NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

2018
MAINTENANCE OPERATIONS AND PERFORMANCE ANALYSIS REPORT (MOPAR)

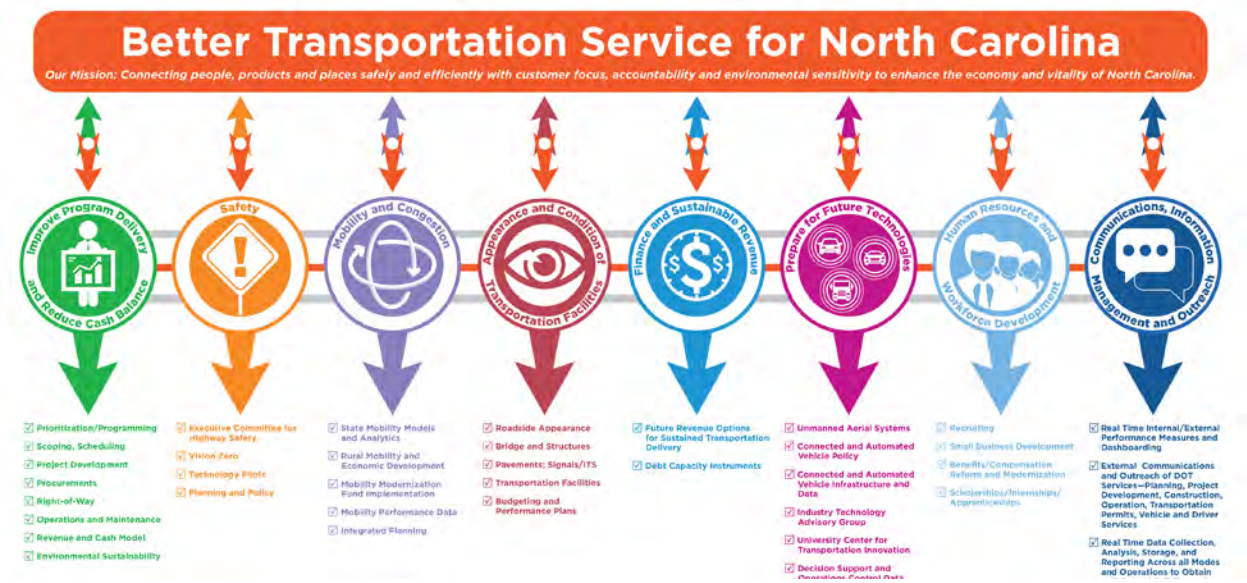
DECEMBER 2018

Contents

FORWARD

Dear North Carolina General Assembly members,

The North Carolina Department of Transportation is pleased to submit the *2018 Maintenance Operations and Performance Analysis Report*. More importantly, we are grateful for the opportunity to demonstrate our commitment to enhancing the economy and vitality of North Carolina. The Department appreciates the partnership with the General Assembly regarding maintenance and operation programs. Furthermore, Secretary Trogdon's commitment to remaining economically competitive on national and international levels, particularly with peer states, has created an intensified focus on asset management. Transportation serves as a catalyst for job creation and economic development and plays a key role in making our state a desirable place to live, work and visit. This report underscores the importance of continued investment for transportation improvements.



The illustration above sets out the Secretary's key focus areas. These categories created a framework within which highway operations has evolved and will continue to mature. For example, the Department has made significant strides towards implementing Division maintenance plans, followed by tracking agency progress and then, as needed, refining goals. As noted in this report, our 2017-2018 performance measures were met, and in many areas exceeded. These successes resulted in our agency delivering an effective asset management program. Successful implementation of Division maintenance plans is only possible with sufficient and consistent maintenance program investment. With adequate investment the State will be able to reverse the declining condition of the highway system and enable real improvement in infrastructure connectivity, traveller safety and congestion reduction.

Our State's population continues to grow and our economic competitiveness continues to get stronger, but our infrastructure is aging. These forces, taken together, present a huge opportunity for gain, yet also pose a huge threat if underinvestment in our transportation system continues. The Department's analysis to determine levels needed to invest in the years ahead ensures that safety, congestion and road conditions do not decline.

On behalf of the Department's fourteen Division Engineers and the employees supporting North Carolina's Division of Highways, I would like to thank the General Assembly for its support relating to highway maintenance and, more broadly, asset management.

Respectfully yours,

Timothy M. Little, PE
Chief Engineer

NCDOT Overview

one of the largest state-maintained highway systems in the nation with about 80,000 miles of road

more than 13,500 bridges

Inspectors check about 9,000 of these bridges and culverts each year.

85 24

more than 15,000 miles of primary highways (Interstate, US and NC routes)

MAIN ST

nearly **65,000 miles** of secondary roads

In 2017 North Carolina interstates were rated as **88% Reliable**

9th Most Populous State **with** **5th** Most Highway Fatalities

Secondary roads make up 81% of the state network and is where most people live.

Bridges on secondary system rated as structurally deficient

21% in 2015

15% in less than 4 years*

*due to recent increase in Bridge Program funds

Recent hurricanes (Matthew, Florence and Michael) cost the Department roughly $470 million.

Hurricane Michael

528 roads closed: **opened 518 roads**

within 20 days

Hurricane Florence

1,576 roads closed: **opened 1,537 roads**

within 45 days

Since 2016, snow and ice storm spending has exceeded $246 million.

NORTH CAROLINA'S PAVEMENT CYCLE TIME

contract resurfacing

16 years primary

31 years secondary

secondary system roughly double industry recommendation

pavement preservation

19 years

almost 3 times industry recommendation

The industry recommends contract resurfacing to be completed every 12–15 years, while pavement preservation every 4–7 years.

in 2018

236 million linear feet of pavement striping replaced

Over 2.2 million shoulder miles *of mowing complete*

132,000 shoulder miles of **litter picked up**

227,000 linear feet of maintenance size pipe replaced

55,367 Citizen Action Requests **completed on time**

1. ASSET MANAGEMENT PROGRAM

The North Carolina Department of Transportation ("the Department") is responsible for the second largest state-maintained road network in the country and its transportation system continues to grow. In addition to the many new miles of secondary roads taken onto our system each year, our currently committed capital improvement projects, or those projects within the first 5 years of the current 2016-2025 State Transportation Improvement Program (STIP), the Department will add roughly 1,200 lane miles of new capacity and 170 bridges to the system. With each new mile and bridge the Department's maintenance and operations responsibilities will only increase.

The Asset Management Program continues to evolve as the vision is translated into goals that drive Improvement Plans. These plans are supported by a number of service delivery standards and performance measures which enable the measurement of overall achievement of the goals. The Program is decentralized, allowing Division staff the opportunity to choose the appropriate maintenance strategies for inclusion in their Improvement Plans, which will then be measured against clear and consistent production targets that tie back to the Department's wider asset management vision (Figure 1 shows the 14 Divisions).

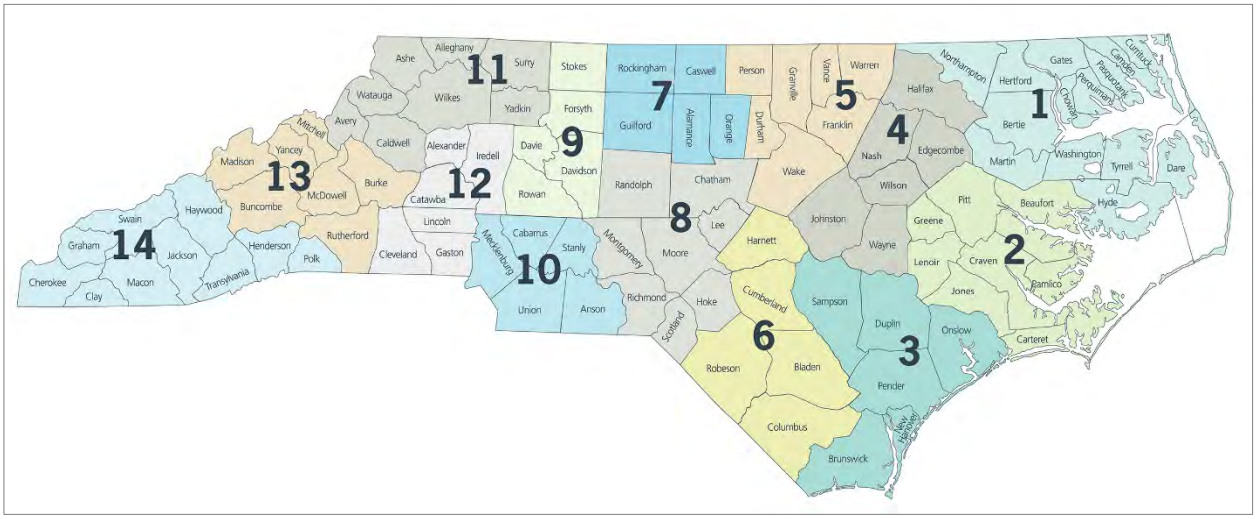


Figure 1 Department of Transportation 14 Highway Divisions

In addition to performing routine maintenance activities, the Department's maintenance crews are responsible for preparing and responding to weather events that can cause significant damage to our infrastructure. These unforeseeable events such as Hurricane Florence, Hurricane Matthew, Winter storm Inga and Winter storm Diego have lasting impacts on our transportation system such as increased deterioration of assets, early replacement of drainage systems, or emergency bridge repair and replacement. Transportation assets are interdependent and require a wholistic maintenance approach. For example, drainage maintenance (e.g. clearing culverts), while not always visible from the roadway, is still one of the most important maintenance activities. Inadequate drainage can cause erosion of our roadway shoulders and ditches, or cause standing water leading to saturated roadway subgrades that cause pavement deterioration and pot holes. Wet surfaces also require increased braking time/distance, ultimately increasing the risk for accidents. Even with a recently renewed focus on planned maintenance, the Department must be able to adapt to constant and unpredictable changes to the condition of our assets. Investing in maintenance programs at the appropriate levels, motorists will see an overall increase in the safety of the highway network, as well as a decline in costly reactive maintenance needs

Recent Program Advances

The Department works with industry and university partners to implement the latest practices and technology to advance our asset management program. Given the vast number of assets the Department is responsible for, initiatives may take years to implement and realize the full benefits. Recent initiatives include:

- The Department is transitioning to a route-based maintenance plan as established under Session Law 2017-57 Section 34.11. Previously, non-pavement and bridge maintenance condition assessments were based on a systemwide level – Interstate, Primary and Secondary, and used statistical sampling to provide a condition of the system. While some of these asset conditions will still be collected by sample and provided at the system level, where possible, the Department is transitioning to collection of asset specific condition data. To support this effort the Department will collect specific inventory data for assets such as maintenance size pipes (those under 48" in diameter), non-NBIS pipes (those 48" in diameter or greater, but not part of the National Bridge Inventory System (NBIS), noise walls and retaining walls. The Department expects to have a full inventory of these assets collected by the end of calendar year 2019. Random sampling, as mentioned previously, will still be used for certain assets with highly varying deterioration such as ditches and shoulders, roadway markings (striping) and markers. In conjunction, the Department will also review its condition assessment program to more accurately reflect performance and desired level of service.
- As per session law 2017-57, the Department is working towards developing a single maintenance improvement program for greater efficiency – i.e. merging of the Highway Maintenance Improvement Program (HMIP), Bridge Maintenance Improvement Program (BMIP) and Routine Maintenance Improvement Program (RMIP). This merged plan will be implemented in 2020 and will include all planned pavement, bridge, and routine maintenance activities for the five years following implementation (2021-2025).
- In 2018, the Department expanded its fully automated Pavement Condition Survey collection to include all interstate, primary, and secondary system routes. This inventory method increases the speed and consistency that pavement condition data is collected. Previously, automated pavement condition surveys only included the interstate and primary systems.
- The Department continues to work with our industry partners, other states, and nationwide research outlets to ensure we are using the most up to date data for our maintenance improvement programs. Ensuring items such as asset life cycles are accurate and reflect industry standards, we are able to further extend our maintenance dollars by not creating maintenance goals that are inflated due to incorrect data. For example, based on industry/national research, our State Traffic Engineer recently identified the life cycle for roadway signage to be approximately 20 years. Previous planning efforts included a life cycle estimate of only 10 years. Making this change to the expected life cycle of our roadway signs will lessen the expected annual need for sign replacement, allowing us to shift the identified maintenance dollars needed for those efforts to other assets on our system with greater maintenance needs.

These and other initiatives impact the way the Department sets its goals, determines its workplan and effectively allocates funding. These improvements will build upon the current asset management program and culminate into a single "Highway Maintenance Improvement Program" and reported per NCGS 136-44.3A.

Hurricane and Snow Preparation and Response

Figure 2 Hurricane Florence Damage US 421

Each year our state experiences a variety of weather events and other natural/ man-made disasters that impact our asset management programs and associated budgets. Some of these storms are declared by the President as federal emergencies, which allows us to pursue reimbursement from federal entities such as the Federal Highway Administration (FHWA) and Federal Emergency Management Agency (FEMA). Two major storms receiving such declarations included Hurricane Matthew in 2016 and Hurricane Florence in 2018. Hurricane Matthew cost the Department nearly $200 million dollars to complete repair and recovery efforts while, Hurricane Florence is estimated to cost at least $260 million dollars. Initial payment for these repairs comes from the Department's maintenance budget. And while we can expect to be reimbursed for 70% to 80% of these costs, the reimbursements from the Federal government may take in excess of five years to receive. These costs and resulting shifting of resources have a huge impact to our maintenance programs and budgets by reducing the funding available to perform routine maintenance operations and shifting the focus of our workforce to storm response, when they could be focusing on planned maintenance.

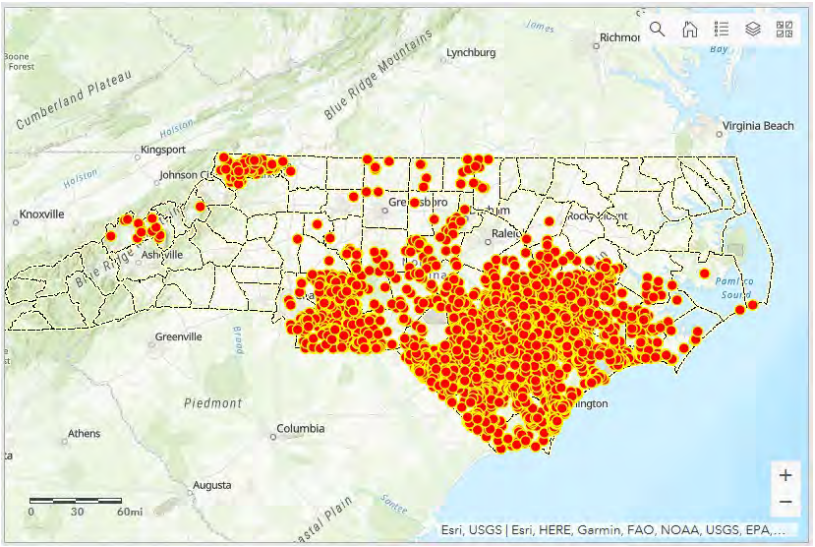


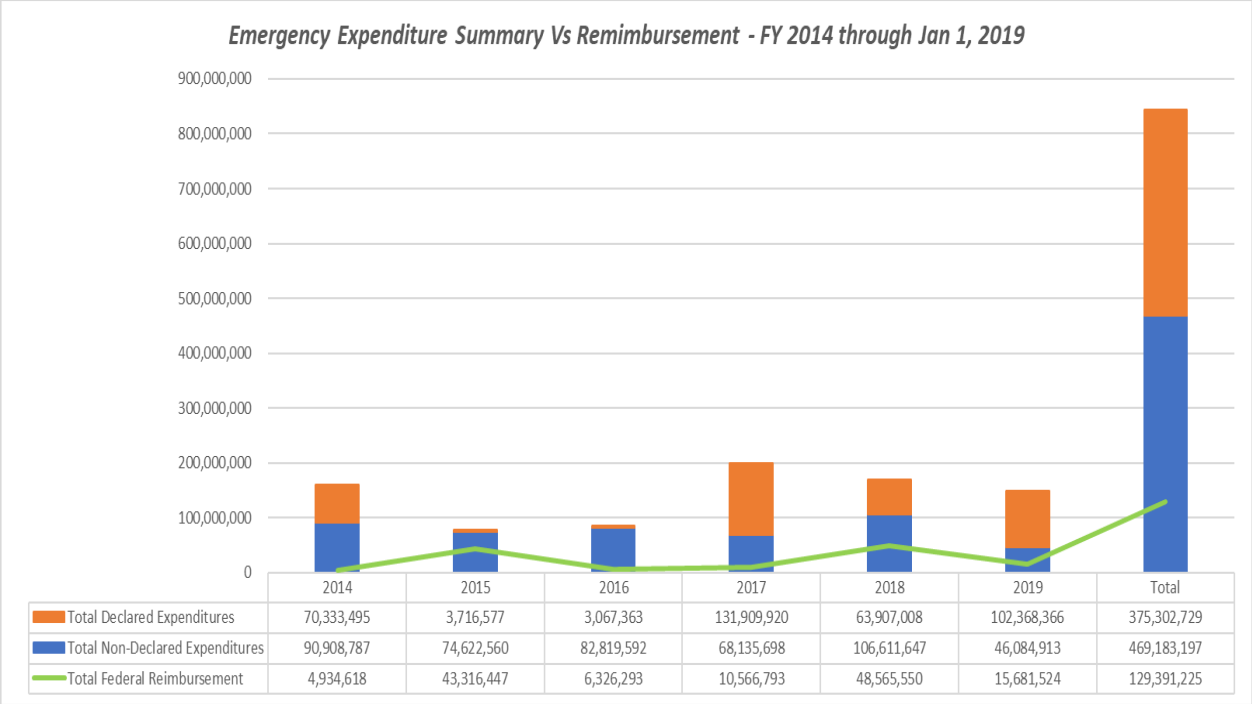
Figure 3 Hurricane Florence Damaged Sites

In addition to these various types of federally declared storms, each year there are many storms or other incidents that do not receive any federal emergency declaration ("non-declared events"). These storms, including snow and ice events and heavy rain and flooding events also require a shifting of our financial resources as well as our workforce, equipment and materials. Most recent examples of these types of non-declared storms include Hurricane Michael and Winter Storm Inga. Unfortunately, none of these costs can be reimbursed from the federal government, and on average, these types of events can cost the Department nearly $100 million dollars each year. All of which is paid for from our limited maintenance budget. Despite this strain on our resources, the Department and our contracting partners continue to thrive in providing timely storm/disaster response and recovery to ensure the safety, health, and well-being of our citizens is maintained. It is imperative that we limit the disruption to their lives by restoring mobility and connectivity as quickly as possible, and we always respond to these challenges. Providing our maintenance forces with sufficient and sustained maintenance funding to ensure we can deliver our maintenance plans also helps during recovery periods. By sufficiently investing our maintenance

programs, our forces can implement solid maintenance plans and strategies to address deficiencies in our infrastructure that will include replacement of substandard pipes and bridges and that can reduce the need for future storm response due to inadequate facilities. In doing so, the cost to the Department for emergency response activities can be reduced and the time our forces must focus on reactive efforts can be minimized.

Figure 4 below provides an overview of both the federally declared and non-declared storm/disaster expenditures that we have experienced over the past several years. Since 2014, the total expenditures on federally declared storm/disaster events exceeds $375 million dollars, while our reimbursement amounts are only $129 million. In addition, the costs incurred for non-declared storms/disasters is nearly $470 million, of which none will be reimbursable. As described earlier, the funds to pay for disaster response/recovery all come from our annual maintenance appropriations. And while reimbursements received from the federal government are beneficial, they do not provide the sufficient, timely relief needed to offset the strain these types of events place on our budgets, employees, equipment and material resources.

Figure 4: Non-Declared Emergency Expenditures and Reimbursements



	2014	2015	2016	2017	2018	2019	Total
Total Declared Expenditures	70,333,495	3,716,577	3,067,363	131,909,920	63,907,008	102,368,366	375,302,729
Total Non-Declared Expenditures	90,908,787	74,622,560	82,819,592	68,135,698	106,611,647	46,084,913	469,183,197
Total Federal Reimbursement	4,934,618	43,316,447	6,326,293	10,566,793	48,565,550	15,681,524	129,391,225

Annual Needs and Recommended Investment (FY20 and FY21)

Pursuant to legislation NCGS 136-44.3 Section 1 the “annual cost to maintain and sustain the established performance standards for the State highway system” – and investment recommendations are identified in Table 1. In keeping with the strategic direction set by the General Assembly in 2014, the Department’s recommended investment departs from past precedence of relying on historical expenditures to establish current year plans. The following investment recommendation is based on Division Improvement Plans for pavements, bridges, highway assets and workforce, and uses a stepwise approach to reach long-term level of service goals. (See Section 2 for details on developing maintenance plans and estimating needs).

Table 1 FY19 Appropriation and Investment Recommendation

Major Programs	FY19 State Appropriation ($ million)	Investment Recommendation ($ million)
Contract Resurfacing	$504	$519
Pavement Preservation	$98	$110
Bridge Program	$272	$272
Bridge Preservation	$82	$82
Roadside Environmental	$101	$122
General Maintenance Reserve		
Highway Maintenance	$159	$455
Statewide Programs	$150	$150
Subtotal, General Maintenance Reserve	$309	$605
Total	**$1,366**	**$1,710**

Delivering the Asset Management Program

Pursuant to NCGS 136-44.3 Sections 3 and 4, this section examines how the Department maximizes efficiency through baseline unit pricing and staffing.

Baseline Unit Cost

In accordance with Session Law 2015-241, Section 29.14.(b), baseline unit costs for principal work activities and transportation goods were established in the December 1, 2015, report titled Efficiency – Establishing Baseline Unit Pricing & Streamlining Project Delivery. These include the following:

- Contract resurfacing
- Pavement preservation
- Bridge replacement
- 10 planned maintenance work functions
- FOB goods most commonly used by maintenance forces

At the end of each calendar year, the Department submits a report to the JLTOC and Fiscal Research Division to identify annual unit cost results for each Division and includes explanations as to why certain Divisions exceeded the established baseline unit prices and what actions they are taking to address any noncompliance. In reviewing the data, the Department is confident that progress continues to be made

with regards to Highway Divisions conducting their operations within 10% of established statewide baseline costs.

Since tracking and reporting on these costs in the fall of 2015, the quality of data captured, and reporting efforts has improved, and Divisions have placed emphasis on meeting production rates and achieving the required outcomes. Data continues to be analyzed and used to refine cost targets and expectations for the coming year as the Department continues to push for efficiency in its operations.

Staffing

To examine staffing efficiency, staffing distribution across 14 divisions along with the number of lane-miles, population served, and areas served per employee (i.e. 2018 filled position) are shown in Table 2. Overall staffing trends are consistent with geographical differences such as the coast/ Sandhills, Piedmont or Mountains. For example, Division 1 manages fewer lanes miles per employee (26 lane miles per employee) but has a higher area served per employee (13 square miles served per employee).

Table 2 Division Staffing

Division	2018 Filled Positions	2018 Vacancy Rate (%)	Lane Mile (L-M)	L-M/ Employee	Population	Population Served/ Employee	Area (square-Mile)	Area served/ Employee
1	413	20%	10,910	26	260,476	631	5,273	13
2	357	26%	10,816	30	497,857	1,395	4,168	12
3	371	24%	12,063	33	709,928	1,914	4,432	12
4	425	20%	13,733	32	592,031	1,393	3,482	8
5	406	33%	14,950	37	1,551,516	3,821	3,219	8
6	360	27%	13,325	37	677,187	1,881	4,008	11
7	408	17%	12,129	30	931,929	2,284	2,458	6
8	442	14%	14,588	33	528,904	1,197	4,093	9
9	395	10%	10,970	28	760,887	1,926	2,185	6
10	422	18%	11,424	27	1,540,047	3,649	2,444	6
11	434	21%	12,475	29	368,569	849	3,314	8
12	368	20%	13,102	36	753,603	2,048	2,351	6
13	443	14%	10,862	25	507,371	1,145	3,152	7
14	517	9%	10,502	20	362,497	701	4,040	8
Avg	412	19%	N/A	30	N/A	1,774	N/A	9
Total	5,761	N/A	171,849	N/A	10,042,802	N/A	48,619	N/A

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Investment Recommendation and Actions

As the Department works towards achieving maintenance goals, set forth in its plans – HMIP, BMIP and RMIP, the success of these plan and the overall asset management program depends on long term consistent and sufficient funding. The below summarizes the investment need as it relates to each of the major maintenance plans.

Recommendation to provide consistent and sufficient investment for contract resurfacing and pavement preservation

- Support long term consistent investment for resurfacing and pavement preservation activities to meet and sustain production goals (i.e. cycle time).
- Increase Contract Resurfacing investment to $519 million (an increase of $15 million).
- Increase pavement preservation investment to $110 million (an increase of $12 million). This recommended pavement preservation investment level is not sufficient to reach established cycle time targets. It is anticipated that investment needs will gradually ramp up with production over time.

Recommendation to maintain the current investment for the Bridge Program

- Continue to fully fund Bridge Program needs of $272 million annually for 12 years. This funding is used for replacement and major rehabilitation activities to meet or exceed Structurally Deficient targets by 2030.
- Continue to fund the Bridge Preservation Program at $82 million annually to focus on high value bridge preservation, slow overall number of bridges becoming SD, and lower maintenance costs.

Recommendation to fully fund Routine Maintenance Improvement Plans, an investment need $455 million and increase investment for Roadside Environment to $122 million (an increase of $21M compared with current levels (FY 2019).

- Fund GMR with $605 million, an increase of $296 million. This investment level is determined by the RMIP needs to reach production goals and includes expenditures that support statewide programs.
- This recommended level is not sufficient to reach established cycle time targets and respond to reactive maintenance needs. The recommended investment relies on a stepwise approach to reach long term performance goals.

2. CURRENT CONDITIONS AND TRENDS

Pursuant to NCGS 136-44.3 Section 2, goals for each of major assets including pavements, bridges and highway assets are described below. An improvement plan governs each of these major assets (e.g. Highway Maintenance Improvement Plan, Bridge Improvement Plan and Routine Maintenance Improvement Plan) which determines the production levels and investment required to meet stated goals. However, as explained in Section 1, these plans are being transitioned to a single route-based plan.

PAVEMENTS

The Highway Maintenance Improvement Plan (HMIP) focuses on maintaining pavements of the state's primary and secondary roadway system. To develop and implement a successful work plan, the specific roadway characteristics, treatment type and timing of treatment must be carefully considered. We have a large roadway system in North Carolina, which requires a substantial financial investment to maintain. And while we have continued to provide significant financial investment into our pavements, the improvements to our pavement conditions will be gradual. And while overall system conditions may change slowly from year to year, individual roadway conditions can vary greatly from season to season dependent upon rainfall, freeze thaw cycles, and traffic loads. As such, the ability to easily respond to rapid condition changes by shifting resources and modifying previously identified treatments is critical.

With funding level for our resurfacing and pavement preservation programs over the past two years, the Department has been able to make some improvements in the number of miles treated and cycle time for which we treat our pavements. Cycle time (the interval between each treatment activity), helps to identify the number of miles needed to reach the LOS goal. The industry recommends contract resurfacing to be completed every 12-15 years, while pavement preservation every 4-7 years. The following section provides a summary of plans and accomplishments for each treatment type – contract resurfacing and pavement preservation.

Figure 5 Contract Resurfacing

Figure 6 Pavement Preservation (chip seal)

Contract Resurfacing

- Cycle time for the contract resurfacing on the primary system is 16 years and is nearly consistent with industry recommendations (shown in Table 3)
- Cycle time for contract resurfacing on the secondary system is 31 years and is roughly double industry recommendations.
- Reaching the recommended cycle time is essential to meeting an expected level of service for our pavement conditions.

Table 3 Contract Resurfacing Planned and Accomplished Work

Contract Resurfacing	Planned	Completed + Under Contract
Primary (lane miles)	1,903	2,172
Percent Statewide System	5%	6%
Cycle Time (years)	18	16
Secondary (lane miles)	3,189	3,945
Percent Statewide System	3%	3%
Cycle Time (years)	38	31

Note: Detailed Division information is provided in the Appendix 1

Pavement Preservation

- The current accomplished cycle time for pavement preservation is 19 years, which is almost three times industry recommendations (shown in Table 4)

Table 4 Pavement Preservation Planned and Accomplished Work

Pavement Preservation	Planned	Completed + Under Contract
Secondary (lane miles)	4,617	6,348
Percent Statewide System	4%	5%
Cycle Time (years)	27	19

Note: Detailed Division information is provided in the Appendix 1

Current Conditions and Tends

Each year, the Department conducts pavement condition surveys of all its pavement assets on the interstate, primary, and secondary systems. These surveys provide a point-in-time snapshot of the condition. The results of these surveys are used to rate the pavement condition using a Pavement

Condition Index (PCI). The PCI considers observed defects in the pavement such as cracking, patching, rutting, traveling, corner breaks, seal breaks, and faulting. A segment of pavement with more of these types of defects will score lower on the PCI and trend towards “fair” or “poor.” Good is defined as a PCI greater than 80 percent, fair is a PCI between 80 to 60 percent, and poor is a PCI less than 60 percent. Pavement condition is influenced by activities funded through the contract resurfacing, pavement preservation, and routine highway maintenance programs. Figure 7 to Figure 9 show pavement condition for interstate, primary and secondary routes since 2006.

Figure 7 Interstate Pavement Condition Since 2006

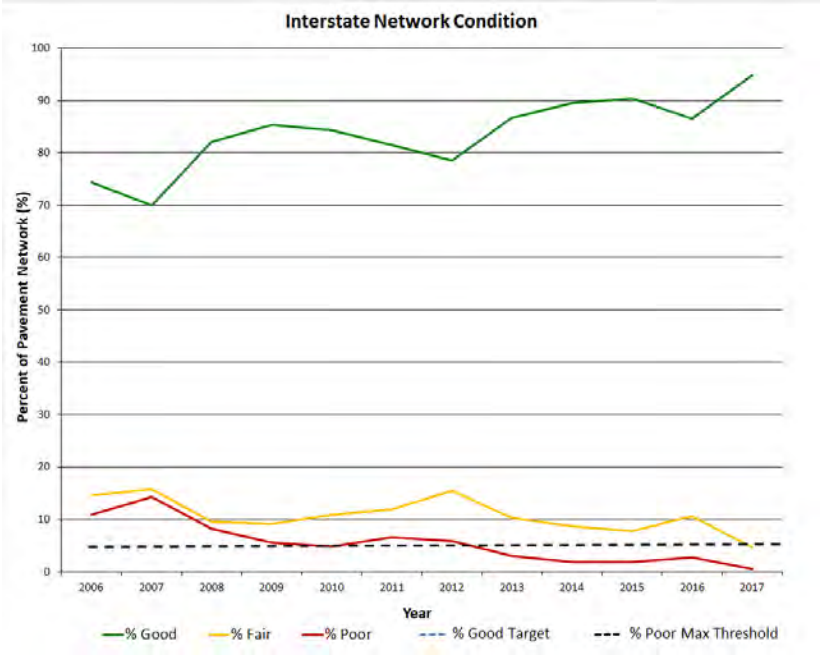


Figure 8 Primary Network Pavement Condition Since 2006

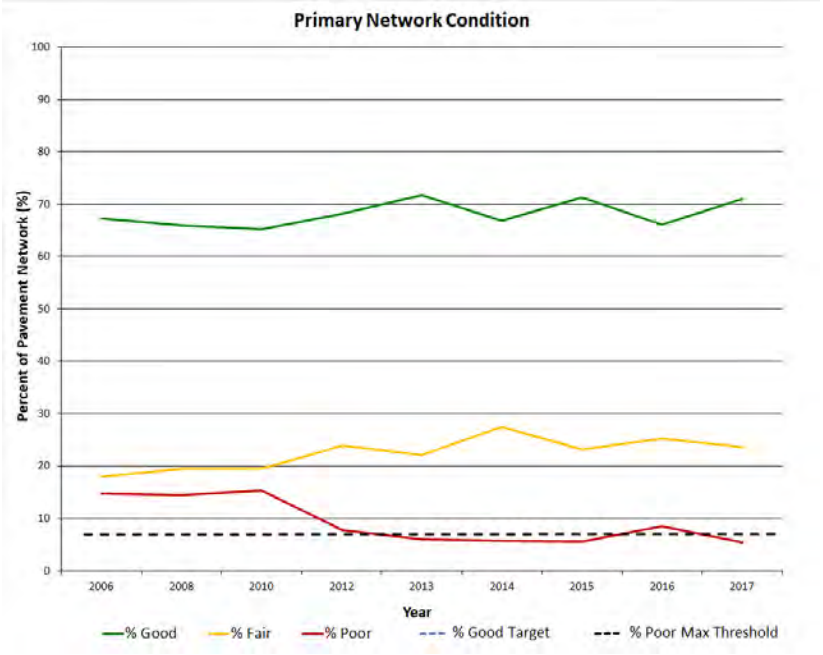
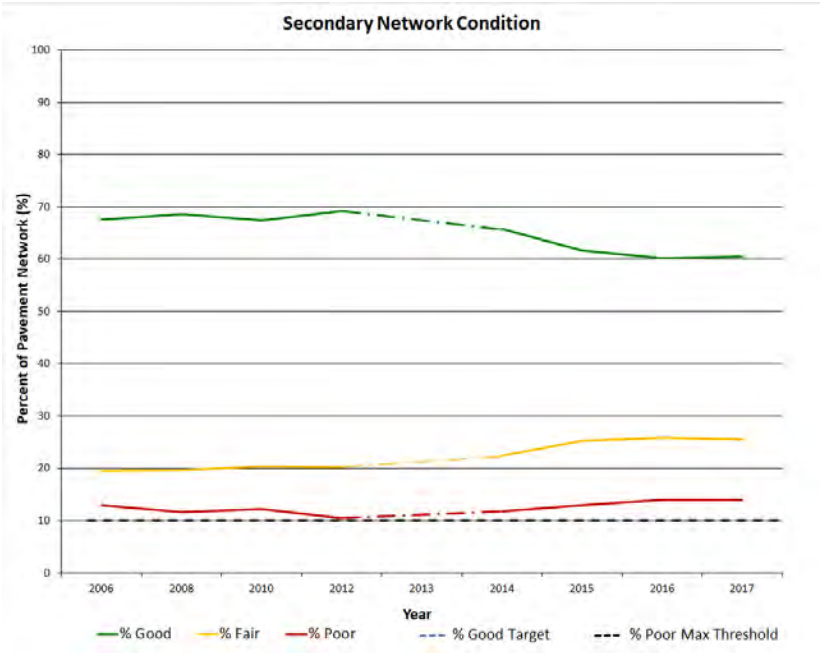


Figure 9 Secondary Network Pavement Condition Since 2006



Interstate and primary road percentage of good pavements have increased in the past 1-2 years, while the secondary road good pavements are stable. In addition, the percentage of fair pavements on the secondary network has increased (and reduced the percentage of poor pavements). To understand the impact of funding, Figure 11 and 12 compares funding levels and pavement condition. For the primary system, the steady funding for Contract Resurfacing (CR) has reduced the percentage of fair and poor pavements over the past 1-2 years. This continued focus is needed to further increase the percentage of good pavements. In contrast, secondary pavement condition has fluctuated more over the past decade. However, with a renewed focus on funding Pavement Preservation (PP), the percentage of good pavements have been stabilized. Given the lack of preservation funding in 2010-2014, the recent impact of funding will likely not show widespread improvements until 2018-2019. With consistent investment Divisions can implement the HMIP as expected and systematically improve or maintain current conditions. The 2018 pavement condition survey data is currently in the final review stages and will be provided in spring 2019.

Figure 10 Paving Operations

Figure 11 Appropriations and Primary System Condition

Figure 12 Appropriations and Secondary System Condition

BRIDGES

Prior to fiscal year 2015, funding for bridge replacements came from federal programs. As these funds were transitioned for capacity improvement projects, State funds became the primary and necessary funding source for bridge replacements. As shown in Table 5, state funds for the improvement of Structurally Deficient (SD) and Functionally Obsolete (FO) bridges have increased substantially since fiscal year 2015. The State Bridge Program has increased from $150 million in SFY 2015 to $272 million in SFY 2019. Beginning in fiscal year 2017, additional bridge preservation dollars were provided to fund cost effective solutions to maximize bridge life and lower lifetime costs.

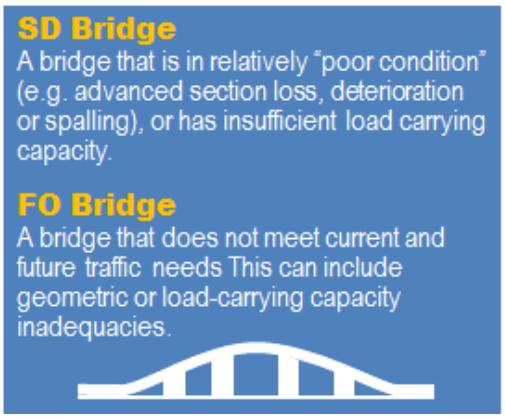


Table 5 State Bridge Program Funding and Investment Recommendation

Program	2015	2016	2017	2018	2019
Bridge Program	$150M	$242M	$242M	$280M	$272M
Bridge Preservation	-	-	-	$80M	$82M

Inventory, Goals, and Targets

North Carolina's bridge portfolio consists of approximately 13,500 bridges state-wide of which 12 percent are considered SD. As shown below in Table 6, the percent of SD bridges has decreased since 2015. This decrease has continued as funds focused on reducing the number of SD bridges has increased.

Table 6 Percent SD Bridges Comparison, 2015 vs. Current

System / Year	SFY 2015	Current	Impact / Change	2030 Goal
Interstate	4%	3%	-1%	2%
Primary	9%	8%	-1%	6%
Secondary	21%	15%	-6%	15%
Statewide (weighted average)	**16%**	**12%**	**-4%**	**10%**

While bridges being built today are designed for a 75-year life or longer, most of the bridges on the state system were designed for a useful life between 50-60 years. However, not all bridges that exceed this age are inherently SD, or even necessarily FO. There are a number of bridges in excess of this age that are safely handling traffic and are not SD or FO. By contrast, there are a number of bridges that have become SD well in advance of the 50 to 60 year average age expectation. This can be due to a variety of factors including harsh environments, higher than anticipated traffic volumes and

local/regional development. Over 5,000 of the Department's bridges are over 50 years old, and many are likely nearing the end of their useful lives. As these bridges continue to deteriorate with age and continued exposure to traffic and environment, they will become poor in condition and considered SD. Figure 13 provides the count of bridges by age and SD percentage by age. In addition, Figure 14 shows the number of bridges that have become SD in each of the last 6 years since 2013.

Figure 13 Bridge Age versus Percent SD

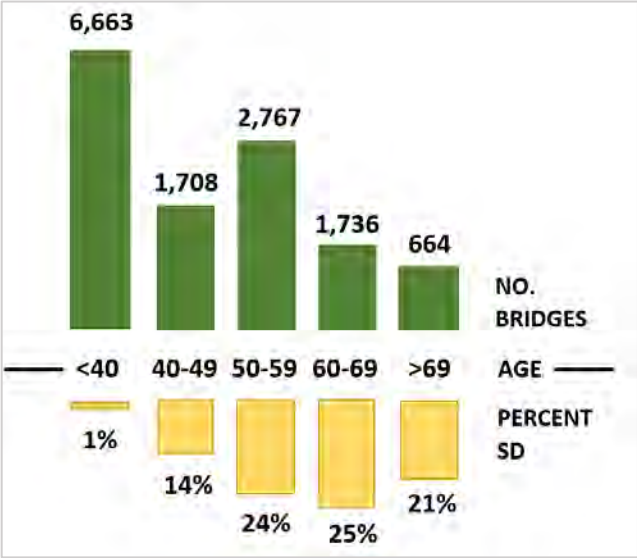
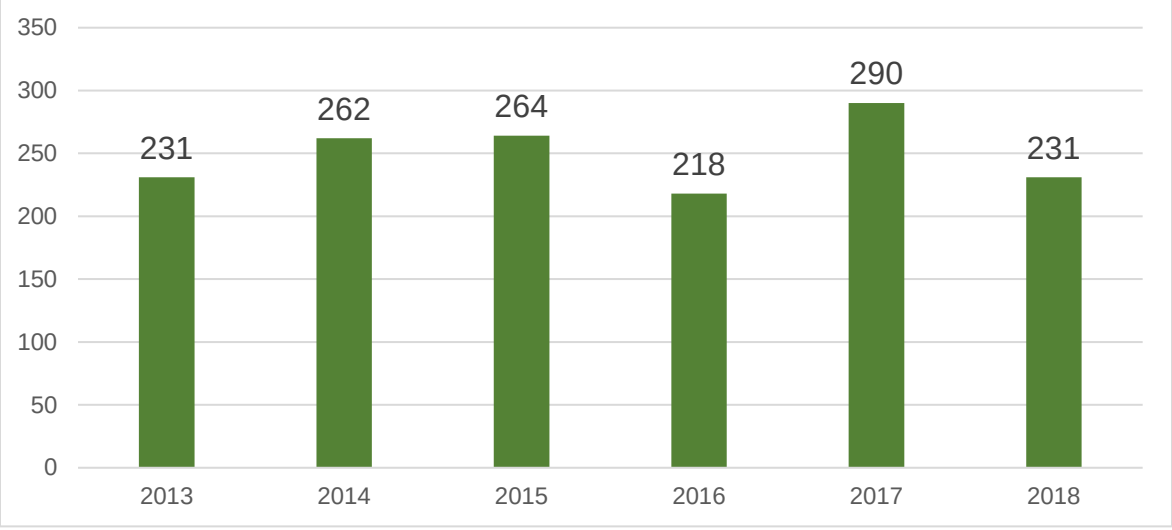
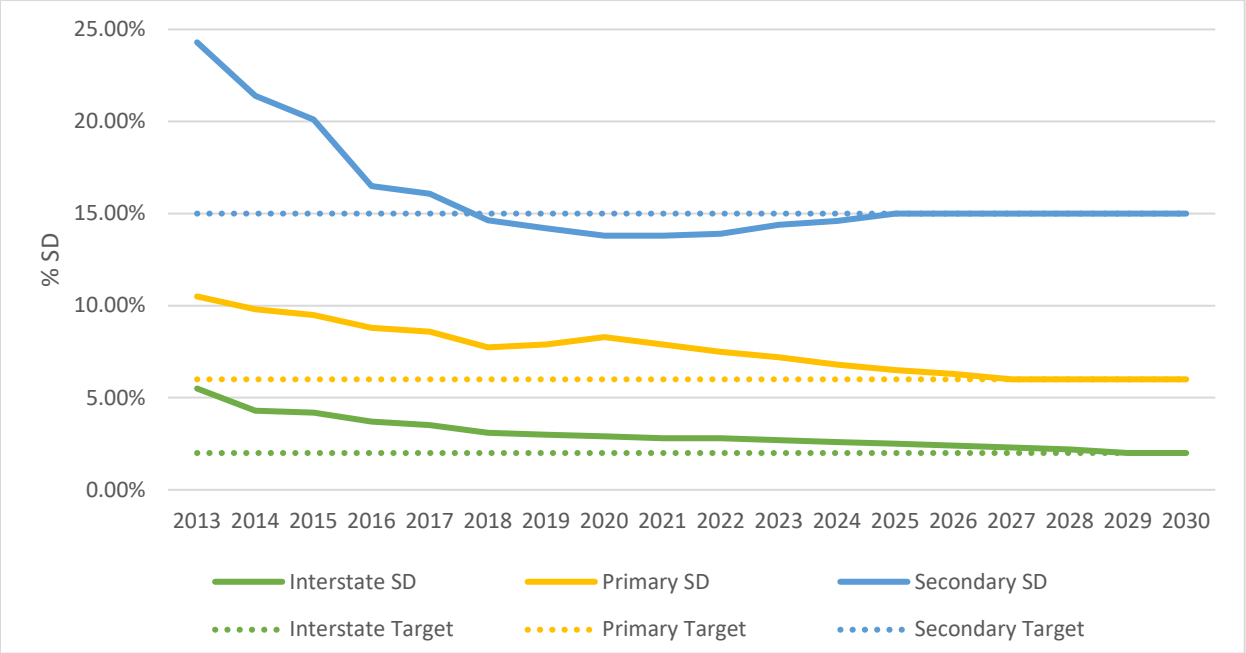


Figure 14 Number of New SD bridges 2013 to 2018



At current funding levels, the Department is confident the Bridge Program will be able overcome deterioration to continue recent condition improvements and achieve statewide goals by, or before, year 2030. Figure 15 provides both recent and predicted performance for the Department's bridge inventory (see Appendix 2 for detailed data).

Figure 15 Historical and Forecasted SD Bridges by Network



Several risks to achieve these goals have been identified. If the Department's "high value bridges", those which would cost more than $20 million to replace, are allowed to deteriorate, then progress toward goals may slow as a large portion of available funds would be required to replace a small number of costly structures. Additionally, while the annual average number of bridges becoming SD has stayed relatively constant, there is risk of this number increasing given the large portion of the bridge system that is nearing the average end of life age.

The Department is currently able to manage these risks, and maintains confidence in projected performance, with the newly implemented Bridge Preservation Program. These funds are used to employ cost effective solutions to maximize bridge life and lower lifetime costs. The program is targeting high value bridges with innovative preservation projects that will prevent continued deterioration and circumvent replacement. Once the risk associated with the high value bridge inventory is mitigated, bridge preservation funds will be employed on a larger number of bridges which is expected to reduce the number of bridges becoming SD each year and lower funds required for maintenance.

Figure 16 Bonner Bridge (high value bridge)

Bridge Program—Replacements

As shown in Figure 15, 21 percent of bridges on the secondary system were rated SD in 2015. That number has been reduced to 15 percent in less than four years due to the recent increase in Bridge Program funds provided. These funds were used in a concerted effort to improve the secondary system and the Department is now focused on ensuring these gains are maintained or further improved upon.

Having achieved the goal for the secondary system, the Department has increased focus on the primary system to achieve all goals by 2030. Since primary system bridges are much more costly to replace, often

between 5 and 10 times that of a secondary bridge, the rate of progress is expected to be slower than experienced with the secondary system.

As shown in Table 7, the Department will use approximately $560 million provided in the 2019 and 2020 Bridge Program to fund the replacement of approximately 376 bridges or 2.8 percent of the total bridge inventory. It is important to note that the impact on SD does not account for additional bridges that will become structurally deficient during this period, so the net reduction of SD percentages will be less than a 2.8% reduction (See Appendix 2 for details on replacement impact by Division).

Figure 17 Bridge Replacement

Table 7 Impact of Bridge Program Replacements on SD Percentages through SFY 2020

SD Bridges by Division - Plan, Production and Impact on % SD					
Road System	**Total Bridges**	**SD Bridges**	**Current % SD**	**Replacements SFY19 & SFY20**	**Impact on %SD**
Interstate	1005	33	3.30%	1	0.1%
Primary	4282	338	7.90%	79	1.8%
Secondary	8299	1237	14.90%	296	3.6%
Statewide	**13,586**	**1,608**	**11.80%**	**376**	**2.8%**

Bridge Program—Preservation

Figure 18 Damaged and Repaired Bridge Deck

these preservation projects is $175 million. The remaining funds provided by the Bridge Preservation Program are allocated to Divisions to assist state bridge maintenance crews in prolonging the life of our bridges by funding preservation projects, timely bridges repairs, and maintaining bridge components critical to reducing long term maintenance costs.

Table 8 High Value Bridge Preservation Projects through 2020

Fiscal Year	# Bridges	Cost to Preserve	Cost to Replace
2019	42	$108 million	$1,123 million
2020	67	$67 million	$3,440 million

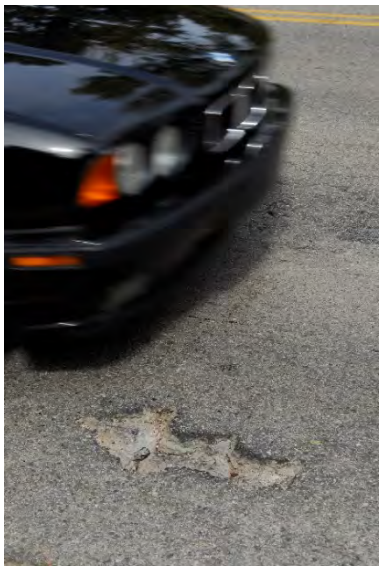
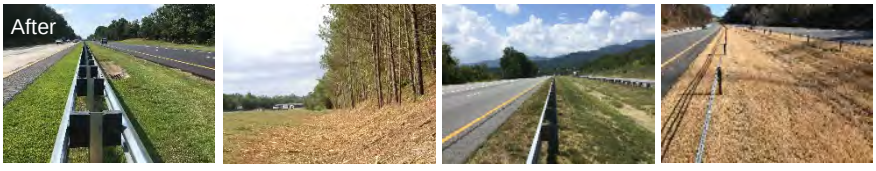
Sample of projects included in the 2019-2020 Bridge Preservation Program:

Bridge No.	County	Route Carried	Intersected Feature	Cost to Preserve ($M)	Cost to Replace ($M)
000148	Alamance	I40	Haw River	$2.2	$36.2
060025	Beaufort	US17 BUS	Pamlico River	$2.6	$51.0
060353	Beaufort	US17	Tar River	$1.8	$733.6
090013	Brunswick	NC904	ICW	$5,.6	$40.6
100705	Buncombe	SR3548	French Broad River	$4.0	$32.5
270009	Dare	US64	Croatan Sound	$34.5	$269.1
270012	Dare	US64	Roanoke Sound	$11.5	$229.6
350143	Gaston	I85	S. Catawba River	$5.2	$70.0
350159	Gaston	I85	Catawba River	$4.8	$114.3
410063	Halifax	US158	Roanoke River	$2.2	$23.6
440108	Henderson	I26WBL	Green River	$7.7	$25.6
440112	Henderson	I26EBL	Green River	$7.7	$25.6
640011	New Hanover	US74	NE Cape Fear River	$9.0	$97.7
710014	Perquimans	US17S	Perquimans River	$2.2	$64.7
830050	Stanly	NC24	Pee Dee River	$4.8	$32.5
910270	Wake	SR1005	I-440	$2.5	$20.3
930015	Washington	NC32	Albemarle Sound	$6.0	$419.8

HIGHWAY ASSETS

The General Maintenance Reserve (GMR) and Roadside Environmental appropriation supports a wide range of essential activities summarized in Table 9.

Table 9 Summary of General Maintenance and Roadside Environmental Activities

General Maintenance and Roadside Environmental Activities	
Routine Maintenance Improvement Plan (RMIP)	Routine maintenance includes activities that are performed on a recurring basis and are associated with the maintenance and upkeep of the system. These maintenance activities can be viewed in two categories: **Planned routine maintenance activities** – These activities are planned based on condition and LOS targets. Examples include shoulders and ditch maintenance, crossline pipe replacements, pavement striping, bridge joint repairs, mowing, and painting steel girders, among others. **Reactionary routine maintenance activities** – These are activities that cannot be planned and typically require an immediate response. Examples of these activities include pothole repair, removal of hazards, guardrail repair, among others. 
Roadside Environmental	Funds are used to support vegetation management and beautifying roadways. The Department has numerous contracts for these activities including mowing, long arm mowing, string trimming, litter removal, tree removal and rest area maintenance.   

Statewide Programs	
Asset maintenance and operations	Funds are used to support statewide needs including condition assessments, incident management and rest area renovations.
Snow and ice activities, and non-declared emergencies	Funds used for snow and ice removal account for roughly 70% of the statewide program. Needs for snow and ice removal activities in a given year are based on a 5-year average expenditure of approximately $75 million and can range from $15 million to $90 million. Because of the wide range of potential expenditures and challenges with forecasting needs, budget allocation each year also includes overages from the previous year. Funds are also used to cover unanticipated expenditures for non-declared emergency operations such as hurricanes. 
Research and development	Funds are used for research, developing and piloting technologies, practices and procedures such as Institute for Transportation Research Education (ITRE) programs and customer service surveys
State and Federal obligations	Funds are required to support state or local federal laws, regulations or rules including railroad signal maintenance, overweight/ oversize bridge repairs, and weigh station maintenance.

RMIP Planning and Implementation

The asset inventory and cycle-based program requires the setting of goals for specific roadway, roadside, traffic and bridge maintenance operations. Most RMIP goals are set based on the lifecycle of the asset and the calculated or known inventories of assets. Some items such as mowing, and litter control are based on the number of cycles that are performed each year. Based on best practices and field experience, current activity cycle time were established to determine goal amounts (summarized in Table 10 below.) These select activities form a major part of highway maintenance activities for drainage, traffic and roadside. The Department will

Figure 19 Blocked Crossline Pipe

periodically review and update cycle time with new industry research and standards. In addition, the Department intends to vary cycle times by division to account for unique geographic and roadway conditions across the state.

Table 10 Activity Cycle Time for Major Activities

Select Activities	Activity Cycle Time (Target)
Replacing Drainage Pipe <= 48'' (LFT)	50 years
Replacing Drainage Pipe > 48'' (LFT)	50 years
Bridge Joints (LFT)	7 years
Ditch Maintenance (SHM)	8 years
Shoulder Maintenance (SHM)	8 years
Installing Pavement Markings (Paint) (LFT)	4 years
Installing Long Life Pavement Markings (Thermo, Poly) (LFT)	10 years
Replacing Ground Mounted Signs* (SFT)	20 years
Brush and Tree (SHM)	5 years
Mowing – Interstate (SHM)	2.5 months
Mowing – Primary (SHM)	2.5 months
Mowing – Secondary (SHM)	2.5 months

*life cycle for ground mounted signs recently increased from 10 to 20 years

Major RMIP activities along with the amount of work planned and accomplished is summarized in Table 11. For most of the activities, the amount accomplished closely track or exceed the planned expectation. When a lag occurs in the amount accomplished, it reflects a need for more specialized contractors or supplier production. In addition, some assets may last longer than expected and needs may fluctuate year to year. For example, long-life marking is worsened by repeated plowing operations and the deterioration depends on the type and number of winter weather events.

Figure 20 Damaged Pavement Markers

As shown in Table 11 below, actual cycle time, based on the amount of work accomplished, is greater than recommend targets (refer to Appendix 3 for Division details). To reach established targets, additional investment is required. More importantly, sustaining long term investment for routine maintenance and operations activities will decrease reactive maintenance work and increase overall pavement condition.

Table 11: Statewide RMIP Summary

RMIP Activities / Quantities	Planned Work	Accomplished Work	Percent Accomplished	Actual Cycle Time (years)
Bridge Joints	136,206	56,629	42%	17
Bridge Pipe	40,658	39,202	96%	52
Brush and Tree	95,363	104,656	110%	5
Ground Signs	1,287,250	872,184	68%	15
IMAP	79,948	132,204	165%	N/A
Litter	151,828	187,331	123%	N/A
Maintenance Pipe	277,977	227,894	82%	61
Mowing	829,330	2,227,699	269%	N/A
Pavement Markings - Long Life	22,834,863	28,011,901	123%	8
Pavement Markings - Paint	271,022,729	208,734,859	77%	5
Rest Area Maintenance	17,224,098	16,720,571	97%	N/A
Shoulder and Ditch	21,488	19,298	90%	9
Traffic Signal Maintenance	13,406	23,779	177%	N/A

The Roadside Environmental Unit performed over 1,400 route inspections on Interstate and Primary routes in 2018 as shown in Table 12. The assessment validates the performance of the contractors and their ability to perform the mowing, litter cleanup, and trimming by the holiday target dates for Memorial Day, July 4th, Labor Day, and Veterans Day/ Thanksgiving. Routes were evaluated to determine if the cycle of work was completed by the holiday. The following chart represents the percentage of inspected interstate and primary routes that were completed by the holiday target dates.

Figure 21 Litter Management

Table 12 Roadside Environmental Performance

Major Holiday	Memorial Day	July 4th	Labor Day	Veterans Day/Thanksgiving
Mowing Operations	81%	88%	89%	99%
Litter Management	96%	94%	95%	95%
Guardrails/Signs/Bridges	79%	83%	85%	96%
Statewide Average	85%	88%	89%	97%

Figure 22 Roadside Beautification

The Department understands that the importance of customer service and citizen's requests and legislative compliance are a priority. However, costs related to these responses also influence overall maintenance expenditures and planned accomplishments. Pursuant to NCGS 136-18.05 and the implementation of Responsiveness, Efficiency, Performance, Oversight, Restructure, and Transparency (REPORT) DOT program, the Department is closely tracking and quantifying activities and associated expenditures.

The Citizen Action Request System (CARS) records citizen's requests into a centralized work order system and in timely manner, sends information to appropriate field crews. CARS Action Requests (ARs) are routed to the relevant unit within the Department. Each county or division unit develops an internal system for distributing ARs, following up with field forces and the requesting party/ motorist, and then after repairs are completed, there is a process to document and close the AR. In 2018, the Department received and in a timely manner completed approximately 55,367 ARs.

3. SAFETY AND MOBILITY

Update and Trends

An efficient transportation network means faster and more reliable travel times for both people and goods. For example, with predictable travel times manufactures can reduce distribution costs, and in turn, pass savings onto consumers. This section uses three measures to evaluate mobility. Each one provides insights into different aspects of congestion and should be viewed together to provide a more complete picture.

- Travel Time Index – the variability of travel time during rush hour
- Average Number of Congested Hours – the number of hours that speeds are slow
- Travel Time Reliability – the variability of travel time on a "bad day"

Travel Time Index

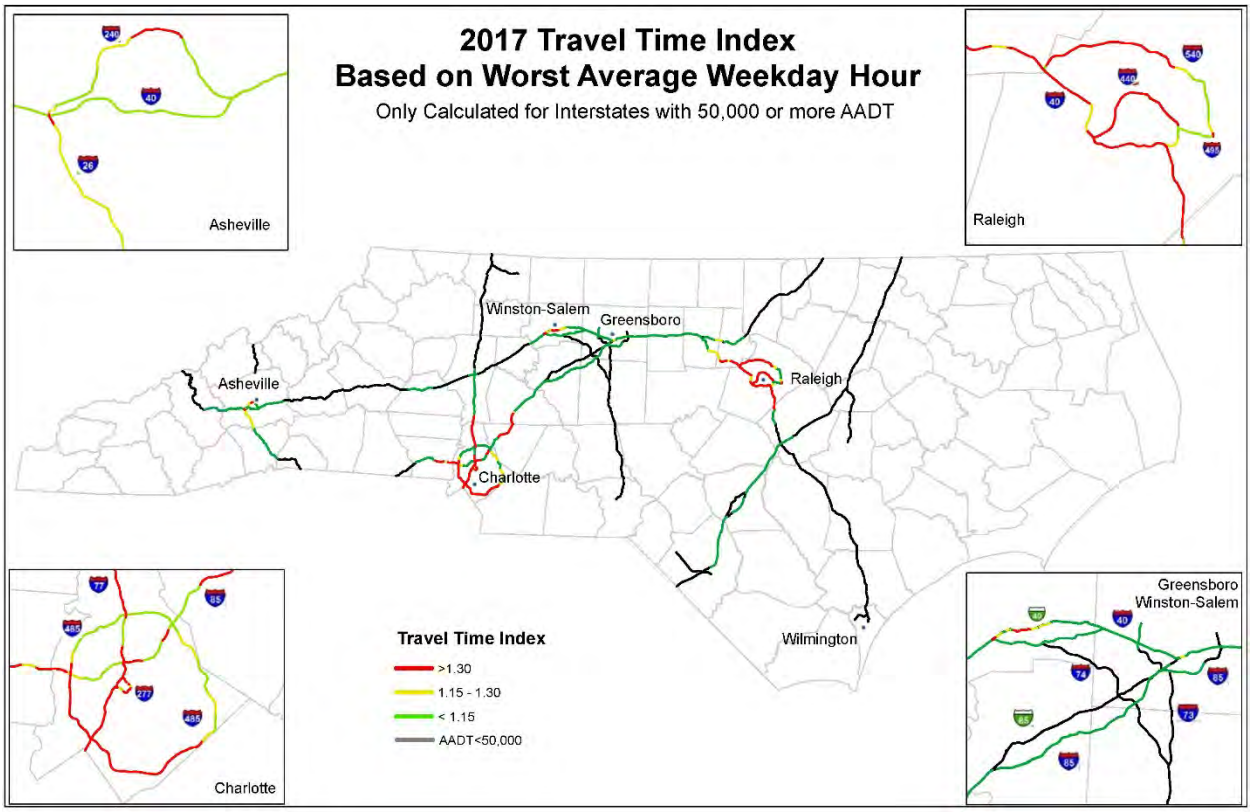
The first way the Department evaluates congestion is by comparing the variability of travel times. Specifically, travel at the speed limit is compared to travel during rush hour. This comparison is known as Travel Time Index or TTI. For example, if a trip takes 20-minutes when made at the speed limit and that same trip takes 30 minutes during rush hour, the Travel Time Index is 30/20 =1.50 and the Congestion Level is "Poor." The values and levels are given in Table 13. The higher the TTI the more travel time varies between rush hour and non-rush hour trips. This means that commuters and businesses must allow extra time to make a trip during those hours.

Table 13 Congestion Level and Travel Time Index

Congestion Level	Additional Travel Time/Travel Speed	Travel Time Index	
Great	■ Congestion increases trip time by less than 15% ■ Travel speed within 15% of Posted Speed Limit (PSL)	<1.15	
Good	■ Congestion increases trip time by 15%-30% ■ Travel speeds 15%-30% below PSL	1.15 to 1.30	
Poor	■ Congestion increases trip time by over 30% ■ Travel speeds 30% below PSL	>1.30	

During the most congested hour of the day 73 percent of heavily travelled interstates were rated as Great, 9 percent were rated as Good and 18 percent were rated as Poor. Interstate congestion is concentrated in urban and suburban areas including Raleigh, Charlotte, Asheville, Greensboro and Winston-Salem, shown in Figure 14.

Figure 23 Levels of Traffic Congestion on Heavily Travelled Interstates, 2017



Average Number of Congested Hours

A second dimension of congestion is "How long does it last?" On freeways the Department considers congestion to begin when speeds drop below 45 miles per hour. Table 14 shows the average number of hours that speeds drop below 45 miles per hour at the top 10 congested locations. I-77 in the Charlotte area experiences Poor congestion levels during rush hour (TTI greater than 1.15) and the most frequent congestion in the state, with several locations experiencing between an average of 4-7 hours of congestion per day.

Table 14 Highest Average Number of Congested Hours on Heavily Travelled Interstates, 2017

Rank	Route	County	Direction	Location	Length (miles)	Avg. Congested Hours per Day
1	I-77	Mecklenburg	South	NC-73/EXIT 25 - GILEAD RD/EXIT 23	5.4	7.0
2	I-77	Mecklenburg	North	I-485/J G MARTIN FWY/EXIT 2 - US-521/WOODLAWN RD/EXIT 6	4.9	5.0
3	I-277	Mecklenburg	Outer	I-77/US-21/EXIT 5 -US-29/NC-49	1	6.0
4	I-77	Mecklenburg	North	GILEAD RD/EXIT 23 -NC-73/EXIT 25	5	6.0
5	I-77	Mecklenburg	South	I-277/US-74/EXIT 9-NATIONS FORD RD/EXIT 4	5.3	5.0
6	I-77	Mecklenburg & Iredell	South	LANGTREE RD/EXIT 31-IREDELL/MECKLENBURG CO LINE	3.4	4.0

Rank	Route	County	Direction	Location	Length (miles)	Avg. Congested Hours per Day
7	I-277	Mecklenburg	Outer	NC-16/FOURTH ST/EXIT 2-US-74/EXIT 2	0.7	4.0
8	I-85	Cabarrus	North	NC-73/EXIT 55	1.4	3.0
9	I-85	Gaston	South	NC-273/EXIT 27	2.6	3.0
10	I-440	Wake	West	LAKE BOONE TRL/EXIT 5	1.7	3.0

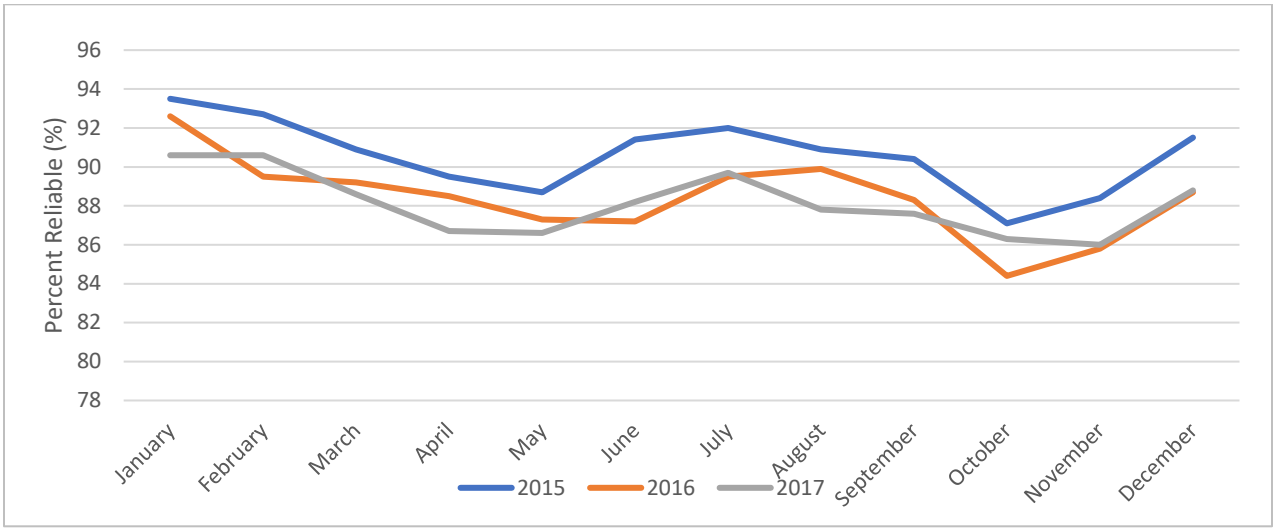
Travel Time Reliability

In addition to assessing the variability in travel times during different periods of the day the Department also evaluates day to day travel time reliability. The Level of Travel Time Reliability (LOTTR) index represents how poorly a road performs on a "bad day" – i.e. that day with a crash, weather event or active work zone, compared to an average day. For example, if it takes a motorist 40 minutes to make a given trip on a bad day compared with 20 minutes to make the same trip on an average day, then the LOTTR would be 40/20 = 2.0. The Federal Highway Administration defines an LOTTR higher than 1.5 to mean that the road was considered "unreliable". This means that the there is a wide variability in travel times from day to day. In addition to the trip taking longer than normal, this variability makes trip planning challenging for motorists.

Figure 24 Peak Period Congestion

Figure 22 below shows the percent reliability on North Carolina Interstates over the last 3 years. The values show what percentage of our 1,270 miles of Interstate are operating with a LOTTR of better than 1.5 and therefore operating reliably. The peaks and valleys can be explained by seasonality. For example, October is often when hurricane season occurs and for example, in 2017 LOTTR drops in October through November due to Hurricane Matthew.

Figure 25 Monthly Interstate Reliability



Responding to Roadway Incidents

Clearing accidents quickly minimizes delay and improves travel time reliability and safety. The Department works with local first responders to promote the “quick clearance” of incidents that disrupt the flow of traffic. In 2017, the State’s average incident clearance time was 75 minutes. When compared to a best practice of “90% of incidents cleared within 90 minutes”, the Department is currently clearing 79% of incidents within 90 minutes. The Department is conducting SHRP-2 Incident Responder training to increase the number of first responders who have been educated on the methods and benefits of quick clearance. In addition, the Department is working towards establishing multi-agency shared incident clearance goals with the NC State Highway Patrol for quicker clearance of traffic crashes through coordinated efforts.

APPENDIX 1

Contract Resurfacing— Primary System (Planned 2017, Completed and Under Contract 2017)							
Division	**Primary System Inventory**	**Planned**	**% of system planned**	**Cycle Time**	**Completed + Under Contract**	**% of system treated**	**Cycle Time**
1	**3,246**	152	5%	21	154	5%	21
2	**2,873**	49	2%	59	71	2%	40
3	**3,039**	107	4%	28	136	4%	22
4	**3,282**	165	5%	20	176	5%	19
5	**2,648**	281	11%	9	327	12%	8
6	**3,017**	133	4%	23	156	5%	19
7	**1,849**	38	2%	49	73	4%	25
8	**2,662**	270	10%	10	292	11%	9
9	**1,618**	69	4%	23	83	5%	19
10	**2,151**	75	3%	29	75	3%	29
11	**2,079**	155	7%	13	160	8%	13
12	**2,114**	198	9%	11	243	11%	9
13	**2,027**	157	8%	13	171	8%	12
14	**2,257**	54	2%	42	56	2%	40
Statewide	**34,863**	**1,903**	**5%**	**18**	**2,172**	**6%**	**16**

Contract Resurfacing—Secondary System (Planned 2017, Completed and Under Contract 2017)							
Division	**Secondary System Inventory**	**Planned**	**% of system planned**	**Cycle Time**	**Completed + Under Contract**	**% of system treated**	**Cycle Time**
1	**6,969**	369	5%	19	374	5%	19
2	**7,411**	140	2%	53	174	2%	42
3	**8,464**	290	3%	29	308	4%	27
4	**9,655**	148	2%	65	315	3%	31
5	**10,895**	497	5%	22	510	5%	21
6	**9,405**	216	2%	44	156	2%	60
7	**8,922**	236	3%	38	406	5%	22
8	**10,940**	201	2%	54	356	3%	31
9	**8,357**	105	1%	80	106	1%	79
10	**8,291**	127	2%	65	140	2%	59
11	**8,638**	119	1%	73	157	2%	55
12	**10,121**	228	2%	44	319	3%	32
13	**7,589**	302	4%	25	365	5%	21
14	**6,845**	211	3%	32	259	4%	26
Statewide	**122,502**	**3,189**	**3%**	**38**	**3,945**	**3%**	**31**

Pavement Preservation—Secondary System (Planned 2017, Completed and Under Contract 2017)							
Division	Primary System Inventory	Planned	% of system planned	Cycle Time	Completed + Under Contract	% of system treated	Cycle Time
1	6,969	199	3%	35	326	5%	21
2	7,411	73	1%	102	519	7%	14
3	8,464	379	4%	22	144	2%	59
4	9,655	181	2%	53	630	7%	15
5	10,895	283	3%	38	237	2%	46
6	9,405	319	3%	29	526	6%	18
7	8,922	302	3%	30	440	5%	20
8	10,940	413	4%	26	717	7%	15
9	8,357	430	5%	19	654	8%	13
10	8,291	380	5%	22	387	5%	21
11	8,638	553	6%	16	517	6%	17
12	10,121	277	3%	37	310	3%	33
13	7,589	227	3%	33	468	6%	16
14	6,845	601	9%	11	474	7%	14
Statewide	**122,502**	**4,617**	**4%**	**27**	**6,348**	**5%**	**19**

APPENDIX 2

Historical and Forecasted SD Bridges by Network

	Year	Interstate	Primary	Secondary	Statewide
PAST	2013	5.50%	10.50%	24.30%	18.70%
	2014	4.30%	9.80%	21.40%	16.50%
	2015	4.20%	9.50%	20.10%	15.60%
	2016	3.70%	8.80%	16.50%	13.10%
	2017	3.51%	8.58%	16.07%	12.78%
CURRENT	2018	3.09%	7.73%	14.64%	11.60%
PREDICTED	2019	3.00%	7.90%	14.20%	11.40%
	2020	2.90%	8.30%	13.80%	11.20%
	2021	2.80%	7.90%	13.80%	11.00%
	2022	2.80%	7.50%	13.90%	11.10%
	2023	2.70%	7.20%	14.40%	11.30%
	2024	2.60%	6.80%	14.60%	11.00%
	2025	2.50%	6.50%	15.00%	10.80%
	2026	2.40%	6.30%	15.00%	10.40%
	2027	2.30%	6.00%	15.00%	10.30%
	2028	2.20%	6.00%	15.00%	10.10%
	2029	2.00%	6.00%	15.00%	10.00%
	2030	2.00%	6.00%	15.00%	10.00%

Primary System SD bridges by Division and Replacement Impact

Division	Total Bridges	SD	Current SD%	SFY18 and SFY19 Replacements	Impact on %SD*
1	286	20	7%	4	1%
2	287	20	7%	6	2%
3	291	16	5%	10	3%
4	446	26	6%	7	2%
5	393	19	5%	2	1%
6	301	15	5%	4	1%
7	266	42	16%	11	4%
8	338	9	3%	2	1%
9	301	55	18%	6	2%
10	298	23	8%	3	1%
11	205	25	12%	10	5%
12	275	17	6%	4	1%
13	298	28	9%	5	2%
14	297	23	8%	6	2%
Statewide	**4,282**	**338**	**8%**	**79**	**2%**

Secondary System SD Bridges by Division and Replacement Impact

Division	Total Bridges	SD Bridges	Current SD%	SFY18 and SFY19 Replacements	Impact on %SD
1	284	27	10%	12	4%
2	325	42	13%	17	5%
3	353	63	18%	11	3%
4	441	51	12%	15	3%
5	507	63	12%	29	6%
6	391	50	13%	22	6%
7	520	80	15%	21	4%
8	556	52	9%	12	2%
9	388	44	11%	20	5%
10	496	45	9%	30	6%
11	1,066	261	25%	24	2%
12	611	85	14%	19	3%
13	1,151	189	16%	33	3%
14	1,210	185	15%	31	3%
Statewide	**13,586**	**1608**	**12%**	**85**	**1%**

APPENDIX 3

RMIP Goals by Division

Division	RMIP Asset Group	UOM	GOAL
1	Bridge Joints	LFT	9,825
2	Bridge Joints	LFT	6,452
3	Bridge Joints	LFT	6,968
4	Bridge Joints	LFT	8,593
5	Bridge Joints	LFT	12,193
6	Bridge Joints	LFT	7,035
7	Bridge Joints	LFT	9,577
8	Bridge Joints	LFT	6,921
9	Bridge Joints	LFT	8,701
10	Bridge Joints	LFT	10,978
11	Bridge Joints	LFT	5,095
12	Bridge Joints	LFT	7,769
13	Bridge Joints	LFT	7,958
14	Bridge Joints	LFT	5,405

Division	RMIP Asset Group	UOM	GOAL
1	Bridge Pipe	LFT	1,831
2	Bridge Pipe	LFT	2,524
3	Bridge Pipe	LFT	2,791
4	Bridge Pipe	LFT	1,868
5	Bridge Pipe	LFT	3,286
6	Bridge Pipe	LFT	3,110
7	Bridge Pipe	LFT	2,727
8	Bridge Pipe	LFT	1,440
9	Bridge Pipe	LFT	2,540
10	Bridge Pipe	LFT	2,513
11	Bridge Pipe	LFT	2,993
12	Bridge Pipe	LFT	3,072
13	Bridge Pipe	LFT	2,555
14	Bridge Pipe	LFT	2,463

Division	RMIP Asset Group	UOM	GOAL
1	Brush and Tree	SHM	2,073
2	Brush and Tree	SHM	2,019
3	Brush and Tree	SHM	2,233
4	Brush and Tree	SHM	2,546
5	Brush and Tree	SHM	2,629
6	Brush and Tree	SHM	2,488
7	Brush and Tree	SHM	2,181
8	Brush and Tree	SHM	2,756
9	Brush and Tree	SHM	2,032
10	Brush and Tree	SHM	2,010
11	Brush and Tree	SHM	2,394
12	Brush and Tree	SHM	2,458
13	Brush and Tree	SHM	2,044
14	Brush and Tree	SHM	1,970

Division	RMIP Asset Group	UOM	GOAL
1	Ground Signs	SFT	18,403
2	Ground Signs	SFT	45,428
3	Ground Signs	SFT	50,234
4	Ground Signs	SFT	21,524
5	Ground Signs	SFT	59,152
6	Ground Signs	SFT	30,813
7	Ground Signs	SFT	49,079
8	Ground Signs	SFT	15,000
9	Ground Signs	SFT	25,146
10	Ground Signs	SFT	27,145
11	Ground Signs	SFT	19,877
12	Ground Signs	SFT	55,300
13	Ground Signs	SFT	45,608
14	Ground Signs	SFT	18,750

Division	RMIP Asset Group	UOM	GOAL
1	Litter	SHM	5,250
2	Litter	SHM	6,385
3	Litter	SHM	4,567
4	Litter	SHM	10,118
5	Litter	SHM	11,659
6	Litter	SHM	14,320
7	Litter	SHM	14,652
8	Litter	SHM	10,000
9	Litter	SHM	1,150
10	Litter	SHM	15,658
11	Litter	SHM	9,392
12	Litter	SHM	14,829
13	Litter	SHM	4,500
14	Litter	SHM	6,170

Division	RMIP Asset Group	UOM	GOAL
1	Maintenance Pipe	LFT	13,226
2	Maintenance Pipe	LFT	15,143
3	Maintenance Pipe	LFT	16,745
4	Maintenance Pipe	LFT	19,091
5	Maintenance Pipe	LFT	19,717
6	Maintenance Pipe	LFT	18,663
7	Maintenance Pipe	LFT	16,360
8	Maintenance Pipe	LFT	19,340
9	Maintenance Pipe	LFT	15,242
10	Maintenance Pipe	LFT	15,078
11	Maintenance Pipe	LFT	17,956
12	Maintenance Pipe	LFT	18,433
13	Maintenance Pipe	LFT	15,332
14	Maintenance Pipe	LFT	14,778

Division	RMIP Asset Group	UOM	GOAL
1	Mowing	SHM	55,853
2	Mowing	SHM	51,185
3	Mowing	SHM	37,645
4	Mowing	SHM	50,383
5	Mowing	SHM	72,400
6	Mowing	SHM	71,400
7	Mowing	SHM	52,300
8	Mowing	SHM	53,800
9	Mowing	SHM	35,980
10	Mowing	SHM	49,560
11	Mowing	SHM	45,470
12	Mowing	SHM	64,438
13	Mowing	SHM	31,438
14	Mowing	SHM	37,912

Division	RMIP Asset Group	UOM	GOAL
1	Pavement Markings - Long Life	LFT	2,526,183
2	Pavement Markings - Long Life	LFT	-
3	Pavement Markings - Long Life	LFT	2,311,955
4	Pavement Markings - Long Life	LFT	2,691,264
5	Pavement Markings - Long Life	LFT	11,583,350
6	Pavement Markings - Long Life	LFT	-
7	Pavement Markings - Long Life	LFT	1,658,027
8	Pavement Markings - Long Life	LFT	-
9	Pavement Markings - Long Life	LFT	-
10	Pavement Markings - Long Life	LFT	4,984,382
11	Pavement Markings - Long Life	LFT	1,690,979
12	Pavement Markings - Long Life	LFT	1,748,445
13	Pavement Markings - Long Life	LFT	1,806,162
14	Pavement Markings - Long Life	LFT	-

Division	RMIP Asset Group	UOM	GOAL
1	Pavement Markings - Paint	LFT	17,632,410
2	Pavement Markings - Paint	LFT	18,196,443
3	Pavement Markings - Paint	LFT	20,006,928
4	Pavement Markings - Paint	LFT	11,336,193
5	Pavement Markings - Paint	LFT	-
6	Pavement Markings - Paint	LFT	22,572,779
7	Pavement Markings - Paint	LFT	21,048,844
8	Pavement Markings - Paint	LFT	26,681,826
9	Pavement Markings - Paint	LFT	9,838,298
10	Pavement Markings - Paint	LFT	19,143,484
11	Pavement Markings - Paint	LFT	23,424,731
12	Pavement Markings - Paint	LFT	24,016,137
13	Pavement Markings - Paint	LFT	19,095,107
14	Pavement Markings - Paint	LFT	18,344,662

Division	RMIP Asset Group	UOM	GOAL
1	Rest Area Maintenance	DOL	1,145,880
2	Rest Area Maintenance	DOL	382,317
3	Rest Area Maintenance	DOL	496,609
4	Rest Area Maintenance	DOL	1,900,000
5	Rest Area Maintenance	DOL	790,000
6	Rest Area Maintenance	DOL	1,025,000
7	Rest Area Maintenance	DOL	135,000
8	Rest Area Maintenance	DOL	-
9	Rest Area Maintenance	DOL	994,000
10	Rest Area Maintenance	DOL	690,000
11	Rest Area Maintenance	DOL	440,000
12	Rest Area Maintenance	DOL	1,129,834
13	Rest Area Maintenance	DOL	60,000
14	Rest Area Maintenance	DOL	1,388,765

Division	RMIP Asset Group	UOM	GOAL
1	Shoulder and Ditch	SHM	1,296
2	Shoulder and Ditch	SHM	1,262
3	Shoulder and Ditch	SHM	1,395
4	Shoulder and Ditch	SHM	1,591
5	Shoulder and Ditch	SHM	1,643
6	Shoulder and Ditch	SHM	1,555
7	Shoulder and Ditch	SHM	1,363
8	Shoulder and Ditch	SHM	1,499
9	Shoulder and Ditch	SHM	1,270
10	Shoulder and Ditch	SHM	1,156
11	Shoulder and Ditch	SHM	1,496
12	Shoulder and Ditch	SHM	1,190
13	Shoulder and Ditch	SHM	1,278
14	Shoulder and Ditch	SHM	1,232

Division	RMIP Asset Group	UOM	GOAL
1	Traffic Signal Maintenance	EA	75
2	Traffic Signal Maintenance	EA	1,745
3	Traffic Signal Maintenance	EA	510
4	Traffic Signal Maintenance	EA	1,723
5	Traffic Signal Maintenance	EA	3,206
6	Traffic Signal Maintenance	EA	1,850
7	Traffic Signal Maintenance	EA	-
8	Traffic Signal Maintenance	EA	876
9	Traffic Signal Maintenance	EA	500
10	Traffic Signal Maintenance	EA	2,014
11	Traffic Signal Maintenance	EA	1,156
12	Traffic Signal Maintenance	EA	1,508
13	Traffic Signal Maintenance	EA	1,648
14	Traffic Signal Maintenance	EA	638