Maintenance Condition Report

December 2004

NC Department of Transportation

2004
Maintenance Condition And Funding Needs For The North Carolina State Highway System

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December 2004

Acknowledgements

The Division of Highways wishes to acknowledge the contributions of those individuals within the State Road Maintenance Unit, the Pavement Management Unit, the Bridge Maintenance Unit and the 14 Highway Divisions for their assistance in providing the survey data and contents of this report.

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2004 REPORT ON THE CONDITION OF THE STATE HIGHWAY SYSTEM

EXECUTIVE SUMMARY

Introduction

The North Carolina Department of Transportation has surveyed and evaluated the condition of the state's structures and paved roads in order to estimate the needs for routine maintenance and resurfacing. The purpose of this report is to provide the results of the survey. This report assesses the current condition of the highway infrastructure and estimates the funding needed to reach a minimum level of service.

North Carolina's highway system consists of 78,615 miles of roadway and 17,756 structures. The Division of Highways within the Department of Transportation is responsible for maintaining this system. Since the 1989 Highway Trust Fund was enacted, the number of lane miles of North Carolina's paved highway system has increased by 24%; during the same time, bridge deck area has grown by 29%. While the system continues to grow, the traditional highway maintenance funds necessary to maintain it have not changed significantly when adjusted for inflation.

Recognizing this gap between available funding and maintenance needs, the North Carolina General Assembly and the Department have worked together to find non-traditional funding sources that are beginning to fill this gap. Starting with the 2001 Session of the General Assembly, several alternative methods of funding maintenance have been given to the Department. These alternative methods include the ability to use Highway Trust Fund cash balances to address highway maintenance and operation needs. Senate Bill 1005 allowed for up to $ 515 million to be spent on primary route pavement preservation and traffic management systems. Most recently, Governor Mike Easley's *North Carolina Moving Ahead!* approved by the 2003 session of the General Assembly gave the Department the opportunity to improve the safety and maintenance condition on designated primary and high volume secondary routes. The Department has planned or programmed $630 million over the two-year life of the funding in a statewide effort to improve the safety and functionality of specific roads and bridges. The utilization of these funds allows the

Department to perform widening, pavement rehabilitation, resurfacing, turn-lane installation, signal installation, and bridge replacement/repair. The project funding associated with *North Carolina Moving Ahead*! enables the Department to effectively program and fully fund the necessary safety and maintenance measures for each project and longer sections of thoroughfares. Otherwise, when utilizing annual maintenance funding dollars, these projects would have to be pieced together over multiple years or not be done at all. The Department is in the second year of this program and is beginning to reap the maintenance benefits of these improvements. It is expected that the projects and funding associated with Moving Ahead will allow for annual maintenance funding to be spent on other routes which will improve the overall roadway system for years to come.

In addition, the Department has taken advantage of the flexibility in the Federal-Aid funding allotments to address highway maintenance and operational programs. According to the Transportation Improvement Program, approximately $ 44.6 million per year will be available to address new and existing programs. These new non-traditional funding sources have been included in this report and the maintenance needs identified take into consideration the availability of these dollars.

Background

North Carolina General Statute 136-44.3 requires that on each even-numbered year, the NCDOT shall survey and report the condition of the state highway system. This report shall provide estimates of:

(1) the annual cost of routine maintenance,
(2) the cost of eliminating any maintenance backlog,
(3) the annual cost of resurfacing based on:
    (a) a 12-year paving cycle for the primary system, and
    (b) a 15-year paving cycle for other highways
(4) the cost of eliminating any resurfacing backlog.

On the basis of this report, NCDOT shall develop a statewide annual maintenance program for the state highway system.

Survey Results

Three comprehensive statewide surveys were used to evaluate the condition of the state highway system: (1) the Maintenance Condition Survey, (2) the Bridge Condition Survey, and (3) the Pavement Condition Survey. These surveys confirmed that many of the highway features, such as pavements, driveway pipes, timber bridges, signs, etc., are not in an acceptable maintenance condition. In accordance with the legislative requirements, the Department has estimated the cost to achieve a minimum acceptable maintenance condition and estimated the backlog cost. These costs are itemized as follows:

Annual Cost of Routine Maintenance

The annual cost of routine maintenance in order to provide a minimum acceptable level of service is **$ 626.6 million.**

Cost of Eliminating Maintenance Backlog

The cost of eliminating the maintenance backlog in order to raise the existing condition to an acceptable level is $ 235.0 million. Prorated over several years, the first year's cost would be **$ 28.7 million.**

Annual Cost of Resurfacing

The annual cost of resurfacing the Primary system on a 12-year cycle and the Secondary and Urban systems on a 15-year cycle is **$ 248.6 million.**

Cost of Eliminating Resurfacing Backlog

The cost of eliminating the resurfacing backlog in order to raise existing conditions of the pavements to an acceptable level is $ 223.8 million. Prorated over 10 years, the first year's cost would be **$ 22.4 million.**

Disasters and Emergencies

Recent years have brought three major hurricanes and several statewide severe winter weather events to North Carolina. These storms have caused the Department to incur a projected debt of $ 88.6 million. For budgeting purposes, this obligation is spread over 5

years. The annual anticipated need for disasters and emergencies is $ 15 million. The total disaster and emergency obligation for FY 2005-06 is **$ 30 million.**

Total Maintenance Funding Need

The total maintenance funding need for FY 2005-06 is **$ 956.3 million.**

Adjustment for Alternate Funding

Non-traditional funding sources such as SB1005, *NC Moving Ahead!*, and the TIP have helped to reduce maintenance needs in past years. However, with the expiration of SB 1005, and *NC Moving Ahead!* only TIP funds remain as a source for additional maintenance funding. As a result, the total maintenance funding need next fiscal year will only be reduced by $ 44.6 million, leaving the estimated funding need at **$ 911.7 million**.

Long Range Plans for Transportation Needs

In 2004, the Board of Transportation adopted a 25-year, long range transportation plan. This plan provides a blue print for greater investment in maintenance, preservation and modernization of the state's existing highway system. Through extensive public outreach, the Department worked to develop a plan which meets the total transportation demands of the 21st Century. The plan's Recommended Investment Scenario enables the department to meet an additional 10% of its maintenance and preservation needs and nearly 25% more of its infrastructure modernization needs. The plan identifies three levels of transportation facilities: Statewide facilities such as interstates, Regional facilities such as NC and US routes, and Sub-regional facilities such as secondary roads. The designation of these three facility types allows DOT to focus its maintenance dollars on the highest priority systems with the largest volumes of traffic.

2004 REPORT ON THE CONDITION OF THE STATE HIGHWAY SYSTEM

A - INTRODUCTION

Background

In 2002, the North Carolina Department of Transportation submitted a report to the Joint Legislative Transportation Oversight Committee on the condition of the state system's roads and bridges and the funding level needed to maintain this system at a reasonable level of service. The 2002 report also estimated the cost to resurface the state primary system on a 12-year paving cycle and the cost to resurface all other state highways on a 15-year cycle. As required by G.S. 136-44.3, the report also estimated the cost to eliminate the maintenance and resurfacing backlogs.

This document, the "2004 Report on the Condition of the State Highway System", is an update of the 2002 report. The intent of this report is to satisfy the legislative requirements, as well as provide a clear link between maintenance objectives, maintenance activities, maintenance service levels, budget and actual performance.

Highway System Growth

North Carolina's highway system consists of 78,615 miles of roadway and 17,756 structures. Since 1989, the number of paved lane miles has increased by 24.1% and the square footage of bridge deck area has grown by 29.1%. As illustrated in Figures 1 and 2, the system continues to increase as roads are widened and new roads and bridges are constructed. Appendix A lists the mileage and bridge deck area totals from 1989 through 2003.

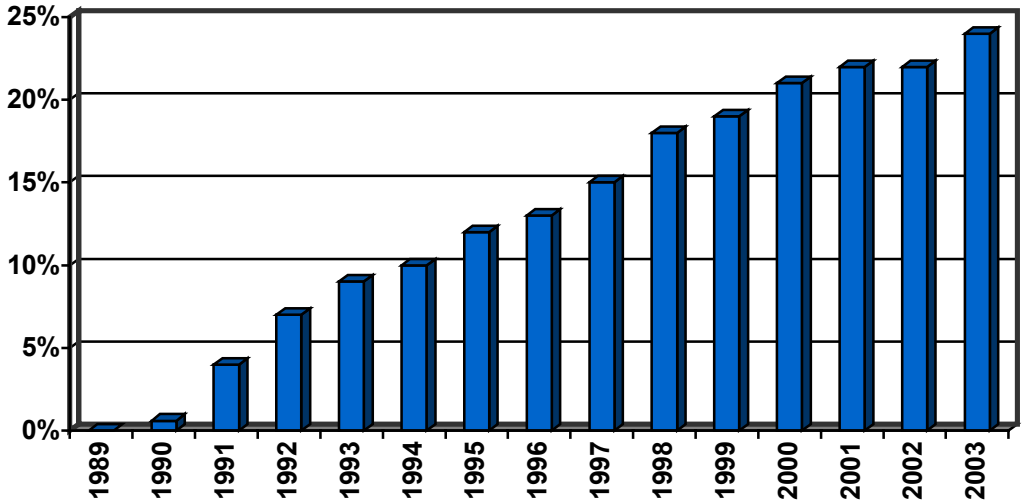

Figure 1 - Paved Lane Mileage Growth

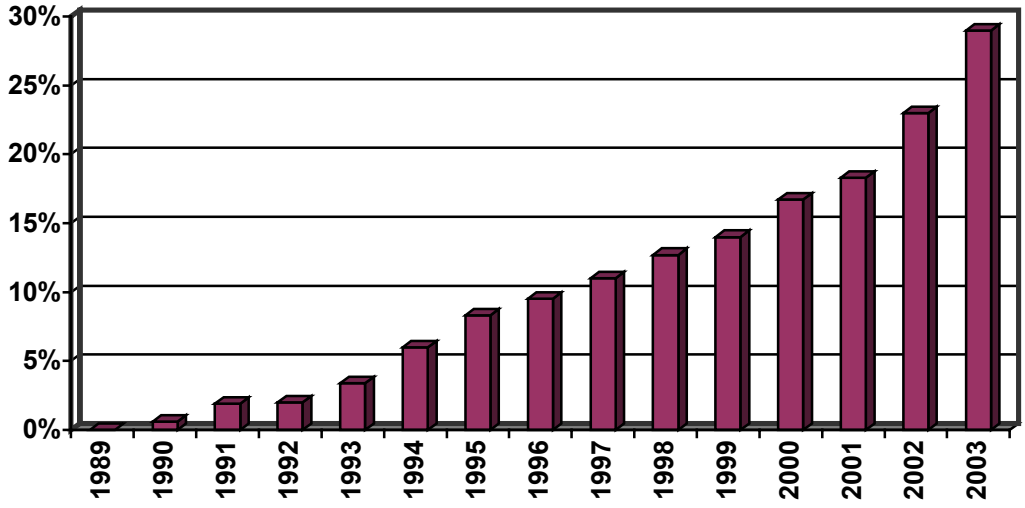

Figure 2 - Bridge Deck Surface Area Growth

In addition to the steady increase in the paved system, vehicular travel has also risen. During the same time period, vehicle miles traveled increased by 54.0% while the paved lane miles have only increased 24.1%. These trends, as illustrated in Figure 3, show the significantly larger increase in vehicle miles traveled. This increase places a heavier burden on the existing infrastructure. It also accentuates the need for additional maintenance funding to address the added deterioration created by the increase in traffic.

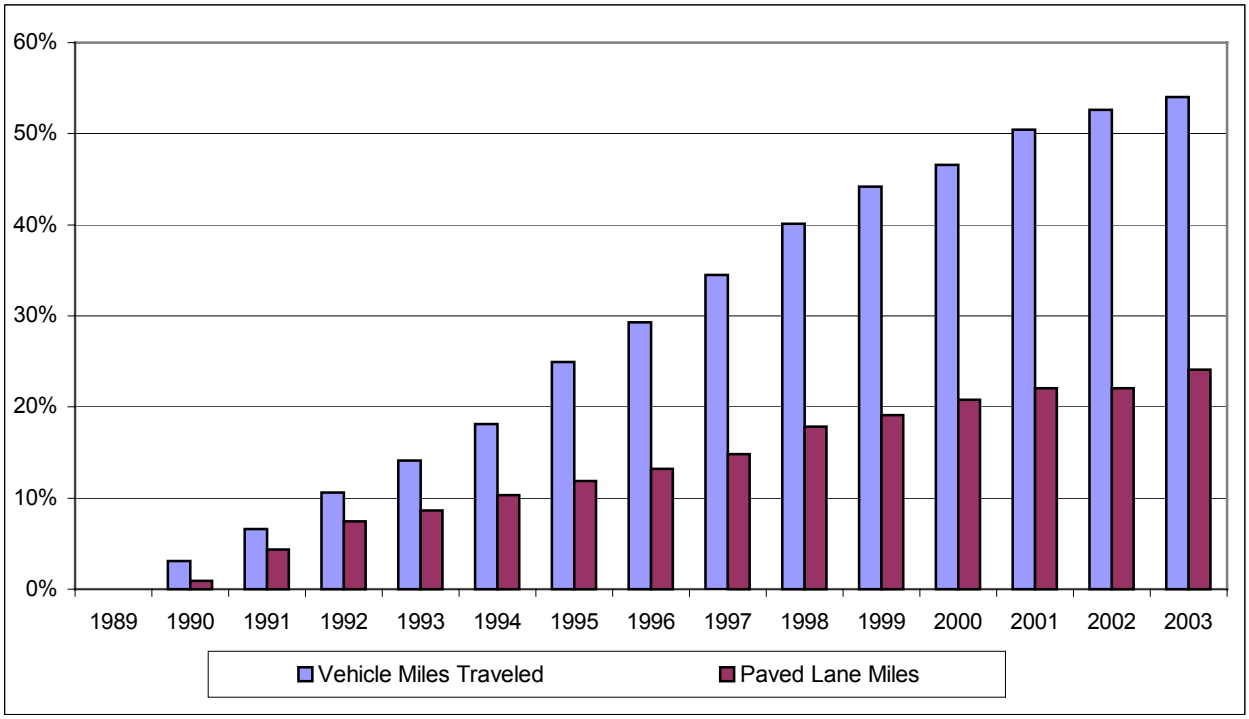

Figure 3 – Percentage Trends of System Inventory and Traffic Volumes

History of Maintenance Funding

Although the highway system has shown a steady increase in the last decade, the increase in total funds for maintenance has not kept pace with inflation. In fact, when adjusted by the Consumer Price Index, the total dollar amount devoted to maintenance and resurfacing in FY 2005 is only 13% higher than that of FY 1990 as indicated in Figures 4 and 5 respectively.

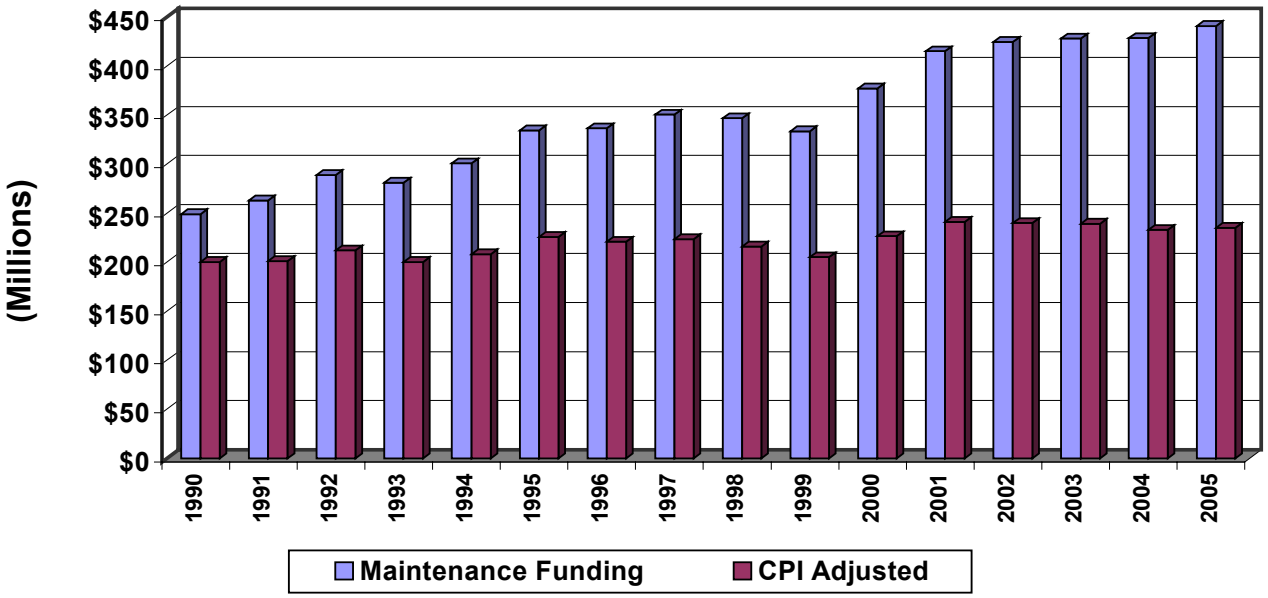

Figure 4 – Maintenance Funding, Adjusted by Consumer Price Index

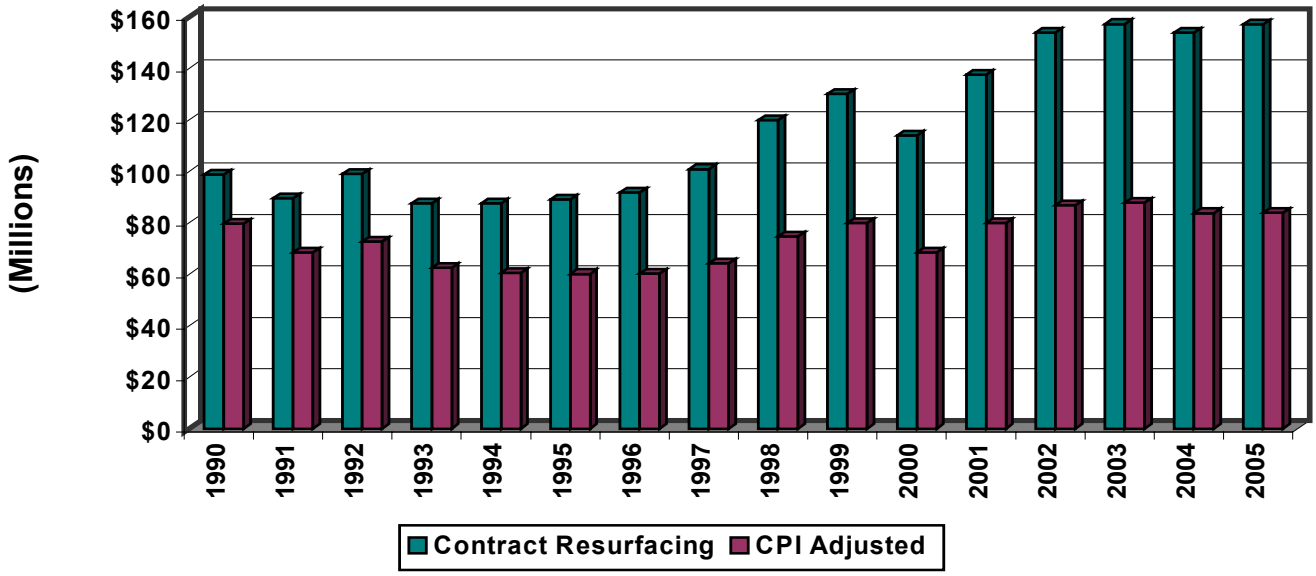

Figure 5 – Contract Resurfacing, Adjusted by Consumer Price Index

Non-Traditional Funding Sources

Recognizing this gap between available funding and maintenance needs, the North Carolina General Assembly and the Department have worked together to find non-traditional funding sources that are beginning to fill this gap.

SB 1005 Funding

The 2001 Session of the General Assembly approved a special provision authorizing NCDOT to use a portion of the Highway Trust Fund cash balances to address highway facility needs. Senate Bill 1005 provided approximately $ 515 million over a three-year period to fund traffic management system improvements and to address pavement needs on the state's primary system. Upon completion of this program, approximately 5,500 lane miles will have been strengthened and resurfaced to accommodate both the current and anticipated traffic volumes and weights. While much of this pavement is on the ground, weather restrictions and other factors have delayed the award of approximately $ 70 million. These projects will be awarded in 2005. It is anticipated that these funds, in conjunction with the increases in Contract Resurfacing funds, will eliminate the backlog of pavement needs identified by our Pavement Condition Survey on the Primary System. Additionally, these funds have helped to offset the maintenance needs on these roads for items such as low shoulders, drainage, guardrail, pavement striping and pavement markers. However, without a substantial increase in the Contract Resurfacing funds after the expiration of the SB 1005 funds, these highways will begin to deteriorate and fall into an unacceptable condition. As a result, the backlog of pavement needs will begin to grow once again.

North Carolina Moving Ahead!

In 2003, Governor Easley announced *North Carolina Moving Ahead!* and the legislation that created this landmark program was ratified in August of that same year. Over a two-year period, $ 630 million will be spent to improve highways, and bridges. These projects will enhance safety, improve system efficiency and address our growing maintenance needs. Currently, over 40% of the projects have been completed or are under contract. All projects are scheduled to be let by July 2005.

Other Funding Sources

With the passage of the Transportation Equity Act for the 21st Century (TEA-21) in 1998, the United States Congress realized the increasing need to migrate from a strictly "construction" program to a "maintenance and preservation" program. This transition gave States more latitude in how they spend their Federal dollars. It has been estimated that the Nation's investment in its transportation system is about $ 1 trillion in replacement value; therefore, it only makes good business sense to maintain and preserve this tremendous asset. NCDOT has taken advantage of this shift in Federal focus by establishing Transportation Improvement Projects to address allowable operational programs and activities. In the TIP, the following projects have been listed which would address current operational programs.

TIP Project	Description	FY 2005-2006 Allocation
ITS Traffic Operations (R-4049)	Funds would be used for operation and maintenance of Incident Management and ITS Programs	$ 18.0 M
Positive Guidance Program (R-4067)	Funds would be used to improve lane lines and symbols to provide better traffic guidance and visibility on the primary roadway system	$ 6.6 M
Traffic System Operations Program (R-4701)	Funds would be used for operation and maintenance of traffic management devices such as signal systems, cameras, highway advisory radios and vehicle detection systems	$ 18.0 M
Bridge Preventative Maintenance Program (B-4700)	Funds would be used to address bridge needs such as deck and joint repair, and bridge painting	$ 2.0 M

The projects that would help to meet the estimated highway maintenance funding needs have been taken into consideration in the total estimated funding cost and are reflected in Appendix G.

B – REQUIREMENTS AND METHODOLOGIES

Requirements of G.S. 136-44.3

North Carolina General Statute 136-44.3, ratified by the 1997 General Assembly, requires NCDOT to survey the condition of the State Highway System and prepare a report of the findings. The report is to provide quantitative and qualitative descriptions of the condition of the system and provide cost estimates of the following:

(1) the annual cost of routine maintenance of the State Highway System,
(2) the cost of eliminating any maintenance backlog by categories of maintenance requirements,
(3) the annual cost to resurface the State Highway System based upon
    (a) a 12-year paving cycle for the primary system, and
    (b) a 15-year paving cycle for other highways,
(4) the cost of eliminating any resurfacing backlog by system.

The statute also requires that, on the basis of this report, the Department shall develop a statewide annual maintenance program for the State Highway System. The report shall be presented to the Joint Legislative Transportation Oversight Committee each even-numbered year.

In accordance with the requirements of this statute, this report describes the survey methodology and estimated costs of routine maintenance and resurfacing, as well as the costs to eliminate backlogs. To satisfy the requirements of this legislation, a detailed assessment was conducted of the state's pavements, structures and roadway features.

Three statewide surveys were used to assess the condition of the State Highway System: (1) the Maintenance Condition Survey, (2) the Bridge Condition Survey, and (3) the Pavement Condition Survey. Along with the results of these surveys, historical funding and expenditure data were used to estimate the annual costs of routine maintenance and resurfacing to provide a minimum acceptable level of service.

The methodologies used in the preparation of these survey reports, along with the results and conclusions, are accepted practices used in other state transportation departments throughout the United States.

Level of Service

In order to effectively evaluate the condition of the State Highway System, it was necessary to establish common sense definitions for different levels of services. A five-level grading system (A, B, C, D and F) was established and is used in this report. Level A refers to the highest or best level and Level F refers to the lowest or worst level. The report also includes cost estimates for delivering each of the five service levels for the major maintenance activities. Detail definitions of each level are as follows.

Level of Service A (best)
This is a very high level of service in which the roadway, bridges and associated features are in excellent condition. Very few deficiencies are present, all systems are operational and the overall appearance is pleasing. Preventive maintenance is a high priority in all maintenance activities.

Level of Service B (good)
This is a high level of service in which the roadway, bridges, and associated features are in good condition. Very few deficiencies are present in safety and investment protection, but moderate deficiencies exist in other areas. All systems are operational. Preventive maintenance is a high priority for safety-related activities, but is deferred for other areas, resulting in additional corrective maintenance activities.

Level of Service C (fair)
This is a fair maintenance service level in which the roadway, bridges and associated features are in fair condition. Very few deficiencies are present in safety related activities, but moderate deficiencies exist for investment protection and significant aesthetic related deficiencies. Preventive maintenance is deferred for many activities except safety-related work. Corrective maintenance is routinely practiced for all activities. A backlog of deficiencies begins to build up that will have to be dealt with eventually, at a higher cost. Some roadway structural problems begin to appear due to long-term deterioration of the system.

Level of Service D (poor)
This is a low maintenance service level in which the roadway, bridges and associated features are kept in generally poor condition. Moderate deficiencies are present in safety-related activities, and significant deficiencies for all other activities. Very little preventive maintenance is accomplished; maintenance becomes very reactionary and places emphasis on correcting problems as they occur. A backlog of deficiencies will build up. Safety problems begin to appear that increase risk and liability, and significant structural deficiencies exist that accelerate the long-term deterioration of the system. The overall appearance of the system is poor.

Level of Service F (worst)
This is a very low service level in which the roadway, bridges and associated features are kept in poor and failing condition. Significant deficiencies are present in all maintenance activities. The overall appearance is not aesthetically pleasing. Preventive maintenance is not practiced for any maintenance activities. Maintenance is completely reactive and places emphasis on correcting problems as they occur. Significant backlogs of maintenance deficiencies exist. Excessive safety problems occur.

Minimum Acceptable Levels of Service

In order to establish the five levels of service previously described and relate them to performance standards and condition ratings, the Department conducted extensive research into condition assessment methods in other State DOT's. The Department also conducted a work session attended by representatives from each of the 14 Divisions to provide input based on their knowledge of the highway system and its maintenance condition. Baselining what other State DOT's have done along with input from the professional staff, realistic levels of service were established for each maintenance feature.

Based on the definition of these five levels, it would be desirable for the entire highway system to be maintained at Level of Service "A". However, due to fiscal constraints and funding limitations, it would be impractical, if not impossible, to achieve this level of service for all highways. On the other hand, there are valid reasons for some of the features to be maintained at a high level of service; especially those features associated with safety such as median guardrails. Other features such as pavements, pavement striping, low shoulders and raised pavement markers affect safety as well. The lower the level of service of these features, the poorer the condition, and the greater the potential for vehicle damage and accidents. In order to provide the traveling public with a safe and uniformly maintained highway system, the cost estimates itemized in this report reflect achieving at least a "C" Level of Service. However, some of the cost estimates reflect a higher level of service due to safety considerations.

C – ROUTINE MAINTENANCE

Routine maintenance may be described as those work activities that are performed on a recurring basis to provide the traveling public with a safe and reliable highway facility. However, before the first dollar can be allocated to satisfy Routine Maintenance Activities, several million maintenance dollars are set aside each year to fund specific statewide programs. Some of these programs are mandated while others are allocated by choice. Examples of these programs include: historical markers, state park road maintenance, railroad signal maintenance, weigh station maintenance, maintenance and technical training, major events, rest area restorations, and emergency work. Historically, the cost of these statewide programs has grown at the rate of about 3% per year with next year's funding needs estimated at approximately $ 7.9 million. Once these program needs are satisfied, the remaining dollars are allocated to fund routine maintenance activities. For the purposes of this report, roadway maintenance and bridge maintenance are addressed separately as follows.

C.1 – ROADWAY MAINTENANCE

Roadway maintenance consists of those work activities associated with the maintenance and upkeep of the roadway. Work activities can be subdivided into two categories: (1) Recurring Programs and (2) Performance Based Activities.

Recurring Programs

These activities consist of rest area and welcome center maintenance, roadway hazard removal, traffic signal maintenance, roadway lighting, sign lighting, municipal agreements, plant beds and unpaved roads. The overall expenditures of these programs are approximately $ 113.8 million. The cost of these activities is estimated to grow at a constant rate of approximately 5% each year.

Performance Based Activities

These activities consist of maintenance to pavements, shoulders and ditches, drainage, mowing, litter, guardrail, signs, pavement markings, vegetation, etc. A detailed survey was conducted through the Maintenance Condition Survey and the Pavement Condition Survey to assess the condition of these roadway features. They were categorized into six (6) major elements of the roadway: pavement, shoulders and ditches, drainage, roadside, traffic control devices, and environmental. The following photographs illustrate some of the features recorded during the survey.

Pavement

Shoulders and Ditches

Drainage

Roadside

Traffic Control Devices

Environmental

The pavement evaluation was based on the recently completed Pavement Condition Survey. The survey uses the complete roadway length, not a statistical sample. This report also includes updated treatments and costs associated with pavement preservation activities. Pavement Preservation Activities are recommended earlier in the pavement life, "keeping good roads in good condition". Treatments for pavements in poor condition now include rehabilitation methods such as milling and deeper overlays. These treatments increase the overall resurfacing cost, but they provide much needed pavement strengthening.

For the remaining elements, an evaluation was made by gathering data as part of the Maintenance Condition Survey. For each of the four highway systems (Interstate, Primary, Urban, and Secondary), a statistical sampling was made to determine the location of sites to be surveyed. For this year's survey, data was collected to project the highway condition to the division-level, whereas past surveys have only projected condition on a statewide level. Projecting highway condition to the division-level meant that approximately 11,000 sites would have to be sampled. These sites were randomly selected and survey teams assessed the condition of these 0.2-mile sections for the features shown on the next page in Table 1. The deficient conditions were recorded and summarized, and a maintenance condition rating calculated. From this assessment, the necessary maintenance activities to achieve the various levels of service were determined along with their estimated costs. It should be noted that the survey was conducted to a division-level and the results cannot be applied to a county or district area. For the purposes of this report, the data has been rolled up to a statewide-level and does not include individual division conditions.

Feature	Threshold Condition
Pavement	
Cracking	Cracks ≥ 1/8 inch wide
Rutting	Ruts ≥ 1/4 inch deep
Raveling	Loss of aggregate, pitting, or binder wearing away
Bleeding	Bleeding ≥ 10% of the section
Ride Quality	Uneven ride, tire noise, cannot maintain speed
Unpaved Shoulders and Ditches	
Low Shoulder	Low ≥ 2 inches
High Shoulder	High ≥ 1 inch
Lateral Ditches	Blocked ≥ 50% and Not Funct. as designed
Lateral Ditch Erosion	Eroded ≥ 1 ft
Drainage	
Crossline Pipe	Blocked ≥ 50%, or Damaged
Driveway Pipe	Blocked ≥ 50%, or Damaged
Curb & Gutter	Blocked ≥ 2 in x 2 ft, or Damaged
Catch Basin & Drop Inlet	Blocked ≥ 25%, Damaged, or Grate Problem
Other Drainage Features	Not Functioning as designed
Roadside	
Mowing	Average Grass Height
Brush and Tree Control	Within 15' above, 10' back of ditch/shoulder
Litter & Debris	Number of Pieces ≥ Fist-Sized
Slope	Failures ≥ 1ft wide
Guardrail	Damaged, or Not Functioning as designed
Traffic Control Devices	
Traffic Signs	Illegible, Missing or Obliterated
Pavement Striping	Worn, Missing or Obliterated
Words and Symbols	Damaged or Missing
Pavement Markers	Worn, Missing or Obliterated
Environmental	
Turf Condition	Bare, Dead, Diseased, Distressed or Weedy
Misc. Vegetation Management	Uncontrolled Growth at Signs or Guardrail

Table 1 – Maintenance Features and Threshold Conditions

Survey Findings

The results of the surveys have been summarized in accordance with the previously defined service level descriptions on pages 12 and 13. Figures 6, 7, 8, and 9 illustrate the average statewide level of service by maintenance activity on the Interstate, Primary, Urban, and Secondary systems.

These figures indicate that some activities are being maintained at an acceptable level of service or higher, while many activities are being maintained at a poor “D” or unacceptable “F” level of service due to a lack of funds. In order to bring those poor and unacceptable maintenance activities up to an acceptable condition, additional funding is needed. In addition, as was previously mentioned, some features must be maintained at a high level of service due to safety concerns and considerations. The five levels of service for each feature along with their associated cost are listed in Appendix B and C. Table 2, on page 23, is a summary of the estimated cost to achieve the acceptable level of service. As can be seen in this table, $ 379.9 million is the estimated cost to fund routine road maintenance at the minimum acceptable level of service for the performance based activities.

Statewide Average - Interstate System

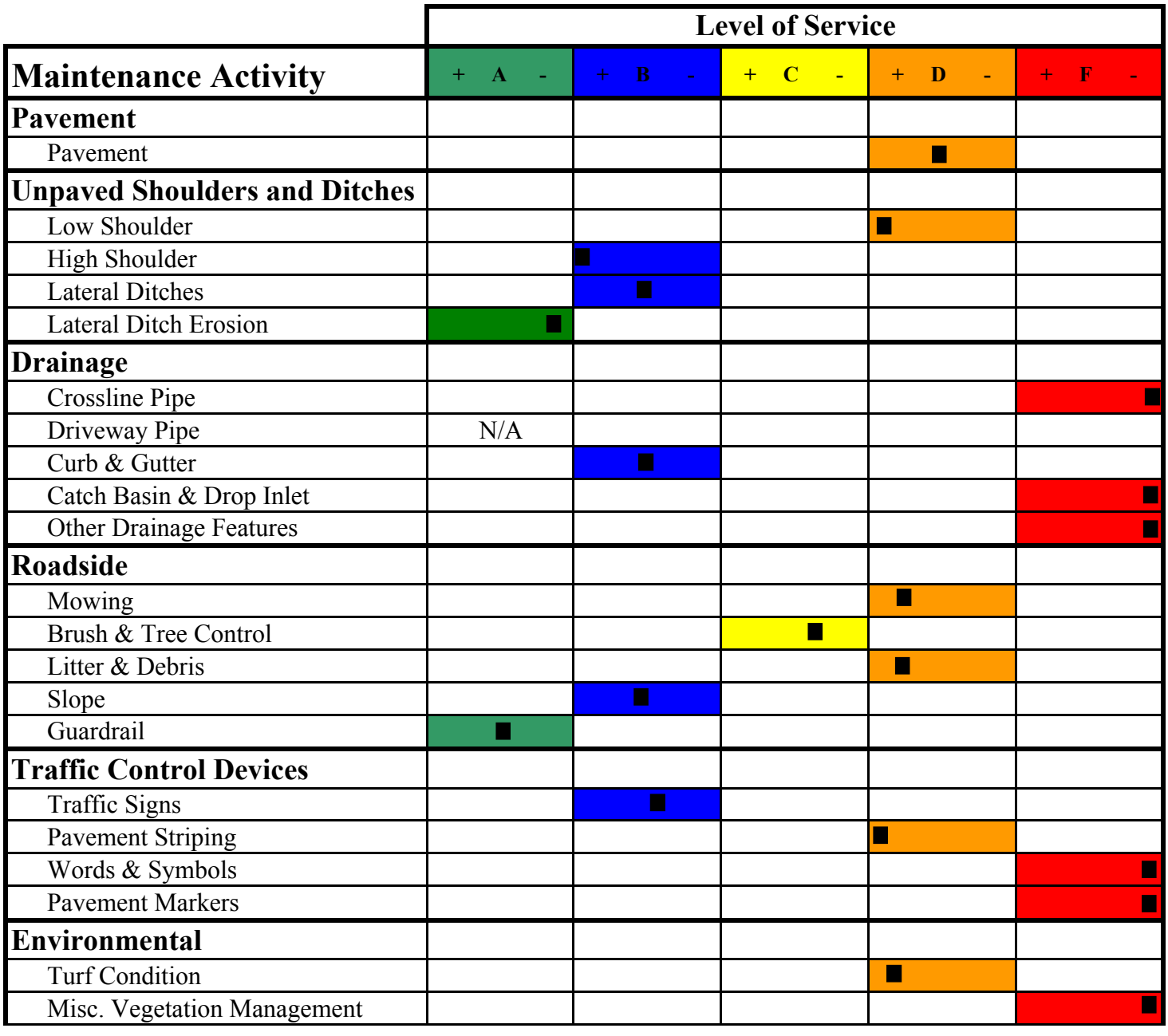

Figure 6

Statewide Average - Primary System

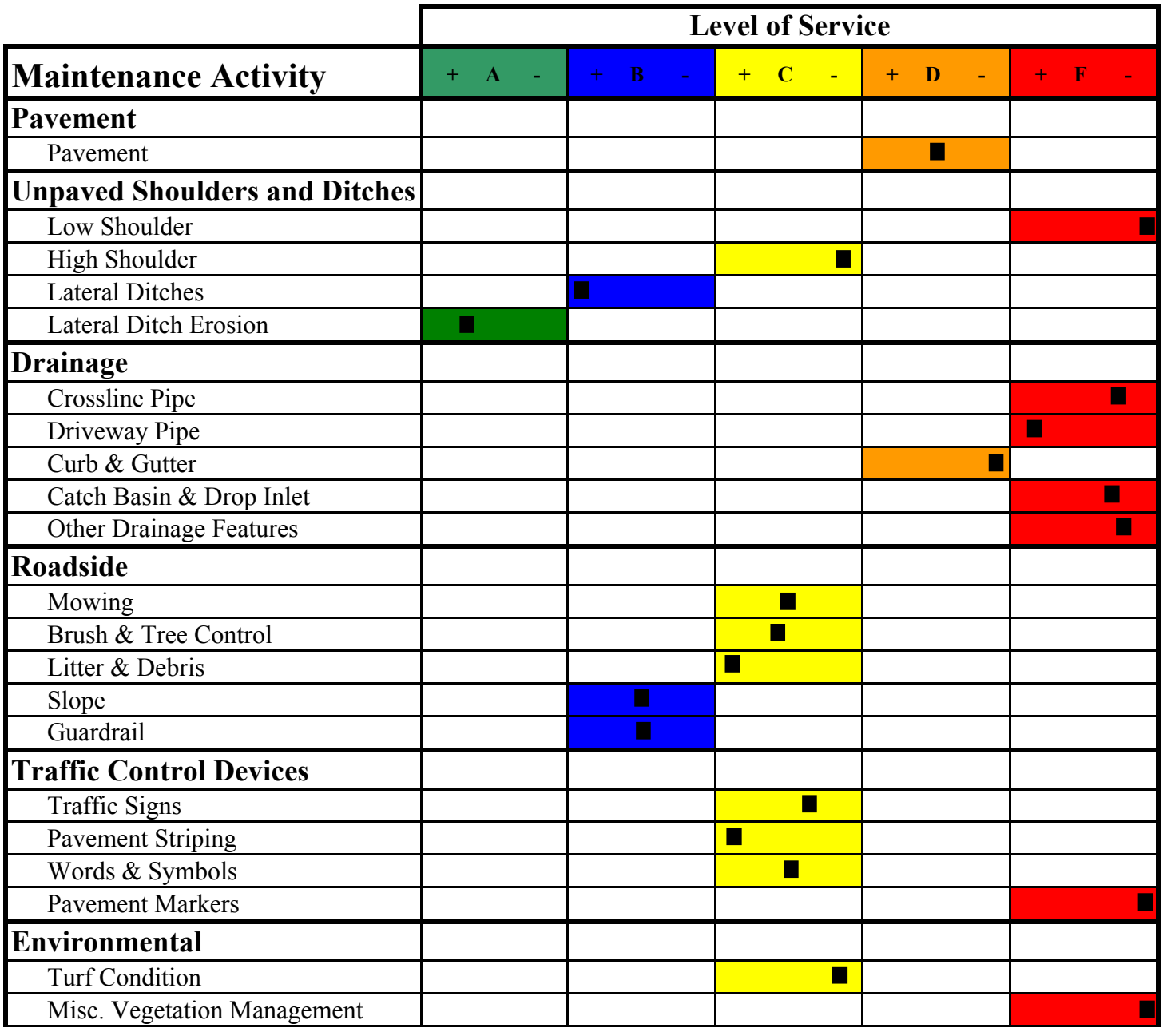

Figure 7

Statewide Average - Urban System

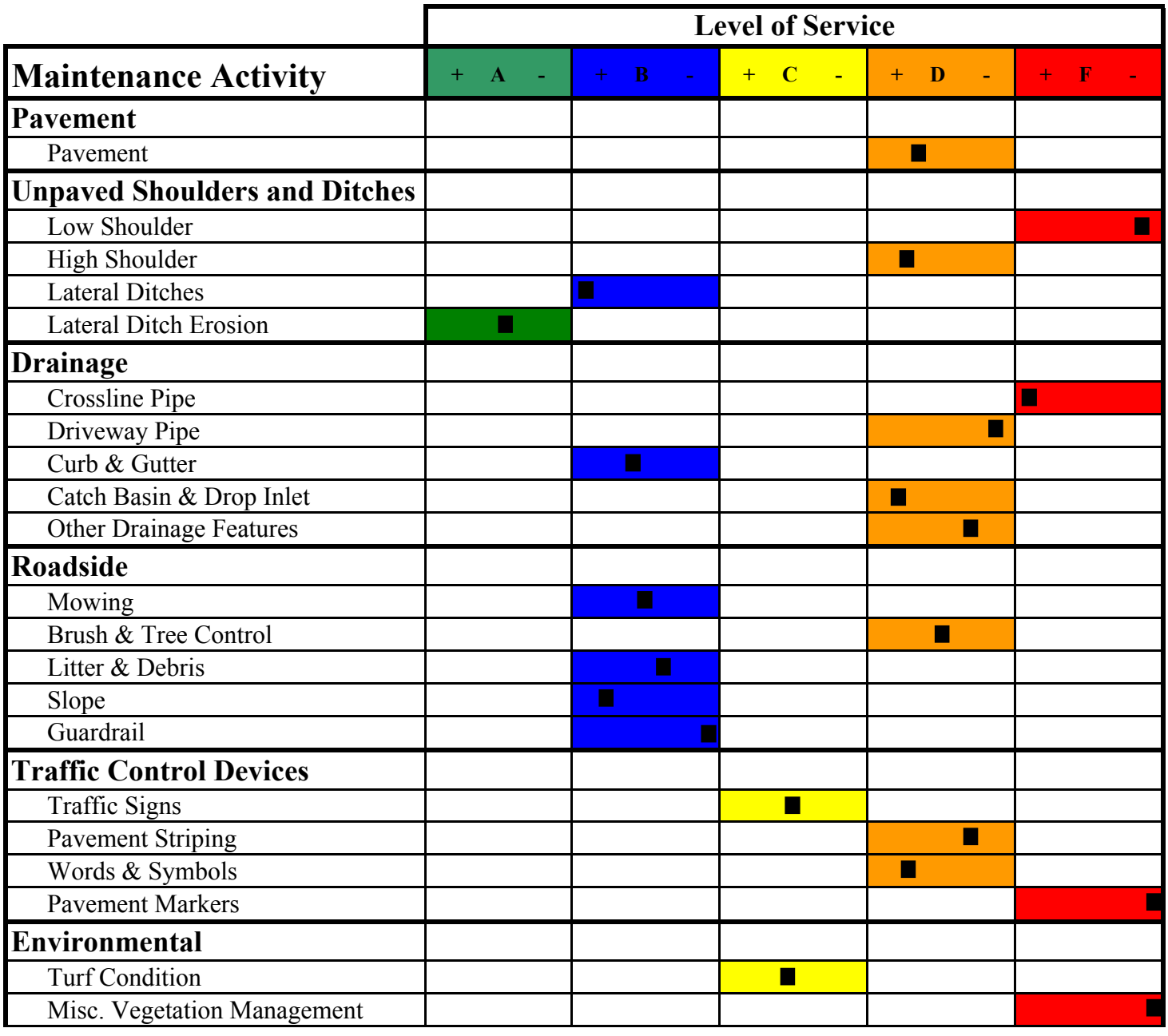

Figure 8

Statewide Average - Secondary System

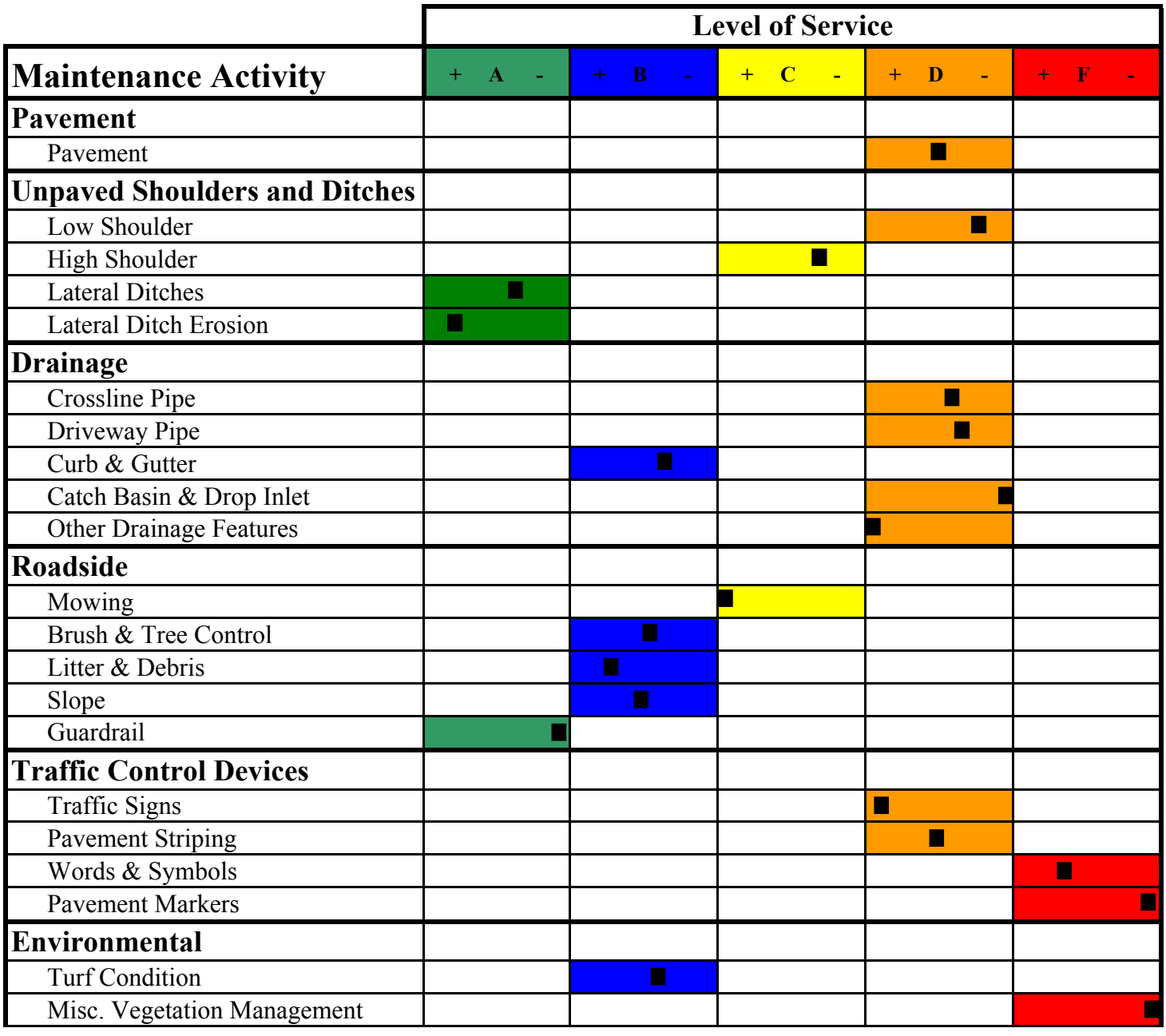

Figure 9

Road Maintenance Funding Needs for Acceptable Level of Service - Performance Based Activities

(all figures in million dollars)

Maintenance Activity	Interstate	Primary	Urban	Secondary	Total
Pavement Maintenance					
Pavement	$ 2.91	$ 35.46	$ 22.95	$ 110.17	$ 171.49
Subtotal	$ 2.91	$ 35.46	$ 22.95	$ 110.17	$ 171.49
Shoulders & Ditches					
Low Shoulder	$ 0.34	$ 6.06	$ 1.47	$ 12.71	$ 20.59
High Shoulder	$ 0.08	$ 2.80	$ 0.66	$ 5.84	$ 9.38
Lateral Ditches	$ 0.09	$ 2.20	$ 0.37	$ 4.86	$ 7.52
Lateral Ditch Erosion	$ 0.04	$ 0.97	$ 0.18	$ 3.09	$ 4.28
Subtotal	$ 0.56	$ 12.03	$ 2.68	$ 26.49	$ 41.76
Drainage					
Crossline Pipe	$ 0.35	$ 3.12	$ 1.69	$ 11.74	$ 16.89
Driveway Pipe	$ -	$ 1.93	$ 0.63	$ 7.13	$ 9.69
Curb & Gutter	$ 0.18	$ 0.51	$ 0.49	$ 1.17	$ 2.35
Catch Basins & Drop Inlets	$ 0.49	$ 0.79	$ 0.82	$ 1.23	$ 3.33
Other Drainage Features	$ 1.38	$ 1.22	$ 0.85	$ 1.15	$ 4.61
Subtotal	$ 2.39	$ 7.57	$ 4.49	$ 22.42	$ 36.87
Roadside					
Mowing	$ 1.13	$ 4.66	$ 0.78	$ 12.23	$ 18.80
Brush & Tree Control	$ 1.31	$ 7.32	$ 1.56	$ 11.02	$ 21.22
Litter & Debris	$ 2.72	$ 10.96	$ 2.83	$ 1.78	$ 18.29
Slope Failures	$ 0.16	$ 1.52	$ 0.32	$ 0.79	$ 2.79
Guardrail	$ 2.23	$ 7.85	$ 3.00	$ 0.17	$ 13.26
Subtotal	$ 7.55	$ 32.31	$ 8.49	$ 26.00	$ 74.35
Traffic Control Devices					
Traffic Signs	$ 1.45	$ 6.45	$ 1.98	$ 8.71	$ 18.59
Pavement Striping	$ 0.55	$ 1.63	$ 2.44	$ 12.88	$ 17.50
Words & Symbols	$ 0.05	$ 0.79	$ 1.41	$ 1.10	$ 3.35
Pavement Markers	$ 0.12	$ 2.30	$ 2.25	$ 3.37	$ 8.05
Subtotal	$ 2.17	$ 11.17	$ 8.08	$ 26.07	$ 47.49
Environmental					
Turf Condition	$ 0.93	$ 1.66	$ 0.04	$ 0.19	$ 2.82
Misc. Vegetation Management	$ 1.09	$ 2.47	$ 0.76	$ 0.81	$ 5.14
Subtotal	$ 2.03	$ 4.13	$ 0.80	$ 1.00	$ 7.95
Total	$ 17.60	$ 102.67	$ 47.49	$ 212.15	$ 379.91

Table 2

C.2 – BRIDGE MAINTENANCE

Bridge maintenance consists of those work activities associated with the maintenance and upkeep of bridges, structures, and large culverts. Like road maintenance work activities, these can be subdivided into two categories: (1) Recurring Programs, and (2) Performance Based Activities.

Recurring Programs

These activities consist of drawbridge maintenance, small bridge replacements, large culvert installation and maintenance, and scour/slope protection. The annual expenditures for these programs is approximately $ 20.1 million.

Performance Based Activities

These activities consist of maintenance and repairs to bridge items such as timber and steel handrails, timber, concrete and steel decks, expansion joints, steel and concrete beams, support piles, and footings. A detailed analysis of these elements is made through the Bridge Condition Survey. In accordance with this survey, inspections are conducted to assess the condition of the state highway system bridges for five major elements: railings, decks, expansion joints, superstructure, and substructure. The photographs on the next page illustrate some of the conditions observed during the survey.

Every bridge in the state is inspected in detail once every two years. Survey teams assess the condition of the elements for each bridge. Element conditions are then determined for each bridge and summarized into a statewide Bridge Condition rating. In addition, the survey teams determine the quantity and type of repair needed. This information is used to calculate the statewide bridge maintenance needs.

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Railings

Decks

Expansion Joints

Superstructures

Substructures

Survey Findings

The Bridge Condition Survey identifies levels of service for each element and summarizes them into five levels of service, LOS A through LOS F. Figure 10, shown on the next page, illustrates the average statewide condition of North Carolina structures. In addition to the level of service for each feature or characteristic, the average for each element is also shown.

Statewide Average - Bridges

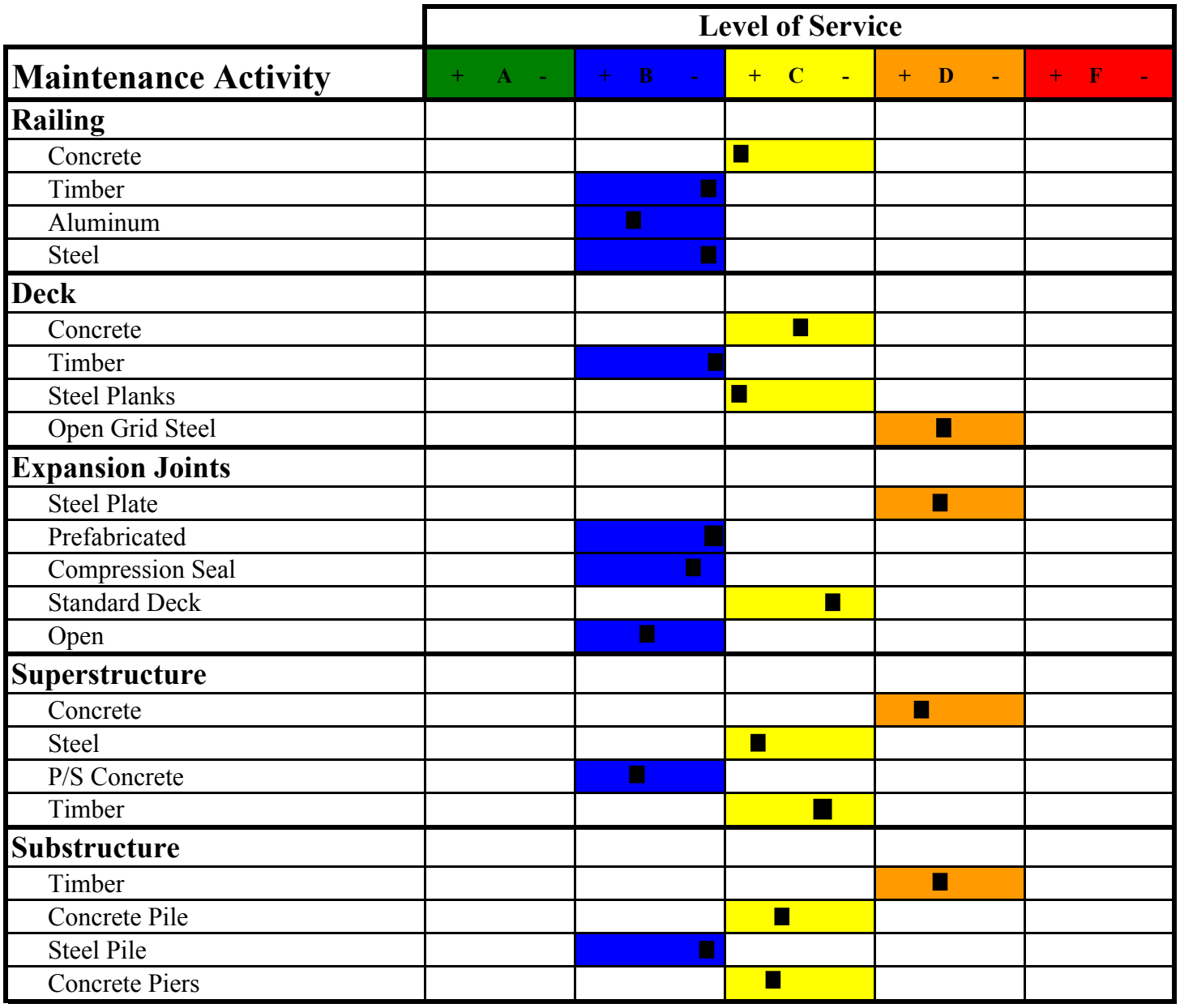

Figure 10

Figure 10 indicates that some activities are being maintained at an acceptable level (LOS B). However, many activities are being maintained at an unacceptable level. In order to bring those poor activities up to an acceptable condition, additional funding is needed. The five levels of service for each feature along with their associated costs are listed in Appendix D and E. Table 3, on the next page, is a summary of the estimated cost to achieve an acceptable level of service. As can be seen in the table, $ 23.8 million is the estimated cost to fund routine bridge maintenance at an acceptable level of service for the performance based activities.

Federal-Aid Preventative Maintenance Program

Included in the Transportation Improvement Program is a project to address Preventative Maintenance and Safety Issues at selected bridge sites statewide on the Federal-Aid Primary Highway System. This program will earmark approximately $ 2 million each year to address some of the bridge needs identified in this report. These needs include such items as deck and joint repair, joint sealing, bridge painting and bridge bearing preventative maintenance. This work has been reflected in the total estimated Highway Maintenance needs listed in Appendix G.

Bridge Maintenance Funding Needs for Acceptable Level of Service – Performance Based Activities

Maintenance Activity	Total Funds Needed
Railing	
Concrete	$ 739,524
Timber	$ 19,514
Aluminum	$ 3,218
Steel	$ 32,066
Subtotal	$ 794,321
Deck	
Concrete	$ 7,736,925
Timber	$ 664,243
Steel Planks	$ 90,835
Open Grid Steel	$ 10,812
Subtotal	$ 8,502,816
Expansion Joints	
Steel Plate	$ 55,413
Prefabricated	$ 102,310
Compression Seal	$ 21,150
Standard Deck	$ 1,944,585
Subtotal	$ 2,123,458
Superstructure	
Concrete	$ 1,709413
Steel	$ 1,378,809
P/S Concrete	$ 124,539
Timber	$ 590,288
Subtotal	$ 3,803,049
Substructure	
Timber	$ 5,183,857
Concrete Pile	$ 616,293
Steel Pile	$ 61,435
Concrete Piers	$ 2,736,082
Subtotal	$ 8,597,668
Total	$ 23,821,313

Table 3

D – CONTRACT RESURFACING

The Contract Resurfacing Program provides funding for the resurfacing of the paved road system with hot mixed asphalt. In order to preserve the integrity of the pavement structure and to provide a smooth riding surface, it is necessary to resurface paved roads on a regular frequency. Many national studies of pavements and their performance lives indicate that pavements generally deteriorate at a slow rate in the very first years of their life. However, when pavements reach a certain age, they deteriorate at an accelerated pace. Failure to resurface a pavement before it begins a sharp downward trend will result in higher repair costs in maintenance, patching and eventually, if deferred too long, in reconstruction. Furthermore, the rapid growth this state has experienced has placed an additional strain on our highway pavements. Not only are there more cars and trucks traveling our highways, the trucks tend to have heavier payloads, which accelerates the deterioration of the pavements.

In accordance with North Carolina General Statute 136-44.3, the Department has estimated the annual cost of resurfacing based upon cycle lengths of 12 years for the Primary system and 15 years for the Urban and Secondary systems. However, past experience in North Carolina as well as in other states, has shown that it is more cost effective to utilize a combination of asphalt overlays and other preventive maintenance treatments such as chip seals and slurry seals to extend pavement life and performance. The timing and selection of treatments are largely dependant on traffic and environmental influences and are best determined through the analysis of data collected from routine pavement condition surveys as compared to a purely cyclical approach.

In accordance with the previous discussion on Level of Service from pages 12 and 13 of this report, five different levels of service have been determined based on resurfacing frequency. Table 4 as shown on the next page indicates these five levels along with estimated costs for each resurfacing frequency. Asphalt resurfacing deals with the functional aspects of the road; it improves ride quality and provides a new wearing surface for an aged or environmentally cracked surface. The treatments in Table 4 consist of resurfacing with either 1.5” for primary and urban routes or 1.0” for secondary routes. Table

4 shows that the funding required to maintain all three systems at the "C" level is $248.6 million per year. Funding below this level will result in a backlog of pavement needs in one or more systems.

It should be noted that the funding identified in this section does not include any contract resurfacing or rehabilitation needs for the Interstate System. It is anticipated the Transportation Improvement Program will address these needs.

System		Level of Service				
		A	B	C	D	F
Primary	Years	10	11	12	14	> 14
	Millions	$93.9	$85.4	$78.1	$67.1	< $67.1
Secondary	Years	12	13	15	17	> 17
	Millions	$162.7	$150.2	$130.	$114.9	< $114.9
Urban	Years	12	13	15	17	> 17
	Millions	$50.3	$48.2	$40.3	$36.8	< $36.8
Total	**Millions**	**$307.0**	**$283.8**	**$248.6**	**$218.8**	**< $218.8**

Table 4 - Resurfacing Level of Service

In conjunction with the Contract Resurfacing Program, the Department has expanded its preventive maintenance treatment program by using chip seals, slurry seals and micro-surfacing. When applied at the right time, these low-cost treatments help keep good roads in good condition and retard the deterioration caused by weather, traffic and the environmental factors. These treatments typically have a life span of about 7-9 years and cost approximately one-third of what a hot mixed asphalt surface would cost. These treatments can be utilized effectively on most state system highways to extend the service life and get the maximum performance out of our asphalt pavements. While not especially suited for high volume roadways, more than 71,000 miles of the system would benefit from these types of preventive maintenance treatments at an annual cost of about $ 81.1 million at a Level of Service B as shown in Table 5. By definition, Level of Service B provides for an emphasis on preventive maintenance.

Level of Service					
	A	**B**	**C**	**D**	**F**
System	6 Years	7 Years	8 Years	9 Years	> 9 Years
Primary	$ 10.4	$ 9.7	$ 9.1	$ 8.6	< $8.6
Secondary	$ 69.2	$ 63.6	$ 58.8	$ 54.7	< $54.7
Urban	$ 8.4	$ 7.8	$ 7.3	$ 6.9	< $6.9
Total	**$ 88.0**	**$ 81.1**	**$ 75.2**	**$ 70.2**	**< $70.2**

Table 5 – Retreatment Level of Service

While the cyclical approach of resurfacing on a 12 and 15 year frequency provides a simplistic method to calculate funding needs, it is not a realistic view of how roads are actually treated. Nationally, pavement experts recommend that pavement should be treated with a blend of plant mix resurfacing and surface treatments. (Treatments may also include patching and milling.) A more strategic approach would be to incorporate surface treatments in conjunction with the plant mix resurfacing cycles.

The 2001 session of the North Carolina General Assembly made additional funding available for primary route pavement preservation using cash balances that have accrued in the Highway Trust Fund. Senate Bill 1005 allowed the Department to utilize $ 423 million over a three-year period to strengthen and resurface approximately 1,500 miles of major US and NC routes across the state. These projects were aimed at correcting weak pavements at locations where vehicle loading levels have increased to the point where more asphalt thickness is required to provide a sound pavement. Resurfacing a roadway that is structurally deficient is a stopgap measure and is not cost effective in the long term. It is equivalent to painting over rotten wood. The corrective treatments for these projects are designed specifically for each section of road based on its structural capacity, condition and expected traffic loadings. They have generally required extensive milling and placement of multiple layers of asphalt to provide the strength necessary to restore the structural integrity of the road and carry the anticipated vehicular loads. In addition, guardrail, drainage improvements, signing and shoulder construction was included where needed to conform to current design

requirements. It is anticipated that this initiative combined with adequate contract resurfacing funding will eliminate the backlog of resurfacing needs on the primary system. And since the right treatment is being applied, these pavements will remain at a high level of service over the long term. With recurring funding provided at the levels indicated in previous Tables 4 and 5, the Department will be in a position to sustain these good pavement conditions through the implementation of a pavement preservation strategy. This strategy will reduce maintenance costs for patching and pavement repairs as well as road user costs, resulting in a long-term savings ratio of at least 4:1 when compared to allowing pavements to deteriorate to poor condition where significant repairs or rehabilitation is required. The total funding needed for resurfacing and pavement preventive maintenance is $ 329.7 million.

E – TRAFFIC SYSTEMS MAINTENANCE

In July 2000, the Department began a comprehensive study of its operation and maintenance of the more than 8,000 traffic signals across North Carolina. As a part of this initiative, a course of action was prepared similar to the other Performance Based activities in this report with the expected outcome to determine the cost to operate and maintain the various traffic signal systems at a "Good" level of service.

The Department has a variety of different types of traffic signal systems to maintain. These systems include: 1) timed-based signals systems, 2) traffic responsive "closed loop" systems where several signals "talk" to each other, and 3) large municipal integrated coordinated traffic systems throughout a city's core area.

The benefits of maintaining traffic signal systems at a good level of service are increased safety, reduction in the amount of time waiting for the light to change, reduction in fuel consumption, improvement in air quality, and lastly, it makes good business sense to keep things operating efficiently.

The funding for the needs identified in this study have been shared between highway maintenance funds and Federal dollars. The highway maintenance funding level has been fixed at $ 5.5 million each year for the next several years. The Federal Aid funding for this coming fiscal year is $ 16.5 million and will grow to about $ 24.5 million in Fiscal Year 2011. This funding amount will help to achieve a "C" Level of Service for traffic signal systems.

F – BACKLOG

Most people will agree that backlog is the accumulation of unfinished work. For the State Highway System, the existence of a backlog may be attributed to the continual under-funding of maintenance programs over time. Adequate funding of a maintenance program where a backlog already exists will not reduce the backlog; it will only stop its growth. Conversely, eliminating the backlog along with adequately funding maintenance will prevent the growth of any backlog. Over the last several years, maintenance funding has not kept up with the need; therefore, the maintenance condition of our highways has suffered and a backlog of work has developed. The extent and effect of this "backlog" figure is real and continues to eat away at maintenance dollars. Previous reports have attempted to address backlog; however, adequate funding was not provided. While the Department was addressing backlog reduction in one area, it was growing in another. Based on lessons learned from the past and on the information from our surveys, the first step should be the adequate funding of maintenance at the level previously identified in the report in order to stop the growth of backlog. Once backlog growth has been stopped, then and only then can it be reduced. Based on our surveys, it is estimated that the value of the highway maintenance backlog is $ 235.0 million and that of contract resurfacing is $ 223.8 million. Obviously, these costs are too large to be funded or effectively expended in any one year; therefore one strategy might be to amortize these costs over a period of time. A strategy of spreading the cost of the maintenance backlog and the contract resurfacing backlog over a 10-year period is shown in Appendix F.

G – SUMMARY AND CONCLUSIONS

Throughout this report, the annual maintenance and resurfacing needs have been identified and described. These activities make up the Department's road and bridge maintenance operations. As required by G.S. 136-44.3, this report documents the efforts of the Department of Transportation to provide the Joint Legislative Transportation Oversight Committee with an accurate analysis of the condition of the State Highway System and the funding levels needed to provide a minimum acceptable level of service. The completion of new and wider freeways along with the paving of approximately 500-600 miles of Secondary Roads a year places an additional burden on the maintenance budget. Each year, the funding of some popular programs and maintenance activities are in danger of being scaled back or eliminated due to funding constraints. Activities such as the Raised Pavement Marker Program, Vegetation Management Program, Litter and Debris removal, etc. are the first to be reduced when faced with a funding shortfall. In times of tight fiscal constraints, any program or activity that can be reduced or eliminated without seriously jeopardizing safety will be considered.

In order to provide for the continual maintenance of the highway system in an acceptable condition and catch-up on the maintenance and resurfacing backlogs, adequate funding levels must be provided. The chart below summarizes the funding levels needed to provide a minimum acceptable level of service as required by G.S. 136-44.3.

Category	Funding Needs
Annual Routine Maintenance	$ 626.6 million
Annual Resurfacing	$ 248.6 million
Backlog of Routine Maintenance (10%/yr)	$ 28.7 million
Backlog of Resurfacing (10%/yr)	$ 22.4 million
Disasters & Emergencies	$ 30.0 million
TOTAL NEEDS	$ 956.3 million

Based on this funding level, the Department would propose to develop a statewide annual maintenance funding plan similar to that shown in Appendix G. This plan would not only allow the establishment of a sound maintenance program that would provide an acceptable level of service, but would also address the backlog which continues to chip away at the condition of the highway system.

APPENDIX INDEX

Paved Lane Miles

	Lane Miles				Cumulative Total	
	Primary	Secondary	Urban	Total	Mileage	Percent
Year		Paved				
1989	28,379	86,023	13,407	127,809		
1990	28,305	86,842	13,812	128,959	1,150	0.9%
1991	28,451	88,973	15,988	133,412	5,603	4.4%
1992	28,440	91,935	16,918	137,293	9,484	7.4%
1993	28,457	93,278	17,089	138,824	11,015	8.6%
1994	28,632	94,631	17,790	141,053	13,244	10.4%
1995	28,760	96,249	18,013	143,022	15,213	11.9%
1996	28,845	97,273	18,585	144,703	16,894	13.2%
1997	28,915	98,774	19,079	146,768	18,959	14.8%
1998	28,986	101,835	19,785	150,606	22,797	17.8%
1999	28,915	103,185	20,157	152,257	24,448	19.1%
2000	29,366	104,701	20,293	154,360	26,551	20.8%
2001	29,506	105,742	20,712	155,960	28,151	22.0%
2002	29,506	105,742	20,712	155,960	28,151	22.0%
2003	29,281	107,282	22,029	158,592	30,783	24.1%

Bridge Deck Area

	Total	Bridge Deck Area	Cumulative Change	
Year	Bridges	(Square Feet)	Square Feet	Percent
1989	16,900	61,096,212		
1990	16,902	61,442,948	346,736	0.6%
1991	16,927	62,267,231	1,171,019	1.9%
1992	16,958	62,323,862	1,227,650	2.0%
1993	17,019	63,184,966	2,088,754	3.4%
1994	17,059	64,749,783	3,653,571	6.0%
1995	17,089	66,179,519	5,083,307	8.3%
1996	17,088	66,892,675	5,796,463	9.5%
1997	17,077	67,794,862	6,698,650	11.0%
1998	17,145	68,829,594	7,733,382	12.7%
1999	17,263	69,679,605	8,583,393	14.0%
2000	17,410	71,298,167	10,201,955	16.7%
2001	17,463	72,290,160	11,193,948	18.3%
2002	17,664	75,342,236	14,246,024	23.3%
2003	17,756	78,720,488	17,624,276	28.8%

ROAD MAINTENANCE PERFORMANCE MEASURES - Interstate

ELEMENT 1			Service Level					Acceptable Level of Service
Roadway Pavement			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Pavement Maintenance	Pavement Condition Rating	PCR	98	93	86	70	< 70	B

ELEMENT 2			Service Level					Acceptable Level of Service
Unpaved Shoulders and Ditches			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Low Shoulder	Low ≥ 2 inches	FT	2%	4%	7%	10%	> 10%	B
High Shoulder	High ≥ 1 inch	FT	2%	4%	7%	10%	> 10%	B
Lateral Ditches	Blocked ≥ 50% & not funct. as designed	FT	2%	6%	9%	12%	> 12%	B
Lateral Ditch Erosion	Eroded ≥ 1 ft	FT	1%	2%	3%	4%	> 4%	B

ELEMENT 3			Service Level					Acceptable Level of Service
Drainage			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Crossline Pipe	Blocked ≥ 50% , or Damaged	EA	1%	3%	4%	6%	> 6%	B
Driveway Pipe	Blocked ≥ 50% , or Damaged	EA	n/a	n/a	n/a	n/a	n/a	n/a
Curb & Gutter	Blocked ≥ 2 in x 2 ft, or Damaged	FT	2%	5%	7%	10%	> 10%	B
Catch Basin & Drop Inlet	Blocked ≥ 25% , Damaged, or Grate Problem	EA	2%	5%	8%	11%	> 11%	B
Other Drainage Features	Not Functioning as designed	EA	2%	5%	8%	12%	> 12%	B

ROAD MAINTENANCE PERFORMANCE MEASURES - Interstate

ELEMENT 4			Service Level					Acceptable Level of Service
Roadside			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Mowing	Average Grass Height	IN	6	8	10	14	> 14	C
Brush & Tree Control	Within 15' above, 10' back of ditch/shoulder	FT	2%	7%	12%	17%	> 17%	C
Litter & Debris	Number of Pieces ≥ Fist-Sized	PCS	25	56	100	190	> 190	C
Slope	Failures ≥ 1 ft wide	FT	1%	2%	4%	6%	> 6%	B
Guardrail	Damaged, or Not Functioning as designed	FT	1%	2%	4%	6%	> 6%	A

ELEMENT 5			Service Level					Acceptable Level of Service
Traffic Control Devices			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Traffic Signs	Illegible, Missing, or Obliterated	EA	1%	3%	5%	7%	> 7%	B
Pavement Striping	Worn, Missing, or Obliterated	FT	2%	4%	7%	10%	> 10%	B
Words & Symbols	Worn, Missing, or Obliterated	EA	1%	2%	3%	4%	> 4%	B
Pavement Markers	Damaged or Missing	EA	2%	5%	8%	13%	> 13%	B

ELEMENT 6			Service Level					Acceptable Level of Service
Environmental			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Turf Condition	Bare, Dead, Diseased, Distressed, or Weedy	FT	2%	6%	10%	14%	> 14%	C
Misc. Vegetation Mgmt.	Uncontrolled Growth at Signs or Guardrail	FT	5%	10%	15%	20%	> 20%	C

ROAD MAINTENANCE PERFORMANCE MEASURES - Primary

ELEMENT 1			Service Level					Acceptable Level of Service
Roadway Pavement			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Pavement Maintenance	Pavement Condition Rating	PCR	98	93	86	70	< 70	C

ELEMENT 2			Service Level					Acceptable Level of Service
Unpaved Shoulders and Ditches			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Low Shoulder	Low ≥ 2 inches	FT	1%	5%	8%	11%	> 11%	C
High Shoulder	High ≥ 1 inch	FT	1%	4%	6%	10%	> 10%	C
Lateral Ditches	Blocked ≥ 50% & not funct. as designed	FT	2%	6%	9%	12%	> 12%	C
Lateral Ditch Erosion	Eroded ≥ 1 ft	FT	1%	2%	3%	4%	> 4%	A

ELEMENT 3			Service Level					Acceptable Level of Service
Drainage			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Crossline Pipe	Blocked ≥ 50% , or Damaged	EA	2%	7%	11%	15%	> 15%	C
Driveway Pipe	Blocked ≥ 50% , or Damaged	EA	10%	15%	25%	35%	> 35%	C
Curb & Gutter	Blocked ≥ 2 in x 2 ft, or Damaged	FT	2%	5%	7%	11%	> 11%	C
Catch Basin & Drop Inlet	Blocked ≥ 25% , Damaged, or Grate Problem	EA	2%	5%	8%	12%	> 12%	C
Other Drainage Features	Not Functioning as designed	EA	2%	6%	9%	12%	> 12%	C

ROAD MAINTENANCE PERFORMANCE MEASURES - Primary

ELEMENT 4			Service Level					Acceptable Level of Service
Roadside			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Mowing	Average Grass Height	IN	6	8	10	14	> 14	C
Brush & Tree Control	Within 15' above, 10' back of ditch/shoulder	FT	5%	10%	15%	25%	> 25%	C
Litter & Debris	Number of Pieces ≥ Fist-Sized	PCS	30	60	120	200	> 200	C
Slope	Failures ≥ 1 ft wide	FT	1%	3%	5%	7%	> 7%	B
Guardrail	Damaged, or Not Functioning as designed	FT	1%	3%	5%	7%	> 7%	A

ELEMENT 5			Service Level					Acceptable Level of Service
Traffic Control Devices			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Traffic Signs	Illegible, Missing, or Obliterated	EA	1%	3%	6%	8%	> 8%	C
Pavement Striping	Worn, Missing, or Obliterated	FT	2%	5%	8%	11%	> 11%	C
Words & Symbols	Worn, Missing, or Obliterated	EA	1%	4%	8%	11%	> 11%	C
Pavement Markers	Damaged or Missing	EA	5%	10%	15%	20%	> 20%	B

ELEMENT 6			Service Level					Acceptable Level of Service
Environmental			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Turf Condition	Bare, Dead, Diseased, Distressed, or Weedy	FT	3%	7%	11%	15%	> 15%	C
Misc. Vegetation Mgmt.	Uncontrolled Growth at Signs or Guardrail	FT	5%	10%	15%	25%	> 25%	C

ROAD MAINTENANCE PERFORMANCE MEASURES - Secondary

ELEMENT 1			Service Level					Acceptable Level of Service
Roadway Pavement			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Pavement Maintenance	Pavement Condition Rating	PCR	98	93	86	70	< 70	C

ELEMENT 2			Service Level					Acceptable Level of Service
Unpaved Shoulders and Ditches			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Low Shoulder	Low ≥ 2 inches	FT	2%	5%	8%	11%	> 11%	C
High Shoulder	High ≥ 1 inch	FT	2%	5%	8%	11%	> 11%	C
Lateral Ditches	Blocked ≥ 50% & not funct. as designed	FT	3%	6%	8%	11%	> 11%	C
Lateral Ditch Erosion	Eroded ≥ 1 ft	FT	1%	2%	3%	4%	> 4%	C

ELEMENT 3			Service Level					Acceptable Level of Service
Drainage			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Crossline Pipe	Blocked ≥ 50% , or Damaged	EA	5%	10%	14%	22%	> 22%	C
Driveway Pipe	Blocked ≥ 50% , or Damaged	EA	10%	15%	25%	35%	> 35%	C
Curb & Gutter	Blocked ≥ 2 in x 2 ft, or Damaged	FT	2%	5%	8%	12%	> 12%	C
Catch Basin & Drop Inlet	Blocked ≥ 25% , Damaged, or Grate Problem	EA	2%	5%	10%	13%	> 13%	C
Other Drainage Features	Not Functioning as designed	EA	2%	6%	9%	12%	> 12%	C

ROAD MAINTENANCE PERFORMANCE MEASURES - Secondary

ELEMENT 4			Service Level					Acceptable Level of Service
Roadside			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Mowing	Average Grass Height	IN	6	8	10	14	> 14	C
Brush & Tree Control	Within 15' above, 10' back of ditch/shoulder	FT	10%	15%	20%	30%	> 30%	C
Litter & Debris	Number of Pieces ≥ Fist-Sized	PCS	30	60	120	200	> 200	C
Slope	Failures ≥ 1 ft wide	FT	1%	3%	5%	7%	> 7%	C
Guardrail	Damaged, or Not Functioning as designed	FT	1%	3%	5%	7%	> 7%	A

ELEMENT 5			Service Level					Acceptable Level of Service
Traffic Control Devices			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Traffic Signs	Illegible, Missing, or Obliterated	EA	3%	4%	7%	9%	> 9%	C
Pavement Striping	Worn, Missing, or Obliterated	FT	3%	6%	10%	15%	> 15%	C
Words & Symbols	Worn, Missing, or Obliterated	EA	3%	7%	11%	15%	> 15%	C
Pavement Markers	Damaged or Missing	EA	5%	10%	15%	25%	> 25%	B

ELEMENT 6			Service Level					Acceptable Level of Service
Environmental			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Turf Condition	Bare, Dead, Diseased, Distressed, or Weedy	FT	3%	8%	12%	16%	> 16%	C
Misc. Vegetation Mgmt.	Uncontrolled Growth at Signs or Guardrail	FT	10%	15%	20%	30%	> 30%	C

ROAD MAINTENANCE PERFORMANCE MEASURES - Urban

ELEMENT 1			Service Level					Acceptable Level of Service
Roadway Pavement			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Pavement Maintenance	Pavement Condition Rating	PCR	98	93	86	70	> 70	C

ELEMENT 2			Service Level					Acceptable Level of Service
Unpaved Shoulders and Ditches			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Low Shoulder	Low ≥ 2 inches	FT	1%	5%	8%	11%	> 11%	C
High Shoulder	High ≥ 1 inch	FT	1%	4%	7%	11%	> 11%	C
Lateral Ditches	Blocked ≥ 50% & not funct. as designed	FT	2%	6%	9%	12%	> 12%	C
Lateral Ditch Erosion	Eroded ≥ 1 ft	FT	1%	2%	3%	4%	> 4%	B

ELEMENT 3			Service Level					Acceptable Level of Service
Drainage			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Crossline Pipe	Blocked ≥ 50% , or Damaged	EA	2%	7%	10%	13%	> 13%	C
Driveway Pipe	Blocked ≥ 50% , or Damaged	EA	10%	15%	25%	35%	> 35%	C
Curb & Gutter	Blocked ≥ 2 in x 2 ft, or Damaged	FT	2%	5%	7%	11%	> 11%	C
Catch Basin & Drop Inlet	Blocked ≥ 25% , Damaged, or Grate Problem	EA	2%	5%	8%	12%	> 12%	C
Other Drainage Features	Not Functioning as designed	EA	2%	6%	9%	12%	> 12%	C

ROAD MAINTENANCE PERFORMANCE MEASURES - Urban

ELEMENT 4			Service Level					Acceptable Level of Service
Roadside			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Mowing	Average Grass Height	IN	6	8	10	14	> 14	C
Brush & Tree Control	Within 15' above, 10' back of ditch/shoulder	FT	5%	10%	15%	25%	> 25%	C
Litter & Debris	Number of Pieces ≥ Fist-Sized	PCS	30	60	120	200	> 200	C
Slope	Failures ≥ 1 ft wide	FT	1%	3%	5%	7%	> 7%	B
Guardrail	Damaged, or Not Functioning as designed	FT	1%	3%	5%	7%	> 7%	A

ELEMENT 5			Service Level					Acceptable Level of Service
Traffic Control Devices			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Traffic Signs	Illegible, Missing, or Obliterated	EA	1%	3%	6%	8%	> 8%	C
Pavement Striping	Worn, Missing, or Obliterated	FT	2%	5%	8%	11%	> 11%	B
Words & Symbols	Worn, Missing, or Obliterated	EA	1%	4%	8%	11%	> 11%	B
Pavement Markers	Damaged or Missing	EA	5%	10%	15%	20%	> 20%	B

ELEMENT 6			Service Level					Acceptable Level of Service
Environmental			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Turf Condition	Bare, Dead, Diseased, Distressed, or Weedy	FT	3%	7%	11%	15%	> 15%	C
Misc. Vegetation Mgmt.	Uncontrolled Growth at Signs or Guardrail	FT	5%	10%	15%	25%	> 25%	C

Road Maintenance Funding Matrix Table
Performance Based Activities

Maintenance Activity	Interstate System			
Pavements	TOTAL COST A	TOTAL COST B	TOTAL COST C	TOTAL COST D
Subtotal	$ 3,912,597	$ 2,912,597	$ 2,662,597	$ 1,912,597
Shoulders & Ditches				
Low Shoulder	$ 418,120	$ 344,520	$ 234,119	$ 217,191
High Shoulder	$ 155,603	$ 82,003	$ 60,658	$ 48,735
Lateral Ditches	$ 254,196	$ 92,522	$ 49,100	$ 5,678
Lateral Ditch Erosion	$ 39,327	$ 39,327	$ 38,402	$ 32,531
Subtotal	$ 867,246	$ 558,371	$ 382,280	$ 304,136
Drainage				
Crossline Pipe	$ 373,736	$ 345,908	$ 331,993	$ 304,165
Driveway Pipe	$ -	$ -	$ -	$ -
Curb & Gutter	$ 179,116	$ 176,772	$ 175,780	$ 174,293
Catch Basins & Drop Inlets	$ 532,038	$ 488,088	$ 444,139	$ 400,189
Other Drainage Features	$ 1,635,830	$ 1,376,753	$ 1,117,676	$ 772,239
Subtotal	$ 2,720,721	$ 2,387,521	$ 2,069,588	$ 1,650,886
Roadside				
Mowing	$ 1,539,001	$ 1,333,030	$ 1,127,058	$ 921,087
Brush & Tree Control	$ 1,358,138	$ 1,331,507	$ 1,313,451	$ 1,295,848
Litter & Debris	$ 3,624,293	$ 3,171,256	$ 2,718,220	$ 2,265,183
Slope Failure	$ 173,611	$ 158,196	$ 137,914	$ 117,631
Guardrail	$ 2,231,843	$ 2,008,334	$ 1,691,300	$ 1,374,265
Subtotal	$ 8,926,886	$ 8,002,323	$ 6,987,942	$ 5,991,618
Traffic Control Devices				
Traffic Signs	$ 1,547,310	$ 1,447,067	$ 1,412,985	$ 1,362,863
Pavement Striping	$ 819,450	$ 548,712	$ 142,606	$ 110,118
Words & Symbols	$ 54,143	$ 52,163	$ 50,183	$ 48,203
Pavement Markers	$ 148,920	$ 123,610	$ 98,300	$ 56,117
Subtotal	$ 2,569,823	$ 2,171,553	$ 1,704,074	$ 1,577,301
Environmental				
Turf Condition	$ 955,592	$ 943,878	$ 932,163	$ 928,444
Misc. Vegetation Management	$ 1,266,238	$ 1,179,806	$ 1,093,375	$ 1,006,943
Subtotal	$ 2,221,830	$ 2,123,684	$ 2,025,538	$ 1,935,387
Total	$ 21,219,102	$ 18,156,048	15,832,019	13,371,925

Road Maintenance Funding Matrix Table
Performance Based Activities

Maintenance Activity	Primary System			
Pavements	TOTAL COST A	TOTAL COST B	TOTAL COST C	TOTAL COST D
Subtotal	$ 66,250,349	$ 56,526,183	$ 35,457,154	$ 11,470,876
Shoulders & Ditches				
Low Shoulder	$ 7,948,688	$ 6,871,413	$ 6,063,457	$ 5,255,501
High Shoulder	$ 4,123,447	$ 3,315,491	$ 2,797,052	$ 2,537,833
Lateral Ditches	$ 3,017,016	$ 2,524,495	$ 2,199,040	$ 1,873,585
Lateral Ditch Erosion	$ 973,898	$ 947,048	$ 930,775	$ 914,503
Subtotal	$ 16,063,050	$ 13,658,447	$ 11,990,324	$ 10,581,421
Drainage				
Crossline Pipe	$ 3,943,945	$ 3,486,205	$ 3,120,012	$ 2,753,820
Driveway Pipe	$ 3,136,403	$ 2,735,368	$ 1,933,298	$ 1,131,228
Curb & Gutter	$ 554,044	$ 529,250	$ 512,721	$ 480,201
Catch Basins & Drop Inlets	$ 1,016,489	$ 901,718	$ 786,947	$ 633,918
Other Drainage Features	$ 2,047,026	$ 1,575,084	$ 1,221,127	$ 867,170
Subtotal	$ 10,697,907	$ 9,227,624	$ 7,574,105	$ 5,866,337
Roadside				
Mowing	$ 7,173,686	$ 5,917,535	$ 4,661,384	$ 3,405,233
Brush & Tree Control	$ 7,594,950	$ 7,410,303	$ 7,322,042	$ 7,089,202
Litter & Debris	$ 16,438,928	$ 13,699,106	$ 10,959,285	$ 8,219,464
Slope Failure	$ 1,720,135	$ 1,519,065	$ 1,417,257	$ 1,315,450
Guardrail	$ 7,847,225	$ 6,618,864	$ 6,235,001	$ 5,851,138
Subtotal	$ 40,774,924	$ 35,164,873	$ 30,594,969	$ 30,109,299
Traffic Control Devices				
Traffic Signs	$ 9,291,290	$ 8,066,101	$ 6,448,852	$ 5,836,258
Pavement Striping	$ 3,965,643	$ 2,099,295	$ 1,632,708	$ 163,271
Words & Symbols	$ 956,173	$ 861,324	$ 787,974	$ 713,992
Pavement Markers	$ 2,572,840	$ 2,298,231	$ 2,023,622	$ 1,749,013
Subtotal	$ 16,785,946	$ 13,324,951	$ 10,893,156	$ 8,462,533
Environmental				
Turf Condition	$ 1,821,331	$ 1,734,899	$ 1,655,597	$ 1,641,563
Misc. Vegetation Management	$ 2,773,631	$ 2,623,579	$ 2,473,527	$ 2,173,422
Subtotal	$ 4,594,962	$ 4,358,478	$ 4,129,124	$ 3,814,985
Total	$ 155,167,138	$ 132,260,556	100,638,833	70,305,451

Road Maintenance Funding Matrix Table
Performance Based Activities

Maintenance Activity	Secondary System			
Pavements	TOTAL COST A	TOTAL COST B	TOTAL COST C	TOTAL COST D
Subtotal	$ 203,500,731	$ 166,168,199	$ 110,169,401	$ 55,103,917
Shoulders & Ditches				
Low Shoulder	$ 19,852,108	$ 16,280,025	$ 12,707,943	$ 9,802,649
High Shoulder	$ 12,136,962	$ 8,564,880	$ 5,838,190	$ 5,367,866
Lateral Ditches	$ 7,907,545	$ 5,924,123	$ 4,860,625	$ 3,265,379
Lateral Ditch Erosion	$ 3,284,672	$ 3,165,029	$ 3,085,266	$ 3,005,504
Subtotal	$ 43,181,287	$ 33,934,056	$ 26,492,024	$ 21,441,398
Drainage				
Crossline Pipe	$ 14,540,118	$ 12,982,026	$ 11,735,553	$ 9,900,120
Driveway Pipe	$ 14,041,690	$ 11,736,285	$ 7,125,477	$ 2,514,668
Curb & Gutter	$ 1,193,689	$ 1,181,232	$ 1,174,299	$ 1,165,054
Catch Basins & Drop Inlets	$ 1,449,513	$ 1,366,515	$ 1,228,186	$ 1,145,188
Other Drainage Features	$ 1,955,686	$ 1,497,778	$ 1,154,346	$ 810,915
Subtotal	$ 33,180,696	$ 28,763,837	$ 22,417,860	$ 15,535,945
Roadside				
Mowing	$ 21,115,748	$ 15,339,993	$ 12,229,971	$ 7,787,082
Brush & Tree Control	$ 11,689,321	$ 11,113,976	$ 11,024,581	$ 9,631,453
Litter & Debris	$ 2,544,409	$ 2,035,527	$ 1,781,086	$ 1,526,645
Slope Failure	$ 1,468,742	$ 986,229	$ 792,059	$ 763,030
Guardrail	$ 174,650	$ 78,258	$ 68,543	$ 57,911
Subtotal	$ 36,992,869	$ 29,553,982	$ 25,896,240	$ 26,235,816
Traffic Control Devices				
Traffic Signs	$ 12,947,053	$ 11,888,935	$ 8,714,582	$ 7,471,294
Pavement Striping	$ 23,539,940	$ 18,970,654	$ 12,878,273	$ 7,227,590
Words & Symbols	$ 1,192,947	$ 1,147,809	$ 1,102,672	$ 1,057,534
Pavement Markers	$ 3,628,493	$ 3,371,584	$ 3,114,676	$ 2,600,859
Subtotal	$ 41,308,432	$ 35,378,983	$ 25,810,203	$ 18,357,278
Environmental				
Turf Condition	$ 565,176	$ 196,658	$ 191,751	$ 187,932
Misc. Vegetation Management	$ 887,354	$ 848,415	$ 809,477	$ 731,599
Subtotal	$ 1,452,531	$ 1,045,073	$ 1,001,227	$ 919,531
Total	$ 359,616,546	$ 294,844,130	211,786,957	137,593,885

Road Maintenance Funding Matrix Table
Performance Based Activities

Maintenance Activity	Urban System			
Pavements	TOTAL COST A	TOTAL COST B	TOTAL COST C	TOTAL COST D
Subtotal	$ 42,209,506	$ 36,127,330	$ 22,949,281	$ 7,135,622
Shoulders & Ditches				
Low Shoulder	$ 2,317,533	$ 1,833,784	$ 1,470,972	$ 1,108,160
High Shoulder	$ 1,389,986	$ 1,027,174	$ 664,362	$ 404,649
Lateral Ditches	$ 557,656	$ 424,221	$ 366,789	$ 309,356
Lateral Ditch Erosion	$ 197,609	$ 178,800	$ 164,442	$ 150,084
Subtotal	$ 4,462,783	$ 3,463,979	$ 2,666,565	$ 1,972,249
Drainage				
Crossline Pipe	$ 2,129,280	$ 1,856,640	$ 1,693,057	$ 1,529,473
Driveway Pipe	$ 1,401,496	$ 1,144,271	$ 629,820	$ 115,368
Curb & Gutter	$ 679,156	$ 548,509	$ 486,737	$ 363,194
Catch Basins & Drop Inlets	$ 1,474,598	$ 1,148,619	$ 822,640	$ 388,000
Other Drainage Features	$ 1,419,282	$ 1,095,944	$ 853,440	$ 610,936
Subtotal	$ 7,103,813	$ 5,793,983	$ 4,485,693	$ 3,006,972
Roadside				
Mowing	$ 1,637,002	$ 1,230,869	$ 779,611	$ 328,352
Brush & Tree Control	$ 1,710,475	$ 1,633,790	$ 1,557,104	$ 1,445,910
Litter & Debris	$ 4,044,458	$ 3,235,566	$ 2,831,120	$ 2,426,675
Slope Failure	$ 369,480	$ 323,504	$ 287,234	$ 266,800
Guardrail	$ 3,001,458	$ 1,881,854	$ 1,317,821	$ 753,789
Subtotal	$ 10,762,873	$ 8,305,582	$ 6,772,890	$ 6,975,111
Traffic Control Devices				
Traffic Signs	$ 6,933,224	$ 4,260,085	$ 1,982,570	$ 1,715,256
Pavement Striping	$ 3,655,799	$ 2,439,857	$ 1,223,915	$ 697,007
Words & Symbols	$ 1,766,032	$ 1,405,096	$ 923,848	$ 825,192
Pavement Markers	$ 2,497,684	$ 2,252,174	$ 2,006,665	$ 1,761,155
Subtotal	$ 14,852,738	$ 10,357,212	$ 6,136,998	$ 4,998,610
Environmental				
Turf Condition	$ 119,504	$ 65,857	$ 37,692	$ 36,901
Misc. Vegetation Management	$ 861,280	$ 810,402	$ 759,523	$ 657,765
Subtotal	$ 980,784	$ 876,258	$ 797,215	$ 694,666
Total	$ 80,372,497	$ 64,924,343	43,808,641	24,783,230

BRIDGE MAINTENANCE PERFORMANCE MEASURES

Bridge Elements			Service Level					Acceptable Level of Service
			A	B	C	D	F	
Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold	
Railings	Bridge Condition Rating	BCR	8	7	6	5	> 5	B
Decks	Bridge Condition Rating	BCR	8	7	6	5	> 5	B
Expansion Joints	Bridge Condition Rating	BCR	8	7	6	5	> 5	B
Superstructure	Bridge Condition Rating	BCR	8	7	6	5	> 5	B
Substructure	Bridge Condition Rating	BCR	8	7	6	5	> 5	B

BRIDGE MAINTENANCE FUNDING MATRIX TABLE
PERFORMANCE BASED ACTIVITIES

Maintenance Activity	TOTAL COST "A"	TOTAL COST "B"	TOTAL COST "C"	TOTAL COST "D"
Railing				
Concrete	$2,187,728	$739,524	$590,597	$492,164
Timber	$67,550	$19,514	$18,792	$15,660
Aluminum	$29,903	$3,218	$2,758	$2,298
Steel	$155,321	$32,066	$27,485	$22,904
Subtotal	$2,440,503	$794,321	$639,633	$533,027
Deck				
Concrete	$19,188,546	$7,736,925	$2,064,572	$1,720,477
Timber	$3,092,456	$664,243	$469,484	$391,237
Steel Plank Floor	$466,224	$90,835	$48,366	$40,305
Open Grid Steel	$17,255	$10,812	$4,370	$1,444
Subtotal	$22,764,482	$8,502,816	$2,586,793	$2,153,463
Expansion Joints				
Steel Plate	$91,500	$55,413	$19,326	$11,454
Prefabricated	$973,518	$102,310	$88,526	$73,772
Compression Seal	$126,268	$21,150	$18,128	$15,107
Standard Deck	$3,780,781	$1,944,585	$604,806	$504,005
Subtotal	$4,972,068	$2,123,458	$730,786	$604,338
Superstructure				
Concrete	$2,736,660	$1,709,413	$682,166	$425,053
Steel	$4,604,626	$1,378,809	$764,555	$637,129
Prestressed Concrete	$480,155	$124,539	$106,748	$88,956
Timber	$1,158,931	$590,288	$192,759	$160,633
Subtotal	$8,980,372	$3,803,049	$1,746,228	$1,311,771
Substructure				
Timber	$7,976,758	$5,183,857	$2,390,956	$1,166,158
Concrete Pile	$1,398,502	$616,293	$283,866	$236,555
Steel Pile	$498,595	$61,435	$77,830	$64,859
Concrete Pier	$7,400,558	$2,736,082	$1,313,452	$1,094,543
Subtotal	$17,274,414	$8,597,668	$4,066,105	$2,562,115
TOTAL	$56,431,838	$23,821,313	$9,769,545	$7,164,714

BACKLOG REDUCTION STRATEGY

		FISCAL YEAR									
Maintenance Programs	**Total**	**2005-2006**	**2006-2007**	**2007-2008**	**2008-2009**	**2009-2010**	**2010-2011**	**2011-2012**	**2012-2013**	**2013-14**	**2014-15**
Road Maintenance											
Pavements	$ 95.87	$ 9.59	$ 9.87	$ 10.17	$ 10.48	$ 10.79	$ 11.11	$ 11.45	$ 11.79	$ 12.14	$ 12.51
Shoulders & Ditches	$ 1.29	$ 0.13	$ 0.13	$ 0.14	$ 0.14	$ 0.14	$ 0.15	$ 0.15	$ 0.16	$ 0.16	$ 0.17
Drainage	$ 9.31	$ 0.93	$ 0.96	$ 0.99	$ 1.02	$ 1.05	$ 1.08	$ 1.11	$ 1.15	$ 1.18	$ 1.21
Roadside	$ 1.12	$ 0.11	$ 0.12	$ 0.12	$ 0.12	$ 0.13	$ 0.13	$ 0.13	$ 0.14	$ 0.14	$ 0.15
Traffic Control Devices	$ 13.52	$ 1.35	$ 1.39	$ 1.43	$ 1.48	$ 1.52	$ 1.57	$ 1.61	$ 1.66	$ 1.71	$ 1.76
Environmental	$ 2.45	$ 0.25	$ 0.25	$ 0.26	$ 0.27	$ 0.28	$ 0.28	$ 0.29	$ 0.30	$ 0.31	$ 0.32
Traffic Signals (SHUP, LEDS, ETC)	$ 15.00	$ 3.00	$ 3.09	$ 3.18	$ 3.28	$ 3.38	$ -	$ -	$ -	$ -	$ -
Subtotal	$ 138.56	$ 15.36	$ 15.82	$ 16.29	$ 16.78	$ 17.28	$ 14.32	$ 14.75	$ 15.20	$ 15.65	$ 16.12
Bridge Maintenance											
Railings	$ 2.70	$ 0.27	$ 0.28	$ 0.29	$ 0.30	$ 0.30	$ 0.31	$ 0.32	$ 0.33	$ 0.34	$ 0.35
Bridge Decks	$ 27.30	$ 2.73	$ 2.81	$ 2.90	$ 2.98	$ 3.07	$ 3.16	$ 3.26	$ 3.36	$ 3.46	$ 3.56
Expansion Joints	$ 6.30	$ 0.63	$ 0.65	$ 0.67	$ 0.69	$ 0.71	$ 0.73	$ 0.75	$ 0.77	$ 0.80	$ 0.82
Superstructures	$ 7.40	$ 0.74	$ 0.76	$ 0.79	$ 0.81	$ 0.83	$ 0.86	$ 0.88	$ 0.91	$ 0.94	$ 0.97
Substructure	$ 15.50	$ 1.55	$ 1.60	$ 1.64	$ 1.69	$ 1.74	$ 1.80	$ 1.85	$ 1.91	$ 1.96	$ 2.02
Small pipe replacement	$ 37.26	$ 7.45	$ 7.68	$ 7.91	$ 8.14	$ 8.39					
Subtotal	$ 96.46	$ 13.37	$ 13.77	$ 14.19	$ 14.61	$ 15.05	$ 6.86	$ 7.07	$ 7.28	$ 7.50	$ 7.72
Total Maintenance Backlog	$ 235.02	$ 28.73	$ 29.59	$ 30.48	$ 31.39	$ 32.33	$ 21.19	$ 21.82	$ 22.48	$ 23.15	$ 23.85
Contract Resurfacing Backlog	$ 223.83	$ 22.38	$ 23.05	$ 23.75	$ 24.46	$ 25.19	$ 25.95	$ 26.73	$ 27.53	$ 28.35	$ 29.20
Grand Total	$ 458.85	$ 51.11	$ 52.64	$ 54.22	$ 55.85	$ 57.53	$ 47.13	$ 48.55	$ 50.00	$ 51.51	$ 53.05

all figures are in million dollars

STATEWIDE ANNUAL MAINTENANCE FUNDING PLAN

Maintenance Programs	Fiscal Year Funding Need (million dollars					
	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Annual Cost of Routine Maintenance	$ 626.58	$ 659.95	$ 693.61	$ 728.12	$ 764.04	$ 801.63
Cost of Eliminating Maint. Backlog	$ 28.73	$ 29.59	$ 30.48	$ 31.39	$ 32.33	$ 21.19
Annual Cost of Resurfacing	$ 248.60	$ 261.03	$ 274.08	$ 287.79	$ 302.17	$ 317.28
Cost of Eliminating Resurf. Backlog	$ 22.38	$ 23.05	$ 23.75	$ 24.46	$ 25.19	$ 25.95
Disasters & Emergencies	$ 30.00	$ 30.00	$ 35.00	$ 35.00	$ 35.00	$ 15.00
Total Maintenance Funding Need	**$ 956.29**	**$ 1,003.62**	**$ 1,056.91**	**$ 1,106.76**	**$ 1,158.74**	**$ 1,181.05**
Supplemental Maintenance Funds	$ 44.64	$ 48.00	$ 51.88	$ 54.38	$ 56.89	$ 58.15
Adjusted Total Maintenance Funding Ne	**$ 911.65**	**$ 955.62**	**$ 1,005.03**	**$ 1,052.38**	**$ 1,101.85**	**$ 1,122.90**
Estimated Maintenance Fund Allocation	$ 598.11	$ 598.11	$ 598.11	$ 598.11	$ 598.11	$ 598.11
Estimated Maintenance Fund Shortfall	**$ 313.54**	**$ 357.51**	**$ 406.92**	**$ 454.27**	**$ 503.74**	**$ 524.79**