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Road and Bridge Infrastructure

2011

REGIONAL TRANSPORTATION PLAN

5 Roadway and Bridge Infrastructure

Comprised of scenic roadways and covered bridges, Franklin County has a diverse collection of transportation resources. A safe and efficient transportation network depends on the quality and integrity of the transportation infrastructure in the county, including roads and bridges. This chapter examines the condition of these road and bridge resources, and includes an analysis of the roadway network (mileage and functional classification), traffic volumes, bridge ratings, pavement management analysis, congestion and traffic operations. The goal of this chapter is to identify existing concerns and future needs based on this analysis and public input received during the development of this plan.

The programs and projects recommended in this chapter are consistent with the goals of the MassDOT's long-range statewide transportation plan, *The Commonwealth of Massachusetts Long-Range Transportation Plan* (2006). MassDOT's statewide plan emphasizes the "Fix-It-First" policy of maintaining and upgrading existing roadway and bridge infrastructure over supporting the creation of new transportation facilities. The statewide plan also focuses on improving transportation safety, enhancing mobility for people and for goods, and improving operational efficiency and cost-effectiveness. MassDOT's statewide plan also includes goals that foster sustainable growth as well as encourage the preservation of historic and scenic resources.

Existing Conditions

Franklin County consists of nearly 1,700 centerline miles. The majority of these miles, nearly 80 percent, are owned and maintained by the Towns, while MassDOT owns and maintains almost 11 percent of the roads. The remaining 9 percent 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 municipalities.

Functional Classification

Functional classification is the categorization of highways and roadways in terms of the service that the roads provide within the regional network, as mandated under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Additionally, functional class has both rural and urban designations based on the U.S. Census population figures. The urban boundaries are based on 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).



View of the General Pierce Bridge

The majority, 84 percent, of roadway mileage in Franklin County is categorized as rural, with the remaining 16 percent defined as urban. The breakdown of road miles in Franklin County according to functional classification is summarized in Table 5-2. A map of the roadways in the county, along with the functional classification of each roadway is located at the end of this chapter.

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Table 5-1: Roadway Centerline Mileage by Maintenance Authority

Town	Maintenance Authority						Town Totals
	MassDOT	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	1.04	58.07
Buckland	6.04	43.05	0.00	0.00	0.00	1.42	50.50
Charlemont	12.00	43.12	1.63	0.00	0.00	0.80	57.55
Colrain	3.99	78.85	1.18	0.00	0.00	2.30	86.32
Conway	6.53	64.11	0.00	0.00	0.00	0.32	70.96
Deerfield	19.97	77.47	1.16	0.00	0.00	1.53	100.44
Erving	13.57	17.51	7.43	0.00	0.00	1.00	39.51
Gill	3.94	34.92	0.13	0.00	0.00	4.65	43.65
Greenfield	18.83	102.24	0.00	0.00	2.04	9.15	132.25
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	59.53
Leverett	5.44	34.50	0.00	0.00	0.00	3.07	43.01
Leyden	0.00	35.54	0.00	0.00	0.00	2.54	38.08
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	4.07	114.31
New Salem	11.94	35.64	0.20	53.79	0.00	2.23	103.79
Northfield	11.18	65.532	0.06	0.00	0.00	6.97	83.73
Orange	12.28	87.232	0.55	0.00	0.00	3.47	103.53
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	30.90	0.00	5.17	0.00	2.73	41.95
Sunderland	4.48	38.94	2.90	0.00	0.00	0.00	46.31
Warwick	0.01	56.02	6.64	0.00	0.00	1.82	64.49
Wendell	0.31	46.40	16.49	2.02	0.00	1.26	66.47
Whately	8.72	31.15	0.00	0.00	0.00	8.41	48.27

Centerline Miles refer to the linear length of a road segment. For divided highways, 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 2009.

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Table 5-2: Roadway Centerline Mileage by Functional Class

Functional Classification	Total Centerline Mileage	Percentage of Total
1. Rural Interstate	15.97	0.94 %
Urban Interstate	7.83	0.46 %
2. Rural Principal Arterial	29.99	1.76 %
3. Rural Minor Arterial	55.15	3.25 %
Urban Principal Arterial	22.06	1.30 %
5. Rural Major Collector	231.87	13.64 %
Urban Minor Arterial	45.43	2.67 %
6. Rural Minor Collector	120.42	7.09 %
Urban Collector	23.83	1.40 %
7. Rural Local	985.74	58.01 %
Urban Local	161.05	9.48 %
Total	1699.34	100.00 %

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: Massachusetts Department of Transportation, Road Inventory Year-End Report and Road Inventory File, 2009.

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 25 percent of the roads in Franklin County's road network are classified in categories 1 through 5 and Urban Collectors in category 6. The remaining 76 percent 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 750 different locations since 1991, the majority of which have been conducted by the FRCOG and MassDOT. The FRCOG maintains a database of this traffic volume data and annually produces a Traffic Count Data Book for all counted locations in Franklin County.

Traffic volumes on Franklin County's roadways vary from over 25,000 vehicles per day on sections of Interstate 91 to less than 100 vehicles per day on a number of local roadways. The most heavily traveled roadway in Franklin County is Interstate 91 where Average Annual Daily Traffic (AADT) volumes range from approximately 30,000 vehicles per day in Whately to approximately 20,000 vehicles per day through Bernardston. Along Route 2, AADT volumes vary between 22,000 vehicles per day near the Greenfield Rotary to less than 2,000 vehicles per day through parts of Charlemont. Other high volume corridors include Route 116 in Sunderland and Route 5/10 in Whately, with traffic volumes near 15,000 vehicles per day.

Using a sampling of data collected between 2005 and 2009 at 20 locations throughout the county, annual traffic growth was examined and an average growth rate (AGR) for traffic was estimated. The AGR for the period between 2005 and 2009 was calculated equal to -2.00%. In other words, traffic

has declined at a rate of approximately 2 percent between 2005 and 2009.

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. The majority of bridges located on high volume roadways are predominantly under the domain of the State and are inspected by MassDOT 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

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replacement it must have an AASHTO rating of less than 50. Bridges may be further classified as *structurally deficient (SD)* or *functionally obsolete (FO)*. Each of these classifications can increase the priority of repair or replacement of the bridge.

MassDOT maintains a listing of all bridges that meet the National Bridge Inventory (NBI) criteria set by FHWA. This criteria identifies bridges that are 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 funding¹. 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 MassDOT 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. Information on Franklin County bridges and their current classification are shown in a map at the end of this chapter.

In a recent survey, the majority of residents in Franklin County felt that the condition of bridges has worsened in the past five (5) years.

Bridges are considered structurally deficient if they fall below specific thresholds. These bridges may span a range of conditions, from requiring a minor, but vital, repair to a more complete rehabilitation. As with all bridges in the Commonwealth, safety concerns are paramount. If a bridge is in need of significant repair to maintain current traffic volumes and vehicular weight, then that bridge should be high on the priority list. Statewide, priority for funding is given to structurally deficient bridges.

Bridges may also become functionally obsolete. Functionally obsolete refers to a bridge's inability to

fully support the roads they serve due to variables such as limited width or height. Such a determination is based on the current operating capacity of the bridge. This bridge classification helps identify areas where mobility may be decreased as a result of the bridge. For example, if a four-lane roadway leads into a two-lane bridge, some level of congestion is expected as a result of the decreased capacity. While the bridge may be structurally sound, the issue lies in the capacity of the bridge to carry traffic. Functionally obsolete bridges may not present a safety hazards, but may contribute to overall congestion. This bridge classification category can be used to identify problem areas in the transportation network.



View of the Conway Covered Bridge

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

Table 5-3: NBIS Bridge Condition, per Town

Town	Bridge Condition			Total Bridges
	Functional	Functionally Obsolete	Structurally Deficient	
Ashfield	9	1	0	10
Bernardston	12	0	3	15
Buckland	12	3	3	18
Charlemont	20	4	2	26
Colrain	21	2	2	26
Conway	11	5	2	18
Deerfield	9	2	5	16
Erving	5	2	2	9
Gill	2	0	2	4
Greenfield	32	9	6	47
Hawley	8	0	2	10
Heath	3	1	1	5
Leverett	4	3	3	10
Leyden	1	0	0	1
Monroe	2	0	2	4
Montague	9	5	4	18
New Salem	1	0	1	2
Northfield	9	2	1	12
Orange	9	1	5	15
Rowe	2	1	0	3
Shelburne	3	0	1	4
Shutesbury	0	0	0	0
Sunderland	1	0	0	1
Warwick	2	0	1	3
Wendell	1	0	0	1
Whately	13	1	1	15
County Totals	201	42	49	293

There are a total of 293 bridges in Franklin County that are on the NBI, according to the 2009 MassDOT Bridge Inventory. In order for a bridge to be eligible for reconstruction it must have an AASHTO rating of less than 75. There are currently 125 (43 percent) bridges in Franklin County which are eligible for reconstruction according to this requirement. Of those 125 bridges, 37 (13 percent) of them meet the requirements for replacement with an AASHTO rating of less than 50. Further analysis of this data revealed that a total of 49 bridges in the county are formally classified as structurally deficient and an additional 42 bridges are formally classified as functionally obsolete. Table 5-3 presents an overview of the bridge condition for NBI bridges in Franklin County, by municipality.

Several other types of bridges are located throughout the county in addition to those bridges listed on the NBI. The jurisdiction of these bridges ranges from private ownership to being municipally owned. Additional bridge categories include bridges such as pedestrian bridges, culverts and railroad bridges. While MassDOT is responsible for the inspection of all NBI bridges, MassDOT also maintains an inventory of all additional bridges in the state.

In addition to data collected by MassDOT, the FRCOG also collected qualitative data from Franklin County residents as part of the Regional Transportation Plan Update. To gain a better understanding of the qualitative perception of bridge conditions in the region, a question addressing bridge conditions was included on the transportation survey that was distributed as part of the public outreach of this Regional Transportation Plan. The survey asked Franklin County residents to indicate if they felt that bridges in the county have improved, stayed the same, or gotten worse over the past 5 years.

The majority of respondents (47 percent) felt that bridges have worsened in the past 5 years. Furthermore, approximately 32 percent of residents felt that they have stayed the same, while 14 percent saw an improvement in bridge conditions. The remaining 8 percent had no opinion.

Pavement Management Analysis

A Pavement Management System (PMS) is a planning tool that collects and monitors information on current pavement conditions, evaluates and prioritizes alternative maintenance, rehabilitation and reconstruction (repair) strategies, according to the Federal Highway Administration (FHWA). In Franklin County, it is extremely important to develop a plan for the region aimed at pavement management, because pavement is such a

significant capital investment and a critical component of our transportation infrastructure.

The relationship between pavement condition and cost is not linear. In other words, as pavement condition decreases, cost does not linearly increase. Rather, as pavement condition worsens, the costs to bring the pavement condition back up to excellent condition increases significantly. It is estimated that it will likely cost approximately 5 times more to repair pavement that has been allowed to deteriorate from a condition fair to very poor condition. Research in the field of pavement management has exhibited that a balance must be struck between maintaining roadways and repairing roadways in poor condition. Because it is so much more costly to reconstruct a roadway, the most cost effective approach would be to properly maintain all roadways before they reach that stage of debilitation. A PMS provides the framework and analysis for developing these regional priorities.

MassDOT and the FRCOG each have a history of conducting pavement management analyses throughout the county. Franklin County has a total of 432.71 miles of roadway that are eligible for federal funding. Table 5-4 presents a summary of roadway jurisdiction for federal aid eligible roadways in the county. Some pavement management data has been collected by MassDOT for a portion (15.75 percent) of these roadways in Franklin County using sophisticated data collection equipment. A special testing vehicle, the Automatic Road Analyzer (ARAN) collects pavement condition data and rates the pavement condition according to the Pavement Serviceability Index (PSI) on a 5 point scale. Based on this scale, roadway conditions are classified as poor, fair, good, or excellent.²

Data collected by MassDOT using this method includes approximately 65 miles of roadway in the county. This sample of roadways accounts for approximately 25 percent of federal aid eligible roadways as well as a variety of roadway functional classifications and can be used to estimate the general condition of roadways in the county. Of the

² MassDOT. Draft FFY 2011 – 2015 Highway Capital Investment Plan. May 2010.

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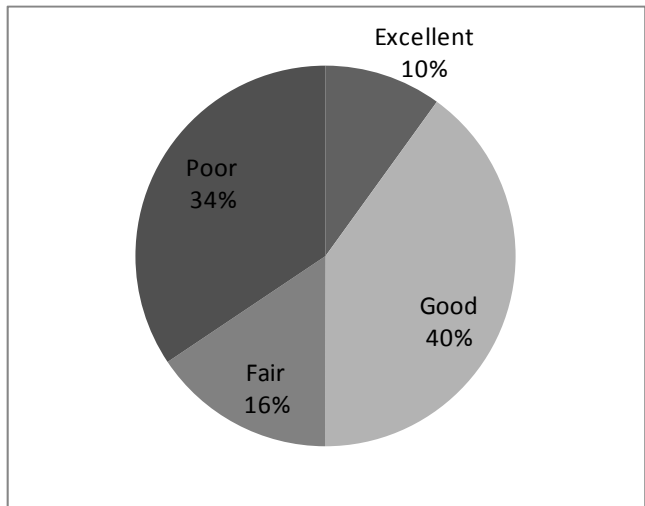
roadways that have been surveyed by MassDOT, pavement condition has been estimated for the region and is shown in Figure 5-1.

Table 5-4: Federal Aid Eligible Roadway Mileage, by Jurisdiction

Jurisdiction	Miles	Percentage
MassDOT	179.64	41.52%
Town	253.07	58.48 %
Total	432.71	100.00 %

Using this data collected by MassDOT, estimated pavement condition for the county can be deduced. As shown in Figure 5-1, the majority of roadways surveyed are categorized as in good (40 percent) or poor (34 percent) condition. Approximately 16 percent of roadways are in fair condition, with the remaining 10 percent of roadways in excellent condition.

Figure 5-1: Pavement Condition Estimates, 2010



In addition to MassDOT pavement management efforts, the FRCOG has been involved in pavement management since the early 1990s. In 1997, the FRCOG concluded a three-year contract with MassDOT 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

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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 most recent study, completed in July 2006 for the Town of Montague, found that the town’s 93 miles of paved roads were in an overall Fair condition with a \$5.7 million backlog of repairs.

The work completed as part of these pavement management studies 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 FRCOG is currently working to restart a pavement management program for Franklin County and maintain a database of pavement condition on federal aid eligible roadways in the region. Federal aid eligible roadways in Franklin County will be continually monitored and surveyed on a three-year rotating basis and a database will be maintained. A regional report will outline the status of surveyed roadways as it becomes

available.

In order to estimate the anticipated costs of repair and maintenance to bring roadways up to an excellent rating, cost estimates were calculated based on data collected by MassDOT on a sample of federal aid roadways in the county using cost estimates obtained from the Pioneer Valley Planning Commission (PVPC). Estimated maintenance and repair costs are shown in Table 5-5. The estimates shown below outline the total cost of bringing all roadways in Franklin County up to *excellent* condition at the same time. These calculations assume that all roadways currently in the excellent category are in need of routine maintenance. These cost estimates are extremely approximate in nature as they are based on an estimated condition of the regional pavement system as well as approximate cost estimate figures.

It is unrealistic, due to limited financial and physical resources, to bring all roadways in the county to excellent condition at one time. Furthermore, it is important to note that even as roadways reach excellent condition, they will still need to be maintained in order to prevent deterioration. Due to financial constraints and limitations it is necessary to prioritize pavement management needs throughout the county and balance this with cost and safety considerations. This is further complicated by the fact that the relationship between pavement condition and cost is not linear. For example, the strategy that often seems the most logical (repair the worst roads first), is actually the least cost effective. As roadway conditions

Table 5-5: Pavement Management Repair Cost Estimates – Existing Conditions

Condition	Percent of Sample	Estimated Lane Miles	Repair Category	Repair Cost (per lane mile)	Total Estimated Cost	Expected Life Span (years)
Excellent	9.93%	42.97	Routine Maintenance	\$5,280	\$226,882	4
Good	40.10%	173.52	Preventative Maintenance	\$59,840	\$10,383,437	8
Fair	15.52%	67.16	Resurfacing	\$126,720	\$8,510,515	8
Poor	34.45%	149.07	Reconstruction	\$211,200	\$31,483,584	10
Total	100.00%	432.71			\$50,604,418	

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Table 5-6: Sign Replacement Cost Estimates Based on Centerline Miles, per Town

Town	Regulatory Signs		Warning Signs		Guide Signs		Total Signs	
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Ashfield	1285	\$ 19,273	343	\$ 42,657	86	\$ 6,424	1713	\$ 68,353
Bernardston	753	\$ 11,294	201	\$ 24,998	50	\$ 3,765	1004	\$ 40,056
Buckland	775	\$ 11,624	207	\$ 25,727	52	\$ 3,875	1033	\$ 41,225
Charlemont	776	\$ 11,642	207	\$ 25,769	52	\$ 3,881	1035	\$ 41,292
Colrain	1419	\$ 21,290	378	\$ 47,121	95	\$ 7,097	1892	\$ 75,507
Conway	1154	\$ 17,310	308	\$ 38,312	77	\$ 5,770	1539	\$ 61,392
Deerfield	1394	\$ 20,917	372	\$ 46,296	93	\$ 6,972	1859	\$ 74,185
Erving	315	\$ 4,728	84	\$ 10,464	21	\$ 1,576	420	\$ 16,768
Gill	629	\$ 9,428	168	\$ 20,868	42	\$ 3,143	838	\$ 33,439
Greenfield	1840	\$ 27,605	491	\$ 61,099	123	\$ 9,202	2454	\$ 97,905
Hawley	807	\$ 12,101	215	\$ 26,784	54	\$ 4,034	1076	\$ 42,920
Heath	939	\$ 14,089	250	\$ 31,183	63	\$ 4,696	1252	\$ 49,968
Leverett	621	\$ 9,315	166	\$ 20,617	41	\$ 3,105	828	\$ 33,037
Leyden	640	\$ 9,596	171	\$ 21,239	43	\$ 3,199	853	\$ 34,033
Monroe	301	\$ 4,514	80	\$ 9,992	20	\$ 1,505	401	\$ 16,011
Montague	1871	\$ 28,064	499	\$ 62,115	125	\$ 9,355	2495	\$ 99,533
New Salem	642	\$ 9,623	171	\$ 21,298	43	\$ 3,208	855	\$ 34,129
Northfield	1180	\$ 17,694	315	\$ 39,162	79	\$ 5,898	1573	\$ 62,753
Orange	1570	\$ 23,553	419	\$ 52,130	105	\$ 7,851	2094	\$ 83,533
Rowe	646	\$ 9,690	172	\$ 21,448	43	\$ 3,230	861	\$ 34,368
Shelburne	896	\$ 13,438	239	\$ 29,743	60	\$ 4,479	1194	\$ 47,660
Shutesbury	556	\$ 8,343	148	\$ 18,466	37	\$ 2,781	742	\$ 29,590
Sunderland	701	\$ 10,514	187	\$ 23,271	47	\$ 3,505	935	\$ 37,289
Warwick	1008	\$ 15,125	269	\$ 33,478	67	\$ 5,042	1344	\$ 53,645
Wendell	835	\$ 12,528	223	\$ 27,729	56	\$ 4,176	1114	\$ 44,433
Whately	561	\$ 8,411	150	\$ 18,615	37	\$ 2,804	748	\$ 29,829
County Totals	24114	\$ 361,707	6430	\$ 800,577	1608	\$ 120,569	32152	\$ 1,282,853

Notes: Cost estimates were calculated using centerline miles under Town Jurisdiction only and based on formulas provided by the FHWA in the *Sign Retroreflectivity Guidebook*. These formulas utilize the following assumptions: 10% of regulatory signs will need to be replaced; 83% of warning signs will need to be replaced; 50% of guide signs will need to be replaced; and estimated sign replacement costs, including materials and labor, are \$150 per sign.

These requirements have a phased-in compliance structure which consists of the following milestones:

- **January 2012:** By this date, all agencies will have to establish a sign maintenance program that can regularly address the new minimum sign retroreflectivity requirements.
- **January 2015:** By this date, all agencies must comply with the new retroreflectivity

requirements for most of the traffic signs they have installed, including all red or white “regulatory” signs, yellow “warning” signs, and green/white “guide” signs.

- **January 2018:** By this date, all agencies must comply with the new retroreflectivity requirements for overhead guide signs and all street name signs.

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Most immediately, by January 2012, agencies need to have a method in place to maintain minimum levels of retroreflectivity.

The additional costs of bringing signs into compliance by the prescribed dates can have significant financial implications for the towns. Table 5-6 presents an overview of estimated sign replacement costs for each community in Franklin County using formulas provided by the FHWA. It is recommended that towns begin to plan for sign replacement in town and department budgets, as well as explore additional financing mechanisms and purchasing options, such as cooperative purchasing.

Traffic Studies

Route 5/10 Corridor Plan

In 2008, two large parcels in Bernardston were designated Priority Development Sites under Massachusetts General Law Chapter 43D. This designation allows expedited permitting and incentives to encourage development and, thus, increase jobs and the tax base in the area. In response to this designation, the FRCOG undertook the Route 5/10 Corridor Plan to examine the current conditions (such as land use, zoning, and traffic operations) along the Route 5/10 Corridor in Bernardston, Gill, and Northfield (Route 5/10 runs the entire length of the county) and estimate how future development may impact the safety and efficiency of the transportation infrastructure. The plan documents the existing safety and operational conditions of the study area while also providing a glimpse into the future operations of the corridor in light of potential future growth and development. The plan culminates with the presentation of several mitigation strategies aimed at reducing the negative impacts associated with future traffic growth and development.

Deerfield Level of Service Analysis

In 2010, the FRCOG conducted a Level of Service (LOS) analysis of the Route 5/10 Corridor in Deerfield as part of a Zoning exercise. The intent was to estimate the potential impacts of future development scenarios on the local transportation

system. Since zoning guides development patterns and land use types, this exercise was designed to provide local officials with information about future zoning scenarios and the transportation related challenges that may result.

Identification of the Most Hazardous Intersections in Franklin County

Approximately every three years the FRCOG analyzes crash data from the Registry of Motor Vehicles for the twenty-six communities in Franklin County to identify intersections that have experienced a repeated occurrence of crashes. The study identifies the fifty most hazardous intersections and ranks them based on a calculated crash rate that takes into account the severity of each of the crashes, as well as the exposure to crashes based on traffic volumes. The most recent study was completed in 2009 and reviewed crash data from 2004 through 2006. This study is described more thoroughly in Chapter 13 – Transportation Safety. An update of the report, using the next set of available data, will be completed in 2012.

Road Safety Audits

The Road Safety Audit (RSA) process is an effective tool for improving traffic safety at specific locations and is a measure that has been supported for many years by MassDOT and the FHWA. With the intention of bring the RSA process to Franklin County, in 2010 the FRCOG performed a study, *Development of Safety Improvements for Hazardous Locations*, to identify specific locations that would benefit most from a RSA.

Since completion of the *Development of Safety Improvements for Hazardous Locations*, several RSAs have been conducted in Franklin County. To date, ten RSAs have been conducted in the communities of Deerfield, Greenfield, and Whately. More complete information about RSA activity in Franklin County can be found in Chapter 13 – Transportation Safety.

Planned and Completed Roadway Improvement Projects

Greenfield Intersection Improvement Project

Intersection improvements were completed in 2010 at eight intersections in Greenfield. Improvements included the installation of new traffic signals, resurfacing, curbing, drainage work, sidewalks, wheelchair ramps, signs and pavement markings that were geared towards improving the safety and efficiency at these intersections. More information about this project can be found in Chapter 13 – Transportation Safety.

Route 2 Safety Improvements

Since the formation of the Route 2 Task Force in 1994, the FRCOG has been working together with the communities along the Route 2 corridor from Philipston to Greenfield to create a safer roadway. Since that time, nearly \$70 million has been invested in constructing safety improvement in the corridor. The first improvements included numerous upgrades such as the installation of shoulder rumble strips, new signs and lines, tree clearing for improved visibility, and the installation of variable message signs. The first major construction project was the realignment of Route 2 around the Erving Paper mill, creating a safer climate for both through travelers of the roadway and the Mill's loading docks. This work was followed by the construction of climbing lane and intersection improvements and a truck weigh station in Athol, including installation of an innovative centerline treatment called "Qwick Kurb" along 13 miles of highway in Philipston and Athol. Next was the reconstruction of two bridges and lowering the profile of Route 2 in the Erving area of Erving, along with the construction of protected turn lanes, acceleration and deceleration lanes, and traffic flow improvements in the Erving neighborhoods near the French King Bowling Alley. Currently under construction are improvements in Orange that include intersection and climbing lane improvements, as well as rehabilitation of the Route 122 Bridge. Designs for improvements in Erving Center and Farley are nearing the 25% design completion stage, and a

round of public information meetings are being planned for the affected neighborhoods. Finally, some improvements in the Gill/Greenfield section are being completed as part of the rehabilitation of the Gill-Montague Bridge, however other improvements for this area are just in the preliminary planning stage. More detailed information about the Route 2 Safety Improvements and the Route 2 Task Force can be found in Chapter 13 – Transportation Safety.

Pedestrian Safety Improvements in Sunderland

Following the tragic death in December 2004 of a pedestrian crossing Route 116 in front of the 7-11 Plaza in Sunderland, the FRCOG assisted the Town of Sunderland and MassDOT in implementing several measures to improve pedestrian, bicycle, and vehicle safety at this location. The effectiveness of the installed safety improvements were evaluated by FRCOG and MassDOT. Both agencies determined that the implemented safety improvements had a positive impact on improving the safety along the corridor by decreasing crash frequency as well as crash severity. In other words, the number of crashes decreased and the type of crashes shifted away from the more dangerous angle type crashes to the typically less severe rear-end type crashes.

While the improvements were shown to improve the safety of the area, there was still some concern that more safety improvements could be made. This need for additional safety measures was revisited when, on September 8, 2009, two pedestrians were struck while crossing in the crosswalk on Route 116. Both pedestrians survived the incident; however, one had several injuries. This crash prompted additional discussions between MassDOT, the Town, residents, and the FRCOG. The resultant solution was the installation of a traffic signal at the intersection of Squire Village Drive and Route 116, where the one crosswalk is located. The traffic signal was installed and activated on October 22, 2009. More information about this project can be found in Chapter 13 – Transportation Safety.

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develop potential improvements to this intersection and has agreed upon the installation of a roundabout to enhance safety and improve traffic flow. The roundabout is currently under design with a projected cost of \$1.6 million.

Greenfield Road Improvements

The reconstruction of Greenfield Road in Montague consists of roadway reclamation and minor widening of approximately 2 miles from near Sherman Road south to Hatchery Road. Major elements of the project will improve safety at the intersection of Randall Road (site of a fatal crash), will widen shoulders to improve bicycle accommodation on this segment of the Franklin County Bikeway, and will ultimately connect to a new bicycle and pedestrian bridge under design for south of Hatchery Road. Design is underway and is challenged with some topography issues, but it is expected that the project should be ready to advertise by 2013-2014.

Route 2 Culvert Repair in Charlemont

Several culverts along Route 2 in Charlemont are listed in MassDOT's planned projects for repair or replacement, along with other work. Route 2, from Route 8A to South Street, is currently in the design phase for culvert repair as well as roadway resurfacing and related work. An additional culvert located on Route 2 (over Oxbow Brook and Wilder Brook) will be replaced and is currently listed in the 2011 TIP for advertising.

Recommendations for Road and Bridge Infrastructure

- Work with MassDOT to examine and implement, if feasible, the installation of a **climbing lane** up Greenfield Mountain on Route 2 west in Greenfield.
- Work with Towns to implement requirements of the **sign retroreflectivity** program.

Retrofit of the Greenfield Rotary

Another major improvement project that has been recently completed is the redesign of the Route I-91/ Route 2 Rotary. The improvements were aimed at addressing safety issues, including trucks crowding out other vehicles on the rotary and the speed of circulating traffic. The projects included redesigning and clearly delineating travel lanes in the rotary, expanding or reconfiguring the exit/entrance ramps for I-91 and Routes 2 and 2A, and adding signage to better direct traffic flow. Initial evaluations of effectiveness after the improvements were installed are encouraging, however more data is needed in order to document the significance of the results. Additional follow-up will be conducted in upcoming years. More details about this project can be found in Chapter 13 – Transportation Safety.

Greenfield Mountain Climbing Lane

In the 2009 *Route 2 West Safety Study*, it was recommended that a climbing lane be added to the westbound lane of Route 2 over Greenfield Mountain. Currently, slow-moving traffic (usually freight trucks) going up Greenfield Mountain on Route 2, which has one lane in each direction, often use the roadway shoulder as a second travel lane. However, the shoulder is not wide enough to accommodate tractor-trailers, leaving these large trucks to straddle both the breakdown lane and travel lane, creating a hazardous situation as the faster moving vehicles in the travel lane are forced into the oncoming lane in order to pass. The *Route 2 West Safety Study* concluded that there is enough pavement width on the roadway to accommodate a climbing lane, but not enough to have a desirable shoulder width. The Study recommended that a climbing lane be created, even with a smaller shoulder, as this would be a safer alternative to the current situation.

Roundabout at Greenfield Community College (GCC) and Colrain Road

The intersection of Colrain Road and College Drive in Greenfield is located at the entrance to Greenfield Community College (GCC) and experiences delay and safety challenges. MassDOT has been working with the City of Greenfield to

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- Conduct follow-up to determine the **effectiveness of improvements** at the Greenfield Rotary.
- Continue developing a **Pavement Management Program**.
- Update the Most Hazardous Intersections report using the next set of available data.
- Continue conducting **Road Safety Audits** to address safety issues in the region.
- Continue to staff the Route 2 Task Force and advocate for advancement of **additional safety improvements**.
- Support development of a **roundabout** at Greenfield Community College and Colrain Road.
- Support the **repair and replacement** of culverts along Route 2 in Charlemont.