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Economic Performance Measurements

Volume 3

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16. Abstract

This project is part of a program-level assessment and evaluation of the economic performance of various business units. This project will help prepare NCDOT to better align its strategies, policies, programs, projects, and activities to evaluate their performance in terms of enhancing the economy and well-being of North Carolina. Over the course of Task 2A, we completed a basic inventory of each business unit's current activities (i.e., programs, projects, and services), their current performance measures, and current understanding of their economic contribution. During Task 2B, we met with each of the business units. The summaries of those meetings are contained in this report.

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Economic Performance Measures Project: Final Summary

Prepared for North Carolina Department of Transportation

Prepared by
Institute for Transportation Research and Education
North Carolina State University

August 31, 2015

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NCDOT Economic Performance Measures Project

Transportation Planning Branch

Final report: June 25, 2014

Presentation

This project is part of a program-level assessment and evaluation of the economic performance of various business units. This project will help prepare NCDOT to better align its strategies, policies, programs, projects, and activities to evaluate their performance in terms of enhancing the economy and well-being of NC.

Over the course of Task 2A, we completed a basic inventory of each business unit's current activities (i.e., programs, projects, and services), their current performance measures, and current understanding of their economic contribution.

During Task 2B, we met with each of the business units. In the case of the Transportation Planning Branch, we met for approximately three hours to discuss key concepts in transportation economics. On March 28, 2014, Mike Bruff, Earlene Thomas, Dan Thomas, Susan Pullium, Travis Marshall, Angela Person, Leigh Lane, and James Martin met at the Institute for Transportation Research & Education at North Carolina State University. The workshop proceeded according to an agenda provided by staff at ITRE, and was split into two modules:

Module 1:

- Know definitions and sources of transportation economic benefits and impacts.
- Differentiate different types of benefits without double counting.
- Assess land use and contingent development without "picking winners"
- Relate engineering performance measures to economic outcomes.
- Use benefits and impacts as economic performance measures.

Module 2:

- Understand where economic analysis fits into the planning and project development process.
- Identify appropriate methods to support projects in different stages of development.

- Assess and articulate the economic feasibility (or infeasibility) or a project concept.
- Apply transportation economics in both early project planning and long-range strategic planning settings.

Presentation Recap

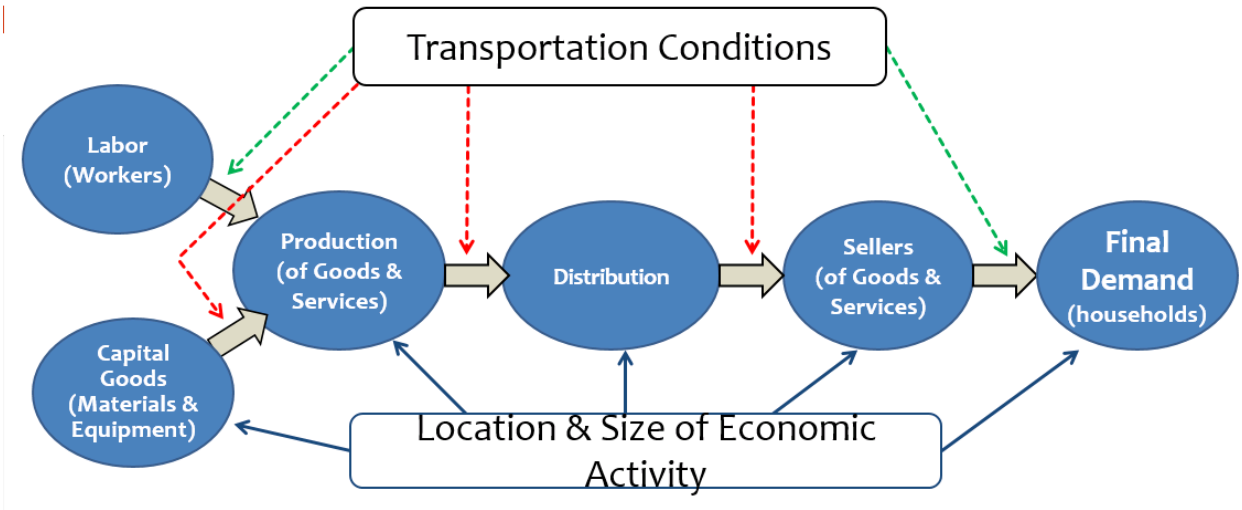
Speaking Transportation Economics: Economic effects of transportation improvements

The tools of economic analysis represent new territory to many transportation planners, but are gaining in popularity as a way to demonstrate the contribution of transportation to the country's economy. To assess the effect of new business development that locates in the area with the help of a transportation project, planners may use engineering performance measures that can easily relate to economic outcomes. By integrating existing tools (such as GIS and travel modeling) with current land uses, planners may assess economic development opportunities without being put in the position of 'picking winners' from communities seeking similar projects.

Transportation affects the economy in five primary ways:

1) Access to Markets
2) Access to Workforce
3) Access to Supply Chain
4) Inter-City Linkages
5) Feeder Systems

Access to markets refers to the efficiency with which a business operates. By extending a runway at a local airport, a company that ships its final product overseas may be able to decrease the number of flights necessary to reach its target market, and decrease its operating costs. **Access to workforce** refers to the available labor supply. Strong public transportation may improve the available labor supply for local companies who depend on workers who do not own their own vehicles**. Access to supply chain** refers to the cost of logistics. If a company sources its factors of production from a warehouse located next to a congested interstate, decreasing the congestion on that interstate will decrease the company's operating costs. **Inter-city linkages** refers to the ease with which cities trade with one another. Because of metropolitan areas in North Carolina like the Triangle or the Piedmont Triad, inter-city linkages are of particular importance to NCDOT. **Feeder systems** refers to the modal network passengers and cargo use over the course of a trip. Public transportation may be considered a feeder system to North Carolina airports, as many passengers arrive at the airport by bus.



The role of transportation improvements can be demonstrated visually, using a simple value chain that shows the various inputs and stages of production goods pass through in order to meet final demand. The dotted lines in the image above represent areas where transportation conditions affect the final cost of goods consumed by households. The figure demonstrates that there is an interplay between transportation conditions with economic conditions.

Examining the effects of transportation on the economy is important because of federal legislation like the National Environmental Policy Act (NEPA) and grant programs like Transportation Investment Generating Economic Recovery (TIGER). This analysis can also help prioritize transportation investments and build public support.

TIGER Discretionary Grant Program

Since 2009, the US Congress has allocated more than $5.9 billion in six rounds of funding to projects that can demonstrate their competitiveness in five areas: economic competitiveness, safety, state of good repair, livability, and environmental sustainability. Projects are often multi-modal, multi-jurisdictional, and difficult to finance through traditional mechanisms. TIGER grants must demonstrate, through Cost Benefit Analysis (CBA), that the benefits of the project exceed the costs.

Benefits

Transportation's effect on the economy can be better understood by examining transportation improvements' benefits and impacts. A benefit is added value that accrues to a particular person or place. **In transportation economics, benefits typically take one of three forms: money saving benefits, productivity benefits, and new economic activity.**

Money saving benefits include benefits that users of transportation infrastructure experience when time is used efficiently. When travel time or vehicle operating costs are reduced, time that might have been spent in traffic or on maintenance can be put to other productive uses. Money saving benefits can also take the form of improved reliability, which is essential for businesses to deliver goods and services according to a set schedule. Safety can also have a money saving benefit, in the form of fewer crashes or

fatalities. Even environmental benefits can be money saving, as some air quality models are used in the NEPA process.

Productivity benefits can also take a variety of forms, including improved access to the market and increases in productivity. By improving the reliability of shipping, it may be possible for firms to improve the productivity of manufacturing facilities. In some cases, site efficiency may be valued as a form of productivity benefit. For example, if a transportation improvement enables a firm to relocate to a site that enables the firm to produce more using the same resources, the transportation improvement can be characterized as a productivity benefit. Agglomeration benefits are another type of productivity benefit in which firms co-locate in close proximity to each other in order to reduce the cost of production (this is also called 'clustering').

New economic activity includes new business that has either relocated to the area (a different state, a different country) or been created in the area. It is important in this case not to count businesses that are relocating from one neighborhood to another.

Impacts

In addition to providing benefit, transportation improvements can also impact the economy. An impact shows what the economy does with its benefit. Transportation improvements can create these impacts in several ways, including: 1) **improvements in efficiency**, 2) **improving market access**, 3) **contingent development**, 4) **construction**, and 5) **adverse tax/tolling impacts**. Many transportation improvements will both directly benefit the economy and also impact the economy (as in the example below), but not all of the effects studied can be attributed to the economy. Many of the items on this list are similar to the list of possible benefits, except for adverse tax/tolling impacts. These tax and toll impacts include the cost of a toll on a newly constructed road, which may result in a small (usually insignificant) negative impact for businesses using the new road.

BENEFIT	$100,000	saved in reliability time and allows the firm to invest in a new machine, which results in…
IMPACTS	$225,000	earned from the sale of additional goods
	$20,000	additional profits retained
	2	additional workers employed
	$130,000	additional annual wages paid

In the example above, a firm saves $100,000 as a result of improved reliability time. Because this effect is the direct result of a transportation improvement, it is classified as a **benefit**. But because the company might use the $100,000 savings in many

Economic Analysis Primer (for more on discount rates and inflation)

http://www.fhwa.dot.gov/infrastructure/asstmgmt/primer03.cfm

different ways, it is classified as an **impact**. The company's expanded sales, profits, workers, and wages are all classified as impacts because they followed this benefit, but are not directly related to improvements in transportation. The company might instead choose to use the $100,000 to pay down debt, forgoing additional investment. It is important to note that the number of additional jobs is the only impact that can't be considered cumulatively. The 2 additional jobs created in the example above would either be described as 2 additional jobs over a 10 year period, or as 20 'job years.' Also, it is important to observe that this simplified example also does not include the effects of time, such as inflation or discounting. A change in taxes or tolls can be positive or negative. Charging a toll will reduce the amount of money users can spend on other goods and services, and may have a negative impact.

Counting impacts and benefits together results in double counting. Improvements in performance measures like reliability and safety often impact businesses' operating costs, with reduced cost of insurance or decreased logistic costs.

Development that occurs as a result of a transportation improvement is usually the largest driver of economic growth. **Contingent development** includes new businesses that have expanded, developed, or relocated in an area as a **direct result** of transportation improvements. Establishing that certain development is truly 'contingent' can be controversial, as businesses often make the decision to expand based on a number of different factors. In order to claim the business decision as 'contingent', five criteria must be satisfied:

1) There must be a clear linkage between the transportation infrastructure and the prospect's decision
2) There must be no possibility that the business is simply locating from one North Carolina location to another
3) The process must be substantiated by local planning, zoning, infrastructure, and community development
4) There must be compelling evidence that the project is necessary to create a condition that would not occur without the project
5) The business must not be simply 'population serving' (e.g., restaurants, most retail, grocery)

What is contingent development?

Scenario	Contingent?
Developer wants an interchange to move a Super Wal-Mart from Sanford to Carthage	No
Motorola is choosing between a site in Greenville, NC and a site in Memphis, TN; has presented a site plan to the EDA in Greenville but cannot build if an intersection is not improved.	Yes
A city wants a bypass to enable the downtown to be more pedestrian friendly in hopes of retaining businesses downtown and keeping it from sprawling strip malls.	No
A furniture factory plans to expand its plant to a new site, hiring 5,000 people, and wants improved access to a nearby arterial.	Possibly – needs to be justified

After a business decision has been classified as 'contingent', it is possible to estimate how much additional economic activity results from the improvement. The Bureau of Economic Analysis (BEA) studies relationships between industries, and is able to estimate how much additional production/employment is created for every increase in production in another area. This additional production is the '**multiplier effect'** of every additional increase in production. These impacts can be indirect, and capture the expanded market producing inputs for a particular industry; the impacts can also be induced, and capture the additional household spending that results from the increase in employment. Multipliers are calculated on a transportation's impacts, never to its benefits.

Regional Economic Accounts (for more information on multipliers)

http://bea.gov/regional/pdf/overview/Regional_RIMS.pdf

It may be more difficult to apply the concept of economic benefit to intangible benefits, including beautification projects, wildlife, and other strategic outcomes. Targeting these intangible benefits often involves long-term projects that are often distributive in nature (that is, they require moving money and resources from one part of the economy to another). Monetizing these intangible improvements may involve assigning dollar values that are hard to defend to the public.

Using Transportation Economics

One of the simplest ways of including intangible benefits is **Multi-Criteria Analysis (MCA).** MCA is a tool that allows users to assign a score to a particular performance area, and weight those scores according to their relative importance. The final weighted score will reveal how well a project performs. By focusing on performance areas, and not on dollar values that may be subjective or difficult to defend, it may be possible to include these factors for consideration without inviting debate over environmental factors.

NCDOT currently uses a cost benefit ratio to determine which projects should receive SPOT Safety funds. The benefit of the project (the decreased spending on crashes associated with a site) is divided by the cost of treatment.

MCA is a useful tool that can be used to weight the results of economic models in such a way that not only the valuation of the economic outcomes is considered, but also the relative importance of each outcome in a given policy environment. The use of each model may depend on the performance area being studied, the audience, or the outcome desired. Some of the most common methods are: **Cost Benefit Analysis (CBA), Economic Impact Analysis (including platforms like TREDIS), Multi-Criteria Analysis, Market Studies, Trade Studies,** and **Financial and Fiscal Studies.**

Each tool may be more applicable at a certain stage of the business process, though some tools will apply to many:

	Feasibility analysis	Corridor studies	Environmental documents (incl. NEPA)	Policy evaluation	Long-range planning (performance based)	Prioritization and programming (STIP/TIP)
CBA	✓	✓	✓	✓	✓	✓
Market Studies		✓		✓		
Economic Impact Analysis	✓	✓	✓	✓	✓	
Multi-Criteria Analysis		✓		✓	✓	✓
Financial and Fiscal Studies		✓			✓	

The Transportation Planning Branch is primarily concerned with five tasks:

1. Initial feasibility of project concepts
2. Supporting project development
3. Complementing traffic data
4. Long range system planning
5. Benchmarking contributions

The first three relate to the Comprehensive Transportation Plan (CTP), and reflect areas that were of particular importance to staff at the TPB. These relate largely to early assessment of a project.

During early assessment, it is possible to get a rough idea of a project's benefits without doing a comprehensive analysis. In this case, it can be done using a spreadsheet (see Appendix 1 for an example of such a tool developed for CDOT by EDRG). A simple spreadsheet can take engineering performance measures, like reduction in travel time, and monetize these measures. It is then possible to estimate the projected benefit of a project based on these changes in performance measures and select a project with the greatest dollar benefit.

Another tool that can be used while evaluating feasibility includes a cross section analysis. Simple tools make it possible to examining existing cross sections with a certain design, and drag and drop additional features in the cross section. The tool balances trips and applies principles from the *Highway Capacity Manual*, and then apply monetizable factors to the changes in those attributes.

Because quite a bit of project development occurs after the Transportation Planning Branch completes its work but is facilitated by the TPB, it may be possible to demonstrate the TPB's contribution by taking advantage of North Carolina's extensive use of GIS and travel demand models. These models may make it possible to map both avoidable costs to infrastructure and the location of constituents paying for that infrastructure. This analysis can be built into other tools like TransCAD and Cube Voyager.

An important area where economic tools and methods can add value is in long range system planning. In Michigan, MDOT prepared a plan based on the state's infrastructure needs until 2040. Michigan considered the economic implications of five alternative funding allocations, looking at total employment, gross state product, personal income, and personal travel time savings. This analysis helped to build support for MDOT's preferred funding and programming mix (see figure on following page).

Economic Impacts and Benefits 2007 - 2030

	Business as usual	Investing to achieve vision	Difference (=IAV-BAU)	% Increase IAV over BAH
Total employment (in thousands permanent jobs)	30	43	13	43.3%
Gross state product (in billions of 2005 $)	$50.0	$69.6	$19.6	39.2%
Personal income (in billions of 2005 $)	$38.4	$54.7	$16.3	42.4%
Personal travel time savings benefit (in billions of 2005 $)	$22.2	$27.1	$4.9	22.1%

Another area that is increasingly important to the Transportation Planning Branch is developing a system for benchmarking the contribution of planning. Two possible approaches to this might include either a **timing benefit** or a **development benefit**.

A development benefit could be calculated by calculating the economic effect of projects selected by the TPB for development, and estimating the TPB's contribution to those projects. Because some projects would not be selected for development without oversight from the TPB, they may be classified as 'contingent' on the TPB's contribution. A percentage of the benefit of those projects would be directly attributable to the TPB.

A second approach might be to calculate the timing benefit of the projects implemented by the TPB. Because the TPB strives to ensure that projects are easy to implement, a part of the benefit might be expressed as benefit years. For example, if a project is completed five years earlier than anticipated and carries an annual benefit, part of the benefit over time may be considered the TPB's contribution.

Summarizing and Closing Comments

In all of this analysis, it is important to take a step back and make sure that a project is being evaluated based on the reason it is being considered. For example, if an old rail bridge can be converted to a pedestrian bridge as a way of avoiding the cost of tearing down the bridge, then that avoided cost is part of the project's benefits.

Transportation improvements affect the economy as either a direct benefit or as an indirect impact. While it is common practice to consider only construction employment as a project's economic impact, this only captures a small portion of a project's impacts, and none of the most important outcomes. In fact, the main benefits of a transportation project include improvements in money saved, increased productivity benefits, and new economic activity.

Calculating a cost benefit ratio based on only one of the project's benefits (e.g., travel times savings) will tend to favor projects that produce the strongest benefits to only the study area. For example, if safety is not measured in this ratio, projects that primarily improve safety will have a relatively low cost benefit ratio and look less desirable than many other projects. Similarly, performing a cost benefit analysis on a decrease in congestion that only examined air quality would overlook efficiency benefits. This is particularly important for highway preservation projects, which reduce users' operations and maintenance costs.

Finally, be mindful of how the final analysis is presented. Consider: who will benefit from an improvement? Which users will pay for it? Are intangibles being monetized in a way that can't be defended? Are certain costs or benefits excluded that may change the final recommendation? By considering these and other factors, the analysis is more likely to serve its intended use.

Moving Forward

Economic analysis could be strategically useful for the Transportation Planning Branch in two ways: during project development, and as a tool to benchmark the contribution of planning.

Pre-tester: During early project assessment, the quick estimation tool (see Appendix 1) could be used to monetize engineering performance measures like reduction in travel time, improvement in pavement condition ratings, and changes in average trip length in order to calculate a potential present value of the project's benefit stream. The version of the tool included at Appendix 1 is known as a pre-tester, and is a way of responding to a project idea with dollar values to summarize its benefit.

Mappable benefits and costs: Later in the project development stage, it may be possible to expand travel demand models to map costs, benefits, and the primary financial supports of a transportation project using TransCAD and CUBE Voyager. Though no off-the-shelf tool currently exists, ITRE and EDR Group can develop these models in software packages currently being used by NCDOT.

Cross section analysis: Similarly, a cross section analysis can be expanded using tools under development by EDR Group and its affiliates. Based on a cross section's current design, including features like sidewalks and shoulder width, these tools can describe proposed changes in terms of dollars in benefit to the users of the cross section.

Development benefit: Calculated using economic effect of projects selected by the TPB for development and estimating the TPB's contribution.

For more information about CUBE Voyager, see ***www.citilabs.com***

Timing benefit: For projects that are completed earlier as a result of the TPB's contribution, part of the project's annual benefit for those years could be assigned to the TPB. This timing benefit, in addition to the development benefit, could be used to create additional measures in addition to those currently in place in the TPB (see Appendix 4 for a current list).

Use the tools *now*

There is $25,000 available in federal money available for a pilot application of the T-PICS database over the next 12 to 18 months. A likely evaluation would entail searching the database for analogous projects to a series of projects as the TPB considers them for the CTP, and assessing likely transportation performance and economic outcomes to inform both the CTP incorporation decision as well as discussions of the decision with stakeholders.

There is also $125,000 available in federal money for a pilot application to test the publicly available SHRP C-11 economic tools. These tools utilize network data (trip tables, skim tables and TAZ data) of the type available at NCDOT to quantify the value of improved reliability, performance and accessibility that results from a project or set of projects. The TPB's current modeling process and GIS data sources lend themselves to this type of analysis, and using NCDOT's existing project and model data to pilot this federal tool could provide valuable insights for the TPB in how to assess the overall economic contribution of its program, as well as the incremental contribution of any given project or group of projects.

Deadline for application: Friday, June 27, 2014

For more information on any of these tools, please contact Leigh Blackmon Lane at lblane@ncsu.edu.

Appendix 1: Final Workshop Questionnaire Results

Pre-Workshop:

1) **List three ways that transportation impacts the economy.**
   User 1: Jobs, where development occurs (housing, restaurants, buildings), freight movement
   User 2: Capability to serve industry (land use), including infrastructure in lace and modes connected; jobs
   User 3: In terms of alternative transportation, make travel on roads non-congested; a means of providing transportation for people without transportation; helps environment by not having as many cars emitting CO2 and other fossil fuels into the atmosphere
   User 4: Public: access to jobs/market etc., make & spend; Traditional infrastructure: provide and/or enhance mobility/connectivity, expanded access to jobs, expanded access to markets; perception vs reality: '4 lane divided' economic development check list, attract new industry
2) **What metrics have you used to quantify the benefits of transportation investment?**
   User 1: Cost & benefit, AADTs, job creation after the project is completed, health, ridership/use
   User 2: Safety, congestion, infrastructure, life span, VMT, travel time
   User 4: Project selection, STI, Economic competitive factor (TREDIS); planning, land use plan coupled with transportation plan; travel time savings, proxy for mobility/connectivity and link to job creation; freight volume, proxy for 'farm to market'; low weight bridges (??)

Post-Workshop:

1) **List three ways that transportation impacts the economy**
   User 4: Travel time savings; Reliability; Safety
2) **What is the difference between an economic benefit and an economic impact?**
   User 4: Benefit is direct, Impact is indirect
3) **What did you learn today that stood out as critically important when understanding how transportation affects the economy?**
   User 1: How other states are using this information and how we can incorporate these into NC. Also looking at GIS and economics would be helpful to see with areas like EJ (Environmental Justice) and other groups
   User 2: Contingent development discussion was important. Provided useful discussion points to consider and help local officials understand concepts/issues associated
   User 3: It stood out—the concept of using tools to help identify what is more important to address. This way DOT won't be wasting funds on unnecessary needs and more benefits can be addressed.
   User 4: Engineering performance factors vs. contingent development; being clear
4) **What additional information or assistance would be useful to you to improve how your business unit considers economic benefits and impacts as part of decision-making?**
   User 1: How to develop into TransCAD or another program. There is a lot of data there—what ones are usable which ones have a problem.
   User 2: Would love to preview/utilize some tools mentioned in presentation
   User 4: Support in evaluating effectiveness of branch/planning activities in achieving economic impact/goals

Appendix 2: Additional Resources

Title	Economic Analysis Primer
Author	FHWA
URL	http://www.fhwa.dot.gov/infrastructure/asstmgmt/primer03.cfm

This resource provides information on the fundamentals of economic analysis. This section addresses accounting for dollars over a project life cycle, including inflation and discounting. The entire primer discusses the benefits of using economic analysis, when to use life-cycle analysis, procedures for best results, cost benefit analysis, externalities versus indirect effects, appropriate use of benefit cost analysis, forecasting traffic for benefit calculations, and risk analysis.

Title	Regional Economic Accounts
Author	Bureau of Economic Analysis (BEA)
URL	http://bea.gov/regional/pdf/overview/Regional_RIMS.pdf

This resource, published by the Bureau of Economic Analysis, provides a brief overview on the use and calculation of regional economic multipliers. Multipliers are used to calculate the impact of additional production on other industries in the region.

Title	Professional Journal Articles and Conference Presentations
Author	(multiple)
URL	http://tredis.com/resources/articles

Many resources are available for learning about TREDIS. The publishers of TREDIS track publications that use the TREDIS software as a tool to evaluate different modes, types of analysis, and different phases of project development.

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Appendix 3: Example of a quick estimation tool for establishing a project's benefits

Project Name	*Name*
Project Description	*Description*

Performance Measure	**Before**	**After**
AADT	50,000	50,500
Avt Trip Length	8	9
% of Pavement 'Good'	0.18	0.23
Crashes per Million VMT	3	2.7
% Freight Rail	0.05	0.04
% Truck	0.15	0.15
% Trips by Bus	0.15	0.15
% Trips Pass Rail	0.1	0.15
% Trips Car	0.55	0.5
Peak Speed	45	45
Base Year	2013	
Project completion year		2015
Horizon Year		2040
Traffic Growth Rate	2.35%	
Project Discount Rate:	5.00%	

Potential present value of benefit stream:

$1,536,000

Appendix 4: Current Performance Measures at the Transportation Planning Branch

Goal	Element	Measure
Works Well	CMAQ	Pct. CMAQ Applications reviewed within 3
Works Well	Comprehensive Transportation Plans	No. CTP maps adopted by NCDOT
Works Well	Comprehensive Transportation Plans	No. CTP reports completed
Works Well	Comprehensive Transportation Plans	Pct. CTP milestone completed ontime
Works Well	MPO/RPO Program	% of LRTP milestone completed on time
Works Well	MPO/RPO Program	Pct. Prog milestone completed on time
Works Well	Project Data	Pct. Traffic Data delivered for projects
Works Well	Traffic Forecasts	Pct. Reviews for TPB Traffic Forecasts
Works Well	Traffic Forecasts	Pct. Reviews PEF Traffic Forecast prod.
Works Well	Traffic Forecasts	Pct. Traffic Forecasts delivered on-time
Works Well	Traffic Monitoring	No. of Coverage Counts collected
Works Well	Traffic Monitoring	Pct. Data capture at continuous monitoring
Works Well	Traffic Monitoring	Pct. Traffic Data sets del. For Hwy Per
Works Well	Traffic Monitoring	Pct. TVT and LTPP Data delivery on time

NCDOT Economic Performance Measures Project Traffic Systems Operations Unit Final Report: June 27, 2014

Project Background

This project is part of a program-level assessment and evaluation of the economic performance of various business units. This project will help prepare NCDOT to better align its strategies, policies, programs, projects, and activities to evaluate their performance in terms of enhancing the economy and well-being of NC.

Over the course of Task 2A, we completed a basic inventory of each business unit's current activities (i.e., programs, projects, and services), their current performance measures, and current understanding of their economic contribution.

During Task 2B, we met with each of the business units. In the case of the Traffic Systems Operations Unit, we met for two hours to discuss connections between the unit's activities and their current performance measures, and then to establish a working understanding of how the business unit's activities (not a select list) connect to economic outcomes. This involved a 'mapping exercise' that encouraged each business unit to think critically about how their work connects to the economy. On November 25, 2013, Ehren Meister, Angela Pearson, Meredith McDiarmid, Kelly Wells, Jennifer Portanova, Leigh Lane, and Adrienne Heller met at the Joint Force Headquarters at 1636 Gold Star Drive, home to NC National Guard, Emergency Management, the DOT Statewide Transportation Operations Center (STOC) and State Highway Patrol Troop-C Communications. The meeting proceeded according to an agenda provided by staff at ITRE.

Unit Background

The mission of the Traffic Systems Operations Unit (TSOU) is maintain responsibility "for developing and implementing regional and statewide traffic operational strategies to reduce congestions."

While the unit continues to evolve, the main groups in the unit include the Signal Systems Timing Unit, Traveler Information Unit, and contract staff. A list of the TSOU's programs, projects, and staff are highlighted on the following page.

- **Statewide Transportation Operations Center & Regional Transportation Management Center – (Training Program) -** All information concerning transportation (freeways, traffic signals, transit vehicles, etc.) is collected and analyzed at these Centers. This analysis is used to make modifications to the system and is distributed to the public. There are currently three centers—one in Raleigh, Charlotte, and Greensboro. These are not managed by the TSOU, but support its operations and are close partners.
- **Incident Management Program –** IMAP squads, painted bright yellow, help to clear the roadway following an incident. The squads are equipped with traffic control devices; gasoline, water, air pumps, and jumper cables; push bumpers and winches. The program includes operations and training.
- **Traveler Information Management System –** This website provides real-time information on events that will cause severe and unusual congestion on NCDOT. The information on the website may be downloaded into Excel.
- **511 System –** The 511 system is part of a nationwide effort to disseminate traffic information to the public by telephone. Using an automated voice response systems, travelers can find information on traffic incidents, closures, and other roadway conditions.
- **Signal systems timing** – The TSOU is responsible for improving signal timing at signalized intersections. Three systems are used: timed signals, actuated signals, and closed loops (mostly used in CBDs).
- **INRIX data and VPP** - software used to collect before and after data to see what kind of positive effect we've had on travel time.
- **Internal data in terms of incident management**—a spreadsheet for response times, etc.
- **Automated Transportation Management System (ATMS) -** a system that brings in all of the BU's devices, road weather information systems, automatic vehicle location systems, etc. into one interface.
- **Commercial vehicle operations** Staff at the TSOU provide on-board safety monitoring, electronic clearance, automated roadside safety inspections and hazardous material (hazmat) for commercial vehicles.
- **Emergency Traffic Operations: Hurricane Evacuation, EM Drills**
- **Bus on Shoulder System (BOSS) –** When traffic is moving at speeds below 35 mph, buses may travel on the shoulder at speeds no greater than 15mph faster than the average speed of traffic. (formerly with Public Transportation)

Economic Outcomes Workshop

The discussion began by examining the relationship between the TSOU's current performance measures and the unit's Programs, Projects and Services (for a complete list, see Appendix item 6). A common theme in many of the meetings we've done to this point is that many of the programs overlap with others quite a bit. Because performance measures can be useful in determining funding for both a business unit and for its activities, choosing performance measures with clear connections is critical.

Much of the conversation centered on resolving funding challenges by incorporating economic analysis. A document created by TSOU in September 2011 in response to funding pressure, titled 'Traffic Operations Strategies for the Future' was discussed extensively. This document includes 17 program-wide performance measures considered for development at the TSOU (for a complete list, see Appendix item 7). The strategy was prepared with guidance from the second Strategic Highway Research Program (SHRP 2), a federally-funded research directive administered by the Transportation Research Board of the National Academies and the American Association of State Highway and Transportation Officials. Using a Capability Maturity Model developed through SHRP 2 L06, 'Institutional Architectures to Advance Operational Strategies.' The Capability Maturity Dimensions include Business Processes, Systems and Technology, Performance Management, Culture, Organization/Workforce, and Collaboration. The organization evaluates each of these Dimensions and assigns a level to their current level of maturity (levels 1-4). Additional guidance is available to advance between specific levels. The project was developed for Transportation Systems Management & Operations, but could be adapted to suit other business units.

The next activity included a mapping exercise designed to reinforce the process of creating economic connections. One of the unit's main activities is providing traveler information. This is submitted via RSS feed of incidents, ISPs, and other media. Travelers (customers) consume this information. The initial impact of this information, for the traveler, is to experience a decrease in travel time, secondary crashes, better-managed expectations, and (possibly) an increased willingness to pay for this information. As these benefits accumulate among many travelers, mobility, customer service, and safety all increase. The economic contributions between these ultimate outcomes was well understood by the group.

The discussion ended with a review of possible resources that might be useful in creating a new economically-based performance measure. The list included metrics that currently are being used for various performance measures. The list also included a number of other reports created on various schedules, including a bottleneck list, stops made by IMAP drivers, roadway clearance time, recovery time, secondary crashes, time to respond, and very detailed information in the IMAP dispatch log.

Customers

The unit's main customers include the media, travelers (both commuters and tourists), the trucking industry, the NCDOT field divisions, responders (including fire, police, rescue, and tower), disabled motorists, vehicles in queue, municipalities, other states (particularly TN, GA, SC, and VA), transit agencies, and other Divisions (including Operations, Construction, and Maintenance).

Partners

The Unit's main partners include the Statewide Transportation Operations Center & Regional Transportation Management Center, Traffic Safety Systems, ITS & Signals (in the Transportation Mobility and Safety Division), Safety & Risk Management, the GIS Unit, and the Communications Office.

Business Strategy

The Traffic Systems Operations Unit is unique among the units contacted thus far in that it has a formal business strategy: 'Traffic Operations Strategies for the Future.' This strategy includes a history of traffic operations in the state of North Carolina, value of traffic operations, stakeholders of traffic operations, alignment with department mission and goals, functions and services of NCDOT's traffic operations program, NCDOT traffic operations capability maturity model, current weaknesses to be addressed, recommended strategies, summary of recommendations, specific strategy recommendations, specific transition timeline, and appendices. This business strategy informs policy decisions related to the business unit and has been an important document for the unit to help convey the importance of funding the unit. The business strategy includes a list of proposed performance measures (Appendix 7), a list of recommended strategies and corresponding unit objectives, (Appendix 8), and specific strategy recommendations (Appendix 9). At the time of this writing, the proposed performance measures are still in the process of being implemented.

'Economic Impact of Traffic Incidents on North Carolina's Interstate Facilities' (2008) reported that in areas of heavy deployment for IMAP, the total annual cost savings was $10,844,662. Areas of heavy deployment for Advanced Traveler Information Systems (ATIS) were $13,378,716. Figures for light and medium areas of deployment were also included in the report.[1]

Economic Contribution

The economic contribution of the TSOU is currently best described in narrative form, although many of the metrics they currently use could be monetized to generate at least a rough estimate of the value provided by the unit's activities. In Appendix item 10, two pathways illustrate how two activities (Traveler Information and IMAP) contribute to economic outcomes.

In January of 2008 the Center for Urban & Regional Studies (CURS) at the University of North Carolina at Chapel Hill and the Department of Civil and Environmental Engineering at Old Dominion University of

Norfolk, VA prepared a report titled 'Economic Impact of Traffic Incidents on North Carolina's Interstate Facilities.' The study used information on the total number of incidents in the state, estimated a percentage of commercial traffic, and interviewed representative stakeholders to estimate the cost of such delays. 29 firms were interviewed by telephone, 9 non-carrier and three non-carrier firms participated in face-to-face interviews. Information gathered was used to construct an equation that calculated the expected cost of delay. The study also developed case studies to simulate the impact of incident management programs (like IMAP).

The Texas Transportation Institute (TTI) produces an annual report that attempts to quantify the cost and benefits of traffic operations programs. The TTI prepares a detailed Urban Mobility Report for the city of Raleigh which summarizes the effects of congestion as measured according to the value of time, the commercial cost, cost of gasoline, and cost of diesel. The report also measures excess CO2 that results from congestion. Ultimately, the report finds that congestion cost each auto commuter an additional $502 in 2011 and increased truck costs by $96 million.[1]

Moving forward

Much of the unit's operations are driven by a need to defend funding. The business strategy already developed is an exceptional tool to speak to the unit's continued funding. Participating in an update of this tool would be useful both for the unit's own continued priorities and bring capacity to researchers at ITRE to perform this strategic planning for other business units.

The Unit is interested in analysis that would support the programs maintained by the Unit. Members of the TSOU present at the workshop expressed interest in the following analyses, many of which would speak directly toward capturing that value:

- A quote that would capture the cost of losing the Incident Management Assistance Patrol (IMAP)
- A dollar value capturing the value of the Traffic Incident Management System (TIMS) in emergency situations
- Evaluating whether the media's willingness-to-pay (WTP) for TIMS or camera access
- Capturing the number of jobs supported by TIMS
- Calculating the avoided cost of pedestrians injured while changing tires
- Calculating the cost of secondary accidents
- Calculating state and local police's avoided cost that can be traced back to activities managed by the TSOU
- Capturing the benefits of increased reliability of infrastructure.

[1] 'Performance Measure Summary - Raleigh-Durham.' Available at NCHttp://d2dtl5nnlpfr0r.cloudfront.net/tti.tamu.edu/documents/ums/congestion-data/ralei.pdf

[2] Original spreadsheet provided by Kelly Wells by email on January 25, 2014. This spreadsheet identifies

Appendix 5. Matrix of the TSOU & Traffic Operation's Current Programs & Proposed Measures[2]

Traffic Systems Operations Unit (TSOU) & Traffic Operations Program Measures/Programs Updated 1/24/14	FREEWAYS													
	Travel Time Index	Travel Time Reliability	Extent of Congestion	Secondary Crashes	Roadway Clearance Time	Incident Clearance Time	Recovery Time	Temp Traffic Control Response Time	Customer Satisfaction	ITS Device Response Time	ITS Device Uptime	IMAP Response Time	IMAP Service Time	Operator Detection
Incident Management														
IMAP: Operations, SOP's,Training Program	X	X	X	X	X	X	X	X	X			X	X	
Responder Outreach and Training: RIMC, SHRP-2,	X	X	X	X	X	X	X		X					
MOVE Program	X	X	X	X	X	X	X		X					
Work Zone Traffic Mgmt: Fortify, Hawks, etc.	X	X	X	X	X	X	X	X	X					
Traveler Information														
TIMS & 511	X		X						X					
CCTV: Website, Media Sharing, etc.	X		X						X					
ITS Devices: DMS, CCTV, ….	X		X	X					X	X	X			X
Cross-Cutting, and Other														
ATMS	X				X	X	X				X			X
TMC and STOC Operations: SOP's and Training Program	X	X	X	X	X	X	X		X					X
INRIX Data and VPP														X
Emergency Traffic Ops: Hurr Evac, Exercises, etc.									X					
Recurring Congestion Management														
Signal System Timing	X		X	X					X					
BOSS		X												
Ramp Metering	X		X	X										

[2] Original spreadsheet provided by Kelly Wells by email on January 25, 2014. This spreadsheet identifies which proposed measures would evaluate the TSOU's programs, projects, and services. See Appendix 7 for more detail on proposed measures.

Appendix 6. Traffic Systems Operations Unit Current Performance Measures

Element	Measure
Accident Clearance Time	Avg. Clearance Time of 75 min. or less
Develop Implementation Plan for Non-Interstate TTI	Interstate TTI for High-Volume Segments
Rear End Crashes	5-yr rolling avg. for rear end crashes
Signal System Delay	Reduce avg. % reduction in delay
Special Initiatives	No. of initiatives completed
R-4049 Budget	95% (+/- 10%) of allocation expended
R-4701 Budget	95% (+/- 10%) of allocation expended
NC 511	Improve Customer Satisfaction

Appendix 7: Performance measures that could be used to measure the effectiveness of NCDOT's Traffic Operations program

Metric	Definition	Present	Future
Operator Detection	% of total incidents detected by an operator	No	Smartlink
Operator Verification	Time it takes for operator to verify or dispatch IMAP	No	Smartlink
Operator Response Time	Time to disseminate traveler information	No	Smartlink
IMAP Detection	% of total incidents detected by IMAP patrol	No	Smartlink
IMAP Verification	Time it takes for IMAP to be on scene	Variable	Smartlink
IMAP Response Time	Services provided such as traffic control, motorist assistance, etc.	Variable	Smartlink
Roadway Clearance Time	Time between first recordable awareness of incident by a responsible agency and first confirmation that all lanes are available for traffic flow	Yes (no consistent definition)	Smartlink
Incident Clearance Time	Time between first recordable awareness of incident by a responsible agency and first confirmation that all lanes are available for traffic flow	No	Smartlink
Recovery Time	Time between first awareness of incident and restoration of roadway to "normal" conditions	No	Smartlink
Temporary Traffic Control Response Time	Time to respond with proper temporary traffic control	No	Policy Change
Secondary Crashes	Number of crashes beginning with the time of detection of the primary incident where a collision occurs either a) within the incident scene or b) within the queue, including the opposite direction, resulting from the original incident	Variable (Using rear end crashes on interstate as substitute)	Policy Change
Travel Time Index	Ratio of travel time in peak periods to ideal travel time	Variable	Yes
Travel Time Reliability	Level of consistency of travel times over time	No	Yes
Extent of Congestion	The time duration during which the prevailing speed of vehicles on a given roadway section averages less than 40 mph on Interstates and Freeways with posted speeds of 55 mph and greater	No	yes
Customer Satisfaction	Measure of how satisfied customers are	No	Yes
ITS Response Time	Time to respond to ITS equipment failure	No	Yes
Device % Uptime	Device availability	No	Yes

Source: Traffic Operations Strategies for the Future, 2011

Appendix 8: Recommended Strategies

		Objectives				
	Recommended strategies	Outcome Focused	Hire Specialized Staff	Increase and Improve Skill Levels	Consistent and Redundant Regional Approaches	Consistent and Redudant TMC Coverage
Consistency, interoperability, redundancy, reliability, accountability	Performance Measures	✔			✔	
	Statewide TMC Rationale				✔	✔
	TMC Functional Chart			✔	✔	
	Specialized In-house Staffing		✔	✔		
	Outsource Appropriate Functions		✔	✔		
	Statewide Training and Certification			✔	✔	✔
	Statewide Device Maintenance	✔	✔	✔	✔	✔

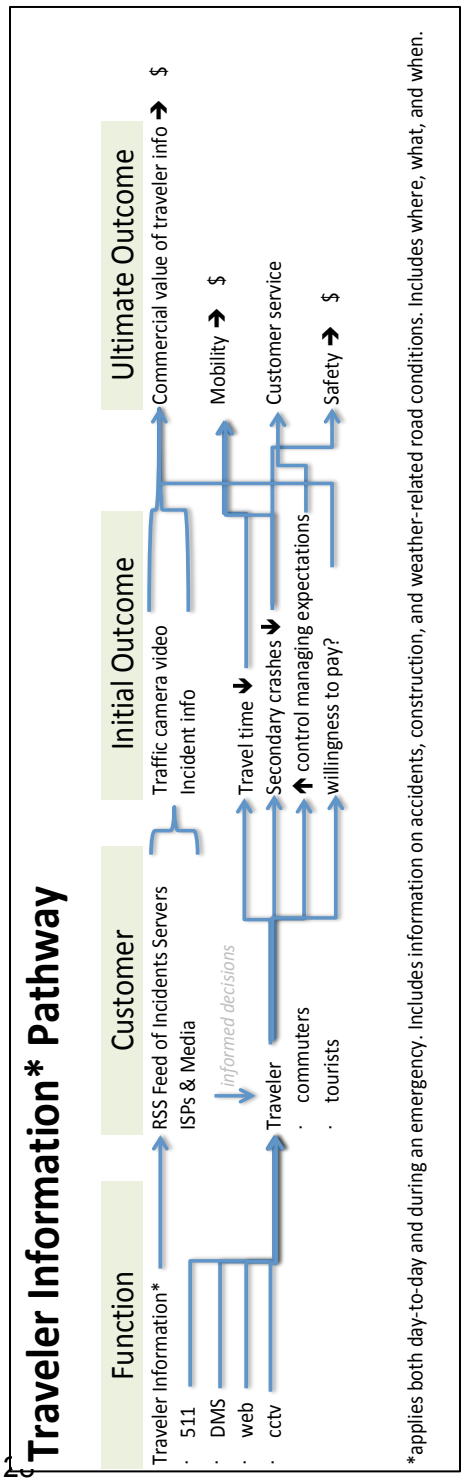
Source: Traffic Operations Strategies for the Future, 2011

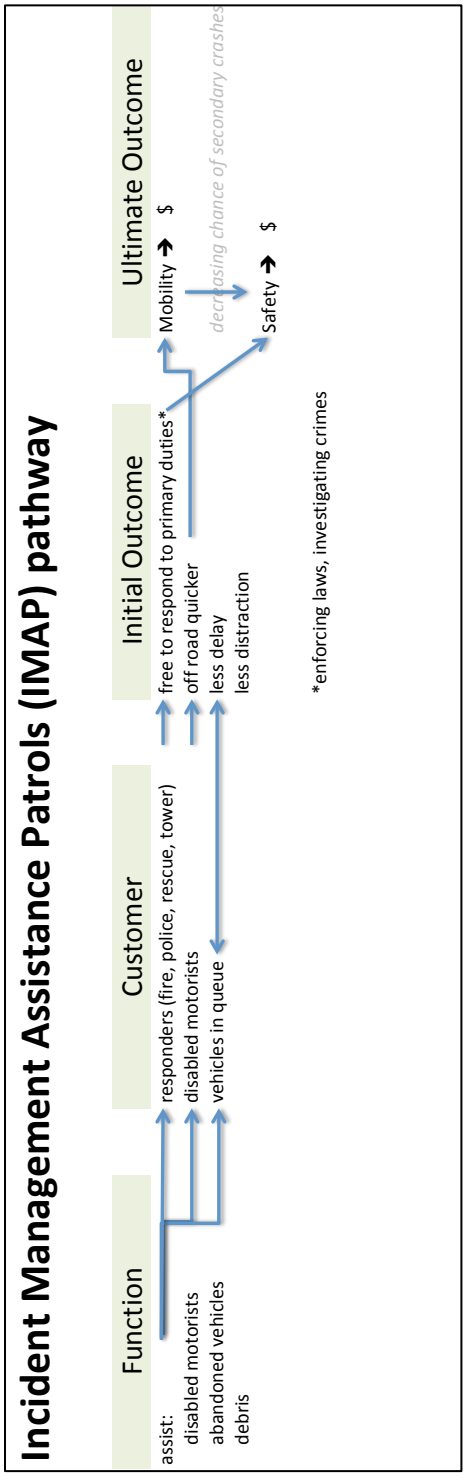
Appendix 9: Specific Strategy Recommendations

Functional Area	Detail Actions
All	Statewide Performance Measures
TMC Location and Coverage	5 Regional TMCs Covering the Entire State • 1 - 24x7 STOC in Triangle/Extended hour Regional Triangle TMC • 1 - Extended hour Metrolina TMC (redundant TMC with 24x7 capabilities when warranted) • 3 - Peak period Regional TMCs (Triad, Western, and Eastern • Other Divisions may have mini-TMC when warranted (eyes for local area)
NCDOT Management and Oversight	NCDOT statewide Policy and Procedure Responsibilities NCDOT Regional Oversight (TMC and Field) NCDOT Co-Managed Reporting Structure
Specialized Staffing in TMCs and IMAP	Traffic Operations, Traffic Management, Traffic Engineering Configuration Management Specialists and Technicians IT Specialists Communications and Public Relations Specialists Field Specialists Law Enforcement and Emergency Responders Liaisons Contract Managers Data Analysts Trainers
Outsource Appropriate Functions	Specialized Staff in TMC and IMAP (including operators and drivers) Device Maintenance when necessary
Statewide Training and Certification	Control Room Operators IMAP Drivers, Other NCDOT Incident Management responders
Statewide and Regional Options for Device Maintenance	Statewide Contracts Regional Contracts On-Call Contracts In-House Staff

Source: Traffic Operations Strategies for the Future, 2011

Appendix 10: Traveler Information and IMAP pathways to economic outcomes





NCDOT Economic Performance Measures Project

Communications Office

Final report: June 27, 2014

Project Background

This project is part of a program-level assessment and evaluation of the economic performance of various business units. This project will help prepare NCDOT to better align its strategies, policies, programs, projects, and activities to evaluate their performance in terms of enhancing the economy and well-being of NC.

Over the course of Task 2A, we completed a basic inventory of each business unit's current activities (i.e., programs, projects, and services), their current performance measures, and current understanding of their economic contribution.

During Task 2B, we met with each of the business units. In the case of the Communications Office, we met for two hours to discuss connections between the unit's activities and their current performance measures, and then to establish a working understanding of how the business unit's activities (not a select list) connect to economic outcomes. This involved a 'mapping exercise' that encouraged each business unit to think critically about how their work connects to the economy. On December 2, 2013, Julia Cassandonte, Lisa Schell, Nicole Meister, Dara Demi, Cris Mulder, Ehren Meister, Angela Pearson, Leigh Lane, and Adrienne Heller met at the North Carolina Department of Transportation building. The meeting proceeded according to an agenda provided by staff at ITRE.

Communications Office Background

The current statement is: "The mission of the Communications Office (CO) is to inform and educate citizens about the Department's programs and activities. Specifically, the CO oversees media relations, special events, information programs, customer service, crisis management and publications."

The Communications Office sections are currently organized into five main functions including the Deputy Secretary of Communication's office, Marketing Services, Communications, Communications, and Art/Illustration/Photography.

A list of the Communication Office's programs, projects, and services are highlighted below:

Programs, Projects, and Services[3]

- **Media Relations –** This includes news releases, field reporter inquiries, and media coverage of major news stories and events. Four public information officers rotate being on-call nights and weekends. Any non-routine calls are handled by the Deputy Secretary of Communications or Director of Marketing Communications.
- **Special events –** Formal events designed to communicate to the public.
- **News Releases and Speeches Archive –** The Office maintains an archive of all news releases and speeches regarding the Department's activities and operations.
- **Information Programs** – This is public information distributed to the public through a variety of programs, promotions, and campaigns. This includes:
    - **Click it or Ticket** and **Booze it Or loose,** an awareness campaign covers the danger of driving without a seatbelt, or while under the influence of alcohol.
    - **Work zone safety** - An awareness campaign dedicated to promoting safety of construction workers.
    - Information on the **Strategic Mobility Formula** – A set of resources on the Strategic Transportation Investments Bill (HB 817) of June 26, 2013.
    - **Be Rail Safe** – This awareness campaign promotes the importance of not stopping on the tracks.
    - **Watch for me NC** – Awareness campaign intended to promote visibility of pedestrians, cyclists, and other vulnerable travelers.
- **NCDOT Newsroom –** A clearinghouse for news and information about NCDOT and its operations.[4] This page includes the following resources:
    - **About NCDOT**, an education resource on NCDOT structure, mission and goals, finance, and leadership.
    - **Contact Us**, a web-based portal that allows members of the public to submit a comment via the web. There is also a link to that takes users to the NCDOT directory.
    - **Useful Links -** A page with approximately 25 transportation-related links.
    - **Story Ideas -** A resource on story ideas for news reporters.
    - **Video Gallery** - Hundreds of videos on the NCDOT YouTube channel (includes NCDOT Now, NCDOT Mobile, Visualizations).
    - **Fast Facts –** A PDF guide with quick information on the number of employees at NCDOT, the Board of Transportation, the Aviation Division,

[3] Formerly: 1-877-4-YOU, NCDOT Newsroom (still on the website, no longer maintained), Construction progress report, work zone safety, FastFacts sheet, NCDOT Contact Page, Story Ideas, About NCDOT

[4] http://www.ncdot.gov/newsroom/

the Beatification program, the Bicycle and Pedestrian Division, the Ferry Division, Highways, the DMV, Public Transportation, the Rail Division, and Amtrak.
    - A **Contact FAQ**, with information on emergency procedures, littering, reporting transportation issues, adding roads, permitting, maintenance issues, and more.
- **Customer Service** - Customer service representatives are responsible for providing a first point of contact between the public and NCDOT. The two main avenues for connection are 1-877-4YOU and the website.
- **Maps and Publications** – The office oversees development and distribution of the state transportation map, the aeronautical chart, bicycle maps, the ferry schedule, NC Scenic Byways, NC Rest Area System, Train Schedules, NC Coastal Boating Guide, and GIS & Mapping Resources
- **NC Amtrak Marketing –** The Office oversees promotion of the Carolinian/Piedmont line.
- **NC Quick Pass Marketing** – The Office oversees promotion for the North Carolina Turnpike Authority.
- **Ferry Division Marketing –** This project, which may or may not be ongoing, promotes the use of the North Carolina Ferry System.

NC Scenic Byways, NC Wildflowers – This promotional material includes information on NC Scenic Byways available via the NCDOT website and a booklet on the NC Wildflowers program.

Economic Outcomes Workshop

The discussion largely centered on the operational functions of the Communications Office. Participants were asked to identify the major tasks required of their position. After compiling these lists, participants grouped individual functions into broad categories. The activity led to a discussion of a more philosophical bent to determine the appropriate categories in which to organize the functions. For example, some activities are revenue generating, including the NC Quick Pass promotion. Promotional work done for Aviation and Rail Division is intended to promote ridership, which also generates revenue for NCDOT. The results of this activity are summarized in Appendix item 11.

This conversation led to discussion of the Communication Office's strategic vision, and how the Office should organize and prioritize activities in the future. Outgoing Communications Director, Cris Mulder, had developed a rough draft of a strategic communications plans that organized activities into three broad categories: 1) Approach, which includes what the Communications Office is doing and how they are doing it; 2) ID, which includes the 'look and feel' of the material presented; and 3) Vehicles, which refers to the way the message is delivered and includes items like social media. See Appendix item 12 for a copy of the spreadsheet provided following the meeting. Note that the names of the categories used in the meeting do not align with the categories discussed in the meeting.

The meeting participants spoke at some length about the various goals that would direct strategic planning. Currently, much of the focus is on the Governor's 'Three Es': Energy, Efficiency, and the Economy.

Following a brief explanation of economic development outcomes, each group member was asked to develop a list describing how particular activities connected with the economy (see Appendix item 13). The group generally agreed that the activities often connected with multiple economic indicators and made many connections.

The group agreed that attendance from both high-level officers within the Communications Office and relatively junior employees was positive. Many in the group said that it was difficult for them to go from 'metrics' to the economy.

Customers

The Unit spoke at length about the needs of various business units within NCDOT. The Unit was also very engaged with the Governor's 'Three E' agenda. While connecting particular activities to the economy (see Appendix 13), the group also identified citizens, cities, drivers, train riders, drivers, business (in a business attraction context), and homeowners.

Partners

The Office's main partners include media outlets, including WRAL TV and Go Triangle. The Office also works closely with NC Commerce.

Business strategy

The business strategy will likely change in the coming months under the direction of the new Deputy Secretary. The current strategic priorities, as listed in the spreadsheet Cris Mulder sent out following the meeting remain current with the new Deputy Secretary of Communications: 1) Communications that drive action 2) Manage NCDOT brand and 3) Increase operational efficiencies and capabilities. To see the relationship between these priorities, tactical strategies, primary actions, and measures, see Appendix item 12. The Communications Office's current measures are included in Appendix item 13 for reference—one observation that came up in the meeting is that the current measures relate most strongly to DOT goals, but not the Office's priorities.

Economic Contribution

The business unit currently characterizes their economic contribution qualitatively. At the meeting, participants recognized that their actions led to an increased quality of life, saving time and money, developing connectivity between cities (which can lower transaction costs, contribute to regional infrastructure, and contribute to clustering), business attraction, and household savings.

When asked how various functions of the Office contributed to the state economy, meeting participants provided the following:

- Engage with citizens via social media to inform, educate, and involve in project development / travel on NC roads
- Produce videos to explain benefits of project and announce its start/finish.
- Promoting Walk Bike NC plan → Cities adopt suggestions → Become more bike/ped friendly → Better quality of life
- Communication → Awareness of traffic or closures → Shift behavior (take another route) → Save time and money (Increase Productivity)
- Use news releases to communicate from start to finish how project will enhance traffic flow and benefit business
- Advertising train transportation → more people ride train → increases connectivity between cities
- Provide alternate route info to help drivers avoid delays via social media and traditional media (news releases, pitches)
- Communication → Promote NCDOT role in attracting business/moves goods and services - > Share of voice in multiple publications → business attraction
- Use web to show drivers where traffic problems are and how to avoid them, promote alternate transportation modes, inform about project benefits
- Sierra Nevada economic development video → Tells the story about great infrastructure → Makes NC more attractive to business → Business attraction
- Publicizing information about road conditions, construction, etc. saves time and money
- Providing information about new roads (access) helps business development
- Informing travel of the best mode/roate to take → getting home/work faster/safer → time and money → household savings → keeping jobs

Moving forward

It will be very difficult to create a broad set of performance measures based on activities conducted by the Communications Office without a unifying business strategy to be shaped by the new Deputy Secretary of Communications, Mike Charbonneau. The Communications Office did not have a goal in mind with regard to creating an economically based performance measure. This is also a necessary step before additional action can be taken.

The Communications Office does collect a wide array of metrics that might be useful in constructing a performance measure of the unit's economic contribution. The data the Office currently collects, or has the ability to collect, includes comments made via social media, number of publications, VOCUS metrics (including the number of times a story has been picked up by other outlets, circulation numbers, and which outlet has picked up the story), Google Analytics (formerly monitored by Kim Patterson, Outreach

Coordinator). There may be some opportunity to use data collected by advocacy partners, including WRAL and Go Triangle.

At the time of Cris Mulder' departure, the Communications had recently signed up with VOCUS, a media-tracking platform that can create summary statistics on a number of metrics. In the coming months, Tammy Stewart will prepare reports for Mike Charbonneau using VOCUS reporting the number of news releases put out by the office, tone (positive or negative) of the stories picked up by other news outlets, number of interview requests the department has received, the proactive pitches delivered by the department, types of stories put out by other news outlets during certain weather and transportation-related events (using keyword searches), and social media monitoring (including Facebook, Twitter, Youtube, Flickr, and others). Lisa Schell will also provide reports on social media. The reports will help Mike establish a baseline of the Office's activities and be used to change the message of the Office. For a sample report from VOCUS, see Appendix 14.

Using this data, it would be possible to tell the story of the Communications Office's contribution to the economy using real data. This analysis could use VOCUS data that reports which media outlets are picking up stories authored by the Communications Office, identify media outlets that do this with some regularity, and use interviews to develop a case study showcasing the Office's contribution to that outlet. An example of this kind of case study analysis includes the work performed by ITRE for the Communications Office in June of 2013, when researchers at ITRE gathered information on the proposed cold storage facility at the Port of Wilmington, the Industrial Access program administered by the Rail Division, the Job Access Reverse Commute (JARC) program, the Sierra Nevada brewery in North Carolina, the Wildflower campaign, and the Spot Safety Improvement Program.

Appendix 11: Communications Office functions (orange) organized by category (blue) (Summary of workshop exercise)

Custodial Responsibilities For Public Records And Foia Requests	Aligning Communications With Statewide Priorities	Reputation Management	Emergency Communication	Communication tools, vehicles, and approaches (for an external audience)	Marketing Strategies	Shifting the Culture	*(Uncategorized)*
timeline, collect and archive information for future of past use	create messaging platforms aligned with the governor & NCDOT strategic initiatives	Crisis Communication Management	Crisis/Emergency Communication Protocols	Social media planning	create/implement marketing strategy for passenger rail	Communicate information to internal DOT employees	Increase operational efficiencies and capabilities
	advise other units on messaging to ensure consistency			facilitiates special events (e.g., ribbon cutting, announcements, governor events, etc.)	ad buys	Internal communication governance	drive efficiency in spend, analysis, and performance
				Communicate various project info	drive marketing educational awareness campaigns that drive action/behavior		
				use social mediat ot help address local questions/concerns	create and implement watch 4 me NC		
				social media conversation monitoring	Review analytics for social media marketing/web and make changes to improve/extend reach		
				integration of social media for public outreach	streamline approach for direct customer engagement		
				photography for social media platforms	Oversee the creation, development and execution of marketing campaigns		
				Facebook/Twitter/Pinterest etc. content (creation and development)	responsible for overarching "look and feel" of NCDOT		
				manage social media use and execution	Develop editorial calendar for cross-department, cross-agency targeted, timeline, relevant messaging		
				inform public about transportation projects - new/under construction/planned	Assist PIOs/marketers in developing effective plans utilizing all marketing tools services		
				draft and distribute news releases			
				create fact sheets			
				create and edit website content			
				Strengthen NCDOT visual brand ID (consistent experience, enforcing approach)			
				help oversee redesign and reorganization of NCDOT.gov			
				manage the content of NCDOT.gov to ensure it's clear, concise, and conversational			
				Photos (print and digital)			
				Develop storytelling capability and adoption of integrated communications practice and approach			
				proactive pitches to media			
				media interview			
				media relations			
				create videos promoting transportation and economic development			
				manage video production to ensure strong visual storytelling/tell NCDOT story			
				help tell the NCDOT story			

Appendix 12: Strategic Communications Plan developed by Cris Mulder[5]

Strategic Priorities	Tactical Strategies	Primary Actions	Measure
Communications that drive action	Develop storytelling capability and adopt integrated communications practice and approach	1. Develop editorial calendar for cross-departmental and cross-agency targeted messaging approach 2. Create communications planning templates (objective, audience/stakeholders, key messages, call-to-action, vehicles) 3. Manage array of social-media touch points to create community and share news	metrics by tactic (open, click-thru, likes, shares, tone, pick-up rate, visitors, bounce, time on-site)
	Create messaging platforms aligned with Gov and NCDOT strategic initatives	1. Develop & implement strategic communications plan to drive passage of strategic transportation investment bill 2. Relaunch 40/440 Rebuild and 540 expansion project campaigns and tie together Triangle Mobility 3. Develop DMV customer service build communications strategy and advise on tactics/ experience	# articles targeted DMA pick-up metrics by tactic (open, click-thru, likes, shares, pick-up rate, visitors, bounce, time on-site)
	Create revenue generating opportunities	1. Develop quarterly marketing campaign to increase NC Quickpass transponder sales and ridership on Triangle Expressway 2. Create consumer websites for ByRail and ByFerry to sell tickets and promote marketing campaigns	# of new customers % revenue increase ROI
Manage NCDOT brand	Strengthen NCDOT visual brand identify for consistent experience and engaging approach	1. Develop style guide and templates for web and presentations 2. Create share site for commonplace logos, icons, photos for consistent use	
	Relaunch www with improved navigation, relevant content channels to improve user experience and engagement	1	
	Cultivate thought leadership position	1. Identify industry verticals and regional/national speaking opportunities and media placement (proactive pitch articles) 2. Submit for national awards	targeted awareness # exercised opportunities vs. submissions # awards

[5] Original spreadsheet provided to Ehren Meister and the rest of the team on December 9, 2013.

Increase operational efficiences and capabilities	Restructure communication department to greater support customer needs and align practices	1. Rewrite job descriptions and create field positions for greater local support 2. Create a more collaborative work space through office reconstruction for newsroom environment 3. Identify professional development opportunities for each employee to increase skill ability, awareness or experience	
	Develop SLAs for marketing agency to drive efficiency in spend, analysis, and performance	1. Track placement and report on performance (baseline goals and measure outcomes) 2. Conduct quarterly meetings to analyze performance and plan for upcoming media buys	ROI Measured performance goals (ie: GHSP targeted placement and change in survey % awareness)
	Identify PR contact management tool; greater analysis and relationship management	1. Implement Vocus	utilization productivity report pick-up share of voice
	Enahance crisis/emergency communicaitons protocols; document processes and practices to update COOP	1. Conduct crisis communication exercise bi-annually (winter weather, storm season) 2. Document protocals 3. Conduct lessons learned following each situation and evaluate needs and implement improvements	

Appendix 13: Current Performance Measures

Safer	Identify/communicate to target audiences	Utilize multiple communications tools
Safer	Support key revenue genrting initiatives	Develop and implement marketing plans
Works Well	BU identity audit & strategic update	Assess/change material/web pages for BU
Works Well	Media Satisfaction Survey	Improve ratings in at least 2 categories
Works Well	New Media	Utilize Twitter for public events
Works Well	Use visual media for key messages	Determine and utilize specialized tools
Works Well	Use web-based sites/application public	Identify special projects/initiatives
Works Well	Website re-design & TransShare expansion	Launch website & enhance TransShare use
Works Well	Inside NCDOT Now, TransShare updates	Expand amount and variety of information

Appendix 14: Sample Report of Analytics from VOCUS

PRWeb News Releases Summary Report
Fine Alpaca Wool to be Attraction at Peru Fashion Night in American Capital

This report provides you with a summary of the analytics for your release. For a more complete overview of how your release performed, please log in and visit your analytics dashboard.

ITRE
Institute for Transportation
Research and Education

PRWeb
Online Visibility from Vocus

Media Deliveries

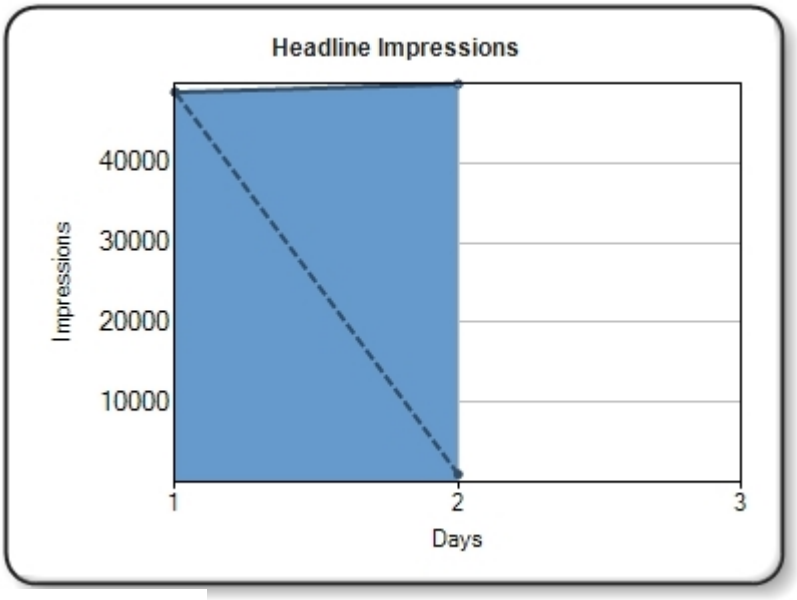
This report contains a sample of media outlets that received your news release via e-mail or news feed. For the full listing of media deliveries please log-in and view your analytics.

ABC
Albuquerque Journal
ARIZONA DAILY STAR
Asheville Citizen-Times
BBC
Bloomberg News - Princeton Bureau
BOSTON GLOBE
Buffalo News
CHATTANOOGA TIMES FREE PRESS
CHICAGO TRIBUNE
Crain's Cleveland Business
Detroit Free Press
Erie Times-News
FINANCIAL
Age, The
ALL
Arizona Republic
The Atlanta Journal-Constitution
Bloomberg News
Bloomberg Television Boys' Life
BUSINESS
Chicago Sun-Times
CNN
Davis Enterprise
ENTERTAINMENT EXAMINER.COM
Generación 21
HITS MAGAZINE
Intelligencer Journal
Las Vegas Review-Journal
Las Vegas Weekly
LOS ANGELES TIMES NA
NEW YORK TIMES NEWSPAPERS
NUVO Newsweekly
Orange County Register
Pittsburgh Tribune-Review
Post and Courier
The Record, The
REUTERS
Sacramento Bee
Seattle Times
Spartanburg Herald-Journal
ST. PETERSBURG TIMES
Star Magazine
Statesman Journal
The Asheville Citizen-Times The Gazette
The Greeley Tribune
The Journal Record
The Log Newspaper
The New York Times
Forbes
Fresno Bee
Greenville News
Houston Chronicle
INTERNET
Las Vegas Sun
Le Devoir
Mpls. St. Paul Magazine
New York Post
NEWSPAPER
NONE
Omaha World-Herald
Palm Beach Post
Plain Dealer, The
RADIO
Recycling Today
Richmond Times-Dispatch
San Francisco Chronicle
Seattle Weekly
St. Louis Post-Dispatch
Standard-Examiner
Star Tribune
Tampa Tribune
The Columbian
The Globe and Mail
THE HOLLYWOOD REPORTER
The Kansas City Star
The Modesto Bee
THE OBSERVER
THE RECORD
USA Today
WAGA-TV
Washington Post WEB
WISH-TV
WSVN-TV
YES
The Orange County Register
The Star
VOCUS
Wall Street Journal
Washington Times
The Winston-Salem Journal
WLOS-TV
Wyoming Tribune-Eagle

Impressions

This report tells you how many times the title of your release appeared in a feed or Web page we have the ability to track. Please note that the actual number of impressions is significantly larger however we do not currently have the ability to track impressions on all of our partner sites or search engines.

Total Impressions: 49,882

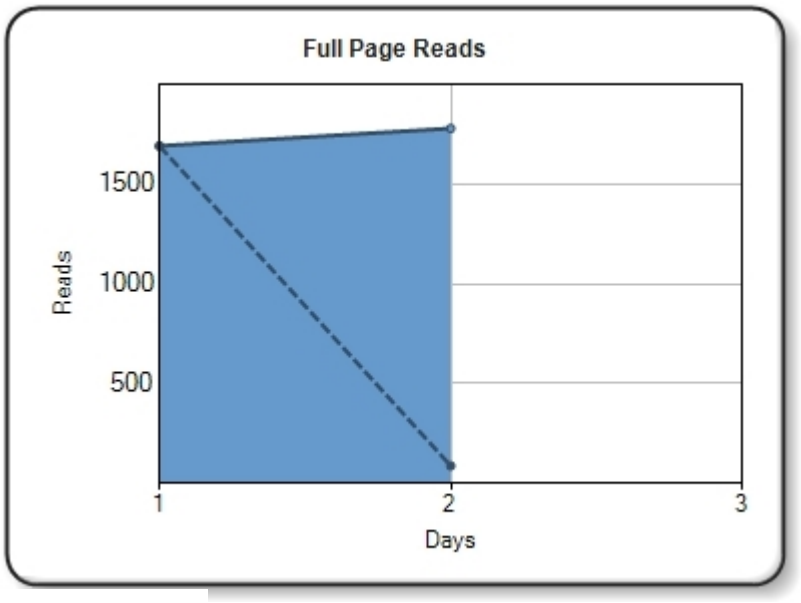


Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Impressions	48851	49882												
Day	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Impressions														

Reads

This report tells you how many people loaded a full version of your news release hosted on PRWeb. Please note that the actual number of reads is significantly larger however we do not currently have the ability to track readership on our partner sites.

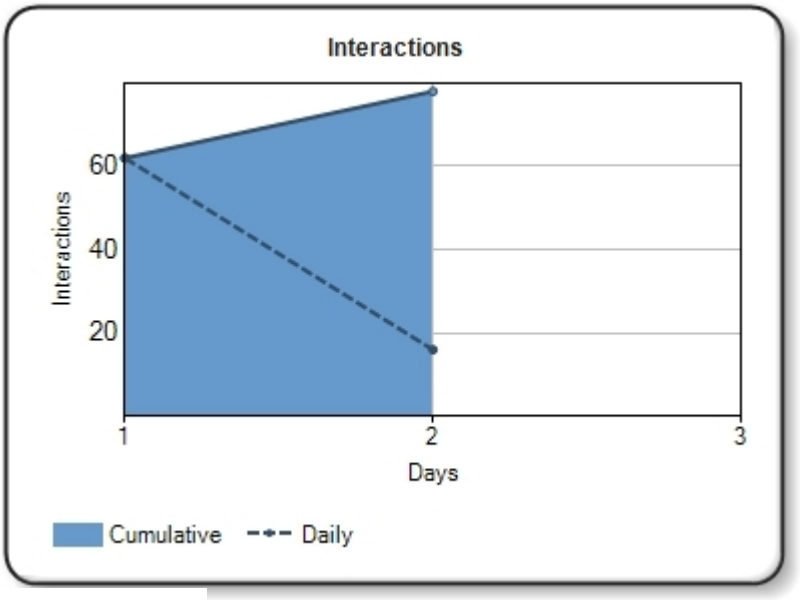
Total Reads: 1,778



Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Reads	1,690	1,778												
Day	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Reads														

Interactions:

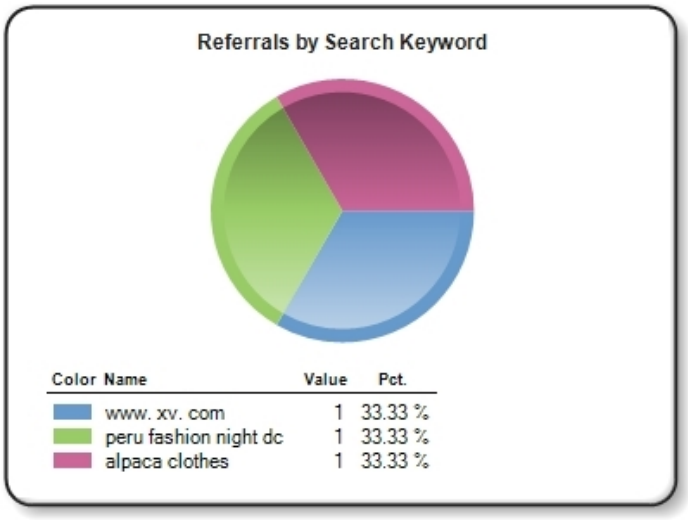
This report provides you with an aggregate number of different activities that people performed when visiting your release including printing your release, forwarding it, downloading a PDF version, clicking on a link or interacting with your embedded Web site.

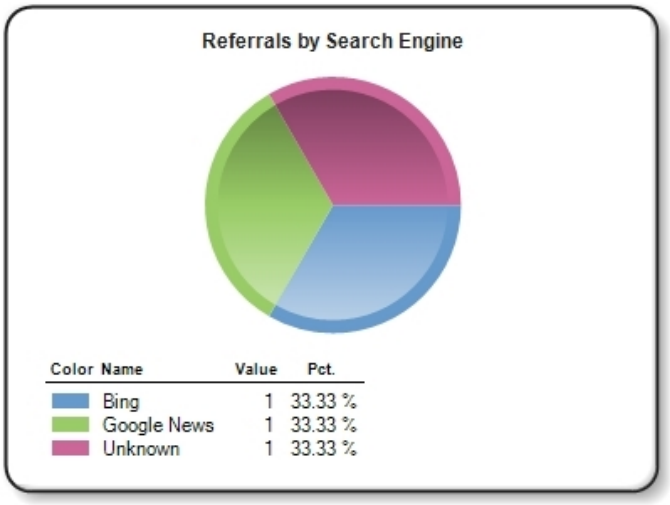


Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Interactions	62	78												
Day	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Interactions														

Traffic Sources

This report provides you with data on where traffic to your release on PRWeb is coming from as well as the keywords people are using to find your release in search engines.





Online Pickup

This report contains a sample of Web sites that picked-up or syndicated your story. To see the full list of sites that picked-up your story please login to your account.

Web Site	Link to your Release
WZDX-TV - Online	See your release
WTRF-TV - Online	See your release
WTNZ-TV - Online	See your release
WSHM-TV - Online	See your release
WSFX-TV - Online	See your release
WRIC-TV - Online	See your release
WRCB-TV - Online	See your release
WOWK-TV - Online	See your release
WOI-TV - Online	See your release
WLTZ-TV - Online	See your release
WKRG-TV - Online	See your release
WFXS-TV - Online	See your release
Northern Colorado 5 - Online	See your release
KVVU-TV - Online	See your release
KTXD-TV - Online	See your release
KOTV-TV - Online	See your release
KLJB-TV - Online	See your release
KION - TV - Online	See your release
KFMB-AM (760 AM Talk Radio) - Online	See your release
Big News Network	See your release
KALB-TV - Online	See your release
PRWeb - Online	See your release
WBOC- TV (DT2 - FOX) - Online	See your release

NCDOT Economic Performance Measures Project

Aviation Division

Final report: June 27, 2014

Project Background

This project is part of a program-level assessment and evaluation of the economic performance of various business units. This project will help prepare NCDOT to better align its strategies, policies, programs, projects, and activities to evaluate their performance in terms of enhancing the economy and well-being of NC.

Over the course of Task 2A, we completed a basic inventory of each business unit's current activities (i.e., programs, projects, and services), their current performance measures, and current understanding of their economic contribution.

During Task 2B, we met with each of the business units. In the case of the Aviation Division, we met for two hours to discuss connections between the unit's activities and their current performance measures, and then to establish a working understanding of how the business unit's activities (not a select list) connect to economic outcomes. This involved a 'mapping exercise' that encouraged each business unit to think critically about how their work connects to the economy. On December 5, 2013, Bobby Walston, Ehren Meister, Angela Pearson, Daniel Findley, Leigh Lane, and Adrienne Heller met at the Airport Division headquarters located immediately off the terminal of the Raleigh-Durham International Airport. The meeting proceeded according to an agenda provided by staff at ITRE.

Division Background

The Aviation Division's old mission is to "Promote the economic well being of North Carolina through air transportation system development and improved aviation safety and education." This mission is in the process of being updated.

The Division is informally split into five sections: the Director's office, Airports, Aircraft Services, Aircraft Maintenance, and Aviation Safety and Education. Roughly link to the Aviation Division's four main mission points, identified in more detail below.

A list of the Aviation Division's list of programs, projects, and services are highlighted on the following page.

Programs, projects, and services

- **Aircraft Owners and Pilots Association (AOPA) Air Safety Foundation Courses –** These seminars are located concurrently with the Division's Fall and Spring Wings Fly-in events, with 3-4 additional events afterward. These events provide pilots a foundation in air safety and represent a refresher on basic aircraft safety.
- **NC Annual Soaring Safety Summit** – This regular event brings together pilots from across the state to discuss safety-related issues in North Carolina. This is co-sponsored by many regional organizations, the Division of Aviation, and the Aviation.
- **Helicopter Safety Summit** - This event brings together industry experts and representatives for presentations on new technology, regulations, and trends. The topics are chosen by studying accident data, industry technology, and customer demand.
- **Mountain Flying Clinics** – These events, held biannually, consists of seminars and flying training. The program provides lectures along with practical experience.
- **NC Spring/Fall Wings Pilot Proficiency Program** – This event combines safety seminars, flight proficiency training, aviation exhibitors, and a pilot appreciation banquet.
- **Flight Instructor Workshops** – The Aviation Division, in cooperation with the FAA, offers 32 flight instructo workshops across North Carolina on an annual basis. Topics are chosen using current accident data, trends and expert opinion.
- **Aviation Maintenance Technician (AMT)/Inspection Authorization (IA) Safety Programs –** These two hour seminars are held in many locations across the state in order for AMTs to meet requirements for the Inspection Authorization Renewal requirements. It also allows AMTs to earn a bronze, silver, or gold award in the FAA AMT Awards Program depending on level of training.
- **Flying Companion Course** - This course is designed for pilots described as 'frequent flyers'. This program gives participants flight confidence by providing them the opportunity to fly with an FAA Certified Flight Instructor.
- **General Public Education** – In this program, the Aviation Division will bring a public speaker to a group organized by the public to discuss topics including aviation, airports, aviation safety, and state government aviation.
- **Youth Aviation Education –** This includes several youth-targeted programs, including an Aviation Explorer Post, a "Day at the Airport programs, Aviation Youth Camps, career days and educational materials.
- **EAA's Young Eagle Flights –** The Division of Aviation offers support to the Experiment Aircraft Associations (EAA) "Young Eagles Program". This program targets youth ages 8-17 to move beyond the classroom to a 'trilling' airplane ride.
- **Information on NC Military Bases –** The Division maintains a website for pilots called 'See and Avoid' to enable pilots flying in eastern North Carolina to avoid active military airfields and training airspace.
- **Airport Improvement –** The Division oversees funds used to improve the quality of runways and other facilities at the state's 72 airports.
- **NC Airport System Plan** - This is a performance-based approach to evaluate the statewide airport

system's needs. This plan is in the process of being updated (see below for information on data gathered for this update). When complete, it will also incorporate policies and guidelines that promote the objectives of the Department of Aviation.

Economic Outcomes Workshop

The discussion largely centered on the Division's business work plan, and steps to expand the unit's performance measures to include all four the unit's operational functions. Bobby Walston, recent incoming Director of the Aviation Division, revealed a working draft of the Division's goals in November of 2013. The Aviation Division's operational functions roughly correspond to each of these goals, and include: 1) airports 2) oversight 3) aircraft services and 4) education/safety. Currently, only the function of the first group (airports) is well-captured by the Division's performance measures.

The Aviation Division's Mission

1. Provide assistance to the airports of North Carolina
2. Be the state's Aviation Authority
3. Provide aircraft services for state business
4. Promote the value of Aviation

Because the Division works very closely with the state's 72 airports, the unit is required to produce certain pieces of data for the Federal Aviation Administration (FAA) on a regular basis. One possibility for a new performance measure would be to expand on data already being collected to meet funding requirements mandated by the FAA. For example, the FAA requires a statewide system plan, which directs quite a bit of research and the prioritization of projects. The plan includes models for all general aviation airports that help quantify their deficiencies. The result is a wish list of potential projects that can help direct federal dollars. It also provides an overview of the Division's current airports, traffic and demand for those airports, and cost calculations for certain projects. The end product is a cost that can be used to evaluate whether improvements are worthwhile. The Division is in the midst of updating this system plan that will focus on projects for the next 20 years. One of the deliverables will be to issue a current program guidance handbook (last updated in 2000). This system plan also has its own set of performance measures (see Appendix item 15).

As with other business units, a lingering challenge is to monetize the unit's activities. The unit provides services that can fall into a few categories: essential but unpriced (such as photogrammetry and state weather systems), business development (for which even low rates of helicopter use may indirectly result in high state economy yields), and services that could be priced in the private market but are not currently (such as providing air transport to members of state government). This became especially apparent during the mapping exercise, when the Division's 'push' and 'pull' factors were discussed. For example,

Reports led by Daniel Findley on behalf of the Aviation Division:

- **Fiscal Impact of Strategic Investments at Piedmont Triad International (PTI) Airport.** This case study analyzes investments and tax revenue to account for monetary investment at the PTI airport for Honda's site development.
- **National Review of Aerospace Industry Incentives.** This report examines national tax exemptions and deductions, tax credits, and other tax incentives related to the aerospace industry.
- **Economic Contribution of North Carolina Airports**. This report calculated the direct, indirect, and

Lowe's Corp moved to Charlotte in part because of the city's strong airports (a pull factor), where airports that fall into disrepair may encourage companies to relocate (a push factor).

As with other business units, the Aviation is most strongly connected to measures that affect Mobility and Safety. Mobility can be improved by activities that include things like clearing trees from runways. Safety is improved more generally by activities that include pilot training. The Aviation Division's goals reflect their priorities and are more encompassing than NCDOT's mobility and safety goals.

Daniel Findley, Senior Research Associate at ITRE, is currently engaged with several projects that may help explain some of the push/pull factors that govern aviation and the Aviation industry (see right sidebar). For example (for full list, see sidebar above), an evaluation of how the tax base in Greensboro and statewide is impacted by aviation investment will highlight the importance of maintaining aviation to protect services provided by a local municipality. By examining the aerospace incentives on a national scale, the contrast between incentives in North Carolina and other states may reveal shortcomings. Finally, Findley leads the semi-regular quantitative analysis of the economic contribution of North Carolina's 72 airports.

Customers

In discussion both before and following the meeting, the Aviation Division's main customers were identified as students at the various flight safety instruction courses, the state's 72 airports (referred to as 'airports sponsors'), airport owners, airport managers, professionals facilitating the design of airports (e.g., consultants, engineers, architects), passengers at those airports, and prospective businesses interested in locating in North Carolina. Bobby Walston's main concern, for the time being, is to increase staff levels to improve the Division's customer service.

Partners

In discussion prior to the meeting, members of the Division identified the Aeronautics Council (a 14 member board that advises the secretary), the Aircraft Owners and Pilots association (AOPA) Air Safety Foundation (not-for-profit political organization that advocates for general aviation), regional soaring organizations, the Federal Aviation Administration, local pilots, the US Experimental Aircraft Association (cosponsors of events and materials related to the Young Eagles program), the Photogrammetry Unit, DOT Right of Way Branch, and the Pavement Management Unit (inspects airports' pavement conditions every 2-3 years)

Business Strategy

The Aviation Division's business strategy is currently changing with the addition of a new Director. In the future, a Chief Financial Officer will manage the business work plan. This person will also oversee project requests and track federal dollars to ensure that they meet specific criteria (a kind of 'spot quality control'). This person will, ideally, join the Division by March of 2014.

Informally, the Division is currently directed by the new set of goals outlined in November of 2013 (see above: 'The Aviation Division's Mission').

The new North Carolina Airports System Plan (NCASP) will also play a significant role in directing the activities of the airports group in the future. The NCASP is a statewide analysis of the state's 72 public use airports (nine of which are commercial service airports). The NCASP will assess the current condition of the system, as well as plan for current and future needs. The first meeting of the steering committee overseeing the update of this plan (last completed in 2000) will be February 4, 2014. The steering committee will primarily include representatives from many of the state's airports.

Economic Contribution

A recent study led by Daniel Findley at ITRE speaks to the Aviation Division's economic contribution most strongly. This report, titled 'Economic Contribution of North Carolina Airports,' was completed in November of 2012 and calculates direct, indirect, and induced impacts of North Carolina's 72 airports. Direct impacts were calculated using surveys of airport management, tenants, and major users. Indirect and induced impacts of commercial airports were calculated using IMPLAN. According to this report, the total contribution of airports in North Carolina is $25.9 billion. The airports support 108,000 jobs.

As part of the NCASP update, the Division will work with consultants Kimley-Horn and Associates, Parsons Brinckerhoff, Marr Arnold Planning, and Roy D. McQueen & Associates to evaluate all of the state airport's performance on several key measures that fall under three categories: Safety, Infrastructure Health, and Mobility (see complete list in Appendix item 15). As part of this process, the team will undertake several case studies to document how investment in airports has impacted local and regional economies at three airports (Fayetteville, Cape Fear, and Mount Airy). The documentation from the complete NCASP process will include a traditional technical report, individual airport reports, and a statewide executive summary. For a complete list of activities included in the NCASP system plan update, please see Appendix item 17.

On the subject of oversight, there is evidence that the Aviation Division decreases the cost of doing business for many of the airports, though this information has not been thoroughly studied yet (see more below).

Moving Forward

The Division's main priority, at the moment, is to update the new North Carolina Airports System Plan (NCASP) and to bring the new CFO on board. Once this new staff member is chosen, the business plan will also be updated to reflect the Division's informal goals. With this foundation, it may be more possible for members of each group to direct attention toward critical data collection that could be used to create measures specifically directed at all four groups/goals of the Division.

In order to better capture the contribution of all of the various groups within the Division, a number of approaches are possible. The following section outlines recommendations that are specific to each group within the Aviation Division. These measures are also presented in a table on page 7.

1) **Airports**. As Bobby Walston discussed, a regular schedule for updating 'Economic Contribution of North Carolina Airports,' would enable cross-year comparisons. An additional study of economic activity might include a cluster analysis to examine the amount of business income generated within the sphere of influence of the state's airports. A third approach might include qualitative evidence of the Division's benefit to the economy with regular surveys to the general public and businesses targeted by NC Commerce.

2) **Services**. In this case, the Division faces a challenge capturing the two very different uses of state aircraft: transporting state officials and tours for business attraction. Additional research into other states' use of these measures is warranted for a complete recommendation. However, one option discussed in the meeting was a retroactive surveys of businesses that chose to relocate/open in the state to indicate the Division's effectiveness with regard to business attraction. With regard to the transportation of public officials, the Division already tracks the number of hours aircraft is in use. These two indicators could be combined to create a weighted performance measure tracking quality of customer service and hours of use. Evidence from other organizations, including the National Business Aviation Association,[6] suggests the use of government-owned aircraft can also assist in disaster operations. Evaluating these uses will also contribute to a more complete understanding of aircraft services' role in the state economy.

3) **Oversight**. .[7] A statewide analysis of the Division's capacity to avert costs to its customers and partners would provide detailed information on the Division's oversight-related activities to contribute to the state economy. A compelling example of this activity includes a recent project initiated by Jennifer Fuller, Airport Program Manager with the Aviation Division. The Division brought on board WK Dixon to put together a best practices manual for the Department of the Environment and Natural Resources (NC DENR) to demonstrate that airports were extremely clean. The new standards will be included in a new chapter (to be approved later this year) that will approve overland flow for airports. It also eliminates a requirement to have standing water around an airport. Julie Wilsey, Deputy Airport Director at Wilmington International Airport, estimates that this improvement will have a significant impact on the airport's bottom line. An alternative analysis—that could be completed yearly—might include a regular survey of those partners and customers who take advantage of the Division's oversight capacities.

4) **Education/Safety.** With regard to education and safety, the Aviation Division has several alternatives. A key statistic is the number of seminars, training events, and other events held each year. Another key statistic is the percentage of pilots captured during these events.

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[6] 2014 Business Aviation Factbook. http://www.nbaa.org/business-aviation/fact-book/business-aviation-fact-book-2014.pdf

[7] Julie Wilsey, conversation with Adrienne Heller February 19, 2014.

This will provide important internal statistics used to track the Division's ability to reach out to customers and partners. This could ultimately be used to create a basic Cost Benefit Analysis of the Division's educational and safety objectives.

Proposed Performance Measures

Goal	Element	Measure	Schedule	Purpose
Works well	Economic Impact of NC Airports	IMPLAN analysis	annual, semi-annual, or every five years	Benchmark NC Airports' contribution to the economy
Works well	Business Attraction Effectiveness	Survey of businesses opening in the previous year	ongoing, reported annually	Gauge quality of service for helicopter tours and other services provided by NCDOT Aviation and NC Commerce
Works well	Helicopter quality of service	Survey of state officials using helicopter services	ongoing, reported annually	Gauge quality of service for helicopter use for public officials
Works well	Disaster-related aviation services	Review of flight logs	1 month after disaster-related mobilization	Percent of fleet mobilized within 24 hours of disaster, number of flights provided in disaster-related services, pounds of supplies moved, victims relocated
Works well	Oversight quality of service	Survey of airport owners and managers	annual	Evaluate Division's responsiveness relative to questions of oversight, possibly include cost savings of Aviation's support
Works well	Educational events	Number of seminars, trainings, and other events held annually	ongoing, reported annually	Capture the total number of events hosted by the Aviation Division annually
Works well	Educational outreach	Number of number of pilots and employees working in aviation captured each year	ongoing, reported annually	Capture the number of people attending educational events annually
Works well	Pilot recertification	Number of number of pilots recertified each year	ongoing, reported annually	Capture the number of pilots receiving certification annually

Use of TREDIS in the NC Airport Systems Plan

The number of projects considered in the process of developing the North Carolina Airport Systems Plan may be as few as a dozen or as many as several hundred. Projects in a State Airport System Plan (SASP) range may include new and expanding runways, ILS improvements, and landside projects. Incorporating access measures and benefit cost analysis can dramatically change the ranking and relative benefits and costs of various proposed projects. It can identify proposed projects that particularly affect regionally significant economic factors. If desired, the assessment can also recognize projects in rural and isolated areas where potential benefits relate more to connectivity and access than direct performance.

An advantage of the TREDIS platform is that changes can be made to a single factor or multiple factors, discount rates, capital costs of single projects, and/or the schedule of construction of one, several or all projects (geographically by airport, region, or system wide; or by project type) and an alternative scenario is instantly calculated.

For example, TREDIS is set up to address two broad categories of airport planning issues for the Virginia Airport System Plan (for the factors listed below in 'Long-range scenarios'). TREDIS is pre-loaded with ratios on a per capita, per ton, per mile and per minute basis. These are based on national data and can be changed if more suitable data are available in Virginia or in regions of the Commonwealth. The default factors will be provided to DOAV staff for review early in the project.

1. Long-range scenarios

TREDIS can show the impact of aviation or multi-modal long-range plans in terms of overall impact on a state or regional economy. This was done as part of the Virginia Six-Year plan, which separately examined the statewide impacts of proposed statewide airport system investments, as well as statewide marine, highway and transit investments. To accomplish this type of study, TREDIS uses the following factors associated with changes in annual trips by aircraft type:

- Passenger volumes
- Cargo volumes
- Aircraft Occupancy Rates
- Flight Disruption Rates
- Schedule Reliability Rates
- Safety Rates
- Operating costs per hour
- Fuel Consumption costs and rates
- Fuel tax rate
- Airport fees

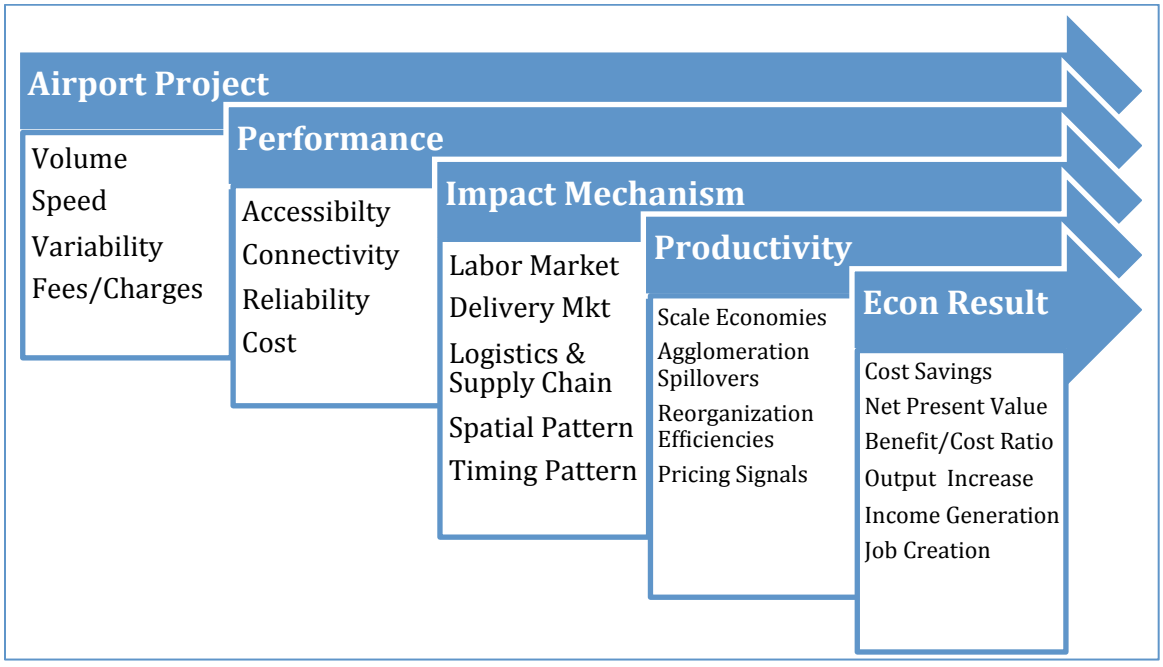
2. Benefit-Cost Studies

TREDIS has a separate module to conduct benefit-cost analysis consistent with FAA guidelines. This is now being applied for Wisconsin DOT's upgraded Airport Benefit Cost (ABC) system. To accomplish this type of study, TREDIS incorporates the following factors:

- Capacity & Navaids Effects: (Operations Per Day, Critical Aircraft Types)
- Travel Speed (Average. Miles Per Hour While Moving)
- Incidence Of Flight Route Disruption (Percent Of Landing Operations)
- Flight Time Added Per Disrupted Operation
- Incidence Of Aircraft Queue Delays (Percent of Operations)
- Added Ground Minutes Per Queued Operation
- Incidence Of Schedule Delays (Percent of Operations)
- Average Minutes Per Delayed Operation
- Tower, Taxiway, Apron & Runway Safety (Average Incidents Per 100m Operations)
- Runway Extension Effect: Critical Aircraft Load (Average Passengers Per Operation)
- Critical Aircraft Cargo Load (Average Tons Per Aircraft Operation)

The graphic below illustrates an example of the sequence of calculations imbedded in TREDIS' performance measurement and prioritization functions.

Sequence of Calculation Steps Relating Transportation Project Changes to Productivity



3. State Airport System Plan - Return on Investment Analysis

The SASP will address project-specific investments and should include an estimate of the potential return on investment (ROI) of these projects. NCDOT will be able to use TREDIS to estimate the economic impact/benefits to costs of future projects if they are implemented. For example, at NCDOT's discretion, the capital projects that are recommended as part of the soon-to-be completed SASP can be analyzed for the potential return on investment (ROI) of these projects (in terms of benefits to costs and marginal economic impacts). These analyses will enable the NCDOT to help prioritize capital investments prepare and submit Aviation Improvement Program grants to the FAA, if needed.

In practice, there are seven ways that ROI can be used when assessing the impacts and benefits of transportation infrastructure investments. We recommend concentrating the ROI effort on these the key measurements listed below, followed by additional impact measures.

The three measurements recommended by TREDIS:

- Benefit Cost Analysis (BCA) based on productivity gains and increased economic benefits
- Social (non-transactional) returns monetized for presentation as BCA or NPV
- Incremental economic impacts

Additional impact measures for consideration are:

- Net Present Value (NPV) of benefits based on productivity gains and increased economic benefits
- Tax impacts
- Cash flows separated by public and private parties
- Temporary construction impacts

It is also possible to compare all projects to each other in terms of all of the grouping criteria listed below. Projects can also be grouped to measure their ROI within specific categories, including:

- Type of project
- Category, e.g., airside and landside (changes in cost, capacity and delay)
- Single airport, or by airport classification (including synergy effects of multiple projects or effects of removing a project)
- Estimated project cost (separating large from small projects)
- Policy goals (e.g., improving access to a particular air service)
- Geography (sub-state region)

The specific subtasks are listed below:

- Calibrate TREDIS model for all NC counties and airports (service areas per airport identified in recent economic impact study)

- License and set-up model based on ROI and grouping measurements selected and review relevant data requirements and sources needed for each measure. The deliverables will include a PowerPoint presentation and technical memo summarizing meeting decisions
- Load preliminary project data by airport based on the types of groupings selected
  a. Analyze up to three alternative packages of airport projects correlating to low, medium and high budget levels
  b. Review results with NDAC and adjust modeling effort as needed
- ROI analysis of projects to be included in the SASP by ROI measures and groupings selected by NCDOT and also by airport and system wide
- Prepare ROI Report as a standalone report in draft and final versions
- Renovations for safety or rehab to keep facility operational would not be part of an ROI.

4. Air Freight & Supply Chain

TREDIS also makes it possible to assess the relationship between regional/state economic activity and operation of air freight transportation and supply chain infrastructure. The software can be used to identify freight dependent industries and develop profiles for the freight industries to include the role of both inbound and outbound traffic, as well as the effects of changes in delay, reliability, and supply chain development. It can also use forecasts of national and state-level economic activity to assess the possible changes in future freight system demands and the effects of these forecasts on freight flows into and out of North Carolina. Using data and methods available in TREDIS, it is possible to identify industries that depend on air freight for inputs to production and as well as the jobs, wage structure, economic output and overall business sales that depends on these freight flows. The analysis will help establish the current climate for intermodal transportation, and also establish the characteristics of current freight economy.

The primary goals/objectives of this air freight program assessment would be as follows:

- Assess industries that depend on air freight
- Identify opportunities for improving the competitiveness of existing air freight-dependent industries and potential for growth of new and emerging industries and economic clusters, which may be by improvements of airport facilities to be investigated as part of the SASP, improvements in ground access to airports (discussions with airport managers and sponsors, industry and business leaders, officials of NCDOT, and local economic development officials) and combined programs of ground access improvements and airport improvements.
- Develop analysis to:
  - Profile the economic supply chain of air freight, including the economic contribution of air freight to North Carolina industries
  - Estimate the potential economic impact and benefit/cost ratios of freight related projects that emerge from the SASP.

- Estimate the potential economic impact and benefit/cost ratios of multi-modal freight investments that span ground and air transportation.

5. Multi-modal impact analysis

Passenger and freight air trips begin and end with a ground transportation mode to and from an airport. Significant changes in (a) regional demographics (more passenger trips); (b) regional economies (more cargo shipped by air and more business travel); and (c) airport development[8] (attracting more operations, passengers and/or cargo tonnage to an airport) will result in more ground trips *and* more airport operations/passengers/freight flows. In addition to economic impacts, it is possible that these situations will yield to capital investments for ground transportation, air transportation (airport development, by definition is a capital investment), or both (including more than one type of ground transportation and aviation facility. (For example a project bundle might include a proposed highway widening and new transit connection to increase access to an airport, as well as an extended runway and improvements to the terminal building). Using TREDIS, the program or "bundle" can be analyzed as a holistic project in terms of marginal economic impacts, net present value and benefit-cost analysis, alternative analyses can be conducted by including and excluding parts of the proposed "bundle" and each component piece can be analyzed as well.

[8] Include new/extended runways, improved instrument or lighting capabilities, and landside facilities such as improved terminals, warehousing capacity, and other, as well as a new GA or commercial airport.

Appendix 15: North Carolina Airports System Plan Performance Measures[9]

NCASP Goal Categories and Performance Measures	
Goal Category: SAFETY	
1	Percent of airports with controlling interest (property ownership/easements) over the FAA design standard Runway Protection Zones (RPZs) for each runway end.
2	Percent of system airports with an Airport Emergency Plan.
3	Percent of system airport with a Wildlife Management Plan.
4	Percent of system airports with a General Aviation Security Plan.
5	Percent of system airports that support search and rescue operations.
6	Percent of hospitals in the state within 30 minutes of a system airport with Instrument Meteorological Conditions (IMC) capability, on-site weather reporting, and jet fuel availability.
7	Percent of system airports that comply with the EPA's current requirements for spill Prevention, Control, and Countermeasure (SPCC).
8	Percent of system airports that comply with the EPA's current requirements for Storm water Pollution Prevention Plans (SWPPP).
Goal Category: INFRASTRUCTURE HEALTH	
1	Percent of system airports' primary runways with a PCI of 75 or greater.
2	Percent of system airports with a current airport layout plan (ALP).
3	Percent of system airports that meet applicable FAA runway/taxiway separation design criteria on their runways for their current ARC.
4	Percent of airports meeting all mandatory items in GAADP.
5	Percent of airports meeting all required items in GAADP.
6	Percent of system airports that are adequately accessible in terms of signage and access road quality.
Goal Category: MOBILITY	
1	Percent of population within 30 minutes of a system airport by category.
2	Percent of total employment/businesses within 30 minutes of a system airport.
3	Percent of system airports with a standard instrument approach procedure (i.e. ILS CAT 1, 200', 1/2 mile visibility).
4	Percent of total population within 30 minutes of a system airport meeting traditional business user needs (supports business aviation/Part 135).
5	Percent of population within 60 minutes of a system airport with commercial airline service by at least one airline.
6	Percent of system airports that provide intermodal options for their community, including public transportation interfaces at the airports (i.e. bus).
7	Percent of system airports with 24/7 fueling.
8	Percent of system airports with Jet Fuel.
9	Percent of system airports that are recognized in local comprehensive plans.

[9] Per conversation with Pam Keidel Adams of Kimley-Horn and Associates (February 28, 2014), these measures are in the process of being updated and will likely change.

Appendix 16: Aviation Division's Current Performance Measures

Goal	Element	Measure
Last longer	Pavement Condition Ratings	% of GA systems with PCI of 70 or greater
Safer	Automated Weather Observation Systems	GA syst airports w/state maintained AWOS
Safer	Runway Approach	GA airports w/Clear Primary Runway Appro
Safer	Runway Safety Areas	# of GA system airports with RSAs
Works Well	Grant Administration	Grants closed out wi 6 mo of final insp
Works Well	Non Primary Entitlement Funds	$ FAA NPE funds to support TIP projects
Works Well	Pilot Utilization Rate	% hours of utiliz of pilots to support DOT
Works Well	State Construction Discretionary Funds	State const funds under contract wi 1 year
Works Well	Utilization of Airplanes	# of hours of utilization of airplanes
Works Well	Utilization of Helicopter	# of hours of utilization of helicopter

Appendix 17: key steps in NCASP update[10]

- **Goals and Performance Measures:** establish the goals for the study and the performance measures used to evaluate the airport system
- **Inventory:** obtain airport data to support evaluation of system performance
- **Case Studies:** document how investment in airports has impacted local and regional economies at 3 airports. This is a qualitative analysis to provide narrative evidence of the airports' contribution to the local economy.
- **Airport AWOS Survey:** visually inspect weather equipment and develop database
- **Airport LPV Survey:** analyze which runways are potential candidates for a Localizer Performance with Vertical guidance (LPV) approach procedures
- **Airport Land Use:** prepare Airport Influence Areas drawings that reflect off-airport property affected by aircraft overflights
- **Developable Land Survey:** collect airport data to support the developable land database for the Department of Commerce
- **RSA and RPZ Reviews**: Review existing airport Runway Safety Area and Runway Protection Zone per FAA standards in advisory circular 5300-13A "Airport Design"
- **Pilot Survey:** gather input from pilots on airport use, development needs, and specific issues
- **Forecasts:** project aviation activity for next 20 years for commercial and general aviation airports. These forecasts are largely built around historical changes in activity for aircraft based at each airport, enplanements, employment at commercial airports, and others. These forecasts are largely used to prioritize projects at the state's general aviation airports as these airports compete for federal/state funding, and is largely built on self-reported data. Analysis is done using MS Excel.
- **Airport Groupings Analysis:** update the 2003 airport groupings utilizing current data
- **System Analysis:** evaluate the system's performance for each measure, including updated airport development criteria; includes GIS analysis and airport compliance to produce "report card"
- **Alternatives Evaluation:** evaluate future system needs and options for system improvement; includes analysis of non-aviation influences on system needs, ability to meet FAA standards, and comparison of FAA's NPIAS and ASSET data relative to North Carolina airports. These evaluations are primarily used to direct policymakers to the most effective use of grant funding.
- **Future System Recommendations:** identify future system needs including capital improvement plans for each airport and system as a whole
- **Program Implementation:** analyze priorities, revenues, and other North Carolina policies that impact implementation of system recommendations; conduct sensitivity analysis on major recommendations
- **Update Program Guidance Handbook:** DOA's existing handbook will be updated to reflect changes in policies and airport development planning
- **Pavement System Evaluation:** review and assess existing Statewide Airport Pavement Management System
- **Pavement Management System:** Conduct survey for 12 of the Part 139 Airports and incorporate data collected on 33 General Aviation Airfields by DOA, into a comprehensive maintenance plan
- **Nondestructive Runway Testing:** conduct testing at 12 Part 139 airports for future computation of a pavement classification number (PCN) for each runway
- **Documentation:** in addition to a traditional technical report, the NCASP will provide individual airport reports and a statewide executive summary for use in communicating the study results and recommendations
- **Cultural Survey Support:** assist DOA with the airport system planning aspects of the "Cultural Resources and Environmental Planning Study"

[10] Provided by Pam Keidel Adams of Kimley-Horn and Associates and Mark Kutrus of Parsons Brinckerhoff

NCDOT Economic Performance Measures Project Division of Bicycle and Pedestrian Transportation Final Report: August 16, 2015

Project Background

This project is part of a program-level assessment and evaluation of the economic performance of various business units. This project will help prepare NCDOT to better align its strategies, policies, programs, projects, and activities to evaluate their performance in terms of enhancing the economy and well-being of NC.

Over the course of Task 2A, the Institute for Transportation Research and Education (ITRE) completed a basic inventory of each NCDOT business unit's current activities (i.e., programs, projects, and services), their current performance measures, and current understanding of their economic contribution. During Task 2B, ITRE met with each of the business units.

The Division of Bicycle and Pedestrian Transportation was established in 1973 to "integrate bicycle and pedestrian safety, mobility and accessibility into the overall transportation program through engineering, planning, education and training." Most of these objectives are driven by local priorities, and these priorities are often influenced by an appreciation for the economic contribution of bicycling and walking to their community.

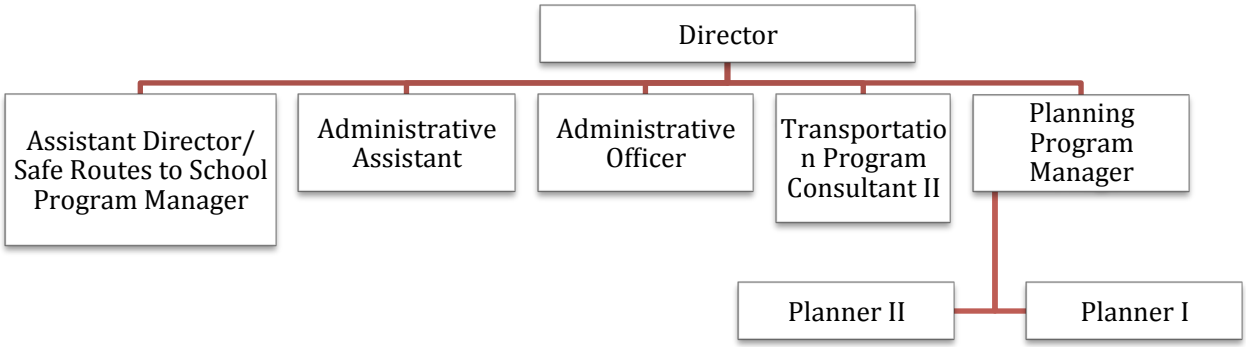
The Division does not currently have a strategic plan. In 2013, the Division updated its long range plan with Walk Bike NC, which sets forth the following goals: improve mobility, improve safety, contribute to public health, maximize economic competitiveness, and advance environmental stewardship. The Division's internal work plan has been driven by working on shorter-term projects identified in Walk Bike NC. The next step is to look more closely at developing a strategic plan.

There is some concern about choosing the correct performance measures, and worry that selecting the wrong ones will reflect a shortcoming in the Division or be unmeasurable. For example, the Division tracks the number of public involvement meetings, but they only attend meetings after receiving an invitation. Because receiving an invitation is out of the division's

control, this measure may not reflect the division's responsiveness. On the other hand, with regard to NCDOT's Complete Streets policy, the best measure would be the number of eligible projects that have a bike/ped accommodation. Unfortunately, that data does not readily exist. Being able to identify the percentage of bicyclists traveling to their destination by bicycle (i.e., mode share) is the performance measure the division is most interested in developing; it is also unmeasurable at present.

To address some of these data shortfalls, Lauren Blackburn's top priority is to engage in data collection, and continue work on safety education and planning.

Organization



Programs, Projects, and Service Priorities

This shorter list of programs, projects, and services represent the items that the Division, in cooperation with outside partners and others within NCDOT, will form the core of the Division's activities.

- Safe Routes to School federal funding oversight – The Division works with local governments, other state agencies, and highway divisions to administer projects funded by the federal Safe Routes to School program. The NC Department of Health and Human Services (NC-DHHS) is one such recipient, and this funding supports the Active Routes to School program designed to encourage students to walk and bike to schools.
- Municipal and Regional Planning Program – This program provides matching funds to local governments to encourage to the development of comprehensive bicycle and pedestrian plans. The Division is responsible for funds management, applicant selection, and plan review.
- Bicycle Helmet Initiative – NCDOT provides helmets to local agencies that, in turn, provide them and safety training to children.
- Project Prioritization - The Division works with other units to prioritize bicycle/pedestrian projects for NCDOT-directed federal funding. The Division is also engaged with other

units and divisions to assist local governments responsible for administering funded infrastructure projects.

- Research – The Division identifies research needs and funding for core areas such as data collection and infrastructure design. Data collection efforts include a growing "counts" program, crash data mapping and analysis, and compilation of local GIS layers of planned and built infrastructure.
- Technical Assistance – The Division provides comments to other units during the planning, design and construction of roadway, bridge and rail projects led by NCDOT. These comments are critical to the implementation of Complete Streets in North Carolina.
- Safety and Education Campaign Oversight – NCDOT's Bicycle and Pedestrian Division and the Governor's Highway Safety Program coordinate funding and oversight of the Watch for Me NC statewide safety campaign.

The Division of Bicycle and Pedestrian Transportation's statewide plan, Walk Bike NC, outlines many of the economic benefits of cycling and walking. The statewide plan identifies several ways in which bicycle and pedestrian infrastructure supports the state economy, particularly by supporting property values, playing an important role in the state's strong tourism industry, or providing transportation to groups that otherwise do not have access to transportation.

A major focus of the DBPT, as outlined in WalkBikeNC, is to foster robust economic development by promoting walking and bicycling. To improve economic outcomes for the state, several performance measures tied to the economy can be used. The three outlined in Walk Bike NC are:

- Return-on-investment measures
    - Tourism
    - Property values
    - Job creation
    - Small business development
    - Individual health and quality-of-life measures
- Percentage of active transportation project costs supported by local funding, public-private partnerships, and/or other cost recovery mechanisms
- New business start-ups due to walkability of community

A number of organizations are investigating the economic impact of cyclists. A study completed for the Arizona Department ADOT found that, in 2012, out-of-state bicycle participants contributed more than $88M to the state economy, and supported 721 jobs. Headwaters Economics found that, in 2007, non-local mountain bikers traveling to BLM land in Grand County Utah, made expenditures that supported 313 jobs and added more than $22M to the local economy.

NCDOT has performed similar studies on the impact of providing bicycling infrastructure, including a study on the Outer Banks in 2003 and a recent study on completing a link in the

American Tobacco Trail. The study on the American Tobacco Trail found that completing the trail led to the creation of 43 jobs per year, and an increase of $4.9 million in total business gross revenues. This kind of analysis could provide support for dedicated bicycling infrastructure, permitting large group rides, and developing connected trail networks.

Business Unit Work Plan

The DBPT's current business unit work plan is included below:

Element	Measure
Project Scoping	Number of scoping comments to PDEA
Meetings/Presentations	Number of public involvement meetings
Awareness Campaigns	Total population involved in safety campaigns
Bicycle crash rate	Number of bicycle crashes
Pedestrian Crash Rate	Number of pedestrian crashes

The Division prioritizes performance metrics that can be tracked on a month-to-month basis. Many of the Division's activities would be more usefully measured on an annual basis, but the current format of performance management monitoring limits the Division to measures that may fluctuate in a relatively short period of time. It is also important to base performance measures on available data. While the Division reconsiders its existing business unit work plan metrics, it is actively developing data collection projects. These future data sets will inform new business unit metrics.

Five Year Strategic Goals and Priorities

Process

A team from ITRE including Leigh Lane and Adrienne Heller first met with Lauren Blackburn of the Division of Bicycle and Pedestrian Transportation (DBPT) on February 6, 2015. At this meeting, the team decided that a strategic planning approach was appropriate in order to better prepare the DBPT to integrate economic performance measures into its performance management system. This meeting also began a process of validating the current programs, projects, and services managed by the DBPT. Adrienne Heller followed up with Lauren by telephone on February 10 to further capture the Division's organizational structure, continue the process of validating the DBPT's range of activities, and discuss next steps.

At this meeting, Lauren Blackburn indicated that a survey would be very helpful to the DBPT to better understand the priorities of key stakeholders and partners. In March of 2015, Adrienne Heller and Lauren Blackburn developed a survey in order to support the Division's ongoing commitment to customer service. The survey was distributed April 1, 2015, and was

administered by ITRE from April 1, 2015 to May 1, 2015. Lauren Blackburn, Director of the Division of Bicycle and Pedestrian Transportation, sent an invitation to partners by email on April 1. These partners included NCDOT employees, representatives from several Metropolitan Planning Organizations, a representative of the Regional Planning Organization association, representatives of local government, consultants, employees of university partners, and members of advocacy organizations. Approximately 50 people were contacted directly by email and were invited to forward these emails on to staff in their agencies/organizations.

The purpose of this survey was to prepare for a strategic planning process. This survey was intended to provide a basic baseline understanding of the DBPT's current level of customer service, and to better understand how key stakeholders view the DBPT's role. Forty-three respondents completed the survey between April 2nd and May 1st.

Near the close of the survey, Adrienne Heller, Leigh Lane, and Lauren Blackburn met on April 28, 2015 to discuss how best to proceed. During this meeting and preliminary discussion of survey results, the team identified several key areas highlighted in the survey. In general, DBPT is performing very well with regard to safety-related activities and planning, both of which are perceived as core services and frequent areas of collaboration. The survey also highlighted a need for the DBPT to place greater emphasis activities related to data collection and activities that might fall under technical assistance (including project delivery and oversight). Survey results also suggested the DBPT place a greater emphasis on both improving the materials provided through the website, and work to build capacity on bike/ped issues within NCDOT. For more information on the survey, please see Appendix 19.

On May 12, 2015, Leigh Lane, Adrienne Heller, and Lauren Blackburn met again to discuss the strategic planning workshop. In order to ensure a broad representation from stakeholders and partners, a meeting was scheduled for the end of June, and an environmental scan with the entire DBPT staff was scheduled on the end of the month.

On May 27, 2015, Leigh Lane (ITRE), Adrienne Heller (ITRE), Lauren Blackburn (DBPT), Ed Johnson (DBPT), Jo Ann Greene (DBPT), John Vine-Hodge (DBPT), Bryan Poole (DBPT), Kendra Bridges (DBPT), and Adja Fall (DBPT). During this meeting with the greater group, Leigh Lane and Lauren Blackburn provided a brief background on the environmental scanning effort and summarized work that had occurred. The group then discussed the different types of work items they were currently working on as well as ones they would start in the next six months**.** This occurred in a round-robin style, with each member identifying several major activities that were tied with certain programs or projects. Following the session, the Division continued to add to the list of activities which became part of the environmental scan information included in Appendix 27.

The day of the strategic planning workshop, June 10, 2015, Leigh Lane (ITRE), Adrienne Heller (ITRE), Lauren Blackburn (DBPT), Ed Johnson (DBPT), Jo Ann Greene (DBPT), Ralph Strickland (DBPT), Kendra Bridges (DBPT), John Vine-Hodge (DBPT), Bryan Poole (DBPT), and Adja Fall (DBPT intern) were joined by several key stakeholders and partners. These included Pam Cook (NCDOT Transportation Planning Branch), Greg Brew (NCDOT Roadway

Design Unit), Rekha Patel (NCDOT Roadway Design Unit), Kevin Moore (NCDOT Roadway Design Unit), Nancy Horne (NCDOT Engineering Coordination & Safety Branch), John Williams (NCDOT PDEA), Mike Kneis (NCDOT Division 5), Harrison Marshall (NCDOT Human Environment Section), Jeff Cabaniss (NCDOT Division 2), Bob Deaton (NCDOT Project Development), Sarah O'Brien (ITRE), Kristy Jackson (ITRE), and Nancy Pullen-Seufert (Highway Safety Research Center at the University of North Carolina at Chapel Hill). An agenda was provided at the meeting (see Appendi 28).

In this meeting, participants were introduced to the strategic planning process. Participants were lead through a participatory strategic planning exercise during which they were asked to characterize what successful integration of bicycle and pedestrian priorities would look like in five years. The workshop focus question was "What do we want to see going on in the Bike and Pedestrian Division in the next 5 years to better integrate bike and pedestrian interests into transportation decision-making?" The group's answers were grouped into nine main goal areas: 1) Funding, 2) Staffing, 3) Marketing, 4) Implementation and integration, 5) Data collections, 6) Connectivity of Network, 7) Increased safety and education, 8) Normalizing, 9) Planning. For more detail see Appendix 29.

Following a short break, participants worked in small groups to complete a worksheet for each goal which include current reality, one-year action items and measures of success. This included metrics that could be used to track whether each goal was being successfully implemented as well as action items that could be completed in the next year to help move the gauge on the performance measure identified. Once these worksheets were completed, the performance measures developed were listed on the sticky wall with the goals. For more detail on this exercise, please see Appendix 30. Due to time limitations only five of the goal areas were discussed during the workshop.

When the group was asked which performance measures were most important to achieve feedback from the Roadway Design Engineers suggested that more consistent guidance on integrating bicycle and pedestrian facilities (i.e., Complete Streets) would be helpful. In all cases, participants requested additional data.

Following this workshop, Leigh Lane and Adrienne Heller met with Lauren Blackburn by telephone to discuss a reasonable refinement of these goals. Several goals developed in the workshop included items that fell outside the DBPT's purview (e.g., staffing and funding) or could be combined to form a clearer goal area. During this discussion, the group decided that five or six goal areas would be especially useful to help refine the DBPT's focus.

On June 25, 2015, the staff of the Division of Bicycle and Pedestrian Transportation met at NCDOT to develop the strategic planning process by first finalizing a list of goals and identifying priority action items to be used to guide the DBPT's activities for the next five years. Several of the items identified during the earlier workshop were

After these goals were developed and action items were developed, the staff scored the action items to develop priorities within the next five years. The timeline developed will be discussed in

greater detail in the five year strategic goals and priorities section below. The criteria used to score the items will also be discussed below.

Outcomes

Based on the strategic planning process, the Division of Bicycle and Pedestrian Transportation has identified five goal areas and several corresponding activities. The list of those activities is included on the following page.

For each of the goal areas, a general time horizon has been included to identify when that activity will be initiated. 'Now' is used to refer to activities that are either already underway or should be initiated in the next year and a half. 'Soon' refers to activities that should start in the next two to three years. 'Later' refers to activities that should be initiated in the next three years.

Each of the activities is listed in order of their relative priority within the time horizon listed. For instance, in the first goal arena ('Promote cycling/walking'), the main priority is to evaluate socio-cultural issues with cycling in rural areas. After that, the DBPT will prioritize continuing the ARTS program oversight, and then develop a strategy with partners to promote North Carolina as a Great Trails State.

To identify the relative priority for each of these goal areas, the DBPT staff evaluated the activities according to two main criteria: whether the activity was closely related to Walk Bike NC, the state's statewide bike plan, and the importance of the activity. If an activity was closely related to Walk Bike NC, it would move up in the list relative to other activities; if it was less closely-related to Walk Bike NC, it would move down in the list relative to other activities. The importance of each activity was assigned based on a number of factors, including whether the DBPT is considered the expert, whether the DBPT has a special relationship with important stakeholders, whether the activity was strongly related to the goal with which it is associated, whether the activity generally affected users at a state-wide level, and whether the DBPT administers funds relevant to the activity. For more detail on this criteria, see Appendix 31.

Highlights

In Years 1 and 2, DBPT should focus on continuing already successful initiatives such as ARTS, Watch for Me NC, data collection projects, Let's Go NC, and the municipal planning grant program. In addition to maintaining these initiatives, DBPT should develop strategies for promoting NC as the Great Trails State, evaluate the Complete Streets process for process and policy improvements, and create a resource guide for bicycle and pedestrian facility terminology.

In Years 3 and 4, DBPT should focus on reporting and communication to NCDOT partners and for external customers. This reporting could include best practices for regional and intermodal planning, economic impact research, innovative infrastructure project summaries, and safety trend analysis. Additionally, DBPT will continue improvements to the project prioritization system, implementation of routine customer surveys, and evaluation of policies, laws, and practices including bicycle and pedestrian safety.

In Year 5 and beyond, DBPT should focus on comprehensive marketing strategies for bicycle and pedestrian tourism, health-related performance measures, new research needs, and an expanded data-collection program.

Promote Cycling/Walking	
Evaluate socio-cultural issues with cycling in rural areas	**Now**
Continue Active Routes to School program oversight	**Now**
Develop strategy with partners to promote NC as Great Trails State	**Now**
Produce bi-annual reports summarizing health, economic and quality of life benefits of bicycling/walking in NC (target audience: decision-makers)	**Soon**
Produce bi-annual reports summarizing innovative bike-ped projects (target audience: transportation professionals)	**Soon**
Create health-in-transportation performance metric(s) with DHHS	**Later**
Develop model strategy for promoting bicycling/walking tourism	**Later**

Implement Complete Streets	
Evaluate and improve process for including bike-ped comments in bridge-scoping	**Now**
Develop strategy for communicating Complete Streets policies	**Now**
Synthesize existing bike/ped project and accommodation policies	**Now**
Create uniform standards for implementation of Complete Streets	**Soon**
Work with other business units to include bike/ped issues early and in all transportation decisions	**Soon**

Collect and Use Data	
Catalog, maintain and publish existing and desired data sets (i.e, infrastructure GIS information, crash data, volumes)	**Now**
Refine the prioritization process bi-annually to make use of best data	**Soon**
Research economic impacts for significant trails/greenway systems	**Soon**
Conduct user preference survey one year prior to update of Walk Bike NC	**Soon**

Continue volume collection program; expand to all areas of state by 2019	Later
Identify new research needs (for one new sponsored project every 2 years)	Later

Increase Safety	
Make direct invite and offer support to each K-8 school to teach Let's Go NC	Now
Continue Watch for Me NC program	Now
Identify specific strategies to reduce bike/ped crash/fatality rates as described by SHSP	Soon
Identify gaps in bike/ped safety-education-laws-enforcement among state agencies and local law enforcement	Soon
Create efficient methodology for creating bike/ped road safety assessments	Soon
Produce bi-annual report of crash trends; contrast with hospital records	Later

Improve Planning Practice	
Maintain strong local bike/ped planning program; monitor implementation of plans	Now
Ensure inclusion of transportation divisions in local planning process	Now
Create uniform terminology guide for bike/ped facilities	Now
Develop Technical Assistance Tools to Local Governments for planning FAQs	Soon
Develop best practices for plans to assess connectivity to transit, destinations, and surrounding communities	Soon
Establish working relationship with local planners and DPI to improve site selection for schools for safer bike/ped access	Later

Next steps

Due to time constraints, the project did not fully integrate all of the various pieces of information uncovered throughout this process. In the future, the results of the environmental scan (see Appendix 27) should be clearly connected to each of the goal areas, and performance measures identified for each.

Next steps for the DBPT should include fully fleshing out the performance measures used to measure the success of the goals included in this preliminary strategic plan. To assist with this process, the DBPT staff did identify several categories by may be useful to evaluate the success of each of the goal areas. These are included on the following page:

Take inventory	Is anyone performing this activity? Are we the best group to accomplish the activity?
Collaborate	What resources and partners should we work with to accomplish this activity?
Create strategy	Have we developed or are we developing a strategy for performing the activity?
Communicate	Are we communicating that we are currently performing this activity?
Train	Are we training others on how to perform this activity?
Track-Evaluate	How are we monitoring the success of this activity?

The primary benefit for this process was to begin to identify clear priorities for the DBPT. Because this is an extraordinarily small division with very limited staff, it is particularly critical for this group to identify areas of high priority in order to avoid overreach and burnout. This document provides a foundation for this work, but should be expanded upon and refined.

It is particularly critical that this process be revisited every two years. DBPT has a strong need for this kind of strategic planning effort, and is in a position to become a leader in NCDOT performance management and strategic planning.