CHAPTER 4

PAVEMENT MANAGEMENT

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 Orange requested that a portion of their Executive Order 418 funding for the Town's Community Development Plan be utilized to produce a pavement management analysis of the town maintained paved road network. The results of the analysis are contained within this Master Plan.

The Town of Orange maintains 87.42 miles of roadway, of which 72.72 miles are paved. The FRCOG conducted a pavement surface survey in the Fall of 2002 and analyzed the data. The survey indicates that the Town is implementing sound pavement management practices with the limited funds that are available. The paved road network is currently in a fair overall condition.

An analysis of future conditions indicates that existing levels of Chapter 90 funding are not sufficient to allow the Town to improve or even maintain the existing level of pavement conditions through 2012. An additional analysis looked at the effect on the road network conditions if Chapter 90 funds were restored to an annual $150 million statewide program. This analysis involved adding an extra $100,000 per year of funding for Orange and indicated that with restored Chapter 90 funding levels not only would existing pavement conditions be maintained, but small improvements could be made to the Town's overall paved road network. In fact, a net reduction in the projected Backlog of Repair of almost $1.9 million versus the projected increase ($490,405) in the Backlog of Repair under existing Chapter 90 funding levels was seen. This is an $800,000 return on the additional $1.1 million investment.

The Town already does an excellent job of utilizing available funding sources, but for it to protect the investment it has already made, additional maintenance funds must be found. In these tough economic times it is difficult to leverage additional funds, but with Governor Romney's new Road and Bridge Policy of "Fix It First", this report could be used as justification when lobbying for additional funding now or in the future.

The Town now has the base data that will allow it to monitor its progress with maintaining the road network through 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 towns who are interested in establishing a Pavement Management System for their community. The Town of Orange requested that a portion of its 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 4-1 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 an additional 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 to formalize a pavement management system for the Town of Orange.

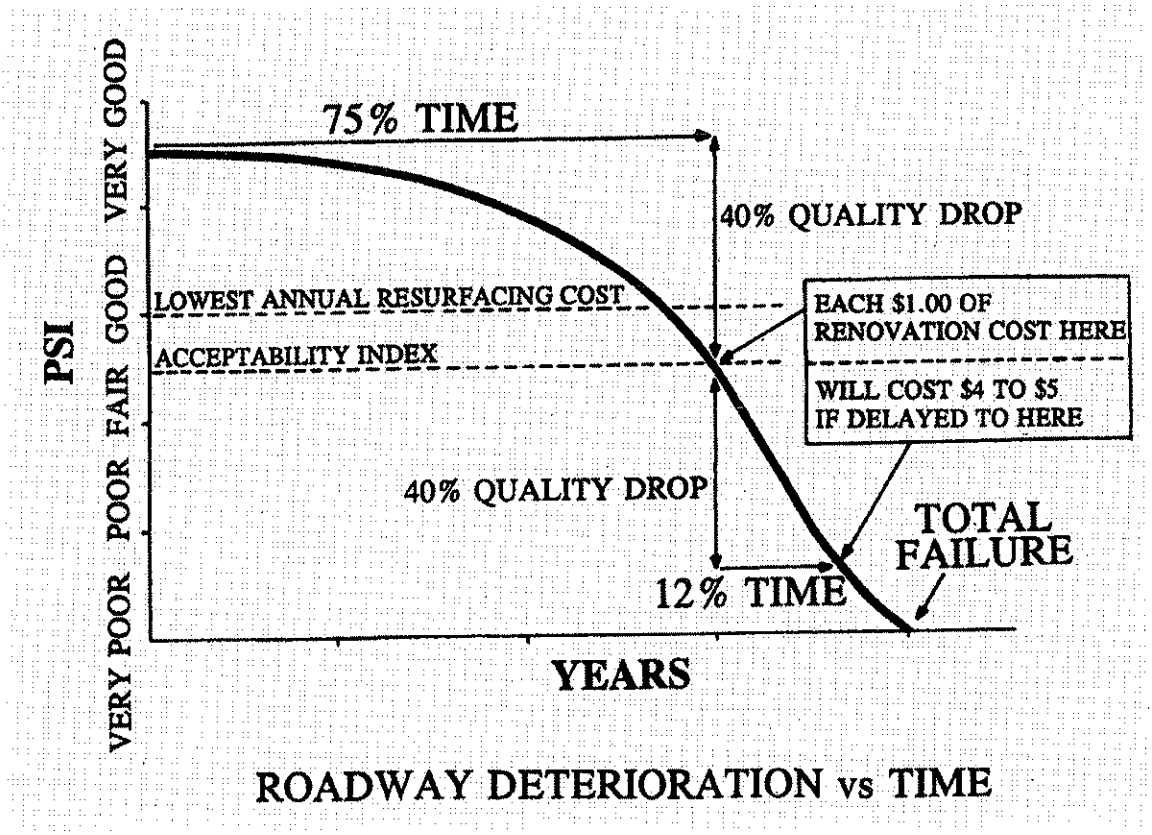


Figure 4-1: Life Cycle of Asphalt Pavement

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 Orange 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 some street names changed and these updates 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 Orange 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 87.42 miles of roadway and MassHighway is responsible for the maintenance of 16.16 miles of roadway. Unaccepted (abandoned or privately maintained) roadways account for an additional 6.54 miles, and the State Park or Forest Service is responsible for the maintenance of another 0.55 miles of roads within the town. This produces a total of 110.67 miles of both paved and gravel roadways in the Town of Orange. It should be noted that these mileages are provisional until MassHighway has accepted the submitted updates. Map 1 at the back of this chapter shows the Orange 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 in Massachusetts. 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 channelization 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 regional Transportation Improvement Program (TIP) coordinated by the Franklin Regional Council of Governments.

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

- Interstates: Highways that serve interstate travel;
- Arterials: Roads hat 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 Orange are termed "Rural".

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

Orange's road network is made up of Arterial, Collector and Local classified roadways. Map 2 at the back of this chapter shows the road network and the assigned functional classifications. Of the 87.42 miles of roadway maintained by the Town, 3.60 miles are classified as Rural Minor Arterial, 5.45 miles as Rural Major Collector, 12.99 miles as Rural Minor Collector and 65.38 miles as Rural Local. Town maintained roadways classified as Rural Minor Arterial and 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 chapter.

As mentioned previously, there are 87.42 miles of Town maintained paved and gravel roads within the Town of Orange. This report deals only with the paved road network. This study identified 72.72 miles of town maintained paved roadways and 14.70 miles of town maintained gravel roads. Map 3 distinguishes the paved road network from the gravel surfaced roadways. The 16.16 miles of MassHighway maintained roadways are all paved and include 9.52 miles of Route 2 and its associated exit ramps, which were not surveyed. The remaining 6.64 miles of MassHighway maintained roadways include Route 202 (Daniel Shays Highway) Route 122 (South Main Street) and Route 2A (East Main Street and New Athol Road), which were surveyed as part of this study.

Methodology

The methodology used for data collection and analysis of the roads was designed to maximize the effectiveness of the RoadManager (RM) software. For each paved road, section breaks were defined based on the following criteria: a change in pavement surface type; a pavement width change of more than five feet; or a dramatic change in pavement conditions. 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 inputted 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

Pavement Condition Index

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; as the number, severity and extent of distresses increases, 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

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 Orange 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 (and estimated costs) 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.

Benefit Value

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, but repairing those sections with the highest values is generally the most 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 were 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. The Appendix for this chapter contains a table of the ADT volumes collected in Orange from 1991 through 2002 by the FRCOG and MassHighway, and a corresponding map showing the locations with 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 road 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 in this analysis 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

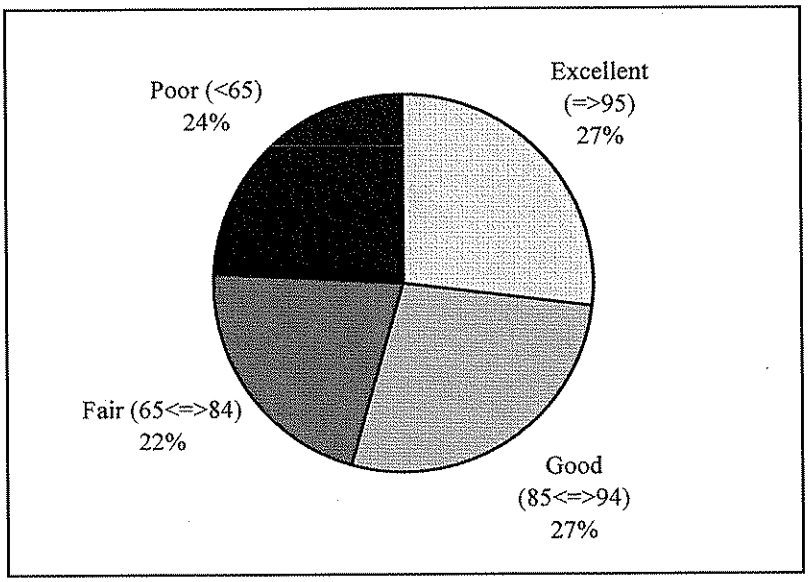
Data collection was conducted during September, October, and November 2002. The chapter Appendix contains detailed information on the existing conditions of the paved road network based on this data collection. Table 4-1 and Figure 4-2 summarize the results of the pavement management analysis of existing conditions for town maintained paved roadways and Table 4-2 and Figure 4-3 show the results for the surveyed MassHighway maintained paved roadways, while Map 4 (at the back of this chapter) shows the existing conditions broken down into the four condition categories: excellent, good, fair, and poor for all the surveyed paved roadways.

Overall, the condition of the town maintained paved road network in Orange could be considered Fair, with an average PCI equal to 82. The mileage in each of the four condition categories is almost equally split. Prominent sections of town maintained roadways in excellent condition include Holtshire Road south of Route 2 to the New Salem Town Line; Warwick Road (Route 78); West Main Street from the center of town to Cherry Street; and Main Street from North Main Street to Creamery Hill Road. Additionally, at the time of the survey, reconstruction work on West River Street was nearing completion and, therefore, was assumed to be in excellent condition for the purposes of this study. Prominent sections of town maintained roadways in poor condition include East River Street from the Pine Crest Apartments to the Athol Town Line; North Main Street south of Dexter Road and north of Ox Bow Road; and Main Street from North Main Street to the Warwick Town Line.

Table 4-1: Summary of Existing Pavement Conditions for Town Maintained Paved Roads

PAVEMENT CONDITION (PCI Range)	Number of Miles	% of Total Mileage
Excellent (=>95)	19.53	27%
Good (85<=>94)	19.97	27%
Fair (65<=>84)	15.68	22%
Poor (<65)	17.54	24%
Total Mileage	72.72	**100%**

Figure 4-2: Summary of Existing Pavement Conditions for Town Maintained Paved Roads



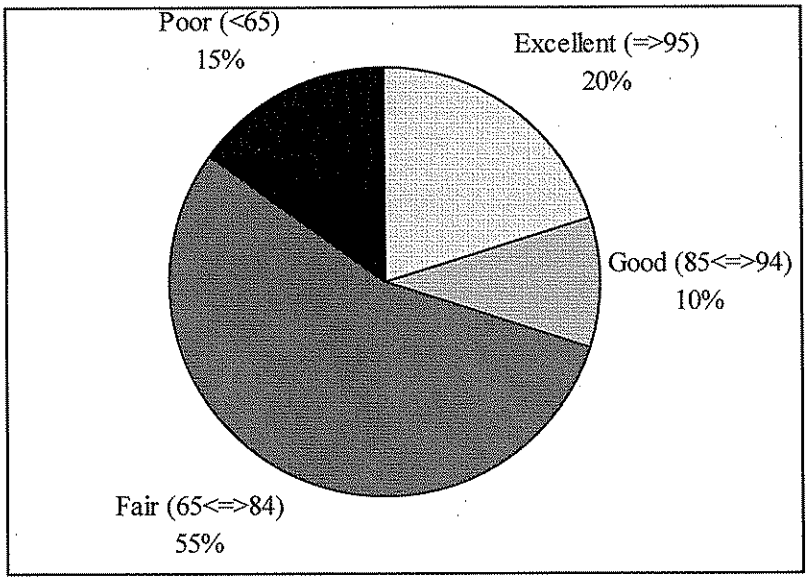
Overall, the conditions of the MassHighway maintained paved road network in Orange could be considered Fair, with an average PCI equal to 76.

Table 4-2: Summary of Existing Pavement Conditions for Surveyed MassHighway Maintained Paved Roads

PAVEMENT CONDITION (PCI Range)	Number of Miles*	% of Total Mileage
Excellent (=>95)	1.34	20%
Good (85<=>94)	0.66	10%
Fair (65<=>84)	3.64	55%
Poor (<65)	1.00	15%
Total Mileage	**6.64**	**100%**

** Mileage does not include Route 2 and its associated exit ramps which were not surveyed*

Figure 4-3: Summary of Existing Pavement Conditions for MassHighway Maintained Paved Roads



Assignment of Repair Strategies

Once existing conditions are documented and road segments are grouped into the four condition categories, a breakdown of recommended repairs and estimated costs of repairs is calculated. This information is summarized in Table 4-3 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 $6,676,829 for town maintained paved roadways. The majority of the Town Backlog of Repair (75%) is accounted for by the approximately 14 miles of roadway deemed by the analysis software to require full reconstruction. Sections of East River Street, North Main Street, Main Street, East Road and Athol Road are prominent town maintained roadways that have been prescribed a reconstruction repair. It appears from the observed surface distresses that each of these roadway sections is experiencing failure in the base of the road structure that can only be permanently resolved by full depth reconstruction or rehabilitation of the entire road structure.

The distribution of the mileage across the assigned repair strategies indicates that the Town has been following good pavement management practices in that almost 70 percent of the mileage requires either routine maintenance or no immediate action.

Table 4-3: 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	24.66	34%	$0
4. Routine Maintenance	24.38	34%	$764,350
3. Preventative Maintenance	5.86	8%	$640,471
2. Rehabilitation	3.92	5%	$450,684
1. Reconstruction	13.90	19%	$4,821,324
Total Mileage	**72.72**		**Backlog of Repair = $6,676,829**

Table 4-4 summarizes the suggested maintenance needs of the surveyed MassHighway maintained roadways. Approximately 50 percent of these roadways require either reconstruction or rehabilitation repairs, and account for the majority of the $1,389,992 Backlog of Repairs. A one-mile section of South Main Street (Route 122) between the cemetery and Gay Street has been assigned a reconstruction repair as a result of the heavy surface distresses that were observed. Sections of Daniel Shays Highway (Route 202) around Route 2 Exit 16, New Athol Road (Route 2A) and East Main Street (Route 2A) have been assigned rehabilitation repairs.

Table 4-4: 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	1.34	20%	$0
4. Routine Maintenance	0.66	10%	$30,978
3. Preventative Maintenance	1.26	19%	$168,701
2. Rehabilitation	2.38	36%	$503,913
1. Reconstruction	1.00	15%	$686,400
Total Mileage	**6.64**		**Backlog of Repair = $1,389,992**

** Mileage does not include Route 2 and its associated exit ramps which were not surveyed.*

Calculation of a Benefit Value

Of the 224 town maintained road sections surveyed, 146 (48.06 miles) require some form of repair or maintenance. The remaining 78 (24.66 miles) sections require no immediate action. As mentioned previously, the 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 repairing the sections with the highest values is generally the most beneficial and cost effective. The BV can 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.

The roadway section with the highest BV received a rank of 1 and section with the lowest BV received a rank of 146. The chapter Appendix contains the BV and ranking for all surveyed road sections. Table 4-5 on the next page shows the top 10 road sections for repair in prioritized order according to the calculated Benefit Value.

It can be seen by the top ten list that nine of the ten sections require either Routine Maintenance or Preventative Maintenance, which follows the principles of pavement management in that it is much more cost effective to maintain paved roads in perpetual good condition than it is to let them deteriorate to a condition requiring reconstruction. The ranking system, through the calculation of the Benefit Value takes into account the use of the roadway by incorporating average daily traffic volume data. For this reason, the section of East River Street between the Pine Crest Apartments and the Athol Town Line, which has been assigned a reconstruction repair, has been ranked tenth.

Table 4-5: Top 10 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
West Main Street*	2	Cherry Street	Route 78	4,224	88	4	$31,680	1	7,500	10/15/02
West Orange Road*	1	Route 78	Mossbrook Road	7,920	83	3	$191,400	2	7,500	10/15/03
West Orange Road*	2	Mossbrook Road	Erving Town Line	1,531	83	3	$36,999	2	7,500	10/15/02
East River Street*	1	South Main Street	Pine Crest Apartments	5,808	87	4	$46,787	4	4,000	10/15/02
North Main Street	3	House #130	Dexter Street	528	87	4	$4,693	5	3,000	10/21/02
Tully Road	5	Bridge	Change in Pavement	10,032	86	4	$52,947	6	1,500	11/15/02
Dexter Street	1	North Main Street	School parking Lot	898	80	4	$5,488	7	1,500	10/29/02
East Road	3	WCE Pole 18	Enfield Road	2,218	88	4	$11,090	8	1,000	9/20/02
North Main Street	1	East Main Street	School Street	528	83	3	$17,600	9	3,000	10/21/02
East River Street*	2	Pine Crest Apartments	Athol Town Line	5,755	62	1	$460,400	10	7,500	10/15/02

Street Name - Street Name. * Indicates the road section is eligible to receive Federal Aid or Non-Federal Aid for Reconstruction through the Transportation Improvement Program.

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)

Rank - A ranking of all the sections requiring repair, based on a Cost/Benefit analysis produced by the RoadManager software through the Benefit Value calculations. 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 were available on the higher volume roads. Where data were 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 were collected.

Budgetary Analysis

Existing Funding Levels

The primary source of funding for road repairs and reconstruction in the Town of Orange is the Town's 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 percent 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 Orange's allocation of Chapter 90 funding for FY 2003 totaled approximately $215,000. Even though Massachusetts is currently facing a budget crisis where many programs are facing cuts in funding, when this analysis was conducted in December 2002 there was no indication the current $100 million statewide Chapter 90 program would be reduced. The Orange Highway Superintendent biannually allocates a portion of the Town's Chapter 90 allocation to rehabilitate gravel roads. In the past, approximately $35,000 has been used for this purpose, but the Highway Superintendent expects this amount to drop to $20,000 in the future as budgets become tighter.

In addition to Chapter 90 funding, the Town of Orange receives approximately $600,000 of U.S. Department of Housing & Urban Development, Community Development Block Grant Program (CDBG) funding. "CDBG provides eligible metropolitan cities and urban counties (called "entitlement communities") with annual direct grants that they can use to revitalize neighborhoods, expand affordable housing and economic opportunities, and/or improve community facilities and services, principally to benefit low- and moderate-income persons."[2] Orange utilizes a large amount of this funding to improve sewer and water systems in the downtown neighborhood streets. This work requires the reconstruction of these roadways and it is estimated that the equivalent of $200,000 of this funding is used to reconstruct these roadways per year.

The Town also recently received funding through a State appropriation to reconstruct a section of North Street south of Dexter Street. The pavement management survey identified a section of North Street between School Street and Dexter Street for which it suggested a reconstruction repair. The estimated cost of this reconstruction was calculated at approximately $100,000, but site specific issues will likely raise the actual cost of this reconstruction project.

[2] U.S. Department of Housing and Urban Development.

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 East Main Street, West Main Street, West Orange Road, South Main Street, East River Street, West River Street and Warwick Road. The east section (approximately 1 mile) of East River Street has been identified as requiring reconstruction by this pavement management analysis, and the Highway Superintendent is looking to apply to the TIP process to fund this repair. The pavement management analysis estimated the cost to complete the reconstruction of this section at $460,400. The actual extent and scope of this project has not yet been defined and may incorporate a larger section of the roadway, so the final cost may exceed this amount.

The RM software can be used to predict the potential effect that different 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 scans 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 4-1 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:

- Chapter 90 funding would remain at existing levels over the ten years. Therefore, $215,000 was allocated each year for pavement maintenance.
- $20,000 was subtracted from the $215,000 Chapter 90 funding biannually to reflect the expected expenditures on gravel road maintenance.
- $98,560 (amount calculated by software) was allocated in 2003 to reflect the State appropriation of funds for the reconstruction of the section of North Main Street.

- $460,400 (amount calculated by software) was allocated in 2006 to reflect the potential use of TIP programmed Federal Aid for the reconstruction of the easterly section of East River Road. No other TIP eligible roadways are in current need of reconstruction; all rank high enough that they would receive funding for routine and preventative maintenance thus keeping them in a perpetual good to excellent condition for the duration of the ten years analyzed.
- $200,000 was allocated for the reconstruction of downtown neighborhood roadways each year to reflect the use of CDBG funds for reconstruction projects.

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 4-6 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 slowly decline from an existing PCI of 82 (Fair) to 78 (Fair), and the Backlog of Repairs could increase by almost $500,000 to approximately $7.2 million over the ten-year period. It should be noted that this analysis does not account for inflation.

Table 4-6: 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	$6,676,829	82
2003	$513,560[1]	$6,288,632	82
2004	$395,000	$6,251,051	81
2005	$415,000	$6,648,734	81
2006	$855,400[2]	$6,465,066	81
2007	$415,000	$6,309,203	80
2008	$395,000	$6,320,720	80
2009	$415,000	$6,680,757	80
2010	$395,000	$6,646,525	79
2011	$415,000	$7,056,882	78
2012	$395,000	$7,167,234	78

[1] *Includes $98,560 for the reconstruction of a section of North Main Street.*
[2] *Includes $460,400 for the reconstruction of a section of East River Street.*
Total Funding allocated over ten years equals $4,608,960.

Table 4-7 provides a comparison between the existing conditions and the projected conditions of the paved road network in 2012 assuming existing funding levels. This comparison shows that the mileage of roadways in excellent, good and fair conditions would decline and the mileage in poor condition would increase by a total of four miles.

Table 4-7: 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)	19.53	18.23	-1.30
Good (85<=>94)	19.97	17.95	-2.02
Fair (65<=>84)	15.68	14.83	-0.85
Poor (<65)	17.54	21.71	4.17
Total Mileage	**72.72**	**72.72**	**0.00**

Tables 4-8 and 4-9 show the projected change in assigned repair strategies and estimated Backlog of Repair for the road sections analyzed to 2012 under existing funding levels. These tables show an increase of almost two miles in roadways that require no immediate repairs, while an additional 2.5 miles would require rehabilitation or reconstruction repairs, resulting in a net increase in Backlog of Repair of almost $500,000.

Table 4-8: 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	24.66	26.56	1.90
4. Routine Maintenance	24.38	21.40	-2.98
3. Preventative Maintenance	5.86	4.39	-1.47
2. Rehabilitation	3.92	4.39	0.47
1. Reconstruction	13.90	15.98	2.08
Total Mileage	**72.72**	**72.72**	**0.00**

Table 4-9: 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	$764,350	$659,217	-$105,133
3. Preventative Maintenance	$640,471	$467,344	-$173,127
2. Rehabilitation	$450,684	$486,856	$36,172
1. Reconstruction	$4,821,324	$5,553,817	$732,493
Total Backlog of Repair	**$6,676,829**	**$7,167,234**	**$490,405**

This analysis shows that if the existing Chapter 90 and CDBG funding along with TIP funding is continued for the ten year period through 2012, the town maintained paved road network as a whole would see a slow decline in conditions resulting in a relatively small increase in Backlog of Repair. The use of the CDBG funds to reconstruct neighborhood streets in the downtown area certainly makes a substantial difference. Many of these streets are currently in need of reconstruction and because of the low traffic volumes they carry, they would otherwise not rank high enough to receive funding. Additionally, many of these streets are short in length and lend themselves to being repaired within the small amount of CDBG funding available each year. A closer look at the analysis results shows that the current funding levels are not sufficient to conduct the required maintenance for all the roadways.

Due to the lack of available funding, some roadways that currently require low-cost routine or preventative maintenance will likely deteriorate to the point where they will require a rehabilitation or reconstruction repair. Other road portions, such as sections of North Main Street, Main Street, East Road and Tully Road, that are currently in need of reconstruction would not be allocated funding for repair, either because the cost of the project is in excess of the available funding and/or its ranking did not put it in a high enough position for repair.

Existing Funding Levels without CDBG Funds

The Town of Orange currently receives $600,000 per year in CDBG funds that it elects to use for sewer and water main upgrades in eligible downtown neighborhoods. This work results in the reconstruction of these roadways. The highway superintendent estimates that each year the equivalent of $400,000 is spent on the sewer and water main replacement and the equivalent of $200,000 is spent on the road reconstruction. Since the Town is not limited to using these funds for this purpose a budgetary analysis was run to estimate the impacts on the paved road network if these funds were not used in this manner. Therefore, for the ten-year period 2003 through 2012 a budgetary analysis was run using the following assumptions:

- Chapter 90 funding would remain at existing levels over the ten years. Therefore, $215,000 was allocated each year for pavement maintenance.
- $20,000 was subtracted from the $215,000 Chapter 90 funding biannually to reflect the expected expenditures on gravel road maintenance.
- $98,560 (amount calculated by software) was allocated in 2003 to reflect the State appropriation of funds for the reconstruction of the section of North Main Street.
- $460,400 (amount calculated by software) was allocated in 2006 to reflect the potential use of TIP programmed Federal Aid for the reconstruction of the easterly section of East River Road. No other TIP eligible roadways are in current need of reconstruction and all rank high enough that they would receive funding for routine and preventative maintenance thus keeping them in a perpetual good to excellent condition for the duration of the ten years analyzed.
- No CDBG funds would be used for projects that result in any reconstruction or maintenance of paved roads.

Table 4-10 summarizes the results of this budgetary analysis using the above funding assumptions. It can be seen from this table that under these funding levels (without the use of CDBG funds), the average condition of the road network is projected to decline from its existing 82 (Fair) to 76 (Fair), and the Backlog of Repairs is projected to increase by almost $1.9 million to approximately $8.5 million over the ten-year period. This decline in average PCI is slightly greater than that projected if CDBG funds are used for road projects, and the increase in Backlog of Repair is approximately $1.4 million greater. It should be noted that this analysis does not account for inflation.

Table 4-10: Projected Backlog of Repair and Average PCI to 2012 with Existing Funding Levels without CDBG Funds

Future Year	Funding Level	Backlog of Repair	Average PCI
2002	Existing Conditions	$6,676,829	82
2003	$313,560[1]	$6,469,912	81
2004	$195,000	$6,643,722	80
2005	$215,000	$7,228,318	80
2006	$655,400[2]	$7,236,523	79
2007	$215,000	$7,288,993	79
2008	$195,000	$7,479,874	78
2009	$215,000	$7,920,538	78
2010	$195,000	$7,935,860	77
2011	$215,000	$8,395,515	76
2012	$195,000	$8,524,557	76

[1] Includes $98,560 for the reconstruction of a section of North Main Street
[2] Includes $460,400 for the reconstruction of a section of East River Street
Total Funding allocated over ten years equals $2,608,960

Table 4-11 provides a comparison between the existing conditions and the projected conditions of the paved road network in 2012 under the above funding assumptions (without the use of CDBG funds). This comparison shows mileage of roadways in excellent, good and fair conditions would all decline by 2012, and the mileage in poor condition would increase by a total of 9.5 miles.

Table 4-11: Comparison of Existing and Projected Pavement Conditions for Town Maintained Paved Roads in 2012 with Existing Funding Levels without CDBG Funds

PAVEMENT CONDITION (PCI Range)	Existing 2002 Mileage	Projected 2012 Mileage	Change in Mileage
Excellent (=>95)	19.53	16.16	-3.37
Good (85<=>94)	19.97	15.18	-4.79
Fair (65<=>84)	15.68	14.33	-1.35
Poor (<65)	17.54	27.05	9.51
Total Mileage	**72.72**	**72.72**	**0.00**

Tables 4-12 and 4-13 show the projected assigned repair strategies and estimated Backlog of Repair for the road sections in 2012 under existing funding levels without CDBG funds. These tables show a combined decline of approximately eight miles in roadways that require routine or preventative maintenance, or no immediate action. This indicates that these eight miles would decline to conditions where rehabilitation or reconstruction strategies would be required, thus increasing the Backlog of Repair by almost $1.9 million.

Table 4-12: Comparison of Existing and Projected Required Repairs for Town Maintained Paved Roads in 2012 with Existing Funding Levels without CDBG Funds

REPAIR TYPE	Existing 2002 Mileage	Projected 2012 Mileage	Change in Mileage
5. No Immediate Action	24.66	23.51	-1.15
4. Routine Maintenance	24.38	19.61	-4.77
3. Preventative Maintenance	5.86	3.89	-1.97
2. Rehabilitation	3.92	6.27	2.35
1. Reconstruction	13.90	19.44	5.54
Total Mileage	**72.72**	**72.72**	**0.00**

Table 4-13: Comparison of Existing and Projected Backlog of Repairs for Town Maintained Paved Roads in 2012 with Existing Funding Levels without CDBG Funds

REPAIR TYPE	Existing 2002 Backlog	Projected 2012 Backlog	Change in Backlog
5. No Immediate Action	$0	$0	$0
4. Routine Maintenance	$764,350	$610,036	-$154,314
3. Preventative Maintenance	$640,471	$422,024	-$218,447
2. Rehabilitation	$450,684	$726,033	$275,349
1. Reconstruction	$4,821,324	$6,766,464	$1,945,140
Total Backlog of Repair	**$6,676,829**	**$8,524,557**	**$1,847,728**

This analysis shows the importance of using the CDBG funding for the repair of downtown streets under the existing (non CDBG) funding levels. Use of the CDBG funds will slow the decline in the overall condition of the paved road network, and will slow the increase in the Backlog of Repair of town maintained paved roads.

Increased Chapter 90 Funding

In the late 1990s, the Chapter 90 program was funded at a $150 million level statewide, which equated to approximately $322,500 in Chapter 90 funding to the Town of Orange. 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. However, to illustrate the difference that an increase in Chapter 90 funding would make to the future conditions of the paved road network, a new analysis was conducted using the following assumptions.

- Chapter 90 funding at $150 million level over the ten years. Therefore, $322,500 would be available for pavement maintenance.
- $20,000 was subtracted from the $215,000 Chapter 90 funding biannually to reflect the expected expenditures on gravel road maintenance.
- $98,560 (amount calculated by software) was allocated in 2003 to reflect the State appropriation of funds for the reconstruction of the section of North Main Street.
- $460,400 (amount calculated by software) was allocated in 2006 to reflect the potential use of TIP programmed Federal Aid for the reconstruction of the easterly section of East River Road. No other TIP eligible roadways are in current need of reconstruction and all rank high enough that they would receive funding for routine and preventative maintenance thus keeping them in a perpetual good to excellent condition for the duration of the ten years analyzed.
- $200,000 was allocated for the reconstruction of downtown neighborhood roadways each year to reflect the use of CDBG funds for reconstruction projects.

Table 4-14 summarizes the projected conditions of the paved road network using the above funding assumptions that reflect an increase in Chapter 90 funding to the former $150 million level. It can be seen from this table that under these funding levels the average condition of the paved road network hovers around existing levels of 82 or 83(Fair), and the Backlog of Repairs declines by almost $1.4 million to approximately $5.3 million over the ten-year period. It should be noted that this analysis does not account for inflation.

Table 4-14: Projected Backlog of Repair and Average PCI to 2012 with Increased Chapter 90 Funding

Future Year	Funding Level	Backlog of Repair	Average PCI
2002	Existing Conditions	$6,676,829	82
2003	$601,560[1]	$6,181,861	82
2004	$523,000	$5,988,228	83
2005	$502,000	$6,222,185	82
2006	$983,400[2]	$5,907,386	82
2007	$502,000	$5,561,435	83
2008	$523,000	$5,530,870	83
2009	$502,000	$5,684,495	82
2010	$523,000	$5,429,949	83
2011	$502,000	$5,361,379	83
2012	$523,000	$5,276,508	83

[1] Includes $98,560 for the reconstruction of a section of North Main Street
[2] Includes $460,400 for the reconstruction of a section of East River Street
Total Funding allocated over ten years equals $5,684,960

Table 4-15 provides a comparison between the existing conditions and the projected conditions of the paved road network in 2012 under the above funding assumptions. This

comparison shows that the mileage of roadways in excellent and good conditions increases, while roadways in fair and poor conditions decline.

Table 4-15: Comparison of Existing and Projected Pavement Conditions for Town Maintained Paved Roads in 2012 with Increased Chapter 90 Funding

PAVEMENT CONDITION (PCI Range)	Existing 2002 Mileage	Projected 2012 Mileage	Change in Mileage
Excellent (=>95)	19.53	23.03	3.50
Good (85<=>94)	19.97	24.09	4.12
Fair (65<=>84)	15.68	10.12	-5.56
Poor (<65)	17.54	15.48	-2.06
Total Mileage	**72.72**	**72.72**	**0.00**

Tables 4-16 and 4-17 show the projected assigned repair strategies and Backlog of Repair for the road sections analyzed to 2012 under the above funding assumptions that reflect an increase in Chapter 90 funding to the former $150 million level. These tables show a trend toward the paved road network slowly improving. A projected increase (almost 15 miles) in roadways that require no immediate repairs is seen, and there is a small reduction in the mileage requiring reconstruction. In turn, this results in a reduction in the Backlog of Repair of $1.4 million between 2002 and 2012.

Table 4-16: Comparison of Existing and Projected Required Repairs for Town Maintained Paved Roads in 2012 with Increased Chapter 90 Funding

REPAIR TYPE	Existing 2002 Mileage	Projected 2012 Mileage	Change in Mileage
5. No Immediate Action	24.66	39.32	14.66
4. Routine Maintenance	24.38	16.56	-7.82
3. Preventative Maintenance	5.86	2.40	-3.46
2. Rehabilitation	3.92	1.94	-1.98
1. Reconstruction	13.90	12.50	-1.40
Total Mileage	**72.72**	**72.72**	**0.00**

Table 4-17: Comparison of Existing and Projected Backlog of Repairs for Town Maintained Paved Roads in 2012 with Increased Chapter 90 Funding

REPAIR TYPE	Existing 2002 Backlog	Projected 2012 Backlog	Change in Backlog
5. No Immediate Action	$0	$0	$0
4. Routine Maintenance	$764,350	$515,465	-$248,885
3. Preventative Maintenance	$640,471	$238,460	-$402,011
2. Rehabilitation	$450,684	$217,633	-$233,051
1. Reconstruction	$4,821,324	$4,304,950	-$516,374
Total Backlog of Repair	**$6,676,829**	**$5,276,508**	**-$1,400,321**

This analysis indicates that if the Chapter 90 funding levels were raised back to the $150 million level, the decline in the paved road network conditions in Orange would likely be halted and, in fact, small advances would likely be made toward reducing the road mileage requiring reconstruction. Such an increase in Chapter 90 funding would allow the Town to make the majority of the required routine and preventative repairs each year. This would mean that the investment in reconstruction that has and will been made (through TIP and CDBG funds) would be protected by providing sufficient funding to maintain these roadways in good to excellent condition through the next ten years. The additional Chapter 90 funds would amount to almost $1.1 million over the ten years and would provide a reduction in the Backlog of Repair of $1.4 million. This would be, in fact, a net reduction in the projected Backlog of Repair of almost $1.9 million versus the projected increase ($490,405) in the Backlog of Repair under existing Chapter 90 funding levels. Therefore, an $800,000 return in the additional investment would be realized.

Conclusion

Based on the pavement surface survey conducted in the Fall of 2002, the paved road network maintained by the Town of Orange is currently in "Fair" condition with an average Pavement Condition Index (PCI) of 82. The distribution of the mileage by repair type indicates that the Town's highway department has been practicing good pavement management practices with the limited funding that has been available. The Town currently faces a Backlog of Repair of almost $6.7 million. Although the Town is doing an extremely good job of utilizing all available funding sources, such as CDBG and TIP funds for reconstruction projects, the analysis indicates that the existing level of Chapter 90 funding, the primary source of road maintenance funds, is insufficient to maintain the paved road network in its present condition. Under these funding circumstances, the analysis indicates that the overall condition of the paved road network will decline slowly, and that the Backlog of Repairs will increase by approximately $500,000 over the ten years analyzed.

An additional analysis was conducted to project the potential improvements that could be achieved if the Chapter 90 funding was increased to the former $150 million statewide level. This analysis indicates that the additional funding would be sufficient to maintain or slightly

improve the condition of the paved road network and reduce the existing Backlog of Repair by $1.4 million. In fact, this equates to a net reduction in the projected Backlog of Repair of almost $1.9 million versus the projected increase ($490,405) in the Backlog of Repair under existing Chapter 90 funding levels. Therefore, an $800,000 return in the additional investment would be realized.

In these current tough economic times it will be difficult to leverage additional funds, but with Governor Romney's new Road and Bridge Policy of "Fix It First", this report could be used as justification when lobbying for additional funding now or in the future. The Town now has the base data that it needs to monitor pavement conditions over time and to continue to prioritize repairs in the most cost effective way. The FRCOG will continue to provide support to the extent possible.

Alternative Funding Sources

Transportation Improvement Program

The Town of Orange already does an excellent job at utilizing different funding sources for road maintenance and repairs. 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 Franklin Regional Council of Governments (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 list only 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 work 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 FRCOG 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 which include parts of Franklin County, 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 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 (EOTC).

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, a town's responsibilities are to: (1) attend all design public hearings; and (2) acquire any necessary rights-of-way. For road projects initiated by a 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 its regional MassHighway District office and the MassHighway Project Review Committee.

Based on the pavement survey data and analysis, East River Street has been identified as needing reconstruction. The Orange Highway Superintendent has already expressed his intent to use the TIP as a funding source for this repair, and this was reflected in the budgetary analysis that was conducted for this research.

Towns sometimes view the TIP method 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 that TIP 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. These standards allow projects to have narrower travel lane widths and shoulders for roadways with speeds less than 40 mph and traffic volumes of less than 2000 vehicles per day. None of the TIP eligible roadways meet these criteria since traffic volumes are 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. FRCOG transportation planning staff can provide additional information on this program.[3]

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.

[3] For additional details on the Footprint Roads Program, contact Maureen Mullaney, FRCOG Transportation Program Manager at 413-774-1194 (ext. 108).

Eligible PWED projects include roadway and bridge improvements, sidewalk or lighting installation, traffic control facilities, and drainage or culvert work. PWED projects must, 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 already been initiated. PWED projects can not 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 through the program and there is no local match requirement. Towns interested in pursuing a PWED project should contact the FRCOG transportation planning staff for an application.

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. Since the population of Orange is greater than this threshold, it is not a funding source available to the Town.

Conclusion

In the absence of an annual $150 million Chapter 90 state program, the Town should continue to explore and utilize alternative funding sources such as the TIP to ensure that the roadway existing conditions can be maintained and possibly improved.

Pavement Management Recommendations

- Work with area legislators to secure additional maintenance funding and encourage the Massachusetts Legislature to restore Chapter 90 road funding to its previous level from the late 1990s of $150 million statewide, approximately $332,500 of which went to the Town of Orange.
- Use the results of the pavement management analysis to help prioritize future road projects in Orange.

Insert Map 1 & 2

Insert Map 3 & 4