TOWN OF SHUTESBURY

PAVEMENT MANAGEMENT STUDY

SCENARIO 2

FRANKLIN REGIONAL COUNCIL OF GOVERNMENTS
425 Main Street, Greenfield, MA 01301
413-774-3167

June 2004

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Executive Summary

The Franklin Regional Council of Governments (FRCOG) has been involved in pavement management since the early 1990s. In 1997 the FRCOG concluded a three year contract with the Massachusetts Highway Department (MassHighway) that completed 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. The Town of Shutesbury requested that a portion of their Executive Order 418 funding be utilized to produce a pavement management analysis of the town maintained paved road network. The results of the analysis are contained within this report.

The Town of Shutesbury maintains 31.15 miles of roadway, of which 14.98 miles are currently paved. The FRCOG conducted a pavement surface survey during the fall of 2002 and analyzed the data. The survey indicates that the Town is implementing sound pavement management practices, with the paved road network currently in a Good overall condition.

An analysis of future conditions indicates that existing levels of Chapter 90 funding combined with the reconstruction of Leverett, Cooleyville and Prescott Roads and an additional investment of saved funds will be sufficient to allow the Town to improve the condition of paved road network and keep it in a perpetual Good to Excellent Condition.

Over the next several years the Town should monitor the paved road maintenance needs and explore and utilize alternative funding sources when necessary to ensure that the paved road network continues to be maintained in a perpetual Good to Excellent condition.

The Town now has the base data that will allow it to monitor its progress with maintaining the road network through the regular survey of its paved road network and the FRCOG will continue to provide support to the extent possible.

Introduction

The Franklin Regional Council of Governments (FRCOG) has been involved in pavement management since the early 1990s. In 1997 the FRCOG concluded a three-year contract with the Massachusetts Highway Department (MassHighway) that completed 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 Buckland, Heath, Orange and Shelburne. The Town of Shutesbury requested that a portion of their Executive Order 418 funding be utilized to produce a pavement management analysis of the town maintained paved road network. The FRCOG was contracted to complete the study and the results of the analysis are contained within this report.

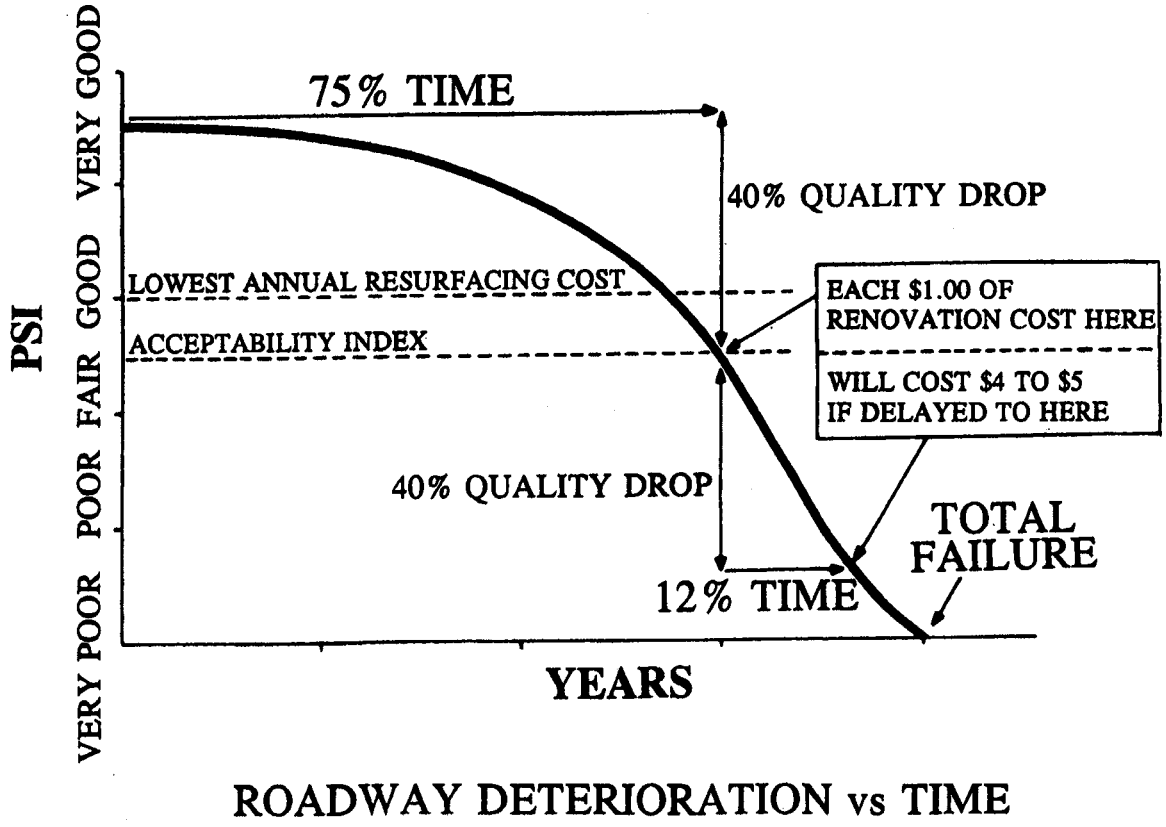
A Pavement Management System (PMS), as defined by the American Public Works Association (APWA), is "a systematic method for routinely collecting, storing, and retrieving the kind of decision-making information needed (about pavement) to make maximum use of limited maintenance and construction dollars." Historically, road maintenance funds were channeled to those roads that were perceived by local highway superintendents to be in the worst condition, or where political influence dictated. 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 a "Poor" or "failed" condition. A PMS is designed to provide quantitative information to support repair and budget decisions which reflect this thinking.

Figure 1 gives a graphical depiction of the general life cycle of an asphalt pavement. Under normal conditions of consistent weather and traffic patterns, a pavement will deteriorate by 40 percent in the first 75 percent of its life. During the next 12 percent of its life, the pavement will deteriorate by a further 40 percent. 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 on 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. A PMS is generally based on a computer software database that has been developed from years of research into the function and longevity of pavement materials and the effects of timed repair strategies. A PMS can help in determining the most appropriate time for repair action, the most cost-effective methods, and the cost of maintaining the roadway at the desirable condition level.

This pavement management study provides the core information and a starting point for the formalizing of a pavement management system for the Town.

Figure 1: Life Cycle of Asphalt Pavement



Source: 1996 Pavement Management Program Technical Report, MassHighway

Background

The FRCOG utilizes the RoadManager (RM) pavement management software for its pavement management studies and extracts basic geometric and administrative information about roads from the MassHighway maintained Road Inventory File (RIF). The RIF is a computerized database containing information on all public roads and highways within the Commonwealth of Massachusetts. It was originally compiled from field data collected between 1969 and 1974 and has become an important reference source for transportation planning and administration at the Federal, State and local levels. In conjunction with this study, the FRCOG has worked with the Highway Superintendent, to update the information contained in the latest version of the RIF. A number of new roadways have been constructed, as well as street names changed, and these have been incorporated into the data used in this study. The FRCOG will be working with the Town and MassHighway to ensure that all updates identified will be reflected in future versions of the RIF.

The road network in the Town of Shutesbury is comprised of both paved and gravel surfaces. According to the 2001 year-end release of the RIF with the subsequent updates, the Town is

responsible for the maintenance of 31.15 miles of roadway and MassHighway is responsible for the maintenance of 3.16 miles of roadway. Unaccepted (abandoned or privately maintained) roadways account for an additional 6.24 miles, and the Metropolitan District Commission (MDC) is responsible for the maintenance of another 4.87 miles of roads within the town. This produces a total of 45.42 miles of both paved and gravel roadways in the Town of Shutesbury. It should be noted that these mileages are provisional until MassHighway has accepted the submitted updates. Map 1 shows the Shutesbury road network by Maintenance Authority (i.e. Town, MassHighway, etc.)

Functional Classification of roadways was mandated under the Federal Intermodal Surface Transportation Efficiency Act (ISTEA) legislation passed in 1991, and was completed in 1993 by MassHighway in cooperation with the 13 Regional Planning Agencies. The Federal Highway Administration states that, "Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Functional classification defines the nature of this channeling process by defining the part that any particular road or street should play in serving the flow of trips through a highway network."[1] The classification ranks roads according to a hierarchy and determines which roads are eligible for Federal Aid and State Transportation Program (STP) funds for improvements through the Transportation Improvement Program (TIP) coordinated by the Franklin Regional Council of Governments.

There are four basic categories of functional classification based on the hierarchical system. They are:

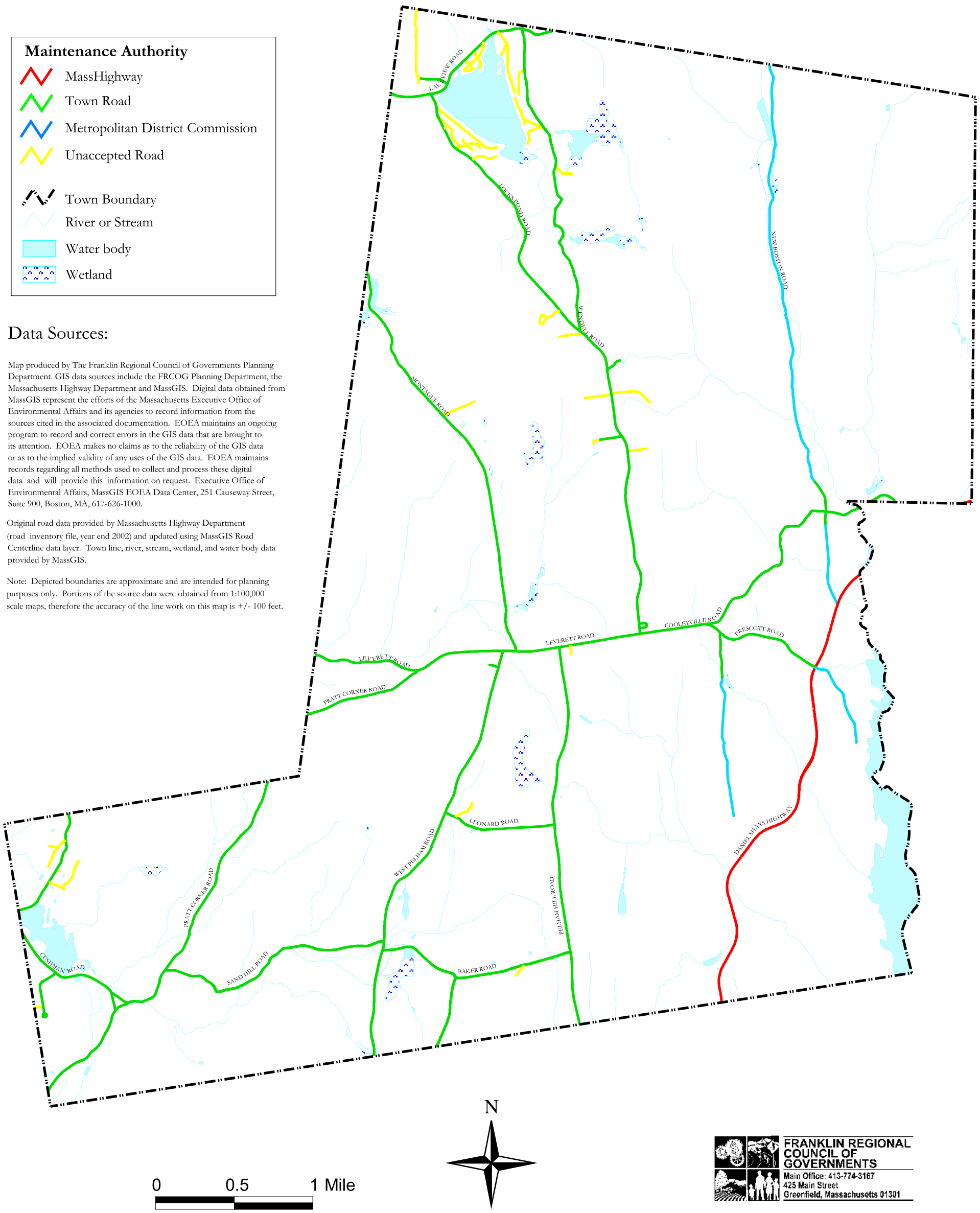
- Interstates - Highways that serve interstate travel;
- Arterials - Roads that link cities to towns or provide interstate/intercounty service;
- Collectors - Roads that serve towns outside of the arterial system, lead to the arterial system, or link towns; and
- Local - Roads that primarily serve residential areas or adjacent land uses.

Arterials and Collectors have further sub-classifications of "Urban" or "Rural", and "Major" or "Minor" based on population density characteristics. All roadways in Shutesbury are termed "Rural".

Shutesbury's road network is made up of Arterial, Collector and Local classified roadways. Map 2 shows the road network and the assigned functional classifications. The 3.16 miles of Route 202 maintained by MassHighway is functionally classified as Rural Minor Arterial. Of the 31.15 miles of roadway maintained by the Town, 8.50 miles are classified as Rural Major Collector, 2.79 miles as Rural Minor Collector and the remaining 19.86 miles as Rural Local. Town maintained roadways classified as Rural Major Collector are eligible for Federal Aid and STP funds for reconstruction through the TIP Process. The procedures for applying for this source of funding are discussed later in this report.

[1] Highway Functional Classification: Concepts, Criteria and Procedures. U.S. Department of Transportation, Federal Highway Administration. March 1989. Publication number FHWA-ED-90-006

TOWN OF SHUTESBURY PAVEMENT MANAGEMENT STUDY
SCENARIO 2
Map 1 - Maintenance Authority



Data Sources:

Map produced by The Franklin Regional Council of Governments Planning Department. GIS data sources include the FRCOG Planning Department, the Massachusetts Highway Department and MassGIS. Digital data obtained from MassGIS represent the efforts of the Massachusetts Executive Office of Environmental Affairs and its agencies to record information from the sources cited in the associated documentation. EOEA maintains an ongoing program to record and correct errors in the GIS data that are brought to its attention. EOEA makes no claims as to the reliability of the GIS data or as to the implied validity of any uses of the GIS data. EOEA maintains records regarding all methods used to collect and process these digital data and will provide this information on request. Executive Office of Environmental Affairs, MassGIS EOEA Data Center, 251 Causeway Street, Suite 900, Boston, MA, 617-626-1000.

Original road data provided by Massachusetts Highway Department (road inventory file, year end 2002) and updated using MassGIS Road Centerline data layer. Town line, river, stream, wetland, and water body data provided by MassGIS.

Note: Depicted boundaries are approximate and are intended for planning purposes only. Portions of the source data were obtained from 1:100,000 scale maps, therefore the accuracy of the line work on this map is +/- 100 feet.

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TOWN OF SHUTESBURY PAVEMENT MANAGEMENT STUDY
SCENARIO 2
Map 2 - Functional Classification

Functional Classification

- Rural Minor Arterial
- Rural Major Collector
- Rural Minor Collector
- Rural Local Road
- Town Boundary
- River or Stream
- Water body
- Wetland

Data Sources:

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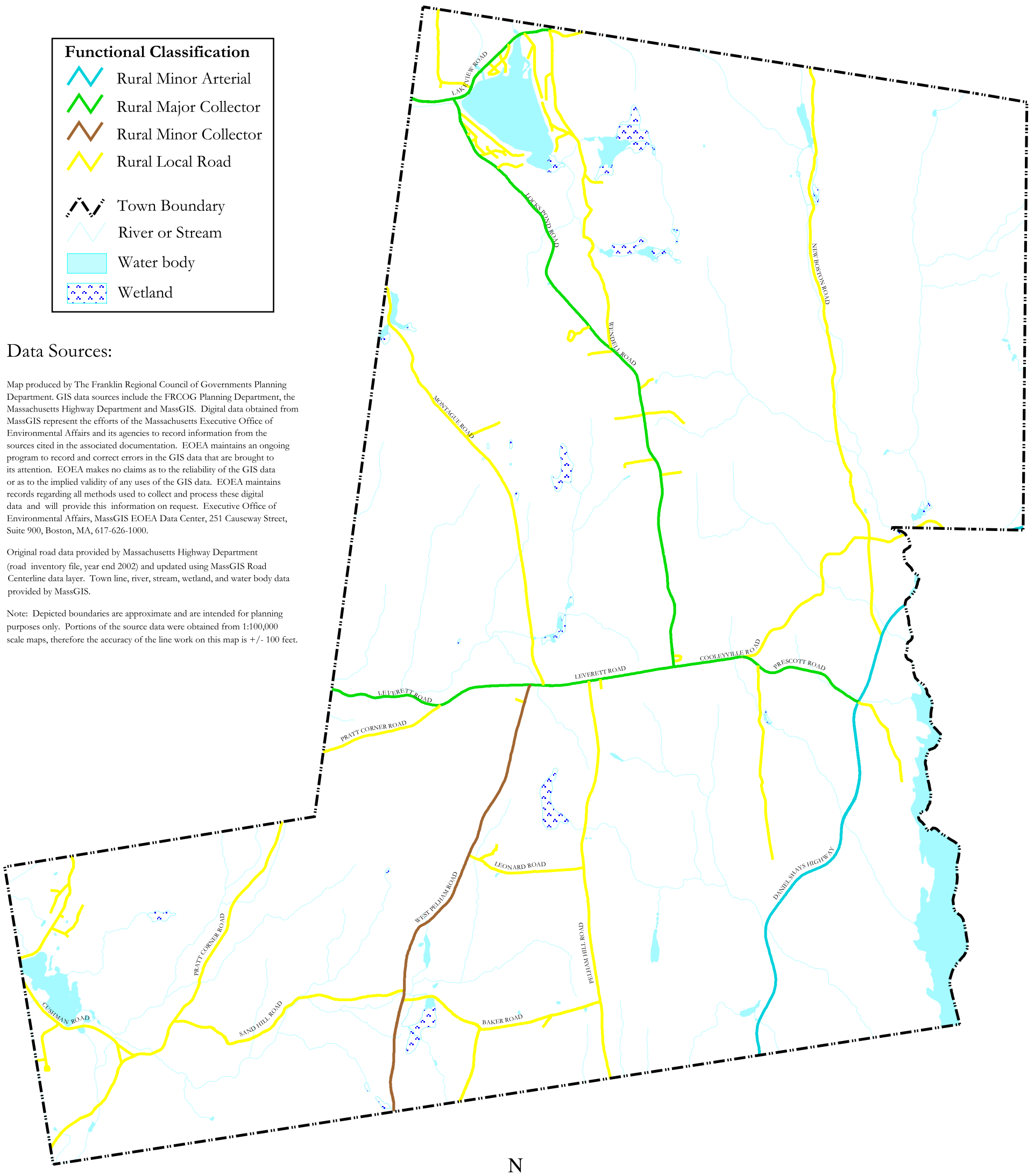

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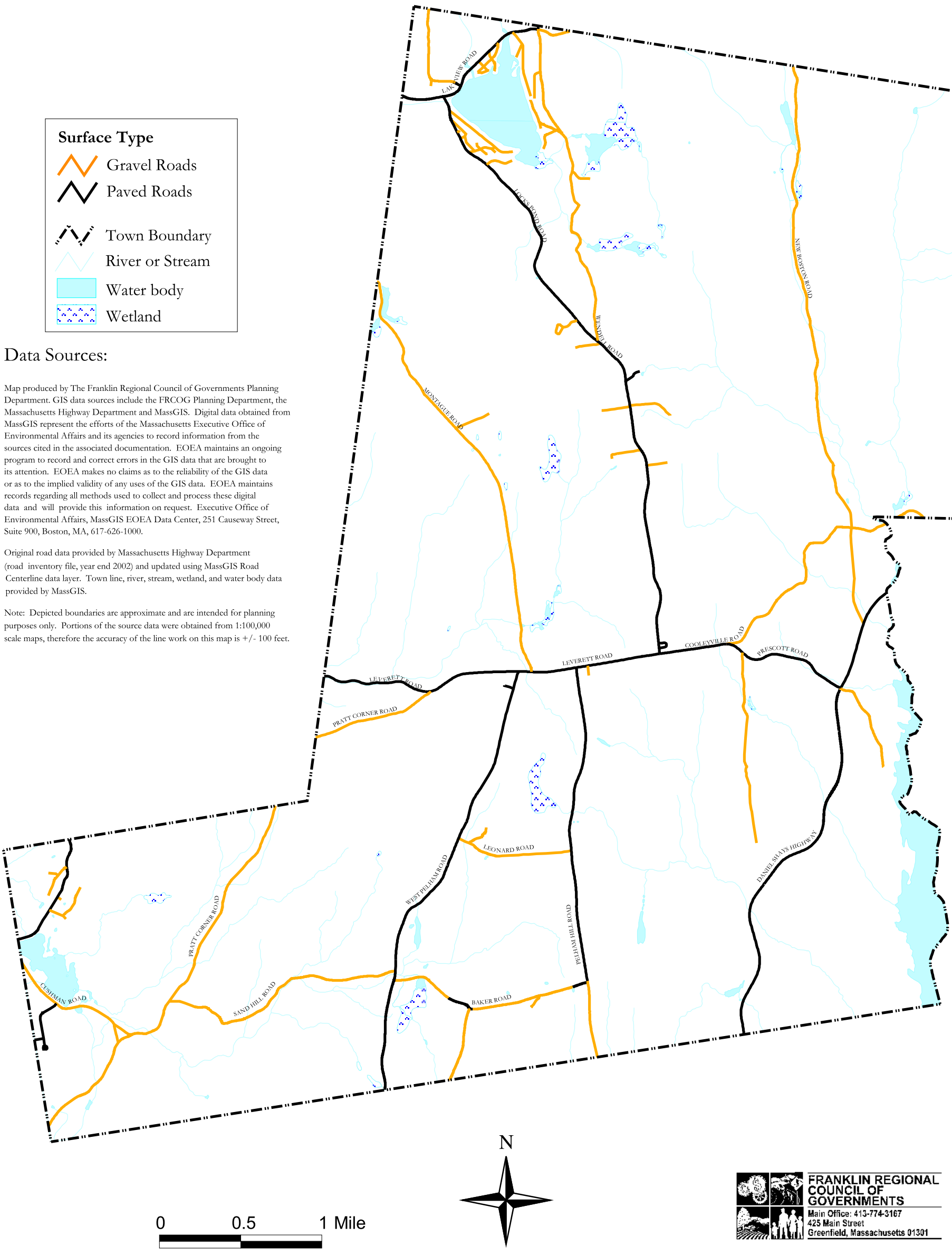
TOWN OF SHUTESBURY PAVEMENT MANAGEMENT STUDY
SCENARIO 2
Map 3 - Surface Type



Surface Type

- Gravel Roads
- Paved Roads
- Town Boundary
- River or Stream
- Water body
- Wetland

Data Sources:

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N

0 0.5 1 Mile

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As mentioned previously, there are 31.15 miles of Town maintained paved and gravel roads within the Town of Shutesbury. Because gravel roads generally receive regular maintenance this report deals only with the paved road network. The pavement survey identified 14.98 miles of town maintained paved roadway and 16.17 miles of town maintained gravel roads. The Highway Superintendent (Tim Hunting) identified 0.47 miles of Pelham Hill Road from Baker Road to the Pelham town line that is currently gravel and may be paved in the future. For the purposes of this study this section of roadway has been treated as if this section of roadway will remain gravel. Map 3 distinguishes the paved road network from the gravel surfaced roadways. The 3.16 miles of MassHighway maintained roadways are all paved and were surveyed as part of this study.

Methodology

The methodology used for data collection and analysis was designed to maximize the effectiveness of the RM software. For each paved road, section breaks were defined based on the following criteria: at a change in pavement surface type; at a pavement width change of more than five feet; or if the pavement conditions changed dramatically. All data collection was conducted by a field survey. This involved driving each road twice. The first pass identified the start and end points of each section, additionally the section length and width were recorded along with the pavement type. The second pass was made at low speed (5 mph) during which the average pavement distresses were noted.

The RM software requires the identification of nine categories of distresses, which are:

1. Potholes and Non-Utility Patches
2. Travel Lane Alligatoring
3. Distortion
4. Rutting
5. Weathering/Block Cracking
6. Transverse and Longitudinal Cracking
7. Bleeding/Polished Aggregate
8. Surface Wear and Raveling
9. Corrugation, Shoving or Slippage

Distress categories 1 to 4 are known as base distresses. These distresses show up in the pavement surface because of a failure in the road base and can only be permanently repaired by reconstruction to the full depth of the road structure. Distress categories 5 to 9 are known as surface distresses. These distresses are generally caused by a failure in the pavement surface due to the result of aging and/or vehicle loading and can be repaired with relatively low cost maintenance methods such as crack sealing or overlaying with a few inches of asphalt.

The average severity and extent of each distress was noted for each section and then input into the software. On completion of the data entry for each section, the software conducted three sets of analyses:

1. Calculation of a Pavement Condition Index (PCI)
2. Assignment of a Repair Strategy
3. Calculation of a Benefit Value

The Pavement Condition Index (PCI) is based upon a scale between 100 (best) and 0 (worst). A section with no distresses will have a PCI equal to 100 and as the number, severity and extent of distresses increase the lower the PCI becomes. A general evaluation of a pavement's condition is as follows:

- **PCI between 95 and 100** means that the pavement is in **Excellent** condition and generally requires no immediate pavement maintenance.
- **PCI between 85 and 94** means that the pavement is in **Good** condition and generally requires minor or no immediate pavement surface maintenance.
- **PCI between 65 and 84** means the pavement is in **Fair** condition and will generally need minor to extensive pavement surface maintenance and/or rehabilitation.
- **PCI between 0 and 64** means the pavement is in **Poor** condition and will generally need extensive rehabilitation or reconstruction.

Repair strategies are assigned to sections through a matrix, which takes into account the PCI, condition of the pavement base associated with the observed surface distresses, the average curb height, functional class and the pavement type. Five generalized repair categories are used. The costs associated with each of these categories were discussed with the Highway Superintendent and provide a fair estimate of the total costs involved in designing, bidding, conducting and overseeing each of the repairs.

The five repair strategies are as follows:

1. **Reconstruction Or Reclamation** ($30 per sq/yd)
   Complete removal and replacement of a failed pavement and base by excavation or reclamation, which may include widening and realignment, installation of drainage and culverts, and safety hardware such as guardrails and signage.

2. **Rehabilitation** ($10 per sq/yd)
   Full depth patching, partial depth patching, joint and crack sealing, grouting and under-sealing, grinding or milling in conjunction with overlays over 2 inches in depth. Edge work and drainage would likely also be required in conjunction with an overlay.

3. **Preventative Maintenance** ($7.50 per sq/yd)
   Localized crack sealing and full/partial depth patching in conjunction with Chip sealing, or Micro Surfacing, or overlays less than 2 inches in depth. Edge work would likely also be required in conjunction with an overlay.

4. **Routine Maintenance** ($2.50 per sq/yd)
   Crack sealing and localized patching.

5. **No Immediate Action** ($0 per sq/yd)
   No maintenance

The existing pavement area (section length multiplied by section width) is multiplied by the assigned repair strategy cost to provide an estimated total cost of conducting the repair on the road section.

The "Benefit Value" (BV) reflects the Cost/Benefit of doing the repair and is used in the budgetary analysis to prioritize sections for repair. There is no scale for the BV, only that those sections with the highest values are more beneficial and cost effective. The following formula is used to calculate the BV.

$$BV = \frac{\textbf{365 x ADT x Section Length x Estimated Life of Repair}}{\textbf{Current Cost of Repair x Pavement Condition Index}}$$

It can be seen from this formula that roads with higher Average Daily Traffic (ADT) volumes will be assigned higher BV's, which provides priority for higher volume roads. On roadways where no traffic volume data was available, volumes were estimated based on road use and the number of homes and businesses located along them and with consultation with the Highway Superintendent. Appendix A contains a table of the ADT volumes collected in Shutesbury from 1991 through 2002 by the FRCOG and MassHighway and a corresponding map showing the locations with existing traffic volume data.

Additionally, Routine and Preventative Maintenance repairs receive higher weighting than Rehabilitation and Reconstruction repairs to reflect the principles of pavement management.

Existing Conditions Analysis Results

The following section summarizes the results of the analysis of the existing conditions surveyed in the Fall of 2002. It should be noted that the information contained in the tables and figures was created from a visual evaluation of the pavement surface in which the severity and extent of the observed distresses were estimated. The recommended repair strategies and the associated costs are not final. A more detailed engineering evaluation must be conducted before finalizing any repairs and their associated costs. The information presented here can be used as a tool for preliminary evaluation and prioritization of the paved road network as a whole.

Existing Pavement Conditions

Data collection was conducted in October, 2002. Appendix B contains detailed information on the existing conditions of the paved road network. Table 1 and Figure 2 summarize the results of the pavement management analysis of existing conditions for town maintained paved roadways and table 2 and figure 3 for the surveyed MassHighway maintained paved roadways, while Map 4 shows the existing conditions broken down into the four condition categories: Excellent, Good, Fair, and Poor for all the surveyed paved roadways.

Overall the conditions of the town maintained paved road network in Shutesbury could be considered as Good, with an average PCI equal to 93. Over half of the paved road network was assessed in Excellent condition and over a quarter in Good condition. The 1% of the paved road network assessed in Poor condition is the almost two tenths of mile of Baker Road between School House Road and the start of the gravel surface. The high percentage of roadways in Excellent and Good condition indicates that Shutesbury has done a very good job of maintaining its paved road network with the limited funds that have been available.

Table 1: Summary of Existing Pavement Conditions for Town Maintained Paved Roads

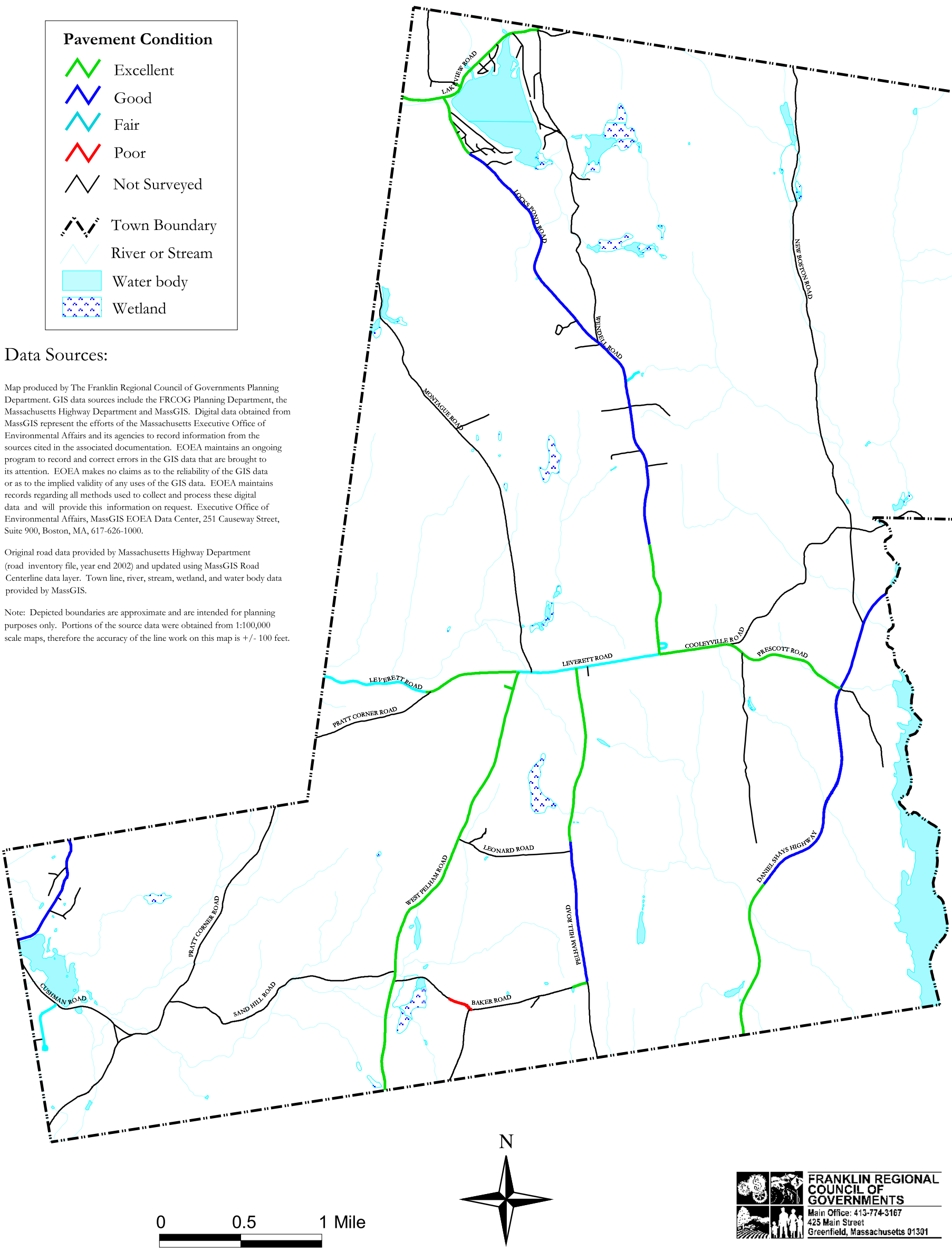
PAVEMENT CONDITION (PCI Range)	Number of Miles	% of Total Mileage
Excellent (=>95)	8.10	54%
Good (85<=>94)	4.54	30%
Fair (65<=>84)	2.17	15%
Poor (<65)	0.17	1%
Total Mileage	**14.98**	

Overall, the conditions of the MassHighway maintained paved road network in Shutesbury could be considered as Good, with an average PCI equal to 91. Much of Route 202 through Shutesbury was recently crack sealed, bringing the pavement condition back to a Good condition.

Table 2: Summary of Existing Pavement Conditions for Surveyed MassHighway Maintained Paved Roads

PAVEMENT CONDITION (PCI Range)	Number of Miles	% of Total Mileage
Excellent (=>95)	1.00	32%
Good (85<=>94)	2.08	66%
Fair (65<=>84)	0.08	2%
Poor (<65)	0.00	0%
Total Mileage	**3.16**	

TOWN OF SHUTESBURY PAVEMENT MANAGEMENT STUDY
SCENARIO 2
Map 4 - Existing Pavement Conditions



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Assignment of Repair Strategies

Now that the existing conditions have been documented and road segments have been grouped into the four condition categories, a breakdown of recommended repairs and estimated costs of repairs has been calculated. This information is summarized in Table 3 for town maintained paved roads. This table includes the results of a calculation called "Backlog of Repair". The Backlog of Repair reflects the estimated cost of conducting all the prescribed repairs to bring the paved network up to an Excellent condition. This Backlog of Repair is estimated to equal $189,898 for town maintained paved roadways. It should be noted that this backlog does not reflect the proposed $1.5 million reconstruction of Leverett, Cooleyville and Prescott Roads. It does reflect any repairs that are currently prescribed by the analysis for these road sections based on the surface survey. The majority (60%) of the Town's Backlog of Repair is accounted for by two road segments totaling 0.87 miles deemed by the analysis software to require a rehabilitation repair. These two segments are the segments of Baker Road in Poor condition and the segment of Leverett Road between Pratt Corner Road and the Leverett Town Line listed in Fair condition.

The distribution of the mileage indicates that the Town has been following good pavement management practices in that over 90% of the mileage requires either no immediate action or routine maintenance.

Table 3: Summary of Suggested Repairs for Town Maintained Paved Roads

REPAIR TYPE	Number of Miles	% of Total Mileage	Estimated Cost of Repair
5. No Immediate Action	12.64	84%	$0
4. Routine Maintenance	1.01	7%	$32,458
3. Preventative Maintenance	0.46	3%	$43,913
2. Rehabilitation	0.87	6%	$113,527
1. Reconstruction	0.00	0%	$0
Total Mileage	**14.98**		**Backlog of Repair = $189,898**

Table 4 summarizes the suggested maintenance needs of the surveyed MassHighway maintained roadways. It appears that Route 202 through Shutesbury is undergoing maintenance, as some of the roadway has recently been crack sealed. It is likely that crack sealing will be completed on the remaining sections of roadway this coming year. The Backlog of Repair for the MassHighway maintained roadways in Shutesbury has been assessed at $88,457.

Table 4: Summary of Suggested Repairs for MassHighway Maintained Paved Roads

REPAIR TYPE	Number of Miles	% of Total Mileage	Estimated Cost of Repair
5. No Immediate Action	1.00	32%	$0
4. Routine Maintenance	2.08	66%	$79,314
3. Preventative Maintenance	0.08	2%	$9,143
2. Rehabilitation	0.00	0%	$0
1. Reconstruction	0.00	0%	$0
Total Mileage	**3.16**		**Backlog of Repair = $88,457**

Calculation of a Benefit Value

Of the 28 town maintained road sections surveyed, only 7 (2.81 miles) require some form of repair. The remaining 21 (12.64 miles) sections require no immediate maintenance. As mentioned previously, a Benefit Value (BV) reflects the Cost/Benefit of doing a suggested repair, and is used to help prioritize sections for repair. There is no scale for the BV, but sections with the highest values are generally more beneficial and cost effective. BV can then be translated into a ranking system to indicate repair priorities. It should be noted that this ranking system does not take into account social factors such as the need to maintain suitable emergency vehicle access.

Therefore, the roadway section with the highest BV has received a rank of 1 and the lowest has received a rank of 6. Appendix B contains this information for all surveyed road sections. Table 5 on the next page shows the seven sections requiring repair in prioritized order according to the calculated Benefit Value.

Because of the limited number of road segments requiring repair and wide variations in traffic volumes it is difficult to see the standard pattern that generally occurs with the ranking. Generally, to reflect the principles of pavement management, roadways requiring routine and preventative maintenance would dominate the top ten list. In Shutesbury's case the number one ranked project is a routine maintenance repair on Leverett Road, but because of the influence of traffic volumes in the benefit value calculation the next two ranked segments are rehabilitation repairs.

Table 5: Top 6 Town Maintained Road Sections for Repair

Street Name	Section ID#	Section From:	Section To:	Length (ft)	PCI	Repair Code	Estimated Cost	Rank	Estimated ADT	Survey Date
Leverett Road*	1	Wendell Road	Montague Road	4752	84	4	$30,360	1	2000	10/17/02
Leverett Road*	3	Pratt Corner Road	Leverett Town Line	3696	78	2	$98,560	2	2000	10/17/02
Baker Road	3	Schoolhouse Road	Gravel	898	55	2	$14,967	3	200	10/21/02
Weather-wood Road	1	Cushman Road	Cul-de-sac	1848	65	3	$40,040	4	50	10/21/02
Town Common	1	Wendell Road	Wendell Road	581	66	3	$3,873	5	5	10/17/02
Stowell Road	1	Wendell Road	Dead End	581	74	4	$2,098	6	5	10/17/02

Street Name - Street Name. * Indicates the road section is eligible to receive Federal Aid or Non-Federal Aid for Reconstruction only.

Section From - Start point of the individual section.

Section To - End point of the individual section.

Length (ft) - The length of the section, measured in feet.

PCI - Pavement Condition Index: 95 - 100 indicates the pavement is in **Excellent** condition,
85 - 94 indicates the pavement is in **Good** condition;
65 - 84 indicates the pavement is in **Fair** condition;
0 - 64 indicates the pavement is in **Poor** condition.
** - Currently gravel surface identified for paving in the near future

Repair Code - 1. Reconstruction; ($30 sq/yd)
2. Rehabilitation; ($10 sq/yd)
3. Preventative Maintenance; ($7.50 sq/yd)
4. Routine Maintenance; ($2.50 sq/yd)
5. No Immediate Maintenance. ($0 sq/yd)

Rank - A ranking of all the sections requiring repair, based on a cost/benefit produced by the RoadManager software through the Benefit Value. The section with the highest Benefit Value has received a PMS Ranking of 1. Sections with equal Benefit Values have received the same ranking. In total there are 28 ranked sections.

Estimated ADT - Average Daily Traffic traveling on each section of road. Generally, traffic count data was available on the higher volume roads. Where data was not available, estimates were made based on the functionality of the road and the number of houses or businesses they served.

Survey Date - Date on which the pavement distress data was collected.

Budgetary Analysis

Existing Funding Levels

The primary source of funding for road repairs and reconstruction in the Town of Shutesbury is its Chapter 90 allocation from the State. Each municipality in the Commonwealth receives Chapter 90 funding through the Transportation Bond. Funding levels are based on a formula that takes into account the number of miles of town maintained roadways, population, and level of employment. Approved Chapter 90 projects are 100% reimbursable. However, a town must receive written approval from their MassHighway District Director before beginning a project. Eligible Chapter 90 projects are highway construction or improvement projects that extend the life of a roadway or bridge. Other eligible Chapter 90 uses are engineering services for projects on the TIP or other transportation projects, pavement management services, and the purchase of road machinery, equipment, or tools.

The Town of Shutesbury's allocation of Chapter 90 funding for FY 2003 totaled approximately $71,000. Even though Massachusetts is currently facing a budget crisis where many programs are facing cuts in funding, when this analysis was conducted in April 2003 there was no indication the current $100 million statewide Chapter 90 program would be reduced. According to the Highway Superintendent, the Town of Shutesbury generally uses its full Chapter 90 allocation for maintenance of its paved road network.

Roadways that are functionally classified as a Major Collector or higher are eligible to receive Federal Aid and Non-Federal Aid for reconstruction projects through the Transportation Improvement Program (TIP). An explanation of the TIP process appears later in this report. Town maintained roadways eligible for this funding source are: Lakeview Road, Locks Pond Road, Wendell Road, Leverett Road, Cooleyville Road and Prescott Road. The Town has been pursuing TIP funding for the reconstruction of Leverett, Cooleyville and Prescott Roads, but issues over the design required by MassHighway had stalled this project. Recently, this project was identified by the Franklin Regional Council of Governments in cooperation with the Town, as its initial project for MassHighway's Footprint Road Program. The Footprint Road Program, still under development, is intended to allow road projects that make improvements within the existing paved footprint of the road to be funded through the TIP process if certain criteria are met. At this time, the Town has appropriated the funds to complete the design for this project, and submitted the Footprint Road Application for review by MassHighway. This project has been scheduled in the TIP for advertisement in FY 2004 and would likely be constructed in 2005. A pavement overlay was applied to this roadway a couple of years ago to provide a suitable riding surface and prevent further deterioration of the road structure in the meantime. It appears from the pavement surface survey that apart from one segment of Leverett Road that this repair is holding together well.

The Town has also appropriated its own funds towards repairs and upkeep of both the gravel and paved road network in the past, but with the tightening financial situation, this may not continue into the future.

The RM software can be used to predict the potential effect funding levels will have on the future conditions of the paved road network. The RM software creates a prioritized list of sections requiring repair by ranking them based on the BV. When assigning funds to repair sections of roadway, the software starts at the top of the ranked list and works its way down. As the budget limit nears and the next ranked section has too high a cost to remain within the budget, the software continues to scan down the list, choosing sections for repair until the budget limit is reached or there are no more ranked sections. Those sections chosen for repair then assume a PCI of 99 (Excellent condition). For planning and forecasting purposes, those sections not selected are then evaluated by the software based on performance curves developed from research into the life cycles of pavements under differing traffic loading characteristics. The performance curves resemble the generic curve shown in figure 1 at the beginning of the report. Each year that a section is not chosen for repair, its PCI value drops down the curve. At the end of each year, the repair strategies are reassigned based on the decreased PCI and the costs and BVs are recalculated producing a new list of ranked sections for the next year's budget allocation.

To predict the potential impacts the existing funding projections will have on the condition of the town maintained paved road network over a ten-year period between 2003 and 2012, a budgetary analysis was run using the following assumptions developed in cooperation with the Highway Superintendent and the Towns Executive Order-418 Committee:

- In 2003 the Highway Superintendent was scheduled to complete the following repairs using a mixture of Chapter 90 and Town appropriated funds:
  Baker Road, from Schoolhouse Road to gravel – Full depth reclamation and chip seal, $15,000
  Weatherwood Road, from Cushman Road to cul-de-sac – Full depth reclamation and chip seal, $50,000
  January Hills Road from Amherst Town Line to Leverett Town Line– Double chip seal, $30,000
  Town Common Drive – Regrade base and chip seal, $3,500
- In 2004 the Highway Superintendent had proposed to combine the 2004 Chapter 90 allocation with Chapter 90 funds carried over from previous years to pave the current gravel section of Pelham Hill Road. Due to opposition to this plan, this analysis assigns the expected $100,000 that was to be used for that project to be used for repairs to the existing paved road network.
- The reconstruction of Leverett Road, Cooleyville Road and Prescott Road under the Footprint Road Program will be completed in 2005 at a cost of $1.5 million.
- Chapter 90 funds for 2003 through 2005 would be allocated to the projects listed above. From 2006 to 2012 the existing annual allocation of $71,000 of Chapter 90 funding would be available for paved road maintenance.

For each future year of the analysis, output from the software provides a list of the projects allocated funding and also allows for the calculation of a number of benchmark measures such as Backlog of Repair, miles per repair category, and average PCI for the whole road network.

Table 6 provides a general projection of the future condition of the paved road network that could be expected under the above funding assumptions. It can be seen from this table that the average condition of the road network would likely increase with the improvements conducted by the Town in 2003 and with the reconstruction of Leverett, Cooleyville and Prescott Roads. The average PCI declines in 2010, 2011 and 2012 as those roadways improved in 2003, 2004 and 2005 all begin to decline to where Routine Maintenance activities will begin to be required. The considerable jump in Backlog of Repair in 2012 reflects the fact that sections of Leverett, Cooleyville and Prescott Roads reconstructed in 2005, would likely need Routine Maintenance in 2012. Overall it appears from this analysis that there is sufficient funds to keep pace with all the maintenance needs. It should be noted that this analysis does not account for inflation.

Table 6: Projected Backlog of Repair and Average PCI to 2012 with Existing Funding Levels

Future Year	Funding Level	Backlog of Repair	Average PCI
2002	Existing Conditions	$256,085	91
2003	$98,500[1]	$228,507	93
2004	$100,000[2]	$220,000	93
2005	$1,500,000[3]	$ 12,907	95
2006	$71,000	$ 33,554	94
2007	$71,000	$ 89,538	94
2008	$71,000	$116,568	94
2009	$71,000	$ 0	94
2010	$71,000	$ 12,907	92
2011	$71,000	$ 85,682	90
2012	$71,000	$205,835	91

[1] – Assumes repairs to Baker Road ($15,000), Weatherwood Road ($50,000), January Hills Road ($30,000) and Town Common Road ($3,500)
[2] – Combination of left over Chapter 90 funds from previous years, plus the 2004 Chapter 90 allocation.
[3] – Assumes reconstruction of Leverett, Cooleyville and Prescott Roads ($1.5 million)
Total Funding allocated over ten years equals $2,195,500

Table 7: Comparison of Existing and Projected Pavement Conditions for Town Maintained Paved Roads in 2012 with Existing Funding Levels

PAVEMENT CONDITION (PCI Range)	Existing 2002 Mileage	Projected 2012 Mileage	Change in Mileage
Excellent (=>95)	8.10	2.90	-5.20
Good (85<=>94)	4.54	10.47	+5.93
Fair (65<=>84)	2.17	1.61	-0.56
Poor (<65)	0.17	0.00	-0.17
Total Mileage	**14.98**	**14.98**	

Table 7 provides a comparison between the existing conditions and the projected conditions of the paved road network in 2012 under the existing funding assumptions. This comparison shows that the mileage of roadways in Excellent condition in 2012 would be 5 miles less than in 2002,

while the mileage of roadway in Good condition would increase by almost 6 miles. Mileage in Fair condition would decline by half a mile and there would be no roadways in Poor condition.

Tables 8 and 9 show the projected change in assigned repair strategies and estimated Backlog of Repair for the road sections analyzed to 2012 under existing funding levels. It can be seen that the paved road mileage would require either No Immediate Action or Routine Maintenance. The reduction in mileage in No Immediate Action and increase in mileage requiring Routine Maintenance in 2012 over 2002 is the result of the roadways improved in 2003 through 2005 declining to the point where they would likely begin to require Routine Maintenance.

Table 8: Comparison of Existing and Projected Required Repairs for Town Maintained Paved Roads in 2012 with Existing Funding Levels

REPAIR TYPE	Existing 2002 Mileage	Projected 2012 Mileage	Change in Mileage
5. No Immediate Action	12.64	8.69	-3.95
4. Routine Maintenance	1.01	6.29	+5.28
3. Preventative Maintenance	0.46	0.00	-0.46
2. Rehabilitation	0.87	0.00	-0.87
1. Reconstruction	0.00	0.00	0.00
Total Mileage	**14.98**	**14.98**	

Table 9: Comparison of Existing and Projected Backlog of Repairs for Town Maintained Paved Roads in 2012 with Existing Funding Levels

REPAIR TYPE	Existing 2002 Backlog	Projected 2012 Backlog	Change in Backlog
5. No Immediate Action	$0	$0	$0
4. Routine Maintenance	$32,458	$205,835	+$173,377
3. Preventative Maintenance	$43,913	$0	-$43,913
2. Rehabilitation	$113,527	$0	-$113,527
1. Reconstruction	$0	$0	$0
Total Backlog of Repair	**$189,898**	**$205,835**	**+$15,937**

This analysis shows that under this funding scenario that the town would be able to keep pace with all the maintenance needs of the Towns paved road network keeping it in perpetual Good to Excellent condition through 2012. This is the result of the existing Good condition of the paved road network combined with the increased funding available in 2003 and 2004, and the considerable non-town investment used to reconstruct Leverett, Cooleyville and Prescott Roads. The small decline in average PCI from 2011 through 2012 and the increase in Backlog of Repair in 2012 is the result of the roadways that were repaired in 2003, 2004 and 2005, reaching a point in their life where Routine Maintenance activities would begin to be needed. This decline would likely be cleared in the subsequent two or three years.

Increased Chapter 90 Funding

In the late 1990s, the statewide Chapter 90 program was funded at a $150 million level, which equated to approximately $106,500 in Chapter 90 funding to the Town of Shutesbury. Since this program was reduced to the $100 million level there have been many efforts to restore the program to its original $150 million level. Unfortunately, these efforts have thus far failed and seem less likely than ever to be successful given the current economic climate in Massachusetts. Since the analysis using existing funding levels shows that there was sufficient funds to keep pace with the repair needs of the paved road network, running an analysis with increased Chapter 90 funding levels would produce the same result. Therefore, a budgetary analysis using this funding scenario was not conducted.

Conclusion

Based on the pavement surface survey conducted in the fall of 2002 the paved road network maintained by the Town of Shutesbury is currently in "Good" condition with an average pavement condition index (PCI) of 93. The distribution of the mileage by repair type indicates that the Town's highway department has been practicing good pavement management practices with the funding that has been available. The analysis indicates that the existing levels of funding provided through Chapter 90, the primary source of road maintenance funds combined with the reconstruction of Leverett, Cooleyville and Prescott Roads using Federal Funds would be sufficient to keep pace with the maintain needs of the paved road network.

The Town now has the base data that will allow it to monitor its progress with maintaining the paved road network through the regular survey (ideally biannually) of its paved road network and the FRCOG will continue to provide support to the extent possible.

Alternative Funding Sources

Transportation Improvement Program

The Town of Shutesbury already does an excellent job at utilizing alternative funding sources. Approximately nine miles of the paved road network is functionally classified as Rural Minor Arterial and Rural Major Collector making these road sections eligible for Federal Aid funds for reconstruction under the Transportation Improvement Program (TIP). The TIP is a prioritized, fiscally constrained listing of all transportation projects in the region eligible to receive federal funding. The TIP is created every year and lists projects for the six upcoming federal fiscal years. The federal fiscal year runs from October 1 to September 30. The FRCOG is responsible for the creation and maintenance of the TIP. The creation and maintenance of the TIP is mandated by the Federal Highway Administration (FHWA). In addition, the FHWA requires that the federal aid portion of the TIP be fiscally constrained and only list projects within the funding levels expected for the subject TIP year.

To the extent possible, non-federal aid (excluding Chapter 90) projects are also included in the TIP, allowing a more complete picture of transportation needs in the region to be reflected. Regional Planning Agencies are working closely with their MassHighway Districts to prioritize and fiscally constrain non-federal aid projects and provide a realistic picture of non-federal aid funding availability.

The Franklin Regional Council of Governments solicits TIP projects each year from Franklin County Towns. At the same time, the FRCOG asks the Towns to provide a status report of projects already on the TIP. Additionally, the FRCOG contacts both MassHighway Districts for a listing of new projects and for the status of existing projects. With this information, projects are placed in the appropriate fiscal year of the TIP. The Franklin Regional Planning Board Transportation Subcommittee is responsible for prioritizing all of the projects in each fiscal year. The ranking procedure is based on the regional and local priority of each project and the status of the project's design and permitting. The Franklin Regional Planning Board (FRPB) then considers the recommendations of the FRPB Transportation Subcommittee before voting to approve the TIP for that period. The TIP is then reviewed at MassHighway Planning in Boston before being officially endorsed by the FRCOG Executive Committee, the Franklin Regional Transit Authority (FRTA), the Greenfield-Montague Transportation Area (GMTA), the Commissioner of MassHighway and the Secretary of the Executive Office of Transportation and Construction.

Bridge projects listed on the TIP are designed, engineered and constructed by MassHighway. Towns usually do not get involved in bridge projects, unless the project design is unacceptable to the Town. For bridges, the Town's responsibilities are to: (1) attend all design public hearings; and (2) acquire any necessary rights-of-way. For road projects initiated by the Town, the Town is responsible for the design and engineering of the project. Design and engineering is a Chapter 90 reimbursable cost once the Town has received approval for the project from the MassHighway District and the MassHighway Project Review Committee.

Towns sometimes view the TIP route of funding unfavorably, due to the small regional funding targets in recent years, and the length of time it can take to work through the process.

An additional concern of using this funding source is often these projects must meet MassHighway Design Standards, which in the past has meant designs with wider roadways requiring land takings, tree removal and a resulting impact to an area's rural appearance. In 1997 MassHighway produced the Low Speed/Low Volume Design Standards, which allow for narrower travel lane widths and shoulders for roadways with speeds less than 40mph and traffic volumes of less than 2000 vehicles per day. It had been hoped that these standards could be applied to the Leverett, Cooleyville, Prescott Roads reconstruction but the projected future traffic volumes on Leverett Road were in excess of the 2000 vehicles per day threshold.

That being said, MassHighway is currently piloting a new program, the Footprint Roads Program which, if fully adopted will allow communities to use the TIP process while still maintaining the existing roadway footprint. The Leverett, Cooleyville, Prescott Road project has been identified by the FRCOG as its regional pilot project for the program. For additional details on this program, call Maureen Mullaney, FRCOG Transportation Program Manager at 413-774-1194 (Ext 108).

The Public Works Economic Development Program

The Public Works Economic Development (PWED) Program was established through and is funded by the Transportation Bond. It provides funding to assist Towns in their efforts to create economic development through infrastructure improvement projects.

Eligible PWED projects include roadway and bridge improvements, sidewalk or lighting installation, traffic control facilities, and drainage or culvert work. The project must, however, retain, expand or establish industrial or commercial facilities, create or retain long-term employment opportunities, have a positive impact on the local tax base, or strengthen the partnership between the public and private sector. Ineligible PWED projects include sewage systems, water systems, or projects on which construction has been initiated. PWED projects cannot exceed $1 million unless the Secretary of the Executive Office of Transportation and Construction deems the project to have regional impact.

Funding for the PWED program is allocated on a first come-first served basis. The total cost of a PWED project is funded, there is no local match requirement. Towns interested in pursuing a PWED project should contact the transportation planning staff at the Franklin Regional Council of Governments for an application.

The Small Town Road Assistance Program

The Small Town Road Assistance Program (STRAP) was established through and is funded by the Transportation Bond. It provides funding to towns with populations less than 3,500 for transportation improvement projects.

Eligible STRAP projects are transportation projects that improve public safety or emphasize economic development. Right-of-way takings cannot be funded with STRAP funds. Projects cannot exceed $500,000. Towns approved to receive STRAP funds will receive 70% of the total cost of the project as a grant. The remaining project cost (30%) is given to the town in the form of a loan which the town must repay within ten years of the project's completion. The Massachusetts Department of Revenue arranges the repayment plan. The loan payment is deducted from the town's Local Aid Cherry Sheet over the ten year period. A town may receive a STRAP grant once every five years. STRAP funding is allocated on a first come-first served basis. Applications for STRAP funding are available at the MassHighway District offices. However, STRAP application submittals should be sent directly to the Secretary of the Executive Office of Transportation and Construction at the Transportation Building, Ten Park Plaza, Suite 3170, Boston, MA 02116.

Conclusion

The Town should continue to monitor the paved road maintenance needs over the next several years and explore and utilize alternative funding sources when necessary to ensure that the paved road network continues to be maintained in a perpetual Good to Excellent condition.

Appendices

Appendix A

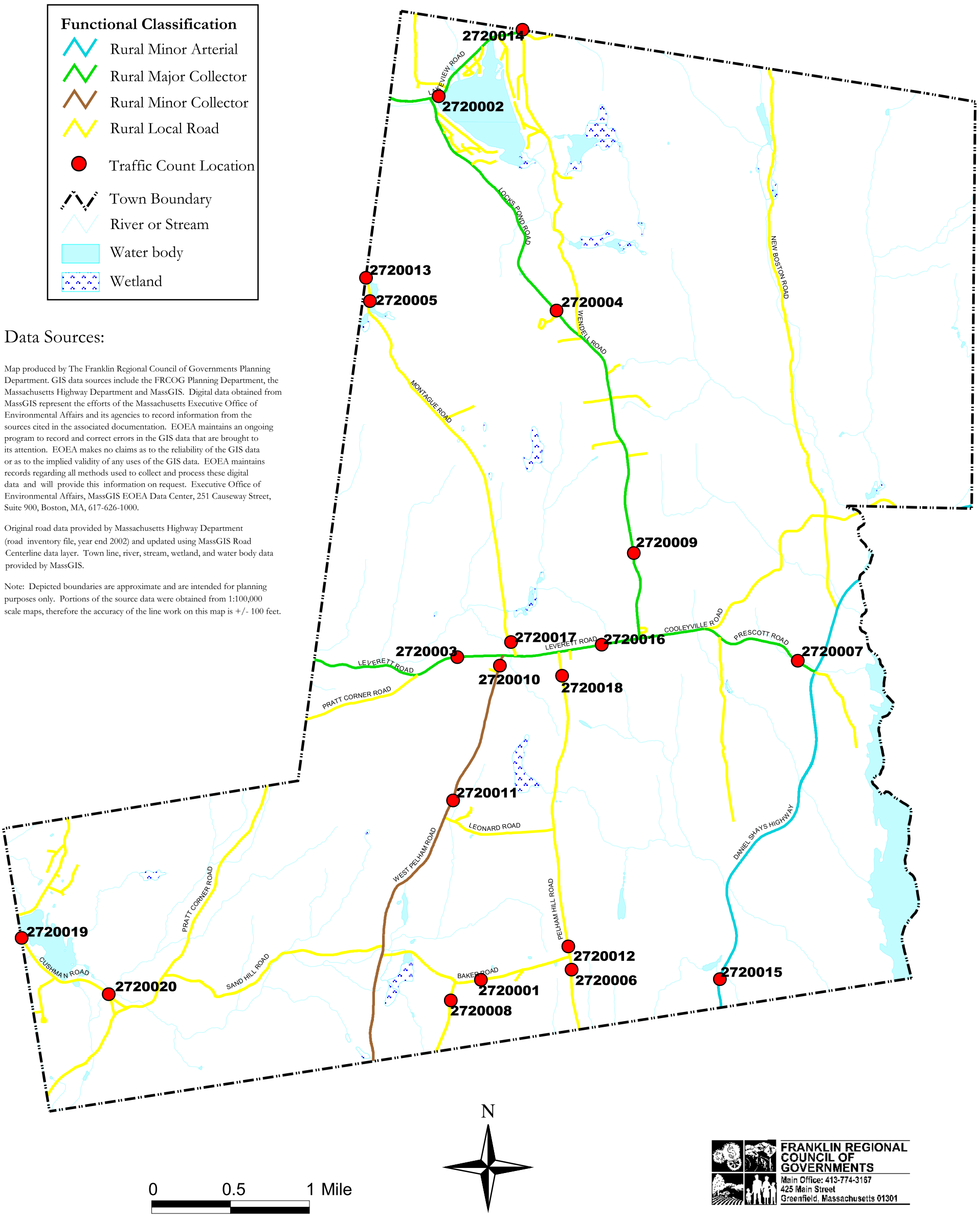
Average Annual Daily Traffic (AADT) Count Data 1991-2002
For the Town of Shutesbury

Appendix A: Average Annual Daily Traffic (AADT) Count Data 1991-2002

StationID	Street/Route	Location	Average Annual Daily Traffic (AADT) Volumes											
			1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
2720001	Baker Road	Btwn West Pelham Road & Pelham Hill Road	200											
2720020	Cushman Road	200ft West of Cross Road												170
2720019	Cushman Road	Amherst Town Line												230
2720002	Lakeview Road	Btwn Locks Pond Road & Farrar Road	740					810				920		
2720003	Leverett Road	3/10 mile East of Pratts Corner Road	1380				1620				1680	1620		
2720016	Leverett Road	Btwn Pelham Hill Road & Wendell Road										1750		
2720004	Locks Pond Road	¼ mile North of Old Orchard Road						570				620		
2720017	Montague Road	1/10 mile North of Leverett Road											450	
2720013	Montague Road	¼ mile South of Dudleyville	560					150						
2720005	Montague Road	¼ mile South of Leverett Town Line			170								170	200
2720006	Pelham Hill Road	200ft South of Baker Road	340					310				300		280
2720012	Pelham Hill Road	500ft North of Baker Road									340			
2720018	Pelham Hill Road	1/10 mile South of Leverett Road												400
2720007	Prescott Road	1/10 mile West of Route 202					800					810		
2720015	Route 202	2/10 mile North of Pelham Town Line										3200	3300	2800
2720008	Schoolhouse Road	South of Baker Rd	120											
2720014	Wendell Road	Wendell Town Line			800			670			740			730
2720009	Wendell Road	6/10 mile North of Leverett Road	600				810				910	890		
2720010	West Pelham Road	200ft South of Leverett Road						840				810		
2720011	West Pelham Road	¾ mile South of Leverett Rd	660					520				630		

Source: Franklin Regional Council of Governments Traffic Count Database

TOWN OF SHUTESBURY PAVEMENT MANAGEMENT STUDY
SCENARIO 2
Appendix A - Traffic Count Locations



Data Sources:

Map produced by The Franklin Regional Council of Governments Planning Department. GIS data sources include the FRCOG Planning Department, the Massachusetts Highway Department and MassGIS. Digital data obtained from MassGIS represent the efforts of the Massachusetts Executive Office of Environmental Affairs and its agencies to record information from the sources cited in the associated documentation. EOEA maintains an ongoing program to record and correct errors in the GIS data that are brought to its attention. EOEA makes no claims as to the reliability of the GIS data or as to the implied validity of any uses of the GIS data. EOEA maintains records regarding all methods used to collect and process these digital data and will provide this information on request. Executive Office of Environmental Affairs, MassGIS EOEA Data Center, 251 Causeway Street, Suite 900, Boston, MA, 617-626-1000.

Original road data provided by Massachusetts Highway Department (road inventory file, year end 2002) and updated using MassGIS Road Centerline data layer. Town line, river, stream, wetland, and water body data provided by MassGIS.

Note: Depicted boundaries are approximate and are intended for planning purposes only. Portions of the source data were obtained from 1:100,000 scale maps, therefore the accuracy of the line work on this map is +/- 100 feet.

FRANKLIN REGIONAL COUNCIL OF GOVERNMENTS
Main Office: 413-774-3167
425 Main Street
Greenfield, Massachusetts 01301

Map composed by FRCOG Planning Department.: C:\My Documents\Pms\Eo418\Gis\a_shut_pave_scenario2.apr

JUNE 2004

Appendix A: Average Annual Daily Traffic (AADT) Count Data 1991-2002

Appendix B

Existing Pavement Conditions Analysis Results

Appendix B: Glossary of Terms for Data Format

Street Name - Street Name prefixed with the Municipalities three digit code.
* Indicates the road section is eligible to receive Federal Aid for Reconstruction.

Section From - Start point of the individual section.

Section To - End point of the individual section.

Length (ft) - The length of the section, measured in feet.

PCI - Pavement Condition Index
95 - 100 indicates the pavement is in **Excellent** condition,
85 - 94 indicates the pavement is in **Good** condition;
65 - 84 indicates the pavement is in **Fair** condition;
0 - 64 indicates the pavement is in **Poor** condition.

Repair Code -
1. Reconstruction; ($30 sq/yd)
2. Rehabilitation; ($10 sq/yd)
3. Preventative Maintenance; ($7.50 sq/yd)
4. Routine Maintenance; ($2.50 sq/yd)
5. No Immediate Maintenance. ($0 sq/yd)

PMS Ranking - A ranking of all the sections requiring repair, based on a cost/benefit produced by the RoadManager software through the Benefit Value. The section with the highest Benefit Value has received a PMS Ranking of 1. Sections with equal Benefit Values have received the same ranking. In total there are 146 ranked sections.

Estimated ADT - Average Daily Traffic traveling on each section of road. Generally, traffic count data was available on the higher volume roads. Where data was not available, estimates were made based on the functionality of the road and the number of houses or businesses they served.

Survey Date - Date on which the pavement distress data was collected.

NOTE:

The information contained in these tables was created from a visual evaluation of the pavement surface in which the severity and extent of the observed distresses were estimated. The recommended repair strategies and the associated costs are not final. A more detailed engineering evaluation must be conducted before finalizing any repairs and their associated costs. The information presented here can be used as a tool for preliminary evaluation and prioritization of the paved road network as a whole.

Appendix B: Existing Pavement Conditions (Fall 2002)
Alphabetical List of Town Maintained Paved Roads

STREET NAME	SECTION ID #	SECTION FROM:	SECTION TO:	LENGTH (ft)	PCI	REPAIR CODE	ESTIMATED COST	PMS RANK	ESTIMATED ADT	SURVEY DATE
BAKER ROAD	1	PELHAM HILL ROAD	GRAVEL	528	100	5	$0		200	10/21/02
BAKER ROAD	3	SCHOOL HOUSE ROAD	GRAVEL	898	55	2	$14,967	3	200	10/21/02
COOLEYVILLE ROAD	2	PRESCOTT ROAD	WENDELL ROAD	2165	99	5	$0		1000	10/17/02
FARRAR ROAD	1	LAKEVIEW ROAD	GRAVEL	211	99	5	$0		100	10/17/02
JANUARY HILLS RD.	1	AMHERST TOWN LINE	LEVERETT TOWN LINE	4066	88	5	$0		250	10/21/02
LAKEVIEW ROAD	1	WENDELL ROAD	PARK ENTRANCE	2640	100	5	$0		1000	10/17/02
LAKEVIEW ROAD	2	PARK ENTRANCE	LEVERETT TOWN LINE	2851	98	5	$0		1000	10/17/02
LEVERETT ROAD	1	WENDELL ROAD	MONTAGUE ROAD	4752	84	4	$30,360	1	2000	10/17/02
LEVERETT ROAD	2	MONTAGUE ROAD	PRATT CORNER ROAD	3168	99	5	$0		2000	10/17/02
LEVERETT ROAD	3	PRATT CORNER ROAD	LEVERETT TOWN LINE	3696	78	2	$98,560	2	2000	10/17/02
LOCKS POND ROAD	1	LAKEVIEW ROAD	GREAT PINES ROAD	2112	95	5	$0		750	10/17/02
LOCKS POND ROAD	2	GREAT PINES ROAD	#110 LOCKS POND RD	5280	89	5	$0		750	10/17/02
LOCKS POND ROAD	3	#110 LOCKS POND RD	WENDELL ROAD	2640	89	5	$0		750	10/17/03
PELHAM HILL ROAD	1	LEVERETT ROAD	LEONARD ROAD	5808	99	5	$0		400	10/21/02
PELHAM HILL ROAD	2	LEONARD ROAD	GRAVEL	4646	94	5	$0		350	10/21/02
PRESCOTT ROAD	1	COOLEYVILLE ROAD	ROUTE 202	4382	99	5	$0		1000	10/17/02
SCHOOL DRIVE	1	WEST PELHAM ROAD	DEAD END	317	99	5	$0		50	10/21/02
STOWELL ROAD	1	WENDELL ROAD	DEAD END	581	74	4	$2,098	6	5	10/17/02
TOWN COMMON RD.	1	WENDELL ROAD	WENDELL ROAD	581	66	3	$3,873	5	5	10/17/02
WEATHERWOOD RD.	1	CUSHMAN ROAD	CUL-DE-SAC	1848	65	3	$40,040	4	50	10/21/02
WENDELL ROAD	1	LEVERETT ROAD	POLE 27 (PAVE CHNGE)	3696	99	5	$0		1000	10/17/02
WENDELL ROAD	2	POLE 27 (PAVE CHNGE)	LOCKS POND ROAD	7339	90	5	$0		1000	10/17/02
WENDELL ROAD	4	GRAVEL	WENDELL TOWN LINE	158	100	5	$0		1000	10/17/02
WEST PELHAM RD.	1	LEVERETT ROAD	LEONARD ROAD	5280	99	5	$0		1000	10/21/02
WEST PELHAM RD.	2	LEONARD ROAD	POLE 203	1584	100	5	$0		750	10/21/02
WEST PELHAM RD.	3	POLE 203	BAKER ROAD	3696	95	5	$0		750	10/21/02
WEST PELHAM RD.	4	BAKER ROAD	PELHAM TOWN LINE	4171	95	5	$0		750	10/21/02

Appendix B: Existing Pavement Conditions (Fall 2002)
Ranked List of Town Maintained Paved Roads

STREET NAME	SECTION ID #	SECTION FROM:	SECTION TO:	LENGTH (ft)	PCI	REPAIR CODE	ESTIMATED COST	PMS RANK	ESTIMATED ADT	SURVEY DATE
LEVERETT ROAD	1	WENDELL ROAD	MONTAGUE ROAD	4752	84	4	$30,360	1	2000	10/17/02
LEVERETT ROAD	3	PRATT CORNER ROAD	LEVERETT TOWN LINE	3696	78	2	$98,560	2	2000	10/17/02
BAKER ROAD	3	SCHOOL HOUSE ROAD	GRAVEL	898	55	2	$14,967	3	200	10/21/02
WEATHERWOOD RD.	1	CUSHMAN ROAD	CUL-DE-SAC	1848	65	3	$40,040	4	50	10/21/02
TOWN COMMON RD.	1	WENDELL ROAD	WENDELL ROAD	581	66	3	$3,873	5	5	10/17/02
STOWELL ROAD	1	WENDELL ROAD	DEAD END	581	74	4	$2,098	6	5	10/17/02
BAKER ROAD	1	PELHAM HILL ROAD	GRAVEL	528	100	5	$0		200	10/21/02
COOLEYVILLE ROAD	2	PRESCOTT ROAD	WENDELL ROAD	2165	99	5	$0		1000	10/17/02
FARRAR ROAD	1	LAKEVIEW ROAD	GRAVEL	211	99	5	$0		100	10/17/02
JANUARY HILLS RD.	1	AMHERST TOWN LINE	LEVERETT TOWN LINE	4066	88	5	$0		250	10/21/02
LAKEVIEW ROAD	1	WENDELL ROAD	PARK ENTRANCE	2640	100	5	$0		1000	10/17/02
LAKEVIEW ROAD	2	PARK ENTRANCE	LEVERETT TOWN LINE	2851	98	5	$0		1000	10/17/02
LEVERETT ROAD	2	MONTAGUE ROAD	PRATT CORNER ROAD	3168	99	5	$0		2000	10/17/02
LOCKS POND ROAD	1	LAKEVIEW ROAD	GREAT PINES ROAD	2112	95	5	$0		750	10/17/02
LOCKS POND ROAD	2	GREAT PINES ROAD	#110 LOCKS POND RD	5280	89	5	$0		750	10/17/02
LOCKS POND ROAD	3	#110 LOCKS POND RD	WENDELL ROAD	2640	89	5	$0		750	10/17/03
PELHAM HILL ROAD	1	LEVERETT ROAD	LEONARD ROAD	5808	99	5	$0		400	10/21/02
PELHAM HILL ROAD	2	LEONARD ROAD	GRAVEL	4646	94	5	$0		350	10/21/02
PRESCOTT ROAD	1	COOLEYVILLE ROAD	ROUTE 202	4382	99	5	$0		1000	10/17/02
SCHOOL DRIVE	1	WEST PELHAM ROAD	DEAD END	317	99	5	$0		50	10/21/02
WENDELL ROAD	1	LEVERETT ROAD	POLE 27 (PAVE CHNGE)	3696	99	5	$0		1000	10/17/02
WENDELL ROAD	2	POLE 27 (PAVE CHNGE)	LOCKS POND ROAD	7339	90	5	$0		1000	10/17/02
WENDELL ROAD	4	GRAVEL	WENDELL TOWN LINE	158	100	5	$0		1000	10/17/02
WEST PELHAM RD.	1	LEVERETT ROAD	LEONARD ROAD	5280	99	5	$0		1000	10/21/02
WEST PELHAM RD.	2	LEONARD ROAD	POLE 203	1584	100	5	$0		750	10/21/02
WEST PELHAM RD.	3	POLE 203	BAKER ROAD	3696	95	5	$0		750	10/21/02
WEST PELHAM RD.	4	BAKER ROAD	PELHAM TOWN LINE	4171	95	5	$0		750	10/21/02