

# NCDOT

From Policy to Projects

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## 2040 Plan

## North Carolina Statewide Transportation Plan

August 2012

Prepared for:



Prepared by:

# ATKINS





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# Messages

## Message from Governor Perdue

Dear North Carolinian:

As a resident of this state, you play a tremendous role in our vision for the future of North Carolina—one that meets the needs of our growing population, ensures our economic well-being, and supports a high quality of life for each of us.

Transportation is one of the most important aspects of this vision. From providing access to jobs, education and healthcare, to moving the goods and services we all rely on, it touches every area of our lives. It is deeply intertwined with the economic development of our state, and solid transportation infrastructure is needed to attract new business and industry and create opportunities for our citizens. Smart transportation decisions are also important in our work to protect our natural resources and support livable communities.

This plan charts a strategic direction for North Carolina that will help ensure our transportation system supports our economy into the future.

Yours truly,

Bev Perdue, Governor of North Carolina

## Message from the Secretary of Transportation

Dear North Carolinian:

North Carolina is home to the nation's second largest state highway system and its second-largest ferry system, 72 public and 300 private airports, extensive rail and public transit systems, numerous bicycle and pedestrian facilities, two water ports, and two inland terminals, as well as the Global TransPark located in Eastern North Carolina. We have a vast transportation infrastructure to oversee, and we must ensure it can effectively move people and goods and support the growth and development of our communities.

Balancing the diverse needs of a rapidly growing state is no easy task, and it takes careful planning and ongoing input from all our stakeholders to ensure that we are meeting North Carolina's travel demands.

The 2040 Plan is a broad investment strategy that lays out the policies and programs needed to enhance safety, improve mobility, and reduce traffic congestion for North Carolinians over the next 30 years. It is the final step in our recently developed prioritization process that begins with high-level strategic decision-making and ends with a realistic project-specific work plan that makes the best use of available resources. By painting an accurate picture of our priorities well into the future, it also supports our efforts to find new ways to pay for our state's growing transportation needs.

Extensive public outreach was a critical part of this plan's development, and the success of our efforts hinges on continued feedback from the communities we serve. On behalf of NCDOT, I thank you for your participation in helping guide the future of our state's transportation infrastructure.

Sincerely,

Gene Conti, Secretary of Transportation

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# Acknowledgements

The Department of Transportation acknowledges the leadership of Secretary Conti and the Board of Transportation in developing the 2040 Plan, and the strong support provided by NCDOT staff, planning partners, and its consultant team

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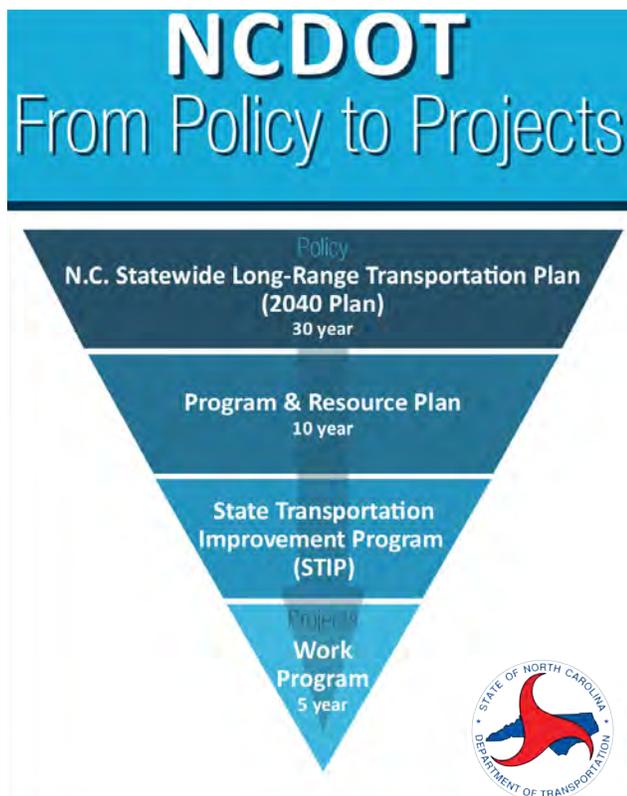
# 2040 Plan: Executive Summary

## Introduction and Plan Purpose

The 2040 Plan is a blueprint that sets investment and policy priorities for North Carolina's evolving transportation system over the next thirty years. It is a policy-based document that identifies transportation needs, estimated revenue to fund those needs, and investment strategies and policies supporting them. The plan focuses on the policies and programs needed to enhance safety, improve mobility, and reduce congestion for all transportation modes.

## 2040 Plan Process

The 2040 Plan is the long-range planning element of NCDOT's Policy to Projects planning process which is designed to provide continuity to NCDOT's program delivery. Drawing from technical analysis, partner and stakeholder collaboration, and public involvement, it presents study findings and recommendations that will guide NCDOT's investment priorities and improve its program delivery and sustainability efforts through improved policy and program efforts.



The 2040 Plan builds off ongoing efforts within the Department to provide: greater transparency, improved efficiency and sustainability, funding flexibility, and increased emphasis on freight movement.

## NCDOT's Mission, Goals, and 2040 Plan Guiding Principles

The North Carolina Board of Transportation has reaffirmed its program delivery goals while updating NCDOT's mission to read: *Connecting people and places safely and efficiently, with accountability and environmental sensitivity to enhance the economy, health and well-being of North Carolina.* With this updated mission in mind, six Guiding Principles helped guide development of the plan:

- Maximize economic opportunity
- Maintain transparency
- Improve modal systems
- Promote long-term viability of environmental systems
- Recognize the growing diversity and mobility needs
- Provide for the security of NC's residents and its economy

## Trends and Challenges Affecting North Carolina Transportation

Over the next 30 years, North Carolina's population will grow, shift, and diversify, and its economy will change. North Carolina will continue to attract newcomers, with an estimated 13.5 million residents by 2040.

The 2040 Plan identifies a number of specific transportation challenges, brought in part by changing demographics and economy, including:

- Growing and Changing Personal Mobility Needs
- Preservation of Transportation Infrastructure Health
- Growing and Changing Freight Movement and Logistics Needs
- Financial Sustainability
- Environmental Stewardship

### 30-Year Transportation Needs

To face these challenges, NCDOT has identified and measured long term needs by mode, investment goals (safety, infrastructure health, and mobility), tier (Statewide, Regional, and Subregional), and quality or level of service (LOS). Within this reporting framework, the 2040 Plan reports that all of North Carolina’s modal systems are tasked with responding to the demographic and economic challenges facing the state, and to the aging of its infrastructure. On a system-wide basis, the existing quality of North Carolina’s transportation system is LOS C, a condition that has been deemed unacceptable by NCDOT’s stakeholders and the public. The average LOS for each mode is shown below:

Reporting North Carolina’s long-term transportation funding needs requires that a targeted, optimized LOS be identified as the basis for evaluation. For the 2040 Plan, a **Target Levels of Service** based on analyses conducted by each of NCDOT’s Business Units has been used.

**The 2040 Plan estimates that over the next 30 years, North Carolina will require nearly \$123 billion to bring our transportation system to the Target LOS for all modes. This compares to \$94 billion to maintain current, less-than-desirable system quality, and \$66 billion simply to keep spending at the same level as today.**

		Mode*					
Level of Service	General Condition	Highways	Public Transportation	Aviation	Bicycle/ Pedestrian	Ferries	Passenger Rail
<b>C AVERAGE</b>	Minimally acceptable conditions, minimally convenient service, moderate availability	X	X			X	X
<b>D BELOW AVERAGE</b>	Poor facility conditions, very minimal service, limited availability			X	X		

\*Ports came under NCDOT management in 2011, and LOS criteria for the ports have not been developed.

In considering the state’s 30-year transportation needs, it is critical to understand the broad scope of our transportation system today. Our highway network is the nation’s second largest state-maintained system, and planning for its needs will be challenged by the large shortfalls in funding created by an unsustainable revenue source, the current motor fuels tax. Residents in each of our 100 counties rely increasingly on our public transportation systems. Our ferry system is the nation’s second largest. Bicycle and pedestrian systems are increasingly seen by our residents as important elements of livable places to live and work. And in a changing state and national economy, we have become ever more aware of the critical need to respond to the logistics needs of our multiple economic sectors through vibrant rail and aviation systems.

30-Year Investment Needs by Quality of Service and Mode (billions of 2011 dollars)			
Mode	Target LOS	Current LOS	Continue Current Funding Levels
Aviation	2.22	2.08	1.46
Rail	3.54	3.03	1.66
Bicycle/ Pedestrian	0.77	0.77	0.34
Public Transportation	20.38	17.34	14.74
Ferries	1.59	1.42	0.71
Ports	1.30	0.97	0.65
Highways	93.03	68.52	46.62
<b>Grand Total</b>	<b>122.83</b>	<b>94.13</b>	<b>66.17</b>

## Funding Our Transportation Needs

Today, NCDOT's revenue comes from three primary funding sources: *the Highway Fund, the Highway Trust Fund, and federal funds*. NCDOT estimates that its baseline revenue (federal allocations, state motor fuels taxes at current tax rates, and other traditional transportation revenues) through the year 2040 Plan will be \$54 billion, which is available for program delivery (construction, maintenance, and operation of multimodal systems).

Comparing NCDOT's 30-year multimodal transportation needs to the baseline revenue forecast of traditional funding sources reveals a significant long-term funding gap. Additional funding will be imperative: the gap to fund Target LOS needs is \$60 billion; just maintaining existing quality of service will require additional \$32 billion.

Projected Needs, Funding, and Funding Gap (billions of 2011 dollars)			
	Target LOS	Current LOS	Continue Current Funding Levels
Total Needs	122.83	94.13	66.17
NCDOT Share of Needs	114.11	86.30	59.70
Total Baseline Revenues	54.03		
<b>Baseline Funding Gap</b>	<b>(60.08)</b>	<b>(32.27)</b>	<b>(5.67)</b>

NCDOT believes that there are feasible new or expanded revenue sources which can be utilized to minimize the funding gap. Those evaluated for their ability to help in closing the funding gap are shown in the table below. Some of the options are powerful – they could provide substantial new funding to supplement or even replace the diminishing motor fuels tax. These are outlined in bold.

Transportation Revenue Enhancement Options (billions of 2011 dollars)		
Revenue Enhancement Options	Total Revenue until 2040	Implementation Year
<b>Continue Motor Fuel Tax Indexing</b>	<b>18.85</b>	Ongoing
Increase Registration/License Fees	6.13	2016
Eliminate Transfers from Highway Fund	4.25	2016
Redirect Short Term Vehicle Lease Fee to NCDOT	0.63	2016
Additional 1% Highway Use Tax	3.25	2016
Dedicated Local Vehicle Property Tax	0.50	2016
<b>Auto Insurance Surcharge (10% Tax Rate)</b>	<b>12.16</b>	2020
Wholesale Motor Fuels Tax (8%)	12.22	2020
<b>Interstate Tolling</b>	<b>41.93</b>	2020
<b>VMT Fee</b>	<b>26.64</b>	2020
<b>Total Revenue Enhancement Options Potential</b>	<b>126.56</b>	

## Strategic Investments and Plan Implementation

The rapid population growth that North Carolina has experienced over the past decade is expected to continue through the 2040 Plan period. As this happens, continued expansion, improvement and adaptation of all elements of our transportation systems will be critical if goals of safety, mobility, and infrastructure health are to be achieved and economic opportunities are to be realized.

The 2040 Plan offers three sets of recommendations that will guide NCDOT going forward:

### Recommendation 1: Embrace Ongoing Major Policy and Process Initiatives

The 2040 Plan recognizes the value of and is committed to recent/ongoing major policy and process initiatives that are both internal and external to NCDOT.

NCDOT commits to continued efficiency and support of economic opportunity pursuits through:

1. Transparency
2. Partnering
3. Sustainable Investments
4. Financial Stewardship

**Recommendation 2: Pursue Focused, Strategic Investment Priorities**

The 2040 Plan establishes clear investment priorities that reflect the Guiding Principles and are intended to achieve positive, clearly defined outcomes in a funding-challenged environment:

1. Priority on safety and infrastructure health
2. Mobility emphasis on statewide tiers
3. Emphasis on meeting logistics needs
4. Creation of funding and project priority flexibility to recognize regional and urban/rural diversity of needs.

**Recommendation 3: Pursue Policy, Process, and Program Changes for 2040 Plan Implementation.**

Implementation of 2040 Plan recommendations will require consideration of substantive enhancements to NCDOT’s policies and processes. NCDOT will work closely with the stakeholders and program delivery partners to address strategic policies, processes and programs. The initiatives below are strategic targets to be examined in detail by NCDOT.

**Closing**

North Carolina’s rapid population growth and development will continue over the coming decades as its economy continues to evolve. These factors place increasing pressure on NCDOT and its public and private transportation partners to provide for the safe and efficient movement of people and goods. By 2040, over \$123 billion will be needed to improve transportation systems that are in some decline, but existing revenue sources will become increasingly unsustainable and generate only \$54 billion.

However, realistic new funding sources reflecting new technologies and apparent public acceptance lead NCDOT to conclude that it should plan for a transportation program that responds to the current challenges, by improving the overall transportation system and expanding transportation choices. Within the framework of the ongoing need to be ever more efficient, the 2040 Plan offers investment strategies and policy initiatives intended to allow the Department to pursue its Mission and Goals. If the initiatives embraced in the 2040 Plan are implemented, then the future North Carolina’s transportation safety, mobility, and infrastructure health should be satisfied.

Proposed NCDOT Policy, Process and Program Enhancements	
1	Focus investment on multimodal facilities of Statewide importance
2	Work with regional planning partners to increase flexibility and responsiveness
3	Reward entities that better integrate land use and transportation planning
4	Expedite project development and delivery through improved efficiency and flexibility
5	Strengthen planning processes to recognize North Carolina’s diversity
6	Maximize economic opportunity and job creation via improved freight initiatives
7	Establish new sources of revenue for transportation investments
8	Increase funding flexibility to recognize regional, urban and rural differences
9	Embrace and capitalize on technological advances

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# 1. Introduction and Plan Purpose

North Carolina's economy depends on having a safe, efficient, well-maintained transportation system. The infrastructure and services that make up the transportation network are critical to the efficient movement of people and goods in support of economic opportunity and must respond to the growing diversity of the State's citizens and its regions. It is vital that the State has a clear vision of how those systems and services should evolve over the coming decades, reflecting anticipated changes in population, the economy, and technology.

The North Carolina Department of Transportation (NCDOT) is charged with developing a long-term vision for transportation in the state and ensuring that public and private transportation service providers work together to achieve that vision. This includes building, operating, and maintaining a safe and seamless intermodal transportation network that links North Carolina internally, with the country, and the world.

Defining that vision for North Carolina's transportation system is the purpose of this update of the state's long-range transportation plan. Called the **2040 Plan**, it defines needed investment, estimated revenue to fund that investment, transportation infrastructure and service investment strategies, and policies supporting them. The plan focuses on the policies and programs needed to enhance safety, improve mobility, and reduce congestion while addressing all modes of transportation for which NCDOT has some degree of responsibility: highways, aviation, ferries, ports, rail, public transportation, bicycling, and walking. The process for preparing the 2040 Plan is described on page 4.

The 2040 Plan sets investment and policy priorities for North Carolina's evolving transportation system over the next 30 years to meet growing mobility needs of residents and visitors, support and enhance the state economy, preserve the environment, and improve the quality of life in a safe, secure, and cost-effective manner.

## NCDOT in Transition: The Benefits of Transportation Reform

NCDOT's last statewide transportation plan was adopted by the Board of Transportation in 2004. Since then, the Department has been involved in a number of initiatives that have influenced how it does its business and interacts with its "clients," all users of the state's transportation system. The principal driving force behind the enhancements that now permeate NCDOT's day-to-day operations was a thorough management review that led to an initiative known as Transportation Reform.

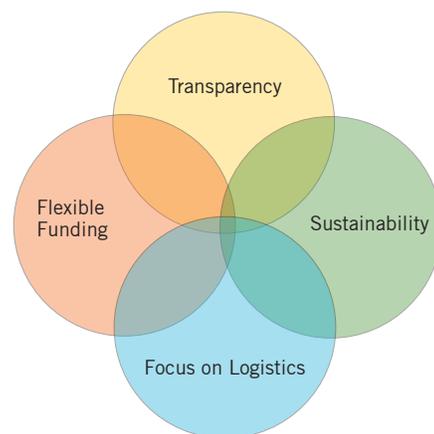
This process has resulted in a "Policy-to-Projects" process that begins with long-range goals and investment decisions and ends with a detailed work program that spells out

specific projects needed to achieve these goals. The result of Transportation Reform can be found in the organizational initiatives described below.

**Greater Transparency** – NCDOT's decisions and performance have been made more transparent to its stakeholders through initiatives such as:

- **Project Prioritization:** use of a data-driven strategic prioritization process helps identify the need for and inclusion of transportation projects (across all modes) in the 10-Year Program and Resource Plan; candidate projects are scored and ranked through a process that takes place every two years.
- **Performance Measurement:** a new ranking system sets goals and objectives based on measurable standards; results are displayed on a "Performance Dashboard," a graphic indicator of how well NCDOT is meeting its goals.
- **Open Communications:** a clear and accountable communications strategy designed to keep

NCDOT—Transitioning for a New Era



residents and employees better informed. NCDOT has developed the Unified Public Engagement Process and is utilizing social media (Twitter, YouTube, and Facebook) to reach a more tech savvy audience. Major projects are also showcased as stand-alone websites that make it easy for the public to see and find information.

**Improved Efficiency and Sustainability:** NCDOT is increasingly focused on providing efficient and sustainable solutions through measures such as:

- **NCDOT Principles and Objectives:** the integration of Principles, Objectives and Performance Metrics across NCDOT business units, projects, programs and services that optimize all human and financial forms of capital for the greatest long-term societal good; the recently-adopted Principles and Objectives can be found in *Appendix B*.
- **Complete Streets Policy:** a policy that encourages design of the state’s highway system in a way that integrates the needs of all types of users, including pedestrians, bicyclists, and transit riders, and improves livability of NC communities.
- **Stewardship in program delivery:** working aggressively to meet project delivery schedules and to streamline project development timelines, raising the bar in delivery of the Transportation Improvement Program, while maintaining NCDOT’s vision for environmentally sensitive systems; one example is the reduction of bridge replacement time from 5 to 3 years, and lowering costs by 25%.
- **Increased use of technology:** using technology to reach NC’s citizens and partners, including



user-friendly spatial mapping tools showing transportation data on a state map, and development of a management system streamlining environmental project development and documentation.



**Funding Flexibility:** using funding tools such as new debt financing instruments that leverage a portion of NCDOT’s federal funds to accelerate improvements and provide interim financing (for example, Grant Anticipation Revenue Vehicle, or GARVEE bonds), toll financing, private sector partnering, the Mobility Fund, and expanded multimodal funding, NCDOT is stretching its revenues and speeding project delivery. In 2011, NCDOT sold bonds through the N.C. Turnpike Authority and began construction on the first of five potential toll projects around the state. The exploration of naming rights for infrastructure is another funding source the Department is considering.

**Increased Emphasis on Logistics and Freight Movement:** greater institutional understanding of the importance of logistics to promoting economic opportunity is influencing allocation of financial resources. Governance changes that will facilitate improved utilization of critical logistics assets such as the state’s ports, inland terminals, the Global TransPark (GTP) economic hub, and the North Carolina Railroad Company have been implemented. Spurred by the work of the Governor’s Logistics Task Force (GLTF) under the direction of the Lt. Governor, successful implementation of this far-reaching initiative will be critical if the state is to achieve economic well-being for its residents.

## Successes and the Look Ahead

The result of this new approach to doing business is a set of successes indicating to NC's citizens that the NCDOT is working hard to be good stewards of their tax dollars. Recent examples of these NCDOT Successes are shown below. However, the need to be flexible, responsive, and creative demands that the Department moves forward with a clear vision of our plan for tomorrow.

## Stakeholder Expectations

In preparing the 2040 Plan, NCDOT sought stakeholder input through a comprehensive public participation program (see *Appendix C* for a description), allowing multiple opportunities for a wide variety of stakeholders to provide valuable input. While a wide range of input was received, prevailing thoughts and ideas included:

- It will be increasingly important to offer public transportation and non-motor vehicle options as the population diversifies and ages.
- It is imperative that North Carolina take care of its existing infrastructure and place a high priority on roadway improvements that address congestion and economic development needs.
- Linking multiple modes and connecting land uses to transportation would create a more efficient transportation network and help address urban sprawl.



- Although increased funding may be needed to pay for transportation projects, facilities and services, NCDOT should exhaust all ways of streamlining its operation and eliminating fund diversions at the state level while considering other ways of obtaining funds.
- When increased funding is sought, it should come from a variety of sources.
- NCDOT needs to work more closely with its transportation partners at the Metropolitan Planning Organization (MPO) and Rural Planning Organization (RPO) levels, and recognize transportation needs vary from region to region.
- More education of stakeholders and the general public is needed about transportation, including how it is funded and what it costs to maintain and improve a multi-modal transportation network.

### Recent NCDOT successes:

- Implemented a new performance management system allowing goals and objectives to be measures against known standards.
- Increased Program Delivery rate to 90-95%.
- Developed Project Prioritization process to make project selection more objective.
- Implemented a transparent and accountable communications strategy.
- Began use of GARVEE bonds to speed delivery of federal-aid highway projects.
- Reduced bridge replacement time from 5 to 3 years, and cost by 25%.
- Sold bonds through the N.C. Turnpike Authority and began construction on the first of five potential toll projects around the state.
- Adopted "Complete Streets" policy that improves livability of NC communities by integrating transit and pedestrian planning into roadway design.
- Expanded NCDOT Mission to recognize transportation's connection to the state's economy, health and well-being.
- Developed departmental Principles, Objectives and Performance Measures to gauge progress on the expanded mission.
- Added new mid-day frequency to the intercity rail passenger service between Raleigh and Charlotte (the Piedmont) and received \$545 million High Speed Intercity Passenger Rail Program grant to add more service.
- Developed security plans for the state's ferry system.

## 2040 Plan Process—Collaborative, Continuing, and Coordinated

The 2040 Plan is the long-range planning element of NCDOT’s *Policy to Projects* planning process that is designed to provide transparency, objectivity, and continuity to NCDOT’s program delivery. The 2040 Plan has been prepared by combining technical analysis and public outreach, and is intended to meet federal transportation planning requirements as defined in 23 CFR Part 450 (see *Appendix D* for required transportation plan content).

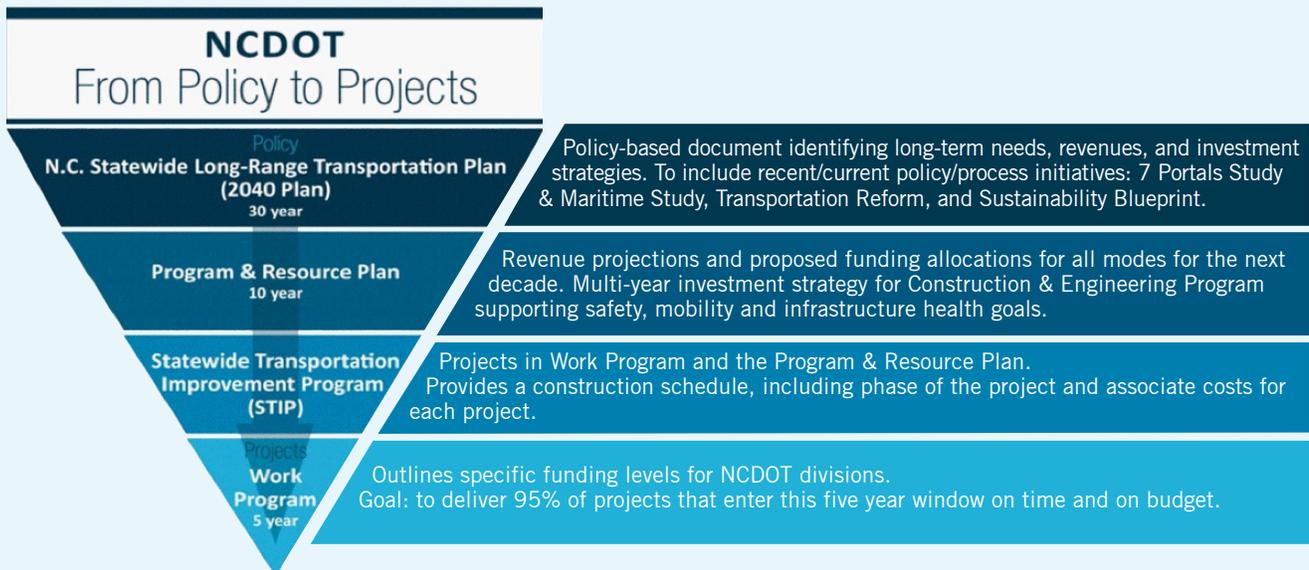
Technical activities included:

- Forecasting long-term socioeconomic trends.
- Defining long-term transportation challenges and opportunities.
- Estimating North Carolina’s 30-year transportation needs for all modes of transportation; needs estimates draw directly from long-range transportation plans of the state’s seventeen MPOs, planning and asset management efforts of NCDOT’s modal units, and external strategic planning of the Governor’s Logistics Task Force.
- Forecasting baseline state and federal transportation revenue.

- Estimating the gap or shortfall in funding, and comparing baseline revenue to 30-year funding needs.
- Identifying revenue enhancement options and their potential to close the funding gap.

Public involvement included general communications on the NCDOT web site, distribution of three public opinion surveys and evaluation of the input received from approximately 8,500 responses, multiple meetings with a Statewide Stakeholder Group and Agency Coordination Group, and ongoing coordination with the state’s MPOs and RPOs.

The result of the 2040 Plan process is a set of broad policy, program delivery, and investment strategy recommendations. Drawing from the technical analysis, partner and stakeholder collaboration, and public involvement, the 2040 Plan presents study findings and recommendations that will guide the Department in setting investment priorities in its 10-Year Program and Resource Plan, and will enhance program delivery and sustainability efforts through improved policy and program efforts.



## 2. NCDOT's Mission, Goals, and 2040 Plan Guiding Principles

Following completion of the last statewide plan in 2004, the North Carolina Board of Transportation adopted a mission statement and five primary goals that have become the foundation upon which NCDOT does its work for the citizens of the state and which drive the day-to-day activities of the Department. The Mission was updated in 2012 to reflect a more focused intent to enhance the economy, health, and well-being of North Carolina through NCDOT's varied transportation programs. In adopting this 2040 Plan, the Board of Transportation specifically re-affirms the Mission and Goals, directing how NCDOT will continue to define and measure its program-delivery efforts.



### 2040 Plan Guiding Principles

Further defining NCDOT'S five goals, the 2040 Plan establishes the following six Guiding Principles that define overarching focus areas that are consistent with NCDOT's Mission and Goals and will guide development of the 2040 Plan's recommendations:

- **Maximize economic opportunity** in its programming of financial resources.
- **Maintain transparency** in development and funding of multimodal projects and programs.
- **Improve modal systems** by clearly defining performance measures and expectations.
- **Promote long-term viability** of environmental systems, preservation of resources, livability of the state's communities, and transportation system efficiency and flexibility.
- **Recognize the growing diversity and mobility needs** of the state's population by continuously improving the mobility options that are available.
- **Provide for the security of North Carolina's residents and its economy** by considering security needs in project development processes, including in providing for the security of data.



# 3. Trends and Challenges Affecting North Carolina Transportation

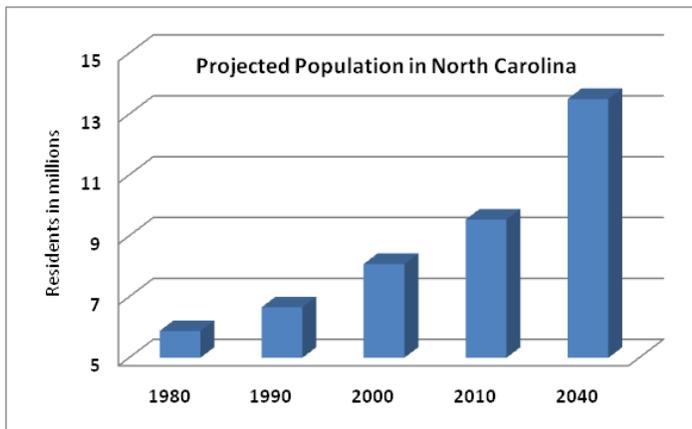
Over the next 30 years, North Carolina's population will grow, shift, and diversify, and the economy will change. These changes will create major challenges to NCDOT and its transportation partners.

## Population and Employment Trends

The movement of people and goods is a primary output of social and economic activity, increasing the demand for transportation services. The following trends will have a significant impact on efforts to provide needed transportation services and infrastructure over the next three decades:

From 2000 to 2010, North Carolina's 18.5% population growth rate was surpassed by only five states, and its absolute population increase of 1.5 million was topped by just four states.

- North Carolina will continue to attract newcomers. By 2040, an estimated 13.5 million people will call North Carolina home, a 42% increase from 2010.<sup>1</sup>



- The state's population will continue to concentrate in urban clusters and along major transportation corridors. Population in the state's six major metropolitan areas (Charlotte, Raleigh-Durham, Greensboro-Winston-Salem, Asheville, Fayetteville, and Wilmington) will grow from 69% to 74% of state population.

- Population outside the six major metropolitan areas will increase by 600,000, to 3.6 million.
- Older adults are the fastest growing segment of North Carolina's population. Those over 65 years of age will increase from 13 to 18% of the state's population, doubling to 2.4 million.
- The employment base will continue its shift from the manufacturing base of the 1990s, becoming increasingly service-oriented. Employment will increase from pre-recession 2007 levels of 4.1 million to 5.7 million in 2040, manufacturing jobs will drop 32% to 368,000, and non-military service jobs will increase 50% to 5.0 million.

These trends present serious challenges to the delivery of transportation services in the state. While the demographic trends serve as the evidence of how attractive the state has become to the newcomers, they create more strain on the state's multimodal network. The state's shifting economy will require a well-maintained and expanded transportation infrastructure to support it.

## Transportation Challenges

NCDOT and its transportation partners face substantial hurdles in addressing the broad transportation needs of the state over the next 30 years. These challenges include assurance of the safety of its systems, preservation of the health of an aging infrastructure, and provision of economic opportunity brought in part by personal mobility and efficient movement of the freight and goods. These trends, more completely reported in the 2040 Plan *Challenges and Opportunities* (September 2011), are summarized below. Several current NCDOT initiatives to address these challenges are also identified.

### 1. Growing and Changing Personal Mobility Needs

North Carolina must respond to the demographics-related challenges facing its transportation sector, resulting in substantial impacts on travel patterns and demand and increased strain on the state's transportation infrastructure health. The continued

<sup>1</sup> Global Insight database. US Census 2010.

concentration of population in the state's six major metropolitan areas will lead to increased traffic congestion and inadequate transportation infrastructure. The aging of the state's population will challenge efforts to provide mobility for this age sector and to ensure safety of motorists, as North Carolinians live longer and older residents form a growing percentage of the total population.

## 2. Preservation of Transportation Infrastructure Health

While NCDOT and its public and private transportation partners have invested heavily in North Carolina's transportation infrastructure, the infrastructure "health" is in jeopardy. This issue affects all transportation modes in the state. To cite some highway statistics, while 84% of interstate miles are in good condition, only 63% of primary and 67% of secondary miles are in good condition.<sup>2</sup> The NCDOT's *2010 Report on the Condition of the State Highway System* reported that if funding remains stagnate, the percent of highway miles in good condition in North Carolina is projected to drop from 68 to 50% by 2017, with a similar percentage drop for bridges.<sup>3</sup> The modal needs described in the next section of the 2040 Plan document that each mode faces very large infrastructure needs. Preserving the existing transportation infrastructure in sound physical condition will require more resources than are available today. The challenge ahead will be to augment existing revenue sources to pay for preservation of our transportation infrastructure.

"Businesses looking to relocate or expand want a strong transportation infrastructure to effectively move their goods."

Governor Beverly Perdue

## 3. Growing and Changing Freight Movement and Logistics Needs

NC businesses rely on freight movement to succeed in today's competitive global economy; as such, the state's economic prosperity hinges on the ability of goods to be transported in an efficient and cost-effective manner. The state's ports in Wilmington and Morehead City are important international gateways for bulk exports and commodities imports; the Interstate highways serve as the primary trucking cargo arteries; the two Class 1 railroads (CSX and Norfolk Southern) offer most of the freight rail capacity; and the three

international airports (Charlotte/Douglas, Piedmont Triad, and Raleigh-Durham) serve as major freight hubs. The state's ability to attract new businesses will be aided by prompt responsiveness to their short and long term freight movement and logistics needs. This is documented in

reports such as the *Statewide Logistics Plan*, the *Seven Portals Study*, the *North Carolina Maritime Strategy*, and reflected in the work of the Governor's Logistics Task Force. North Carolina needs to prepare ongoing response to freight movement and logistics needs of commerce in the state. This includes both added capacity needed to handle expected increases in freight volume, and changing logistics patterns as the state's economy evolves.

To address logistics needs and the economic development opportunities as defined by the Governor's Logistics Task Force, the General Assembly has transferred the State Ports Authority and the Global TransPark to NCDOT management and has created a State Transportation Logistics Coordinating Council. Additionally, NCDOT has appointed a Statewide Logistics Coordinator to guide the Department's efforts to more efficiently address the economy's logistics needs.



<sup>2</sup> NCDOT, *A Vision Set in Motion, 2010 Annual Performance Report*

<sup>3</sup> NCDOT, *2010 Report on the Condition of the State Highway System*

#### 4. Financial Sustainability

Adequate financing is fundamental to the delivery of transportation services and infrastructure. NCDOT recognizes the need for a comprehensive funding approach for all aspects of its operations and expansion, but revenues are not keeping pace with the growth in demand for transportation in North Carolina.

NCDOT is faced with identifying stable, long-term sources of transportation funds that can address the funding gap in a meaningful way. North Carolina's revenue per lane-mile is well below the national average. In 2008, NCDOT received \$20 in revenue per lane mile, compared to \$64 nationwide.<sup>4</sup> In addition, the state gas tax receipts have decreased significantly in recent years, a function of the economic downturn and more fuel efficient vehicles.

This adverse impact on revenues is expected to accelerate with implementation of the new federal fuel efficiency standards, resulting in a long-term decrease in the consumption of motor fuels. The purchasing power of NCDOT construction dollars has shrunk in recent years; each dollar spent by NCDOT for highway construction and maintenance buys 42% less in 2011 than it did in 2003.<sup>5</sup> And the federal funding program remains uncertain, with possible cuts to the overall program driven by the need to reduce national deficit and likely changes to grants and formula programs.

To address this challenge, NCDOT continues to seek new and innovative funding options. Most notable has been the creation of the NC Turnpike Authority and sale of toll-backed bonds to finance multiple new highway and bridge projects. Other notable examples:



- **Interstate Highway tolling:** to fund a \$4 billion improvement program on I-95 that far exceeds the capacity of traditional funding sources, NCDOT is seeking authority from FHWA to use tolls under the Interstate System Reconstruction and Rehabilitation Pilot Program.
- **Public-Private Partnerships:** developed to bring private capital to projects such as the I-77 High-Occupancy Toll Lane project and the Mid-Currituck project. Under such arrangements, NCDOT is the owner of the project and provides preliminary surveys and technical support. Its private partners are responsible for obtaining all project permits, supplemental surveys, project design, and coordinating the resolution of all utility conflicts, and providing capital for project implementation that is repaid from revenues generated by the project.<sup>6</sup>
- **Value Capture:** for major transit capital investments such as the Mecklenburg County Red Line commuter rail project, NCDOT is working with local governments and regional transit agencies to create new mechanisms that capture public revenues from increased private land values resulting from public investment. For the Red Line, “value capture” could provide half of the anticipated \$400 million project cost.

<sup>4</sup> Federal Highway Administration, *Highway Statistics 2008*

<sup>5</sup> NCDOT, *A Vision Set In Motion: 2010 Annual Performance Report*

<sup>6</sup> [http://www.ncdot.gov/doh/preconstruct/altern/design\\_build/HOCTPARTNERSHIP/synopsis.pdf](http://www.ncdot.gov/doh/preconstruct/altern/design_build/HOCTPARTNERSHIP/synopsis.pdf)

## 5. Environmental Stewardship

Preservation of the environment and efforts to meet the mobility needs of a growing population, sometimes leads to unavoidable impacts, and creates what some find to be conflicting objectives. The NCDOT must address the environmental challenges facing the state's transportation sector, while also supporting economic opportunities leading to a high quality of life for all residents. Can NCDOT provide infrastructure and services that minimize the impact to the environment while supporting economic opportunities?

While this challenge is substantial, NCDOT is taking several actions to address it. The Complete Streets policy, context-sensitive design, major investments in public transportation and intercity rail, efficient operations and improved freight movement are examples of tools already utilized by NCDOT that reduce greenhouse emissions, conserve energy, and improve air quality. As important, they enhance the quality of life of the state's residents and address climate change in a meaningful way. The framework for NCDOT's environmental stewardship goals, objectives, and strategies was designed to promote optimal outcomes, with a set of performance measures to monitor implementation progress and effectiveness over time.



## Transportation Opportunities

With each challenge comes opportunity. The 2040 Plan *Challenges and Opportunities* offers some responses to identified transportation challenges:

- As North Carolina continues its rapid population growth and demographic change, NCDOT and its partners can focus on efforts to provide mobility in the context of improving health and well-being of NC's residents.
- Scarce and dwindling financial resources leverage the greatest economic benefit when the state promptly responds to transportation needs of the industries and infrastructure investment strategies are consistent with evolving commercial opportunities.
- Expanded, more flexible funding initiatives (such as the Mobility Fund or GARVEE bonds) and new funding sources (such as tolling or Vehicle Miles Travelled fee) could address the funding gap.
- Sustainable transportation solutions, including better linkage between land use and transportation decisions, expanded and enhanced multimodal options, and increased use of green technology in the delivery of transportation services, could result in more efficient trip making and energy savings.

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## 4. 30-Year Transportation Needs

The NCDOT administers and partners in a substantial and well-developed network of multimodal transportation facilities. The 2040 Plan assesses transportation needs by whether **modal** needs (transportation facilities such as highways and transit systems) are current or occur in the future, by investment goal (infrastructure health, mobility, or safety), by system tier (Statewide, Regional, or Subregional), and resultant Level of Service. This section provides a snapshot of NC's transportation system, the performance of each of the eight broad types or modes of transportation, and the funding needed for each mode over the next 30 years to maintain and expand the infrastructure and services. Consideration will be given to the investment needed from several perspectives:

- **Current or accruing modal needs:** long-range capital and operating costs for infrastructure and services for each transportation mode (or means of transportation) have been estimated and catalogued as being either current deficiencies or accruing (future) modal needs, defined as follows:
  - **Current deficiencies:** existing modal needs that are sometimes referred to as backlogged needs. These needs would already have been addressed had necessary funds been available.
  - **Accruing needs:** anticipated future modal needs, due to capacity and services needs arising from growth in demand over time, due to ongoing maintenance requirements.
- **Investment goals:** flowing directly from NCDOT's mission and the three goals described previously that relate to asset management, development, and funding, modal needs are defined in the 2040 Plan in terms of funding required to address:
  - **Safety:** cost to improve safety and security. A safety project may also improve the condition (health) of the facility or mobility along the corridor. Examples include: guardrails, rail crossing and safety projects, upgrading roadway projects to improve safety where no additional capacity or lanes are included, traffic signals, rumble strips, and runway lighting.
  - **Infrastructure health:** cost of operating, maintaining, and modernizing systems. Examples include: reconstruction, rehabilitation, resurfacing, repair, replacement, or preservation projects, rest area projects, replacing an aging ferry vessel (as opposed to a new ferry for new service), replacing an aging bus (as opposed to a new bus for expanded service), and repaving an airport runway.
  - **Mobility:** cost to expand systems or services to reduce congestion, improve access to economic opportunities, or satisfy land access or freight movement needs. Examples include: roadway widening and new location projects, converting highway intersections or grade-separations to interchange projects, signal system coordination projects, variable message signs and traffic cameras, new multi-use trail projects, new buses for a new bus route, new passenger/commuter/light rail service, adding double track to a rail line, new ferry vessel for expanded ferry service, and runway extension to accommodate larger planes.
- **System tiers:** Elements of the various modal systems have been assigned by NCDOT to one of three tiers that define how each of those elements contributes to serving particular types of transportation movements. The North Carolina Multimodal Investment Network (NCMIN) classifies facilities across all transportation modes as part of a unified system into three tiers: Statewide, Regional, and Subregional.<sup>7</sup> The three tiers as they are described in the NCMIN are as follows:
  - **Statewide tier:** facilities or services that serve long-distance trips, connect regional centers, have the highest usage, and mostly provide a mobility function (as opposed to a land access function).
  - **Regional tier:** facilities or services that connect major population centers and have a mix of functions. Some of the Regional Tier facilities can be viewed as serving statewide transportation criteria, but they usually provide a localized function. They are equally important to a particular region of the state and also provide some land access.

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<sup>7</sup> <http://www.ncdot.gov/performance/reform/NCMINmaps/>

- o **Subregional tier:** facilities or services that serve localized movements. They provide more of an access than mobility function, and are of a higher interest to cities and counties than the state.

For the 2040 Plan, needs have been identified and reported to differentiate among these three tiers.

- **Quality, or Level of Service (LOS):** As part of the 10-year Project Prioritization process that is an element of Policy-to-Projects (described previously in this report), NCDOT has developed a grading system for each transportation mode that defines how well that mode meets public needs. The level of performance of each mode is ranked similar to a school report card: LOS A, B, C, D, and F; descriptions of each LOS by mode are shown in the

table below. Generally, an optimum **LOS A** rated network would provide excellent quality conditions, very convenient service, and wide availability of service, but possibly at an unattainable cost to build, maintain, and operate. An improved, above average system, with **LOS B** rating, would provide good quality conditions, convenient service, and good safety, with a higher return on investment than could be obtained for **LOS A** investment. A transportation system at **LOS C** is veering toward wide-spread safety concerns, deferred maintenance, and congestion and land access issues that constrain economic opportunity.

On a system-wide basis, the existing quality of North Carolina’s transportation system is **LOS C**. For context, the table below identifies the average LOS for each mode.

Level of Service Definitions								
Level of Service	General Condition	Highways	Public Transportation	Aviation	Bicycle/ Pedestrian	Ferries	Passenger Rail	Ports*
<b>A EXCELLENT</b>	High quality conditions, very convenient service, widely available	Very smooth roads, minimal congestion	Frequent service and good geographic coverage	No safety issues	Many and varied bike and pedestrian routes	No ferry delays	Good cross-state rail service	No safety issues
<b>B ABOVE AVERAGE</b>	Good quality conditions, convenient service, good availability	Generally smooth roads, some congestion	Good bus service	Some safety issues	Some bike routes	Periodic ferry delays	Decent state rail service	Some safety issues
<b>C AVERAGE</b>	Minimally acceptable conditions, minimally convenient service, moderate availability	More rough roads, potholes & deficient bridges, common congestion	Infrequent service and limited geographic coverage	Many safety issues	Scattered bike routes	Frequent ferry delays	Limited state rail service	Many safety issues
<b>D BELOW AVERAGE</b>	Poor facility conditions, very minimal service, limited availability	Many rough roads, broad congestion	Barebones service	Many safety issues	Few bike routes	Frequent ferry delays	Poor state rail service	Many safety issues
<b>F FAILING</b>	Deteriorated facility conditions, spotty and irregular services, very limited availability	Widespread rough roads, potholes & deficient bridges, widespread congestion	Very restricted service	Widespread safety issues	No bike routes	Regular and long ferry delays	No state rail service	Widespread safety issues

■ Shaded cells denote current overall modal level of service, as determined by NCDOT as part of its 10-Year Project Prioritization process, based on degree to which modal systems meet defined performance standards.

■ Shaded cells denote desired overall modal level of service ('Target LOS'), as determined by NCDOT as part of its 10-Year Project Prioritization process, based on degree to which modal systems meet defined performance standards.

\* Ports came under NCDOT management in 2012, and LOS has not yet been rated.

## Level of Service Targets for Modal Needs

Reporting of North Carolina's long-term transportation funding needs requires that a targeted, optimized Level of Service be identified as the basis for evaluation. One option is to use LOS A as the ongoing system goal, but as noted above, the cost and expected lower return on investment of that goal makes its use unwarranted. A second option is to report needs at Levels of Service that correspond to current assessed quality levels; but as has been widely reported, current LOS does not meet public expectations for safety, congestion relief, or strengthening of multimodal opportunities, and are leading to conditions of deferred maintenance that will result in much more costly repairs or replacements in the future. Neither of these options is considered desirable.

A third option, and the one used for estimating North Carolina's long-term transportation funding needs, is to build upon modal Target as they have been identified in the 10-Year Project Prioritization process. This third option is identified as **Target Levels of Service**, and is based on analyses conducted by each of NCDOT's modal Business Units. In all cases, the targeted

average modal LOS is better than existing conditions but is less than LOS A. The modal LOS is shown in the table on page 12. *Appendix E* provides more details on the LOS options considered by the 2040 Plan, including a summary of LOS A costs.

## Multimodal Transportation Needs

Using the Target Levels of Service described above, North Carolina over the next 30 years will require \$122.83 billion if it wishes to provide a transportation system that achieves the "Target LOS" for all modes. At \$87.32 billion of the total, accruing needs represent 71% of all identified needs, with current deficiencies accounting for \$35.51 billion, or 29%. Reflecting that the state's transportation system is heavily oriented toward automobile use for personal mobility and trucks for freight movement, highway needs are by far the largest. By investment goal, 54% of identified transportation needs are mobility needs, with 43% dedicated to infrastructure health needs. Identified needs by tier vary by mode depending on the particular needs and role in each tier. Overall, 37% of identified transportation needs are on the Statewide tier and 38% are on the Subregional tier.

### 30-Year Transportation Needs Summary (Target LOS) by Mode, Investment Goal, and Tier (billions of 2011 dollars)

By Mode	By Investment Goal	By Tier
<ul style="list-style-type: none"> <li>\$93.03 billion (76%) is for highway programs (includes needs for roadway, bridges, and Intelligent Transportation Systems)</li> <li>\$29.80 billion (24%) is split between the six non-highway modes</li> </ul>	<ul style="list-style-type: none"> <li>\$67.35 billion (54%) are mobility needs</li> <li>\$52.62 billion (43%) are infrastructure health needs</li> <li>\$2.88 billion (3%) are safety needs</li> </ul>	<ul style="list-style-type: none"> <li>\$45.20 billion (37%) are Statewide tier needs</li> <li>\$31.07 billion (25%) are Regional tier needs</li> <li>\$46.55 billion (38%) are Subregional tier needs</li> </ul>

### 30-Year Transportation Needs by Mode, Investment Goal, and Tier (Target LOS) (billions of 2011 dollars)

By Mode	Investment Goal			Tier			30-Year Total
	Mobility	Safety	Health	Statewide	Regional	Subregional	
Aviation	0.76	0.15	1.31	0.06	1.68	0.47	2.22
Rail	3.38	0.14	0.02	1.22	1.42	0.90	3.54
Bicycle/Pedestrian	0.39	0.39	—	0.02	0.06	0.69	0.77
Public Transportation	12.78	0.15	7.46	0.19	11.29	8.90	20.38
Ferry	0.24	—	1.35	1.12	0.47	—	1.59
Ports	0.10	0.05	1.15	1.30	—	—	1.30
Highways	49.70	2.00	41.33	41.29	16.15	35.59	93.03
<b>Total</b>	<b>67.35</b>	<b>2.88</b>	<b>52.62</b>	<b>45.20</b>	<b>31.07</b>	<b>46.55</b>	<b>122.83</b>

The LOS reported for each transportation mode in the following pages represents a system average, based on the degree to which modal systems meet defined performance standards. Within a mode, there can be significant variation, especially when conditions of modal elements are controlled by multiple governmental units. This is particularly the case with Public Transportation and Aviation. For a more detailed examination of North Carolina's 30-year transportation needs, see *Appendix E* and the *System Inventory and Modal Needs Report*.

## Aviation

North Carolina has 72 publicly owned airports, of which nine are primary commercial service airports and 63 are general aviation airports.



The airports that receive scheduled passenger service serve more than 47 million passengers annually. NCDOT is responsible for state aviation system planning, airport and aviation system development, and construction and improvement of publicly owned general aviation airports.

According to a 2006 study by NCDOT, airports across North Carolina generate \$11.8 billion in economic impact annually and provide over 88,000 jobs.<sup>8</sup> This estimate is likely to be much higher in the future due to expected growth in general aviation, corporate travel, and air cargo shipments. For airports in NC, the ability to generate revenue streams and garner local revenue aid to match grants and to cover direct costs might continue to be a challenge. Today, the general structure of the NCDOT program of grants supporting the state's public aviation facilities is intact, but the need for state and federal funding to support specific airport projects is exceeded by local facility needs.

### Aviation Performance

In 2012, existing aviation system performance was rated at **LOS D** for the three investment goals of safety,

mobility, and health. LOS will vary from airport to airport, reflecting local facility ownership and funds availability.

### Aviation Needs

The 30-year aviation needs total \$2.22 billion. At \$412 million, current deficiencies represent 18% of identified needs. By investment goal, \$1.31 billion (59%) are infrastructure health needs, \$758 million (34%) are mobility needs, and \$154 million (7%) are safety needs.

Aviation Needs (Target LOS) (billions of 2011 dollars)			
Investment Goal	Current Deficiencies	Accruing	30-Year Total
Mobility	0.28	0.48	0.76
Safety	0.11	0.06	0.15
Health	0.09	1.27	1.31
<b>Total</b>	<b>0.41</b>	<b>1.81</b>	<b>2.22</b>

### Implications

While NCDOT currently has a minimal role at the large commercial airports, the growth in the state's population should drive airport improvements at all tiers: Statewide, Regional, and Subregional. The Governor's Logistics Task Force has found that healthy airports are crucial to efforts to achieve regional economic opportunity, as key economic sectors increasingly rely on the logistics benefits of good air service. The Task Force recommends continued infrastructure health investments to sustain and develop of aviation facilities. Continuation of the current Level of Service D will undoubtedly lead to reduced safety, congestion in the major airports, and increasing cost to preserve even current maintenance levels.

### Intercity and Commuter Passenger Rail

Fourteen intercity passenger trains operated by Amtrak currently serve municipalities in North Carolina. NCDOT operates and independently funds two passenger rail routes: the Piedmont (daily Raleigh-Charlotte) and the Carolinian (daily New York-Richmond-Raleigh-Charlotte). NCDOT's Rail Division is currently upgrading the corridor between Raleigh and Charlotte to increase train speeds, reduce travel time, increase train frequency, and improve safety and reliability.

<sup>8</sup> NCDOT, *2006 Economic Impact of North Carolina's Publicly-Owned Airports*

An average of 2,600 passengers per day use passenger rail stations in North Carolina.

Between 2009- 2010, state-funded Piedmont service had a 46% increase in ridership, the largest increase in the nation.



### Passenger Rail Performance

In 2012, the intercity passenger rail mobility level of service was rated **LOS D**, reflecting that service frequency, communities receiving service, and convenience of service hours is significantly below expectations and below levels needed to capture the market demand for such service.

### Passenger Rail Needs

The 30-year passenger rail needs total \$2.73 billion. At \$19 million, current deficiencies represent less than 1% of passenger rail needs. By investment goal, \$2.57 billion (94%) is for mobility needs, \$139 million (5%) is for safety, and \$22 million (less than 1%) is for infrastructure health. The largest recognized future passenger rail expenditure is the Charlotte to Washington, D.C., Southeast High Speed Rail service addition, followed by the proposed commuter rail systems in the Raleigh-Durham, Charlotte, and Greensboro-Winston-Salem areas. Intercity passenger rail service is on the Statewide tier, which includes all intercity passenger rail service and station facilities.

Intercity and Commuter Passenger Rail Needs (Target LOS) (billions of 2011 dollars)			
Investment Goal	Current Deficiencies	Accruing	30-Year Total
Mobility	0.02	2.55	2.57
Safety	—	0.14	0.14
Health	—	0.02	0.02
<b>Total</b>	<b>0.02</b>	<b>2.71</b>	<b>2.73</b>

### Implications

The low current level of service for intercity passenger rail reflects the scarcity of service outside the Charlotte-to-Raleigh Piedmont Crescent. Growth of ridership in that corridor as highway congestion grows and train frequency is improved suggests the presence of underserved (Raleigh-to-Washington, D.C. Southeast High Speed Rail) and untapped (western and southeastern part of the state) markets. The continued public investment in the state's intercity passenger rail services, as well as long-term investment in high-speed rail, will improve mobility across the state. The *Seven Portals Study* noted the importance the new passenger routes would have on logistics in the state. Improved passenger rail services should also benefit freight rail.

### Freight Rail

North Carolina's freight rail network serves 86 of the state's 100 counties. The majority of the state's freight rail system is owned, operated, and maintained by the private sector. With 3,345 miles of rail lines throughout North Carolina, all but 491 miles are owned by freight railroad companies. The most densely traveled freight rail corridors in North Carolina are owned and/or operated by two Class 1 railroad companies: CSX and Norfolk Southern. Although NCDOT has only a small amount of funding available for freight rail projects, it plays an important role

The state of North Carolina owns the North Carolina Railroad Company, which in turn leases to Norfolk Southern the 317 miles between Charlotte and Morehead City, through Greensboro and Raleigh-Durham. This corridor is crucial to meeting our rail passenger and logistics needs.

in protecting and improving freight service through its passenger rail program expansion plans and work on rail line relocation projects. In addition, the Department administers an incentive program that partially funds reconstruction or refurbishment of industrial tracks required by new or expanding industries to encourage economic development, provides funding for tracking upgrades and additions for shortline railroads that serve rural areas, and manages the nationally-recognized grade crossing safety program.

Of particular note in considering the state's freight rail network is the role played by the North Carolina Railroad Company (NCRR). This company owns the right-of-way from Charlotte through the Piedmont Crescent to Raleigh, and on to the port at Morehead City. The Charlotte-Raleigh segment of NCRR is a key element of NCDOT's expanding intercity passenger rail service that was described above. NCRR is a private, for-profit company in which 100% of the stock is owned by the State of North Carolina. NCRR has been recognized by the Governor's Logistics Task Force as a unique asset in reaching the evolving logistics objectives of NCDOT and the State.

### Rail Freight Performance

Existing freight rail performance was not assigned a LOS score when the most recent ranking was done by NCDOT in 2011. Plans are to develop a LOS for freight rail after more information on logistics needs is available, as part of the Prioritization 3.0 process.

### Freight Rail Needs

The 30-year freight rail needs total \$806 million. All identified needs are accruing needs. By investment goal, all freight rail needs are mobility needs. The largest single identified future freight rail expenditure is for improvements to short line railroads.

Freight Rail Needs (Target LOS) (billions of 2011 dollars)			
Investment Goal	Current Deficiencies	Accruing	30-Year Total
Mobility	—	0.81	0.81
<b>Total</b>	<b>—</b>	<b>0.81</b>	<b>0.81</b>

Note: Rail Division reports no identified freight rail safety or health needs

### Implications

NCDOT has increased focus on corridors with shared freight and passenger rail usage and statewide freight logistics. It envisions continued strategic investments in private Class 1 and shortline railroads to enhance publicly sponsored rail operations and address targeted safety priorities. The *Seven Portals Study* recommended that the state arrange for more competitive rail service to increase statewide freight mobility and should make better use of the NCRR. The *Statewide Logistics Plan* pointed out that freight rail can shift some traffic off the highways.

### Bicycle and Pedestrian

Bicycle and pedestrian infrastructure in North Carolina includes both state and municipal facilities, which may be on-road or off-road. Bicyclists may use general-purpose lanes on all roadways in the state with the exception of controlled-access freeways. Dedicated on-road pedestrian facilities include sidewalks, crosswalks, curb-ramps, and pedestrian refuge islands. Off-road pedestrian and bicycle facilities include multi-use paths and greenways and may be paved or unpaved.

NCDOT funds project development and construction of bicycle lanes, paved shoulders, and multi-use paths and trails. NCDOT also funds spot safety and signing improvements, as well as safety education and bicycle mapping projects. Larger municipalities in the state directly fund bicycle and pedestrian facilities.

### Bicycle/Pedestrian Performance

In 2012, NCDOT determined the current statewide LOS for the bicycle and pedestrian system to be **LOS D**, based on a bicycle/pedestrian index developed by the Division of Bicycle and Pedestrian Transportation. The most significant measure of the safety of bicycle/pedestrian facilities is the presence of shoulders on highways.

### Bicycle and Pedestrian Needs

The 30-year bicycle and pedestrian needs total \$773 million. At \$632 million, current deficiencies represent 82% of bicycle and pedestrian needs. By investment goal, the 2040 Plan classifies bicycle and pedestrian needs as mobility and safety needs.

### Bicycle and Pedestrian Needs (Target LOS) (billions of 2011 dollars)

Investment Goal	Current Deficiencies	Accruing	30-Year Total
Mobility	0.32	0.07	0.39
Safety	0.32	0.07	0.39
<b>Total</b>	<b>0.63</b>	<b>0.14</b>	<b>0.77</b>

Note: NCDOT Bicycle/Pedestrian Division reports no identified health needs

### Implications

Reflecting the Division of Bicycle and Pedestrian Transportation's revised mission to secure the safety of the state's bicyclists and pedestrians, the most pressing need going forward will be the Department's ability to address significant safety needs across the state. Analysis of bicycle and pedestrian needs reveals substantial overall need, with significant accumulated backlog of needs. The main reason for sequential increase in estimated bicycle and pedestrian needs is population growth, resulting in increased demand for bicycle and pedestrian facilities. Limited funding for bicycle and pedestrian enhancements and the general land use patterns prevalent across the state not being conducive to bicycle and pedestrian travel could continue to contribute to the low quality of service scores.



### Public Transportation

Public transportation systems in North Carolina provide mobility options for residents who cannot or choose not to drive. Public transportation systems are operated directly by local and regional transit agencies. NCDOT administers federal and state transportation grant programs, provides matching state funding, provides safety and training opportunities for transit professionals, and offers planning and technical assistance to transit agencies. North Carolina's urban and rural transit systems provided nearly 68 million passengers trips in 2010, more than 220,000 trips per day. More than 19 million trips have been taken on the LYNX Blue Line light rail in Charlotte since it opened in November 2007. Its ridership continues to exceed expectations with over 15,000 passengers per weekday.

### Public Transportation Performance

In 2012, NCDOT scored the existing public transportation system performance at mostly **LOS C**, reflecting performance measures that reflect average ridership/market penetration, fleet age, and safety expenditures. LOS will vary from transit agency to transit agency, reflecting the dominant influence of local government policy and funding allocations.

### Public Transportation Needs

The 30-year public transportation needs total \$20.38 billion. This program cost reflects the needs of a wide range of services, from social service transportation, to fixed-route bus service, to the light-rail transit systems in place in Charlotte and being considered in the Research Triangle. At \$10.86 billion, current deficiencies represent 53% of identified transit needs. Urban service needs represent 89% of need by service type, and rural service accounts for 11%. By

improvement goal, \$12.78 billion (63%) are mobility needs, \$7.46 billion (37%) infrastructure health needs, and \$146 million (1%) safety needs.

Public Transportation Needs (Target LOS) (billions of 2011 dollars)			
Investment Goal	Current Deficiencies	Accruing	30-Year Total
Mobility	6.88	5.90	12.78
Safety	0.11	0.04	0.15
Health	3.87	3.59	7.46
<b>Total</b>	<b>10.86</b>	<b>9.53</b>	<b>20.38</b>

**Implications**

Public transportation services are a partnership arrangement with NCDOT that funds and channels federal grants for county and local services outside the major metropolitan areas and provides some financial support for metropolitan and regional transit services. At the local level, the ability to provide matching local funds is an issue, at the time of rising demand for public transportation services.

**Ferries**

The NCDOT operates and maintains the second largest ferry system in the U.S. It includes seven routes that carry 2.5 million passengers and 1.1 million vehicles annually. Recent major storm events on the North Carolina coast have raised awareness of both the tenuous nature of the ferry system and its critical role in evacuation and storm recovery efforts. In an ongoing reworking of the Ferry Division's mission and structure, increasing attention is being given to maintenance of terminals and channels, schedule adherence, and passenger safety.



**Ferry Performance**

In 2012, existing ferries performance was scored at an **LOS C** for Statewide and Regional tier services for both

mobility and health. Ferry LOS is based on the system's ability to serve passenger demand and to meet safety and environmental regulations.

**Ferry Needs**

The 30-year ferry needs total \$1.59 billion. At \$1.22 billion, accruing needs represent 77% of ferry needs, with current deficiencies at \$365 million, or 23% of the total. To accommodate future ridership increases, ferry needs include new vessels for expanded service or vessel replacements with larger capacity terminal infrastructure improvements. By investment goal, \$1.35 billion (85%) are infrastructure health, while \$244 million (15%) are mobility needs.

Ferry Needs (Target LOS) (billions of 2011 dollars)			
Investment Goal	Current Deficiencies	Accruing	30-Year Total
Mobility	0.04	0.20	0.24
Health	0.33	1.02	1.35
<b>Total</b>	<b>0.37</b>	<b>1.22</b>	<b>1.59</b>

Note: Ferry Division reports no identified safety needs

**Implications**

While the Ferry Division has recently introduced several replacement vessels, considerable need remains to address other infrastructure health and provide capacity for peak demand periods. The growth in total population is anticipated to require expanded terminal and fleet requirements. Security requirements may become more stringent, affecting staffing and operations costs, as well as facility configurations. Ferry infrastructure health and safety will need to be addressed more directly in light of the recast definition of the highway system that meets the dual mission to maintain the "waterside" highway and to provide mobility to the traveling public. The *Seven Portals Study* and the Governor's Logistics Task Force Subcommittee note the impact of ferries on supporting generation of tourism revenue.

**Ports**

North Carolina has two seaports (Wilmington and Morehead City) and two inland terminals (in Charlotte and the Piedmont Triad). Both of the seaports and the inland terminals comprise the state ports system that is owned and operated by the North Carolina State Ports Authority (NCSPA). The port at Wilmington serves as

the state's only container port. The Morehead City port provides service for bulk and break-bulk commodity shippers.

A third inland facility under public operation that is closely tied to the ports is the Global TransPark (GTP) in Kinston. GTP is a 5,775 acre industrial site that has become a hub of aerospace, logistics, and industrial activity, while also gaining increasing importance as an intermodal center and is seen as a pivotal element in efforts to advance the state's transportation system to support the economy's logistics needs.

Until 2011, the NCSPA and GTP operated as independent public agencies, with NCSPA operating on revenues generated from movement of freight through the two ports in the state. However, in 2011, the General Assembly directed that the ports and GTP would be transferred to NCDOT for coordinated management with the state's other transportation modes. The Governor's Logistics Task Force has given particular attention to the role of the ports as clear opportunities to strengthen North Carolina's position as a key US Department of Defense center and to move the state's agricultural production into world markets. This advancement of logistics considerations is discussed in more detail at the end of this section of the 2040 Plan.

### Port Performance

Because the two ports until recently operated as independent entities, they had not been graded under NCDOT's Project Prioritization process. It is expected that this rating will be developed during the Prioritization 3.0 cycle beginning in 2013. However, as has been reported in the *North Carolina Maritime Strategy* prepared for NCDOT as part of the GLTF efforts, North Carolina's ports will require significant improvements if they are to remain competitive with the ports of neighboring states after opening of the expanded Panama Canal.

### Ports Needs

For the 2040 Plan, the NCSPA identified 30-year ports needs at \$1.30 billion. \$1.24 billion of the total (96%) are accruing ports needs, with current deficiencies at \$53 million (4%) of the total. By investment goal, \$1.15 billion (88%) are infrastructure health needs, \$98 million (7%) are mobility needs, and \$50 million (5%) are safety needs.

Ports Needs (Target LOS) (billions of 2011 dollars)			
Investment Goal	Current Deficiencies	Accruing	30-Year Total
Mobility	0.01	0.09	0.10
Safety	0.01	0.04	0.05
Health	0.04	1.11	1.15
<b>Total</b>	<b>0.06</b>	<b>1.24</b>	<b>1.30</b>

While these needs are significant, they reflect little more than modernization of current infrastructure and not costs that would be associated with expanding the facilities to capture opportunities defined in studies such as the *North Carolina Maritime Strategy*. The numbers above will serve as a placeholder for ports needs as opportunities being identified through other studies will certainly raise the ports' price tag.

### Implications

Port facilities are seen as a strong economic engine and an asset to the state from both a commerce and transportation perspective. Through strategic investment in ports, the state can capitalize on its exports.



### Highways

NCDOT owns and maintains approximately 80,000 miles of roadways, three-fourths of the total roadway inventory in the state. The planning, programming, technical assistance and engineering for major highway projects are handled within the central office in Raleigh. The fourteen Transportation Divisions manage project construction, maintain and operate the road system within their geographical areas and handle planning and engineering for smaller projects.

## Highway Performance

In 2012, NCDOT ranked the performance for highway subcategories ranging from **LOS A** to **LOS F**, using performance measures that had been developed as part of the Project Prioritization process. For each of the three Investment Goals, LOS is as follows:

- *Safety* – LOS C, based on average fatal crash rates
- *Mobility* – LOS B for Statewide tier highways and LOS A for Regional and Subregional highways, based on percentage of congested miles
- *Health* – LOS B through F, with ratings assigned for pavement, bridge, and modernization categories, based on percentage of miles or bridges meeting performance standards; generally, Statewide tier facilities perform better than lower tiers, and bridge conditions are better than pavement or modernization conditions.



## Highways Needs

Total highway needs of \$93.03 billion were identified, including needs for roadway, bridges, and ITS. Roadway needs represent 90% of the total, bridge 9%, and ITS 1%. Current deficiencies of \$23.17 billion represent 25% of the identified need. By investment goal, mobility needs are estimated at \$49.70 billion (53%), infrastructure health needs at \$41.33 billion (44%), and safety needs at \$2.00 billion (2%). The majority of identified Statewide tier highways needs are mobility needs, while the majority of identified Regional and Subregional tier needs are infrastructure health improvements.

### Highway Needs (Target LOS) by Investment Goal (billions of 2011 dollars)

Investment Goal	Current Deficiencies	Accruing	30-Year Total
Mobility	19.24	30.46	49.70
Safety	0.76	1.24	2.00
Health	3.17	38.16	41.33
<b>Total</b>	<b>23.17</b>	<b>69.86</b>	<b>93.03</b>

### Highway Needs (Target LOS) by Category (billions of 2011 dollars)

Need Category	Current Deficiencies	Accruing	30-Year Total
Roadway	23.04	61.05	84.09
Bridges	0.13	7.79	7.92
ITS	—	1.02	41.33
<b>Total</b>	<b>23.17</b>	<b>69.86</b>	<b>93.03</b>

## Implications

North Carolina's highway system is by far the state's largest public infrastructure investment. Its continuing maintenance health is crucial to the economic well-being of the state. Given the scale of the investment, failure to maintain or improve the highway system will have profound economic impacts on:

- Safety of the traveling public;
- Ever-increasing maintenance requirements, reflecting on the increasing cost of repairing poorly maintained roadways or bridges compared to well-maintained facilities; and
- Cost to the traveling public and to business due to increasing congestion or poorer access to business.

Planning for solutions to highway needs will be challenged by the large shortfalls in funding, with growing gaps anticipated in the future. Major highway infrastructure throughout the state requires substantial investment in maintenance and rehabilitation. In recent years, progress has also been made in updating and replacing structurally deficient and functionally obsolete bridges. Improved maintenance schedules have made pavement maintenance dollars go further, but there are still significant backlogs in other highway maintenance work, as well as in capacity enhancements

and roadway modernization. NCDOT has also made significant progress in its efforts to increase safety and reduce the number of highway crashes, injuries, and fatalities through the North Carolina Strategic Highway Safety Plan (SHSP) - a comprehensive and collaborative effort among all the of the state's safety partners that set a tangible goal of fatal crash rate reduction (1.0 fatalities/100 million vehicle miles traveled).

## Freight and Logistics Considerations

Throughout the preparation of the 2040 Plan, NCDOT coordinated closely with the Governor's Logistics Task Force, consulting with Task Force staff and providing Task Force briefings.

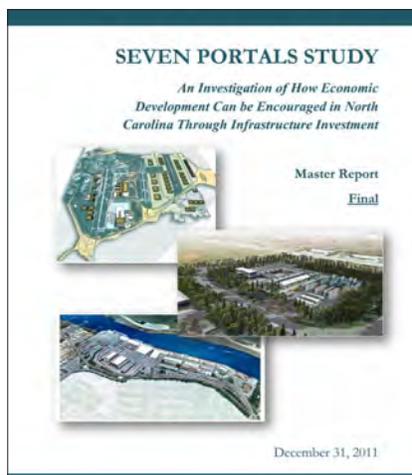
Freight and logistics touch all key elements of the state's multifaceted economy including agriculture, biomedical, tourism, education, military, and manufacturing. Through the work of the Governor's Logistics Task Force, the direct link between transportation investment and economic opportunity has come into sharper focus.

NCDOT has an historic linkage to freight movements. This linkage dates to the early days of DOTs, when their primary focus tended to be on creating "farm to market" roads to meet basic societal needs.

The Governor's office acknowledged that North Carolina's ability to create jobs and to recruit and retain business, and industry depends on an integrated system of transportation and commerce assets that enables people and goods to move swiftly and safely across the state.

In completing its work, the GLTF has produced findings and recommendations captured in a series of study and committee reports significant to NCDOT and the 2040 Plan. While

GLTF recommendations have been referenced previously in this chapter where they might affect individual



modes, their significance is such that they should be captured on more of a multimodal basis, as follows:

- The *Seven Portals Study* (GLTF and NCDOT, December 2011) specifically investigated how infrastructure investment could encourage economic development. This study identified primary economic sectors in each of seven economic regions and potential logistics sites in each of those regions which, if supported by appropriate infrastructure investment, could yield significant economic opportunity in those regions. In assessing the opportunities, multiple highway and rail needs were identified. Examples of this include continued upgrade of US 70 to improve highway access to the port at Morehead City, improved highway access to major military installations, and various rail infrastructure improvements. The study also urged that the state make more extensive use of the North Carolina Railroad Company and work to secure increased rail competition at both ports and better rail connections between major military installations and the ports.

While the 2040 Plan is not making recommendations for specific project or spending priorities (an effort that is assigned to the 10-Year Plan Project-Prioritization process), the modal needs capture the broad logistics-support investments called for in the *Seven Portals Study*.

- The *North Carolina Maritime Strategy* (NCDOT, February 2012) provided an evaluation of the role that the State's ports play in the state economy and the benefits that could be realized through strategic investment in maritime infrastructure. The report provides a clear picture both of the challenges facing the NC ports in competing with ports in neighboring states and of the opportunities that could be realized from focused investment on the ports themselves and on land-side transportation facilities.
- The *Final Report of the Governor's Logistics Task Force* (GLTF, March 2012) offers a range of governance policy recommendations that could directly affect the manner in which NCDOT manages and prioritizes investments its multimodal transportation system:
  - o "One-Stop-Shop" – the Task Force encouraged improved coordination between the state's

multiple transportation agencies (NC State Ports Authority and Global TransPark) and the North Carolina Railroad Company. In its February 2011 report to the Governor, the Task Force recommended that consideration be given to transferring the NC State Ports Authority and GTP to NCDOT. In 2011, action taken by the General Assembly transferred NCSPA and GTP to NCDOT, and the Department has subsequently created the position of Statewide Logistics Director to coordinate the operation and development activities of those facilities.

In addition, the Governor has created the State Logistics Coordinating Council to seek strategic initiatives that advance logistics and economic opportunity.

- o North Carolina Railroad Company – the GLTF report recognizes that the North Carolina Railroad Company is a unique asset from a logistics perspective, as it is a private, for-profit corporation owned by the state. Through its recommendations, the Task Force encouraged close coordination between the North Carolina Railroad Company and NCDOT to more fully realize its potential in achieving economic opportunity.
- o Competitive Rail Access – the GLTF report directly related to transportation services is a call for NCDOT to work aggressively to promote improved and more competitive rail access to the State ports.

### Summary of Transportation Needs

Transportation facilities and service assets in North Carolina provide a broad array of essential and strategic transportation capacity that impacts the daily lives of the state’s residents and critically underpins the diverse movement of freights and goods into, out of, through, and within the state. The critical role and economic significance of this composite transportation network supports the mobility of workers, students, retirees, visitors, businesses, raw and manufactured goods, military personnel and assets, and a vast array of other elements. The importance of this network to the state’s economy cannot be understated. The effective management of the transportation assets and transport services across the public and private sectors is vital

to sustain expected growth in the state’s population, business sector, manufacturing, agriculture, military, and tourism, and to serve the mobility and transport needs of that growth.

30-year statewide transportation funding needed to achieve the Target LOS are large and growing (\$35.51 billion in current backlogged needs plus another \$87.32 billion expected to accrue over the next 30 years). Totalling \$122.83 billion, these needs reflect continuing population growth and diversification, increasing urbanization, and a changing economy and workforce, as well as lack of sufficient historical funding to meet all needs. Even the cost of maintaining the existing LOS, estimated to be \$94.13 billion, is huge. These two levels of funding both exceed North Carolina’s current funding levels, which if continued to 2040 would result in spending of \$66.17 billion but would also result in significant deterioration of levels of infrastructure health and mobility, as real spending for maintenance and capacity improvements would decline substantially.

30-Year Investment Needs by Quality of Service and Mode (billions of 2011 dollars)			
Mode	Target LOS	Current LOS	Continued Current Funding Levels
Aviation	2.22	2.08	1.46
Rail	3.54	3.03	1.66
Bicycle/Pedestrian	0.77	0.77	0.34
Public Transportation	20.38	17.34	14.74
Ferries	1.59	1.42	0.71
Ports	1.30	0.97	0.65
Highways	93.03	68.52	46.62
<b>Grand Total</b>	<b>122.83</b>	<b>94.13</b>	<b>66.17</b>

But will residents and businesses in North Carolina be satisfied with an average or slightly below average performance of the transportation system? NCDOT and North Carolina are faced with difficult choices ahead. On the one hand, increasing demand for transportation facilities and services warrants improved quality of service. On the other hand, future funding constraints and uncertainties might prove an enhanced quality of service unattainable unless additional or expanded sustainable funding sources are secured.

## 5. Funding Our Transportation Needs

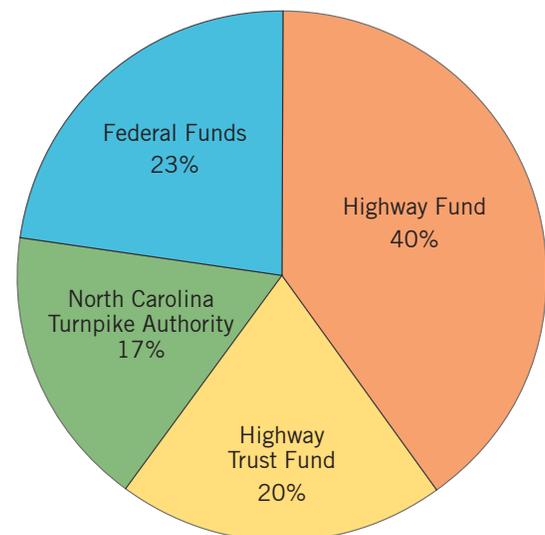
### How Is Transportation Funded in North Carolina?

NCDOT's Fiscal Year (FY) 2011-2012 annual operating budget for all services is \$5.4 billion. For the first time in NC history, the budget includes one-time proceeds from sale of bonds for the state's first modern toll road. In addition to the toll bond revenue, NCDOT's revenue comes from three primary funding sources:

- 1. The Highway Fund:** dating back to 1913, the Highway Fund is used to maintain the state road network, fund NCDOT and Division of Motor Vehicles administrative costs, and support multimodal programs such as public transportation, rail, bicycle/pedestrian, and ferry programs. The Highway Fund also provides resources for secondary road construction and aid to municipalities for road maintenance. It includes sources such as state motor fuels tax and vehicle registration and title fees.
- 2. The Highway Trust Fund:** established in 1989, its two primary purposes are completion of the Intrastate Highway System and construction of Urban Loop highways, as well as supplemental funding for municipal road maintenance and secondary road improvement. Since 2010, Highway Trust Fund receipts have also funded the Mobility Fund as a way to generate new dollars for transportation projects of statewide or regional significance. Funds from the Highway Trust Fund are subject to the legislatively-directed Equity Formula, which is intended to ensure equitable distribution of funds across all regions of the state. The required federal-aid match also comes from the Highway Trust Fund.

The Highway Trust Fund is primarily funded by the motor fuels tax revenue collections and the 3% highway use tax on sales or title transfer of motor vehicles in the state. Other taxes and fees funding the Highway Trust Fund include title and registration fees that are charged at varying rates for the issuance of certificates of title, transfer of registration and replacement of registration plate fees as well as lien recording fees.
- 3. Federal funds:** Congressional formula-based apportionments and competitive and discretionary grant funds. Federal funds are derived primarily from federal motor fuels tax collections deposited into the federal Highway Trust Fund as well as aviation fees that flow into the Aviation Trust Fund and most recently transfers from the federal General Fund. NCDOT accounts for federal funds are reimbursed separately from the Highway Fund and Highway Trust Fund.

**NCDOT Funding Sources FY 2012**



The FY 2011-2012 budget is allocated as follows:

- 30% for Transportation Improvement Program highway construction
- 22% for highway maintenance and bridge preservation
- 19% for toll road construction
- 9% for non-highway modal programs
- 7% for state agency transfers (including the General Fund, Highway Patrol, Public Instruction, and funding for other agencies)
- 6% for administration, and
- 7% for other expenses such as debt service and the Governor's Highway Safety Program

Highway construction and maintenance comprises 71% of the FY 2011-2012 budget. While these allocations vary from year to year, they have followed this pattern in recent years.

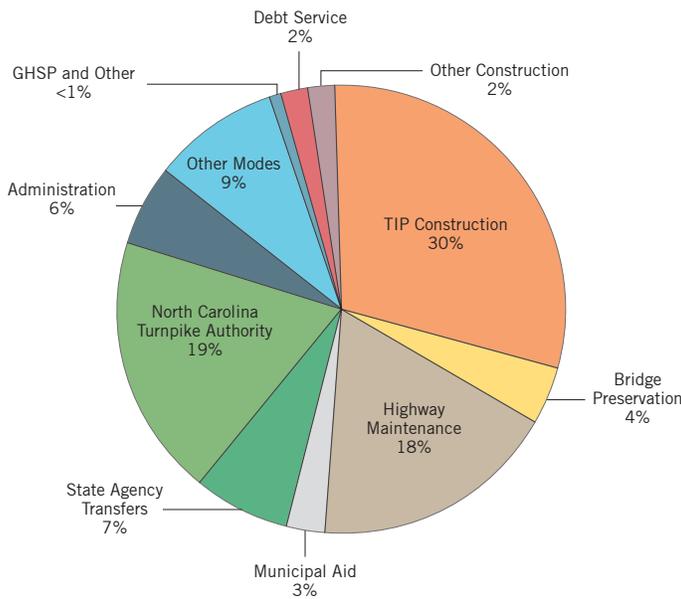
As NCDOT works closely with its transportation partners, these fees are combined with other federal funds that flow directly to local governments or agencies, revenue generated from communities (when they share in the costs), and funds from the private sector to fund state transportation projects.

are typically borne by local entities. Simply to maintain current Level of Service as it was described earlier will require \$86.30 billion in 2011, NCDOT-controlled federal and state dollars.

**There is strong evidence that long-term funding from those traditional NCDOT revenue sources described above will not be sufficient or sustainable.** A few of the challenges to matching the increasing costs facing NCDOT due to inflation and growing demand include:

- Limited growth in motor fuel tax receipts, and after about 2020, their actual decline due to volatility of fuel prices and increasing vehicle fuel efficiency, despite continuing growth in population and vehicle miles of travel on the state’s roadways (see graph on the following page)
- Perceived resistance to increases in motor fuel tax rates
- Uncertain federal funding due to lack of reauthorization and constraints on the federal Highway Trust Fund
- Continuing diversion of Highway Fund revenues to non-transportation uses

**Projected Use of NCDOT Funds  
FY2012**

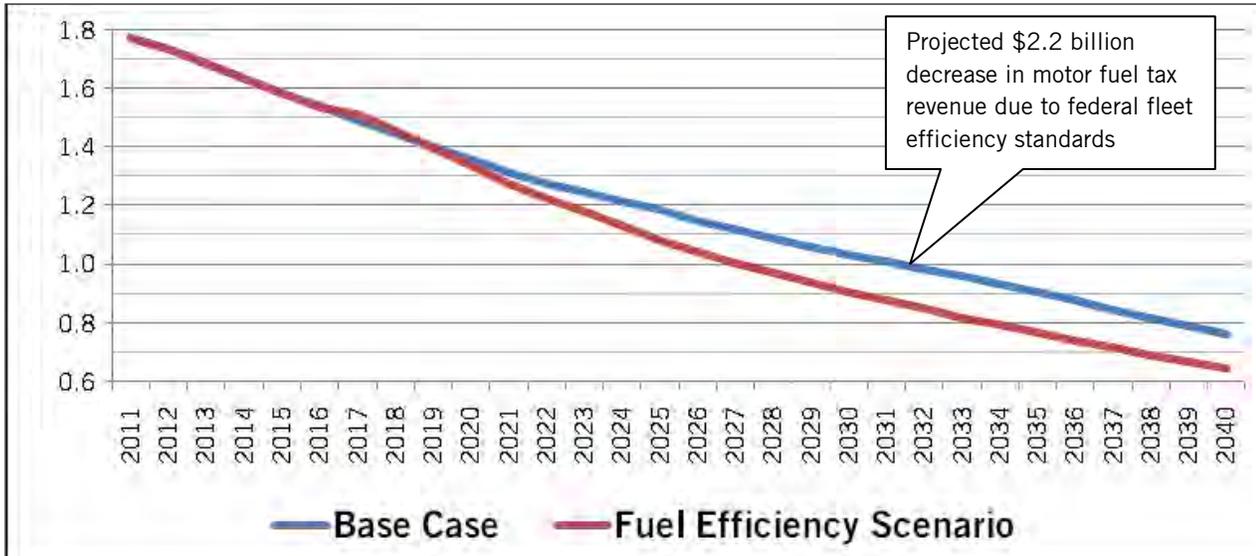


### How Much Future Revenue Will Current Sources Provide?

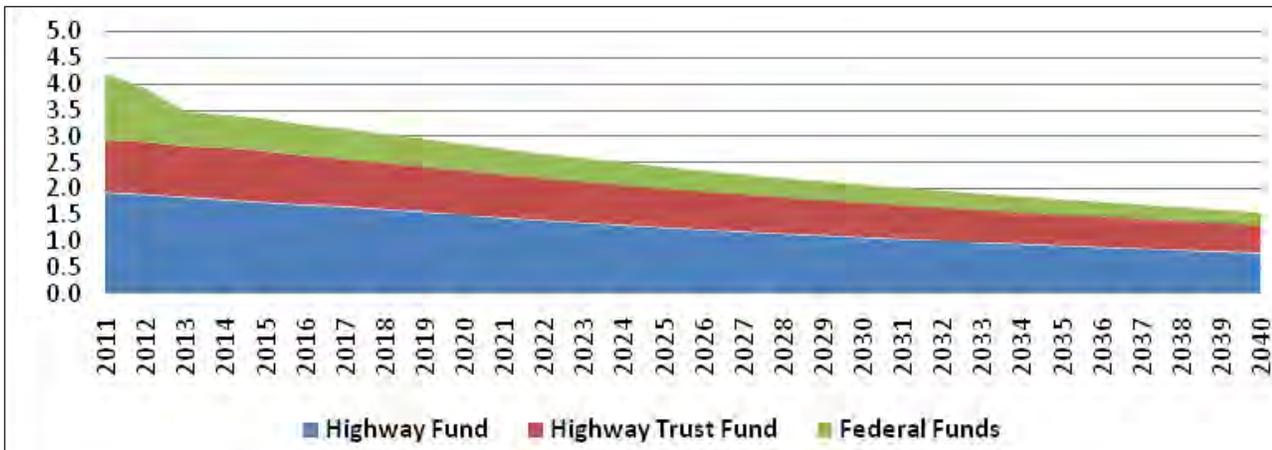
North Carolina will need \$122.83 billion over the next 30 years to maintain and improve North Carolina’s multimodal transportation systems to achieve Target LOS conditions. When that amount is adjusted to reflect only the amount of state and federal revenue that NCDOT controls through its various funds and that it would need to provide under its traditional cost-share programs, the amount needed decreases to \$114.11 billion; the difference reflects portions of program costs, such as public transportation operating costs, which

Based on conservative assumptions of long-term growth in the various revenue sources, NCDOT estimates that its baseline revenues for the duration of the 2040 Plan will be \$54.03 billion available for program delivery (construction, maintenance, operation of multimodal systems). This amount reflects revenue received from a 35 cent per gallon gas tax, the 2011 rate, a 27% reduction in gross revenues of \$73.66 billion due to transfers, municipal aid, administration and existing debt service, costs incurred by NCDOT that are not part of 2040 Plan infrastructure needs estimate. A year-by-year forecast of the three principal accounts in NCDOT’s budget is shown on the following page. This graph demonstrates that the buying power of NCDOT’s traditional funding sources will continue to degrade significantly over coming years, while costs continue to increase due to inflation.

Projected NC Motor Fuel Tax Revenues (billions of 2011 dollars)



Projected NC Motor Fuel Tax Revenues (billions of 2011 dollars)



## Is NCDOT’s Current Funding Model Sufficient and Sustainable?

Comparison of NCDOT’s 30-year net multimodal transportation needs, reflecting anticipated state and federal funds controlled by NCDOT (\$114.11 billion for Target LOS; \$86.30 billion for Current LOS) to the baseline revenue forecast of traditional funding sources (\$54.03 billion) reveals that NCDOT and North Carolina face a significant long-term funding gap. Even preserving a diminished LOS D will result in a funding gap.

**The gap to fund Target LOS needs will be \$60.08 billion through 2040. To maintain current conditions (LOS C) will require an additional \$32.27 billion. Stated another way, over the next 30 years, these two gap figures amount to over \$200 and over \$100 per year, respectively, for every current resident of the state. In the face of currently backlogged needs and the accruing needs driven by demand for expanded services across all modes due to continuing population growth, NCDOT will lose ground without additional funding.**

Projected Needs, Funding, and Funding Gap (billions of 2011 dollars)			
	Target LOS	Current LOS	Continued Current Funding Levels
Total Needs	122.83	94.13	66.17
NCDOT Responsibility*	114.11	86.30	59.70
Total Baseline Revenues**	54.03		
<b>Baseline Funding Gap</b>	<b>(60.08)</b>	<b>(32.27)</b>	<b>(5.67)</b>

\* Combined state and federal funds that flow through NCDOT budgets and which reflect traditional matching amounts; local matching funds make up the balance.  
 \*\* Assumes State Motor Fuel Tax equals an average of 35 cents starting in 2011 and 35% reduction in Federal funds starting in 2013.

## Can the Funding Gaps Be Closed?

Since traditional revenues are not sufficient to fund long-term transportation needs, what options does North Carolina have to close the funding gap? Are there new sources that can be effectively and efficiently tapped, with enough feasibility that NCDOT can set long-term investment strategies beyond what could be funded from the baseline revenue forecast?

NCDOT is working continuously and effectively to deliver its program more efficiently. But as is evidenced by the current backlog of needed funding to address its investment goals (safety, infrastructure health, and mobility), NCDOT is already in a situation of not keeping up with growing needs. Clearly substantial increases in revenue are needed.

NCDOT believes that there are feasible new or expanded revenue sources. In preparing the 2040 Plan, NCDOT drew from previous studies to refine forecasts of revenue enhancement options. Some of the options are powerful – they could provide substantial new funding to supplement or even replace the diminishing motor fuels tax. As noted earlier, annual receipts from the gas tax, even with continuing indexing as it now occurs, are expected to begin a decline by 2020. Additional, but less significant, options such as the local vehicle property tax would help close the overall gap by providing valuable supplemental funding for NCDOT’s partners. To highlight a few major revenue sources:

- **Continued indexing of the motor fuels tax**, as is currently allowed in NC statute, is powerful, generating \$18.85 billion in 2011 dollars between 2011 and 2040; but by itself, indexing is not sufficient to close even the Current LOS gap.
- **Auto liability insurance surcharge** could generate \$12.16 billion between 2020 and 2040; however, concerns have been raised that this option could unfairly affect younger drivers who typically pay higher insurance rates.
- **Tolling of the Interstate highway system**, as is currently being considered by NCDOT for I-95 under a federal pilot program, could generate \$41.93 billion between 2020 and 2040. This option has appeal because it would allow the state to capture revenue from out-of-state drivers - who comprise a high percentage of users of these highways, but due to North Carolina’s high gas tax rate, avoid buying gas, and thus paying motor fuels taxes, in NC.
- **Vehicle Miles Traveled (or VMT) fees** are widely seen as an equitable replacement or supplement to motor fuels taxes, which will begin to decline by 2020. A VMT fee of 2 cents per mile could generate \$26.64 billion during the planning period if implemented by 2020, which is considered to be the earliest that technical and institutional issues

would allow. As an example, for a vehicle that is driven 12,000 miles per year, this fee would total \$240 per year. Gas taxes for that same vehicle, if it gets 40 miles per gallon, would be \$105 per year.

All of the revenue enhancement options considered in this analysis are shown in the table below, together with the assumed year of implementation and total revenue potential for each option through the year 2040.

Transportation Revenue Enhancement Options in NC (billions of 2011 dollars)		
Revenue Enhancement Options	Estimated Total Revenue until 2040	Assumed Year of Implementation
Continue Motor Fuel Tax Indexing	18.85	Ongoing
Increase Registration/License Fees with Inflation	6.13	2016
Eliminate Transfers from Highway Fund	4.25	2016
Redirect Short Term Vehicle Lease Fee to NCDOT	0.63	2016
Additional 1% Highway Use Tax- (sales tax on autos)	3.25	2016
Dedicated Local Vehicle Property Tax	0.50	2016
Auto Insurance Surcharge (10% Tax Rate)	12.16	2020
Wholesale Motor Fuels Tax (8%)	12.22	2020
Interstate Tolling (6 cents/mi Rural, 12 cents/mi Urban, adjusted for 3.5% inflation)	41.93	2020
VMT Fee (2 cents/mi adjusted for inflation)	26.64	2020
<b>Total Revenue Enhancement Options Potential</b>	<b>126.56</b>	

It is recognized that this list of revenue enhancements is not all-inclusive. Indeed, even today, NCDOT is

examining other options. As is being done in other states, consideration is being given to selling “naming rights” for elements of the highway system and ferry vessels, and NCDOT is seeking to leverage the increased property values that could result from major transportation investments through “value-capture” project financing.<sup>9</sup>

While the 2040 Plan does not recommend specific long-term investment strategies, it is important that shorter-term investment programs defined in the Department’s 10-Year *Program and Resource Plan* reflect realistic long-term expectations. Is there reasonable expectation that acceptable revenue enhancements can be implemented? If there is not, then very tough decisions will need to be made as to which tiers, investment goals, or modes will need to be given lower priority. Will North Carolina be forced in the direction of other states, some of which have set mobility investment aside to focus on safety and health?

Four revenue scenarios, summarized in the table on the following page, have been evaluated to assess the potential for gap closure:

1. Supplementing existing taxes/fees with Interstate highway tolling
2. Replacing motor fuel tax with VMT fee in 2020
3. Enhancing existing revenue sources with indexing and increases
4. Supplementing existing taxes/fees with new revenue sources other than Interstate highway tolling.

In examining these scenarios, the objective was not to choose one of them, but to demonstrate the potential and limitations of a series of revenue enhancement strategies. In the tables below, the revenue generated under each scenario is compared to the predicted baseline revenue funding gaps to estimate the remaining gap. Conclusions of the evaluation are:

- All of the funding scenarios demonstrate the ability to reduce reliance on the motor fuels tax and provide substantial resources towards meeting identified modal needs.

<sup>9</sup> The power of “value-capture” is demonstrated by the Red Line commuter rail project being developed in Mecklenburg County; it is expected that the \$452 million project cost will be provided by NCDOT (\$113 million or 25%), CATS (\$113 million or 25%), and value-capture funds through the seven municipalities (\$226 million or 50%).

- Only Scenario 4 (New Revenue Sources) would close the Target LOS baseline gap. Three of the four scenarios would close the Current LOS baseline gap, allowing NCDOT to at minimum retain the Current LOS.

### Transportation Funding: Findings and Key Conclusions

Several important conclusions can be drawn from the analysis:

- While North Carolina’s long-term transportation needs remain similar to those identified in the 2004 Statewide Transportation Plan (when adjusted for inflation and length of the planning period), the funding gap has grown substantially. The backlog of needs has grown, as the buying power of existing revenues has declined.
- NCDOT’s current funding streams are insufficient to maintain current LOS. Without additional funding, infrastructure health and mobility will suffer as NC grows, becomes more urban, and systems age.
- North Carolina’s current funding model is not sustainable. Nationally mandated increases in

vehicle fuel efficiency will result in reduced motor fuel consumption and declining gas tax receipts beginning by 2020, even as total travel in the state continues to increase, and continuing federal funding at current levels is questionable. Continuing to rely on NC’s existing state and federal transportation funding model without additional funding will result in declining infrastructure condition and transportation mobility insufficient to meet demonstrated needs.

- Feasible and powerful revenue enhancement options are available that are user-fee based, implementable, and robust enough to be packaged to address the funding gap over the long term. A listing of potential revenue enhancement options that would form the basis for broad investment strategies is shown in the table below.

Over the next 30 years, difficult decisions will be required, to set the right priorities consistent with NCDOT’s guiding Mission and Goals, and to support North Carolina’s economic opportunity pursuits.

Funding Gap Closure Scenarios (billions of 2011 dollars)			
<b>Revenue Scenario 1: Interstate Tolling to Supplement Existing Taxes/Fees</b>	<b>Target LOS</b>	<b>Current LOS</b>	<b>Continue Current Funding Levels</b>
NCDOT Responsibility	114.11	86.30	59.70
Funding from Existing Sources	54.03	54.03	54.03
Baseline Funding Gap	(60.08)	(32.27)	(5.67)
Interstate Highway Tolling (6 cents/mi Rural, 12 cents/mi Urban, adjusted for 3.5% inflation)	41.93	41.93	41.93
<b>Remaining (Gap)/Surplus</b>	<b>(18.15)</b>	<b>9.66</b>	<b>36.26</b>
<b>Conclusions:</b> Interstate highway tolling would provide an excellent revenue source that could be targeted toward maintenance and preservation of the entire Interstate system.			
<b>Revenue Scenario 2: VMT Fee Replaces Motor Fuel Tax in 2020</b>	<b>Target LOS</b>	<b>Current LOS</b>	<b>Continue Current Funding Levels</b>
NCDOT Responsibility	114.11	86.30	59.70
Funding from Existing Sources	54.03	54.03	54.03
Baseline Funding Gap	(60.08)	(32.27)	(5.67)
Removal of Motor Fuel Tax	(24.66)	(24.66)	(24.66)
VMT Fee (2 cents/mi adjusted for inflation)	26.64	26.64	26.64
<b>Remaining (Gap)/Surplus</b>	<b>(58.10)</b>	<b>(30.29)</b>	<b>(3.69)</b>
<b>Conclusions:</b> VMT rates must significantly exceed motor fuel revenue projection to provide net enhancement			

Revenue Scenario 3: Existing Revenue Sources with indexing & increases	Target LOS	Current LOS	Continue Current Funding Levels
NCDOT Responsibility	114.11	86.30	59.70
Funding from Existing Sources	54.03	54.03	54.03
Baseline Funding Gap	(60.08)	(32.27)	(5.67)
Continue Motor Fuel Tax Indexing	18.85	18.85	18.85
Increase Registration/License Fees with Inflation	6.13	6.13	6.13
Eliminate Transfers from Highway Fund	4.25	4.25	4.25
Redirect Short Term Vehicle Lease Fee to NCDOT	0.63	0.63	0.63
Additional 1% Highway Use Tax (sales tax on autos)	3.25	3.25	3.25
<b>Remaining (Gap)/Surplus</b>	<b>(26.97)</b>	<b>0.84</b>	<b>27.44</b>
<b>Conclusions:</b> Enhanced existing revenue streams could significantly reduce gaps and allow sustainment of current LOS, but leave large Target LOS gap			
Revenue Scenario 4: New Revenue Sources	Target LOS	Current LOS	Continue Current Funding Levels
NCDOT Responsibility	114.11	86.30	59.70
Funding from Existing Sources	54.03	54.03	54.03
Baseline Funding Gap	(60.08)	(32.27)	(5.67)
Dedicated Local Vehicle Property Tax	0.50	0.50	0.50
Auto Insurance Surcharge (10% Tax Rate)	12.16	12.16	12.16
Wholesale Motor Fuels Tax (8%)	12.22	12.22	12.22
Removal of Motor Fuel Tax (at 35 cents/gal.)	(24.66)	(24.66)	(24.66)
VMT Fee (2 cents/mi adjusted for inflation)	26.64	26.64	26.64
Interstate Tolling (6 cents/mi Rural, 12 cents/mi Urban, adjusted for 3.5% inflation)	41.9	41.9	41.9
<b>Remaining (Gap)/Surplus</b>	<b>8.71</b>	<b>36.52</b>	<b>63.12</b>
<b>Conclusions:</b> This scenario suggests that tolling and a few other robust revenue options can close the funding gap for all scenarios. Notably, VMT fee replaces the motor fuels tax in 2020.			

For additional information of the financial analyses described in this section, see the 2040 Plan *Financial Plan and Investment Strategies Report*, August 2012).



## 6. Strategic Investments and Plan Implementation

North Carolina will continue its rapid population growth and urbanization, and our economy will diversify over the next 30 years. As this happens, continued expansion and adaptation of all elements of our transportation systems will be critical if goals of traveler safety and mobility are to be achieved and economic opportunities are to be realized. Moreover, the transportation infrastructure investment that has been crucial to getting our economy to where it is today must be preserved.

To address these ongoing transportation needs, NCDOT, which operates the nation's second largest state-maintained highway system and has varying but significant roles in delivery of all other transportation modes (aviation, public transportation, etc.), stands ready to continue its role as the state's primary provider of transportation infrastructure and service. NCDOT is well aware that success can come only through cooperative effort with many critical partners – both private sector transportation providers and public sector planning partners. ***In other words, NCDOT will continue to pursue its Mission: Connecting people and places in North Carolina – safely and efficiently, with accountability and environmental sensitivity to enhance the economy, health and well-being of North Carolina.***

Our biggest challenge in meeting the state's transportation needs, of course, is paying for them. The good news is that equitable, powerful, user-fee based revenue enhancement options are available that can be implemented and are robust enough to allow this 2040 Plan to define broad investment strategies and to propose policy and process improvements that can achieve major long-term successes.

With that basic understanding, the 2040 Plan offers three sets of recommendations that will guide NCDOT going forward. These recommendations are consistent with the 2040 Plan Guiding Principles defined earlier.

### NCDOT's 2040 Plan Guiding Principles

- Enable and maximize economic opportunity
- Maintain transparency in development and funding of multimodal projects and programs
- Continuously improve modal systems by defining performance expectations
- Ensure that program delivery promotes long-term viability of environmental systems, preservation of resources, livability of the state's communities, and transportation system efficiency and flexibility
- Recognize the growing diversity and mobility needs of the state's population by continuously improving available mobility options
- Provide for the security of NC's residents and its economy by considering security needs in project development processes, including security of data

### Recommendation 1: Embrace Ongoing Major Policy and Process Initiatives

The 2040 Plan recognizes the value of and is committed to recent/ongoing major policy and process initiatives that are both internal and external to NCDOT. In doing so, **NCDOT commits to continuous transparency, partnering, sustainability, and stewardship (of public dollars) through continued efficiency and support of economic opportunity pursuits.** In embracing these initiatives, NCDOT recognizes that there will be need for continuously refined strategies to implement the policy and process initiatives. The last set of recommendations identifies a set of policy and process refinements that offer strong potential to improve NCDOT's overall program delivery mechanisms and to better achieve the Department's ongoing Mission and Goals.

- 1. Transparency** – the transparency of decision-making resulting from NCDOT's Transportation Reform efforts, including the Policy to Projects process of which the 2040 Plan is part, has fostered better decision-making and more results-oriented

investment. NCDOT will continue to improve its Project Prioritization process, to ensure that we spend public dollars where they are truly needed.

2. **Partnering** – NCDOT will continue to strengthen partnering efforts with local and regional partners and the transportation industry’s private sector providers. This commitment recognizes that North Carolina is a diverse state, with different needs in the Mountains, the more heavily populated Piedmont, and the Coastal Plains.
3. **Sustainable Investment** – Consistent with its expanded mission, NCDOT will continue to pursue transportation investments that promote more livable communities and ensure sustainable financial, social, and environmental systems. Strategies include the integration of performance measures to assess progress on the Department’s Principles and Objectives, as well as the *Complete Streets* policy that is focused on converting single-mode highways into multimodal transportation corridors.  
This also necessitates a more dynamic linkage between transportation and land use decision-making, to maximize effective investment and efficient resource management. As NCDOT seeks more extensive public-private partnerships and supports such investments (e.g., major capital investments in public transportation projects with local partners), the land-development benefits of those investments should be leveraged to provide a financial return not only to the private sector, but to the public as well.
4. **Financial Stewardship** – NCDOT understands that it must always seek to improve its efficiency in delivering its programs and projects. The Department will continue to seek innovative ways to stretch the public’s dollars.

## Recommendation 2: Pursue Focused, Strategic Investment Priorities

The *30-Year Transportation Needs* section of the 2040 Plan defines targets for the quality of service provided by each of the modes that make up North Carolina’s transportation system. As presented, the cost of reaching and maintaining such a quality of service and condition for all modes and investment

goals significantly exceeds our ability to pay for it. But while achieving this level of quality would allow many benefits to be gained, it is not considered to be crucial to our economic opportunity. More importantly, maintaining the current conditions, generally understood to be LOS C, is not acceptable for our long-term economic well-being because of the financial implications of deferring maintenance on infrastructure and the undesirable impact on mobility that is crucial to realizing economic opportunities.

Accordingly, the 2040 Plan **establishes clear investment priorities** that reflect the 2040 Plan Guiding Principles and are intended to achieve positive, clearly defined outcomes in a funding-challenged environment:

1. **Priority on Safety and Infrastructure Health:** safety and infrastructure health should receive highest priority among program delivery goals (safety, infrastructure health, mobility) across all modes, by seeking LOS A for Safety and LOS B for Health. By inference, this could reduce funds for mobility projects, depending on revenue availability, but public safety and preservation of infrastructure investment are paramount.
2. **Mobility Emphasis on Statewide Tiers:** in addressing mobility needs, the highest priority must be placed on the Statewide tier, for all modes, by seeking LOS B for the Statewide tier. In stating this, it is understood that some modes (e.g., public transportation and bicycle/pedestrian) have only limited Statewide tier elements and accommodation must be made to avoid precluding funding of these important system elements. The 2040 Plan recognizes that the Regional tier, offering key links in regional economies and mobility, is essential to the functionality of the Statewide tier, while Subregional tier is essential to local mobility and access feeding into the higher tiers. As stated in the Proposed Policies, Processes, and Programs, Initiative #1, the NCDOT will continue its support and funding of all modes at the Regional and Subregional tiers.
3. **Emphasis on meeting Logistics Needs:** The Guiding Principle of providing economic opportunity places the emphasis on projects that support logistics and economic development needs. In addressing the state’s mobility needs, high priority

through the prioritization process will be given to projects of any mode that show clear benefit for logistics improvements that promote local or regional economic opportunity.

- 4. Creation of funding and project priority flexibility to recognize regional and urban/rural diversity of needs.** There is the need for spending flexibility within and across modes to reflect regional and urban/rural differences. Current funding formulas (e.g., equity formula) should be examined to ensure that their initial objectives are still being met. This includes seeking increased public transportation and intercity rail passenger funding.

This investment strategy would improve the transportation system in the state to an above average rated system with an average LOS B rating overall and would seek LOS A for Safety and LOS B for Health, as shown below. It would also aim to fully support and reflect the proposed transportation planning policy, process and/or program initiatives targets described as part of Recommendation 3. The estimated 30-year cost to implement the recommended investment priorities is \$123.13 billion (2011 \$). A breakdown by investment goal and tier is shown below, with more details provided in Appendix E.

30-Year Strategic Investment Needs by Mode, Investment Goal, and Tier (billions of 2011 dollars)		
Statewide tier	Regional tier	Subregional tier
<ul style="list-style-type: none"> <li>\$90.07 billion (73%) is for highway programs</li> <li>\$33.06 billion (27%) is split between the six non-highway modes</li> </ul>	<ul style="list-style-type: none"> <li>\$61.09 billion (50%) are mobility needs</li> <li>\$58.42 billion (47%) are infrastructure health needs</li> <li>\$3.62 billion (3%) are safety needs</li> </ul>	<ul style="list-style-type: none"> <li>\$49.27 billion (40%) are Statewide tier needs</li> <li>\$26.79 billion (23%) are Regional tier needs</li> <li>\$47.07 billion (38%) are Subregional tier needs</li> </ul>

**Recommendation 3: Pursue Policy, Process, and Program Changes for 2040 Plan Implementation.**

Implementation of 2040 Plan recommendations will require consideration of substantive enhancements to NCDOT’s policies and processes. As NCDOT moves to implement the 2040 Plan, we will work closely with our stakeholders and program delivery partners to address strategic policies, processes and programs. These 2040 Plan implementation elements will support future investment in North Carolina’s transportation infrastructure and assist in the delivery of exceptional transportation service.

The summary table below includes transportation planning policy, process, and program targets covering the 2012 – 2040 timeframe. These initiatives will help NCDOT deliver its projected work program more effectively and in line with changing funding and program objectives. These strategic initiatives will be adopted by the North Carolina Board of Transportation as part of the 2040 Plan and implemented by the NCDOT staff. The initiatives are in line with NCDOT’s expanded Mission statement and reflect the Principles and Objectives. Each of the potential policy, process, and program changes are further defined in Appendix F.<sup>10</sup>

Strategic Investment LOS Goals			
Investment Goal	Tier		
	Statewide	Regional	Subregional
Health	B	B	B
Safety	A	A	A
Mobility	B	C	C

Strategic Investment Needs (billions of 2011 dollars)				
Investment Goal	Tier			Total by Investment Goal
	Statewide	Regional	Subregional	
Health	14.68	11.68	32.06	58.42
Safety	1.13	1.14	1.35	3.62
Mobility	33.46	13.97	13.66	61.09
<b>Total by Tier</b>	<b>49.27</b>	<b>26.79</b>	<b>47.07</b>	<b>123.13</b>

<sup>10</sup> For a description of the process that led to identification of these potential policy changes, see the *Strategic Policies, Processes, and Programs Report*, August 2012.

**Summary Table  
Proposed Policies, Processes and Programs**

<b>1</b>	<p><b>Focus investment on multimodal facilities of statewide importance.</b> Given that North Carolina’s financial resources are limited and infrastructure needs are extensive, we will place highest priority on investments within the Statewide tier, e.g., Strategic Highway Corridors and intercity rail passenger lines. Such projects will be defined by a regularly-updated North Carolina Multimodal Investment Network which will maximize Statewide tier safety, mobility and economic development as top priorities, and NCDOT will accomplish this by continuing to improve the State’s project priority processes. In considering this initiative, NCDOT will continue its support and funding of all modes at the Regional and Subregional tiers.</p>
<b>2</b>	<p><b>Work with regional planning partners to increase flexibility and responsiveness.</b> North Carolina’s continued urbanization plus growing diversity of transportation needs across the State’s geographic regions calls for greater flexibility in addressing local and regional transportation needs. In order to strengthen and better integrate decision-making and planning, we will seek to further improve the MPO and RPO processes with a focus on improving relationships and communications. Among other options, this will include gaining more familiarity with local areas and issues while evaluating possible restructuring and consolidation.</p>
<b>3</b>	<p><b>Reward entities that better integrate land use and transportation planning.</b> There is widespread concern that the segregation of land use planning and transportation planning in North Carolina may lead to inefficient allocation of limited transportation funding resources, that transportation project development processes may not be supportive of local land use planning objectives, and that supplemental funding opportunities that could maximize effective investment and efficient resource management through the capture of increased property value stemming from public investment may be missed. To address these challenges we will initiate and stimulate changes in the way land use and transportation issues are integrated into the decision-making, planning and funding processes.</p>
<b>4</b>	<p><b>Expedite project development and delivery through improved efficiency and flexibility.</b> NCDOT has a mission to connect people and places safely and efficiently, with accountability and environmental sensitivity, to enhance the economy, health, and well-being of North Carolina. NCDOT strives to accomplish this mission while also delivering projects on time and within a realistic budget. To that end, NCDOT will continue to seek efficiencies and flexibility in the project development and delivery process, including system planning, programming, corridor planning, alternatives analysis, early consideration of issues related to the human and natural environment, preliminary engineering, final design, right-of-way, letting and construction.</p>
<b>5</b>	<p><b>Strengthen planning processes to recognize North Carolina’s diversity.</b> Facing a growing and more diverse State population over the next 30 years, we will create transparent procedural and analytical approaches to ensure that transportation investments and impacts from the Statewide and local planning processes are appropriately considered from all perspectives of the human environment—including community, cultural, historic, and civic assets—and that they reflect proactive and expansive public involvement strategies. This includes minorities, low-income groups, elderly and disabled individuals, and other protected populations.</p>
<b>6</b>	<p><b>Maximize economic opportunity and job creation via improved freight initiatives.</b> Through the work of the Governor’s Logistics Task Force, NCDOT and sister State agencies have become increasingly aware of the critical need to optimize the movement of freight. In order to use transportation investment as a way to support economic development, job creation and commerce, we will work with freight logistics enterprises and local / regional planning partners to better integrate logistics needs into the transportation planning process.</p>
<b>7</b>	<p><b>Establish new sources of revenue for transportation investments.</b> NCDOT has concluded that traditional transportation revenue streams are unsustainable and insufficient to meet both system preservation and improvement needs. We thus will establish a framework for promoting, endorsing, and supporting new and replacement revenue streams for transportation activities in addition to exploring other revenue opportunities, such as value capture.</p>
<b>8</b>	<p><b>Increase funding flexibility to recognize regional, urban and rural differences.</b> Growing and more diverse transportation system options demand greater flexibility in allocation of limited financial resources. We will analyze current transportation funding allocations and identify opportunities to further optimize funding in the State Transportation Improvement Program.</p>
<b>9</b>	<p><b>Embrace and capitalize on technological advances.</b> NCDOT should ensure that technological advances are pursued on at least two fronts:</p> <ul style="list-style-type: none"> <li>• New applications in vehicle manufacturing, construction materials and construction processes, to address global challenges such as climate change, and system management,</li> <li>• As an opportunity to disseminate information in a timely and clear manner to the public.</li> </ul> <p>These initiatives will require the establishment of on-going relationships with global vehicle and ITS technology suppliers, think-tanks, and universities, as well as the development of improved public communications techniques.</p>



