An Economic Analysis of I-73 and the Grand Strand Expressway (GSX) Alternative

Upgrading SC 38/US 501 provides a realistic alternative to I-73 that improves access and facilitates tourism in the Grand Strand, creates thousands of jobs at one-tenth the cost, does not harm existing businesses along SC 38/US 501 and can be built in our lifetime.

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for the Coastal Conservation League

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Upgrading SC 38/ US 501, an existing major highway corridor between I-95 and SC 22, provides a realistic and preferable alternative to the proposed I-73 interstate. This existing corridor, referred to by proponents as the Grand Strand Expressway (GSX), offers substantial economic benefits at one-tenth of I-73's estimated $1.3 billion cost and would result in improved access to the Myrtle Beach tourism market. Upgrading the GSX would create thousands of jobs and save businesses along the existing routes. Furthermore, upgrades to SC 38/US 501 could be undertaken as funds are available, providing ongoing transportation utility and other economic benefits sooner than the proposed I-73.

This report is intended to help policy makers and citizens compare the economic benefits of the proposed GSX alternative versus those of the proposed I-73 interstate. The analysis focuses on the most important economic factors needed to make an informed decision on a transportation investment that will not only affect those in the region, but all South Carolinians.

This report reaches three key conclusions:

1. The GSX is a more cost effective use of state transportation resources. The GSX has a positive benefit/cost ratio while I-73 does not
2. The GSX provides potential economic benefits to rural counties without displacing local businesses
3. South Carolina can improve access to the Myrtle Beach area, without spending $1 billion that could go to other transportation infrastructure projects with greater economic benefits than the proposed I-73 interstate

Executive Summary
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1. The Grand Strand Expressway (GSX) has a positive benefit/cost (B/C) ratio, I-73 does not.

Benefit Cost Analysis

- ***B/C Ratio of GSX = 1.4.***
- ***B/C Ratio of I-73 = 0.26.***
- ***The GSX alternative has significant travel cost savings at one-tenth the cost of I-73.***

Upgrading the GSX between I-95 and SC 22 has been shown to be a viable transportation alternative to the proposed I-73 interstate. It is estimated that the GSX alternative will cost approximately $150 million.[1] Like the construction of I-73, the GSX alternative creates jobs in its construction phase and facilitates tourism along the Grand Strand at one-tenth the cost of the proposed I-73.

This report utilizes the TREDIS modeling system, the premier transportation/economic modeling system widely used by state departments of transportation throughout the country.[2] TREDIS clearly demonstrates that the benefit/cost (B/C) ratio of the GSX is far better than that of I-73. The B/C ratio of the GSX is 1.4 while the B/C ratio of I-73 is 0.26 (well below 1.0).

It is important to note that traditional public finance decision criteria recommend that if a project's B/C ratio is less than 1.0, the project is not in the public's best interest. In business and government, investing in a project with B/C ratio less than 1.0 would be analogous to investing in a project knowing that the project would lose money.

TREDIS is specifically designed to estimate transportation impacts. In comparison, the report by Chmura Economics & Analytics titled, "Economic Impact of I-73 in South Carolina," utilized the IMPLAN modeling system.[3] IMPLAN is appropriate for estimating some impact scenarios, but it is a simplistic methodology for evaluating transportation systems. TREDIS incorporates the IMPLAN model, but builds and expands on it to make it more appropriate for transportation applications. TREDIS is an integrated framework for transportation planning and project assessment designed to cover a wide range of applications – from looking at the benefit/cost impact of a single transportation investment to analyzing the macroeconomic impacts of alternative long-range plans such as the I-73 proposal.

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2. GSX provides potential economic benefits to rural counties without displacing local businesses

- ***The GSX is estimated to create and maintain 22,000 jobs (3,200 construction and 18,800 other --- and sooner than I-73).***
- ***The GSX will not displace jobs – I-73 will displace jobs along existing routes.***
- ***New interstates often do not help rural areas -- the I-95 corridor is an example.***

The assertion that I-73 will have widespread economic development benefits is largely based on the report by Chmura Economics which estimated there would be thousands of jobs created as a result of the road's construction as of the year 2030. These jobs would be generated primarily from two sources: the physical construction of the road and the improved access to the Grand Strand area from the proposed highway. Most of these jobs are projected to be 20 years in the future. Chmura estimates that approximately 30 percent more jobs will be created by I-73 than those estimated in this study for the GSX. These jobs, however, come at 10 times the cost of GSX. It is also important to note that the additional jobs relate to construction rather than adding permanent economic benefits to the Grand Strand and the rural counties along the proposed route. This report concludes that the GSX alternative is also a substantial job creator. And these jobs could be created much sooner due to the smaller investment required.

It has been suggested that I-73 will benefit the rural areas along the road's route during and after completion. However, this conclusion is not substantiated in the Chmura report or other existing empirical research. The areas along the proposed routes rank relatively low in terms of economic development and per capita income. Historically, interstate construction in South Carolina has not resulted in rural economic prosperity. One only has to look at the counties along I-95, from Dillon to Jasper, to see how little an interstate benefits rural communities along its route. For example, of the 13 South Carolina counties adjacent to I-95 only Dorchester and Jasper had unemployment rates lower than the state average of 9.5 percent in January 2012. The unemployment rate in the other 11 counties averaged 14.0 percent, 4.5 percentage points higher than the state's average.

With fully controlled access highways, such as the proposed I-73, business opportunities are limited to major interchanges. Due to the sudden increase in the value of land at these interchanges, the majority of businesses are large, national operations – not small or locally owned businesses. The upgrading of GSX would maintain the viability of businesses adjacent to the current SC 38/US 501.

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This report also raises questions regarding the validity of the Chmura assumption that the jobs created will be **net** new jobs. That is, many of the jobs estimated by the Chmura study may just replace jobs that could be lost if I-73 were to be completed. There is precedent for this job replacement phenomenon in South Carolina and elsewhere – the decline in jobs and establishments along Highway 301 and other routes when I-95 was constructed.

Even if all the jobs lost due to the construction of I-73 were to be replaced with new jobs along the interstate, the displacement would hurt local communities. Many of the businesses along the GSX route are small and locally owned businesses that would be negatively impacted with traffic being re-routed to I-73. It is unlikely that many of these small businesses would survive or have the financial resources to relocate to an I-73 interchange.

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3. South Carolina can improve access to the Myrtle Beach area, without spending $1 billion that could go to other transportation infrastructure projects with greater economic benefits than the proposed I-73 interstate.

- ***South Carolina does not have the funds available for I-73 and will not for the foreseeable future.***
- ***Other critical infrastructure needs exist in South Carolina that could provide greater economic benefits.***
- ***The construction of I-73 could divert funds away from critical infrastructure needs east of Conway and SC 22.***
- ***SC DOT would need to spend an additional $130 million to maintain the proposed I-73 over a 30-year period.***

In the current environment of scarce highway construction funds, South Carolina needs to carefully consider the construction of I-73 in relation to all of the state's highway infrastructure needs. While the $1.3 billion for I-73 has not been secured, if it was, it could supplant other state transportation infrastructure needs that are a higher priority – especially since improved access to the Grand Strand could be achieved by the GSX at one-tenth the cost. For example, improvements to I-26 and I-85 would most likely provide greater economic benefits to the State than I-73. Road improvements to manufacturing areas have been shown to have more benefits than non-manufacturing areas. The construction jobs that would be created by building I-73 would be generated in the state no matter where $1.3 billion worth of road construction occurs.

Finally, the benefits outlined in the Chmura report do not address the increased maintenance costs of a new interstate. The current costs to maintain SC 38/US 501 would continue if I-73 were to be completed; requiring the state to fund maintenance costs for both routes. Based on SC DOT data, it is estimated that maintenance costs of the new interstate would be more than $4.3 million annually. Over a 30-year period I-73 maintenance costs would exceed $130 million.[4]

Executive Summary
(continued)

Summary and Conclusions

In summary, this report reaches three key conclusions:

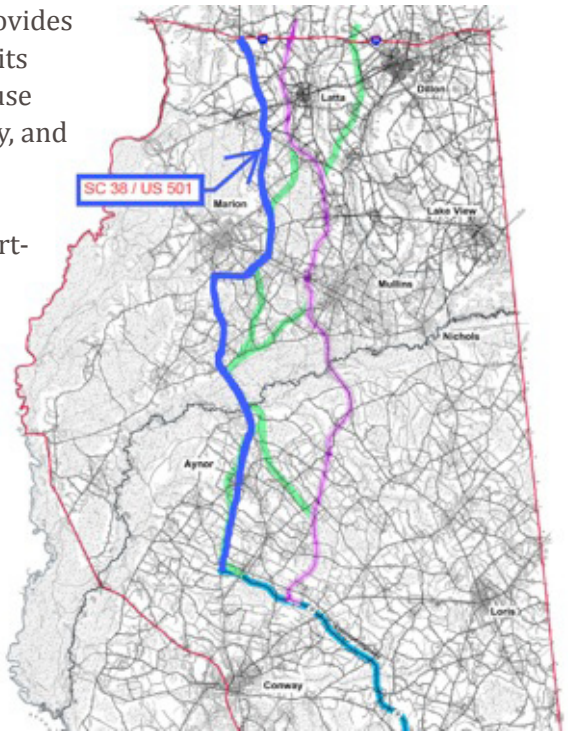
- ***The GSX is a more cost effective use of state transportation resources. The GSX has a positive benefit/cost ratio while I-73 does not.***
- ***The GSX provides potential economic benefits to rural counties without displacing local businesses.***
- ***South Carolina can improve access to the Myrtle Beach area, without spending $1 billion that could go to other transportation infrastructure projects with greater economic benefits than the proposed I-73 interstate.***

As a result of these findings, we conclude that the GSX (upgrading SC 38/US 501 from I-95 to SC 22) alternative is clearly superior to the I-73 proposal for South Carolina taxpayers.

1. Introduction

Transportation infrastructure networks are an integral part of any economic system. Without them we could not easily move goods and/or people -- and commerce would be restricted largely to local trade. Efficient transportation systems expand internal and external trade opportunities, increase labor mobility and enhance the economy's production capacity and, in general, improve the economic welfare of residents. They also provide social and economic opportunities.

The economy is affected by the efficiency of these transportation corridors, such as SC 38/ US 501 and SC 22 in the Pee Dee region. To analyze the economic impact of a transportation improvement, such as upgrading South Carolina Highway 38/US Highway 501, referred to by proponents as the Grand Strand Expressway (GSX), to the new alignment I-73, the examination depends largely on traffic information. This analysis uses the traffic information to determine the benefits of reduced travel time compared with the costs of new construction and/or road improvements. These comparisons are an important way to help policy makers determine what course of action provides the best value (i.e., benefits vs. costs) for those who use the transportation facility, and those who pay for it.



The South Carolina Department of Transportation (SCDOT) and Federal Highway Administration (FHWA) propose building I-73 on new alignment in northeastern South Carolina. This study analyzes the transportation and economic impact study of the proposed I-73 interstate commissioned by the Northeastern Strategic Alliance (NESA), expanding the analysis to include interchange clustering and transportation efficiency, which will provide additional information and insight to policy makers.

This study also looks at the one-time impact of highway construction and efficiency/ productivity gains over the life of the highway. Our overall goal is to determine which alternative, GSX, I-73 or no-build, generates the most value (i.e., travel efficiency) for the least cost to taxpayers. We note that whether the proposed I-73 project, the SC 38/US 501 upgrade, or a no-build option is selected, the Myrtle Beach area will see equal non-transportation related economic impacts.

The South Carolina Department of Transportation (SCDOT), in association with the Federal Highway Administration (FHWA), proposes to build I-73 on new alignment in northeastern South Carolina. SCDOT defines the study area as extending "southeast from I-95, bounded to the northeast by the North Carolina/ South Carolina state line, to the southeast by U.S. Route 17, and to the southwest by

1. Introduction
(continued)

the eastern edge of the Great Pee Dee River floodplain, U.S. Route 378, and U.S. Route 501. The project would extend from I-95 in Dillon County, through Marion County and into Horry County. It would terminate at S.C. Route 22 in Horry County, which would be made part of I-73."(FEDERAL HIGHWAY ADMINISTRATION, 2009)

We analyzed two studies of the proposed I-73; the Chmura Economics & Analytics *Economic Impact of I-73 in South Carolina and the Interstate 73 Final Environmental Impact Statement from I-95 to the Myrtle Beach Region (FEIS)*.(FEDERAL HIGHWAY ADMINISTRATION, 2009). Five primary highway impacts are generally considered in this kind of analysis: land use, tourism, spillover effects (interchange clustering), taxation, and transportation efficiency impacts. In this study, we did not analyze or include impacts from changes in land use in the year 2030, such as the development of distribution centers. As the Chmura study states, "Land use is highly speculative and development is unlikely without additional incentives or expenses to the region."[5]

Because the proposed I-73 corridor and GSX both terminate at SC 22, well northwest of the Grand Strand area, this leads us to conclude there will be no substantive variation in tourism impacts in the Myrtle Beach area among the alternatives. It is very doubtful that the proposed I-73 will be a primary factor in future Myrtle Beach tourism. Rather, demographics, the national economy, affordable housing, and the environment – including beach quality (Klein & Osleeb, 2010), sea level rise and tropical storms – will more likely shape the future of most coastal economies, including the Grand Strand. Finally, tax analysis is greatly dependent on the sources of financing. However, since the sources of financing have not been determined at this time, no tax analysis is included in this study.

In this study, we did not analyze or include impacts from changes in land use in the year 2030, such as the development of distribution centers. As the Chmura study states, "Land use is highly speculative and development is unlikely without additional incentives or expenses to the region."[5]

2. Transportation Analysis of South Carolina 38/US Highway 501

Travel Efficiency: TREDIS

Transportation efficiency in this study is estimated using the Transportation Economic Development Impact System (TREDIS) rather than the "analogy" approach used by Chmura.

TREDIS is specifically designed to estimate transportation impacts. In comparison, the report by Chmura Economics & Analytics, "Economic Impact of I-73 in South Carolina," utilized the IMPLAN modeling system.[6] IMPLAN is appropriate for estimating some impact scenarios, but it is a simplistic methodology for evaluating transportation systems. In fact, the TREDIS model incorporates the IMPLAN model, but builds and expands on that model to make it more appropriate for transportation applications. TREDIS is an integrated framework for transportation planning and project assessment designed to cover a wide range of applications – from looking at the benefit/cost impact of a single transportation investment to analyzing the macroeconomic impacts of alternative long-range plans such as the I-73 proposal.

TABLE 1 Average Annual Daily Traffic

Station Number	2009	2030 Projected*
193	9300	19,530
195	6900	14,490
199	5800	12,180
167	9900	20,790
169	8100	17,010
191	16100	33,810
195	16200	34,020
149	17600	36,960
Aynor**	17600	36,960
151	24200	50,820

*Multiplier 2.1 **Aynor estimated

For each segment of the proposed I-73, inputs including trips, vehicle miles traveled (VMT), and vehicle hours traveled (VHT) are sourced from the FEIS, calculated using standard Highway Capacity Manual methodology and then input into TREDIS. Segment data is based on average annual daily traffic (AADT) for 2030 for passenger (personal/recreational) vehicles. (See Table 1)

2. Transportation Analysis of South Carolina 38/US Highway 501

(continued)

Benefit/Cost Analysis

In this section, we compare the proposed I-73 Build with the SC 38/US 501 Build (Upgrade) and a No Build scenario. The I-73 Build returned a benefit/cost ratio of 0.26, while the SC 38/US 501 Build ratio was 1.4.[7]

It is important to note that traditional public finance decision criteria recommend that if a project's B/C ratio is less than 1.0, the project is not in the public's best interest. In business and government, investing in a project with B/C ratio less than 1.0 would be analogous to investing in a project knowing that the project would lose money.

Our analysis clearly demonstrates that the GSX project provides a significant benefit for dollars invested, while the I-73 project falls woefully short because of its high construction price. It has only a small incremental value compared with a no-build scenario.

The Chmura report suggests that a payback for the proposed I-73 project is four years. The TREDIS analysis shows no evidence of a payback period at all – the opposite conclusion.

The SC 38/US 501 upgrade on the other hand, has a net present value (NPV) of a $51 million benefit while the I-73 project results in a ($704 million) deficit to the public. I-73 provides a 32 percent higher travel cost savings, $29.5 million versus $22 million, but at ten times the cost. Based on transportation efficiency savings, SC 38/US 501 has a projected payback in year 2029, while I-73 has no projected payback period at all.

Our analysis clearly demonstrates that the GSX project provides a significant benefit for dollars invested, while the I-73 project falls woefully short because of its high construction price. It has only a small incremental value compared with a no-build scenario.

2. Transportation Analysis of South Carolina 38/US Highway 501 (continued)

Sensitivity Analysis of Benefit/Cost Analysis

Benefit/cost analysis is significantly influenced in this model by construction cost and time saving. The high cost of construction requires an increased benefit to the public in order to result in a cost/benefit ratio greater than one. Because of the projected high speeds of SC 38/US 501, even without building new infrastructure (using Final Environmental Impact Statement (FEIS) inputs), the difference between build and no-build efficiency is minimal. Thus it does not provide a benefit to the public based on increased speed. The FEIS states:

> Therefore, while all Build Alternatives are projected to have a considerable positive economic impact on the region, the magnitude of that impact between alternatives is too similar for economic development to be the deciding factor in determining which alternative is preferred. (FEDERAL HIGHWAY ADMINISTRATION, 2009).

Further analysis reveals three critical bottlenecks in the SC 38/US 501 alternative. By adjusting the intersection delay at the I-95/SC 38 junction, the City of Aynor intersections, and the US 501/SC 22 merger, we evaluated the speed impact on the benefit/cost relationship.

The City of Aynor intersections and US 501/SC 22 interchange (merge from two lanes to one) have the greatest influence on the system traffic speed based on Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT), and the peak travel multiplier from the FEIS.[8] Our sensitivity analysis adjusted speed inputs and Annual Average Daily Traffic (AADT) over these segments. A positive benefit/cost ratio for the SC 38/US 501 alternative increases as the traffic slows over a four-mile segment for 90 days, with an average speed of below 39 mph and additional intersection delays of 12 minutes. These are in line with projected FEIS case scenarios for 2030. Because of the high cost of building I-73, the project will not have a positive benefit/cost ratio regardless of FEIS scenarios or more extreme conditions that could be applied and modeled to a no build scenario for SC 38/US 501.

Traffic inputs are calculated using the standard Highway Capacity Manual (HCM) method for each segment (See Methodology Section for more detail on HCM). Total for trips, VMT and VHT are then totaled for each alternative. The no-build alternative includes intersection and bottleneck penalties. They are removed in the improved SC 38/US 501 and the I-73 options. Reviewing the 42-mile segment, no build is estimated to yield an average speed of 36 miles per hour.[9] Improved SC 38/US 501 speed is 54 mph and I-73 speed is 65 mph for the three peak travel months, June-August 2030. It is important to keep in mind that during non-peak travel, automobiles are expected to flow at free flow speeds (FFS), even in a no build scenario for 2030. See Table 2.

TABLE 2 Traffic Inputs

Alternative	Trips	VMT	VHT	Average Speed MPH
No-Build 2030	25,728,300	106,133,355	2,946,372	36
Improve 38/501 2030	25,728,300	106,133,355	1,969,448	54
I-73 Build 2030	25,728,300	106,133,355	1,632,821	65

2. Transportation Analysis of South Carolina 38/US Highway 501 (continued)

Travel Efficiency: Myrtle Beach

Travel efficiency for the proposed I-73 is compared with the SC 38/US 501 upgrade alternative. Neither project alternative affects the Myrtle Beach area or other economic development analysis completed for the region. The Grand Strand Area Transportation Study (GSATS) data was not used in this project's research, primarily because both the proposed I-73 and GSX terminate at SC 22. The FEIS states:

> Reducing existing traffic congestion on roads accessing the Myrtle Beach region is a secondary need of the project. As a measure of the effectiveness of the proposed facility to relieve local traffic congestion, the vehicle hours traveled (VHT) for the average annual daily traffic (AADT) on the project study area roadway network, minus the Grand Strand Area Transportation Study (GSATS) area, was determined for each alternative. The GSATS area was removed because of the different roadway capacities and daily traffic criterion used in the GSATS model. The roadway capacities are not set equivalent to the actual roadway capacity, and the daily traffic criterion is for peak daily, not average annual daily traffic. (FEDERAL HIGHWAY ADMINISTRATION, 2009)

The fact that all Myrtle Beach traffic congestion is excluded from the analysis and the previous studies is important. Neither the I-73 nor SC 38/US 501 alternative affect the coastal traffic issues east of SC 22. As the following figure indicates, the areas of severe traffic congestion (indicated by the yellow and red areas) are all east of SC 22.

The fact that all Myrtle Beach traffic congestion is excluded from the analysis and the previous studies is important. Neither the I-73 nor SC 38/US 501 alternative affect the coastal traffic issues east of SC 22. As the following figure indicates, the areas of severe traffic congestion (indicated by the yellow and red areas) are all east of SC 22.

2. Transportation Analysis of South Carolina 38/US Highway 501

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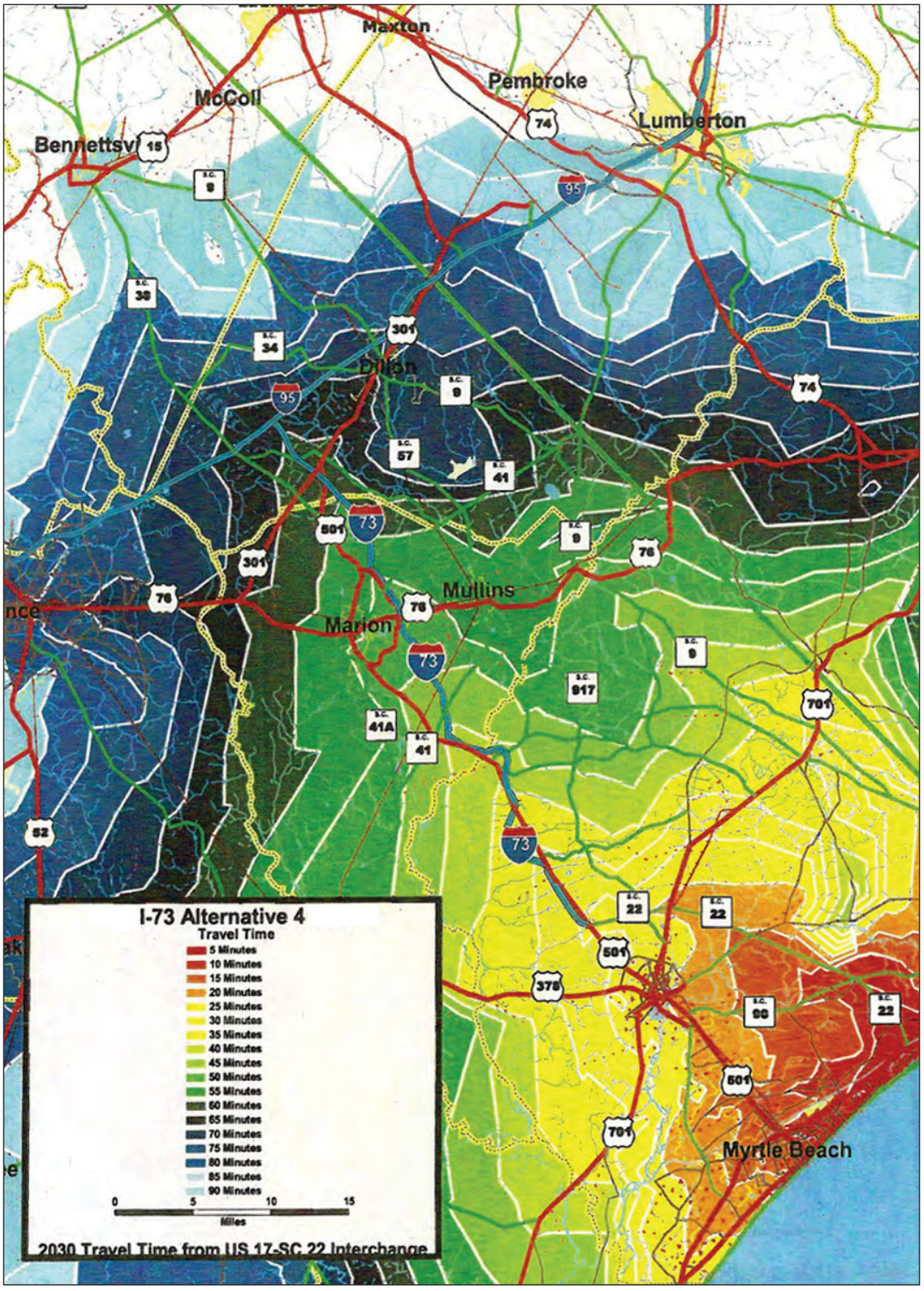

3. Economic Impacts of South Carolina 38/US Highway 501

Construction Impacts

Construction projects provide relatively large economic benefits to any region. Most construction projects return those benefits to the local region, and in the case of large highway projects, to the state, unless contractors are locally based. This would apply to construction of I-73 or the upgrading of SC 38/US 501.

As with any construction activity, the more dollars spent, the larger the impacts on the economy will be. In the case of the proposed I-73, we have assumed an estimated $1.3 billion in construction impacts.[10] The total economic impact, including direct, indirect, and induced spending is estimated at $1.945 billion, or a multiplier of 1.5 above the initial project cost. Over the five-year life of the project, employment is projected at 3,160 per year. These employment impacts, unfortunately, provide little benefit to the community when the project is finished.

Alternatively, the SC 38/US 501 upgrade costs are estimated to be $147 million.[11] Total direct, indirect, and induced impacts are estimated to be more than $219 million -- also a multiplier of 1.5. Total employment over the life of the project is expected at 2,142, a 30 percent lower number but achieved at one-tenth the cost. These impacts also are in line with the positive benefits they provide to the local taxpayer. However, there is an opportunity with SC 38/US 501 to target construction spending on critical bottlenecks providing an immediate economic impact while allowing this highway to continue to be used and to continue to serve the community now, as opposed to waiting until 2030.

Total direct, indirect, and induced impacts are estimated to be more than $219 million -- also a multiplier of 1.5. Total employment over the life of the project is expected at 2,142, a 30 percent lower number but achieved at one-tenth the cost.

3. Economic Impacts of South Carolina 38/US Highway 501
(continued)

Spillover Impacts of the Proposed I-73

Spillover effects are analyzed by evaluating current and empirical transportation research. The literature search was narrowed to a meta-analysis of documents that provided empirical research about the economic impacts of transportation infrastructure projects. This analysis provides the foundation of transportation economic development research into both transportation efficiency, which in this study is measured with TREDIS and transportation spillover effects.[12]

Spillover effects are economic activities uncaptured in core activities and frequently have unintended consequences beyond the primary event. Spillover effects can be measured using the spillover coefficient (Goetz, Deller, & Harris, 2009) and can be both positive and negative.[13] Early studies suggested that larger-than-average inter-regional (non-local) positive spillover coefficients tended to be either in the transportation or utility sectors (Goetz, Deller, & Harris, 2009). However, more recent studies have shown that transportation and other public capital can and do have negative spillovers in local economies (Baird, 2005).

Spillover effects are important to transportation analysis since they can negatively affect local communities. New infrastructure added in an adjacent region creates negative spillovers, most notably in the service industry sectors. The net result is that new highway interchanges outside a local region see an increase in retail, while the local community sees a decrease because the new infrastructure draws business away from the older highway.

A prime example of these negative spillover effects in South Carolina are the negative impacts of I-95 on the communities along US 301 in Allendale, Bamberg and Hampton counties. These communities and businesses once thrived due to continuous traffic, but lost commerce when traffic was shifted from US 301 to I-95.

It has been suggested that the proposed I-73 will benefit the rural areas along the road's route during and after completion. However, this conclusion is not substantiated in the Chmura report or other existing empirical research. The Chmura study suggests that, "the most direct and visible new jobs created by I-73 will be in the businesses along I-73 serving motorists." Chmura states that they use a "model-by-analogy" approach to determine this impact. However, empirical research states that these new jobs actually replace existing jobs from adjacent areas "leaving the net level of economic activity unchanged in non-metropolitan areas" (Baird, 2005).

A prime example of these negative spillover effects in South Carolina are the negative impacts of I-95 on the communities along US 301 in Allendale, Bamberg and Hampton counties. These communities and businesses once thrived due to continuous traffic, but lost commerce when traffic was shifted from US 301 to I-95.

3. Economic Impacts of South Carolina 38/US Highway 501

(continued)

TABLE 3 Labor Force and Unemployment - I-95 Corridor

County	Labor Force	Employment	Unemployed	Unemployment Rate
Bamberg County	6,063	5,157	906	14.9%
Clarendon County	12,313	10,485	1,828	14.8%
Colleton County	16,944	14,818	2,126	12.5%
Darlington County	30,337	27,194	3,143	10.4%
Dillon County	12,973	11,095	1,878	14.5%
Dorchester County	67,533	62,605	4,928	7.3%
Florence County	62,659	56,131	6,528	10.4%
Hampton County	7,578	6,611	967	12.8%
Jasper County	10,218	9,344	874	8.6%
Lee County	8,113	7,063	1,050	12.9%
Marlboro County	11,362	9,496	1,866	16.4%
Orangeburg County	40,280	34,705	5,575	13.8%
Sumter County	44,164	39,454	4,710	10.7%
South Carolina	2,119,571	1,917,507	202,064	9.5%

Source: South Carolina Department of Employment and Workforce. March 2012

Further compromising the Chmura study is the fact that those spillover effects are larger than the benefit of the new highway network itself. Therefore, the new jobs and related impacts for interchange clustering are, in fact, a transfer of services and jobs from the local community to the new infrastructure. However the result is that slightly fewer jobs exist because the businesses that relocate are generally more modern and more productive. This phenomenon is reported in a number of studies, most recently by (Chandra, 2000). Finally, new non-local highway infrastructure actually exports local dollars to national firms, allowing them to invest new money (because they are more productive than local firms) in newly created non-local infrastructure in adjacent localities. Although this is a win for larger business chains (primarily service related firms) it is a clear loss for the local community.

One only has to look at the counties along I-95, from Dillon to Jasper, to see how little an interstate benefits rural communities along its route. As seen in Table 3, of the 13 South Carolina counties adjacent to I-95 only two (Dorchester and Jasper) had unemployment rates lower than the state average of 9.5 percent in January 2012. The unemployment rate in the other 11 counties averaged 14.0 percent, 4.5 percentage points higher than the state's average.

With limited access highways, such as the proposed I-73, business opportunities are limited to major interchanges. Due to the sudden increase in land values along these interchanges, the majority of businesses are large, national operations – not owned by small, local businesses. Upgrading the GSX would maintain the viability of businesses adjacent to the current SC 38/US 501.

3. Economic Impacts of South Carolina 38/US Highway 501

(continued)

Many of the businesses along the GSX route are locally owned small businesses that would be negatively impacted by the loss of traffic being re-routed to I-73 and away from the GSX. It is unlikely that many of these small businesses would survive or have the financial resources to relocate to an I-73 interchange.

In addition, this report raises questions regarding the validity of the Chmura assumption that the jobs created will be **net** new jobs. That is, many of the jobs estimated by the Chmura study may simply replace jobs that could be lost if I-73 were built elsewhere. There is precedent for this job replacement phenomenon in South Carolina. There was a decline in jobs and establishments along Highway 301 and other routes when I-95 was constructed. Even if all the jobs lost due to the construction of I-73 were to be replaced with new jobs along the interstate, the displacement would hurt local communities. Many of the businesses along the GSX route are locally owned small businesses that would be negatively impacted by the loss of traffic being re-routed to I-73 and away from the GSX. It is unlikely that many of these small businesses would survive or have the financial resources to relocate to an I-73 interchange.

3. Economic Impacts of South Carolina 38/US Highway 501
(continued)

Spillover Effects SC 38/US 501

Spillover effects are minimized when existing infrastructure is upgraded rather than replaced. Local companies are able to stay put and compete when upgrades are built with new investment developing an appropriate level of increased demand near local interchanges. With local infrastructure upgrades, local communities also capture economic impacts of both the construction phase, which gives an immediate boost to the economy, and the operational impacts when the highway is up and running. The advantages of upgrading SC 38/US 501 would be delivered to the local community in three ways: 1) maintaining local employment, 2) capturing ongoing economic impacts from increased efficiency of the new infrastructure (especially for manufacturing), and 3) capturing locally owned and operated businesses and proprietary income (value added), which would result in maintaining the local tax structure.

The advantages of upgrading SC 38/US 501 would be delivered to the local community in three ways: 1) maintaining local employment, 2) capturing ongoing economic impacts from increased efficiency of the new infrastructure (especially for manufacturing), and 3) capturing locally owned and operated businesses and proprietary income (value added), which would result in maintaining the local tax structure.

4. Funding Issues Related to the Proposed I-73

As scarce as highway construction funds are today, the state needs to carefully consider the construction of I-73 in relation to all of South Carolina's highway infrastructure needs. While the funds for I-73 have not been secured, if the State were able to secure the $1.3 billion or more of funding, there are other transportation infrastructure needs that are likely to provide greater economic benefit – especially since the Grand Strand's needs could be met by the GSX at one-tenth the cost. The safety and congestion issues on I-26 are one such priority. In addition, the need for improvements to I-26 is expected to increase once the Port of Charleston is deepened. The construction jobs that would be created by building I-73 would be generated no matter where in South Carolina the $1.3 billion worth of new roads were built.

According to the SCDOT long range plan, there are current and future needs in South Carolina that will not be met. For example, the SCDOT estimates that the state needs an additional $40 billion to fund its long-term needs. However, only $11 billion in funding is available, according to SCDOT.[14]

More recently, SCDOT has stated publically that there are critical needs in South Carolina that are currently going unmet. For example, the SCDOT estimates that the state needs an **additional** $340 million today to increase the interstate system's capacity to "good", $440 million to increase the primary road system capacity to "good" and another $540 million to increase the capacity of the secondary road system to "good". When bridge maintenance and other needs are included the SCDOT estimates the cost at $1.5 billion per year in additional funds. It would require $500 million annually to raise the capacity to "fair".

Finally, the current discussion of I-73 has not adequately addressed the increased maintenance costs of a new interstate highway. The current costs to maintain SC 38/US 501 would continue and not stop once I-73 is completed. The state would have to fund maintenance costs for both routes. Based on SCDOT data, it is estimated that annual maintenance costs of the new interstate would be more than $4.3 million. Over the next 30 years this would exceed more than $130 million, adding millions to the statewide system preservation deficit.

5. Conclusions and Summary

This report evaluates alternatives to the proposed I-73, a new four-lane expressway proposed from the southern terminus of I-73 in North Carolina near Rockingham, and continuing through South Carolina, ending at SC 22 (an existing four lane highway). Operation analysis for an updated traffic system is estimated in the year 2030. This analysis specifically focuses on the I-73 corridor and SC 38/US 501 from I-95 to SC 22.

In this study we looked at the one-time impact of highway construction and efficiency/productivity gains resulting in improved infrastructure over the life of the highway. The goal of this analysis is to determine which alternative generates the most value (i.e., travel efficiency) for the least cost to taxpayers. We note that whether the I-73 project, the SC 38/US 501 upgrade, or a no-build option is selected, the Myrtle Beach area will see equal non-transportation related economic impacts.

While each build scenario gains in traffic efficiencies, only the SC 38/US 501 upgrade results in a positive net present value (NPV). Stated another way, only the SC 38/US 501 alternative would provide a positive return to the taxpayers on their infrastructure investment.

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The GSX alternative would produce a net $51 million traveler benefit, while the I-73 project would produce a $704 million travel deficit. The SC 38/US 501 project could also benefit local businesses, but both I-73 and the SC 38/US 501 upgrade would provide travel efficiency gains. Upgrading SC 38/US 501 allows targeted construction spending on critical bottlenecks to happen sooner which would provide benefits to the community earlier than the proposed I-73.

Although speeds are slightly lower with the SC 38/US 501 alternative during the three summer months, the SC 38/US 501 alternative provides five significant benefits over the proposed I-73 corridor for passenger (personal/recreation) vehicles:

- GSX offers a significantly higher benefit/cost ratio of 1.4 compared with the I-73 benefit/cost ratio of .26. (The general decision rule is that projects with B/C ratios greater than 1.0 should be undertaken, while those with B/C ratios of less than 1.0 are not undertaken).
- The I-73 travel cost savings is $29.5 million compared to the SC 38/US 501 travel cost saving of $22 million. However, **the SC 38/US 501 savings comes at one-tenth the cost of building I-73.**
- Upgrading SC 38/US 501 maintains the viability of current businesses near and adjacent to the corridor, eliminating the need for relocations or lost business due to the diversion of traffic to I-73.

5. Conclusions and Summary
(continued)

- Based on travel efficiency savings, the SC 38/ US 501 upgrade has a projected payback in year 2029, while I-73 has no projected payback period.
- SC 38/US 501's economic impacts will enhance productivity for local manufacturers and distributors while having no effect on the Grand Stand's tourism economy as reported in other economic analyses, since it would terminate, like I-73, at SC 22, well north and west of Myrtle Beach.

In summary, this report reaches three key conclusions:

- SC 38/US 501, the GSX alternative, is a more effective use of state transportation resources. The GSX has a positive benefit/cost ratio while I-73 does not.
- The GSX alternative provides potential economic benefits to rural counties without displacing local businesses.
- By upgrading the SC 38/ US 501, South Carolina can improve access to the Myrtle Beach area without spending $1 billion that could go to other transportation infrastructure needs that provide greater economic benefits.

By upgrading the SC 38/ US 501, South Carolina can improve access to the Myrtle Beach area without spending $1 billion that could go to other transportation infrastructure needs that provide greater economic benefits.

As a result of these findings, we conclude that the GSX (upgrading SC 38/US 501 from I-95 to SC 22) alternative is clearly superior to the I-73 proposal for South Carolina taxpayers.

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Endnotes

1 *The Grand Strand Expressway: An Alternative to the Proposed I-73 to Myrtle Beach, South Carolina* Norwich:Smart Mobility, March 2011

2 TREDIS is the Transportation Economic Development Impact System, 2010

3 Chmura Economics & Analytics, *Economic Impact of I-73 in South Carolina*. Florence: Northeastern Strategic Alliance, May 2011.

4 SC DOT data based on Maintenance costs of I-185 extrapolated for 43.5 miles and 30 years.

5 Economic Impact of I-73 in South Carolina, Chruma Economics, May 2011.

6 Chmura Economics & Analytics, *Economic Impact of I-73 in South Carolina*. Florence: Northeastern Strategic Alliance, May 2011.

7 Ratios >1 are a benefit to the community. Ratio's <1 are a community cost.

8 Multiplier of 2.1 * AADT

9 Speed effects transportation efficiency. Speeds lower than posted limits, decreases economic efficiency.

10 "The Grand Strand Expressway", Smart Mobility, March 2011.

11 "The Grand Strand Expressway", Smart Mobility, March 2011.

12 TREDIS is the Transportation Economic Development Impact System (TREDIS, 2010). It is an integrated framework for transportation planning and project assessment designed to cover a wide range of applications – from looking at the benefit/cost impact of a single transportation investment to analyzing the macroeconomic impacts of alternative long-range plans such as the I-73 and GSX systems.

13 "the ratio of indirect economic effect in the region where the direct impact does not originate divided by total indirect effect in SC DOT data based on Maintenance costs of I-185 extrapolated for 43.5 miles and 30 years.

14 Recent Power Point presentation "Getting to Good", by South Carolina Secretary of Transportation, Robert J. St. Onge, Jr.

Methodology

Transportation Economic Impacts:

TREDIS calculates the transportation economic impacts of I-73 and the alternative SC 38/US 501. TREDIS model inputs include the travel demand characteristics for each build and a no-build scenario. Those characteristics include period vehicle trips, period vehicle miles traveled, period vehicle hours traveled, fraction congested, buffer time, average crew members, and average vehicle occupancy. Travel savings are calculated for passenger (personal/recreational) vehicles as a result of other studies being focused on tourism impacts of the project. See Table 2.

Construction Impacts:

Construction impacts are calculated using the total construction costs for the years 2013 through 2015 for SC 38/US 501 and 2015 through 2020 for I-73. The source for construction cost and miles for I-73 in South Carolina, south segment, and the SC 38/US 501 alternatives are from Smart Mobility (Smart Mobility, 2011). Construction impact calculations are carried out by TREDIS, which uses standard IMPLAN® methodology for a period of 20 years with analysis for each alternative done in the year 2030.

Geography:

Study area includes the South Carolina counties of Dillon, Marion, and Horry. Linked counties are not included in any of the scenarios.

Time Period:

Transportation estimates are for the year 2030. Estimates are based on 2009 AADT traffic data and 2005 Travel Demand Model (TDM) traffic data. Economic estimates are in 2030 dollars.

Road Transportation Data and Estimation Method

Data

Proposed road project graphics are included in the Smart Mobility Report (Smart Mobility, 2011). A detailed analysis of the SC 38 and US 501 highways is accomplished using Google Earth®[1] and South Carolina Department of Transportation (SCDOT) 2009 traffic count data.

Transportation projects within a transportation network create complex outcomes that affect the network in some ways that can be measured and others that can't. This estimation process uses 2009 SCDOT traffic count data, and industry standard travel efficiency gains from improvements to create alternative scenarios that lead to economic gains. We estimate the location of the traffic counting stations based on information provided by SCDOT. Each station is assigned to a relevant highway segment and its characteristics, such as number of lanes, width and bottlenecks are recorded. Highway levels of service (LOS) characteristics are then estimated using the Transportation Research Board's Highway Capacity Manual (HCM)(Transportation Research Board, 2010).[2] Each segment is measured, and then summed to a total[3] highway length. Eleven sections are measured using this method.

1. A request was made to the SCDOT for travel demand model data. Data was not available to the public at the time of this report.
2. Chapters: 14, 18, 31
3. Total road length is consistent with the finding from Smart Mobility.

Methodology
(continued)

Estimation

Each road segment is individually analyzed, using standard multilane highway segment methodology for the automobile mode.[4] There are six steps to calculating the level of service (LOS):

- Define basic traffic volume (AADT)
- Calculate free flow speed (FFS)
- Select FFS curve
- Calculate peak hour factor (PHF)
- Estimate speed and density
- Calculate LOS

The primary inputs for the analysis are average annual daily trips (AADT), miles, and speed (HCM). From those data, 2030 AADT volume is calculated. This is estimated with a multiplier of 2.1. We convert demand to peak volume, or Vp[5], which includes adjustments such as peak hour factor (PHF). A multiplier of 1.7 is used to estimate the peak volume, the variable fHV. Finally, free flow speed is estimated,[6] allowing for an estimate of automobiles per lane per mile. With this information we are able to estimate the LOS for peak demand in the year 2030.

In addition to these calculations we also encountered three bottlenecks, two of which included intersections. We chose not to analyze these intersections, but instead estimated the LOS to be "C" during non-peak with an LOS of "F" (most extreme) during peak times for the year 2030. To estimate intersection LOS, the HCM standard is available. Unfortunately, accurately estimating intersection LOS impact requires more than 100 inputs per intersection. Although the analysis is detailed, it is not accurate because it does not contain specific traffic intersection data. We therefore applied industry best estimates and assumed peak LOS "F" where appropriate.

Intersection "penalties" are applied to appropriate segments, then combined with the multilane highway segment data, and totaled for the highway being analyzed, creating three 2030 scenarios: no build, build SC 38/US 501, and build I-73. Final calculations are exported to TREDIS for analysis, sensitivity evaluation, and final estimate reports. Network efficiency economic impacts are calculated separately as are construction impacts. Both impacts represent total transportation-related economic impact from road improvements for the build scenarios.

Benefit/Cost Analysis

We used the Office of Management and Budget revised Circular A-94 (1992) to estimate the discount rate for the project. Over the last 33 years the rate has averaged slightly over 7 percent. The 2011 rate is 4.2 percent. We chose a rate of 5 percent for future estimates.[7]

Report Accuracy and Precision

Accuracy and precision are independent but complementary concepts. Accuracy relates to achieving a correct answer, while precision relates to the size of the estimation range of the parameter in question. This report does not contain field data collect by the authors but instead relies on estimates from other third parties with which we use to make capacity calculations. In most cases, field data, in general, on which the analyses are based, can only be expected to be accurate to within 5% or 10% of the true value. Thus, the computation performed with these inputs cannot be expected to be extremely accurate, and the final results must be considered as estimates that are accurate and precise only with the limits of the inputs used. Our estimates should be considered in the context of planning and preliminary engineering analysis and not used for operational or final highway design inputs.

TREDIS

TREDIS is the Transportation Economic Development Impact System (TREDIS, 2010). It is an integrated framework for transportation planning and project assessment, designed to cover a wide range of applications – from looking at the benefit/cost impact of a single transportation investment to analyzing the macroeconomic impacts of alternative long-range plans.

TREDIS operates as four separate but interconnected modules:

- Travel cost,
- Market access,
- Economic adjustment
- Benefit/cost, and
- Finance

Highway data is imported into TREDIS for analysis. Impacts are forecast using CRIO-IMPLAN multiregional forecasting model. The result is projected economic impacts for transportation infrastructure construction projects and changes in travel demand. A number of assumptions are required as part of the transportation analysis. Some estimates are derived from TDM and others from empirical research.

4. Chapter 14 (Transportation Research Board, 2010)
5. $Vp = \frac{V}{PHF \cdot N \cdot fHV \cdot fp}$
6. HCM Exhibit 14-5 LOS on Base Speed-Flow Curves
7. OMB Revised Circular A-94

Methodology
(continued)

Glossary

Average Annual Daily Traffic (AADT) — Used to calculate toll costs and buffer time costs.

Buffer Time — Variable used to capture the cost of travel time changeability. Unreliable travel times cause travelers to make early departures to "buffer" against potential delay.

Density — The number of vehicles occupying a given length of lane or roadway at a particular instant.

Free-Flow Speed (FFS) — 1) Theoretical speed in miles per hour when the density and flow rate on a study segment are both zero. 2) The prevailing speed in miles per hour on freeways at flow rates between 0 and 1,000 passenger cars per hour per lane (pc/h/ln).

Level of Service (LOS) — A numerical output from a traveler perception model that typically indicates the average rating travelers would give a transportation facility or service under a given set of conditions.

Net Present Value — Present value of future cash returns, discounted at the appropriate market interest rate, minus the present value of the cost of the investment (Ross, Westterfield, & Jaffe, 1996).

Peak Hour Factor (PHF) — The hourly volume during the analysis hour dived by the peak 15-min flow rate within the analysis hour; a measure of traffic demand fluctuation within the analysis hour.

Travel Demand Model (TDM) — Model that includes elements such as roadway and transit networks, population and employment data. The data are used to estimate the demand for transportation based on highway characteristic assumptions.

Vehicle Hours Traveled (VHT) — Variable is used to calculate passenger, crew, and freight time cost.

Vehicle Miles Traveled (VMT) — Variable is used to calculate accident costs, vehicle operating costs, and environmental costs. VMT should be annualized so that for a single study region, all periods sum to annual VMT.

Miley & Associates

Miley & Associates is one of the Southeast's leading economic and financial consulting firms. The firm specializes in economic impact analyses, fiscal impact analyses, feasibility reports, impact fee studies and benefit/cost modeling. Our clients include national and prominent local real estate developers, school districts, local governments, regional development agencies, and other private sector development firms. Miley & Associates partners appear regularly before decision-makers at all levels of government and understand the values, needs and desires of the clients they represent. With offices located in Columbia, South Carolina, the firm is well positioned to provide clients with hands-on service for projects throughout the entire Southeast region.

Miley & Associates appreciates that every research project is unique and deserves a custom solution. Public policy decisions are not made overnight, and we excel at providing advice and counsel along the way. We represent our clients. Our business plan is simple: we focus on exceeding our client's expectations and building long-term relationships.

Miley & Associates, Inc. was founded in 1993 by Harry W. Miley, Jr. Ph.D. The Company is an economic and financial consulting firm providing a range of analytical services to public and private sector clients. Miley & Associates conducts fiscal and economic impact analyses of proposed new developments and has extensive experience in assisting clients with their economic development and community revitalization projects.

Dr. Miley served as Chairman of the South Carolina Board of Economic Advisors (BEA) under two Governors. The BEA is responsible for estimating the State's revenues for the Governor and the General Assembly to use in formulating the State's annual budget. Dr. Miley was originally appointed as Chairman by Governor Carroll Campbell and continued to serve as Chairman for Governor David Beasley.

Dr. Miley was the Senior Executive Assistant for Economic Development to Governor Campbell from 1987 to 1989. Dr. Miley served as principal advisor to Governor Carroll Campbell on the state's policies for economic development, employment and training, work force and adult illiteracy, technical education and transportation issues.

Prior to joining the Governor's Office, Dr. Miley was on the faculty of the Moore School of Business at the University of South Carolina and Associate Director of the Division of Research at the School.

General Limiting Conditions

This economic impact analysis is not a budget or forecasting document and is not intended to depict a definitive course of action. Moreover, economic impact analysis is not designed as a space or facility-planning document. Many assumptions underlying economic impact analyses are based on policy decisions which, if modified, would affect the overall results.

This study is based on estimates, assumptions and other information developed by Miley & Associates, Inc. from its independent research effort, consultations with the client and its representatives, and primary and secondary sources. We have utilized sources that are deemed to be reliable but cannot guarantee their accuracy. Moreover, estimates and analysis are based on trends and assumptions and, therefore, there will usually be differences between projected and actual results because events and circumstances frequently do not occur as expected, and those differences may be material. No responsibility is assumed for inaccuracies in reporting by the client, the client's agent and representatives or any other data source used in preparing this study.

This report is based on information that was current as of April 2012 and Miley & Associates, Inc. has not undertaken any update of its research effort since that date. We have no obligation, unless subsequently engaged, to update this report or revise this analysis as presented due to events or conditions occurring after the date of this report.

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