazardous Intersections in Franklin County 1995-1997, July 2000.

<sup>3</sup> FRCOG, Identification of the Most Hazardous Intersections in Franklin County 1999-2001, September 2004.

The intersections of Route 5&10/Christian Lane in Whately [Rank =5] and Route 5&10/North Main Street/Mill Village Road in Deerfield [Rank =10], complete the top 10 list of hazardous intersections. Both of these intersections appeared in the previous list<sup>4</sup>, and have seen an increase in the number and severity of crashes. A mixture of crash types is noted at both intersections making it difficult to speculate about the exact causes and potential solutions.

Of the 50 most hazardous intersections listed in Tables 5-3 and 5-4, 29 appeared on the previous list of the top 50 most hazardous intersections in Franklin County<sup>5</sup> based on crash data from 1999 through 2001. Of those 29 intersections, 6 have a  $MEV_{EPDO}$  rate higher (marked with “↑” in the tables) than the previous top 50 list and 23 have a  $MEV_{EPDO}$  rate lower (marked with “↓” in the tables). These changes in  $MEV_{EPDO}$  rate are most likely the result of more information contained in the location descriptions being reported in the RMV database. In some instances updated traffic count data may have resulted in lower rates. No major improvements were made to any of these intersections during the period analyzed although since 2004 there are a number of intersections which have or are undergoing further study to assess their safety (marked with “🔍” in the tables).

Because Franklin County is primarily rural, the majority of its roadways carry lower traffic volumes than the rest of the State. Therefore, they experience a lower probability of crashes. This means that inclusion of an intersection on the most hazardous intersection list for Franklin County does not necessarily mean that an intersection is experiencing a hazardous crash problem. To see how intersections on the most hazardous list compare to those intersections statewide, they have been compared to ratings produced by MassHighway.

The  $MEV_{Crash}$  rate is used by MassHighway to develop average rates for both signalized and unsignalized intersections on a regional (MassHighway District) and statewide level. These average  $MEV_{Crash}$  rates are used by MassHighway as a threshold for determining if a particular intersection warrants a more detailed safety evaluation. The  $MEV_{Crash}$  rate has been provided in Tables 5-3 and 5-4 and those intersections identified as having a  $MEV_{Crash}$  rate greater than the MassHighway District 2 (all but two of the intersections are within the MassHighway District 2 region) average of 0.94 per million entering vehicles for signalized intersections and 0.85 per million entering vehicles for unsignalized intersections have been marked with a “🚧” symbol. This comparison identified 20 of the 50 most hazardous intersections as having a  $MEV_{Crash}$  rate greater than the MassHighway District 2 average, including all of the top 11 intersections, and 18 of the top 25 intersections. Based on this threshold these intersections warrant a more detailed safety evaluation.

There are 25 signalized intersections in Franklin County, 17 of which appear in the top 50 most hazardous intersections list. Of these 17 signalized intersections, 5 have a  $MEV_{Crash}$

<sup>4</sup> FRCOG, Identification of the Most Hazardous Intersections in Franklin County 1999-2001, September 2004.

<sup>5</sup> Ibid.

rate higher than the MassHighway District average of 0.94 crashes per million entering vehicles.

MassHighway last created a Top 1000 High Crash Locations Report, which ranks intersections statewide based on the EPDO total only, in 2002, based on RMV crash data from 1997 through 1999<sup>6</sup>. MassHighway uses this list as a foundation for developing safety improvement projects around the state. The topped ranked location in Massachusetts (I-95/I-93 interchange) had a three-year EPDO total of 1618. The thousandth ranked intersection had a three-year EPDO total of 91. Based on this measure, only the Greenfield Rotary has an EPDO total high enough to make it onto the top 1000 High Crash list for Massachusetts. In fact, the Rotary was ranked 420<sup>th</sup> on this MassHighway list with an EPDO total of 150 (1997-1999 data). Based on the EPDO total of 297 calculated in this study with data from 2002 through 2004 the Rotary would have been ranked 112<sup>th</sup> on that list.

The FRCOG is currently working on behalf of the FCPTO on a number of safety related studies and will concentrate for now on completing them and working to implement any recommendations that are identified. Additionally, the FRCOG will provide assistance to the extent possible to any community that wishes to investigate more closely the potential safety deficiencies of the intersections identified in this report.

This is the fourth list of the most hazardous intersections in Franklin County that the FRCOG has created over the past twelve years. It is recommended that this list be updated with data for the next three-year period, 2005 through 2007. It is anticipated that a work task to conduct this study will be included in the Unified Planning Work Program beginning in October 2007 or 2008.

### **Route 2 Safety Improvements**

#### **Background**

Route 2 (also known as the Mohawk Trail from the town of Erving west) has served as the primary east-west highway across the northern portion of the state since the beginning of the 20<sup>th</sup> century. Safety along Route 2 in Franklin County has been a concern for decades. It is a four-lane highway across the majority of Massachusetts, but it drops to two lanes in Phillipston. The highway from Phillipston west is hilly and winding, has unlimited local access, and at several locations has manufacturing facilities located along it. Route 2 is part of the National Highway System (NHS).

During the 1960s, a number of improvement projects were completed on Route 2 between its intersection with Route 495 and Millers Falls. This work included the widening of the section between Interstate 495 and Phillipston to four lanes. The section of Route 2 between the town of Phillipston and the Orange-Wendell town line was reconstructed as a two-lane highway.

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<sup>6</sup> MassHighway Traffic Operations and Safety Unit, Top 1000 High Crash Locations Report 1997-1999, August 2002.

Since the 1960s, the potential widening of the section of Route 2 between Phillipston and the Greenfield town line has been studied and debated at length. Nearly every debate centered around the irresolvable controversy of whether to widen Route 2 through Erving, which would require significant property acquisition, or to cross the Millers River into Wendell and build a new road through the Wendell State Forest. The debate continued into the early 1990s at which time MassHighway notified local officials that until there was local consensus on how to proceed they would take no action.

The 1994 Franklin County Long-Range Regional Transportation Plan recommended that, for a variety of reasons, the feasibility of expanding Route 2 from a two-lane to a four-lane highway between Phillipston and Orange should be studied. Also at that time, the Route 2 Task Force was formed in recognition that a consensus and a new approach were needed if any actions to resolve issues with the roadway were going to be undertaken. The Route 2 Task Force is comprised of Select Board representatives from each town along the corridor, as well as concerned non-profit groups and environmental advocates. The group has met on a regular, often monthly basis, since its establishment in 1994.

In 1995, the recommendation to study the feasibility of widening Route 2 from Phillipston to Orange was modified to focus on identifying and implementing safety improvements throughout the entire corridor from Phillipston to Greenfield. The Task Force was committed to developing a safety improvement plan for the entire Phillipston to Greenfield corridor that would be endorsed by all of the towns along the corridor. Consequently, the Massachusetts Highway Department, the Franklin County Commission (now the FRCOG), the Montachusett Regional Planning Commission, and the Route 2 Task Force compiled a scope of work for such a study. In May 1996, Wilbur Smith Associates (WSA) was hired to conduct the safety improvement study with \$200,000 in funding being provided by MassHighway.

#### Goals of the Safety Study

The primary goal of the Route 2 Safety Improvement Study was to conduct a detailed operational analysis of traffic conditions on Route 2 between Phillipston and Interstate 91 in Greenfield, and prepare recommendations for safety improvements that could be implemented in the near term. The Focus of the study and the Route 2 Task Force has been entirely the implementation of safety improvements throughout the corridor. The Task Force has not participated in any plans to expand Route 2 to four lanes through Athol. That idea was proposed by the Athol Selectboard, and was taken under advisement. In April, 2006 MassHighway, as part of a revised environmental assessment of some portions of the safety improvements, formally stated that they were abandoning any plans to expand Route 2 to four lanes west of Phillipston due to the extreme cost of such improvements and the unsubstantiated capacity demand for them.

#### Current and Future Activities

After completion of the Wilbur-Smith Study, MassHighway and the Route 2 Task Force grouped the corridor's recommendations into seven sections in which to concentrate the identification and implementation of specific safety improvements. They were: Athol/Phillipston, Orange, Erving Paper Mill Corner, Erving Center, Farley, Erving'side

and Gill/Greenfield. Since December, 2006 significant progress has been made toward achieving these goals. The following is a break down of project status to date.

1. Relocation of Route 2 at Erving Paper Mill

The construction of this bypass around the Erving Paper Mill now allows trucks going to the Plant to have unobstructed access to their loading docks. Previously, trucks needed to routinely stop traffic on Route 2 in order to access the docks. This created both a safety hazard and a congestion problem. In addition, workers had to cross busy Route 2 near an “S” curve in order to enter the factory, since the employee parking lot was located on the other side Route 2. Finally, the business was landlocked an unable to expand, having the Millers River to its south side, and Route 2 on its north. Conducting a land swap between the Paper Mill and MassHighway allowed the relocation of Route 2 north of its existing location, providing better loading capability for trucks, safer parking for employees, room for facility expansion, and reduction of traffic and congestion. The new stretch of roadway opened to traffic in November, 2006 to rave reviews.



**New retaining walls along the relocated Route 2 at the Erving Paper Mill were built using stone excavated during construction**



### 2A. Athol-Phillipston: Task Force Safety Improvements

The following safety improvements are currently under construction and are expected to be completed by the Spring of 2007.

- Installation of Qwick Kurb, a median curbing to prevent vehicles from passing on a double line.
- Improvements to Exit 17 (Route 32) in Athol, including changing acceleration and deceleration lanes to lengthen and improve radii. In addition, a bridge overpass at this exit was not designed to be widened. In light of MassHighway's 2006 decision not to pursue widening of Route 2 in this area to four lanes, the need to widen the bridge abutments is moot.
- Construction of a truck weigh station on the westbound side of Route 2 between Exit 17 (Route 32) in Athol and Exit 16 (Route 202) in Orange. The weigh station will be located in Athol approximately halfway between Pleasant Street and South Athol Road.
- Improvements to eastbound and westbound ramp geometry of Exit 18 (2A) in Athol to eliminate compound curves.

### 2B. Athol-Phillipston: Non-Task Force Other Activities/future possibilities

MassHighway decided not to prepare an EIR and feasibility study to determine if Route 2 should be widened to four lanes from Phillipston to Route 122 in Orange. As a result, MassHighway decided to abandon any plans to widen the road in this area. This decision was based on the extraordinary potential cost of the project, and a limited justification based on capacity need. However, comments were submitted by the Route 2 Task Force and the Town of Athol urging that improvements to the South Athol Road interchange, originally expected to be part of the scope of work for a larger, widening project, go forward as an independent project.

### 3. Orange

This section of the project includes intersection and climbing lane improvements, and widening of the bridge at Route 122 (Exit 15). The design is at 100%, and once some additional environmental assessment and permitting are completed will be ready to advertise for construction. It is expected that this project will go out to bid in 2007, and it is estimated to cost approximately \$24 million.

In addition, three bridge projects in the area are also under design under separate contracts. They are:

- a. Lake Rohunta bridge
- b. Route 202 bridge
- c. West River Street bridge over Route 2

### 4. Ervingside

Improvements in the Ervingside section of Erving are being developed in two stages: replacement of two bridges near the French King Bowling alley and a lowering of the vertical curve between them, and improvements to the side streets feeding Route 2, including Route 63. These improvements include protected turn lanes, changes to traffic flow, and new acceleration/deceleration lanes. The project is at 75% design and is listed

in the FY 2007 element of the Franklin Region Transportation Improvement Program for \$1,625,000.

5. Erving Center

Safety improvements in Erving Center will focus on traffic calming and safer turning movements. The Route 2 Task Force submitted comments and recommendations for safety improvements in this area to MassHighway District 2 on February 5, 2002 after meeting with local residents to discuss concerns and options. This project is not yet under design, nor has it been scoped by MassHighway.

6. Farley

Safety improvements in the Farley area of Erving focus on providing safer turning movements with protected turn lanes and improving sight distance in some locations. Initial scoping of this project is underway. It is expected that a design consultant will be under contract during 2007 to begin the design phase.

7. Gill-Greenfield

Safety improvements in the Gill-Greenfield area will incorporate a protected turn lane (westbound) to access Barton Cove, provide safer turning movements for the Route 2 businesses near the Avenue A/Route 2 intersection, incorporate geometric improvements at the entrance to the Gill-Montague Bridge, and address curvature of the roadway in the Factory Hollow area of Greenfield. Task Force comments and recommendations were compiled after meeting with local residents, and forwarded to MassHighway District 2 on October 2, 2002. This project is not yet under design, nor has it been scoped by MassHighway.

During the next several years the Route 2 Task Force will continue working with MassHighway to complete implementation of these critical safety improvements.

### *Greenfield Rotary Safety Improvements*

The Greenfield Rotary has all the characteristics of classic “New England Traffic Circles” that were built during the 1950’s, and 60’s. Those characteristics include a 650-foot diameter, yield-on-entry control and circulating vehicle speeds of between 30 and 40



miles per hour. The Greenfield Rotary controls and directs traffic from Exit 26 of Interstate 91 (a full interchange with both northbound and southbound on and off ramps), Route 2 (to and from the west) and Route 2A (to and from the east and Downtown Greenfield). An average of 24,000 vehicles per day are processed through the Rotary, with approximately two-thirds of that traffic entering from Route 2 and 2A from the west and east respectively.

Rotaries are notorious for the number of crashes they experience and the poor

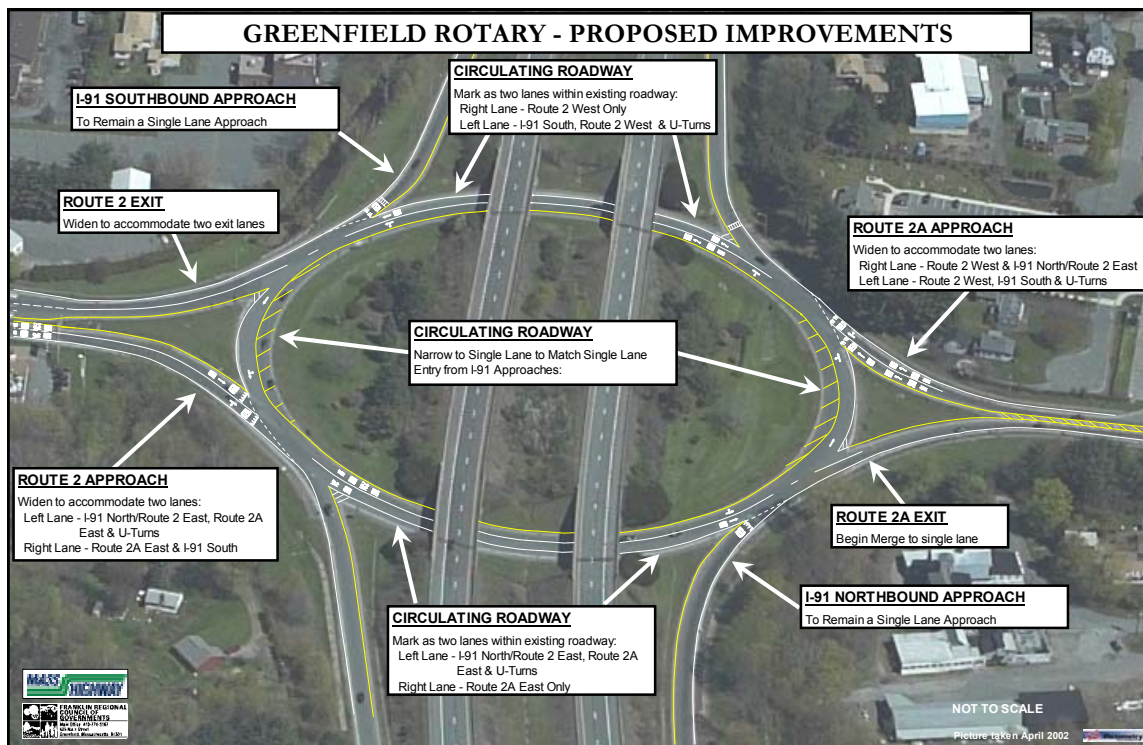
traffic operations resulting in congestion. In Massachusetts, 17 of the approximately 100 rotaries appear on MassHighway’s Top 1000 High Crash Locations list<sup>7</sup>, which is based on crash data from 1997 through 1999. The Greenfield Rotary is one of the 17 rotaries on the list, and was ranked 420<sup>th</sup> in the list of the 1000 high crash locations.

Drawing on its experiences with Modern Roundabouts and conversations with engineers at the New York State Department of Transportation (NYSDOT) who had successfully implemented improvements to a Rotary, the FRCOG staff approached MassHighway District 2, who has jurisdiction over the Rotary, with the idea to explore designing and implementing a lane marking and signing plan with the goal to improve safety and traffic flow. Crash and traffic count data were collected and analyzed, and it was determined that an additional entry lane needed to be added to the Route 2 and Route 2A approaches to reduce delays and, in turn, the probability of rear-end crashes. Adding the additional lanes to these two approaches also reduces the delays on the I-91 approaches as it increased the number of gaps in the circulating flow for those vehicles to enter.

<sup>7</sup>MassHighway Traffic Operations and Safety Unit, Top 1000 High Crash Locations Report 1997-1999, August 2002.

MassHighway District 2 undertook the design and NYSDOT was consulted during the design process. The bulk of the changes involve adding pavement markings and directional signage, but some minor widening is required to accommodate an additional lane on the Route 2 and Route 2A approaches. In addition to the changes to the Rotary, pedestrian improvements have been incorporated into the project, including filling in the missing portions of sidewalk between the Rotary and Newton Street, bringing the existing sidewalks into compliance with ADA regulations and adding pedestrian activated signals to the Newton Street and Colrain Road intersections. A public informational meeting was held in March of 2006 and the project generally received positive reviews from those who attended.

The project went out to bid in October 2006 and it is expected that the improvements will be implemented during the spring or summer of 2007. Following implementation of the improvements, MassHighway and the FRCOG will monitor the results. It is expected that similar improvements could be implemented at a number of the many other Rotaries in Massachusetts, so this project is being monitored with great interest across the Commonwealth.



**Route 2 West Safety Study**

The Route 2 West Safety Study is a multi-year study undertaken to provide a detailed review of potential safety issues along the 22 mile Route 2 corridor from and including the Greenfield Rotary west to the Charlemont/Savoy Town Line. Over the past several years, the Franklin Regional Council of Governments (FRCOG) has been involved in a number of studies (Buckland-Shelburne Master Plan, Downtown Greenfield Circulation

Study, Mohawk Trail Scenic Byway Corridor Management Plan and the Identification of the most Hazardous Intersections in Franklin County) that have included all or a portion of the Route 2 corridor west of Interstate 91. To date, the Greenfield Rotary improvements mentioned above have been the primary focus of the study. A number of recommendations are currently under consideration for other sections of Route 2 West and will be reviewed to assess their feasibility with MassHighway before being finalized. The recommendations currently being considered starting at the Greenfield Rotary are:

- Limit left turns in and out of the Big Y Plaza Driveway onto Route 2.
- Continue two lanes on Route 2 in the westbound direction past the Home Depot driveway.
- Restripe Route 2 up Greenfield Mountain to provide a climbing lane for westbound slow traffic.
- Explore the need for and feasibility of a truck escape ramp or warning devices on Route 2 at the base of Greenfield Mountain.
- Continue to monitor crash and traffic conditions at the Colrain-Shelburne Road intersection with Route 2 to determine the need for a dedicated right turn lane on in the westbound direction of Route 2.
- Add a protected left turn lane to the westbound direction of Route 2 at its intersection with South Maple Street.
- Work with MassHighway District 1 and the Town of Charlemont to develop traffic calming measures and pedestrian improvements through the Village Center.
- Identify and investigate areas experiencing multiple lane departure crashes.

The recommendations of this study will be presented to the public prior to the report being finalized in the Spring of 2007.

#### **Route 116/ 7-Eleven Plaza - Sunderland**

Following the unfortunate death of a pedestrian crossing Route 116 in a crosswalk in December 2004, the FRCOG, MassHighway District 2 and the Town of Sunderland undertook a review of safety along the approximate half mile of Route 116 between Old Amherst Road and Clark Mountain Road. This review included the collection and analysis of crash data, traffic turning movements and pedestrian crossing activity. It resulted in a package of improvements that included, consolidating the four crosswalks into one crosswalk with in-pavement pedestrian activated warning lights, moving the northbound bus stop to the north of the Squire Village driveway, adding sidewalks along both sides of the roadway, adding a solid-colored flush median, and narrowing the travel lanes to 11 feet. These improvements were completed in the July 2006.

A follow-up study of pedestrian crossing activated was conducted in October 2006, after UMass was back in session, where it was determined that although more pedestrians were crossing in the crosswalk, only 50% were using the push button activated in-pavement lights and anecdotal information from pedestrians and Sunderland officials indicated that the in-pavement lights when activated were felt to be ineffective, especially during the day, at warning drivers of pedestrians attempting to cross. A detailed review of the site indicated that the effectiveness of the in-pavement lights was being limited due to them

sitting marginally too low in the pavement. With added concerns about the effectiveness of the in-pavement lights during snow events, MassHighway installed flashing beacons above the pedestrian crossing signs on either side of the roadway that are activated at the same time as the in-pavement lights. From informal observations it still appears that drivers are still not yielding in significant numbers to pedestrians who have activated the warning lights. MassHighway will be installing additional pavement markings to raise the conspicuousness of the crosswalk and adding advanced yield lines to reinforce to drivers where they should yield to pedestrians as soon as weather conditions allows. MassHighway has also received approval to lower the speed limit from 45 to 40 MPH through the area and will be installing the appropriate signage materials when they become available. The street lighting at the crosswalk and through the corridor has been reviewed and the Town of Sunderland is pursuing the installation of increased lighting. In late December 2006 a pedestrian was hit and injured while crossing Route 116 approximately 600 feet north of the crosswalk. Police indicate that the driver was not at fault and that the pedestrian had come from the 7-Eleven Plaza and could have easily used the crosswalk. The FRCOG staff will continue to work with MassHighway and the Town of Sunderland to monitor the effectiveness of the safety improvements along this corridor.



**Route 116 in Sunderland Before and After Safety Improvements**

**Federal Street Corridor Recommendations for Safety Improvements – Greenfield**

The section of Federal Street (Route 5&10) between Pleasant Street and Garfield Street, just north of the central business district is heavily traveled by vehicles, pedestrian and bicyclists. Two pedestrian fatalities have occurred along this section of Federal Street in the last 10 years. The Town had explored the installation of various traffic calming measures on a temporary basis, but failed to come to a consensus on the types of measures that would meet the needs of all users and abutting businesses in this area.

In 2004, the Town utilized grant funds to hire a consultant to develop a conceptual plan of recommendations to improve traffic flow and safety for all users through the area. The resulting plan appeared to have the support of all the interested parties in the area and

included build-outs, median strips and reconfiguration of some of the retail driveways. These improvements cannot move forward to implementation until the engineering designs have been created, something the Town will struggle to fund in these current tight financial times.

### **Congested Locations**

Although nowhere in Franklin County are there the congestion levels seen in the more densely populated metropolitan areas of the Commonwealth, traffic congestion is a growing concern in certain areas of Franklin County. Due to the rural environment and generally free flowing nature of the majority of the county's roadways, having to wait in a line of traffic at a signal or stop sign can be as frustrating for area drivers as a several minute wait for drivers used to urban driving. Congestion occurs when traffic demand approaches or exceeds the available capacity of a road or intersection. Traffic demands can vary significantly depending on the time of year, the day of the week, and the time of day. In addition, a road's capacity to comfortably accommodate traffic can change due to weather conditions, the existence of work zones, or the occurrence of traffic incidents. While congestion often occurs during peak travel and commuting times, it can also occur at times and locations not easily predicted due to unexpected events or inclement weather. In order to ensure safe and efficient travel, congestion levels are monitored on a regional scale. Congestion can be measured using numerous methods, but monitoring traffic volumes, levels of service, and travel times are common measures.



**The Federal Street/Main Street intersection in Greenfield is often congested**

The FRCOG has completed or assisted in the completion of a number of studies analyzing the operation of many of the major intersections in Franklin County. In these cases, the FRCOG used “level of service” to quantify the degree of the congestion. “Level of service” (or LOS) is the measure used to determine the operating level of intersections during peak periods. Factors such as geometry, signal timing (if applicable) or priority, and traffic volumes are used to calculate the operational levels of an intersection. Depending on the delay that a driver experiences at the intersection, the

operation of the intersection is ranked according to the levels A through F, with A indicating an intersection that is operating very well, and F indicating an intersection operating very poorly and experiencing heavy congestion. A level of service D is considered the upper level of acceptable operation. Table 5-5 provides a summary of the level of service for the intersections that have been analyzed in Franklin County. These LOS ratings are based on the average delay experienced by all drivers negotiating an intersection. For the most part, all the intersections that were analyzed are operating at an overall acceptable level of service. However, with a few intersections, certain individual movements (e.g., a left turn) have delays above acceptable levels.

**Table 5-5: Analyzed Intersections in Franklin County**

Town	Intersection	Signalized Yes/No	Intersection LOS		Year Analyzed
Deerfield	Route 116/Industrial Drive West	No	AM	PM	2002
Deerfield	Route 116/Pine Street	No	-	A	2002
Deerfield	Route 116/River Road (north)	No	A	A	2002
Deerfield	Route 116/River Road (south)	No	A	A	2002
Deerfield	Route 116/Sugarloaf Street	Yes	B	B	2002
Deerfield	Route 5&10&116/Elm Street	Yes	B	B	2002
Deerfield	Route 5&10/N. Main/Mill Village Sts	No	A	A	2002
Deerfield	Route 5&10/River Road	No	-	A	2002
Deerfield	Route 5&10/Route 116 (north)	Yes	B	B	2002
Greenfield	Colrain/Solon/Elm Streets	Yes	A	A	2001
Greenfield	Conway/Allen Streets	Yes	A	A	2001
Greenfield	Deerfield/Meridian Streets	Yes	A	A	2001
Greenfield	Deerfield/Mill/Bank Row	Yes	B	B	2001
Greenfield	Federal Street/Pleasant Street	No	A	B	2001
Greenfield	Federal/Main/Bank Row	Yes	D	D	2001
Greenfield	Federal/Pierce/Beacon Street	Yes	A	A	2001
Greenfield	Federal/Silver Streets	Yes	B	C	2001
Greenfield	French King Highway/Loomis Rd	Yes	A	B	2001
Greenfield	High/Silver Streets	Yes	A	A	2001
Greenfield	I-91/Route 2 Rotary	No	-	B	1998
Greenfield	Route 2A/Newton Street	Yes	-	C	1998
Greenfield	Route 2A/River Street/Shelburne Rd	Yes	-	B	1998
Montague	Avenue A/Third Street	Yes	-	C	1996
Orange	Sorth Main/East River/West River Sts	Yes	-	D	1996
Orange	North/South/East/West Main Street	Yes	-	F	1996
Sunderland	Route 116/Route 47	Yes	B	B	2002
Whately	I-91 NB Exit 24 Off-ramp/Route 5&10	No	C	C	2002
Whately	I-91 SB Exit 24 Off-ramp/Route 5&10	No	B	B	2002
Whately	I-91 SB Exit 24 On-ramp/Route 5&10	No	A	A	2002
Whately	Route 5&10/Christian Lane	No	A	A	2002
Whately	Route 5&10/Route 116 (south)	Yes	B	B	2002

Source: Franklin Regional Council of Governments.



There are twenty-four signalized intersections in Franklin County, fifteen of which are maintained by MassHighway. The Town of Greenfield operates nine traffic signals, many of which still operate as they did the day they were installed back in the 1970s. The Town currently has a project at 25% design to upgrade the traffic signals and pedestrian accommodations at eight of the nine traffic signals they own. In general, the upgrading of the signal technology used at these intersections will improve traffic flow through the intersections. This may be most evident at the Main Street/Federal Street intersection in the heart of Greenfield, arguably the most congested location in the county. Other intersections along Federal Street, including the intersections with Silver Street and with Pleasant Street, also experience congestion, though to a lesser extent,

The areas in Franklin County that are currently the most congested are: the Route 5/10 corridor in South Deerfield and northern Whately; the Route 116 corridor from Route 5/10 to the center of Sunderland; the Federal Street (Route 5/10) and the Main Street/High Street (Route 2A) corridors through the urbanized areas of Greenfield, including the Greenfield Rotary; the Route 2 corridor between Main Road in Gill and Adams Road in Greenfield; and Route 2 west of the Greenfield Rotary. It should be noted again that congestion in Franklin County is a relative term and delays that would be greeted with groans by locals would likely be greeted with relief by others.

The FRCOG will continue to monitor congestion levels on the county's roadways and where necessary make recommendations for action to relieve the situation.

### **Park and Ride Lots**

Park and ride lots are parking areas that are typically located along or at the intersection of major commuting routes with the purpose of providing a safe and convenient location for people to switch to car pooling or alternative form of transportation, such as transit or passenger rail. In some instances, the location of the lot may encourage people to finish their journey by non-motorized means such as bicycle. Franklin County currently has one official Park and Ride lot located along Route 2 in Charlemont that opened in 2003. Anecdotal information indicates that use of the lot has increased over the three years it has been in operation, with use peaking in late spring early summer of 2006 when gas prices neared \$3 per gallon. During the first full week of May 2006, the FRCOG conducted a survey of the use of the lot. The number of vehicles and partial license plate information was logged during the midday hours Monday through Friday. A survey asking users several questions, such as reasons for using the lot, frequency of using the lot, etc was left with each vehicle. Over the five days a total 47 spaces were occupied by thirty different vehicles. One vehicle was observed to be parked in the lot each of the five days, five vehicles were observed to park three days and three vehicles were observed to have parked during two of the days. Beginning in September 2006, the FRTA's West Route began stopping at the lot upon request, which is expected to further increase the lot's use.

A new park and ride lot is being planned in the town of Whately, near Interstate 91 and the Deerfield town line. This project is listed in the current (Fiscal Year 2007-2010) Franklin Region Transportation Improvement Program (TIP) for FY 2008, and has been

approved for statewide Congestion Mitigation Air Quality (CMAQ) monies. The establishment of a park and ride lot near the I-91 Exit 24 interchange was a recommendation of the Connecticut River Transportation Crossing Study (2004), prepared by Vanasse Hangen Brustlin, Inc. under contract to MassHighway. The creation of the Whately park and ride lot will encourage carpooling along the I-91 corridor and to nearby communities. The Whately park and ride lot will be served by the FRTA's Valley Route which runs between Greenfield and Northampton along Route 5/10. Additional transit services to the lot and to the Route 5/10 corridor through Whately and Deerfield are under consideration. The Connecticut River Crossing Study estimated that a park and ride lot at that location could potentially lead to an increase in transit users and carpoolers of 75 people per day, and a potential reduction of 45 vehicles crossing the Sunderland bridge during the morning and evening peak commute hours.

### **Modern Roundabouts**

The FRCOG continues to be a strong proponent at both the local and State level of the modern roundabout as a viable alternative to efficiently and safely manage traffic flow. Roundabouts have become an accepted and safer alternative to traffic signals throughout the United States in recent years. For example the State of New York has instituted a policy that all new intersections shall be roundabouts unless it can be proved that they are not feasible for the location. It should be noted that the modern roundabout should not be confused with a traditional rotary. Roundabouts are typically 100 to 250 feet in diameter and are high capacity, high safety and low speed environments that are being embraced all over the United States. In contrast rotaries are typically greater than 300 feet in diameter (Greenfield Rotary is 640ft in Diameter) resulting in low capacity, poor safety, high-speed environments. The FRCOG recognizes the merits of the modern roundabout and would like to see them considered along with traffic signals whenever an intersection is under consideration for improvement. The FRCOG recently completed a "Frequently Asked Questions" guide to roundabouts that will be posted on the FRCOG website ([www.frcog.org](http://www.frcog.org)) in the near future.

The FRCOG is currently studying the feasibility of locating a roundabout at the intersection of Colrain Road/Colrain Street/College Drive in Greenfield. This intersection appears on the high crash intersection list and experiences periods of congestion, primarily associated with student traffic to and from the Greenfield Community College. This study will provide a comparison between a variety of possible improvements, including a four-way stop, a traffic signal, and a roundabout and is expected to be completed in the Spring of 2007. Other intersections that may be good candidates for a roundabout are; Deerfield Street/Cheapside Street in Greenfield, Route 5&10/North Main Street in Deerfield and Route 63/north Leverett Road in Montague.

### **Traffic Calming**

The FRCOG continues to support the incorporation of traffic calming technologies and other pedestrian level improvements where appropriate in order to improve safety. The use of traffic calming techniques have been explored in a number of projects that were planned during the past few years such as the South Deerfield Traffic Calming Project, and the Streetscape Projects in Greenfield, Conway and Millers Falls. The FRCOG is

currently working with MassHighway District 1 and the Town of Charlemont to identify possible traffic calming measures and pedestrian improvements for Charlemont's Village Center that straddles Route 2.

### **Areas Vulnerable to Flooding**

As a tool to help local towns determine roads and bridges at risk for flooding, a mapping project was undertaken. This project identified the 100 year flood areas as determined by the Federal Emergency Management Area (FEMA), and overlaid that information with the FRCOG GIS road and bridge datalayers. The resulting maps highlight roads and bridges located in the 100 year floodplain, giving local towns information to use in their planning efforts. An example of one of these maps is contained at the end of this chapter. More information about hazard mitigation planning can be found in the Transportation Security section of the Regional Transportation Plan (Chapter 14).

### **Scenic Byway Program**

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) continued funding for the National Scenic Byway Program. SAFETEA-LU provides a total of \$175,000,000 in funding for the National Scenic Byway Program for Fiscal Years 2005 through 2009.

The National Scenic Byway Program recognizes roads having outstanding scenic, historic, cultural, natural, recreational and archaeological qualities. The program provides grants and technical assistance for projects related to:

- Planning, design or development of a State or Indian tribe scenic byway program;
- Development and implementation of a corridor management plan to maintain the scenic, historical, recreational, cultural, natural, and archaeological characteristics of a byway corridor while providing for accommodation of increased tourism and development of related amenities;
- Safety improvements to a State scenic byway, Indian tribe scenic byway, National Scenic Byway or All-American Road to the extent that the improvements are necessary to accommodate increased traffic and changes in the types of vehicles using the highway as a result of the designation as a State scenic byway, Indian tribe scenic byway, National Scenic Byway or All-American Road;
- Construction along a scenic byway of a facility for pedestrians and bicyclists, rest area, turn out, highway shoulder improvement, overlook or interpretive facility;
- An improvement to a scenic byway that will enhance access to an area for the purpose of recreation, including water-related recreation;
- Protection of scenic, historical, recreational, cultural, natural and archaeological resources in an area adjacent to a scenic byway; and
- Development and implementation of a scenic byway marketing program.

To be eligible for funding under the program the byway must be officially designated as a scenic byway by the State and a corridor management plan must be completed which identifies the future goals and vision for the byway. The corridor management plan is developed through an extensive public participation process which includes the formation of a byway committee of residents, town officials, business owners, historical commissions and recreational users from the Byway area. The goal is to identify mechanisms to protect the scenic value of the byway while promoting the byway's tourism potential.

There are three State designated scenic byways in Franklin County: The Mohawk Trail (Route 2), the Connecticut River Scenic Farm Byway (Routes 47 and 63) and the Route 112 Scenic Byway. The scenic byways are shown on a map at the end of this chapter. Corridor management plans have been completed for the Connecticut River Scenic Farm Byway (1998) and the western portion of the Mohawk Trail Scenic Byway (2002) from Greenfield to Williamstown. In addition, the FRCOG is currently in the process of completing corridor management plans for the eastern portion of the Mohawk Trail (Route 2 from Greenfield to Athol) and the Route 112 Scenic Byway.

#### **The Mohawk Trail Scenic Byway**

The Mohawk Trail Scenic Byway is one of the earliest scenic byways in New England receiving its designation in 1953. The Byway travels on Route 2 through Berkshire, Franklin and Worcester counties. In Franklin County, the Byway travels through the towns of Charlemont, Buckland, Shelburne, Greenfield, Gill, Erving, and Orange. A corridor management plan was completed for the western section of the Mohawk Trail Scenic Byway from Williamstown to Greenfield. This plan includes an inventory of the historic, cultural and natural resources; a scenic landscape assessment; an inventory of the heritage and recreational attractions; an evaluation of the existing land use regulations and resource protection measures for the towns along the byway; and a list of recommended future actions that are intended to balance future growth with the preservation of the Byway's resources. A corridor management plan is currently being completed for the eastern section of the Mohawk Trail Scenic Byway (Greenfield to Athol).

The FRCOG is currently working to implement the recommendations of the Mohawk Trail Scenic Byway Corridor Management Plan. Funding has been secured to complete a number of the recommendations of the plan. The projects include: completion of tourism and historic facilities improvements (including signs for historic sites, improvements to scenic turn-out areas and the development of an access point for kayaks and canoes along the Deerfield River); completion of a marketing plan to promote viable low impact year round tourism; the purchase of conservation restrictions or agricultural preservation restrictions along the byway; and improvements at the Upper Pioneer Valley Visitors Center in Greenfield.



**A view of the Deerfield River from the Mohawk Trail in Charlemont**

In addition, work is currently underway on the Mohawk Trail East Corridor Management Plan and the study area includes Route 2 and/or Route 2A and a one half mile buffer strip along each side of the road within the towns of Greenfield, Gill, Erving, Orange, and Athol. The total length of this section of the Byway is approximately 29 miles. The project includes an active public participation process.



**A view of the Connecticut River from the French King Bridge located along the Mohawk Trail East**

In the future, funding will be sought for projects that are identified and prioritized in the Mohawk Trail East Corridor Management Plan.

**Connecticut River Scenic Farm Byway**

A corridor management plan was completed for the Connecticut River Scenic Farm Byway in November 1998, and the Franklin County section of the byway was officially designated as a scenic byway by the Massachusetts Legislature in 2000. In Franklin County, the Byway travels along Routes 47 and 63 in the towns of Sunderland, Montague, Erving and Northfield. The Connecticut River Valley’s landscape has distinct natural beauty and classic New England farm village patterns. It is these landscape and historic features that are the basis of the establishment of the Connecticut River Scenic Farm Byway.



**Millers Falls Streetscape Improvement Project which was Constructed using Scenic Byway Funding**

The Connecticut River Scenic Farm Byway Corridor Management Plan adopted recommendations and priorities for promoting economic opportunities while protecting the natural, cultural, and historic resources of the Byway. The FRCOG is working to implement the recommendations of the Connecticut River Scenic Farm Corridor Management Plan. To date, a number of these projects and programs have been awarded funding through the National Scenic Byway Program, and the FRCOG is working to advocate for and advance these projects towards implementation. The projects include: the design and construction of streetscape improvements in Northfield; the development of a vehicle turnout area in Sunderland; the design and construction of streetscape

improvements in Erving on Route 63 north of Millers Falls; the development of a byway logo, directional signs and a website; and the purchase of conservation restrictions or agricultural preservation restrictions along the byway. In the future, the FRCOG will continue to work to secure additional funding to implement the recommendations of the Connecticut River Scenic Farm Corridor Management Plan.

### **Route 112 Scenic Byway**

The Route 112 Scenic Byway was officially designated as a scenic byway by the Massachusetts Legislature in 2004. The Route 112 Scenic Byway travels through the towns of Colrain, Buckland and Ashfield in Franklin County and the towns of Goshen, Cummington, Worthington and Huntington in Hampshire County. It travels through historic town centers, working farms, scenic rivers, and majestic forests with beautiful mountains providing a backdrop. The corridor is rich in natural, cultural, and historic resources. In addition, the Byway intersects with the Mohawk Trail Scenic Byway to the north and the Jacob's Ladder Trail to the south two other designated scenic byways. Route 112 is a particularly beautiful auto-touring route during the fall foliage season.

The work to complete a corridor management plan for the Route 112 Scenic Byway is currently underway. The study area for the project includes a one half mile buffer strip along each side of the road within the towns of Colrain, Buckland, Ashfield, Goshen, Cummington, Worthington and Huntington. The total mileage for the corridor is approximately 51. The overall purpose of the project is to recognize, interpret, preserve, and promote the unique scenic, cultural, archeological, natural, and recreational resources. In addition, the more specific purposes of this project are to: identify and develop strategies to preserve the unique scenic, natural, and cultural resources along the Byway; expand economic opportunities related to agricultural, heritage, and recreational tourism along the Byway; plan for a Byway roadside educational program promoting the history of the land along the Route 112 corridor; develop a land protection program for scenic and historic landscapes along the Byway; and develop a recreational program which identifies and establishes linkages to the Mohawk Trail and Jacob's Ladder Trail Scenic Byways, hiking trails, state forests, river access points and other cultural and recreational features along the byway. The project includes an active public participation process.

### **Route 116 Scenic Byway**

Legislation was introduced to the Massachusetts legislature in 2006 to designate Route 116 from Deerfield through Adams as a Scenic Byway. This route traverses some of the most scenic farm and forested land in western Massachusetts, including Massachusetts highest mountain peak, Mount Greylock. In 2007, a scope of work will be created and funding sought to develop a Corridor Management Plan for the roadway.

## **MassHighway Design Guidebook**

A large-scale effort to revise the Massachusetts Highway Design Manual was completed in 2005 with the introduction of the new MassHighway Design Guidebook. The completely overhauled guidebook was developed with the participation of an extensive group of stakeholders representing all modes of transportation. The new guidebook stresses the importance of Context Sensitive design, and requires the early and regular involvement of Towns and project proponents. These are both important issues in Franklin County where the preservation of rural character and active involvement by local interests is equally important to building and maintaining an excellent transportation network.

### ***Recommendations for Road and Bridge Infrastructure***

- Continue to support rehabilitation and replacement projects for bridges, especially where weight restrictions impede freight trucking along major trucking routes, such as has occurred along Route 2 West corridor in Charlemont.
- Design and Construct Route 2 Safety Improvements in Erving.
- Design and Construct Route 2 Safety Improvements in the Farley Section, Erving.
- Design and Construct Route 2 Safety improvements in Gill and Greenfield.
- Continue to assist with the current and planned improvement projects on Route 2 East, such as the climbing lanes in Athol and Orange, and the turning lane in Erving, and to monitor how they impact freight trucking.
- Monitor implementation and evaluate the effectiveness of the improvements proposed for the Greenfield Rotary.
- Evaluate the feasibility of creating a climbing lane along Route 2 West up Greenfield Mountain.
- Explore the need for and feasibility of a Truck Escape Ramp or warning devices on Route 2 West at the base of Greenfield Mountain.
- Explore the need for and feasibility of a Truck Escape Ramp or warning devices on Greenfield Road in Colrain.
- Explore the need for and feasibility of a Truck Escape Ramp or warning devices on West Leyden Road in Leyden.
- Investigate the feasibility of adding a dedicated Left Turn Lane at the intersection of Route 2/Maple Street in Shelburne.
- Continue to monitor the need for and feasibility of adding a dedicated right turn lane at the intersection of Route 2/Colrain-Shelburne Road in Shelburne.
- Evaluate alternative options to improve safety at commercial driveways along Route 2 West in Greenfield.



- Work with MassHighway to develop and implement traffic calming and pedestrian improvements along Route 2 West through the Charlemont Village Center.
- Work with the Town of Greenfield to identify a funding source to design and construct the identified safety improvements along the section of Federal Street (Route 5&10) between Pleasant Street and Garfield Street.
- Investigate alternative intersection treatments to improve safety and traffic flow at the intersection of Colrain Road/Colrain Street/College Drive in Greenfield.
- Investigate alternative intersection treatments to improve safety and traffic flow at the intersection of Cushman Road/Shutesbury Road in Leverett.
- Ensure that a Roundabout is evaluated as an option for all intersection improvements.
- Continue to be involved in the process related to the Strategic Highway Safety Plan.
- Continue to monitor congestion levels along the Route 5&10 and Route 116 corridors in Deerfield, Whately and Sunderland and the Route 2 and Route 2A corridors in Greenfield.
- Work with MassHighway and the Town of Whately to develop options to relieve congestion at the intersection of the I-91 Exit 24 Northbound exit Ramp and Route 5&10 in Whately.
- Coordinate with Deerfield, Whately, and Sunderland and MassHighway to implement the recommendations of the Connecticut River Crossing Transportation Study to improve traffic flow and safety along the Route 5&10 and Route 116 corridors.
- Continue to monitor the effectiveness of the safety improvements implemented along Route 116 in Sunderland.
- Continue to monitor high crash locations and work with MassHighway and Towns to develop recommendations to improve safety.
- Work with MassHighway, Towns and Police Departments to identify corridors experiencing elevated numbers of “Lane Departure” crashes. Develop strategies to mitigate this type of crash.
- Continue to monitor and assess the transport of hazardous materials in the region, and to develop, update, and coordinate plans with the Local Emergency Planning Committee, and appropriate agencies for responding to a hazardous materials spill.



Map of Road Inventory Functional Class to be inserted here

Map of Road Inventory Functional Class with Urban Boundaries to be inserted here.

Map of Major Roadway Traffic Volumes to be inserted here.

Map of current bridge classifications to be inserted here.

Map of Hazardous Intersections to be inserted here.

Map of Deerfield roadways that have the potential for flooding to be inserted here.



Map of scenic byways to be inserted here.

