Biennial Report on Maintenance Requirements
G.S. 136-44.3

Requires NCDOT to:

- Establish Performance Standards
- Project an annual cost to meet and sustain the performance standards for routine maintenance and operations
- Develop a cost for Pavement and Bridge Preservation
- Develop a cost for Pavement and Bridge Rehabilitation
- Project System Condition at optimal funding for 7 years
North Carolina
State Highway System 2009

- 79,185 road miles
- 160,630 paved lane miles
- 4,592 miles of unpaved roads
- 18,205 structures
- 88.1 M square feet bridge deck area
- 8,900 signals
North Carolina Freight Movement

In 2007:
- 281 million tons moved across N.C. annually
- 770,000 tons per day

In 2030:
- Expect more than 324 million tons to be moved across N.C. annually
- 15% increase
Highway System Usage
(Vehicle Miles Traveled)
History of Routine Maintenance Funding

$292.0 million
$83.0 million

Years: 2000 to 2010
Allocations:
- $292.0 million in 2000
- $83.0 million in 2001

CPI Adjusted:
- $292.0 million in 2000
- $83.0 million in 2001
History of Resurfacing Funding

$186.0 million
$86.0 million

Year
Allocation
CPI Adjusted
Policy to Projects Framework

N.C. Transportation Plan (20 Year)
• Documents mission, goals, objectives, and strategies
• Guides investment decisions

NCDOT Program and Resource Plan (10 Year)
• Allocates funds for all programs (Highway, Rail, Aviation, Public Transportation, Ferry, Bicycle and Pedestrian, etc.)
• Projects ranked (prioritized) based on data
• Includes realistic STIP

NCDOT Work Program (5 Year)
• Comprehensive list of projects, programs and services
• Reliable and fiscally constrained
• 95% delivery rate
Performance Based Management

Benefits include:
- Moving towards uniformly constructed, maintained and operated Highway System
- Data driving decision making
- Increased focus on preventive maintenance
- Targeting Level Of Service by system
- Highest and best use of resources
- Challenging and rewarding workplace
- Accountability
Performance Measures

Sets clearly defined outcomes such as:
- No unsealed cracks in pavements
- Bridge decks rating in good condition
- No pipes blocked or damaged
- Pavement markings visible at night

Since 2008:
- Reviewed targets to ensure accuracy
- Made modifications as necessary
- Simplified and streamlined
Rating the Condition of the Highway System

Maintenance Condition Survey

Pavement Condition Survey

Bridge Condition Survey
## Maintenance Condition Survey Results

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>ELEMENT</th>
<th>PERFORMANCE MEASURE</th>
<th>Target</th>
<th>Score</th>
<th>2010 State Average</th>
<th>Score</th>
<th>2010 State Average</th>
<th>Score</th>
<th>2010 State Average</th>
<th>Score</th>
<th>2010 State Average</th>
<th>Score</th>
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<tbody>
<tr>
<td>DRAINAGE</td>
<td>Unpaved Shoulders</td>
<td>No drop-offs greater than 3” and no shoulder higher than 2”</td>
<td>95</td>
<td>91</td>
<td>90</td>
<td>89</td>
<td>85</td>
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<td></td>
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<tr>
<td></td>
<td>Ditches</td>
<td>No blocked or eroded ditches</td>
<td>95</td>
<td>98</td>
<td>90</td>
<td>94</td>
<td>85</td>
<td>94</td>
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<tr>
<td></td>
<td>Crossline Pipe (Blocked)</td>
<td>Greater than 50% diameter open</td>
<td>95</td>
<td>87</td>
<td>90</td>
<td>78</td>
<td>85</td>
<td>74</td>
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<tr>
<td></td>
<td>Crossline Pipe (Damaged)</td>
<td>No damage or structural deficiency</td>
<td>95</td>
<td>93</td>
<td>90</td>
<td>95</td>
<td>85</td>
<td>91</td>
<td></td>
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<tr>
<td></td>
<td>Curb &amp; Gutter (Blocked)</td>
<td>No obstruction &gt; 2” for 2 feet</td>
<td>95</td>
<td>97</td>
<td>90</td>
<td>96</td>
<td>85</td>
<td>96</td>
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<tr>
<td></td>
<td>Boxes (Blocked or Damaged)</td>
<td>Not blocked &gt; 50%, damaged or broken</td>
<td>95</td>
<td>82</td>
<td>90</td>
<td>87</td>
<td>85</td>
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<td>ROADSIDE</td>
<td>Vegetation (Brush &amp; Tree)</td>
<td>Cleared to Freeway and Non-Freeway standards</td>
<td>90</td>
<td>90</td>
<td>85</td>
<td>85</td>
<td>80</td>
<td>80</td>
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<td></td>
<td>Vegetation (Turf Condition)</td>
<td>Areas free of erosion</td>
<td>95</td>
<td>84</td>
<td>90</td>
<td>83</td>
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<td>86</td>
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<td></td>
<td>Stormwater Devices (NPDES)</td>
<td>Functioning as designed</td>
<td>90</td>
<td>94</td>
<td>90</td>
<td>94</td>
<td>90</td>
<td>94</td>
<td></td>
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<td></td>
<td>Landscape Plant Beds</td>
<td>Minimum condition score of 2</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>N/A</td>
<td>N/A</td>
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<td>Rest Areas &amp; Welcome Ctrs</td>
<td>Condition rating of 90</td>
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<td>90</td>
<td>95</td>
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<td>TRAFFIC</td>
<td>Long Line Pavement Markings</td>
<td>Present, visible</td>
<td>90</td>
<td>93</td>
<td>85</td>
<td>90</td>
<td>80</td>
<td>81</td>
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<tr>
<td></td>
<td>Words and Symbols</td>
<td>Present, visible</td>
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<td>73</td>
<td>85</td>
<td>85</td>
<td>80</td>
<td>77</td>
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<tr>
<td></td>
<td>Pavement Markers</td>
<td>Present and reflective</td>
<td>90</td>
<td>84</td>
<td>85</td>
<td>59</td>
<td>N/A</td>
<td>N/A</td>
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<td></td>
<td>Ground Mounted Signs</td>
<td>Visible and legible</td>
<td>90</td>
<td>94</td>
<td>85</td>
<td>91</td>
<td>85</td>
<td>85</td>
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</tr>
<tr>
<td></td>
<td>Overhead Signs</td>
<td>Visible and legible</td>
<td>92</td>
<td>93</td>
<td>85</td>
<td>80</td>
<td>85</td>
<td>100</td>
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<tr>
<td>BRIDGE</td>
<td>NBIS Culverts</td>
<td>Condition rating ≥ 6</td>
<td>85</td>
<td>86</td>
<td>85</td>
<td>86</td>
<td>85</td>
<td>89</td>
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<tr>
<td></td>
<td>Non-NBIS Culverts</td>
<td>Condition rating = Good</td>
<td>80</td>
<td>64</td>
<td>80</td>
<td>74</td>
<td>80</td>
<td>56</td>
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<td></td>
<td>Overhead Sign Structure</td>
<td>Condition rating = Good</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>93</td>
<td>95</td>
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<td></td>
<td>Totals</td>
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<td>91.27</td>
<td>89.79</td>
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<td>84.49</td>
<td>85.04</td>
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Performance Measure Trends
(Maintenance Condition Survey Results)
Pavements
Pavement Preservation

- Seals off pavement surface
- Reconditions underlying asphalt
- Refreshes driving surface

Treatments include:
- Crack sealing
- Chip seals
- Slurry pavement
- Micro-surfacing
Contract Resurfacing

- Provides renewed driving surface
- Improves ride quality
- Reduces patching and frequent maintenance
Pavement Rehabilitation

- Restores pavement condition
- Increases pavement structure

Treatments include:
- Mill and replace
- Overlay with thicker lifts
Pavement Condition
2000 - 2010

Interstate

Primary

Secondary

Total

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent</th>
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<tbody>
<tr>
<td>2000</td>
<td>80</td>
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<tr>
<td>2002</td>
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<td>2006</td>
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<td>2008</td>
<td>40</td>
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<td>2010</td>
<td>30</td>
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Target: 80%
PCT_GOOD: 70%
PCT_FAIR: 60%
PCT_POOR: 50%
Bridges
Bridge Management
Comprehensive Strategy

- Bridge Preservation
  - For bridges in good to fair condition
- Bridge Rehabilitation
  - For bridges in fair to poor condition
Bridge Preservation

- Painting Structural Steel
- Cleaning Bearings
- Repair and Replace Expansion Joints
- Apply Material to Slow Corrosion
- Waterproofing and Resurfacing Decks
Bridge Rehabilitation

- Restore Bridge Components
- More Expensive than Preservation
- Cost Effective on some bridges
## Bridge Condition Survey Results

<table>
<thead>
<tr>
<th>Bridge Deck</th>
<th>ELEMENT</th>
<th>PERFORMANCE MEASURE</th>
<th>Interstate</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010 Target</td>
<td>State Average Score</td>
<td>2010 Target</td>
</tr>
<tr>
<td>Concrete</td>
<td>% of decks rated greater than or equal to 6</td>
<td>85</td>
<td>85</td>
<td>80</td>
<td>79</td>
</tr>
<tr>
<td>Timber</td>
<td></td>
<td>85</td>
<td>NA</td>
<td>80</td>
<td>86</td>
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<tr>
<td>Steel Planks</td>
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<td>85</td>
<td>NA</td>
<td>80</td>
<td>71</td>
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<tr>
<td>Open Grid Steel</td>
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<td>85</td>
<td>NA</td>
<td>80</td>
<td>50</td>
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</table>

<table>
<thead>
<tr>
<th>Superstructure</th>
<th>ELEMENT</th>
<th>PERFORMANCE MEASURE</th>
<th>Interstate</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010 Target</td>
<td>State Average Score</td>
<td>2010 Target</td>
</tr>
<tr>
<td>Concrete</td>
<td>% of superstructure rated greater than or equal to 6</td>
<td>90</td>
<td>81</td>
<td>85</td>
<td>60</td>
</tr>
<tr>
<td>Steel</td>
<td></td>
<td>90</td>
<td>89</td>
<td>85</td>
<td>82</td>
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<tr>
<td>P/S Concrete</td>
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<td>96</td>
<td>85</td>
<td>95</td>
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<tr>
<td>Timber</td>
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<td>90</td>
<td>NA</td>
<td>85</td>
<td>43</td>
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</table>

<table>
<thead>
<tr>
<th>Substructure</th>
<th>ELEMENT</th>
<th>PERFORMANCE MEASURE</th>
<th>Interstate</th>
<th>Primary</th>
<th>Secondary</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010 Target</td>
<td>State Average Score</td>
<td>2010 Target</td>
</tr>
<tr>
<td>Timber</td>
<td></td>
<td>90</td>
<td>NA</td>
<td>85</td>
<td>40</td>
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<tr>
<td>Concrete Pile</td>
<td>% of substructure rated greater than or equal to 6</td>
<td>90</td>
<td>80</td>
<td>85</td>
<td>75</td>
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<td>Steel Pile</td>
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<td>85</td>
<td>84</td>
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<tr>
<td>Concrete Piers</td>
<td></td>
<td>90</td>
<td>91</td>
<td>85</td>
<td>81</td>
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</tbody>
</table>
Highway Operations

8900 Traffic Signals Statewide

- Signal maintenance provides:
  - Improved safety
  - Reduction in delays
  - Reduced fuel consumption
  - Improved air quality
Highway Operations

- Overhead dynamic message boards
- Camera systems
- Speed detection devices
- Motorist Assistance Patrol
Infrastructure Health Index

- Calculates an overall system score
- Measures NCDOT’s success for maintaining and improving the health of the highway network

Weights asset categories
- 25% for roadsides features
- 35% for bridges
- 40% for pavements
American Reinvestment & Recovery Act of 2009 (ARRA)

- $735 million for North Carolina Highways and bridges
- Required to obligate 50% of funds within 120 days
- Required to obligate remainder of funds within 1 year
- $584 million of projects affect roadway and bridge maintenance

Expended $393 million to date
Interstate Maintenance Preservation Program (IMPP)

- Strategy of cost effective treatments
- Designed to extend the life of bridges, pavements, and roadside features

Not intended to increase structural or traffic capacity $10 million per year
## Alternate Funding (millions)

### TIP Funds
- Signal Preventive Maint. Program: $20.0
- Intelligent Trans. Sys./Incident Resp.: $18.0
- Positive Guidance: $6.0
- Bridge Preventive Maint. Program: $5.0
- Interstate Maintenance: $10.0

**HB 1825 (Secondary Roads) estimate** $70.0

**Total** $129.0
Maintenance Operational Improvements

- 47% of M&O Expenditures spent in the private sector
- LED replacement for signal bulbs
- Signal preventive maintenance
- ITS (IMAP) initiatives
- DOC litter pickup program
- Winter anti-icing operations
- Low growing turf
## Maintenance Funding Needs

**FY 2011-2012 (millions)**

<table>
<thead>
<tr>
<th>Needs</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Maintenance Operations</td>
<td>$ 814.6</td>
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<tr>
<td>Disasters</td>
<td>$  15.0</td>
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<tr>
<td>Contract Resurfacing</td>
<td>$ 330.0</td>
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<tr>
<td>Pavement and Bridge Preservation</td>
<td>$ 233.2</td>
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<tr>
<td><strong>Total Maintenance and Preserv. Needs</strong></td>
<td><strong>$1,392.9</strong></td>
</tr>
</tbody>
</table>

Alternate Maintenance Funds                  | - $ 129.0 |

**Adjusted Maintenance Funding Needs**       | **$1,263.9** |

System Rehabilitation Needs                  | $  340.0 |
## Statewide Annual Maintenance Funding Plan

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<td>Maintenance and Operations</td>
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<td>845.67</td>
<td>880.15</td>
<td>916.01</td>
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<td>Disasters/Emergencies</td>
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<td>Contract Resurfacing</td>
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<td>343.86</td>
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<td>Pavement and Bridge Preserv</td>
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<td>243.04</td>
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<td>263.88</td>
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<td>Total Maint. Funding Needed</td>
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<td><strong>Shortfall</strong></td>
<td><strong>(330.30)</strong></td>
<td><strong>(385.02)</strong></td>
<td><strong>(444.14)</strong></td>
<td><strong>(505.69)</strong></td>
<td><strong>(569.85)</strong></td>
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LOS at Current Funding Level

Year

Infrastructure Health Index

Estimated Dollars to Maintain Current LOS

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<th>Year</th>
<th>Millions</th>
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<td>2011</td>
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<td>2016</td>
<td>$1,300</td>
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<td>2017</td>
<td>$1,400</td>
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Funding Needed to Meet Target LOS

Millions

Year

Questions?