STATE OF NORTH CAROLINA

PERFORMANCE AUDIT

NORTH CAROLINA HIGHWAY PROGRAM

LOCATED WITHIN

THE DEPARTMENT OF TRANSPORTATION

OCTOBER 2006

OFFICE OF THE STATE AUDITOR

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October 20, 2006

The Honorable Michael F. Easley, Governor
Members of the North Carolina General Assembly
Secretary Lyndo W. Tippett,
Department of Transportation

Ladies and Gentlemen:

We are pleased to submit this performance audit entitled North Carolina Highway Program Located Within the Department of Transportation. The objectives of the audit were to determine what changes have taken place in the Highway Trust Fund balance since the State Auditor's 1998 audit and determine the approval process of the State Transportation Improvement Program (TIP) projects and who is involved. Secretary Tippett has reviewed a draft copy of this report. His written comments are included in the appendices to the report.

We wish to express our appreciation to the staff of the Department of Transportation for the courtesy, cooperation, and assistance provided us during the audit.

Respectfully submitted,

Leslie W. Merritt, Jr.

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Summary

The Department of Transportation's mission is to provide and support an integrated transportation system and related services that enhance the state's well-being. The Transportation Improvement Program (TIP) is a planning document that assists the department in focusing on those State transportation projects deemed most pressing.

The 2006-2012 TIP includes 2,750 highway projects totaling $9.8 billion and more than 900 public transportation projects totaling about $2 billion. Highway projects are further broken down into 134 interstate projects, 399 urban highway projects, 448 rural highway projects, more than 1,200 bridge projects, 69 bicycle and pedestrian projects, 64 passenger rail projects and 13 ferry projects.

Comparing North Carolina's highway program with those of our neighboring states (South Carolina, Tennessee, Virginia, and Georgia) shows that North Carolina has more total highway miles - 78,871 in 2004. Further analysis of the data for these states shows that three of these states have historically collected fewer receipts than they have disbursed for their highway programs. North Carolina's history shows that until fiscal year 2002, we have collected more receipts than we have disbursed for the highway program. The disbursement numbers also show that the overall costs of the highway programs in each of these states has generally been increasing since 1998.

Results in Brief

Statistical information contained in the 1998 performance audit report was updated to reflect the most current information available. This information included funding sources for the Highway Trust Fund and transfers to other funds such as the North Carolina General Fund. In order to help balance the State's budget, $526 million more than the original statutory requirements has been transferred from the Highway Trust Fund to the General Fund between fiscal years 2002 and 2006.

Independent financial analysis and project cost detail oversight needs improvement. Projects have shown large costs overruns when compared to cost estimates, ranging from 10% over the latest TIP cost estimates to 299% over the original TIP cost estimates.

Cost reports do not show detailed cost variances. There are no standardized reports that show a cost variance at the contract line item level.

Inflation rates applied to the 2006-2012 State Transportation Improvement Program (TIP) are understated.

Inflation rates applied to the 2006-2012 Transportation Improvement Program (TIP) are not specific to construction project type. TIP costs can be forecasted with better precision by grouping the projects into categories such as bridges, highways, etc. and determining inflation rates by category. Individual categories of construction projects will have different inflation factors based on their commodity, labor, and other cost content.

Cost/benefit analysis to purchase temporary-use construction items is not performed.

Performance management plans do not contain specific fiscal responsibility for controlling project costs.

Certain internal departmental processes are not automated.

The department has not incorporated contingency fund guidelines into its internal policy and procedures manual.

Responses from the Department of Transportation

Responses to the findings are included in the appendices to this report.

OBJECTIVES, SCOPE, AND METHODOLOGY

This audit of the North Carolina Highway Program was undertaken at the discretion of the State Auditor based on questions raised by various legislators on how State Transportation Improvement Program (TIP) projects were prioritized. The TIP is a planning document that assists the North Carolina Department of Transportation in focusing on those State transportation projects deemed most pressing. It contains funding information and schedules for projects in the 14 transportation divisions. Projects encompass highways, aviation, enhancements, public transportation, rail, bicycle and pedestrians, and the Governor's Highway Safety Program.

As part of the audit, the State Auditor determined that an update of findings contained in a 1998 audit of the Highway Trust Fund was in order. In addition, the State Auditor determined that a review of the Statewide Contingency Fund Program and the Spot Safety Program was necessary.

The objectives of the audit were to determine (1) what changes have taken place in the trust fund balance since the State Auditor's 1998 audit, and (2) the approval process of State Transportation Improvement Program (TIP) projects and who is involved.

The scope of this audit included updating the 1998 trust fund audit conducted by the Office of the State Auditor, analyzing trust fund changes, reviewing the TIP projects approval process, and identifying the funding sources for the TIP projects. Work also included identification of contingency and spot safety projects, and identifying how many miles of highway were paved and repaired, cost per mile, and road use compared with other states. To accomplish our objectives, we interviewed department personnel, as well as persons external to the department who had knowledge of the processes under review. Additionally, we reviewed and analyzed data relative to TIP projects, Trust Fund projects, and contingency fund and spot safety projects for the fiscal year 2005.

This report contains the results of the audit including conclusions and recommendations. Specific recommendations related to our audit objectives are reported. Because of the test nature and other inherent limitations of an audit, together with the limitations of any system of internal and management controls, this audit would not necessarily disclose all weaknesses in the systems or lack of compliance.

We conducted this audit under the authority vested in the State Auditor by *North Carolina General Statute* 147-64.6 and according to generally accepted government auditing standards.

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Objective 1: **Highway Trust Fund - Update**

Overview: In 1989 State leaders decided that North Carolina needed to complete the "primary transportation corridors" in the State to take full advantage of an expanding economy and to attract new industry. Leaders at that time felt the existing State Transportation Improvement Program (TIP) was slow in addressing the perceived construction needs. Department of Transportation (department) management indicated to legislators that the TIP, a planning device, should not be considered an accurate schedule for initiating or completing a highway construction project. Thus, the Trust Fund was established to complete certain primary transportation routes.

The initial estimate of time to complete the Trust Fund construction projects was 13.5 years, beginning in fiscal year 1989 and ending in fiscal year 2003. However, due to the combination of many delaying factors, department management revised those estimates of completion time to beyond the 2006-2012 Transportation Improvement Program. No specific completion time had been determined at the time of the fieldwork.

Article 14, Chapter 136 of the General Statutes contains the legislation establishing the Trust Fund. This article also provides for repeal of the legislation when contracts for all Trust Fund projects have been let and sufficient revenue has been accumulated to pay the contracts.

G.S. 136-176 created a special account within the State Treasury called the North Carolina Highway Trust Fund. Funds are credited to this account from the following revenue sources.

- Motor fuel, alternative fuel, and road tax revenue deposited in the Fund under G.S. 105-449.
- Motor vehicle use tax deposited in the Fund under G.S. 105-187.9.
- Vehicle certification of title fees and other fees payable under G.S. 20-85.
- Revenue from the retirement of refunding bonds payable issued to repay highway construction bonds and deposited in the Fund under G.S. 136-83.
- Interest income earned by the Fund.

Methodology: The audit objective was to determine what changes had taken place in the Highway Trust Fund since the State Auditor's 1998 audit. To achieve this objective, we interviewed department personnel with knowledge about the operations of the Trust Fund, reviewed historical legislation, and examined annual financial statements from 1999 through 2005. This data was used to update the information in the 1998 State Auditor's performance audit report on the Trust Fund.

Conclusions: In 1998, the Office of the State Auditor undertook an audit of the North Carolina Highway Trust Fund.[1] That report contained a number of tables and graphs that clearly displayed the status of the Highway Trust Fund at the time. The original legislation set up an annual transfer of $170 million to the General Fund from the Highway Trust Fund, as well as annual transfers for administration and transfers of a percentage of title fees for secondary road construction. Table 1 shows the total transfers from the Highway Trust Fund since its inception. In recent years, the General Assembly mandated additional transfers of $80 million to be on a recurring basis, a one-time advance of $125 million in FY 02-03 and additional monies transferred to the General Fund to help balance the budget. These total $526,600,559 from fiscal years 2002 through 2006 above the original statutory requirements. Approximately $10 million was repaid to the Highway Trust Fund in FY 04-05. The latest legislative session reduced the Highway Trust Fund transfers to the General Fund by $195 million for FY 06-07.

Table 1
Statutory Transfers from Highway Trust Fund

Fiscal Year	Title Fee Collections	Administration	General Fund Transfer	Total Transfers
1990	$ 18,726,256	$ 10,150,000	$ 164,693,276	$ 193,569,532
1991	20,131,285	11,141,990	231,358,005	262,631,280
1992	20,887,001	13,160,822	170,000,000	204,047,823
1993	22,105,469	13,171,828	170,000,000	205,277,297
1994	24,389,449	15,711,750	170,000,000	210,101,199
1995	27,869,389	15,080,459	170,000,000	212,949,848
1996	27,514,786	15,923,483	170,000,000	213,438,269
1997	31,298,276	22,046,617	170,000,000	223,344,893
1998	32,174,843	22,773,824	170,000,000	224,948,667
1999	33,494,526	26,885,576	170,000,000	230,380,102
2000	34,665,111	24,162,602	170,000,000	228,827,713
2001	33,687,363	28,703,311	170,000,000	232,390,674
2002	33,834,765	26,760,798	251,700,000	312,295,563
2003	33,882,377	29,480,937	377,400,000	440,763,314
2004	35,877,921	31,969,800	252,422,125	320,269,846
2005	36,279,779	33,050,992	242,520,317	311,851,088
2006	35,639,285	36,087,657	252,558,117	324,285,059
TOTALS	**$502,457,881**	**$376,262,356**	**$3,472,651,840**	**$4,351,372,167**

Source: Department Financial Records

The sections on the following pages contain details on the various components of the Trust Fund, updating the data from fiscal year 1997 through fiscal year 2006.

[1] *Performance Audit of the Department of Transportation-North Carolina Highway Trust Fund*, Office of the State Auditor, December 14, 1998.

Intrastate System - G.S. 136-178 states that the Intrastate System "transportation corridors" are established to provide high speed, safe travel throughout the State, connect major population centers both inside and outside the State, and provide safe, convenient, through-travel for motorists. The Intrastate System is designed to support Statewide growth and development objectives and to connect to major highways of adjoining states. All segments of the routes in the Intrastate System must have at least four travel lanes or bypasses.

Urban Loops - G.S. 136-180 designated the original seven specific urban loops, the county(ies) in which the loops are located, and contains a general description of where the loops are to be constructed. Table 2 shows the original routes contained in the Trust Fund legislation, as well as the routes currently included in the Trust Fund projects.

Revenues - The 1989 General Assembly created the North Carolina Highway Trust Fund, designated the sources of revenue for the Fund, and specified the purposes for which the Trust Fund revenue may be used. The Highway Trust Fund originally consisted of motor fuel tax, highway use tax, and title fees.

Table 2
Urban Loops Identified by Statute

Loop	Original Estimated Miles	Per Current Legislation	Route	Current Mileage
Asheville	0	Asheville Western Loop	I-2513	**3.5**
Charlotte	63.4	Charlotte Outer Loop		**63.4**
			R-211	16.6
			R-2123	18.8
			R-2248	28
			U-4401	0
Durham	16.4	Durham Northern Loop		**50.5**
			I-4743	6.4
			U-71	2.5
			U-4720	7.8
			U-4721	29.4
			U-4722	4.4
Greensboro	41.6	Greensboro Loop		**30.4**
			I-2402	0
			U-2524	15
			U-2525	15.4
Raleigh	39.3	Raleigh Outer Loop		**43.5**
			R-2000	29
			R-2641	2.1
			R-2635	12.4
Wilmington Bypass	20.2	Wilmington Bypass		**29.7**
			R-2405 A	0
			R-2633	20.2
			U-4436	0
			U-4738	9.5
Winston-Salem	24.5	Winston-Salem Northbelt		**27.4**
			R-2247	14.8
			U-2579	12.6
		Fayetteville Western Outer Loop		**36.7**
			X-2	14.9
			U-2519	21.8
		Gastonia Loop		0
		Greenville Loop	R-2250	**7.8**
TOTAL	**205.4**			**292.90**

Source: NC General Statutes and the Department Transportation Improvement Programs

Motor Fuel Tax - Twenty-five percent of the excise taxes collected on motor fuels and 25% of the road tax levied on motor carriers for the privilege of using the roads in this State are designated for the Highway Trust Fund. These taxes were originally increased in August 1, 1989, from 15.7 cents a gallon to 20.9 cents a gallon. The current tax is 29.9 cents a gallon. Table 3 shows the amount collected through fiscal year 2006.

Table 3
Trust Fund Revenues From Motor Fuels Tax

Fiscal Year	Amount Collected
1990-97	$1,738,682,335
1998	254,604,049
1999	254,740,680
2000	260,744,650
2001	289,594,678
2002	296,259,387
2003	283,055,951
2004	310,767,003
2005	320,410,843
2006	366,457,976
TOTAL	$4,375,317,552

Source: Department Financial Records

Table 4
Trust Fund Revenues (Net) from Highway Use Tax

Fiscal Year	Amount Collected
1990-97	$2,411,615,260
1998	453,226,657
1999	489,513,431
2000	545,268,353
2001	545,166,755
2002	555,320,540
2003	552,758,579
2004	578,346,241
2005	580,117,766
2006	577,236,704
TOTAL	$7,288,570,286

Source: Department Financial Records

Highway Use Tax - The Highway Use Tax, effective October 1, 1989, is levied when a certificate of title for a motor vehicle is issued. Certain motor vehicles that will be rented or leased are not taxed. This titling tax replaced the 2%, $300 maximum sales tax on motor vehicles. Currently the maximum tax for commercial vehicles is $1,000. All other vehicles are charged 3% with no ceiling. Those who lease or rent motor vehicles are given an option of paying the use tax when they purchase a vehicle for lease or rent, or paying a tax on the gross lease or rental receipts subsequently received when the vehicle is leased or rented. The maximum use tax applies to lease or rental receipts, but the maximum is computed anew on each lease or rental of the vehicle to a different person. Table 4 shows the amount collected through fiscal year 2006.

Title Fees - Title fees for motor vehicles are imposed in addition to the highway use tax at the time a certificate of title is issued. Table 5 shows the fees. Table 6 shows the amount of title fees collected through fiscal year 2006.

Table 5
Fees Related to Motor Vehicle Titles

Type	Fee Prior to 8/16/89	Fee After 8/15/89	Fee as of 6/30/06
Certificate of Title	$ 5.00	35.00	$ 40.00
Duplicate or Corrected Title	7.00	10.00	15.00
Repossessor of Title	5.00	10.00	15.00
Transfer of Registration	4.00	10.00	15.00
Replacement of Registration Plates	9.00	10.00	15.00
Duplicate of Registration Certificate	3.00	10.00	15.00
Recording Supplementary Lien	3.00	10.00	15.00
Title Transferred to a Dealer when no tax is due	N/A	10.00	15.00
Instant Title	N/A	50.00	75.00
Special Registration Plates *Established by session law 2004-185			30.00

Source: Department Financial Records

Table 6
Trust Fund Revenues from Title Fees

Fiscal Year	Certificate of Title Fee	Miscellaneous Registration Fee	Lien Recording Fees	Total Fees
1990-97	$450,152,626	$65,572,792	$19,788,873	$535,514,291
1998	75,074,883	9,594,668	2,292,215	86,961,766
1999	78,154,154	9,762,508	2,335,851	90,252,513
2000	80,885,529	10,194,378	2,141,461	93,221,368
2001	78,604,109	9,900,347	2,139,360	90,643,816
2002	78,948,047	9,714,942	2,067,367	90,730,356
2003	79,059,144	9,615,805	2,184,983	90,859,932
2004	83,715,429	10,067,109	2,141,362	95,923,900
2005	84,653,100	9,984,920	2,257,080	96,895,100
2006	90,286,153	12,802,762	2,997,921	106,086,836
Totals	$1,179,533,174	$157,210,231	$40,346,473	$1,377,089,878

Source: Department Financial Records

Investment Income - The legislation creating the Highway Trust Fund also set up a special account, designated the North Carolina Highway Trust Fund, within the State treasury in 1989. Interest income earned on the previously-described revenues deposited with the State treasury is maintained in the Highway Trust Fund. Table 7 shows the amount of interest earned by the Trust Fund through fiscal year 2006.

Table 7
Interest Income Earned by Highway Trust Fund

Fiscal Year	Interest Income
1990-97	$195,206,834
1998	$ 40,928,502
1999	39,323,555
2000	37,444,308
2001	41,393,026
2002	31,525,515
2003	11,730,292
2004	8,925,134
2005	6,485,475
2006	1,498,682
Total	$414,461,323

Source: Department Financial Records

Other Revenue Sources - The 1995 General Assembly enacted the "State Highway Bond Act of 1996" as set forth in Chapter 590 of the 1995 Session Laws, creating the State Highway Bond Fund. The Act authorizes the issuance of $950,000,000 in bonds for the purpose of providing funds for construction, improving and relocating roads, bridges, tunnels, and other highway facilities constituting the urban loops, highways in the Intrastate System, or a part of the State secondary highway system as set forth in Chapter 692 of the 1989 Session Laws creating the Highway Trust Fund. The bond issue was approved by a majority of voters in a referendum held on November 5, 1996.

The proceeds of the bonds are appropriated to the Department of Transportation. The legislation gives the department authority to use bond funding along with other available funds to pay some or all of the costs of Trust Fund projects. The department is to determine when the bond funds should be used with the following restrictions:

- $500,000,000 for urban loops
- $300,000,000 for highways in the Intrastate System
- $150,000,000 for projects constituting a part of the State Secondary Highway System.

As of June 2006, the North Carolina State Treasurer had issued bonds totaling $950,000,000.

Distribution Formula - Exhibit 1 below shows the 14 highway divisions. G.S. 136-17.2A established a distribution formula for expenditures of all highway revenues, including Trust Fund revenues. However, the formula does not apply to expenditures on urban loops, secondary roads, contract resurfacing, and small urban projects because these projects are under the Highway Fund. The formula is designed to ensure that every county in the State receives its fair share for transportation improvements. To apply the formula, the existing 14 highway divisions are divided into seven regions, each of which contains two highway divisions. Table 8 shows the breakdown for the equity formula regions.

Table 8
Equity Formula Regions

Region	Divisions
A	1, 4
B	2, 3
C	5, 6
D	7, 9
E	8, 10
F	11, 12
G	13, 14

Source: Department of Transportation

Table 9 shows the distributions by regions, while Table 10 shows summary data by region.

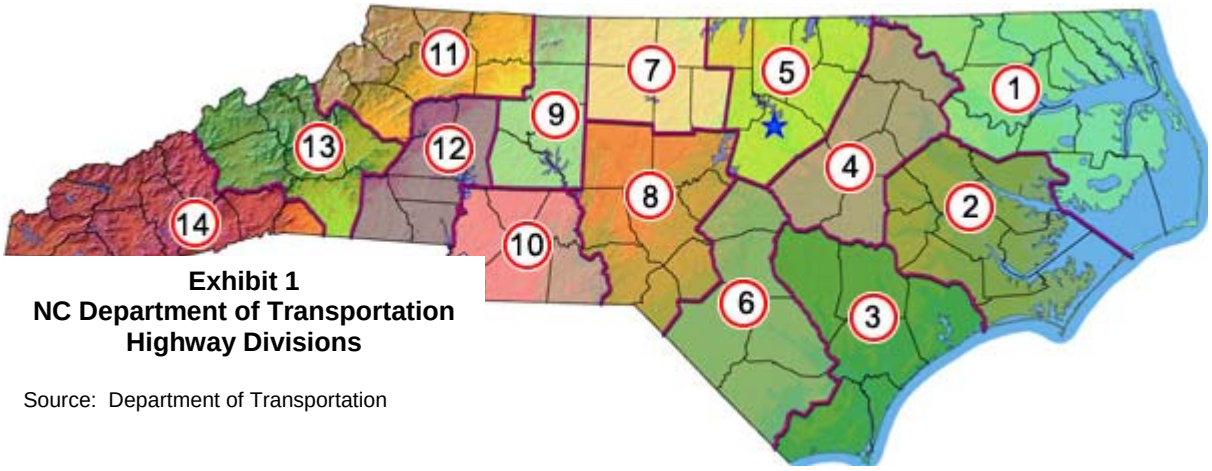


Exhibit 1
NC Department of Transportation
Highway Divisions

Source: Department of Transportation

Table 9
HIGHWAY TRUST FUND EQUITY DISTRIBUTIONS BY REGION
($ in millions)

Region	FY98		FY99		FY00		FY01		FY02		FY03		FY04		FY05	
	% Share	Total Dollar Share	% Share	Total Dollar Share	% Share	Total Dollar Share	% Share	Total Dollar Share	% Share	Total Dollar Share	% Share	Total Dollar Share	% Share	Total Dollar Share	% Share	Total Dollar Share
A	14.6%	$58.7	14.6%	$57.3	14.5%	$63.6	14.5%	$66.1	14.8%	$60.5	14.7%	$44.9	14.9%	$61.3	14.4%	$61.2
B	13.2%	52.9	13.3%	52.1	13.3%	58.1	12.9%	58.6	12.9%	52.7	12.9%	39.4	12.7%	52.2	13.3%	56.5
C	17.5%	70.3	17.4%	68.3	17.4%	76.3	17.7%	80.6	17.4%	71.1	17.7%	54.2	17.6%	72.5	17.4%	74.2
D	14.7%	59.1	14.9%	58.3	14.8%	65.0	14.8%	67.4	14.9%	60.7	15.0%	45.9	15.1%	62.2	15.1%	64.4
E	17.2%	69.1	16.7%	65.6	17.0%	74.7	17.1%	77.8	17.3%	70.3	17.4%	53.4	17.4%	71.7	16.9%	71.7
F	12.0%	48.1	12.0%	47.2	12.0%	52.5	11.8%	53.6	11.4%	46.6	11.1%	34.1	11.2%	46.4	11.8%	50.2
G	10.9%	43.6	11.1%	43.3	11.0%	48.2	11.2%	50.9	11.2%	45.6	11.3%	34.8	11.2%	46.3	11.1%	47.3
Totals	100.0%	$401.9	100.0%	$392.0	100.0%	$438.5	100.0%	$455.0	100.0%	$407.4	100.0%	$306.7	100.0%	$412.5	100.0%	$425.5

Source: Available Department Financial Records

Table 10
SUMMARY OF FUNDS DISTRIBUTIONS BY REGION
($ in millions)

Fiscal Year	A	B	C	D	E	F	G	TOTALS
98	$58.7	$52.9	$70.3	$59.1	$69.1	$48.1	$43.6	$401.9
99	57.3	52.1	68.3	58.3	65.6	47.2	43.3	392.0
00	63.6	58.1	76.3	65.0	74.7	52.5	48.2	438.5
01	66.1	58.6	80.6	67.4	77.8	53.6	50.9	455.0
02	60.5	52.7	71.1	60.7	70.3	46.6	45.6	407.4
03	44.9	39.4	54.2	45.9	53.4	34.1	34.8	306.7
04	61.3	52.2	72.5	62.2	71.7	46.4	46.3	412.5
05	61.2	56.5	74.2	64.4	71.7	50.2	47.3	425.5
Totals	$ 473.6	$ 422.5	$ 567.5	$ 482.9	$ 554.3	$ 378.7	$ 360.0	$3,239.4

Source: Available Department Financial Records

Objective 2: Transportation Improvement Program (TIP) Approval Process

Overview: The TIP is a planning document that assists the North Carolina Department of Transportation in focusing on those State transportation projects deemed most pressing. It contains funding information and schedules for projects in the 14 transportation divisions (see Exhibit 1). Planning includes projects for highways, aviation, enhancements, public transportation, rail, bicycle and pedestrians, and the Governor's Highway Safety Program.

Based on input from various local, regional, and State constituents and guided by General Statutes, the department develops the TIP for a period of seven years into the future. The current TIP schedule is for fiscal years 2006 to 2012. The Board of Transportation, an appointed 19-member policy making board representing each of the State's 14 transportation divisions and five areas of expertise, must approve the schedule.

The 2006-2012 TIP includes 2,750 highway projects totaling $9.8 billion and more than 900 public transportation projects totaling about $2 billion. Highway projects are further broken down into 134 interstate projects, 399 urban highway projects, 448 rural highway projects, more than 1,200 bridge projects, 69 bicycle and pedestrian projects, 64 passenger rail projects and 13 ferry projects.

Methodology: The audit objective was to determine the approval process of the State Transportation Improvement Program (TIP) projects and who is involved. To achieve this objective, we interviewed department personnel with knowledge relating to the TIP process, reviewed internal policies and procedures, and reviewed historical narratives contained in the TIP. Additionally, we examined a representative sample of transportation projects and a sample of contract change orders to determine how cost estimates compared to final costs and we reviewed work plans for selected staff. In addition, we reviewed and tested the procedures in place for handling of contingency funds and spot safety funds appropriated to the department. We also obtained comparative data for other states from the Federal Highway Administration.

Conclusions: The department manages a large number of on-going construction and maintenance projects each year. The TIP, as stated above, is used by the department as a planning tool and not as a budgeting document. However, TIP projects have shown large cost overruns when compared to original cost estimates. Many factors contribute to these costs overruns, such as scope changes, environmental issues and time schedules. The department costs reports do not show detailed cost variances that can be easily measured and tracked at the contract line item level. Inflation rates applied to the 2006-2012 TIP were understated. Purchasing temporary-use construction items used on highway projects for possible reuse on multiple projects could reduce overall project costs. The department's performance management plans for selected staff do not contain specific fiscal responsibility for controlling project costs. Internal departmental processes used to communicate project milestones and costs estimates are not automated. Lastly, contingency fund guidelines have not been incorporated into the department's internal policy and procedures manual.

FINDINGS AND RECOMMENDATIONS

Transportation Improvement Program:

Independent financial analysis and project cost detail oversight needs improvement.

Transportation Improvement Program (TIP) projects have shown large costs overruns when compared to original cost estimates. A sample of 60 transportation projects showed that the latest costs for these projects were 10% over the latest cost estimates and 299% over the original TIP cost estimates. The sample consisted of a random selection of interstate, bridges, rural and urban roadway projects that were substantially completed.

The TIP document is used as a planning and scheduling document. It is not used as the department's budget which is based on project costs that are estimated closer to the project construction starting date.

The initial cost estimate for a TIP project is typically developed a number of years prior to a project's construction starting date. After the initial cost estimate is developed, a project's scope can be changed considerably. These scope changes can result from such factors as environmental impact mitigation, legal issues and noise abatement measures. Contingency costs were included in original cost estimates, but all of the project's cost elements were not sufficiently addressed. Cost overruns cause project delays and rescheduling. The department has analyzed project costs and has initiated more frequent cost estimates during a project's lifecycle.

In 2005, the department began to emphasize more effective cash management. Since the beginning of 2005, the Chief Financial Officer has been monitoring costs using a cash-forecasting modeling tool. The focus has been on meeting annual funding targets. The tool has been effective in predicting cash balances accurately. Additionally, a task group headed up by the department's Director of Construction has studied costs of completed contracts and established additional TIP project estimate milestones and reviews. The department is also developing a program delivery office to monitor projects' life cycle costs, scopes and schedules. However, proactive independent financial analysis and detailed project cost management needs to be improved at the department's executive management level.

Recommendation: A disciplined approach to project risk should define the process of whether to include costs in the estimate as actual or contingency costs. Contingencies should be expressed in terms that can be easily presented to and understood by the public. In some cases, a range may be appropriate for program cost estimates. Major projects require special consideration of project risk and complexity in order to produce accurate contingencies.[2]

The department should consider creating a financial planning and analysis unit within the Chief Financial Office's (CFO) organization to provide proactive independent financial analysis and detailed project cost oversight. This unit should provide financial expertise to the program delivery office being developed by the department. This CFO unit should review

[2] Major Project Program Cost Estimating Guidance, Federal Highway Administration, June 4, 2004.

project cost estimates throughout the project's life cycle, analyze major project cost elements, review monthly reports showing project cost variances and provide recommendations to senior management regarding project cost control and policy issues.

Cost reports do not show detailed cost variances.

There is no standardized report that shows a cost variance at the contract line item level. The existing contract management system, HICAMS (Highway Construction and Materials System) has the capability of producing ad hoc reports to reflect quantity and per unit value changes at the contract level, but not cost variances.

These cost reports do not reflect updated cost estimates that can be compared to the original cost estimates at the contract line item level. As a result, reports do not provide management with anticipated cost variances. An example of anticipated costs is found with in-process contract change orders. These costs are known well in advance of final authorization (many change orders require authorization from the federal government). A sample of 170 contract change orders (Table 11) showed that 45% of the change order dollars took 120 or more days from input into HICAMS until final cost recognition in the department's strategic accounting system, System and Application Products or SAP.

Recommendation: The department should develop standardized reports showing current cost variances and anticipated final project cost variances. These reports should include current (weekly or monthly) data, inception-to-date cost and budget, and estimated final cost and budget information. These reports should provide for the aggregation of contract cost elements to facilitate more accurate financial analysis by the different levels of management.

Table 11
Summary of Change Order Review

Days to SAP Recognition	Number	Percent of Total	Dollar Value	Percent of Total
30 or less	81	47.7%	$313,902	6.7%
31 – 60	33	19.4%	596,702	12.6%
61-90	25	14.7%	1,106,588	23.4%
91-120	13	7.6%	568,399	12.1%
121 or more	18	10.6%	2,134,975	45.2%
TOTALS	**170**	**100.0%**	**$4,720,566**	**100.0%**

Source: Department Financial Records

Overall inflation rate applied to the 2006-2012 Transportation Improvement Program (TIP) is understated.

The department utilizes an overall inflation factor of 4% which represents the inflation incurred by the department from a prior ten-year period to forecast costs over the 7-year TIP period. This inflation rate is understated due to the following: 1) not using the historical 7-year inflation rate of 4.3%; 2) not applying an inflation rate to the first year of projects in the 2006-2012 TIP; 3) not compounding inflation for costs planned after the construction projects' first year.

The effect of projecting inflation rates lower than historical data has been to reduce the department's precision of future forecasting for transportation projects. The resulting impact to project costs is the understatement of approximately $28 million over the 7-year TIP period, as shown in Table 12.

Since the first year of the 2006-2012 TIP is halfway complete, one-half of the department's 4.3% annual inflation rate (2.15%) should be applied to 2006 project costs. Since all subsequent years are shifted six months out in time, all subsequent annual costs projections are understated. This will impact project costs by approximately $212 million the remaining 7-year TIP period.

Recommendation: The department should apply inflation rates based on the historical 7-year North Carolina Construction Index inflation rate to all TIP construction projects to provide better estimates of future construction costs. An inflation factor should also be applied to the first year of the 2006-2012 TIP construction cost schedule and adjustments made to the remaining subsequent years. The department should apply compounded inflation to costs in each year of a construction project.

Table 12
Impact of Inflation Calculation

TIP Year	TIP Budget (millions)	1/2 year inflation impact (2.15%) (millions)	4.3% inflation vs. 4.0% (millions)	Total Inflation impact (millions)
2006	$1,257.30	$27.03	$1.93	$28.96
2007	1,304.70	28.05	4.00	32.05
2008	1,362.30	29.29	4.17	33.46
2009	1,423.80	30.61	4.36	34.97
2010	1,446.20	31.09	4.43	35.53
2011	1,507.10	32.40	4.42	37.02
2012	1,570.30	33.76	4.81	38.57
TOTAL	**$9,871.70**	**$212.24**	**$28.33**	**$240.57**

Notes: TIP Budget is the total estimated budgeted cost from the actual TIP
The ½ year inflation impact is calculated from multiplying the total TIP budget for the year by the 2%
The second inflation factor is calculated from adding the TIP budget plus the ½ year inflation amount together and multiplying that total amount by the .3% for each year

Source: Department Financial Records

Inflation rates applied to the 2006-2012 Transportation Improvement Program (TIP) are not specific to construction project type.

As stated earlier, the department used a 4.0% inflation rate in forecasting costs over the 7-year 2006-2012 TIP period. This general inflation factor is used on all construction projects whether it is an interstate, bridge, rural or urban roadway project. The effect of using a common inflation rate for all transportation projects reduces the precision of future forecasting of individual project costs.

TIP costs can be forecasted with better precision by grouping the projects into categories such as bridges, highways, etc. and determining inflation rates by category. Individual categories of construction projects will have different inflation factors based on their commodity, labor, and other cost content. Bridge costs are related to the structures index, while roadways costs are related to the roadways index. These indices are composed of different mixes of commodity and other cost components. For example, bridges are composed largely of cement and steel; whereas highways have a larger asphalt component.

Recommendation: The department should revise the methodology for estimating TIP costs by using separate annual inflation rates for highways, structures and other categories of projects in the TIP. Inflation projections for the first two years of the TIP should be based on market, industry and government sources that analyze cost components of those project categories.

Cost/benefit analysis to purchase temporary-use construction items is not performed.

We examined a random sample of 60 transportation construction projects and discovered that approximately 2% of the costs in those projects were for temporary-use construction items. "Temporary use" items such as portable lighting, signs, shoring, and crash cushions could be owned and reused for future projects. As shown in Table 13, costs for these items were calculated at $12 million out of a total contract value of $610 million. Current policy allows the private contractors and consultants to include expenses for such temporary-use items on every project bid. Applying the 2% rate across the entire 2006-2012 TIP budget of $9.8 billion, we project costs of $196 million in temporary-use construction items. Buying and maintaining an inventory of the major type of temporary-use construction items could result in reduced project costs.

Table 13
Cost of Temporary-Use Items

Item Description	Item Value in Sample
Portable lighting	$2,216,365
Signs	2,087,685
Shoring	1,858,840
Crash Cushions	1,606,622
Drums	899,963
Slope drains	767,971
Impact attenuator	754,748
Silt fences	717,682
Markers	282,018
Portable concrete barriers & anchors	248,166
Barricades (Type III)	177,145
ROW markers	113,130
Other miscellaneous construction items	537,959
Total Sample	$12,268,294
Contract Value of Sample	$610,091,680
% of Contract Value	2%

Source: Results of Sample Tested by OSA

Recommendation: The department should consider conducting a cost/benefit analysis of purchasing the major temporary-use construction items (such as portable lighting) for reuse on multiple projects. Establishing an inventory of these type items would require consideration of the costs of regional storage and staff to maintain the inventory and the costs to manage those items on multiple projects.

Performance Management Plans did not contain specific fiscal responsibility for controlling project costs.

The Performance Management Plans (PMPs) for selected staff did not include current management expectations for controlling costs. We reviewed the work plans of the Transportation Engineering Supervisors II/Resident Engineers from all divisions. Work plans for two of the divisions (10 and 11) did not mention the responsibility to monitor project expenditures. The remaining plans did mention this responsibility; however, they did not reflect the department's emphasis on cash management.

Recommendation: Performance Management Work Plans for those personnel responsible for transportation projects should contain clear expectations for fiscal responsibility. The department's expectations regarding cash management and sound controls for project costs should be fully documented and communicated to all staff.

Certain internal departmental processes are not automated.

Examination of the processes used to communicate project milestones and cost estimates within the department showed that the majority of these processes were not automated. These processes include the creation of internal memos and forms in hardcopy format, the associated mailing, receiving, and filing activities. Costs associated with the creation, handling, and storage of documents could be reduced by utilizing existing systems technology such as SAP. SAP provides automatic notification of process status and requests inputs from those involved in a particular process such as a TIP cost estimate update. SAP and other existing technology (Microsoft Access databases) can provide authorized personnel with immediate access to data such as the latest cost estimates and history of those estimates. Other processes that can be automated include project milestones such as environmental approvals or project plan approvals or project completion dates. Automating these processes would have the added benefit of reducing the chance of document misplacement and task nonperformance.

Recommendation: The department should evaluate the feasibility of the automation of its manual processes through use of existing information technology. Many of the processes that may lend themselves to automation have been identified in previous studies of departmental processes.[3] [4] [5]

[3] *North Carolina Department of Transportation Project Delivery Study, Final Report*, Dye Management Group Inc., July 19, 2004

[4] *North Carolina Department of Transportation Status of Highway Trust Fund Projects Report*, Dye Management Group Inc. October 2004

[5] *North Carolina Department of Transportation Implementation of Cash Management System Study*, Dye Management Group Inc., 2001

Contingency Funds:

The department has not incorporated contingency fund guidelines into its internal policy and procedures manual.

The Department of Transportation is responsible for administering and handling contingency funds appropriated by the General Assembly. Contingency funds can be used Statewide for rural or small urban highway improvements and related transportation enhancements to public roads and public facilities, industrial access roads, and spot safety projects.[6] See Appendix C, for discussion of contingency fund. Each fiscal year, the General Assembly establishes the amount of contingency funds received by the department. For fiscal years 2004 and 2005, the department received $15 million for contingency funds each year. Legislative guidelines require the Secretary of Transportation to approve these projects. Requests may come from municipalities, counties, legislators, citizens, or the department staff. See Exhibit 2, for flowchart of contingency fund process. During the audit, we examined 60 contingency fund requests, noting only 3 requests (5%) that did not follow the procedures:

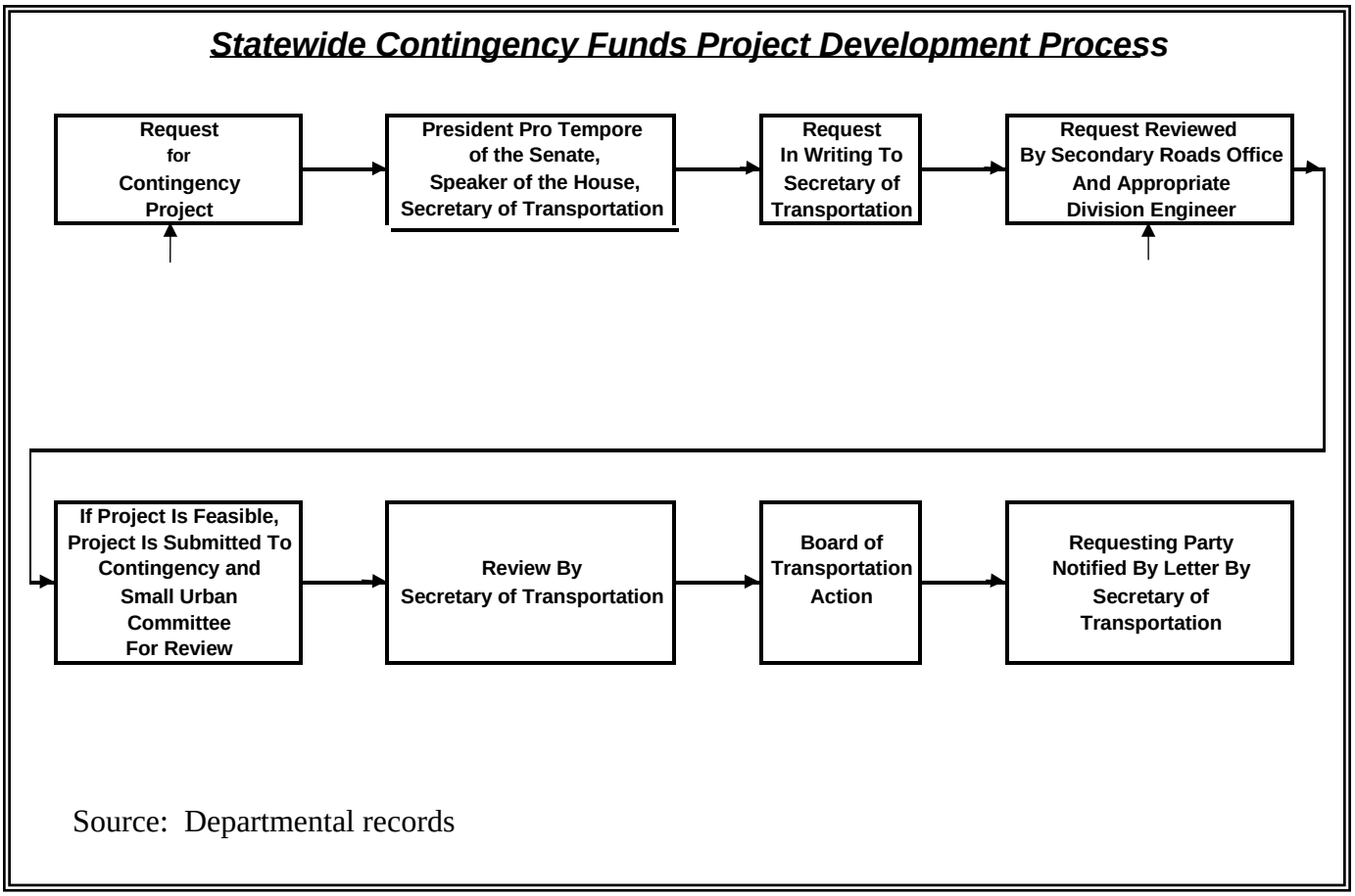
- One "Request for Statewide Contingency Funds" was not required due to a department Highway Administration verbal policy. The verbal policy does not require a request form to be submitted when a project needs increasing less than $50,000 and has received prior department approvals.
- One form was lost.
- One request was not obtained from the Chief Engineer due to oversight.

The department has not formally adopted written procedures; however, an internal document does exist showing general guidelines for requesting contingency funds. Also a departmental review committee meets each month to review contingency fund requests to insure they are in compliance with legislative guidelines. Formal procedures are critical to guide employees and to efficiently distribute state funds.

Recommendation: The department should adopt and include formal written Contingency policies and procedures in the department manual. The manual should include step-by-step procedures for Contingency Funds.

[6] Session Law 2004, House Bill 1414, Section 30.1.(a)

Exhibit 2



Source: Departmental records

Spot Safety Program:

An examination of documentation for 60 spot safety projects showed compliance with established policies and procedures. There are no findings in this area.

Other States:

To provide the reader information to compare North Carolina's highway program with other states, we obtained 2004 data, the most recent data available at the time of the fieldwork, from the Federal Highway Administration. Below we summarize information for North Carolina and surrounding states. We chose these states because they were the most similar to North Carolina's geographic landscape. Appendix E, contains data for all states.

Table 14
RECEIPTS AND DISBURSEMENTS PER MILE OF STATE CONTROLLED HIGHWAY—2004
(DOLLARS IN THOUSANDS)

STATE	TOTAL MILES	RECEIPTS		DISBURSEMENTS	
		TOTAL RECEIPTS	AVERAGE RECEIPTS PER MILE	TOTAL DISBURSE-MENTS	AVERAGE DISBURSE-MENTS PER MILE
North Carolina	78,871	$ 3,460,444	$44	$3,435,789	$44
South Carolina	41,532	1,127,248	27	1,190,918	29
Tennessee	13,809	1,320,715	96	1,228,024	89
Virginia	57,515	2,772,502	48	2,739,048	48
Georgia	17,943	2,185,917	122	1,843,937	103

Source: Federal Highway Administration report dated October 2005

Table 15
HIGHWAY MILES AND ANNUAL VEHICLE MILES TRAVELED (VMT) BY STATE—2004

STATE	STATE HIGHWAY MILES					STATE ANNUAL VEHICLE MILES TRAVELED (IN BILLIONS)				
	TOTAL	RURAL		URBAN		TOTAL	RURAL		URBAN	
	MILES	MILES	PERCENT	MILES	PERCENT	ANNUAL VMT	ANNUAL VMT	PERCENT	ANNUAL VMT	PERCENT
North Carolina	78,871	69,536	88.2%	9,335	11.8%	95.9	47.2	49.2%	48.7	50.8%
South Carolina	41,532	34,588	83.3%	6,944	16.7%	49.6	32.1	64.7%	17.5	35.3%
Tennessee	13,809	10,859	78.6%	2,950	21.4%	70.9	29.6	41.7%	41.3	58.3%
Virginia	57,515	47,996	83.5%	9,519	16.5%	78.9	30.6	38.8%	48.3	61.2%
Georgia	17,943	13,969	77.9%	3,974	22.1%	112.6	44.0	39.1%	68.6	60.9%

Source: Federal Highway Administration report dated October 2005

Table 16
Summary of Average Receipts and Disbursements Per Mile of State Controlled Highways by State for 1999 – 2004
(Dollars in Thousands)

State	1999		2000		2001		2002		2003		2004	
	Average Receipts per Mile	Average Disburse-ments per Mile	Average Receipts per Mile	Average Disburse-ments per Mile	Average Receipts per Mile	Average Disburse-ments per Mile	Average Receipts per Mile	Average Disburse-ments per Mile	Average Receipts per Mile	Average Disburse-ments per Mile	Average Receipts per Mile	Average Disburse-ments per Mile
North Carolina	$ 58	$ 29	$ 55	$ 31	$ 60	$ 35	$ 35	$ 36	$ 32	$ 36	$ 44	$ 44
South Carolina	8	$ 19	$ 6	$ 21	$ 9	$ 25	$ 23	$ 27	$ 22	$ 27	$ 27	$ 29
Tennessee	22	$ 78	$ 24	$ 83	$ 26	$ 88	$ 90	$ 92	$ 92	$ 94	$ 96	$ 89
Virginia	4	$ 44	$ 4	$ 43	$ 5	$ 47	$ 52	$ 52	$ 59	$ 55	$ 48	$ 48
Georgia	199	$ 94	$ 203	$ 78	$ 219	$ 87	$ 98	$ 99	$ 101	$ 99	$ 122	$ 103

Source: Federal Highway Administration report dated October 2005

APPENDICES

APPENDIX A
HIGHWAY TRUST FUND

In 1989 State leaders decided that North Carolina, on an economic threshold, needed to complete the "primary transportation corridors" in the State to take full advantage of an expanding economy and to attract new industry. Leaders at that time felt the existing State Transportation Improvement Program (TIP) was slow in addressing the perceived construction needs. Department of Transportation (department) management indicated to legislators that the TIP, a planning device, should not be considered an accurate schedule for initiating or completing a highway construction project. As a result, a legislative Joint Transportation Oversight Committee (Committee) was formed to address these concerns.

The department was directed to assist the Committee and its staff in determining the projected requirements for completing the "primary transportation corridors." The concept calls for completion of all interstate highways within North Carolina and the multi-laning of other cross-state highways. The Committee also determined that urban loops were needed around seven of the major metropolitan areas to assist in the flow of traffic and prevent "bottlenecking" during rush hours. Legislation was drafted outlining the identified needs. Many of the corridor and urban loop projects identified by the Committee were already in the TIP at various stages of completion. Stipulations were added to the legislation to ensure that most areas of the State, including rural undeveloped areas, received some financial benefit from the legislation. To this end, the legislation called for the paving of all state-maintained dirt roads and for providing additional assistance to municipalities for city streets.

Department staff gave its "best estimates" for construction costs based on average mileage costs within the major geographic sectors of the State (mountains, piedmont, and coast). However, costs estimates did not include consideration of annual economic or construction cost inflation or preliminary costs such as planning, engineering, and environmental impact studies. These types of additional costs were not included due to the time constraints for providing information to the Committee. Therefore, the initial costs given to the Committee were significantly underestimated.

The initial estimate of time to complete the Trust Fund construction projects was 13.5 years, beginning in fiscal year 1989 and ending in fiscal year 2003. However, due to the combination of many delaying factors, department management revised those estimates of completion time. Management estimates the completion time will extend beyond 2013.

Statutory Authority

Article 14, Chapter 136 of the General Statutes contains the legislation establishing the Trust Fund. This article also provides for repeal of the legislation when contracts for all Trust Fund projects have been let and sufficient revenue has been accumulated to pay the contracts.

G.S. 136-176 created a special account within the State Treasury called the North Carolina Highway Trust Fund. Funds are credited to this account from the following revenue sources.

- Motor fuel, alternative fuel, and road tax revenue deposited in the Fund under G.S. 105-449.
- Motor vehicle use tax deposited in the Fund under G.S. 105-187.9.
- Vehicle certification of title fees and other fees payable under G.S. 20-85.
- Revenue from the retirement of refunding bonds payable issued to repay highway construction bonds and deposited in the Fund under G.S. 136-83.
- Interest income earned by the Fund.

Prior to the Trust Fund legislation, the taxes noted above had been received into the State's General Fund. Therefore, a statutory provision was necessary to continue some level of taxation support to the General Fund. G.S. 105-187.9 provides for the State Treasurer to annually transfer funds from the Trust Fund to the General Fund on either a quarterly or fiscal year basis depending on availability of funds.

G.S. 136-176 also provides the department with funding to administer the Trust Fund. The administrative funding is set at an annual appropriation not to exceed 4.5% of the taxes and fess collected. Any administrative funds not expended in a fiscal year revert back to the Trust Fund for allocation.

The legislation places the following allocation stipulations on the Trust Fund:

- Sixty-one and ninety-five hundredths percent (61.95%) to plan, design, and construct the projects of the Intrastate System described in G.S. 136-179.
- Twenty-five and five hundredths percent (25.05%) to plan, design, and construct the urban loops described under G.S. 136-180.
- Six and one-half percent (6.5%) to supplement the appropriation to cities for city streets under G.S. 136-181.
- Six and one-half percent (6.5%) for secondary road construction as provided in G.S. 136-182.

APPENDIX B
TRANSPORTATION IMPROVEMENT PROGRAM

Federal Regulations Title 23, Section 450.216 states that each state shall develop a Statewide transportation improvement program (TIP) for all areas of the State. It shall be financially constrained by year and include sufficient financial information to demonstrate which projects are to be implemented using current revenues and which projects are to be implemented using proposed revenue sources while the system as a whole is being adequately operated and maintained.

The TIP is a planning document that assists the Department of Transportation in focusing on those State transportation projects deemed most pressing. It contains funding information and schedules for projects in the 14 transportation divisions including highways, aviation, enhancements, public transportation, rail, bicycle and pedestrians, and the Governor's Highway Safety Program.

Based on input from various local, regional and state constituents and guided by General Statutes, the department develops the TIP for a period of seven years into the future. The current TIP schedule is for fiscal years 2006 to 2012. The Board of Transportation, an appointed 19-member policy-making committee representing each of the State's 14 transportation divisions and five areas of expertise, must approve the schedule. The TIP must be published and copies must be available for distribution.

The 2006-2012 TIP includes 2,750 highway projects totaling $9.8 billion and more than 900 public transportation projects totaling about $2 billion. Highway projects are further broken down into 134 interstate projects, 399 urban highway projects, 448 rural highway projects, more than 1,200 bridge projects, 69 bicycle and pedestrian projects, 64 passenger rail projects and 13 ferry projects.

State and federal dollars are the primary sources of TIP funds. A special account to address highway projects within the State Treasury is the North Carolina Highway Trust Fund as created by G.S. 136-176. Funds are credited to this account from motor fuel, alternative fuel, and road tax revenue deposited in the Fund (G.S. 105-449.125, 105-449.134, and 105-449.43); motor vehicle use taxes deposited in the Fund (G.S. 105-187.9); vehicle certificate of title fees and other fees payable (G.S. 20-85); and interest and income earned by the Fund.

An equity formula, as established in G.S. 17.2A[7], is used to allocate State and federal funding on a geographic basis. TIP funding for both State and federal aid is allocated to each of seven

[7] Note: Federal congestion mitigation and air quality improvement program funds appropriated to the State by the United States pursuant to 23 U.S.C. § 104(b) (2) and 23 U.S.C. § 149, funds expended on an urban loop project listed in G.S. 136-180 and funds received through competitive awards or discretionary grants through federal appropriations either for local governments, transportation authorities, transit authorities, or the department are excluded from the equity formula. In addition, the formula does not apply to secondary roads, maintenance and contract resurfacing and small urban projects because they are not included in the State Transportation Improvement Program.

regions using this formula. Each region consists of two highway divisions. Each division receives funds from their respective region using the same equity formula.

Metropolitan Planning Organizations, Regional Planning Organizations, Rural Planning Organizations, Board of Transportation, business and government leaders, the environmental community and citizens provide input for TIP candidates. As a result, General Statutes identify specific highway projects to be undertaken. G.S. 136-179 establishes an Intrastate System of highway projects that are identified as first priority for funding from the Highway Trust Fund. G.S. 136-178 identifies additional intrastate highway projects to be funded from the Highway Trust Fund when funds for projects in G.S. 136-179 cannot be used. Specific urban loop projects are identified as eligible for Highway Trust Funds in G.S. 136-180.

APPENDIX C
STATEWIDE CONTINGENCY FUND PROGRAM

The Statewide Contingency Fund, administered by the Secretary of Transportation, is a $15 million fund authorized by the North Carolina General Assembly. Requests for Statewide Contingency Funds can be received from municipalities, counties, businesses, schools, citizens, schools, legislative members and Department of Transportation staff. All requests must be submitted in writing to the Secretary of Transportation and include a clear description and justification of the project.

Any transportation related project may be funded through this program. This fund can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for this funding. The construction and/or paving of parking lots is not allowed except for parking areas for school buses. Projects on or along municipal streets (not a State system) will be set up for the municipality to perform the work with reimbursement upon satisfactory completion.

Once projects requests are received at the department, they are forwarded to the Chief Deputy Secretary for review. The Division Engineer investigates the project and determines cost estimates and any traffic and safety concerns. The Chief Engineer presents the requests to the Contingency and Small Construction Funds Review Committee. The Committee reviews and makes recommendations to the Secretary for his consideration. If approved by the Secretary, the Chief Engineer will place the project on the Board of Transportation's agenda for final action.

The Contingency and Small Construction Funds Review Committee is composed of the following officials: Chief Deputy Secretary, Deputy Secretary for Intergovernmental Affairs and Budget Coordination, State Highway Administrator, Chief Engineer-Operations, Director of Field Operations, State Traffic Engineer, and Chief Financial Officer.

APPENDIX D
SPOT SAFETY PROGRAM

The Spot Safety Program allows the Department of Transportation to deal with critical safety concerns in many locations throughout the State for relatively small amounts of funding per location. The Spot Safety Program is administered by the Traffic Engineering and Safety Systems Branch within the department. Spot Safety Program funding is limited to a maximum of $250,000 per project. Requests for spot safety funds can be received from municipalities, counties, businesses, citizens, legislators, department board members, department's staff and schools. A written request is submitted to the Division Engineer, providing technical information such as location, improvements being requested, and timing for thorough review. A complete justification must also be submitted.

Spot Safety projects may be proposed by either the Division or the Region Traffic Engineer. For each proposed spot safety project, the following steps are required:

- Identification of the problem
- Determine a proposed treatment
- Perform a crash analysis for the location
- Perform a traffic signal warrant analysis
- The Division will provide all necessary city/county resolutions
- The Division shall prepare a cost estimate that includes, but is not limited to, Division design costs, Right-of-Way, utilities, construction, mobilization and traffic control
- Request a cost estimate form Signals & Geometrics (if applicable) for traffic signal and communications design costs

The Division or Region Traffic Engineer conducts the formal study with the specific criteria and forwards the information to the Division Engineer for recommendation. The Division Engineer submits the request to the State Traffic Engineer's Office. The Traffic Engineering and Safety Systems Branch conducts an engineering analysis and statewide comparison of need. If the request does not meet the engineering and safety requirements, the State Traffic Engineering advises the applicants of the decision. If the request meets the requirements, the Chief Engineer and the Deputy State Highway Administrator for Preconstruction review the request and forwards it to the Safety Oversight Committee. The Safety Oversight Committee investigates and studies possible funding appropriation and then forwards the request to the State Board of Transportation for consideration.

Total appropriations for the Spot Safety Program were approximately $10.0 million for FY 2003, $9.8 million for FY 2004 and $9.1 million for FY 2005.

APPENDIX E
RECEIPTS AND DISBURSEMENTS PER MILE OF STATE CONTROLLED HIGHWAY--2004
(DOLLARS IN THOUSANDS)

STATE	TOTAL MILES	RECEIPTS		DISBURSEMENTS	
		TOTAL RECEIPTS	AVERAGE RECEIPTS PER MILE	TOTAL DISBURSEMENTS	AVERAGE DISBURSEMENTS PER MILE
Alabama	11,580	$ 1,135,378	$ 98	$ 1,236,892	$ 107
Alaska	5,636	594,446	105	620,744	110
Arizona	6,816	1,887,690	277	1,916,506	281
Arkansas	16,418	909,936	55	1,056,447	64
California	15,209	6,820,710	448	5,825,786	383
Colorado	9,113	1,947,075	214	1,609,404	177
Connecticut	3,718	1,742,795	469	1,654,653	445
Delaware	5,203	666,803	128	797,903	153
Florida	12,047	5,708,013	474	5,514,559	458
Georgia	17,943	2,185,917	122	1,843,937	103
Hawaii	940	223,585	238	250,529	267
Idaho	4,951	405,360	82	400,236	81
Illinois	16,123	3,063,356	190	3,208,067	199
Indiana	11,186	2,146,165	192	2,110,436	189
Iowa	8,881	851,434	96	765,626	86
Kansas	10,375	1,511,533	146	1,102,909	106
Kentucky	27,509	1,421,840	52	1,676,723	61
Louisiana	16,696	1,385,651	83	1,509,691	90
Maine	8,488	719,926	85	680,110	80
Maryland	5,136	1,486,849	289	1,411,960	275
Massachusetts	2,841	2,913,842	1,026	3,286,481	1,157
Michigan	9,720	1,905,808	196	1,770,496	182
Minnesota	11,833	1,377,140	116	1,322,685	112
Mississippi	10,887	718,661	66	836,746	77
Missouri	32,471	1,804,707	56	1,778,784	55
Montana	7,879	525,475	67	631,361	80
Nebraska	9,981	562,874	56	601,606	60
Nevada	5,449	692,409	127	861,901	158
New Hampshire	4,114	413,935	101	353,118	86
New Jersey	2,318	3,696,721	1,595	3,430,223	1,480
New Mexico	12,009	1,863,333	155	1,085,976	90
New York	15,033	5,062,321	337	5,141,786	342
North Carolina	78,871	3,460,444	44	3,435,789	44
North Dakota	7,382	285,666	39	290,227	39
Ohio	19,307	2,609,812	135	2,492,868	129
Oklahoma	12,280	1,053,423	86	983,361	80
Oregon	7,552	997,630	132	798,639	106
Pennsylvania	39,890	4,854,231	122	4,071,557	102
Rhode Island	1,103	372,561	338	357,363	324
South Carolina	41,532	1,127,248	27	1,190,918	29
South Dakota	7,851	420,356	54	390,419	50
Tennessee	13,809	1,320,715	96	1,228,024	89
Texas	79,624	6,238,524	78	6,690,553	84
Utah	5,858	1,635,876	279	1,731,611	296
Vermont	2,635	261,958	99	247,740	94
Virginia	57,515	2,772,502	48	2,739,048	48
Washington	7,046	2,019,271	287	1,875,262	266
West Virginia	33,971	1,039,179	31	1,055,786	31
Wisconsin	11,812	1,438,193	122	1,389,336	118
Wyoming	6,754	421,212	62	427,994	63
Total	**773,295**	**$ 90,680,489**	**$ 117**	**$ 87,690,776**	**$ 113**

Source: Federal Highway Administration Report dated October 2005

October 12, 2006

Mr. Leslie W. Merritt, Jr, CPA, CFP
State Auditor
2 South Salisbury Street
20601 Mail Service Center
Raleigh, North Carolina 27699-0601

Dear Auditor Merritt:

This is in response to the Performance Audit and Exit Conference regarding the North Carolina Highway Program, specifically the Highway Trust Fund Update and the Transportation Improvement Program (TIP) process. I have reviewed the report and offer the following comments and plan of action.

Transportation Improvement Program (TIP) Approval Process

1. Independent Financial analysis and project cost detail oversight needs improvement.

   Recommendation: A disciplined approach to project risk should define the process of whether to include costs in the estimate as actual or contingency costs. Contingencies should be expressed in terms that can be easily presented to and understood by the public. In some cases, a range may be appropriate for program cost estimates. Major projects require special consideration of project risk and complexity in order to produce accurate contingencies.

   Response: The department's Program Development Branch will examine the feasibility of adding contingencies to estimated project costs. Special attention will be given to major projects because of the significant affect that such projects have to the planning and funding process.

   Recommendation: The department should consider creating a financial planning and analysis unit within the Chief Financial Office's (CFO) organization to provide proactive independent financial analysis and detailed project cost oversight. This unit should provide financial expertise to the program delivery office being developed by the department. This CFO unit should review project cost estimates throughout the project's life cycle, analyze major project cost elements, review monthly reports showing project cost variances and provide recommendations to senior management regarding project cost control and policy issues.

Response: Consideration will be given to the CFO function providing proactive independent financial analysis of project costs. In addition, the department believes the best oversight for projects is providing staff at various project levels with timely and accurate financial information for making decisions and recommendations. Staff members have the expertise, experience and close proximity to projects to ensure quality results at the lowest cost.

The CFO function also is working with all departments to enhance individual and unit accountability that must accompany project decisions and recommendations. Clear, visible and approved justifications for cost variances will help control costs.

A "containment" policy within the Division of Highways has been drafted and is a part of the process to achieve a controlled management process.

2. Cost reports do not show detailed cost variances.

Recommendation: The department should develop standardized reports showing current cost variances and anticipated final project cost variances. These reports should include current (weekly or monthly) data, inception-to-date cost and budget, and estimated final cost and budget information. These reports should provide for the aggregation of contract cost elements to facilitate more accurate financial analysis by the different levels of management.

Response: The department has invested significantly in several reporting systems including SAP-R3 accounting software, HICAMS and PMii. The department agrees that it is important that these efforts be maximized and developed into a formal, standardized reporting system for the benefit of senior management and other department stakeholders. Ultimately the department wants to use a short version of this to develop an executive level reporting system. The Division of Highways will also examine procedures for in-process change orders to ascertain more timely entry into HICAMS and SAP.

3. Overall inflation rate applied to the 2006-2012 Transportation Improvement Program (TIP) is understated.

Recommendation: The department should apply inflation rates based on the historical 7-year North Carolina Construction Index inflation rate to all TIP construction projects to provide better estimates of future construction costs. An inflation factor should also be applied to the first year of the 2006-2012 TIP construction cost schedule and adjustments made to the remaining subsequent years. The department should apply compounded inflation to costs in each year of a construction project.

Response: The Audit report concludes that the inflation rate used in the TIP is understated because an historical 10-year inflation rate of 4 percent is being used instead of an historical 7-year inflation rate of 4.3 percent; the inflation rate is not being applied to the first year of projects; and inflation is not being accounted for during the life of multi-year construction projects.

- Past history serves as a guide when predicting the future. Any projected inflation rate is conjecture, whether it is based on a 10-year or 7-year average. Stating that 4 percent or 4.3 percent is an appropriate inflation rate is assigning a precision to the projected inflation rate that does not exist. The department believes retaining the current 10-year "look back" serves to dampen short-term fluctuations, but will revisit this and other forecasting alternatives.
- The department concurs that inflation should be applied to account for an extra six months of inflation in each fiscal year, but we consider it unnecessary to adjust the first year. It is recommended that the extra half year of inflation be added to years two through seven.
- When a contractor bids a project, inflation of quantities is built into the bid. Since those bids become the basis for determining the estimated cost in "today's dollars," the inflation during multi-year construction is accounted for in the contractor's price.

4. Inflation rates applied to the TIP are not specific to construction project type.

Recommendation: The department should revise the methodology for estimating TIP costs by using separate annual inflation rates for highways, structures and other categories of projects in the TIP. Inflation projections for the first two years of the TIP should be based on market, industry and government sources that analyze cost components of those project categories.

Response: Highway construction project scopes are so varied that this could only be accomplished using an "educated guess" regarding the approximate percentage in each project regarding structures, excavation and surfacing. Because of the inability to accurately make such a prediction, the department prefers to use a composite annual inflation rate to compute future costs in the TIP. The department will examine other sources of market, industry and government data for analyzing and projecting costs that are an accurate reflector and predictor of highway construction cost in North Carolina.

5. Temporary-use construction items are not considered for possible reuse.

Recommendation: The department should consider conducting a benefits/costs analysis of purchasing the major temporary-use construction items (such as portable lighting) for possible future reuse on multiple projects. Establishing an inventory of these type items

would require consideration of the costs of regional storage and staff to maintain the inventory and the costs to manage those on multiple projects.

Response: The department's experience with temporary items has clearly shown that there are significant other expenses associated with them beyond the original purchase price. A full assessment of the cost to the department must also include whether it is economically practical for the department to assume responsibility for storage, transportation, delivery timing, refurbishment, on site performance and economic inventory quantity.

If any one of these supporting requirements fails and causes the contractor to deviate from the project schedule, it could result in a claim against the department far in excess of the value of the temporary item(s). The department will give consideration to temporary use construction items when the amount of the items is significant, e.g., temporary lighting exceeding $1 million, while also looking for other opportunities to deliver projects at lower costs.

6. Performance Management Plans do not contain specific fiscal responsibility for controlling project costs.

Recommendation: Performance Management Work Plans for those personnel responsible for transportation projects should contain clear expectations for fiscal responsibility for each project. The department's financial expectations regarding cash management and sound controls for project costs should be fully documented and communicated to all staff.

Response: The department will require that Performance Management Work Plans for personnel responsible for transportation projects contain a clear expectation for fiscal responsibility for projects.

7. Certain internal departmental processes are not automated.

Recommendation: The department should evaluate the feasibility of the automation of its manual processes through use of existing information technology. Many of the processes that may lend themselves to automation have been identified in previous studies of departmental processes.

Response: The department continually strives to achieve more efficiency and effectiveness by automating its processes. The department's Internal Audit Section will review current processes as well as prior OSA studies to determine what opportunities still remain for improvements.

Mr. Leslie W. Merritt, Jr, CPA, CFP
October 12, 2006
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8. Contingency fund guidelines are not incorporated into the department's policy and procedures manual.

   Recommendation: The department should adopt and include formal written Contingency policies and procedures in the department manual. The manual should include step-by-step procedures for Contingency Funds.

   Response: Step-by-step procedures are a part of the request form used in processing contingency funded projects, from initial requests by the Division office to approval by the Board of Transportation. The Chief Engineer's Office will review and ensure that files for the Contingency funded projects are complete and in compliance with Departmental guidelines.

Thank you for the opportunity to respond to the recommendations in the report. I appreciate the work of the Office of the State Auditor to help the department achieve its goals and become aware of additional opportunities for improvements and savings.

Sincerely,

Lyndo Tippett

LT/jbd

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