North Carolina Department of Transportation

I-95 Planning and Finance Study

STIP Project No. I-5133

Express Lane Assessment

July 2014

Prepared by
Atkins
and
Cambridge Systematics

North Carolina Department of Transportation

I-95 Planning and Finance Study

STIP Project No. I-5133

Express Lane Assessment

July 2014

Prepared by Atkins and Cambridge Systematics

Executive Summary

1. INTRODUCTION

This report addresses the feasibility and effectiveness of implementing tolled "Express Lanes" on Interstate Highway 95 (I-95) in North Carolina as a strategy for addressing growing congestion problems on that highway and for generating needed revenue for funding of improvements. This assessment is a response to legislation introduced in the NC House of Representatives in 2013 (HB 267, Limited Tolling on Interstate Highways) and is part of NCDOT's broader examination of funding options to address an identified need for over $4.5 billion (2011 dollars) in improvements to the 182-mile portion of I-95 that traverses the eastern part of the state from South Carolina to Virginia. The overall study is referred to as the I-95 Planning and Finance Study (I-95 P&FS). In addition to the Express Lane Assessment, the following studies and primary documents have been completed:

- Environmental Assessment (EA): The *Environmental Assessment* (*I-95 EA*, January 2013) determined the needs of the project corridor, evaluated alternatives, included an environmental screening, and recommended widening to 6-8 general use lanes through the use of highway user tolls. The EA estimated costs of the proposed improvements ($4.5 billion). The EA also recommended that the state consider implementation of tolls along the corridor as the basis for generating the revenue needed to fund an accelerated improvement and reconstruction program (referred to as Full-Toll scenario).
- ISRRPP Application: NCDOT also applied to the Federal Highway Administration (FHWA) for entry into the Interstate System Renewal and Replacement Pilot Program (ISRRPP), which authorizes FHWA to test the feasibility of implementing user tolling along an existing Interstate highway corridor. FHWA awarded NCDOT a conditional approval to enter into the program.
- Financial Plan: NCDOT completed the *I-95 Financial Plan (June 2013)*, which demonstrated that tolling of I-95 would generate sufficient revenue to fully fund and accelerate completion of the $4.5 billion program, whereas traditional funding sources would not achieve this goal.
- Economic Assessment: Based on concerns expressed during and following the *I-95 EA* public hearings, NCDOT initiated an expanded assessment of the economic impacts that could result from implementation of I-95 tolling as that financing strategy was evaluated in the *I-95 EA* and the *I-95 Financial Plan*. The economic assessment examined the potential adverse economic impact of tolling on I-95 users and the regional economy, as well as the benefits that could result from the accelerated improvement of I-95. The Economic Assessment concluded that the benefits to tolling would outweigh the costs.

To examine the limited tolling approach to funding I-95 improvements as would be required by enactment of HB 267, NCDOT prepared an assessment of costs, traffic impacts, revenue potential, financial feasibility, and economic impact of a more limited express lane concept on I-95. That evaluation, with comparisons to the Full-Toll Scenario of tolled general use lanes as presented in the *I-95 Financial Plan,* is documented in this report, and includes the following elements:

- Express lane concept development
- Estimated construction costs
- Traffic implications and revenue potential

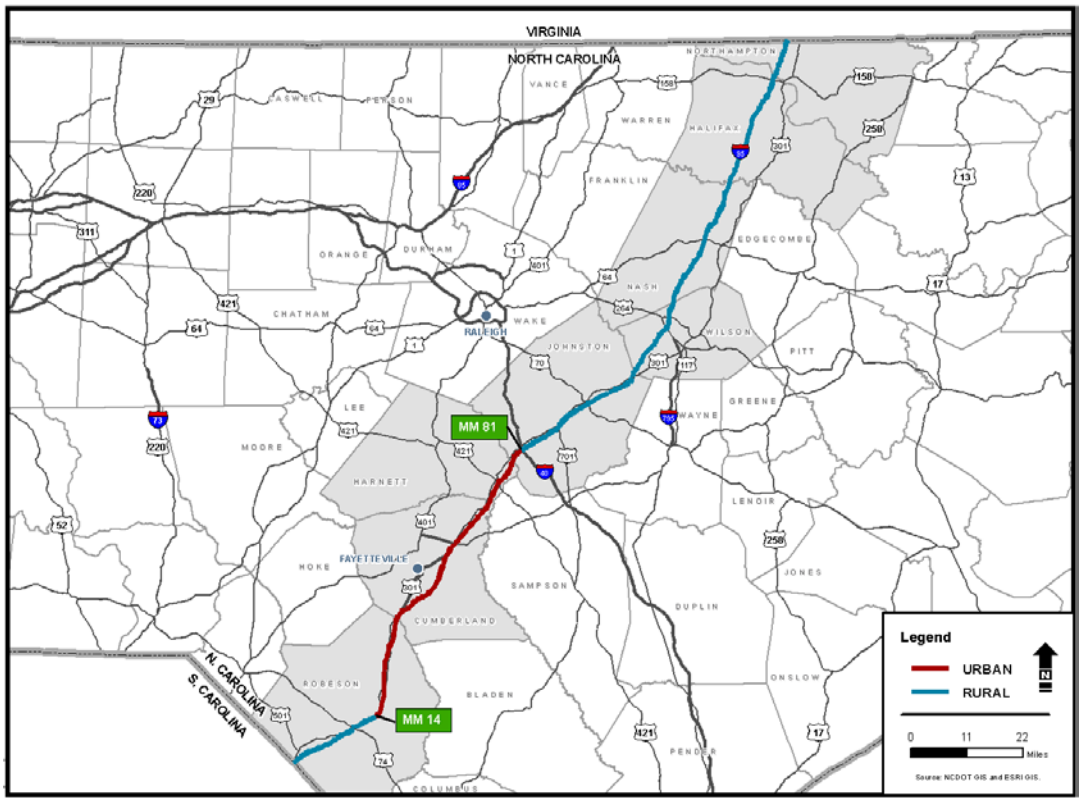
- Financial feasibility
- Economic impacts

2. EXPRESS LANE CONCEPTS CONSIDERED

In conducting the ***Express Lanes Assessment***, two Express Lane concepts were evaluated:

- **Express Lanes/Concept 1** would be a complete express lane installation for the entire 182-mile corridor, from South Carolina to Virginia; allowing comparison of costs, operational improvements, and traffic and revenue potential to the Full-Toll Scenario presented in the *I-95 EA*. In this concept, either one or two express lanes would be built in each direction, for a combined total of six or eight express and general purpose lanes. The total number of lanes in any section of I-95 would be the same as the number evaluated in analyzing the Full-Toll scenario of tolling all I-95 traffic.
- **Express Lanes/Concept 2** would be a more limited express lane application in the more heavily traveled sections of the corridor, to maximize traffic using the Express Lanes and resulting revenue potential. Express Lanes/Concept 2 would extend from I-74 south of Lumberton (Mile Marker [MM] 14) to the I-40 interchange in Johnston County (MM 81), a distance of 67 miles. The limits of Express Lanes/Concept 2, which correspond to Phase 1 construction of the Full-Toll Scenario, are shown in **Figure ES-1**.

Figure ES-1: Refined Preferred Design Concept and Scope



3. EXPRESS LANE CONSTRUCTION COST

As summarized in **Table ES-1**, the estimated cost of Express Lane/Concept 1, adding the same number of lanes as Express Lanes to the entire length of I-95 as the Full-Toll Scenario, would total $2.84 billion (2011$). The cost difference between Express Lane/Concept 1 and the Full-Toll scenario cost has to do with the extent to which other corridor reconstruction needs are or are not addressed. The cost of the Full-Toll concept includes full reconstruction of all roadway pavement, bridges, and interchanges that would not be included in building only Express Lanes. Engineering studies performed during the I-95 Planning and Finance Study concluded that within the study period (by 2040) all pavement and bridges along the entire 182 miles will need to be replaced due to age and deterioration. The cost of remaining needed reconstruction under Express Lane/Concept 1 would be the $1.71 billion difference between the two.

The estimated construction cost of Express Lane/Concept 2, between its defined limits of MM 14 in Robeson County and MM 81 in Johnston County just north of the I-40 interchange, would be $1.31 billion (2011$). The corridor would still require an additional $3.2 billion, in current dollars (2011$), for improvements and reconstruction of the remainder of the I-95 corridor.

Table ES-1: I-95 Improvement Program Full Toll and Express Lane Cost Comparison

I-95 Improvement Program (SC line to VA line) Capacity Expansion Capital Cost Estimate (2011 $, Millions)			
	Full Toll Scenario	Express Lane/Concept 1 (Express Lanes for full corridor length)	Express Lane/Concept 2 (Express Lanes for Full-Toll Scenario, Phase 1)
Construction Total	$4,543 M	$2,840 M	$1,307 M

Source: Atkins, for *I-95 Financial Plan* (2012) and for *I-95 Express Lane Assessment (2013*). Additional detail available.

4. TRAFFIC AND REVENUE FORECASTS

Estimates of traffic that would use the Express Lanes and the revenue that would be generated by that traffic were prepared for each Express Lane concept. The I-95 Corridor Travel Demand Model (CTDM), enhanced by Cambridge Systematics (CS) for the Economic Assessment, was used to study tolls across all lanes along I-95 in North Carolina. In addition, a spreadsheet model was developed using information from the enhanced CTDM (referred to as the CS I-95 Model), plus other sources such as the North Carolina Statewide Travel Demand Model, several NCDOT data sources, and models developed by CS based on willingness-to-pay types of surveys conducted in other parts of the country. Toll rates consistent with those assumed for the Full-Toll Scenario were used in estimating annual revenue.

Express Lanes/Concept 1:

This scenario assumes that Express Lanes will be built along the entire 182-mile corridor, with toll rates between $0.10 and $0.15 per mile (2009$). The forecast assumes that the section from I-74 south of Lumberton to I-40 in Johnston County (subsequently referred to as Segments 4 and 5) will open first, with full operation by 2032. **Table ES-2** summarizes the 2020, 2040 and 40-year total (2020-2059) traffic (vehicle miles traveled, VMT) and gross revenues in year-of-expenditure (YOE) dollars.

Table ES-2: Express Lanes/Concept 1: Full Corridor, Traffic & Revenue Results

Year	Traffic (VMT)	Gross Revenues (YOE$)
2020	7,764,000	$ 1,529,500
2040	37,858,500	$ 9,278,200
2059	48,934,500	$ 19,258,800
2020-2059	1,402,936,012	$ 383,826,900

Express Lanes/Concept 2: Express Lanes between I-40 and Fayetteville

This scenario assumes that Express Lanes will be built only between I-74 south of Lumberton and I-40 in Johnston County, covering about 61 miles on I-95. Toll rates are assumed at $0.075 per mile ($2009), or 50 percent of the toll rate applied in Express Lanes/Concept 1 (full corridor). This allowed testing of the sensitivity of toll rates on willingness of drivers to use the Express Lanes. The Express Lanes are assumed to open by 2020. **Table ES-3** summarizes the 2020, 2040, and 40-year total (2020-2059) traffic (vehicle miles traveled, VMT) and gross revenues in year-of-expenditure (YOE) dollars.

Table ES-3: Express Lanes/Concept 2: Partial Corridor, Traffic & Revenue Results

Year	Traffic (VMT)	Gross Revenues (YOE$)
2020	20,115,800	$ 1,971,300
2040	27,201,900	$ 4,379,500
2059	36,263,200	$ 9,356,000
2020-2059	1,100,158,800	$ 191,142,100

3.2.3 Comparison of Express Lanes Scenarios

Comparing total toll revenues over 40 years, Express Lanes/Concept 2 (partial Express Lanes) is forecast to generate $191.1 million, which is approximately half of the total revenue forecast compared to the full Express Lanes (Concept 1) along I-95 at $383.8 million (See **Table ES-3**). As shown in **Table ES-4**, VMT over 40 years (i.e., 2020-2059) on Express Lanes/Concept 2 is estimated at approximately 78 percent of the VMT forecast on the full corridor (Express Lanes/Concept 1). On year 2020, when both Express Lane concepts are the same in terms of length, however, Traffic and Revenue (T&R) forecasts for Express Lanes/Concept 2 are higher because of the lower toll rate. A reduction of toll rates by 50 percent in Express Lanes/Concept 2 is estimated to result in a VMT increase of 159 percent and a revenue increase of 29 percent in Segments 4 and 5 of the corridor for year 2020. **Figure ES-2** shows the annual traffic and revenue for both scenarios.

Table ES-4: Traffic & Revenue Comparison – Express Lanes/Concept 1 (Full) vs. Express Lanes/Concept 2 (Partial)			
TRAFFIC/VMT			
Year	Express Lanes/Concept 1 (Full)	Express Lanes/Concept 2 (Partial)	% of Partial Compared to Full
2020	7,764,000	20,115,800	259%
2040	37,858,500	27,201,900	72%
2059	48,934,500	36,263,200	75%
2020-2059	1,402,936,012	1,100,158,800	78%
REVENUE			
Year	Express Lanes/Concept 1 (Full)	Express Lanes/Concept 2 (Partial)	% of Partial Compared to Full
2020	$ 1,529,500	$ 1,971,300	129%
2040	$ 9,278,200	$ 4,379,500	47%
2059	$ 19,258,800	$ 9,356,000	49%
2020-2059	$383,826,900	$191,142,100	50%

Figure ES-2: Comparison of Annual Traffic and Revenue, Express Lanes/Concept 1 (Full vs. Concept 2 (Partial)

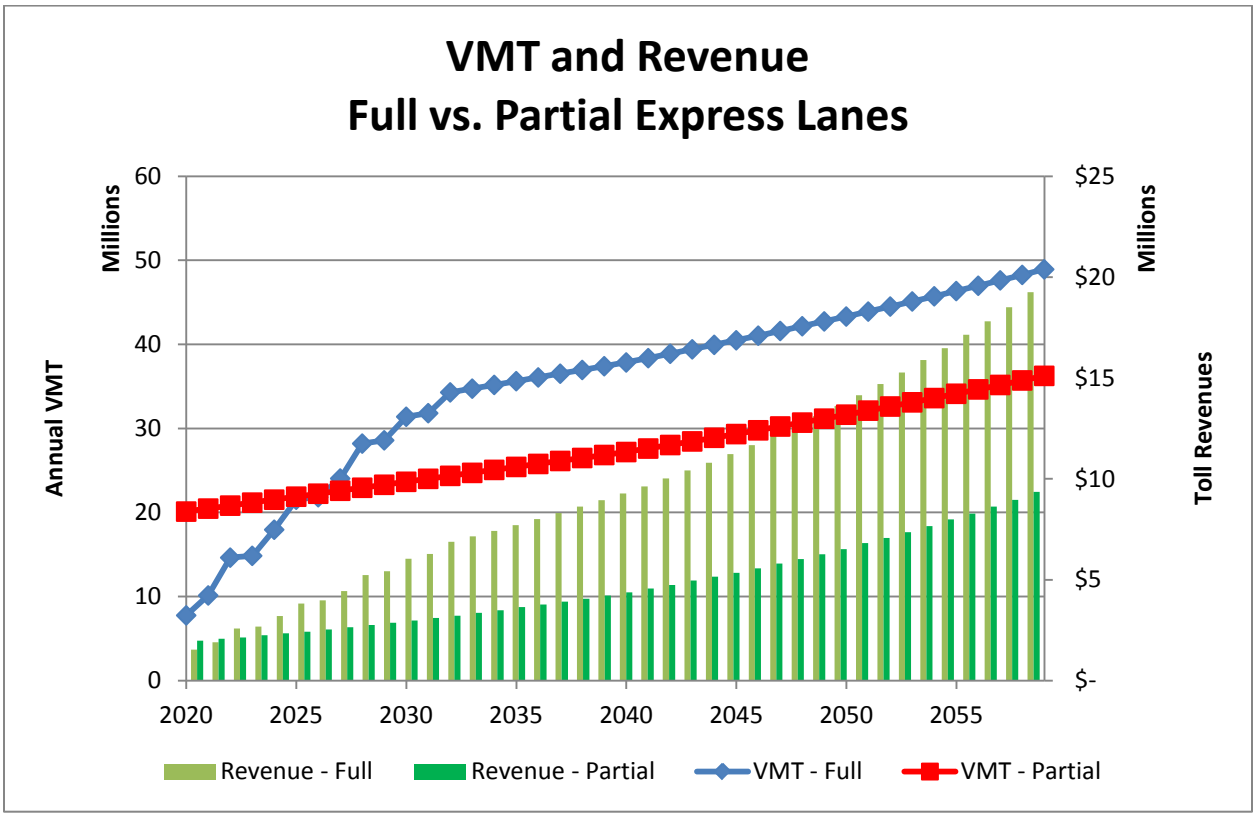
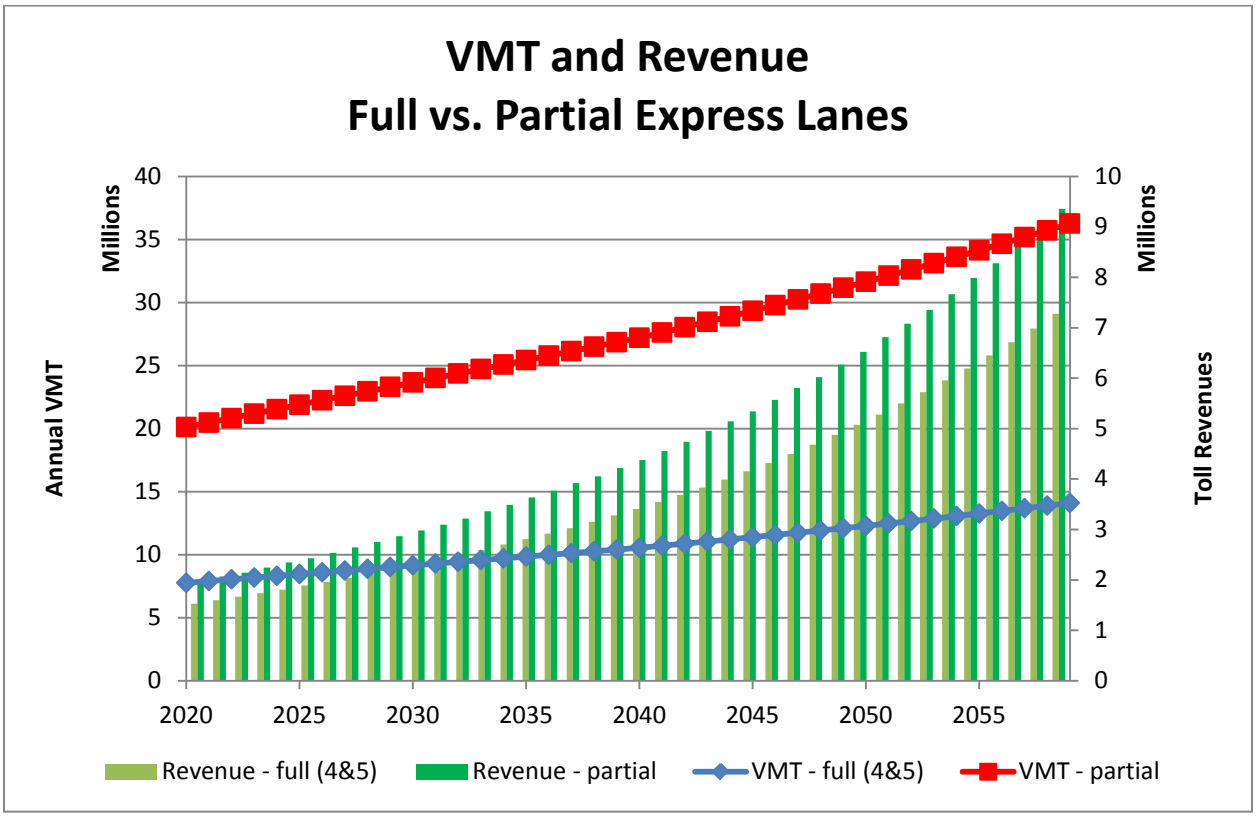


Table ES-5 compares the VMT and revenue forecast for Segments 4 and 5 for both Express Lanes concepts. **Figure ES-3** shows the annual traffic and revenue. Over 40 years, a 50 percent reduction in the toll rate evaluated for the Partial Express Lane concept could generate 29 percent more in toll revenues on Segments 4 and 5 ($148.4 million for Express Lanes/Concept 1 vs. $191.1 million for Express Lanes/Concept 2), because of the additional traffic attracted to the Express Lanes at the lower toll rate.

Table ES-5: Express Lanes Traffic & Revenue Comparison – Full vs. Partial Corridor, Segments 4 and 5 only, 2020-2059		
Year 2020-2059	Traffic (VMT)	Gross Revenues (YOE$)
Express Lanes/Concept 1: Full	426,477,000	$ 148,378,000
Express Lanes/Concept 2: Partial	1,100,158,800	$ 191,142,100
Partial vs. Full (% increase)	158%	29%

Figure ES-3: Comparison of Annual Traffic and Revenue by Express Lanes Concept (for Segments 4 and 5 only)



5. EXPRESS LANE FINANCIAL FEASIBILITY ASSESSMENT

The *I-95 Financial Plan* that was prepared by NCDOT to support possible entry into the ISRRPP full-tolling pilot program presented a complete financial analysis and finance plan for using toll revenue generated from conversion of I-95 to a fully-tolled facility. That analysis and plan considered life-cycle costs of expanding, reconstructing, operating, and maintaining I-95 without use of traditional transportation funds, primarily fuel taxes. The *I-95 Financial Plan* demonstrated that tolls offered a strong potential for fully funding those life-cycle costs.

The conclusion drawn from the initial financial assessment of Express Lanes on I-95 is that this approach will not provide any meaningful revenue stream to support the long-term funding needs for I-95. At best, as shown in **Table ES-6**, revenue generated by Express Lanes would provide a small supplement to traditional revenue sources. More likely, the incrementally higher cost of operating the Express Lanes as a tolled facility would offset any revenue realized from tolling.

Table ES-6: I-95 Improvement Program Express Lane Financial Feasibility Comparison

I-95 Improvement Program (SC line to VA line) Capacity Expansion Cost Estimate (2011$, Millions)		
	Express Lane/Concept 1	Express Lane/Concept 2
Capital Cost	2,840	1,307
Toll Revenue	180	86
Capital Cost Coverage (1)	6.4%	6.6%

Source: Atkins; using Atkins' capital cost estimates and Cambridge Systematics traffic and revenue data.
Notes:

1. The ratio of toll revenue to capital cost does not include any financing costs that would need to be incurred at the start of a construction program to allow accelerated construction. A complete financial analysis of either Express Lanes/Concept 1 or Express Lanes/Concept 2 has not been undertaken, pending review of this preliminary evaluation.

Update of Full-Toll Scenario Finance Analysis

As part of the express lane economic impact assessment, the study team updated the Full-Toll traffic and revenue estimates and the financial analysis. The updated Full-Toll scenario revenue estimate resulted in a slightly more conservative estimate of nominal toll revenue over the full financial analysis period (2020 – 2056) of $31.49 billion, compared to the earlier estimate of $34.17 billion. Without fully updating the financial analysis prepared for the *I-95 Financial Plan*, the study team concluded that even with a slower rate of revenue generation, the Full-Toll scenario would still have a very high probability of fully funding the I-95 improvement program.

Financial Assessment Conclusions

Several conclusions can be drawn from this evaluation of the insertion of Express Lanes on I-95 and use of toll revenue that would be generated by tolling of the new capacity in the Express Lanes:

- While conversion of I-95 to a fully-tolled facility under the terms of the federal ISRRPP would generate revenue from tolled user fees sufficient to fund both construction and ongoing operations and maintenance with little or no need for "gap funding" from the State's Highway Trust Fund, the revenue generated from building and operating Express Lanes, either within the

full corridor or on a more limited basis corresponding to the segments of greatest near-term congestion, would at best finance only a small part of the construction of the Express Lanes (less than 7%), and more likely would not cover even the incremental cost of operating and maintaining the Express Lanes.

- While I-95 experiences limited congestion today, with congestion occurring on a periodic basis tied to roadway incidents or to heavy beach-bound holiday traffic south of the I-95/I-40 interchange in Johnston County, it is expected that traffic growth along the corridor will create more and more congestion over the next 20+ years. Additional capacity will be needed to preserve reliability for movement of people and freight in the 182-mile corridor.
- I-95 faces near term and ongoing need for major improvements to address capital, operating, and maintenance needs. Not only will I-95 require additional capacity, as noted above, but I-95 is an aging roadway that serves as a major critical travel corridor for the US eastern seaboard. Its bridges are safe today, but many are functionally obsolete or structurally deficient and in need of replacement.
- I-95 is in a deferred-maintenance position today, due to lack of adequate funding for ongoing Operations and Management (O&M). On a per mile basis, the cost of maintaining I-95 will continue to rise as greater repairs of aging infrastructure are needed.

6. ECONOMIC IMPACT ASSESSMENT

The economic assessment of Express Lanes on I-95 in North Carolina evaluates the economic implications for the Business As Usual (BAU) and two Express Lanes implementation alternatives. The BAU elements are drawn from the I-95 Corridor Planning and Finance Study. The scenarios examined are defined below:

Business As Usual (BAU): The BAU scenario estimates the potential of foregone economic activity if improvements are not made to I-95 in North Carolina.

Express Lane/Concept 1 - Express Lanes along the entire I-95 Corridor: This scenario focuses on the positive impacts of improved traffic conditions and the influx of construction activity, while incorporating the potential negative impacts associated with a toll to pay for the investment.

Express Lane/Concept 2 - Express Lanes on I-95, between I-40 and Lumberton (MP 81 and MP 14), with reduced toll rates: This is the same scenario as Express Lanes/Concept 1 scenario with similar improvements, but only along the most heavily traveled segment of the Corridor between I-40 and Lumberton.

The economic impact analysis examined the study period from 2014 to 2050, and presents results in constant 2012 dollars. For comparison purposes, three tiers of regional impact analysis are presented:

- Impacts to the I-95 Corridor;
- Impacts to Eastern North Carolina (defined as east of I-95); and,
- Impacts to the rest of the state of North Carolina.

Business as Usual Scenario (BAU)

The BAU scenario assumes ongoing maintenance and operations without any of the proposed improvements stated in the *I-95 EA.*

The BAU scenario presents a significantly negative economic impact to North Carolina. It is important to note the decreases in the economic metrics are not negative levels of economic activity; rather, all results are presented in relation to an economic baseline forecast based on status quo activities. In other words, the economy is growing, but at a slower or reduced rate than is currently projected.

Express Lanes/Concept 1

In this scenario, efficiencies are gained from the improvements on I-95, which lead to business transportation cost savings totaling $2.8 billion between 2014 and 2050 along the Corridor when compared to the BAU scenario. All regions are more economically competitive, with production cost decreases that lead to increases in Gross Regional Product (GRP), personal income, and jobs. Much of the foregone economic activity seen in the BAU scenario is recovered with a forecasted increase in GRP of $3.2 billion over the BAU forecast for the I-95 Corridor but a more modest increase of $0.58 billion in eastern North Carolina across the study period.

Even with the travel efficiencies gained from the improvements along the Corridor, a large portion of the net economic benefits are attributed to construction activities, which are temporary as all activity concludes in the early 2030s. Although the benefits are higher than the Express Lanes/Concept 2 scenario, the benefits are minimal with percentages over the study period at only about a tenth of a percent on average across all economic indicators. Given these relatively small economic impacts, a slight change in economic conditions in North Carolina could further dampen or reverse these transportation efficiency related benefits leading to unanticipated costs for North Carolinians to bear.

Express Lanes/Concept 2

Similar to the long-term economic impacts presented under the Express Lanes/Concept 1 scenario, the Express Lanes/Concept 2 scenario also reveals efficiencies gained from the improvements on I-95. Even with the imposition of tolls along just this segment, the travel efficiencies gained from the highway improvements lead to a net gain in economic activity in North Carolina; however, the gain is minimal over the BAU.

Over the study period, the construction activities contribute about 61 percent to the total gain in jobs in the I-95 Corridor region over the short-term with higher percentages in the other regions. Construction activity is a significant boost to the economic activity in North Carolina in the short-term but once construction is complete the net gain in economic activity over the long-term is only an average of 0.03 percent in the I-95 Corridor region and 0.01 percent in eastern North Carolina. In other words, construction activities will benefit all regions in the short-term mostly in eastern North Carolina and in the rest of the state regions. However, over the longer-term the benefits from the travel efficiencies are realized in the I-95 Corridor region.

Results

Summary findings are presented in **Table ES-7**. The key takeaways from these findings include:

- BAU on I-95 will cost the state an average of more than 16,000 jobs annually compared to baseline economic forecast and over $78 billion in GRP.

- Counties along the I-95 Corridor bear the greatest burden in terms of economic losses arising from tolls, but they also benefit the most from the more limited improvements compared to the full capital investment proposed.
- The economic impact of express lanes is positive; however, benefits are minimal in relation to overall economic activity in each of the regions.

Table ES-7:Summary of Economic Impacts of Express Lanes Alternatives, 2014-2050

Metric	BAU	Build, Full Toll	Express Lanes/Concept 1	Express Lanes/Concept 2
Gross Regional Product ($ billions 2012)	($78.4)	$77.8	$6.5	$2.9
Personal Income ($ billions 2012)	($72.6)	$67.6	$5.4	$2.5
Jobs (average annual full-time)	(16,351)	16,872	1,985	934
Business Transportation Costs ($ billions 2012)	$66.9	($62.4)	($3.8)	($1.8)
Toll Cost ($ billions 2012)		$9.6	$0.12	$0.06

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative values

7. SUMMARY OF STUDY CONCLUSIONS

This evaluation of the potential for Express Lanes on I-95 to serve as a feasible improvement strategy for this crucial highway in Eastern North Carolina suggests that this Express Lane approach is not a feasible solution to address the I-95 Corridor needs. To be feasible, NCDOT considers that the improvements should:

- Provide needed enhancements to highway capacity and traffic operations;
- Address challenges raised by the aging of the roadway and bridges; and
- Funnel significant amounts of supplemental funding into the corridor.

In concluding this report, the study team offers the following observations.

Conclusion 1: Express lanes are not a viable solution to capacity deficiencies and infrastructure aging

I-95 is facing growing recurring congestion, particularly south of I-40 in Johnston County, has safety issues with lengthy delays to travelers due to traffic crashes, and is challenged to maintain the pavement and bridges in good condition due to their growing age. Implementation of Express Lanes, as an alternative to either the accelerated Full-Toll scenario or to continuing the BAU scenario of incremental improvements using traditional motor fuels tax financing, is not seen as a viable improvement strategy for the following reasons:

1. While I-95 experiences limited congestion today, it is expected that traffic growth along the corridor will create more and more congestion over the next 20+ years. Additional capacity will be needed to preserve reliability for movement of people and freight. However, Express Lanes,

tolled to manage congestion and to generate revenue, would be expected to be badly underutilized due to the perceived penalty on the part of potential users to the tolls.

2. I-95 faces near-term and ongoing need for major improvements to address capital, operating, and maintenance needs. Not only will I-95 require additional capacity, but I-95 is an aging roadway that serves as a major critical travel corridor for the US eastern seaboard.
3. On a per mile basis, the cost of maintaining I-95 will continue to rise as greater repairs of aging infrastructure are needed. A construction program focused on Express Lanes will do little to address the ongoing maintenance needs of the remaining general use lanes and the bridges.

Conclusion 2: Express lanes offer little potential for financial feasibility

While conversion of I-95 to a fully-tolled facility under the terms of the federal ISRRPP would be expected to generate revenue from tolled user fees sufficient to fund both construction and ongoing operations and maintenance with little or no need for "gap funding" from the State's Highway Trust Fund, the revenue generated from building and operating Express Lanes would at best finance only a small part of the construction of the Express Lanes **(less than 7%),** and more likely would not cover even the incremental cost of operating and maintaining the Express Lanes.

Conclusion 3: Accelerated construction of Express Lanes offers potential for positive economic impact, but not as much as the Full-Toll scenario

While the revenue generated by implementation of Express Lanes along a portion or the entire length of I-95 offers little potential of covering a significant portion of the cost of building and operating the Express Lanes, construction of an express lane facility would be more beneficial to the regional economy than would be continuation of the BAU scenario of small incremental funding:

- A Business as Usual funding approach on I-95 will cost the state an average of more than 16,000 jobs annually compared to baseline economic forecast and over $78 billion in GRP.
- Counties along the I-95 corridor bear the greatest burden in terms of economic losses arising from tolls, but they also benefit the most from the more limited improvements compared to the full capital investment proposed.
- Express Lanes/Concept 1 is estimated to increase GDP by $6.5 billion by 2040 and support nearly 2,000 additional jobs annually. The impact of Express Lanes/Concept 2 is estimated to be $2.9 billion in GDP and an average of over 900 additional jobs annually between 2014 and 2040.
- The economic impact of Express Lanes is positive; however it is minimal in relation to overall economic activity in each of the regions.

Conclusion: As a stand-alone funding source, the construction of Express Lanes and imposition of tolls on the Express Lanes offer little potential to fully address I-95 needs or to fund the $4.5 billion I-95 improvement program. Even as a supplement to existing funding streams, construction of tolled Express Lanes on I-95 offers little potential for accelerating the necessary program of expansion and reconstruction. To meet those improvement and funding needs, NCDOT must pursue other funding options to pay.

Table of Contents

EXECUTIVE SUMMARY ES-1

1 INTRODUCTION/STUDY PURPOSE 1-1

1.1 I-95 Improvement Needs 1-1

1.2 Principal NCDOT I-95 Work Elements to Date 1-1

1.3 Call for Examination of Feasibility of Limited I-95 Tolling (Express Lanes) 1-2

2 EXPRESS LANE CONCEPT DEVELOPMENT 2-1

2.1 Express Lane Concepts Considered 2-1

2.2 Express Lane Construction Cost 2-2

3 TRAFFIC AND REVENUE FORECASTS 3-1

3.1 Traffic Forecasts 3-1

3.1.1 Overview of the Forecasting Approach 3-1

3.1.2 Traffic Forecasting Tool Structure 3-1

3.1.3 Vehicle Miles Traveled 3-5

3.1.4 Results 3-7

3.2 Toll Revenue Forecasting for Financial Plan 3-7

3.2.1 Assumptions 3-8

3.2.2 Traffic and Revenue Estimates 3-8

3.2.3 Comparison of Express Lane Scenarios 3-13

4 EXPRESS LANE FINANCIAL ASSESSMENT 4-1

4.1 Express Lane Financial Feasibility Assessment 4-1

4.2 Summary of Full-Toll Scenario Finance Analysis 4-2

4.3 Financial Assessment Conclusions 4-3

5 ECONOMIC IMPACT ASSESSMENT 5-1

5.1 Scenarios Modeled 5-1

5.2 Economic Impact Analysis 5-1

5.2.1 Valuation of Economic Impact from Transportation Changes 5-2

5.2.2 Key Modeling Assumptions 5-3

5.2.3 Construction 5-5

5.3 Economic Impact Analysis Results 5-5

5.3.1 Business as Usual Scenario 5-5

5.3.2 Express Lanes/Concept 1 5-6

5.3.3 Express Lanes/Concept 2 5-7

5.3.4 Results 5-10

6 SUMMARY OF STUDY CONCLUSIONS 6-1

LIST OF FIGURES

Figure 2.1 Refined Preferred Design Concept and Scope....2-2

Figure 3.1 Combined Toll Segments....3-6

Figure 3.2 Comparison of Annual Traffic and Revenue, Express Lanes/Concept 1 (Full) vs. Express Lanes/Concept 2 (Partial)....3-14

Figure 3.3 Comparison of Annual Traffic and Revenue by Express Lanes Concept (for Segments 4 and 5 only)....3-15

LIST OF TABLES

Table 2.1 I-95 Improvement Program Full Toll and Express Lane Cost Comparison....2-3

Table 3.1 I-95 General Assumptions Used in Development of Traffic Forecasts....3-4

Table 3.2 Description of the Six Toll Segments....3-5

Table 3.3 Trip Purposes Imported from NC Statewide Model Used for Stratification....3-8

Table 3.4 Estimated 2020 Shift from General Purpose to Toll Lanes – 18 Segments (Weekday NB)....3-9

Table 3.5 Estimated 2020 Shift from I-95 General Purpose to Toll Lanes – 6 Segments (Weekday SB)....3-10

Table 3.6 Estimated 2020 Shift from General Purpose to Toll Lanes – 6 Segments (Summer Weekends NB)....3-10

Table 3.7 Reduced Toll (I-40 to Lumberton) – Estimated 2020 Shift from I-95 General Purpose to Toll Lanes (Weekday SB)....3-11

Table 3.8 Annualized VMT and Revenue for Express Lanes/Concept 2 Using Alternative Toll Rates....3-11

Table 3.9 Opening Schedule and Toll Rates for Express Lanes on I-95....3-12

Table 3.10 Express Lanes/Concept 1: Full Corridor, Traffic & Revenue Results....3-12

Table 3.11 Express Lanes/Concept 2: Partial Corridor, Traffic & Revenue Results....3-13

Table 3.12 Traffic & Revenue Comparison – Express Lanes/Concept 1 (Full) vs. Express Lanes/Concept 2 (Partial)....3-14

Table 3.13 Express Lanes Traffic & Revenue Comparison – Full vs. Partial Corridor, Segments 4 and 5 only, 2020-2059....3-15

Table 4.1 I-95 Improvement Program Express Lane Financial Feasibility Comparison....4-2

Table 5.1 Opening Schedule and Length for Express Lanes on I-95....5-2

Table 5.2 Estimation of Crash Delay....5-4

Table 5.3 Economic Impacts of Business as Usual (BAU) Compared to the Baseline Economic Forecast, 2014-2050....5-6

Table 5.4 Economic Impacts of Express Lanes/Concept 1 Compared to Business as Usual (BAU), 2014-2050....5-8

Table 5.5 Economic Impacts of Express Lanes/Concept 2 Compared to Business as Usual (BAU), 2014-2050 5-9
Table 5.6 Summary of Economic Impacts of Express Lanes Concepts, 2014-2050 5-10

LIST OF APPENDICES

Appendix A Traffic Demand Estimates A-1
A-1: 2020 Express Lanes/Concept 1 Toll Scenario…….....A-1
A-2: 2040 Express Lanes/Concept 1 Toll Scenario…….....A-46
A-3: 2020 Express Lanes/Concept 2 Toll Scenario…….....A-95
A-4: 2040 Express Lanes/Concept 2 Toll Scenario…….....A-111
Appendix B Traffic & Revenue Results.....B-1

Chapter 1
Introduction/Study Purpose

This report documents an examination by the North Carolina Department of Transportation (NCDOT) of the feasibility and effectiveness of implementing tolled "Express Lanes" on Interstate Highway 95 (I-95) in North Carolina as a strategy for addressing growing congestion problems on that highway and for generating needed revenue for funding of improvements. This chapter provides an overview of the need for I-95 improvements and evaluations that have been completed prior to this express lane examination.

1.1 I-95 IMPROVEMENT NEEDS

NCDOT has identified the need for over $4.5 billion (2011$) in improvements to the 182-mile portion of I-95 that traverses the eastern part of the state from South Carolina to Virginia. Roadway construction was initiated in the mid-1950s with final sections constructed in the 1980s. Much of the corridor remains basically the same four-lane divided highway as when it was built, and there are sections that do not meet current design and operating standards in terms of design, physical condition, and levels of congestion.

The need for an I-95 improvement program in North Carolina is based on the evaluation of existing and future conditions along I-95. This aging facility has geometric and structural deficiencies, a higher than statewide average fatal crash rate for interstates, and capacity deficiencies. Specifically, portions of this aging facility do not meet current roadway geometric requirements, horizontal clearances, sight distances, interchange ramp designs, and interchange spacing. Many of its bridges are substandard, having a remaining life of less than 20 years. Some bridges have less than five years of remaining life. There are also areas of I-95 that are in need of extensive pavement reconstruction. A safety analysis of the I-95 corridor revealed that fatal crashes are an issue in certain counties. Traffic operations and existing Levels of Service (LOS) are already an issue during certain times and in certain locations, and are predicted to deteriorate throughout the 182-mile corridor in the future.

As a result of concern that traditional funding streams would not allow the timely implementation of badly needed improvements to this critical corridor, NCDOT began an examination of alternative funding strategies in the mid-2000s.

1.2 PRINCIPAL NCDOT I-95 WORK ELEMENTS TO DATE

To address the immediate and long-term needs of the corridor, NCDOT developed improvement design concepts and conducted an evaluation of funding options. This study is referred to as the I-95 Planning and Finance Study. The recommended improvement design concepts and funding options were presented for public comment as part of the *I-95 Planning and Finance Study Environmental Assessment* (*I-95 EA*, January 2013), with the recommendation that the state consider widening (to 6-8 lanes) and implementation of tolls along the corridor as the basis for generating the revenue needed to fund an accelerated improvement and reconstruction program. The *I-95 EA* was made available for public comment in January 2012.

At the same time that the *I-95 EA* was being prepared, NCDOT was preparing a financial plan and processing an application to the Federal Highway Administration (FHWA) for entry into the Interstate

System Renewal and Replacement Pilot Program (ISRRPP). The ISRRPP program authorizes FHWA to test the feasibility of implementing user tolling along an existing Interstate highway corridor in up to three states. Under the ISRRPP, the toll revenue would replace federal Highway Trust Fund revenue to finance needed corridor improvements. In June 2013, the *I-95 Financial Plan was completed*. That report demonstrated that tolling of I-95 would generate sufficient revenue to fully fund and accelerate completion of the $4.5 billion program.

One of the most frequently voiced comments during the *I-95 EA* Public Hearings, held in February 2012, was concern that full tolling of the roadway would have a severe adverse impact on the economy of communities and businesses in the I-95 corridor. In response, NCDOT agreed to conduct a more thorough review of the impact on the local, regional, and statewide economy if tolling were implemented on I-95. That study, referred to as the report titled *I-95 Economic Assessment*, was completed in June 2013. It concluded that, while tolling would impose some economic impacts, the benefits of improved transportation and of an accelerated construction program would far outweigh toll costs on I-95 users.

1.3 CALL FOR EXAMINATION OF FEASIBILITY OF LIMITED I-95 TOLLING (EXPRESS LANES)

In 2013 the NC House of Representatives passed House Bill 267 (HB 267) to restrict the imposition of tolls on existing highways to only any new capacity. As of this writing, the bill remains under consideration by the state senate. Such new capacity lanes, which are frequently restricted to automobiles only, are referred to in this study as “Express Lanes”. Under the proposed legislation, tolling of existing lanes of traffic (general use lanes) such as would be required under the Full-Toll improvement scenario considered in the *I-95 EA* would be prohibited.

To examine this approach to funding I-95 improvements, NCDOT has conducted a study referred to as the I-95 P&FS – Express Lane Assessment, an assessment of costs, traffic impacts, revenue potential, financial feasibility, and economic impact of a more limited express lane concept on I-95. This report documents that evaluation, with comparisons to the Full-Toll Scenario of tolled general use lanes as presented in the *I-95 Financial Plan.* This report presents the following:

- Express lane concept development and construction costs
- Traffic implications and revenue potential
- Financial feasibility
- Economic impacts

Chapter 2
Express Lane Concept Development

Tolled Express Lanes are also sometimes referred to as managed lanes, high occupancy vehicle, or high occupancy vehicle/toll lanes, depending on application and objectives. In any case, Express Lanes are generally separated by a physical barrier or by pavement marking and regulatory signing, and access is limited to qualifying vehicles, whether high-occupancy vehicles, tolled vehicles, or other special classes such as trucks. Express Lanes are usually constructed as part of the improvement and reconstruction of an existing highway. Principal objectives of Express Lanes are to offer improved, more reliable travel speed, to encourage ride sharing, or to remove heavy, slower vehicles (trucks) from more congested lanes, thereby improving traffic flow in the remaining general purpose lanes. In cases where Express Lanes are tolled, a second objective is generation of revenue through tolling, to offset at least a portion of the cost of construction and operation.

In North Carolina, in response to concern over the economic impact of conversion of I-95 or other existing "free" highways to tolled facilities, consideration has been given to restricting tolling to only the new capacity that would be created by express lane construction.

2.1 EXPRESS LANE CONCEPTS CONSIDERED

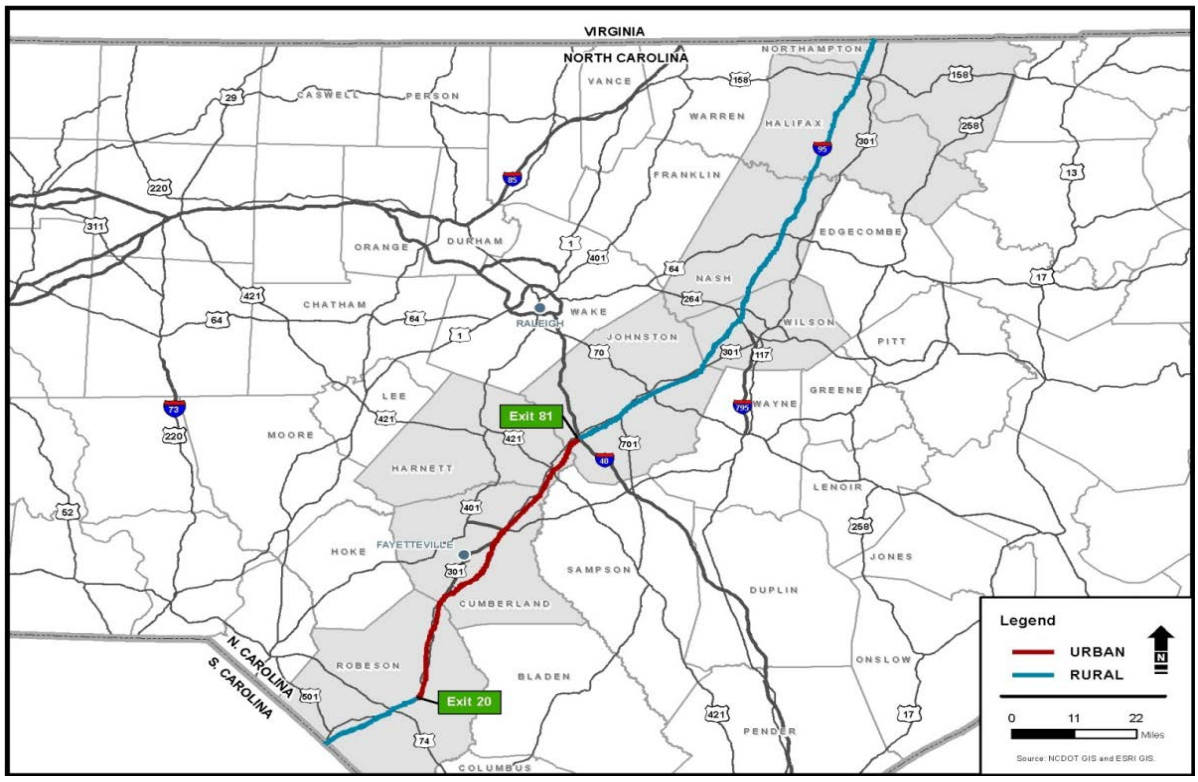
In identifying the Express Lane concepts that would be developed and evaluated for this study, a "guiding principle" was identified by NCDOT: to maximize toll revenue and minimize life cycle cost. The following elements were incorporated into the express lane concepts:

- Two Express Lane concepts were developed.
    - **Express Lanes/Concept 1** would examine a complete express lane installation, from South Carolina to Virginia, for the full 182 mile corridor; this would allow comparison of costs, operational improvements, and traffic and revenue potential to the Full-Toll Scenario presented in the EA.
    - **Express Lanes/Concept 2** would examine a more limited express lane application in the more heavily traveled sections of the corridor, to maximize traffic using the Express Lanes and resulting revenue potential. This would be done by examining traffic diversion results from the full-corridor concept. Express Lanes/Concept 2 as examined in this assessment would extend from south of Lumberton (Mile Marker [MM] 14) to the I-40 interchange in Johnston County (MM 81), a distance of 67 miles. The limits of Express Lanes/Concept 2, which correspond to Phase 1 construction phase of the Full-Toll Scenario, are shown in **Figure 2.1**. In the *I-95 Financial Plan*, the Phase 1 project is also referred to as the Urban Project. The Phase 2 segment projects were referred to as the Rural Projects.
- Cross-section: to minimize express lane construction cost, a "double-stripe" lane separation treatment was assumed; it is recognized that this could increase opportunity for lane violation.
- Toll rates: the Express Lane concept assumes that tolls would be charged for express lane use. To test the Express Lane concepts, a per mile toll rate for Express Lanes/Concept 1 corresponding to the Full-Toll scenario was the basis for estimating usage of the toll lanes and the resulting

revenue. This assumption allowed a straight-forward comparison of use and financial feasibility to the Full-Toll scenario that was applied to the full corridor. For Express Lanes/Concept 2, toll rates were adjusted to maximize revenue.

- Lane requirements: for Express Lanes/Concepts 1 and 2, the same 2 and 4-lane additions as in the Full-Toll scenario were assumed.
- Express lane eligibility: it was assumed that express lane access would be limited to autos only as trucks would not be eligible for express lane use, and that there would be no waiver of tolls for high occupancy vehicles or for local traffic.
- Section limits and construction phasing: to allow consistent analysis and comparison to the Full-Toll scenario, Express Lane concept phasing and section limits matched the phasing plan assumed for financial analysis of the Full-Toll scenario. Corridor construction phasing would mirror full-toll in segment limits and timing.

Figure 2.1: Refined Preferred Design Concept and Scope



2.2 EXPRESS LANE CONSTRUCTION COST

As summarized in **Table 2.1**, the cost of Express Lane/Concept 1, adding the same number of lanes as Express Lanes to the entire length of I-95 as the Full-Toll Scenario, could total $2.84 billion (2011$). The cost difference between Express Lane/Concept 1 and the Full-Toll scenario cost has to do with the extent to which other corridor reconstruction needs are addressed. The cost of the Full-Toll concept includes full reconstruction of pavement, bridges, and interchanges that would not be included in building only

Express Lanes. Engineering studies performed during the I-95 Planning and Finance Study concluded that within the study period (by 2040) all pavement and bridges along the entire 182 miles will need to be replaced due to age and deterioration. It can be reasonably assumed that the cost of the remaining needed reconstruction under Express Lane/Concept 1 would be the $1.71 billion difference between those two scenarios.

Table 2.1: I-95 Improvement Program Full Toll and Express Lane Cost Comparison

I-95 Improvement Program (SC state line to VA state line)
Capacity Expansion Capital Cost Estimate (2011 $, Millions)

	Full Toll Scenario (1)	Express Lane/Concept 1 (Express Lanes for full corridor length) (2)	Express Lane/Concept 2 (Express Lanes for Full-Toll Scenario, Phase 1) (3)
Construction Total	$4,543 M	$2,840 M	$1,307 M

Source: Atkins, for *I-95 Financial Plan* (2012) and for I-95 Express Lane Assessment (2013). Additional detail available.

Notes:

1. Capacity Expansion Capital Cost for Full Toll Scenario includes full reconstruction of pavement and bridges. As developed and evaluated for *I-95 Financial Plan* (July 2013) and I-95 EA (Spring 2012), two construction phases were identified. Phase 1 (between mile markers 14 in Robeson County) and 81 (Johnston County), adds two lanes in each direction. Phase 2 (the remainder of the 182 mile corridor) adds one lane in each direction. Full-Toll scenario includes cost of four small new or accelerated projects not included in phased construction program.
2. Express Lane/Concept 1 would implement Express Lanes through entire 182-mile corridor on phased construction program basis. Lane additions would match the Full Toll scenario of two lanes in each direction in Phase 1 segments and one lane in each direction in Phase 2 segments. In some segments, existing roadway geometry requires full reconstruction of segment as part of express lane construction, including full pavement and bridge replacement. Cost also includes toll equipment capital costs. An additional $$1.71 billion would be required to complete needed reconstruction. For Express Lane scenarios, cost of four projects captured in "Balance of Needed Reconstruction" cost, since assumed not eligible for toll financing.
3. Limits of Express Lane/Concept 2 are the same as Phase 1 of the Full-Toll scenario: from approximately MM 14 in Robeson County (Robeson Segment 2) to MM 81 in Johnston County, including the I-40 interchange (Johnston Segment 1); Phase 1 length = 67 miles. Cost also includes toll equipment capital costs.

The estimated construction cost of Express Lane/Concept 2 between MM 14 in Robeson County and MM 81 in Johnston County (just north of the I-40 interchange) would be $1.31 billion (2011$). As with Express Lane/Concept 1, the cost of this concept includes some reconstruction where the existing median is too narrow to accommodate express lane construction without rebuilding the entire roadway, but does not include major needed reconstruction and safety improvements in the remaining 114 miles or portions of the 67 miles included in Express Lanes/Concept 2 that would not be reconstructed as part of express lane construction. Nor does it address the longer-term capacity enhancement needs within the corridor. In current dollars (2011$), the corridor would still require an additional $3.2 billion for improvements and reconstruction.

Chapter 3
Traffic and Revenue Forecasts

3.1 TRAFFIC FORECASTS

3.1.1 Overview of the Forecasting Approach

The I-95 Corridor Travel Demand Model (CTDM), enhanced by Cambridge Systematics (CS) for the Economic Assessment, was used to study tolls across all lanes along I-95 in North Carolina. However, this model was not considered to be appropriate for purposes of this study. The primary reason to rule out the use of the CTDM was that it is a twenty-four hour model, whereas the demand for express toll lanes in a corridor that is predominantly rural will likely be during a peak period. The model does not have the ability to simulate traffic conditions during periods less than a day given that it is a daily model. Further enhancement of the model was considered, but quickly rejected due to the level of effort, data needs and time constrains of the study.

A spreadsheet model was developed using information from the enhanced CTDM (referred to as the CS I-95 Model), in addition to other sources such as the North Carolina Statewide Travel Demand Model, several NCDOT data sources, and models developed by CS based on willingness-to-pay types of surveys conducted in other parts of the country. This section describes the travel demand modeling methodology, assumptions, and results of the I-95 Express Lanes.

The analysis years were 2020 and 2040, and northbound and southbound traffic were analyzed separately. The baseline data used to run the model is contained in the spreadsheet. It is anticipated that the model will be enhanced over time and can be modified and formatted as individual users choose. The following sections describe the tool structure and resulting traffic and revenue projections.

3.1.2 Traffic Forecasting Tool Structure

The functionality and content of the forecasting tool are described below.

Horizon Years

Horizon year 2020 and 2040 forecasts were developed in separate spreadsheets, using the spreadsheet model. The 2020 spreadsheet model used as inputs the 2020 No Toll vehicle miles traveled (VMT) values from the enhanced CTDM. The VMT was stratified into ten Auto categories, nine of which represent local trip purposes as well as truck trips. The stratification was done based on the I-95 trip purpose proportions obtained from the North Carolina Statewide Travel Demand Model.

Similarly, for 2040, the inputs used corresponded to stratified 2040 No Toll VMT from the CS developed I-95 model. The 2020 and 2040 spreadsheet models for toll effect analysis also differed in that the 2020 model reported figures only for the Segment defined as Phase 1 or “urban” which corresponds to the stretch between mile post 81 (MP 84) and mile post 14 (MP 14) which are located at I-40 and Lumberton, NC, respectively. For 2040, volumes for the entire segment are reported. This is based on the development plan discussed in Section 3.2.1 which indicates the Phase 1 segment will open to traffic in 2020 and the additional lanes along the remainder of the corridor will be open to traffic by 2040. The

same toll rates were used for both years with inflation being addressed in the detailed revenue analysis phase of the project.

The input to the traffic forecast model consists of data for each of the eighteen toll gantries representing segments spaced ten miles apart, along the I-95 corridor. The data includes daily modeled vehicle miles traveled, adjustment factors for peak hours, weekend, and summer months, facility capacity measures and toll choice parameters. Each is described below.

Daily Modeled Vehicle Miles Traveled (VMT)

The total daily vehicle miles traveled (VMT) for each of the eighteen segments was derived from the enhanced Corridor Travel Demand Model (CTDM) used on the I-95 Economic Assessment. The data was further broken down by purpose based on percentage splits obtained from the NC Statewide model. Other data include tolls per segment (2009$), the length of each segment in miles, free flow speed and travel times, and congested segment travel times from the enhanced CTDM.

Adjustment Factors

Different adjustment factors were used to generate the express lane use forecasts. The *Summer Adjustment* factor is derived from available count data along the I-95 corridor and reflects the higher (by 22 percent) summer traffic compared to the annual average daily traffic. A *Peak to Daily* factor is used to convert from daily to peak hour traffic, and a *Peak Hour to Period* adjustment converts a peak hour to peak period or vice versa. Finally, the *Seasonal Adjustment* factors are used to determine the summer months from average monthly count data in the corridor. Summer is defined as the months of June through August. Peak hour to period adjustments were used to account for highest hour within peak.

Facility Capacities

Specific facility capacities were derived from the travel demand model. Other measures of capacity, explained below, were calculated from information such as peak period durations derived from count data along the corridor, the number of general purpose and tolled lanes, and peak weekday and summer weekend factors.

Daily Capacity Mile was calculated by multiplying daily segment capacity by length. To get *Hourly Capacity*, the daily capacity was divided by a *Peak to Daily factor*, usually in the range of eight to ten.

The *Period Duration*, which represents the number of hours in a weekday or summer weekend with the highest traffic volume, was calculated from twenty four hour data available at three locations along I-95. The peak duration was estimated by calculating the number of hours in a day with volumes greater than the 80^{th} percentile. It was considered reasonable to assume that the number of peak hours in the peak period, in this corridor, would be compared to a typical urban area, which could have between six and eight peak hours in the peak period. The average peak period duration was calculated to be four hours in this corridor.

The *Peak Period Capacity Mile* was computed separately for weekdays and summer weekends, by multiplying the hourly capacity mile by the peak period duration, adjusting for peak hour to period effects, and prorating by number of general purpose (GP) or toll lanes.

Peak period factors were developed from traffic count history at three locations along I-95 for which counts were available. The methodology utilized to develop the factors involved extrapolating the peak period volumes to a daily period and then dividing by the observed daily volumes. The extrapolation was

done by multiplying the peak period by the ratio of daily to peak period duration. The resulting number then represents a hypothetical scenario where the peak behavior is extended throughout the day i.e. the entire day displays peak travel characteristics. Dividing this hypothetical scenario by the actual volume gives a sense of the magnitude of the peaking effect. A large number indicates that the maximum (peak) daily volume is significantly larger than the average daily volume and resembles a spike when plotted on a graph of volume by time of day. Subsequent paragraphs will explain how these derived peaking factors were applied in the analysis.

Four separate sets of peaking factors were calculated. They included:

1. A weekday peak representing the peaking characteristics of the first four days of the work week from Monday to Thursday;
2. A Friday peak for non-summer months. The summer months were defined as June through August;
3. A Friday peak for summer months only; and
4. A weekend peak representing Saturdays and Sundays.

Summer Fridays were treated differently from non-summer Fridays. Data in this corridor suggests that summer Fridays behave more like a weekend day than a weekday whereas the opposite is observed for the months in the rest of the year.

The split Friday numbers were then allocated to weekend or weekday procedures depending on the analysis being undertaken. For summer weekends, it was aggregated with weekends in the analysis whereas for weekday analysis, it was aggregated along with the other weekend days.

Toll Choice Parameters

The toll choice model parameters were derived from data obtained from a stated-preference survey conducted in Denver, Colorado. The data used only included samples with income levels between $50,000 and $59,000 per year, consistent with average NC incomes. It was found that the toll choice model is sensitive to delays generally greater than one minute.

Table 3.1 presents a list of general assumptions made.

Weekday Peak & Summer Weekend Peak

As a next step to the modeling process, weekday peak and summer weekend peak periods were estimated by the eighteen toll gantries. Each component of the peak weekday and peak summer weekend is further detailed below.

Peak Period VMT were calculated by multiplying hourly VMT (Daily VMT / 24) by the peak duration and the peak adjustment factor, derived from available traffic count history. The peak period VMT was also broken down by purpose.

Travel time savings, a key input to the model that estimates the attractiveness of express toll lanes, was estimated by segment, both in the general purpose (GP) and express toll lanes. Free flow travel times were computed from the segment lengths and assumed free flow speeds reported by the enhanced CTDM. The Bureau of Public Roads (BPR) equation (shown below) was used to estimate congested travel times.

Table 3.1: I-95 General Assumptions Used in Development of Traffic Forecasts
Tolls are reported as a rate per mile;
o Diversion constants and coefficients from prior CS model development efforts;
o Analysis done by peak period volume;
o Peaking factors (Peak weekday and Peak summer weekend) derived from actual historical count data along I-95 at three different locations. Specific numbers used correspond roughly to locations of the count data;
o Analysis done by factoring for segment mileage. Hence VMTs and capacity miles rather than volumes and capacity;
o Trip purposed derived by applying NC Statewide model purpose output percentages to enhanced CTDM assigned volumes for corresponding locations; and
o CPI used to adjust toll rates 2009$ to 2011$.

$S_a (v_a) = t_a (1+\alpha (v_a/c_a) \wedge \beta)$

- t_a = free flow travel time on link *a* per unit of time
- v_a = volume of traffic on link *a* per unit of time (somewhat more accurately: flow attempting to use link *a*).
- c_a = capacity of link *a* per unit of time
- $S_a(v_a)$ is the average travel time for a vehicle on link *a*

α and β were assumed to be 0.15 and 4 respectively.[1]

The percentage of traffic (by purpose) using the express tolled lanes was estimated using a logit model based on toll parameters.

Aggregated Weekday Peak & Aggregated Summer Weekend Peak

During the development of the traffic forecasts, it became apparent that the resulting estimated toll lane use was higher (in some cases by 20 percent or more) than would be rationally expected given the proposed operating toll scenario. Closer examination revealed that the resulting travel time savings of less than one minute on average meant the toll choice equation was being used outside the bounds for which it was estimated. The resulting express toll lane use percentages were thus inappropriate for the conditions at hand.

To rectify this situation, the eighteen toll gantry segments were combined in an effort to increase the average travel time savings into a range for which use of the equation was applicable. As shown in **Figure 3.1**, the eighteen segments were thus aggregated into six segments. Segment 3 and Segment 6 are

[1] TMIP Online, Technical Synthesis: Speed Adjustments Using Volume-Delay Functions. (http://tmiponline.org/Clearinghouse/Items/Technical_Synthesis_-_Speed_Adjustments_Using_Volume-Delay_Functions.aspx)

longer (4) and shorter (2) respectively, in order to ensure that the segments coincided with planned project phasing. The aggregation was done to the distances, the travel times, and associated savings as well as the toll amounts used for calculation. The end result was that the toll use results seemed more reasonable for the given conditions being below ten percent. **Table 3.2** describes the start and end points of each segment.

Table 3.2: Description of the Six Toll Segments

Segment	Description
1	VA Border to NC NC-481
2	NC 481 to I-795 / US-264 / US-117
3	I-795 / US-264 / US-117 to I-40
4	I-40 to NC 24
5	NC 24 to NC 211
6	NC 211 to SC Border

3.1.3 Vehicle Miles Traveled

Daily vehicle miles traveled (VMTs) for all lanes, as well as VMT in the general purpose and tolled lanes were estimated separately. This was done for the six consolidated segments. The Daily VMT forecasts were estimated by direction and for weekday and summer weekend, separately. This information was used to calculate average daily revenue that was used to calculate annualized revenue.

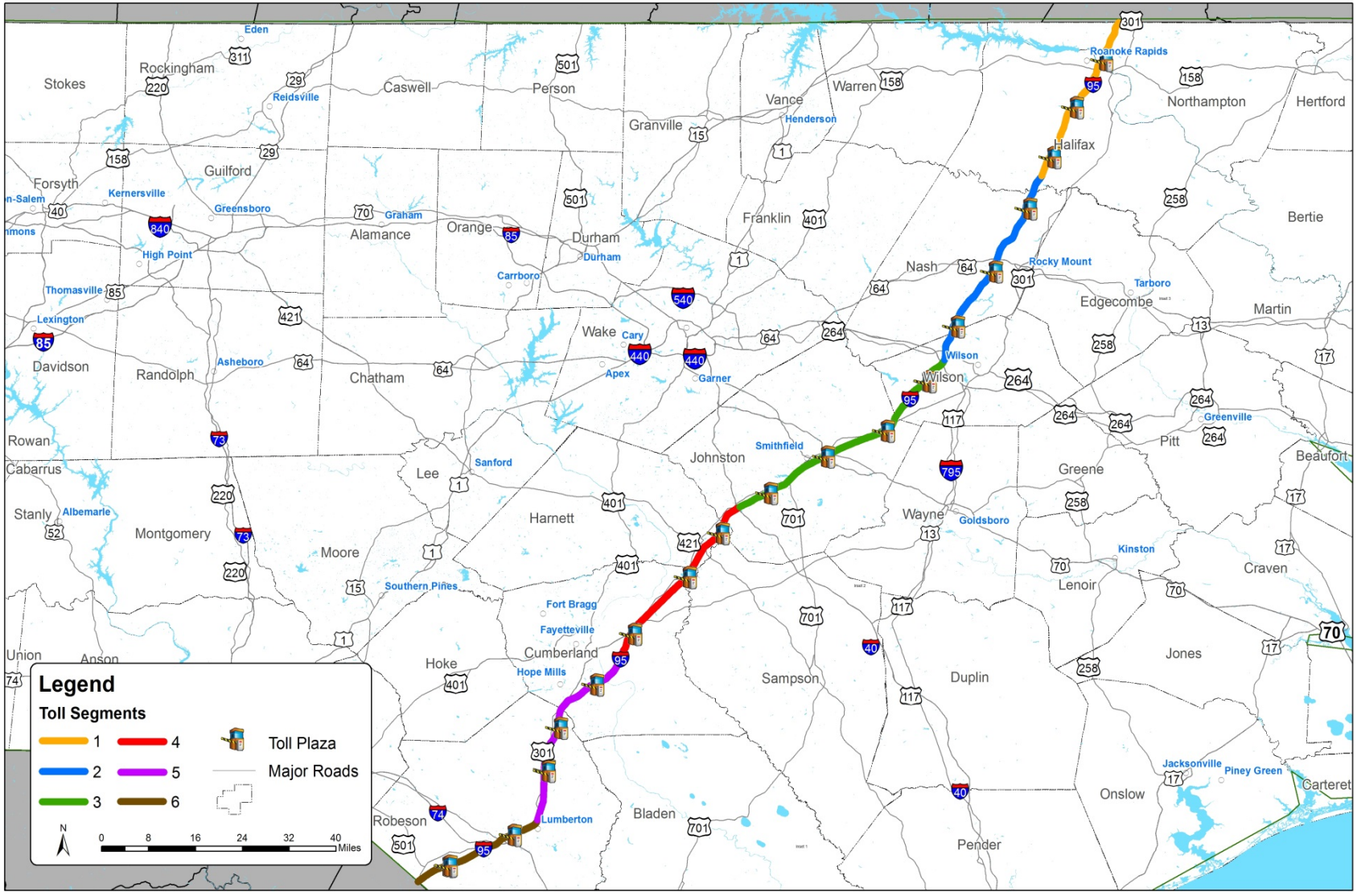
The daily revenue amounts for both directions of travel were used to calculate the annualized outputs. As mentioned earlier, Fridays were treated in a special manner, being split up into summer and non-summer portions and aggregated accordingly.

To annualize the weekday numbers, the daily weekday outputs were multiplied by 365 and then further multiplied by 4/7 (the fraction of a week that is represented by Mondays through Thursdays). This assumes that the average year is not a leap year. For Fridays, the daily Friday outputs were multiplied by the number of non-summer days in the year and then multiplied by 1/7 (the portion of the week that is Friday). This was then added to the previously calculated weekday total.

To annualize the weekend, the daily summer weekend outputs were multiplied by the total number of days in summer and then further multiplied by 2/7 (the fraction of the week represented by Saturdays and Sundays). There is allowance for further adjustment by an off peak patronage factor should the assumption about no toll lane use in off peak period change. For Fridays in summer, the outputs were calculated by multiplying the daily Friday summer output by the total number of summer days (June, July and August) and further multiplying by 1/7 to calculate Friday specific amounts. The total is then added to the weekend total. Finally, the weekend and weekday outputs were summed to give the total annual estimated toll lane use.

Although annualized revenue forecasts were developed in this model, they were not considered the recommended revenue forecasts. Annualized VMT numbers fed into the detailed revenue generation which is discussed in Section 3.2.

Figure 3.1: Combined Toll Segments



3.1.4 Results

This section presents the results of the full and partial corridor express toll lane demand forecasting effort, drawing on examples of the results produced from the effort. **Table 3.3** presents a dictionary explaining the trip purposes. Weekday and summer weekend toll lane use forecasts were developed for horizon years 2020 and 2040. Initially, percentage weekday toll lane use was developed for all eighteen toll sections (full corridor toll scenario), as presented in **Table 3.4**, which presents year 2020 toll choice percentages broken down by trip purpose. Based on experience on similar toll projects and empirical data on toll lane use, these toll lane use percentages appeared high for the range of tolls used in the analysis and travel time savings. As can be seen from **Table 3.5**, travel time savings for many segments was estimated to be less than a minute. The same applied to both weekday and summer weekend travel. As explained earlier measuring shifts from the general purpose to toll lanes for a travel time savings of less than one minute is out of the applicable range of the model.

As a solution to the problem, the eighteen toll gantry locations were consolidated into six segments so that travel time savings per segment are higher in value and more meaningful in terms of the traffic forecasting tool. **Table 3.5** illustrates percentage use of toll lanes for the six consolidated segments, during a typical weekday peak period for the year 2020. The range of percentages in **Table 3.5** is between 3 and 9 percent, significantly lower than the percentage toll lane use for the eighteen segments presented in **Table 3.2**. **Table 3.6** presents 2020 toll lane use in the six segments along I-95 for summer weekends. The percentage use is similar to the weekday use.

Express Lanes/Concept 2 which featured Express Lanes between the intersection of I-95 and I-40 (MP 81), and Lumberton (MP 14) (partial toll scenario), was tested using the same tolls used in the Express Lanes/Concept 1 (Full Corridor Toll) scenario. Although the percentage of traffic using the express toll lanes did not vary, the cost/benefit is likely to have variance. This information is beyond the scope of this memorandum.

A third scenario based on Express Lanes/Concept 2 was tested using toll rates which were reduced by 50 percent (**Table 3.7**). As expected, the segments with reduced tolls were estimated to have a higher patronage as seen for segments 4 and 5 in **Table 3.7**. **Table 3.8** displays the difference in annualized VMT and revenue results for alternative toll rates for Express Lanes/Concept 2. The total VMT in the half toll scenario is significantly higher when compared to the full toll scenario. Note that the tables represent either northbound (NB) or southbound (SB) results as a sample. Note that the complete results are presented in **Appendix A**.

3.2 TOLL REVENUE FORECASTING FOR FINANCIAL PLAN

Gross toll revenue projections from opening year 2020 and over the next 40 years (2020 – 2059) were developed using the traffic forecasts for years 2020 and 2040 for the two Express Lanes concepts described above. Assumptions applied to the traffic and revenue (T&R) forecast are summarized below.

Table 3.3:Trip Purposes Imported from NC Statewide Model Used for Stratification	
Purpose	Description
HBW_i1	Home based work Income Category 1
HBW_i2	Home based work Income Category 2
HBW_i3	Home based work Income Category 3
HBW_i4	Home based work Income Category 4
HBW_i5	Home based work Income Category 5
HBO	Home based other
HBS	Home based shopping
NHB	Non home based – Not at work
NHB_AW	Non home based – At work
Long Distance Auto	Long Distance Trips by Auto

3.2.1 Assumptions

Traffic and gross revenue projections were developed using the construction schedule developed for the *I-95 Financial Plan*.[2] Toll revenue collection was assumed to be phased in, beginning in 2020 with the completion of Segments 4 and 5, and with full toll collection in place by 2032 after construction is completed in Segment 6. **Table 3.9** shows opening year by segment and gantry. The toll collection schedule is assumed as follows:

Year 2020: Segments 4 and 5

Year 2021: Segment 3

Year 2025: Segment 2

Year 2028: Segment 1

Year 2032: Segment 6

3.2.2 Traffic and Revenue Estimates

The annual traffic estimates were developed by assuming lineal growth between 2020 and 2040. Post-2040, the compounded annual growth rate over the 2020-2040 period was applied. No leakage or ramp-up assumptions were applied to gross revenue estimates and 2.5 percent inflation was applied to toll rates (based on *I-95 Financial Plan*[3] assumptions). A brief summary of the Traffic and Revenue (T&R) results by concept is presented below. Detailed T&R results are included in **Appendix B.**

[2] North Carolina Department of Transportation, *I-95 Planning and Finance Study: I-95 Financial Plan*, July 2013.

[3] Ibid

Table 3.4:Estimated 2020 Shift from General Purpose to Toll Lanes – 18 Segments (Weekday NB)													
			Percentage Toll Use										
I-95 Toll Gantry	Travel Time Savings on Toll Lane (in minutes)	Toll Value (2011$)	HBW_i1	HBW_i2	HBW_i3	HBW_i4	HBW_i5	HBW	HBS	NHB	NHB_AW	Long Distance Auto	Truck
1	0.2	0.88	18.7%	18.7%	18.7%	18.7%	18.7%	14.3%	14.3%	14.3%	18.7%	14.3%	0.0%
2	0.3	1.30	15.7%	15.7%	15.7%	15.7%	15.7%	11.9%	11.9%	11.9%	15.7%	11.9%	0.0%
3	0.2	0.72	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
4	0.2	1.33	15.3%	15.3%	15.3%	15.3%	15.3%	11.6%	11.6%	11.6%	15.3%	11.6%	0.0%
5	0.2	0.88	18.5%	18.5%	18.5%	18.5%	18.5%	14.2%	14.2%	14.2%	18.5%	14.2%	0.0%
6	0.3	1.33	15.6%	15.6%	15.6%	15.6%	15.6%	11.8%	11.8%	11.8%	15.6%	11.8%	0.0%
7	0.3	1.31	15.6%	15.6%	15.6%	15.6%	15.6%	11.9%	11.9%	11.9%	15.6%	11.9%	0.0%
8	0.7	0.94	19.1%	19.1%	19.1%	19.1%	19.1%	14.7%	14.7%	14.7%	19.1%	14.7%	0.0%
9	0.7	0.89	19.5%	19.5%	19.5%	19.5%	19.5%	15.0%	15.0%	15.0%	19.5%	15.0%	0.0%
10	0.8	0.92	19.5%	19.5%	19.5%	19.5%	19.5%	15.0%	15.0%	15.0%	19.5%	15.0%	0.0%
11	0.6	1.25	16.5%	16.5%	16.5%	16.5%	16.5%	12.5%	12.5%	12.5%	16.5%	12.5%	0.0%
12	1.0	2.32	10.7%	10.7%	10.7%	10.7%	10.7%	8.0%	8.0%	8.0%	10.7%	8.0%	0.0%
13	0.2	0.98	17.9%	17.9%	17.9%	17.9%	17.9%	13.6%	13.6%	13.6%	17.9%	13.6%	0.0%
14	0.1	1.98	11.3%	11.3%	11.3%	11.3%	11.3%	8.5%	8.5%	8.5%	11.3%	8.5%	0.0%
15	0.5	1.26	16.3%	16.3%	16.3%	16.3%	16.3%	12.4%	12.4%	12.4%	16.3%	12.4%	0.0%
16	0.8	1.83	13.0%	13.0%	13.0%	13.0%	13.0%	9.8%	9.8%	9.8%	13.0%	9.8%	0.0%
17	0.4	0.79	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
18	0.7	1.30	16.4%	16.4%	16.4%	16.4%	16.4%	12.5%	12.5%	12.5%	16.4%	12.5%	0.0%

Table 3.5:Estimated 2020 Shift from I-95 General Purpose to Toll Lanes – 6 Segments (Weekday SB)													
			Percentage Toll Use										
I-95 Segments	Travel Time Savings on Toll Lane (in minutes)	Toll Value (2011$)	HBW_i1	HBW_i2	HBW_i3	HBW_i4	HBW_i5	HBW	HBS	NHB	NHB_AW	Long Distance Auto	Truck
1	0.9	2.9	8.0%	8.0%	8.0%	8.0%	8.0%	6.0%	6.0%	6.0%	8.0%	6.0%	0.9
2	0.9	3.5	5.9%	5.9%	5.9%	5.9%	5.9%	4.4%	4.4%	4.4%	5.9%	4.4%	0.9
3	3.4	3.1	9.3%	9.3%	9.3%	9.3%	9.3%	6.9%	6.9%	6.9%	9.3%	6.9%	3.4
4	1.8	4.5	4.1%	4.1%	4.1%	4.1%	4.1%	3.0%	3.0%	3.0%	4.1%	3.0%	1.8
5	1.4	4.1	4.6%	4.6%	4.6%	4.6%	4.6%	3.4%	3.4%	3.4%	4.6%	3.4%	1.4
6	1.3	3.9	5.1%	5.1%	5.1%	5.1%	5.1%	3.8%	3.8%	3.8%	5.1%	3.8%	1.3

Table 3.6:Estimated 2020 Shift from General Purpose to Toll Lanes – 6 Segments (Summer Weekends NB)			
			Percentage Toll Use
I-95 Segments	Travel Time Savings on Toll Lane (in minutes)	Toll Value (2011$)	Long Distance Auto
1	0.9	2.9	5.9%
2	1.0	3.5	4.4%
3	3.0	3.1	6.7%
4	2.2	4.4	3.2%
5	1.6	4.1	3.4%
6	1.2	3.9	3.7%

Table 3.7:Reduced Toll (I-40 to Lumberton) – Estimated 2020 Shift from I-95 General Purpose to Toll Lanes (Weekday SB)												
			Percentage Toll Use									
I-95 Segments	Travel Time Savings on Toll Lane (in minutes)	Toll Value (2011$)	HBW_i1	HBW_i2	HBW_i3	HBW_i4	HBW_i5	HBW	HBS	NHB	NHB_AW	Long Distance Auto
1	0.9	2.90	8.0%	8.0%	8.0%	8.0%	8.0%	6.0%	6.0%	6.0%	8.0%	6.0%
2	0.9	3.54	5.9%	5.9%	5.9%	5.9%	5.9%	4.4%	4.4%	4.4%	5.9%	4.4%
3	3.4	3.18	9.3%	9.3%	9.3%	9.3%	9.3%	6.9%	6.9%	6.9%	9.3%	6.9%
4	1.8	2.69	9.8%	9.8%	9.8%	9.8%	9.8%	7.3%	7.3%	7.3%	9.8%	7.3%
5	1.4	2.09	12.4%	12.4%	12.4%	12.4%	12.4%	9.3%	9.3%	9.3%	12.4%	9.3%
6	1.3	3.01	8.0%	8.0%	8.0%	8.0%	8.0%	5.9%	5.9%	5.9%	8.0%	5.9%

Table 3.8:Annualized VMT and Revenue for Express Lanes/Concept 2 Using Alternative Toll Rates							
		Reduced Toll Rate		Full Toll Rate		Difference	
I-95 Segments	Segment Length	VMT	Revenue	VMT	Revenue	VMT	Revenue
4	29	12,145,409	$1,012,117	5,030,905	$670,787	27,056,547	$2,141,358
5	32	15,056,547	$1,129,241	5,512,358	$826,854	10,543,263	$1,497,641
Total	27,201,956	$2,141,358	10,543,263	$1,497,641	16,658,693	$643,717	27,201,956

Table 3.9:Opening Schedule and Toll Rates for Express Lanes on I-95				
Gantry	Segment	Opening Year	Express Lane Toll Rate – Express Lanes/Concept 1 (per mile, 2009$)	Express Lane Toll Rate – Express Lanes/Concept 2 (per miles, 2009$)
1	1	2030	0.10	
2	1	2028	0.10	
3	1	2028	0.10	
4	2	2027	0.10	
5	2	2025	0.10	
6	2	2025	0.10	
7	3	2024	0.10	
8	3	2022	0.10	
9	3	2022	0.10	
10	3	2021	0.10	
11	4	2020	0.15	0.075
12	4	2020	0.15	0.075
13	4	2020	0.15	0.075
14	5	2020	0.15	0.075
15	5	2020	0.15	0.075
16	5	2020	0.15	0.075
17	6	2032	0.10	
18	6	2032	0.10	

Express Lanes/Concept 1:

This scenario assumes that Express Lanes will be built along the 182-mile corridor, with toll rates between $0.10 and $0.15 per mile ($2009). The forecast assumes that Segments 4 and 5 will open first, with full operation by 2032. **Table 3.10** summarizes the 2020, 2040, and 40-year total (2020-2059) traffic (vehicle miles traveled, VMT) and gross revenues in year-of-expenditure (YOE) dollars.

Table 3.10:Express Lanes/Concept 1: Full Corridor, Traffic & Revenue Results		
Year	Traffic (VMT)	Gross Revenues (YOE$)
2020	7,764,000	$ 1,529,500
2040	37,858,500	$ 9,278,200
2059	48,934,500	$ 19,258,800
2020-2059	1,402,936,012	$ 383,826,900

Express Lanes/Concept 2: Express Lanes between I-40 and Fayetteville

This scenario assumes that Express Lanes will be built only between I-40 and Lumberton (Segments 4 and 5), covering about 61 miles on I-95. Toll rates are assumed at $0.075 per mile ($2009), or 50 percent of the toll rate applied in Express Lanes/Concept 1 (full corridor). The Express Lanes are assumed to open by 2020. **Table 3.11** summarizes the 2020, 2040, and 40-year total (2020-2059) traffic (vehicle miles traveled, VMT) and gross revenues in year-of-expenditure (YOE) dollars.

Table 3.11:Express Lanes/Concept 2: Partial Corridor, Traffic & Revenue Results

Year	Traffic (VMT)	Gross Revenues (YOE$)
2020	20,115,800	$ 1,971,300
2040	27,201,900	$ 4,379,500
2059	36,263,200	$ 9,356,000
2020-2059	1,100,158,800	$ 191,142,100

3.2.3 Comparison of Express Lanes Scenarios

Comparing total toll revenues over 40 years, Express Lanes/Concept 2 (partial Express Lanes) is forecast to generate $191.1 million, which is approximately half of the total revenues forecast compared to the full Express Lanes (Concept 1) along I-95 at $383.8 million (See **Table 3.11**). Note that toll rates on the partial Express Lanes are assumed at 50 percent of the toll rates applied in the full corridor Express Lanes concept.

As shown in **Table 3.12**, VMT over 40 years (i.e., 2020-2059) on Express Lanes/Concept 2 is estimated at approximately 78 percent of the VMT forecast on the full corridor (Express Lanes/Concept 1). On year 2020, when both Express Lane concepts are the same in terms of length, however, T&R forecasts for Express Lanes/Concept 2 are higher because of the lower toll rate. A reduction of toll rates by 50 percent in Express Lanes/Concept 2 is estimated to result in a VMT increase of 159 percent and a revenue increase of 29 percent in Segments 4 and 5 of the corridor for year 2020. **Figure 3.2** shows the annual traffic and revenue for both scenarios.

Table 3.13 compares the VMT and revenue forecast between I-40 (MP 81) and Lumberton (MP 14) only (identified as Segments 4 and 5 in the travel demand model) for both Express Lanes concepts. **Figure 3.3** shows the annual traffic and revenue. Over 40 years, a 50 percent reduction in the toll rate could generate 29 percent more in toll revenues on Segments 4 and 5 ($148.4 million for Express Lanes/Concept 1 vs. $191.1 million for Express Lanes/Concept 2), because of the additional traffic attracted to the Express Lanes at the lower toll rate.

Table 3.12: Traffic & Revenue Comparison – Express Lanes/Concept 1 (Full) vs. Express Lanes/Concept 2 (Partial)			
TRAFFIC/VMT			
Year	Express Lanes/Concept 1 (Full)	Express Lanes/Concept 2 (Partial)	% of Partial Compared to Full
2020	7,764,000	20,115,800	259%
2040	37,858,500	27,201,900	72%
2059	48,934,500	36,263,200	75%
2020-2059	1,402,936,012	1,100,158,800	78%
REVENUE			
Year	Express Lanes/Concept 1 (Full)	Express Lanes/Concept 2 (Partial)	% of Partial Compared to Full
2020	$ 1,529,500	$ 1,971,300	129%
2040	$ 9,278,200	$ 4,379,500	47%
2059	$ 19,258,800	$ 9,356,000	49%
2020-2059	$383,826,900	$191,142,100	50%

Figure 3.2: Comparison of Annual Traffic and Revenue, Express Lanes/Concept 1 (Full) vs. Express Lanes/Concept 2 (Partial)

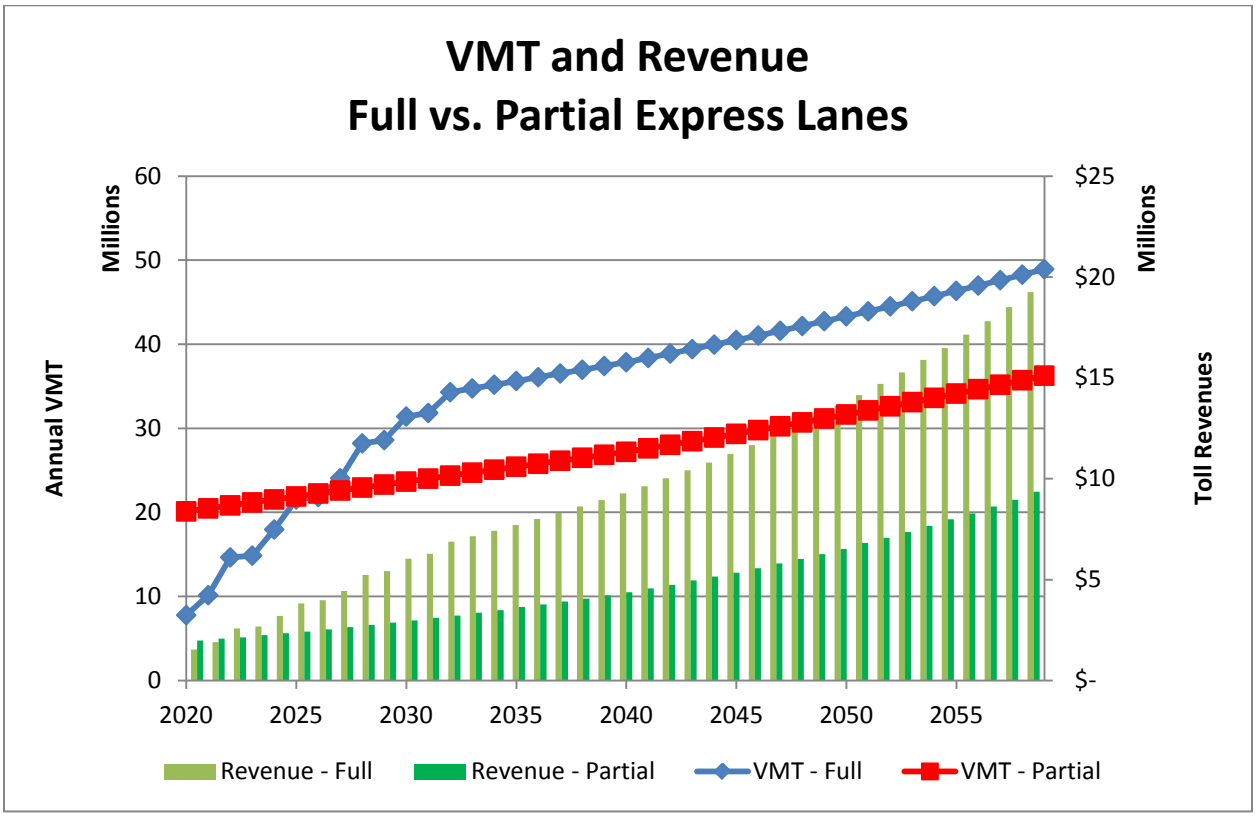
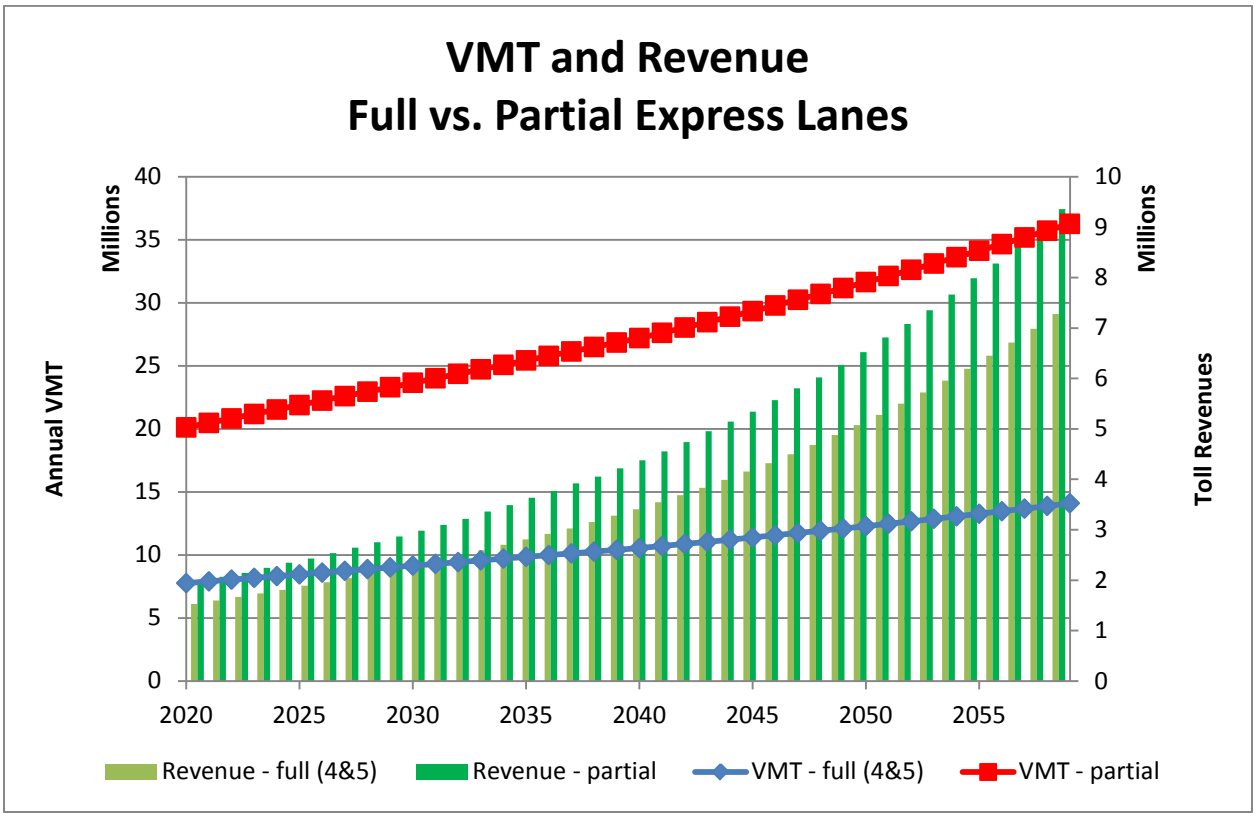


Table 3.13:Express Lanes Traffic & Revenue Comparison – Full vs. Partial Corridor, Segments 4 and 5 only, 2020-2059		
Year 2020-2059	Traffic (VMT)	Gross Revenues (YOE$)
Express Lanes/Concept 1: Full	426,477,000	$ 148,378,000
Express Lanes/Concept 2: Partial	1,100,158,800	$ 191,142,100
Partial vs. Full (% increase)	158%	29%
Express Lanes/Concept 1: Full	426,477,000	$ 148,378,000

Figure 3.3: Comparison of Annual Traffic and Revenue by Express Lanes Concept (for Segments 4 and 5 only)



Chapter 4
Express Lane Financial Assessment

The purpose of this chapter is to examine the ability of revenue streams generated by construction and tolling of Express Lanes implemented on I-95 to fund a significant portion of the long-term funding requirements for improving and reconstructing the highway. This assessment will consider the cost of constructing the Express Lanes, the traffic that could be induced to use those lanes, and the resulting revenues that Express Lane users might generate, all presented in previous sections of this report (Chapters 2 and 3). These data are used to estimate the potential coverage of costs by the toll revenue. For comparative purposes, the Express Lane financial assessment results will be compared to the financial feasibility analysis prepared for the Full-Toll scenario (tolling all lanes under authority of the federal ISRRPP pilot program, described previously).

4.1 EXPRESS LANE FINANCIAL FEASIBILITY ASSESSMENT

The *I-95 Financial Plan* that was prepared by NCDOT to support possible entry into the ISRRPP full-tolling pilot program presented a complete financial analysis and finance plan for using toll revenue generated from conversion of I-95 to a fully-tolled facility. That analysis and plan, summarized later in this chapter, considered life-cycle costs of expanding, reconstructing, operating, and maintaining I-95 without use of traditional transportation funds, primarily fuel taxes. The *I-95 Financial Plan* demonstrated that tolls offered a strong potential for fully funding those life-cycle costs.

The intent of preparing the express lane financial feasibility assessment was to understand the similar potential of this construction and financing strategy to make a meaningful contribution to the funding needs of I-95. The premise is that Express Lanes are seen by the public and some key stakeholders and policy makers as a less intrusive approach than the full-tolls conversion program. To prepare the assessment, the study team undertook a step-wise effort, beginning with a high-level review of financing potential that focused only on construction of the Express Lanes. The strategy was to expand the financial analysis if the initial review showed positive results.

Initial Assessment: To complete the initial screening, without using the debt finance model applied to the Full-Toll scenario financial analysis, the study team prepared a comparison of the cost of constructing either Express Lane/Concept 1 or Express Lane/Concept 2 to the toll revenue likely to be generated by the Express Lanes shows that toll revenue would fall far short of the amounts required to finance construction. As shown in **Table 4.1**, express lane toll revenue would cover less than 7% of the capital cost for either express lane concept.

Exacerbating this poor performance is the exclusion of recurring whole life costs that must be covered by toll revenue or some other revenue source after construction is completed and the Express Lanes are in operation. A complete financial analysis would require consideration of the following, in addition to direct capital expenditures:

- Financing cost (variable, depending on financing structure)
- Annual toll system maintenance, approximately $2 million per year (current dollars)
- Annual toll system operating costs, approximately $2 million per year

- Annual roadway Operations and Management (O&M) costs (not calculated)
- Renewal and Replacement costs, to ensure long-term

The implication of this expanded cost consideration is that revenue generated by express lane tolling (as shown in Chapter 3, estimated toll revenue in 2020 would be $1.53 million for Express Lanes/Concept 1 and $1.97 million for Express Lanes/Concept 2) would not cover even the incremental cost of operating an express lane system, let alone provide capital funding needed for implementation to supplement "traditional" North Carolina highway funding sources derived from the Highway Trust Fund.

Express Lane Financial Feasibility Conclusion: The conclusion drawn by the study team from the initial financial assessment of Express Lanes on I-95 is that this approach will not provide any meaningful revenue stream to support the long-term funding needs for I-95. At best, revenue generated by Express Lanes would provide a small supplement to traditional revenue sources. More likely, the incrementally higher cost of operating the Express Lanes as a tolled facility would offset any revenue realized from tolling.

After reviewing the results of the initial financial feasibility assessment, the study team concluded that there would be no value in completing a more rigorous financial analysis, similar to that prepared for the Full-Toll scenario.

Table 4.1:I-95 Improvement Program Express Lane Financial Feasibility Comparison

I-95 Improvement Program (SC state line to VA state line) Capacity Expansion Cost Estimate (2011$, Millions)		
	Express Lane/Concept 1	Express Lane/Concept 2
Capital Cost	2,840	1,307
Toll Revenue	180	86
Capital Cost Coverage (1)	6.4%	6.6%

Source: Atkins; using Atkins' capital cost estimates and Cambridge Systematics traffic and revenue data.
Notes:

2. The ration of toll revenue to capital cost does not include any financing costs that would need to be incurred at the start of a construction program to allow accelerated construction. A complete financial analysis of either Express Lanes/Concept 1 or Express Lanes/Concept 2 has not been undertaken, pending review of this preliminary evaluation.

4.2 SUMMARY OF FULL-TOLL SCENARIO FINANCE ANALYSIS

The primary objective of the *I-95 Financial Plan* was to establish that a funding program allowing accelerated construction of I-95 improvements and funding of ongoing maintenance and operations from toll revenues could remove need for use of other NCDOT funds such as gas taxes. As reported in the *Financial Plan*, the first phase of the proposed construction program, Phase 1/Urban Project, could be financed through toll debt instruments and federal loan, while the Phase 2/Rural Projects phase of the improvement program could be financed through a combination of toll debt instruments and toll equity. While projected toll revenues would fully support the project's needs, the financing assumed that NCDOT would provide an indirect public equity back-up pledge of non-toll revenues to cover Operations and Management (O&M) and Renewal and Replacement (R&R) expenses, in the event toll revenues were

insufficient, and to support the credit for short-term financing needs. Such back-up pledges are typically used for new toll road projects to enhance feasibility. NCDOT has provided a back-up pledge of non-toll revenues for the NC Turnpike Authority's NC 540 Triangle Expressway project.

It was reported in the *I-95 Financial Plan* that tolls would generate $34.17 billion (in nominal dollars) in gross revenue from 2020 through 2056 (the last year of substantial debt service payments). This amount compares to $383 million that would be generated by Express Lane/Concept 1 and $191 million generated by Express Lane/Concept 2, reflecting the low potential for significant usage of the Express Lanes during any but the most congested periods of any day.

This Full-Toll scenario revenue would be available to pay debt service on the bonds issued to finance the Urban Project and Rural Projects, contribute toll equity to the Rural Projects construction, and fund O&M and rehabilitation and replacement expenses. Toll revenues would also finance O&M and R&R reserves. The residual revenue generated by the I-95 improvement program after debt service, O&M, and R&R was estimated at $8.84 billion YOE dollars ($4.01 billion when deflated to 2017 dollars). Depending on federal requirements, this money might be spent on other projects within the I-95 corridor, or used to reduce the tolls if there are limitations on use of the balance.

Updated Full-Toll Financial Analysis: As part of the express lane economic impact assessment, the study team updated the travel demand model that was the basis for estimating future traffic and associated revenue that would be generated by either of the Express Lane concepts (described in Chapter 3). Those revenue estimates were used in the express lane financial assessment described above. The study team also prepared an updated estimate of revenues that would be generated by the Full-Toll scenario. It was considered that this would be important to ensure that the comparison of Express Lanes and full tolls was based on the same traffic and revenue platform.

The updated Full-Toll scenario revenue estimate resulted in a slightly more conservative estimate of nominal toll revenue over the full financial analysis period (2020 – 2056) of $31.49 billion. This compares to the earlier estimate reported above of $34.17 billion. Without fully updating the financial analysis prepared for the *I-95 Financial Plan*, the study team concluded that even with a slower rate of revenue generation, the Full-Toll scenario would still have a very high probability of fully funding the I-95 improvement program.

4.3 FINANCIAL ASSESSMENT CONCLUSIONS

Several conclusions can be drawn from this evaluation of the insertion of Express Lanes on I-95 and use of toll revenue that would be generated by tolling of the new capacity in the Express Lanes:

1. While conversion of I-95 to a fully-tolled facility under the terms of the federal ISRRPP would generate revenue from tolled user fees sufficient to fund both construction and ongoing operations and maintenance with little or no need for "gap funding" from the State's Highway Trust Fund, the revenue generated from building and operating Express Lanes, either within the full corridor or on a more limited basis corresponding to the segments of greatest near-term congestion, would at best finance only a small part of the construction of the Express Lanes (less than 7%), and more likely would not cover even the incremental cost of operating and maintaining the Express Lanes.
2. While I-95 experiences limited congestion today, with congestion occurring on a periodic basis tied to roadway incidents or to heavy beach-bound holiday traffic south of the I-95/I-40

interchange in Johnston County, it is expected that traffic growth along the corridor will create more and more congestion over the next 20+ years. Additional capacity will be needed to preserve reliability for movement of people and freight in the 182-mile corridor.

3. I-95 faces near term and ongoing need for major improvements to address capital, operating, and maintenance needs. Not only will I-95 require additional capacity, as noted above, but I-95 is an aging roadway that serves as a major critical travel corridor for the US eastern seaboard. Its bridges are safe today, but many are functionally obsolete or structurally deficient and in need of replacement.
4. I-95 is in a deferred-maintenance position today, due to lack of adequate funding for ongoing O&M. On a per mile basis, the cost of maintaining I-95 will continue to rise as greater repairs of aging infrastructure are needed.

Chapter 5
Economic Impact Assessment

5.1 SCENARIOS MODELED

The economic assessment of express lanes on I-95 in North Carolina evaluates the economic implications for the Business As Usual (BAU) and two Express Lanes alternatives. The BAU elements are drawn from the I-95 Corridor Planning and Finance Study. The scenarios examined are defined below.

Business As Usual (BAU): Defined as ongoing maintenance and operations with no capacity expansion, this scenario would result in worsening traffic conditions leading to increased transportation costs on I-95. Traditionally, a base case scenario is compared to an improved network scenario, but in this study, an examination of how transportation costs are likely to change with limited improvements is needed. Thus, the team developed a BAU scenario to estimate the potential of foregone economic activity if improvements are not made to I-95 in North Carolina.

Express Lane/Concept 1 - Express Lanes along the entire I-95 Corridor: Defined as the implementation of the proposed improvements based on the *I-95 Financial Plan*, including rebuilding and expanding the entire Corridor. This scenario includes modeling the impacts of express lane tolling limited to only the expanded lanes along the Corridor. This scenario focuses on the positive impacts of improved traffic conditions and the influx of construction activity, while incorporating the potential negative impacts associated with a toll to pay for the investment.

Express Lane/Concept 2 - Express Lanes on I-95, between I-40 and Lumberton (MP 81 and MP 14), with reduced toll rates: This is the same scenario as Express Lanes/Concept 1 scenario with similar improvements, but only along the most heavily traveled segment of the Corridor between I-40 and Lumberton. It is also assumed the toll charged along this segment is 50 percent of the toll rate in Express Lanes/Concept 1.

For the purpose of the economic impact analysis of the Express Lanes, the proposed 18 gantries or toll collection points along the Corridor were grouped into six segments. Based on the construction schedule developed by the *I-95 Financial Plan*[4], Segments 4 and 5 will begin operating in 2020, followed by Segment 3 (2021), Segment 2 (2025) and Segment 1 (2028). The full Express Lane system on I-95 will be operational by 2032 with the opening of Segment 6. **Table 5.1** shows opening year and the distance for each segment of the Corridor.

5.2 ECONOMIC IMPACT ANALYSIS

This section describes the methodology for conducting the economic impact assessment and presents the findings.

[4] Source: *I-95 Financial Plan*

Table 5.1:Opening Schedule and Length for Express Lanes on I-95[1]				
Gantry	Segment	Opening Year	Length (miles)	County
1	1	2030	12.30	Northampton/Halifax
2	1	2028	12.41	Halifax
3	1	2028	6.86	Halifax
4	2	2027	12.71	Nash
5	2	2025	8.49	Nash
6	2	2025	12.54	Nash/Wilson
7	3	2024	12.47	Wilson/Johnston
8	3	2022	9.14	Johnston
9	3	2022	8.70	Johnston
10	3	2021	8.36	Johnston
11	4	2020	8.10	Johnston/Harnett
12	4	2020	14.94	Harnett/Cumberland
13	4	2020	6.01	Cumberland
14	5	2020	12.33	Cumberland/Robeson
15	5	2020	8.26	Robeson
16	5	2020	11.67	Robeson
17	6	2032	7.54	Robeson
18	6	2032	12.15	Robeson

1. The opening year for each segment corresponds to the development program in the *I-95 Financial Plan*.

5.2.1 Valuation of Economic Impact from Transportation Changes

The analysis of economic impacts from transportation changes are based on changes to freight/crew or passenger time costs and vehicle operating costs. Auto and freight movements along I-95, as well as any changes to these movements, affect the vehicle cost, travel time, and travel demand factors of industries dependent upon the Corridor in North Carolina. These changes are measured by the changes in vehicle miles traveled (VMT) or distance, and vehicle hours traveled (VHT) or total travel time. Both of these metrics are generated from travel demand forecasts.

The Value of Time (VOT) encompasses the labor and non-labor costs associated with transporting goods along the I-95 Corridor. Consisting of crew and freight costs, the VOT fluctuations are dependent upon changes to VHT. As congestion leads to delays, VHT increase, thereby increasing the VOT above the base year levels. These changes are translated into increases in production costs by industry.

Any changes in travel miles constitute fuel and non-fuel operation costs, which are identified as Vehicle Operating Cost (VOC). For example, as congestion increases on I-95 resulting in delays, the VOC would most likely increase as a result of less fuel efficient speeds and increases in congestion-related idling.

When addressing the impacts of tolls, the appropriate percentage of the toll burden borne by user type is estimated. This process was informed by stakeholder input including motor carriers, shippers, and business owners and managers.

User travel cost impacts are estimated as follows:

Value of time (VOT)

$$VOT_{auto} = VHT_{auto} \times avg\ number\ of\ passengers \times \frac{\frac{\$}{hour}}{passenger}$$

$$VOT_{truck} = VHT_{truck} \times avg\ number\ of\ crew \times \frac{\frac{\$}{hour}}{crewmember}$$

Vehicle operating cost (VOC)

$$VOC_{auto} = VMT_{auto} \times (\frac{\$}{mile_{fuel\ auto}} + \frac{\$}{mile_{non-fuel\ auto}})$$

$$VOC_{truck} = VMT_{truck} \times (\frac{\$}{mile_{fuel\ truck}} + \frac{\$}{mile_{non-fuel\ truck}})$$

Delay

$$Delay\ Cost_{auto} = delay\ hours_{auto} \times VOT_{passenger}$$

$$Delay\ Cost_{truck} = delay\ hours_{truck} \times VOT_{crew}$$

Toll/fare cost = trips * $/trip

$$Toll_{auto} = trips_{auto} \times \frac{\$_{auto}}{trip_{auto}}$$

$$Toll_{truck} = trips_{truck} \times \frac{\$_{truck}}{trip_{truck}}$$

Total transportation costs

$$Total\ Transportation\ Cost_{auto} = VOT_{auto} + VOC_{auto} + Toll_{auto}$$

$$Total\ Transportation\ Cost_{truck} = VOT_{truck} + VOC_{truck} + Toll_{truck}$$

5.2.2 Key Modeling Assumptions

When conducting any economic analysis, assumptions regarding certain aspects of the analysis are required. Key auto and truck assumptions and methodology are provided below.

Lost Sales Due to Diversion

- Given the lack of restrictions on both Express Lanes scenarios along the Corridor, the likelihood of diversions are not anticipated in either scenario. Therefore, the lost sales due to diversion are not included in this analysis.

Crash Delay

- Based on crash delay impacts calculated for the Full Toll Build scenario in the 2013 I-95 Economic Assessment report, a revised crash reduction is estimated based on the proposed Express Lanes improvements. While the Full Toll Build scenario indicated a 3.6 percent reduction in the number of crashes, if the improvements are made, a revised crash reduction of 2.2 percent is used for the Express Lanes/Concept 1 scenario. Given the limited highway improvements anticipated for the Express Lanes/Concept 2 scenario, no crash reduction changes were estimated. The Express Lanes/Concept 1 crash reduction percentage is derived from the percent of reduced capital investment improvements planned for the Express Lanes compared to the full improvements proposed in the Full Toll Build scenario. The 50 percent delay reduction in incident clearance times remains valid in both the Full Toll Build and Express Lanes/Concept 1 scenario given the proposed highway improvements. **Table 5.2** provides the estimated delay for autos and trucks caused by incidences for both the BAU, Full Toll Build, and Express Lanes/Concept 1 scenario.

Table 5.2:Estimation of Crash Delay

	Build Improvements	Express Lanes Improvements	
Crash reduction	3.60%	2.22%	
Percent of incidents that cause delay	16%	16%	
Delay reduction	50%	50%	
	Business as Usual (BAU)	Build	Express Lanes/Concept 1 Full
Average number of annual incidents	1,435	1,383	1,403
Annual number of incidents that cause delay	234	221	225
Average incident impact time	66	66	66
Average speed during incident impact time	31	31	31
Average delay per vehicle impacted	31.9	15.95	15.95
Average number of autos impacted by incident	1594	1,537	1,559
Average number of trucks impacted by incident	337	325	330
Total auto delay per incident that causes delay	50,859	24,509	24,861
Total truck delay per incident that causes delay	10,746	5,182	5,256
Total annual minutes auto delay from incidents	11,897,194	5,733,275	5,815,546
Total annual minutes truck delay from incidents	2,513,853	1,212,162	1,229,556
Total annual auto hours delay from incidents	198,287	95,555	96,926
Total annual truck hours delay from incidents	41,898	20,203	20,493

Source: 2012 INRIX, NCDOT Crash Data, and Cambridge Systematics, Inc. calculations

5.2.3 Construction

To avoid over or under estimating the construction spending impacts along the I-95 Corridor, the construction spending dollars are divided into wage and non-wage components. The wage components are allocated based upon historical construction employment throughout all study regions in North Carolina. It is assumed that construction spending from wages is spent in those counties in which the construction employees are located. For non-wage related spending, it is assumed that supporting construction materials and activities required are spent along the Corridor where construction activity occurs. Construction spending is assumed to begin in 2014.

5.3 ECONOMIC IMPACT ANALYSIS RESULTS

The following section presents results from the Regional Economic Model Inc. (REMI) economic model for each scenario. All results are for the study period 2014 to 2050[5], in constant 2012 dollars. For comparison purposes, three tiers of regional impact analysis are presented:

- Impacts to the I-95 Corridor;
- Impacts to Eastern North Carolina (defined as east of I-95); and,
- Impacts to the rest of the state of North Carolina.

5.3.1 Business as Usual Scenario

The BAU scenario assumes ongoing maintenance and operations without any of the proposed improvements stated in the I-95 EA. **Table 5.3** summarizes the economic impacts of BAU over the period from 2014 to 2050. The forecasted increase in population and subsequent economic activity is expected to lead to worsening traffic conditions along I-95, which is expected to increase business transportation costs in all regions. These analysis-period costs increase to as much as $6.0 billion just in eastern North Carolina and up to $51.7 billion along the I-95 Corridor. These additional costs are above what costs would be if current levels of travel efficiencies are maintained between 2014 and 2050. These increases in business transportation costs would be expected to lead to a weakening in economic activity as evidenced by decreases in Gross Regional Product (GRP), personal income, and jobs over the study period for all regions in North Carolina as businesses bear the burden of increased production costs.

The BAU scenario presents a significantly negative economic impact to North Carolina. It is important to note the decreases in the economic metrics are not negative levels of economic activity; rather, all results are presented in relation to an economic baseline forecast based on status quo activities. In other words, the economy is growing, but at a slower or reduced rate that is currently projected.

[5]The REMI model used for the economic analysis has a forecast horizon of 2050, hence limiting the study period used for the economic impact assessment to 2050 as opposed to 2059 which was used for the revenue analysis.

Table 5.3:Economic Impacts of Business as Usual (BAU) Compared to the Baseline Economic Forecast, 2014-2050						
Metric	Constr.	%	Long-term	&	Total	%
I-95 Counties						
Gross Regional Product ($ billions 2012)	$0.23	0.0214	($41.10)	(2.57)	($40.80)	(2.550)
Personal Income ($ billions 2012)	$0.22	0.0179	($44.30)	(2.33)	($44.10)	(2.314)
Jobs (average annual full-time)	132	0.0345	(9,858)	(2.26)	(9,727)	(2.222)
Business Transportation Costs ($ billions 2012)					$51.70	
Eastern NC						
Gross Regional Product ($ billions 2012)	$0.04	0.0012	($7.30)	(0.305)	($7.20)	(0.304)
Personal Income ($ billions 2012)	$0.04	0.0019	($6.90)	(0.306)	($6.80)	(0.304)
Jobs (average annual full-time)	10.00	0.0013	(1,620)	(0.274)	(1,610)	(0.272)
Business Transportation Costs ($ billions 2012)					$6.00	
Rest of State						
Gross Regional Product ($ billions 2012)	$0.15	0.0012	($30.50)	(0.206)	($30.40)	(0.205)
Personal Income ($ billions 2012)	$0.11	0.0014	($21.80)	(0.182)	($21.70)	(0.181)
Jobs (average annual full-time)	34	0.0013	(5,048)	(0.177)	(5,014)	(0.176)
Business Transportation Costs ($ billions 2012)					$9.20	
Total						
Gross Regional Product ($ billions 2012)	$0.41	0.010	($78.90)	(1.285)	($78.40)	(1.275)
Personal Income ($ billions 2012)	$0.38	0.009	($73.00)	(1.172)	($72.60)	(1.163)
Jobs (average annual full-time)	175	0.016	(16,526)	(1.128)	(16,351)	(1.112)
Business Transportation Costs ($ billions 2012)					$66.90	

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative value

5.3.2 Express Lanes/Concept 1

The Express Lanes/Concept 1 (Full) results, summarized in **Table 5.4**, take into account the Express Lane improvements along the Corridor, but also incorporate the proposed tolls paid by North Carolinians. In this scenario, efficiencies are gained from the improvements on I-95, which lead to business transportation cost savings totaling $2.8 billion between 2014 and 2050 along the Corridor when compared to the BAU scenario. Thus, all regions are more economically competitive, with production cost decreases that lead to increases in GRP, personal income, and jobs. Much of the foregone economic activity seen in the BAU scenario is recovered with a forecasted increase in GRP of $3.2 billion over the BAU forecast for the I-95 Corridor but a more modest increase of $0.58 billion in eastern North Carolina across the study period.

In addition to the recovery of the foregone economic activity from the BAU scenario, added economic activity is expected to be generated from the travel efficiencies gained from the highway improvements as represented in the net difference between the BAU and the Express Lanes/Concept 1 scenario. For example, in the I-95 Corridor, the net increase in GRP across the study period is $3.2 billion. This scenario also highlights the significant benefit that the I-95 Corridor region gains from improvements to the Corridor as the region retains the largest share of dollar and job benefits as compared to the other two regions (eastern North Carolina and the Rest of the State). However, this scenario does ignore the real effects of the costs that would be imposed in order to fund the project in its entirety. While all regions benefit from the improvements, even with a toll, most of the benefits are concentrated to those areas along the Corridor.

Even with the travel efficiencies gained from the improvements along the Corridor, a large portion of the net economic benefits are attributed to construction activities, which are temporary as all activity concludes in the early 2030s. In this scenario, not only does the I-95 Corridor region gain the most during the construction period but also over the long-term in the benefits gained from the transportation improvements. The total economic impact attributed to the travel efficiencies gained by the user are, however, relatively small. Although the benefits are higher than the Express Lanes/Concept 2 scenario, the benefits are minimal with percentages over the study period at only about a tenth of a percent on average across all economic indicators. Given these relatively small economic impacts, a slight change in economic conditions in North Carolina could further dampen or reverse these transportation efficiency related benefits leading to unanticipated costs for North Carolinian's to bear.

5.3.3 Express Lanes/Concept 2

Similar to the long-term economic impacts presented under the Express Lanes/Concept 1 scenario, the Express Lanes/Concept 2 scenario also reveals efficiencies gained from the improvements on I-95. Summarized in **Table 5.5**, the Express Lanes/Concept 2 scenario takes into account the improvements to the Corridor and incorporates the proposed tolls for only the segment of I-95 between I-40 and Fayetteville. Even with the imposition of tolls along just this segment, the travel efficiencies gained from the highway improvements lead to a net gain in economic activity in North Carolina; however, the gain is minimal over the BAU.

The net business cost benefits in this scenario are about half that of the Express Lanes/Concept 1 scenario along the I-95 Corridor counties while the other regions are much lower in comparison indicating that a significant amount of the benefits are driven by improvements gained along the I-40 to Fayetteville segment of the Corridor. In general, the long-term business cost savings lead to the recouping of the foregone economic activity if no improvements were made, as in the case of the BAU scenario, and with additional long-term economic benefits. The recovered economic activity is forecasted as an increase in GRP of $1.8 billion over the BAU forecast for the I-95 Corridor and an increase of $0.16 billion in eastern North Carolina across the study period. Although positive, the comparison to overall economic activity across the regions over the study period is relatively small as indicated by the small percentage values across all economic indicators.

Table 5.4:Economic Impacts of Express Lanes/Concept 1 Compared to Business as Usual (BAU), 2014-2050						
Metric	Constr.	%	Long-term	&	Total	%
I-95 Counties						
Gross Regional Product ($billions 2012)	$1.43	0.126	$1.79	0.110	$3.22	0.236
Personal Income ($billions 2012)	$1.49	0.114	$1.30	0.067	$2.79	0.181
Jobs (average annual full-time)	876	0.223	389	0.091	1,265	0.314
Business Transportation Costs ($ billions 2012)					($2.83)	
Toll Cost ($ billions 2012)					$0.102	
Eastern NC						
Gross Regional Product ($billions 2012)	$0.21	0.007	$0.37	0.016	$0.58	0.023
Personal Income ($billions 2012)	$0.24	0.011	$0.33	0.014	$0.57	0.025
Jobs (average annual full-time)	68	0.008	80	0.014	148	0.022
Business Transportation Costs ($ billions 2012)					($0.39)	
Toll cost ($ billions 2012)					$0.008	
Rest of State						
Gross Regional Product ($billions 2012)	$1.22	0.008	$1.49	0.011	$2.70	0.018
Personal Income ($billions 2012)	$0.96	0.011	$1.03	0.009	$1.99	0.020
Jobs (average annual full-time)	336	0.008	236	0.009	572	0.017
Business Transportation Costs ($ billions 2012)					($0.62)	
Toll cost ($ billions 2012)					$0.012	
Total						
Gross Regional Product ($billions 2012)	$2.86	0.060	$3.64	0.056	$6.50	0.116
Personal Income ($billions 2012)	$2.70	0.057	$2.67	0.036	$5.36	0.093
Jobs (average annual full-time)	1,281	0.104	704	0.047	1,985	0.150
Business Transportation Costs ($ billions 2012)					($3.85)	
Toll cost ($ billions 2012)					$0.12	

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative value

Over the study period, the construction activities contribute about 61 percent the total gain in jobs in the I-95 Corridor region over the short-term with higher percentages in the other regions. Construction activity is a significant boost to the economic impacts in North Carolina in the short-term but once construction is complete the net gain in economic activity over the long-term is only an average of 0.03 percent in the I-95 Corridor region and 0.01 in eastern North Carolina. In other words, construction activities will benefit all regions in the short-term mostly in eastern North Carolina and the rest of the state regions.

Table 5.5:Economic Impacts of Express Lanes/Concept 2 Compared to Business as Usual (BAU), 2014-2050						
Metric	Constr.	%	Long-term	&	Total	%
I-95 Counties						
Gross Regional Product ($billions 2012)	$0.66	0.058	$1.14	0.040	$1.80	0.098
Personal Income ($billions 2012)	$0.68	0.052	$0.90	0.027	$1.59	0.079
Jobs (average annual full-time)	403	0.103	264	0.035	666	0.138
Business Transportation Costs ($ billions 2012)					($1.763)	
Toll Cost ($ billions 2012)					$0.053	
Eastern NC						
Gross Regional Product ($billions 2012)	$0.10	0.003	$0.06	0.002	$0.16	0.005
Personal Income ($billions 2012)	$0.12	0.005	$0.09	0.003	$0.20	0.009
Jobs (average annual full-time)	32	0.004	13	0.002	45	0.005
Business Transportation Costs ($ billions 2012)					($0.021)	
Toll cost ($ billions 2012)					$0.004	
Rest of State						
Gross Regional Product ($billions 2012)	$0.56	0.003	$0.42	0.002	$0.98	0.005
Personal Income ($billions 2012)	$0.42	0.005	$0.33	0.003	$0.76	0.008
Jobs (average annual full-time)	154	0.004	68	0.002	223	0.005
Business Transportation Costs ($ billions 2012)					($0.048)	
Toll cost ($ billions 2012)					$0.006	
Total						
Gross Regional Product ($billions 2012)	$1.32	0.028	$1.62	0.019	$2.94	0.046
Personal Income ($billions 2012)	$1.22	0.026	$1.32	0.014	$2.54	0.040
Jobs (average annual full-time)	589	0.048	345	0.017	934	0.064
Business Transportation Costs ($ billions 2012)	$0.00		$0.00		($1.83)	
Toll cost ($ billions 2012)					$0.06	

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative value

However, over the longer-term the benefits from the travel efficiencies are realized in the I-95 Corridor region.

For each scenario and study region, summary impacts provided include:

- Business transportation costs – Travel time cost plus vehicle operating costs without tolls;
- Tolls – Amount of tolls estimated to be paid by people and businesses based on the origin of trips using I-95;

- Gross Regional Product (GRP) – Total value of economic output and general measure of the size of a region's economy;
- Personal Income – Value of wages, salaries and proprietor's income; and
- Jobs – Measured in average annual full-time equivalent jobs.

Summary findings are presented in **Table 5.6**.

5.3.4 Results

The key takeaways from these findings include:

- BAU on I-95 will cost the state an average of more than 16,000 jobs annually compared to baseline economic forecast and over $78 billion in GRP.
- Counties along the I-95 Corridor bear the greatest burden in terms of economic losses arising from tolls, but they also benefit the most from even the more limited improvements compared to the full capital investment proposed.
- The economic impact of express lanes is positive, however, minimal in relation to overall economic activity in each of the regions.

Table 5.6:Summary of Economic Impacts of Express Lanes Concepts, 2014-2050

Metric	BAU	Build, Full Toll	Express Lanes/Concept 1	Express Lanes/Concept 2
Gross Regional Product ($billions 2012)	($78.4)	$77.8	$6.5	$2.9
Personal Income($billions 2012)	($72.6)	$67.6	$5.4	$2.5
Jobs (average annual full-time)	(16,351)	16,872	1,985	934
Business Transportation Costs ($billions 2012)	$66.9	($62.4)	($3.8)	($1.8)
Toll Cost ($billions 2012)		$9.6	$0.12	$0.06

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative values

Chapter 6
Summary of Study Conclusions

This evaluation of the potential for Express Lanes on I-95 to serve as a feasible improvement strategy for this crucial highway in Eastern North Carolina provides evidence that suggests this approach is not a feasible solution to address the I-95 Corridor needs. To be feasible, NCDOT considers that the improvements should provide needed enhancements to highway capacity and traffic operations, address challenges raised by the aging of the roadway and bridges, and funnel significant amounts of supplemental funding into the corridor. In concluding this report, the study team offers the following observations.

Conclusion 1: Express lanes are not a viable solution to capacity deficiencies and infrastructure aging

In preparing various reports during the I-95 Planning and Finance Study, NCDOT has demonstrated that I-95 is facing growing recurring congestion, particularly south of I-40 in Johnston County, has safety issues with lengthy delays to travelers due to traffic crashes, and is challenged to maintain the pavement and bridges in good condition due to their growing age. Implementation of Express Lanes, as an alternative to either the accelerated Full-Toll scenario or to continuing the Business as Usual scenario of incremental improvements using traditional motor fuels tax financing, is not seen as a viable improvement strategy for the following reasons:

1. While I-95 experiences limited congestion today, with congestion occurring on a periodic basis tied to roadway incidents or to heavy beach-bound holiday traffic south of the I-95/I-40 interchange in Johnston County, it is expected that traffic growth along the corridor will create more and more congestion over the next 20+ years. Additional capacity will be needed to preserve reliability for movement of people and freight. However, Express Lanes, tolled to manage congestion and to generate revenue, would be expected to be badly underutilized due to the perceived penalty on the part of potential users to the tolls.
2. I-95 faces near-term and ongoing need for major improvements to address capital, operating, and maintenance needs. Not only will I-95 require additional capacity, but I-95 is an aging roadway that serves as a major critical travel corridor for the US eastern seaboard. Its bridges are safe today, but many are functionally obsolete or structurally deficient and in need of replacement.
3. I-95 is in a deferred-maintenance position today, due to lack of adequate funding for ongoing O&M. On a per mile basis, the cost of maintaining I-95 will continue to rise as greater repairs of aging infrastructure is needed. A construction program focused on Express Lanes will do little to address the ongoing maintenance needs of the remaining general use lanes and the bridges.

Conclusion 2: Express lanes offer little potential for financial feasibility

While conversion of I-95 to a fully-tolled facility under the terms of the federal ISRRPP would generate revenue from tolled user fees sufficient to fund both construction and ongoing operations and maintenance with little or no need for “gap funding” from the State’s Highway Trust Fund, the revenue generated from building and operating Express Lanes, either within the full corridor or on a more limited basis corresponding to the segments of greatest near-term congestion, would at best finance only a small

part of the construction of the Express Lanes (less than 7%), and more likely would not cover even the incremental cost of operating and maintaining the Express Lanes.

Conclusion 3: Accelerated construction of Express Lanes offers potential for positive economic impact, but not as much as the Full-Toll scenario

While the revenue that would likely be generated by implementation of Express Lanes along a portion or the entire length of I-95 offers little potential of covering a significant portion of the cost of building and operating the Express Lanes, construction of an express lane facility would indeed be more beneficial to the regional economy than would be continuation of the Business as Usual scenario of small incremental funding. More specifically, the economic impact assessment found the following:

- A Business as Usual funding approach on I-95 will cost the state an average of more than 16,000 jobs annually compared to baseline economic forecast and over $78 billion in GRP.
- Counties along the I-95 corridor bear the greatest burden in terms of economic losses arising from tolls, but they also benefit the most from even the more limited improvements compared to the full capital investment proposed.
- Express Lanes/Concept 1 is estimated to increase GDP by $6.5 billion by 2040 and support about. 2000 additional jobs annually. The impact of Express Lanes/Concept 2 is estimated to be $2.9 billion in GDP and an average of over 900 additional jobs annually between 2014 and 2040.
- The economic impact of Express Lanes is positive, however, minimal in relation to overall economic activity in each of the regions.

In summary, as a stand-alone funding source, the construction of Express Lanes and imposition of tolls on the Express Lanes offer little potential to fully address I-95 needs or to fund the $4.5 billion I-95 improvement program. Even as a supplement to existing funding streams, construction of tolled Express Lanes on I-95 offers little potential for accelerating the necessary program of expansion and reconstruction. To meet those improvement and funding needs, NCDOT must pursue other funding options to pay for the facility.

APPENDIX A:

TRAFFIC DEMAND ESTIMATES

Appendix A: Traffic Demand Estimates

A-1: 2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario

Southbound

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Southbound Input Tab

Table 1 2020 Daily VMT and travel time from CS I-95 Model (considering SB direction)

	Daily VMT																
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck		Toll per Segment (2009$)	Seg. Length (miles)	Free Flow Speed (mph)	Free Flow Travel Time (min)	Congested Travel Time on the GP lanes (min)
1	2,683	6,196	9,820	10,460	14,074	42,902	7,768	11,431	19,329	31,951	30,730		0.1	8.38	75	6.704182	6.9
2	4,224	8,789	14,694	15,965	23,533	37,246	4,675	5,866	14,484	105,082	46,515		0.1	12.41	75	9.924197	10.3
3	1,952	4,074	7,167	8,168	13,343	11,811	430	1,552	5,295	74,372	25,865		0.1	6.86	75	5.491783	5.7
4	3,704	7,577	13,313	15,515	26,856	39,618	3,503	5,535	13,924	83,161	49,938		0.1	12.71	75	10.16802	10.4
5	2,352	5,065	9,649	12,262	24,414	35,224	4,604	4,795	11,821	41,220	30,760		0.1	8.49	75	6.7938	7.0
6	4,184	8,999	17,087	21,100	39,558	44,773	2,803	8,758	18,338	68,386	47,836		0.1	12.54	75	10.03531	10.4
7	3,513	7,748	14,314	17,547	31,080	42,822	4,054	15,095	22,752	71,059	47,206		0.1	12.47	75	9.974362	10.3
8	2,613	5,796	10,841	13,153	22,802	32,281	3,093	12,522	17,917	46,885	35,825		0.1	9.14	75	7.308886	8.1
9	3,263	6,957	12,732	15,005	25,024	41,310	5,525	12,742	18,468	42,531	34,253		0.1	8.70	75	6.957626	8.0
10	3,263	6,987	12,742	14,784	23,903	38,637	3,423	9,970	16,586	55,664	32,381		0.1	8.36	75	6.685788	7.7
11	2,833	5,866	10,951	13,173	23,313	34,564	5,295	12,392	16,316	63,221	37,767		0.15	8.10	75	6.483365	7.0
12	5,205	10,560	19,969	25,084	45,955	46,615	3,473	11,351	23,713	160,566	65,534		0.15	14.94	75	11.94992	12.8
13	2,092	4,414	8,208	10,190	18,648	24,944	2,512	3,583	8,298	46,645	25,014		0.15	6.01	75	4.804298	5.0
14	5,185	10,180	17,717	20,200	32,782	63,992	7,507	8,278	17,287	70,188	47,456		0.15	12.33	75	9.867858	9.9
15	4,985	9,389	15,585	17,037	25,254	42,551	2,032	5,635	14,054	54,923	33,863		0.15	8.26	75	6.604237	7.1
16	5,185	9,689	16,826	19,068	29,519	53,872	4,504	12,272	23,923	88,356	45,564		0.15	11.67	75	9.332321	10.1
17	2,793	5,095	8,198	8,608	12,192	27,076	2,032	4,865	9,399	41,350	27,126		0.1	7.54	75	6.030746	6.5
18	4,274	6,436	8,748	7,848	8,758	22,552	1,682	4,875	10,800	100,548	40,679		0.1	12.46	75	9.970682	10.8

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Southbound Input Tab (continued)

CPI 2009	214.537
CPI 2011	224.939
Adjustment	1.05

Table 2: Summer Adjustment Factor

Season	Adjustment Factor
Summer	0.78

* Summer seasonal factor from NC DOT

Table 3: Peak Hour to daily adjustment

TOD Period	Adjustment Factor
Peak	10

Table 4: Peak hour to period adjustment

TOD Period	Adjustment Factor
Peak	1.04

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Southbound Input Tab (continued)

Table 5: Capacities from I95 ICTDM

I95 Segments	Daily Capacity-mile	Hourly Capacity-mile	Period Duration in Hours (Weekday)	Period Duration in Hours(Weekend)	Peak Period Capacity-mile (Weekdays)	Peak Period Capacity-mile (Weekends)	# of GP lanes	# of tolled lanes	Maximum Peak Period Toll Lane Capacity-mile (Weekday)		Maximum Peak Period Toll Lane Capacity-mile (Weekend)	TOD Period	Peak Weekday Period	Peak Summer weekend Day
1	502,814	50,281	4	4	128,927	128,927	2	1	64,463		64,463		1.66	1.79
2	744,315	74,431	4	4	190,850	190,850	2	1	95,425		95,425		1.66	1.79
3	411,884	41,188	4	4	105,611	105,611	2	1	52,806		52,806		1.66	1.79
4	762,602	76,260	4	4	195,539	195,539	2	1	97,769		97,769		1.67	1.70
5	509,535	50,953	4	4	130,650	130,650	2	1	65,325		65,325		1.67	1.70
6	752,648	75,265	4	4	192,987	192,987	2	1	96,493		96,493		1.67	1.70
7	748,077	74,808	4	4	191,815	191,815	2	1	95,907		95,907		1.67	1.70
8	548,166	54,817	4	4	140,556	140,556	2	1	70,278		70,278		1.67	1.70
9	521,822	52,182	4	4	133,801	133,801	2	1	66,900		66,900		1.67	1.70
10	501,434	50,143	4	4	128,573	128,573	2	1	64,286		64,286		1.67	1.70
11	631,459	63,146	4	4	121,435	121,435	2	2	121,434		121,434		1.58	1.70
12	1,194,992	119,499	4	4	229,806	229,806	2	2	229,806		229,806		1.58	1.70
13	480,430	48,043	4	4	92,390	92,390	2	2	92,390		92,390		1.58	1.70
14	986,786	98,679	4	4	189,767	189,767	2	2	189,766		189,766		1.58	1.70
15	660,424	66,042	4	4	127,005	127,005	2	2	127,005		127,005		1.58	1.70
16	710,854	71,085	4	4	182,270	182,270	2	1	91,135		91,135		1.58	1.70
17	452,306	45,231	4	4	115,976	115,976	2	1	57,988		57,988		1.67	1.70
18	747,801	74,780	4	4	191,744	191,744	2	1	95,872		95,872		1.67	1.70

Adjustment Factor

Model parameter	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck
Costant for tolled route	-1.045	-1.045	-1.045	-1.045	-1.045	-1.3651	-1.3651	-1.3651	-1.045	-1.3651	-1.045
Time difference	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199
Toll value	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517
Income	0	0	0	0	0	0	0	0	0	0	0

Table 7 Off Peak Adjustment Factor

Off Peak Patronage Factor	1

Table 8: Seasonal Adjustment Factors by Month

Month	Adjustment Factor	Days in Month	Peak Months
1	1.27	31	0
2	1.09	28	0
3	0.94	31	0
4	0.81	30	0
5	0.90	31	0
6	0.89	30	30
7	0.74	31	31
8	0.70	31	31
9	0.98	30	0
10	0.99	31	0
11	0.90	30	0
12	0.90	31	0

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB

Table 8: 2020 Peak period VMT from CS I95 Model - No Toll Scenario

	Peak VMT												
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total VMT
1			742	1,714	2,717	2,894	3,894	11,869	2,149	3,163	5,348	8,840	8,502	51,831
2			1,169	2,431	4,065	4,417	6,511	10,305	1,293	1,623	4,007	29,073	12,869	77,763
3			540	1,127	1,983	2,260	3,692	3,268	119	429	1,465	20,576	7,156	42,615
4			1,031	2,109	3,705	4,318	7,475	11,027	975	1,541	3,875	23,146	13,900	73,103
5			655	1,410	2,686	3,413	6,795	9,804	1,282	1,335	3,290	11,473	8,561	50,703
6			1,165	2,505	4,756	5,873	11,010	12,462	780	2,438	5,104	19,034	13,314	78,441
7			978	2,156	3,984	4,884	8,651	11,919	1,128	4,201	6,333	19,778	13,139	77,151
8			727	1,613	3,017	3,661	6,347	8,985	861	3,485	4,987	13,050	9,971	56,704
9			908	1,936	3,544	4,176	6,965	11,498	1,538	3,547	5,140	11,838	9,534	60,624
10			908	1,945	3,547	4,115	6,653	10,754	953	2,775	4,616	15,493	9,013	60,772
11			746	1,545	2,884	3,469	6,139	9,102	1,394	3,263	4,297	16,648	9,945	59,431
12			1,371	2,781	5,259	6,606	12,101	12,275	915	2,989	6,244	42,282	17,257	110,080
13			551	1,162	2,161	2,683	4,911	6,569	662	944	2,185	12,283	6,587	40,698
14			1,365	2,681	4,666	5,319	8,633	16,851	1,977	2,180	4,552	18,483	12,497	79,203
15			1,313	2,472	4,104	4,486	6,650	11,205	535	1,484	3,701	14,463	8,917	59,331
16			1,365	2,552	4,431	5,021	7,773	14,186	1,186	3,232	6,300	23,267	11,999	81,312
17			777	1,418	2,282	2,396	3,393	7,536	566	1,354	2,616	11,509	7,550	41,398
18			1,190	1,791	2,435	2,184	2,438	6,277	468	1,357	3,006	27,986	11,322	60,454

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB (continued)

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	6.7	0	64,463	6.7	6.9	51,831	128,927	7.0	0.3	75	72
2	9.9	0	95,425	9.9	10.3	77,763	190,850	10.3	0.4	75	72
3	5.5	0	52,806	5.5	5.7	42,615	105,611	5.7	0.2	75	72
4	10.2	0	97,769	10.2	10.4	73,103	195,539	10.4	0.3	75	73
5	6.8	0	65,325	6.8	7.0	50,703	130,650	7.0	0.2	75	73
6	10.0	0	96,493	10.0	10.4	78,441	192,987	10.4	0.4	75	72
7	10.0	0	95,907	10.0	10.3	77,151	191,815	10.4	0.4	75	72
8	7.3	0	70,278	7.3	8.1	56,704	140,556	8.1	0.8	75	67
9	7.0	0	66,900	7.0	8.0	60,624	133,801	8.0	1.1	75	65
10	6.7	0	64,286	6.7	7.7	60,772	128,573	7.8	1.1	75	64
11	6.5	0	121,434	6.5	7.0	59,431	121,435	7.0	0.6	75	69
12	11.9	0	229,806	11.9	12.8	110,080	229,806	12.9	1.0	75	69
13	4.8	0	92,390	4.8	5.0	40,698	92,390	5.0	0.2	75	72
14	9.9	0	189,766	9.9	9.9	79,203	189,767	9.9	0.1	75	75
15	6.6	0	127,005	6.6	7.1	59,331	127,005	7.1	0.5	75	69
16	9.3	0	91,135	9.3	10.1	81,312	182,270	10.1	0.8	75	69
17	6.0	0	57,988	6.0	6.5	41,398	115,976	6.5	0.5	75	70
18	10.0	0	95,872	10.0	10.8	60,454	191,744	10.8	0.8	75	69

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB (continued)

Table 10-1: Estimated 2020 Toll Choice Percentage from I95 general purpose lane

			% Toll Choice										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck
1	0.3	0.88	18.7%	18.7%	18.7%	18.7%	18.7%	14.3%	14.3%	14.3%	18.7%	14.3%	0.0%
2	0.4	1.30	15.9%	15.9%	15.9%	15.9%	15.9%	12.0%	12.0%	12.0%	15.9%	12.0%	0.0%
3	0.2	0.72	19.9%	19.9%	19.9%	19.9%	19.9%	15.3%	15.3%	15.3%	19.9%	15.3%	0.0%
4	0.3	1.33	15.4%	15.4%	15.4%	15.4%	15.4%	11.7%	11.7%	11.7%	15.4%	11.7%	0.0%
5	0.2	0.89	18.6%	18.6%	18.6%	18.6%	18.6%	14.2%	14.2%	14.2%	18.6%	14.2%	0.0%
6	0.4	1.32	15.8%	15.8%	15.8%	15.8%	15.8%	12.0%	12.0%	12.0%	15.8%	12.0%	0.0%
7	0.4	1.31	15.8%	15.8%	15.8%	15.8%	15.8%	12.0%	12.0%	12.0%	15.8%	12.0%	0.0%
8	0.8	0.96	19.1%	19.1%	19.1%	19.1%	19.1%	14.7%	14.7%	14.7%	19.1%	14.7%	0.0%
9	1.1	0.91	20.0%	20.0%	20.0%	20.0%	20.0%	15.3%	15.3%	15.3%	20.0%	15.3%	0.0%
10	1.1	0.88	20.3%	20.3%	20.3%	20.3%	20.3%	15.6%	15.6%	15.6%	20.3%	15.6%	0.0%
11	0.6	1.27	16.3%	16.3%	16.3%	16.3%	16.3%	12.4%	12.4%	12.4%	16.3%	12.4%	0.0%
12	1.0	2.35	10.5%	10.5%	10.5%	10.5%	10.5%	7.9%	7.9%	7.9%	10.5%	7.9%	0.0%
13	0.2	0.94	18.1%	18.1%	18.1%	18.1%	18.1%	13.8%	13.8%	13.8%	18.1%	13.8%	0.0%
14	0.1	1.94	11.5%	11.5%	11.5%	11.5%	11.5%	8.6%	8.6%	8.6%	11.5%	8.6%	0.0%
15	0.5	1.30	16.1%	16.1%	16.1%	16.1%	16.1%	12.2%	12.2%	12.2%	16.1%	12.2%	0.0%
16	0.8	1.83	13.1%	13.1%	13.1%	13.1%	13.1%	9.8%	9.8%	9.8%	13.1%	9.8%	0.0%
17	0.5	0.79	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
18	0.8	1.31	16.5%	16.5%	16.5%	16.5%	16.5%	12.5%	12.5%	12.5%	16.5%	12.5%	0.0%

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB (continued)

Table 11-1: 2020 Toll Lane

	% Toll Choice											
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total
1	139	321	509	542	729	1,702	308	453	1,002	1,267	-	6,972
2	185	386	645	700	1,032	1,240	156	195	635	3,499	-	8,674
3	108	224	395	450	735	500	18	66	292	3,147	-	5,934
4	159	325	571	665	1,152	1,288	114	180	597	2,704	-	7,755
5	121	262	498	633	1,261	1,391	182	189	610	1,628	-	6,776
6	184	395	750	926	1,735	1,491	93	292	805	2,277	-	8,946
7	155	341	630	773	1,369	1,431	135	504	1,002	2,375	-	8,715
8	139	308	577	700	1,214	1,317	126	511	954	1,912	-	7,757
9	181	387	708	834	1,392	1,765	236	544	1,027	1,817	-	8,891
10	185	395	721	837	1,353	1,682	149	434	939	2,423	-	9,118
11	122	252	470	565	1,000	1,127	173	404	700	2,061	-	6,872
12	144	292	553	695	1,273	965	72	235	657	3,325	-	8,211
13	100	211	392	486	890	909	92	131	396	1,700	-	5,306
14	157	308	536	611	992	1,452	170	188	523	1,593	-	6,532
15	211	398	660	722	1,070	1,369	65	181	595	1,767	-	7,040
16	178	333	579	656	1,015	1,395	117	318	823	2,288	-	7,701
17	154	281	452	475	673	1,147	86	206	519	1,752	-	5,746
18	196	295	402	360	402	787	59	170	496	3,509	-	6,676

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB (continued)

Table 12-1: 2020 VMT on tolled lane and checked against toll lane capacity

I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			139	321	509	542	729	1,702	308	453	1,002	1,267	-	6,972
2			185	386	645	700	1,032	1,240	156	195	635	3,499	-	8,674
3			108	224	395	450	735	500	18	66	292	3,147	-	5,934
4			159	325	571	665	1,152	1,288	114	180	597	2,704	-	7,755
5			121	262	498	633	1,261	1,391	182	189	610	1,628	-	6,776
6			184	395	750	926	1,735	1,491	93	292	805	2,277	-	8,946
7			155	341	630	773	1,369	1,431	135	504	1,002	2,375	-	8,715
8			139	308	577	700	1,214	1,317	126	511	954	1,912	-	7,757
9			181	387	708	834	1,392	1,765	236	544	1,027	1,817	-	8,891
10			185	395	721	837	1,353	1,682	149	434	939	2,423	-	9,118
11			122	252	470	565	1,000	1,127	173	404	700	2,061	-	6,872
12			144	292	553	695	1,273	965	72	235	657	3,325	-	8,211
13			100	211	392	486	890	909	92	131	396	1,700	-	5,306
14			157	308	536	611	992	1,452	170	188	523	1,593	-	6,532
15			211	398	660	722	1,070	1,369	65	181	595	1,767	-	7,040
16			178	333	579	656	1,015	1,395	117	318	823	2,288	-	7,701
17			154	281	452	475	673	1,147	86	206	519	1,752	-	5,746
18			196	295	402	360	402	787	59	170	496	3,509	-	6,676

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – Aggregated Segments SB

Table 8: 2020 Peak period VMT from CS I95 Model - No Toll Scenario

	Peak VMT													
I95 Aggregated Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total VMT
1			2,451	5,273	8,765	9,571	14,096	25,442	3,561	5,215	10,820	58,489	28,527	172,209
2			2,850	6,023	11,147	13,604	25,280	33,293	3,037	5,313	12,270	53,653	35,775	202,247
3			3,522	7,650	14,092	16,836	28,615	43,156	4,480	14,008	21,076	60,159	41,657	255,251
4			2,668	5,488	10,304	12,758	23,151	27,946	2,971	7,196	12,726	71,214	33,789	210,210
5			4,043	7,705	13,201	14,827	23,056	42,243	3,698	6,895	14,553	56,213	33,413	219,846
6			1,967	3,210	4,717	4,580	5,831	13,813	1,034	2,711	5,622	39,495	18,873	101,852

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	22.1	0	212,694	22.1	22.9	172,209	425,388	23.0	0.9	75	72
2	27.0	0	259,588	27.0	27.8	202,247	519,176	27.9	0.9	75	73
3	30.9	0	297,372	30.9	34.2	255,251	594,744	34.3	3.4	75	68
4	23.2	0	443,631	23.2	24.8	210,210	443,631	25.0	1.8	75	70
5	25.8	0	407,906	25.8	27.1	219,846	499,041	27.2	1.4	75	71
6	16.0	0	153,860	16.0	17.3	101,852	307,720	17.3	1.3	75	69

Table 10-1: Estimated 2020 Toll Choice Percentage from I95 general purpose lane

			% Toll Use										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck
1	0.9	2.90	8.0%	8.0%	8.0%	8.0%	8.0%	6.0%	6.0%	6.0%	8.0%	6.0%	0.0%
2	0.9	3.54	5.9%	5.9%	5.9%	5.9%	5.9%	4.4%	4.4%	4.4%	5.9%	4.4%	0.0%
3	3.4	3.18	9.3%	9.3%	9.3%	9.3%	9.3%	6.9%	6.9%	6.9%	9.3%	6.9%	0.0%
4	1.8	4.50	4.1%	4.1%	4.1%	4.1%	4.1%	3.0%	3.0%	3.0%	4.1%	3.0%	0.0%
5	1.4	4.18	4.6%	4.6%	4.6%	4.6%	4.6%	3.4%	3.4%	3.4%	4.6%	3.4%	0.0%
6	1.3	3.93	5.1%	5.1%	5.1%	5.1%	5.1%	3.8%	3.8%	3.8%	5.1%	3.8%	0.0%

* Diversion percentages calculated

Table 11-1: 2020 Toll Lane VMT

			Toll VMT											
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			197	423	704	769	1,132	1,517	212	311	869	3,487	0	9,621
2			168	356	658	803	1,493	1,451	132	232	725	2,338	0	8,357
3			327	710	1,308	1,563	2,657	2,985	310	969	1,957	4,161	0	16,947
4			108	223	419	519	941	834	89	215	517	2,126	0	5,991
5			185	352	603	678	1,054	1,420	124	232	665	1,889	0	7,202
6			100	164	241	234	298	519	39	102	287	1,484	0	3,467

* Diversion values calculated

Table 12-1: 2020 VMT on tolled lane and checked against toll lane capacity

I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			197	423	704	769	1,132	1,517	212	311	869	3,487	0	9,621
2			168	356	658	803	1,493	1,451	132	232	725	2,338	0	8,357
3			327	710	1,308	1,563	2,657	2,985	310	969	1,957	4,161	0	16,947
4			108	223	419	519	941	834	89	215	517	2,126	0	5,991
5			185	352	603	678	1,054	1,420	124	232	665	1,889	0	7,202
6			100	164	241	234	298	519	39	102	287	1,484	0	3,467

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB

Table 8: 2020 Summer Weekend VMT from CS I95 Model - No Toll Scenario

	VMT													
I95 Segments												Auto	Truck	Total VMT
1												59,901	11,753	71,654
2												89,713	17,791	107,504
3												49,020	9,893	58,913
4												77,265	18,140	95,405
5												54,998	11,173	66,172
6												84,995	17,376	102,372
7												83,541	17,147	100,688
8												60,990	13,013	74,004
9												66,677	12,442	79,119
10												67,550	11,762	79,312
11												68,262	13,719	81,981
12												128,042	23,805	151,847
13												47,054	9,086	56,140
14												92,016	17,238	109,255
15												69,542	12,301	81,843
16												95,612	16,551	112,164
17												44,174	9,854	54,027
18												64,121	14,777	78,898

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekend Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	6.7	0	64,463	6.7	6.7	71,654	128,927	6.8	0.10	75	74
2	9.9	0	95,425	9.9	9.9	107,504	190,850	10.1	0.15	75	74
3	5.5	0	52,806	5.5	5.5	58,913	105,611	5.6	0.08	75	74
4	10.2	0	97,769	10.2	10.2	95,405	195,539	10.3	0.09	75	74
5	6.8	0	65,325	6.8	6.8	66,172	130,650	6.9	0.07	75	74
6	10.0	0	96,493	10.0	10.0	102,372	192,987	10.2	0.12	75	74
7	10.0	0	95,907	10.0	10.0	100,688	191,815	10.1	0.11	75	74
8	7.3	0	70,278	7.3	7.3	74,004	140,556	7.4	0.08	75	74
9	7.0	0	66,900	7.0	7.0	79,119	133,801	7.1	0.13	75	74
10	6.7	0	64,286	6.7	6.7	79,312	128,573	6.8	0.15	75	73
11	6.5	0	121,434	6.5	6.5	81,981	121,435	6.7	0.20	75	73
12	11.9	0	229,806	11.9	11.9	151,847	229,806	12.3	0.34	75	73
13	4.8	0	92,390	4.8	4.8	56,140	92,390	4.9	0.10	75	73
14	9.9	0	189,766	9.9	9.9	109,255	189,767	10.0	0.16	75	74
15	6.6	0	127,005	6.6	6.6	81,843	127,005	6.8	0.17	75	73
16	9.3	0	91,135	9.3	9.3	112,164	182,270	9.5	0.20	75	73
17	6.0	0	57,988	6.0	6.0	54,027	115,976	6.1	0.04	75	74
18	10.0	0	95,872	10.0	10.0	78,898	191,744	10.0	0.04	75	75

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB (continued)

Table 10-1: Estimated 2020 Toll Choice Percentage from I95 general purpose lane

			% Tolls										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)										Auto	Truck
1	0.1	0.88										14.1%	0.0%
2	0.1	1.30										11.7%	0.0%
3	0.1	0.72										15.1%	0.0%
4	0.1	1.33										11.5%	0.0%
5	0.1	0.89										14.0%	0.0%
6	0.1	1.32										11.6%	0.0%
7	0.1	1.31										11.6%	0.0%
8	0.1	0.96										13.6%	0.0%
9	0.1	0.91										13.9%	0.0%
10	0.1	0.88										14.2%	0.0%
11	0.2	1.27										11.9%	0.0%
12	0.3	2.35										7.3%	0.0%
13	0.1	0.94										13.7%	0.0%
14	0.2	1.94										8.7%	0.0%
15	0.2	1.30										11.8%	0.0%
16	0.2	1.83										9.2%	0.0%
17	0.0	0.79										14.6%	0.0%
18	0.0	1.31										11.6%	0.0%

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB (continued)

Table 11-1: 2020 Toll Lane VMT

	VMT		
I95 Segments	Auto	truck	Total
1	8,440	-	8,440
2	10,511	-	10,511
3	7,397	-	7,397
4	8,862	-	8,862
5	7,686	-	7,686
6	9,860	-	9,860
7	9,721	-	9,721
8	8,285	-	8,285
9	9,287	-	9,287
10	9,576	-	9,576
11	8,138	-	8,138
12	9,371	-	9,371
13	6,440	-	6,440
14	8,022	-	8,022
15	8,175	-	8,175
16	8,796	-	8,796
17	6,437	-	6,437
18	7,407	-	7,407

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB (continued)

Table 12-1: 2020 VMT on tolled lane and checked against toll lane capacity

I95 Segments												Auto	Truck	Total
1												8,440	-	8,440
2												10,511	-	10,511
3												7,397	-	7,397
4												8,862	-	8,862
5												7,686	-	7,686
6												9,860	-	9,860
7												9,721	-	9,721
8												8,285	-	8,285
9												9,287	-	9,287
10												9,576	-	9,576
11												8,138	-	8,138
12												9,371	-	9,371
13												6,440	-	6,440
14												8,022	-	8,022
15												8,175	-	8,175
16												8,796	-	8,796
17												6,437	-	6,437
18												7,407	-	7,407

Table 8: 2020 Summer Weekend VMT from CS I95 Model - No Toll Scenario

	VMT													
I95 Segments												Auto	Truck	Total VMT
1												198,634	39,437	238,071
2												217,259	46,690	263,949
3												278,758	54,366	333,124
4												243,358	46,610	289,968
5												257,171	46,090	303,261
6												108,295	24,630	132,925

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekend Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	22.1	0	212,694	22.1	22.9	238,071	425,388	23.2	1.1	75	71
2	27.0	0	259,588	27.0	27.8	263,949	519,176	28.1	1.1	75	72
3	30.9	0	297,372	30.9	34.2	333,124	594,744	34.7	3.7	75	67
4	23.2	0	443,631	23.2	24.8	289,968	443,631	25.5	2.2	75	68
5	25.8	0	407,906	25.8	27.1	303,261	499,041	27.6	1.8	75	70
6	16.0	0	153,860	16.0	17.3	132,925	307,720	17.4	1.4	75	69

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – Aggregated Segments SB (continued)

Table 10-1: Estimated 2020 Toll Lane Percent from I95 General Purpose Lane

			% Toll Use	
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	Auto	truck
1	1.1	2.90	6.1%	0.0%
2	1.1	3.54	4.5%	0.0%
3	3.7	3.18	7.2%	0.0%
4	2.2	4.50	3.2%	0.0%
5	1.8	4.18	3.5%	0.0%
6	1.4	3.93	3.8%	0.0%

* Diversion percentages calculated

Table 11-1: 2020 Toll Lane VMT

	Toll VMT		
I95 Segments	Auto	Truck	Total
1	12,174	-	12,174
2	9,669	-	9,669
3	20,004	-	20,004
4	7,691	-	7,691
5	9,054	-	9,054
6	4,098	-	4,098

* Diversion values calculated

Table 12-1: 2020 VMT on tolled lane and checked against toll lane capacity

I95 Segments	Auto	Truck	Total
1	12,174	-	12,174
2	9,669	-	9,669
3	20,004	-	20,004
4	7,691	-	7,691
5	9,054	-	9,054
6	4,098	-	4,098

Northbound

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Northbound Input Tab

Table 1 2020 Daily VMT and travel time from CS I-95 Model (considering NB direction)

	Daily VMT																
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck		Toll per Segment (2009$)	Seg. Length (miles)	Free Flow Speed (mph)	Free Flow Travel Time (min)	Congested Travel Time on the GP lanes (min)
1	2,614	6,032	9,581	10,221	13,802	41,558	7,490	11,008	18,595	29,659	35,506		0.1	8.38	75	6.707179	6.9
2	3,922	8,149	13,453	14,509	21,172	34,003	4,105	5,275	13,230	101,596	45,867		0.1	12.41	75	9.93195	10.2
3	1,854	3,869	6,814	7,757	12,653	11,335	422	1,514	5,104	69,958	25,450		0.1	6.86	75	5.48749	5.6
4	3,542	7,220	12,696	14,803	25,652	38,282	3,416	5,352	13,407	76,688	48,820		0.1	12.69	75	10.15262	10.3
5	2,273	4,952	9,452	12,013	23,829	34,427	4,610	4,804	11,701	38,420	30,535		0.1	8.44	75	6.752342	6.9
6	3,992	8,651	16,419	20,388	38,613	43,454	3,021	8,709	17,958	65,259	49,045		0.1	12.69	75	10.15355	10.5
7	3,297	7,270	13,447	16,611	29,804	42,109	4,380	14,730	21,915	59,850	47,529		0.1	12.52	75	10.01673	10.3
8	2,416	5,363	10,017	12,138	20,976	29,760	2,924	11,973	16,880	41,776	36,694		0.1	8.96	75	7.167342	7.9
9	2,711	5,811	10,642	12,557	20,958	35,034	4,713	10,771	15,580	33,934	34,031		0.1	8.51	75	6.806166	7.5
10	2,945	6,263	11,440	13,274	21,502	32,382	2,403	8,313	14,516	54,291	34,637		0.1	8.74	75	6.99146	7.8
11	2,607	5,398	10,091	12,149	21,418	31,868	4,383	11,208	14,995	60,304	38,206		0.15	7.94	75	6.353429	6.8
12	4,926	10,012	18,895	23,692	43,320	44,878	3,739	11,841	23,415	145,496	69,132		0.15	14.75	75	11.80356	12.7
13	1,954	4,120	7,625	9,340	16,928	22,420	2,217	3,121	7,422	40,462	26,958		0.15	6.22	75	4.972222	5.1
14	4,888	9,592	16,711	19,023	30,868	60,976	7,180	7,707	16,259	51,628	50,920		0.15	12.60	75	10.08214	10.1
15	4,190	7,884	13,095	14,330	21,256	35,785	1,710	4,719	11,806	40,463	32,681		0.15	8.00	75	6.398275	6.9
16	4,561	8,517	14,762	16,702	25,793	47,278	4,081	10,818	20,951	67,787	45,972		0.15	11.65	75	9.31881	10.0
17	1,933	3,531	5,693	6,004	8,561	19,170	1,503	3,564	6,760	37,276	27,105		0.1	7.55	75	6.040092	6.5
18	3,265	4,938	6,724	6,055	6,788	17,556	1,318	3,738	8,292	76,067	41,355		0.1	12.44	75	9.955978	10.7

CPI 2009	214.537
CPI 2011	224.939
Adjustment	1.05

Table 2: Summer Adjustment Factor

Season	Adjustment Factor
Summer	0.78

* Summer seasonal factor from NC DOT

Table 3: Peak to daily adjustment

TOD Period	Adjustment Factor
Peak	10

Table 4: Peak hour to period adjustment

TOD Period	Adjustment Factor
Peak	1.04

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Northbound Input Tab (continued)

I95 Segments	Daily Capacity-mile	Hourly Capacity-mile	Period Duration in Hours (Weekday)	Period Duration in Hours(Weekend)	Peak Period Capacity-mile (Weekdays)	Peak Period Capacity-mile (Weekends)	# of GP lanes	# of tolled lanes	Maximum Peak Period Toll Lane Capacity-mile (Weekday)		Maximum Peak Period Toll Lane Capacity-mile (Weekend)	TOD Period	Peak Weekday Period	Peak Summer weekend Day
1	502,814	50,281	4	4	128,927	128,927	2	1	64,463		64,463		1.60	1.68
2	744,315	74,431	4	4	190,850	190,850	2	1	95,425		95,425		1.60	1.68
3	411,884	41,188	4	4	105,611	105,611	2	1	52,806		52,806		1.60	1.68
4	762,602	76,260	4	4	195,539	195,539	2	1	97,769		97,769		1.67	1.83
5	509,535	50,953	4	4	130,650	130,650	2	1	65,325		65,325		1.67	1.83
6	752,648	75,265	4	4	192,987	192,987	2	1	96,493		96,493		1.67	1.83
7	748,077	74,808	4	4	191,815	191,815	2	1	95,907		95,907		1.67	1.83
8	548,166	54,817	4	4	140,556	140,556	2	1	70,278		70,278		1.67	1.83
9	521,822	52,182	4	4	133,801	133,801	2	1	66,900		66,900		1.67	1.83
10	501,434	50,143	4	4	128,573	128,573	2	1	64,286		64,286		1.67	1.83
11	631,459	63,146	4	4	121,435	121,435	2	2	121,434		121,434		1.78	1.80
12	1,194,992	119,499	4	4	229,806	229,806	2	2	229,806		229,806		1.78	1.80
13	480,430	48,043	4	4	92,390	92,390	2	2	92,390		92,390		1.78	1.80
14	986,786	98,679	4	4	189,767	189,767	2	2	189,766		189,766		1.78	1.80
15	660,424	66,042	4	4	127,005	127,005	2	2	127,005		127,005		1.78	1.80
16	710,854	71,085	4	4	182,270	182,270	2	1	91,135		91,135		1.78	1.80
17	452,306	45,231	4	4	115,976	115,976	2	1	57,988		57,988		1.67	1.83
18	747,801	74,780	4	4	191,744	191,744	2	1	95,872		95,872		1.67	1.83

Adjustment Factor

Table 6: Toll Choice Model

Model parameter	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck
Costant for tolled route	-1.045	-1.045	-1.045	-1.045	-1.045	-1.3651	-1.3651	-1.3651	-1.045	-1.3651	-1.045
Time difference	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199
Toll value	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517
Income	0	0	0	0	0	0	0	0	0	0	0

Table 7 Off Peak Adjustment Factor

Off Peak Patronage Factor	1

Table 8: Seasonal Adjustment Factors

Month	Adustment Factor	Days in Month	Peak Months
1	1.27	31	0
2	1.09	28	0
3	0.94	31	0
4	0.81	30	0
5	0.90	31	0
6	0.89	30	30
7	0.74	31	31
8	0.70	31	31
9	0.98	30	0
10	0.99	31	0
11	0.90	30	0
12	0.90	31	0

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB

	Peak VMT													
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total VMT
1			697	1,609	2,555	2,726	3,681	11,082	1,997	2,936	4,959	7,909	9,468	49,618
2			1,046	2,173	3,587	3,869	5,646	9,067	1,095	1,407	3,528	27,092	12,231	70,742
3			494	1,032	1,817	2,069	3,374	3,023	113	404	1,361	18,656	6,787	39,128
4			986	2,009	3,534	4,120	7,140	10,655	951	1,490	3,732	21,345	13,588	69,549
5			633	1,378	2,631	3,344	6,632	9,582	1,283	1,337	3,257	10,694	8,499	49,269
6			1,111	2,408	4,570	5,675	10,747	12,095	841	2,424	4,998	18,164	13,651	76,684
7			918	2,023	3,743	4,623	8,296	11,720	1,219	4,100	6,100	16,658	13,229	72,629
8			672	1,493	2,788	3,379	5,838	8,283	814	3,333	4,698	11,628	10,213	53,139
9			754	1,617	2,962	3,495	5,833	9,751	1,312	2,998	4,336	9,445	9,472	51,977
10			820	1,743	3,184	3,695	5,985	9,013	669	2,314	4,040	15,111	9,641	56,214
11			773	1,601	2,994	3,604	6,354	9,454	1,300	3,325	4,449	17,890	11,334	63,079
12			1,461	2,970	5,606	7,029	12,851	13,314	1,109	3,513	6,946	43,164	20,509	118,473
13			580	1,222	2,262	2,771	5,022	6,651	658	926	2,202	12,004	7,998	42,294
14			1,450	2,846	4,958	5,643	9,158	18,089	2,130	2,286	4,824	15,316	15,106	81,806
15			1,243	2,339	3,885	4,251	6,306	10,616	507	1,400	3,502	12,004	9,695	55,749
16			1,353	2,527	4,379	4,955	7,652	14,026	1,211	3,209	6,215	20,110	13,638	79,276
17			538	983	1,584	1,671	2,383	5,336	418	992	1,882	10,375	7,544	33,706
18			909	1,374	1,871	1,685	1,889	4,886	367	1,040	2,308	21,172	11,510	49,013

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB (continued)

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	6.7	0	64,463	6.7	6.9	49,618	128,927	7.0	0.2	75	72
2	9.9	0	95,425	9.9	10.2	70,742	190,850	10.2	0.3	75	73
3	5.5	0	52,806	5.5	5.6	39,128	105,611	5.6	0.2	75	73
4	10.2	0	97,769	10.2	10.3	69,549	195,539	10.4	0.2	75	74
5	6.8	0	65,325	6.8	6.9	49,269	130,650	6.9	0.2	75	73
6	10.2	0	96,493	10.2	10.5	76,684	192,987	10.5	0.3	75	73
7	10.0	0	95,907	10.0	10.3	72,629	191,815	10.3	0.3	75	73
8	7.2	0	70,278	7.2	7.9	53,139	140,556	7.9	0.7	75	68
9	6.8	0	66,900	6.8	7.5	51,977	133,801	7.5	0.7	75	68
10	7.0	0	64,286	7.0	7.8	56,214	128,573	7.8	0.8	75	67
11	6.4	0	121,434	6.4	6.8	63,079	121,435	6.9	0.6	75	69
12	11.8	0	229,806	11.8	12.7	118,473	229,806	12.8	1.0	75	69
13	5.0	0	92,390	5.0	5.1	42,294	92,390	5.2	0.2	75	72
14	10.1	0	189,766	10.1	10.1	81,806	189,767	10.1	0.1	75	75
15	6.4	0	127,005	6.4	6.9	55,749	127,005	6.9	0.5	75	70
16	9.3	0	91,135	9.3	10.0	79,276	182,270	10.1	0.8	75	69
17	6.0	0	57,988	6.0	6.5	33,706	115,976	6.5	0.4	75	70
18	10.0	0	95,872	10.0	10.7	49,013	191,744	10.7	0.7	75	70

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB (continued)

Table 10-1: Estimated 2020 Toll Choice Percentage from I95 general purpose lane

			% Toll Choice										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck
1	0.2	0.88	18.7%	18.7%	18.7%	18.7%	18.7%	14.3%	14.3%	14.3%	18.7%	14.3%	0.0%
2	0.3	1.30	15.7%	15.7%	15.7%	15.7%	15.7%	11.9%	11.9%	11.9%	15.7%	11.9%	0.0%
3	0.2	0.72	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
4	0.2	1.33	15.3%	15.3%	15.3%	15.3%	15.3%	11.6%	11.6%	11.6%	15.3%	11.6%	0.0%
5	0.2	0.88	18.5%	18.5%	18.5%	18.5%	18.5%	14.2%	14.2%	14.2%	18.5%	14.2%	0.0%
6	0.3	1.33	15.6%	15.6%	15.6%	15.6%	15.6%	11.8%	11.8%	11.8%	15.6%	11.8%	0.0%
7	0.3	1.31	15.6%	15.6%	15.6%	15.6%	15.6%	11.9%	11.9%	11.9%	15.6%	11.9%	0.0%
8	0.7	0.94	19.1%	19.1%	19.1%	19.1%	19.1%	14.7%	14.7%	14.7%	19.1%	14.7%	0.0%
9	0.7	0.89	19.5%	19.5%	19.5%	19.5%	19.5%	15.0%	15.0%	15.0%	19.5%	15.0%	0.0%
10	0.8	0.92	19.5%	19.5%	19.5%	19.5%	19.5%	15.0%	15.0%	15.0%	19.5%	15.0%	0.0%
11	0.6	1.25	16.5%	16.5%	16.5%	16.5%	16.5%	12.5%	12.5%	12.5%	16.5%	12.5%	0.0%
12	1.0	2.32	10.7%	10.7%	10.7%	10.7%	10.7%	8.0%	8.0%	8.0%	10.7%	8.0%	0.0%
13	0.2	0.98	17.9%	17.9%	17.9%	17.9%	17.9%	13.6%	13.6%	13.6%	17.9%	13.6%	0.0%
14	0.1	1.98	11.3%	11.3%	11.3%	11.3%	11.3%	8.5%	8.5%	8.5%	11.3%	8.5%	0.0%
15	0.5	1.26	16.3%	16.3%	16.3%	16.3%	16.3%	12.4%	12.4%	12.4%	16.3%	12.4%	0.0%
16	0.8	1.83	13.0%	13.0%	13.0%	13.0%	13.0%	9.8%	9.8%	9.8%	13.0%	9.8%	0.0%
17	0.4	0.79	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
18	0.7	1.30	16.4%	16.4%	16.4%	16.4%	16.4%	12.5%	12.5%	12.5%	16.4%	12.5%	0.0%

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB (continued)

Table 11-1: 2020 Toll Lane

	% Toll Choice											
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1	130	301	478	510	688	1,586	286	420	927	1,132	-	6,458
2	164	340	562	606	885	1,078	130	167	553	3,220	-	7,706
3	98	205	360	410	669	460	17	61	270	2,839	-	5,389
4	151	308	542	632	1,095	1,239	111	173	572	2,481	-	7,305
5	117	256	488	620	1,230	1,359	182	190	604	1,517	-	6,563
6	173	374	711	883	1,671	1,427	99	286	777	2,142	-	8,543
7	143	316	585	722	1,296	1,389	145	486	953	1,974	-	8,010
8	129	285	533	646	1,117	1,214	119	488	899	1,704	-	7,133
9	147	316	578	682	1,138	1,459	196	449	846	1,413	-	7,223
10	160	340	621	721	1,168	1,349	100	346	788	2,262	-	7,856
11	127	264	493	593	1,046	1,183	163	416	732	2,239	-	7,257
12	156	317	598	750	1,372	1,063	89	281	742	3,447	-	8,815
13	104	218	404	495	897	907	90	126	393	1,637	-	5,272
14	164	321	559	637	1,033	1,529	180	193	544	1,294	-	6,453
15	203	382	634	693	1,029	1,316	63	174	571	1,488	-	6,553
16	176	328	569	644	995	1,373	118	314	808	1,968	-	7,294
17	106	194	313	330	471	810	63	151	372	1,575	-	4,385
18	149	225	307	276	310	609	46	130	378	2,637	-	5,065

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB (continued)

Table 12-1: 2020 VMT on tolled lane and checked against toll lane capacity

I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			130	301	478	510	688	1,586	286	420	927	1,132	-	6,458
2			164	340	562	606	885	1,078	130	167	553	3,220	-	7,706
3			98	205	360	410	669	460	17	61	270	2,839	-	5,389
4			151	308	542	632	1,095	1,239	111	173	572	2,481	-	7,305
5			117	256	488	620	1,230	1,359	182	190	604	1,517	-	6,563
6			173	374	711	883	1,671	1,427	99	286	777	2,142	-	8,543
7			143	316	585	722	1,296	1,389	145	486	953	1,974	-	8,010
8			129	285	533	646	1,117	1,214	119	488	899	1,704	-	7,133
9			147	316	578	682	1,138	1,459	196	449	846	1,413	-	7,223
10			160	340	621	721	1,168	1,349	100	346	788	2,262	-	7,856
11			127	264	493	593	1,046	1,183	163	416	732	2,239	-	7,257
12			156	317	598	750	1,372	1,063	89	281	742	3,447	-	8,815
13			104	218	404	495	897	907	90	126	393	1,637	-	5,272
14			164	321	559	637	1,033	1,529	180	193	544	1,294	-	6,453
15			203	382	634	693	1,029	1,316	63	174	571	1,488	-	6,553
16			176	328	569	644	995	1,373	118	314	808	1,968	-	7,294
17			106	194	313	330	471	810	63	151	372	1,575	-	4,385
18			149	225	307	276	310	609	46	130	378	2,637	-	5,065

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – Aggregated Segments NB

Table 8: 2020 Peak period VMT from CS I95 Model - No Toll Scenario

	Peak VMT													
I95 Aggregated Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total VMT
1			2,237	4,813	7,959	8,663	12,701	23,172	3,205	4,746	9,848	53,657	28,486	159,488
2			2,730	5,796	10,734	13,138	24,519	32,332	3,075	5,251	11,987	50,202	35,738	195,502
3			3,164	6,877	12,677	15,192	25,952	38,768	4,014	12,744	19,175	52,842	42,555	233,958
4			2,815	5,794	10,861	13,404	24,227	29,419	3,067	7,764	13,597	73,058	39,841	223,847
5			4,046	7,711	13,222	14,850	23,116	42,731	3,848	6,896	14,541	47,431	38,440	216,831
6			1,447	2,357	3,456	3,356	4,272	10,222	785	2,032	4,189	31,547	19,054	82,719

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	22.1	0	212,694	22.1	22.8	159,488	425,388	22.8	0.7	75	73
2	27.1	0	259,588	27.1	27.7	195,502	519,176	27.8	0.7	75	73
3	31.0	0	297,372	31.0	33.5	233,958	594,744	33.6	2.6	75	69
4	23.1	0	443,631	23.1	24.7	223,847	443,631	24.9	1.8	75	70
5	25.8	0	407,906	25.8	27.0	216,831	499,041	27.1	1.3	75	71
6	16.0	0	153,860	16.0	17.2	82,719	307,720	17.2	1.2	75	70

Table 10-1: Estimated 2020 Toll Choice Percentage from I95 general purpose lane

			% Toll Use										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck
1	0.7	2.90	7.9%	7.9%	7.9%	7.9%	7.9%	5.8%	5.8%	5.8%	7.9%	5.8%	0.0%
2	0.7	3.55	5.8%	5.8%	5.8%	5.8%	5.8%	4.3%	4.3%	4.3%	5.8%	4.3%	0.0%
3	2.6	3.14	8.7%	8.7%	8.7%	8.7%	8.7%	6.4%	6.4%	6.4%	8.7%	6.4%	0.0%
4	1.8	4.49	4.1%	4.1%	4.1%	4.1%	4.1%	3.0%	3.0%	3.0%	4.1%	3.0%	0.0%
5	1.3	4.22	4.4%	4.4%	4.4%	4.4%	4.4%	3.3%	3.3%	3.3%	4.4%	3.3%	0.0%
6	1.2	3.93	5.1%	5.1%	5.1%	5.1%	5.1%	3.7%	3.7%	3.7%	5.1%	3.7%	0.0%

* Diversion percentages calculated

Table 11-1: 2020 Toll Lane VMT

			Toll VMT										
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			176	379	626	682	999	1,353	187	277	775	3,133	0	8,588
2			158	335	621	760	1,419	1,380	131	224	693	2,143	0	7,865
3			274	596	1,099	1,317	2,250	2,500	259	822	1,663	3,408	0	14,188
4			115	237	445	549	993	885	92	234	557	2,199	0	6,308
5			180	343	588	661	1,028	1,397	126	226	647	1,551	0	6,747
6			73	119	175	170	216	380	29	76	212	1,174	0	2,624

* Diversion values calculated

Table 12-1: 2020 VMT on tolled lane and checked against toll lane capacity

I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			176	379	626	682	999	1,353	187	277	775	3,133	0	8,588
2			158	335	621	760	1,419	1,380	131	224	693	2,143	0	7,865
3			274	596	1,099	1,317	2,250	2,500	259	822	1,663	3,408	0	14,188
4			115	237	445	549	993	885	92	234	557	2,199	0	6,308
5			180	343	588	661	1,028	1,397	126	226	647	1,551	0	6,747
6			73	119	175	170	216	380	29	76	212	1,174	0	2,624

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB

Table 8: 2020 Summer Weekend VMT from CS I95 Model - No Toll Scenario

	VMT													
I95 Segments												Auto	Truck	Total VMT
1												54,047	12,746	66,793
2												78,764	16,465	95,229
3												43,537	9,136	52,673
4												78,619	19,090	97,708
5												57,278	11,940	69,218
6												88,554	19,178	107,732
7												83,450	18,585	102,035
8												60,305	14,348	74,654
9												59,714	13,307	73,021
10												65,430	13,544	78,974
11												67,085	14,695	81,780
12												127,006	26,589	153,595
13												44,464	10,369	54,833
14												86,474	19,585	106,058
15												59,707	12,569	72,277
16												85,096	17,682	102,777
17												36,754	10,599	47,353
18												52,687	16,171	68,858

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekend Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	6.7	0	64,463	6.7	6.7	66,793	128,927	6.8	0.07	75	74
2	9.9	0	95,425	9.9	9.9	95,229	190,850	10.0	0.09	75	74
3	5.5	0	52,806	5.5	5.5	52,673	105,611	5.5	0.05	75	74
4	10.2	0	97,769	10.2	10.2	97,708	195,539	10.2	0.09	75	74
5	6.8	0	65,325	6.8	6.8	69,218	130,650	6.8	0.08	75	74
6	10.2	0	96,493	10.2	10.2	107,732	192,987	10.3	0.15	75	74
7	10.0	0	95,907	10.0	10.0	102,035	191,815	10.1	0.12	75	74
8	7.2	0	70,278	7.2	7.2	74,654	140,556	7.3	0.09	75	74
9	6.8	0	66,900	6.8	6.8	73,021	133,801	6.9	0.09	75	74
10	7.0	0	64,286	7.0	7.0	78,974	128,573	7.1	0.15	75	73
11	6.4	0	121,434	6.4	6.4	81,780	121,435	6.5	0.20	75	73
12	11.8	0	229,806	11.8	11.8	153,595	229,806	12.2	0.35	75	73
13	5.0	0	92,390	5.0	5.0	54,833	92,390	5.1	0.09	75	74
14	10.1	0	189,766	10.1	10.1	106,058	189,767	10.2	0.15	75	74
15	6.4	0	127,005	6.4	6.4	72,277	127,005	6.5	0.10	75	74
16	9.3	0	91,135	9.3	9.3	102,777	182,270	9.5	0.14	75	74
17	6.0	0	57,988	6.0	6.0	47,353	115,976	6.1	0.03	75	75
18	10.0	0	95,872	10.0	10.0	68,858	191,744	10.0	0.02	75	75

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB (continued)

Table 10-1: Estimated 2020 Toll Choice Percentage from I95 general purpose lane

			% Tolls										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)										Auto	Truck
1	0.1	0.88										14.1%	0.0%
2	0.1	1.30										11.6%	0.0%
3	0.1	0.72										15.0%	0.0%
4	0.1	1.33										11.5%	0.0%
5	0.1	0.88										14.0%	0.0%
6	0.1	1.33										11.6%	0.0%
7	0.1	1.31										11.6%	0.0%
8	0.1	0.94										13.7%	0.0%
9	0.1	0.89										14.0%	0.0%
10	0.1	0.92										13.9%	0.0%
11	0.2	1.25										12.1%	0.0%
12	0.4	2.32										7.4%	0.0%
13	0.1	0.98										13.5%	0.0%
14	0.1	1.98										8.5%	0.0%
15	0.1	1.26										11.9%	0.0%
16	0.1	1.83										9.2%	0.0%
17	0.0	0.79										14.5%	0.0%
18	0.0	1.30										11.5%	0.0%

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB (continued)

Table 11-1: 2020 Toll Lane VMT

	VMT		
I95 Segments	Auto	truck	Total
1	7,595	-	7,595
2	9,168	-	9,168
3	6,552	-	6,552
4	9,033	-	9,033
5	8,034	-	8,034
6	10,232	-	10,232
7	9,693	-	9,693
8	8,261	-	8,261
9	8,359	-	8,359
10	9,116	-	9,116
11	8,086	-	8,086
12	9,437	-	9,437
13	5,993	-	5,993
14	7,378	-	7,378
15	7,096	-	7,096
16	7,787	-	7,787
17	5,343	-	5,343
18	6,080	-	6,080

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB (continued)

Table 12-1: 2020 VMT on tolled lane and checked against toll lane capacity

I95 Segments	Auto	Truck	Total
1	7,595	-	7,595
2	9,168	-	9,168
3	6,552	-	6,552
4	9,033	-	9,033
5	8,034	-	8,034
6	10,232	-	10,232
7	9,693	-	9,693
8	8,261	-	8,261
9	8,359	-	8,359
10	9,116	-	9,116
11	8,086	-	8,086
12	9,437	-	9,437
13	5,993	-	5,993
14	7,378	-	7,378
15	7,096	-	7,096
16	7,787	-	7,787
17	5,343	-	5,343
18	6,080	-	6,080

Table 8: 2020 Summer Weekend VMT from CS I95 Model - No Toll Scenario

	VMT													
I95 Segments													Auto	Truck	Total VMT
1													176,348	38,347	214,695
2													224,450	50,207	274,658
3													268,899	59,784	328,683
4													238,555	51,653	290,208
5													231,277	49,836	281,113
6													89,441	26,769	116,210

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekend Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	22.1	0	212,694	22.1	22.8	214,695	425,388	23.0	0.9	75	72
2	27.1	0	259,588	27.1	27.7	274,658	519,176	28.0	1.0	75	72
3	31.0	0	297,372	31.0	33.5	328,683	594,744	34.0	3.0	75	68
4	23.1	0	443,631	23.1	24.7	290,208	443,631	25.3	2.2	75	68
5	25.8	0	407,906	25.8	27.0	281,113	499,041	27.4	1.6	75	71
6	16.0	0	153,860	16.0	17.2	116,210	307,720	17.2	1.2	75	70

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – Aggregated Segments NB (continued)

Table 10-1: Estimated 2020 Toll Lane Percent from I95 General Purpose Lane

			% Toll Use	
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	Auto	truck
1	0.9	2.90	5.9%	0.0%
2	1.0	3.55	4.4%	0.0%
3	3.0	3.14	6.7%	0.0%
4	2.2	4.49	3.2%	0.0%
5	1.6	4.22	3.4%	0.0%
6	1.2	3.93	3.7%	0.0%

* Diversion percentages calculated

Table 11-1: 2020 Toll Lane VMT

	Toll VMT		
I95 Segments	Auto	Truck	Total
1	10,479	-	10,479
2	9,850	-	9,850
3	18,030	-	18,030
4	7,554	-	7,554
5	7,797	-	7,797
6	3,344	-	3,344

* Diversion values calculated

Table 12-1: 2020 VMT on tolled lane and checked against toll lane capacity

I95 Segments	Auto	Truck	Total
1	10,479	-	10,479
2	9,850	-	9,850
3	18,030	-	18,030
4	7,554	-	7,554
5	7,797	-	7,797
6	3,344	-	3,344

Daily (Both Directions)

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Daily VMT on Tolled Lanes

Table 1A : 2020 Weekday Daily Outputs on All Lanes (SB Direction)

	Daily VMT												Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
4	10,130	20,840	39,128	48,447	87,915	106,123	11,281	27,327	48,327	270,432	128,314	798,264	9,601	1,840	11,441
5	15,355	29,258	50,129	56,305	87,555	160,416	14,044	26,185	55,264	213,467	126,883	834,860	9,950	1,784	11,734
											Total	1,633,124		**Total**	**23,175**

Table 2A : 2020 Weekday Daily Outputs on General Purpose Lanes (SB Direction)

													Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
4	10,021	20,617	38,709	47,928	86,974	105,289	11,192	27,112	47,810	268,307	128,314	792,273	9,521	1,840	11,361
5	15,170	28,906	49,525	55,627	86,501	158,996	13,919	25,954	54,598	211,578	126,883	827,657	9,854	1,784	11,638
											Total	1,619,931		**Total**	**22,999**

Table 3A : Weekday Daily 2020 VMT , VHT and revenue on tolled lane (SB Direction)

	Weekday Peak VMT												Daily VHT			
I95	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long	Truck	Total	Auto	Truck	Total	Auto Revenu
4	108	223	419	519	941	834	89	215	517	2,126	0	5,991	80	0	80	$799
5	185	352	603	678	1,054	1,420	124	232	665	1,889	0	7,202	96	0	96	$1,080
											Total	13,193		**Total**	**176**	**$1,879**

Table 1B : 2020 Weekday Daily Outputs on All Lanes (NB Direction)

	Daily VMT												Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
4	9,488	19,530	36,611	45,181	81,665	99,166	10,338	26,170	45,833	246,262	134,297	754,540	8,894	1,926	10,820
5	13,639	25,993	44,568	50,055	77,917	144,039	12,971	23,244	49,016	159,878	129,573	730,893	8,455	1,822	10,277
											Total	1,485,432		**Total**	**21,097**

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Daily VMT on Tolled Lanes (continued)

Table 2B : 2020 Weekday Daily Outputs on General Purpose Lanes (NB Direction)

													Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
4	9,373	19,292	36,166	44,632	80,672	98,281	10,246	25,936	45,275	244,063	134,297	748,232	8,804	1,926	10,730
5	13,458	25,650	43,980	49,394	76,889	142,641	12,846	23,019	48,369	158,327	129,573	724,145	8,360	1,822	10,182
											Total	1,472,377		**Total**	**20,912**

Table 3B : Weekday Daily 2020 VMT, VHT and revenue on tolled lane (NB Direction)

	Weekday Peak VMT												Daily VHT			
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
4	115	237	445	549	993	885	92	234	557	2,199	0	6,308	90	0	90	$946
5	180	343	588	661	1,028	1,397	126	226	647	1,551	0	6,747	95	0	95	$1,012
											Total	13,055		**Total**	**185**	**$1,958**

Table 4 : Weekday Daily 2020 VMT and VHT and revenue on tolled lane (Both Directions)

	Weekday Peak VMT												Daily VHT				
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total	Auto Revenu	Average A
4	224	461	864	1,068	1,934	1,720	181	448	1,075	4,325	0	12,299	170	0	170	$1,640	423
5	365	695	1,192	1,338	2,082	2,817	250	457	1,312	3,440	0	13,950	191	0	191	$2,092	432
											Total	**26,248**		**Total**	**361**	**$3,732**	

Table 5A : Summer Weekend Daily 2020 VMT and VHT on all Lanes (SB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
4	243,358	46,610	289,968	3,548	682	4,230
5	257,171	46,090	303,261	3,661	658	4,318
			593,229		**Total**	**8,548**

Table 6A : Summer Weekend Daily 2020 VMT and VHT on General Purpose Lanes (SB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
4	235,667	46,610	282,277	3,446	682	4,127
5	248,117	46,090	294,207	3,540	658	4,198
			576,484		**Total**	**8,325**

Table 7A: Summer Weekend Daily 2020 VMT, VHT and revenue on tolled lane (SB Direction)

	VMT			VHT			
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
4	7,691	0	7,691	103	0	103	$769
5	9,054	0	9,054	121	0	121	$905
		Total	**16,745**		**Total**	**223**	**$1,675**

Table 5B : Summer Weekend Daily 2020 VMT on all Lanes (NB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
4	238,555	51,653	290,208	3,458	751	4,208
5	231,277	49,836	281,113	3,266	705	3,971
			571,320		**Total**	**8,180**

Table 6B : Summer Weekend Daily 2020 VMT and VHT on General Purpose Lanes (NB

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
4	231,001	51,653	282,653	3,357	751	4,108
5	223,479	49,836	273,315	3,162	705	3,867
			555,968		**Total**	**7,975**

Table 7B: Summer Weekend Daily 2020 VMT, VHT and revenue on tolled lane (NB Di

	VMT			VHT			
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
4	7,554	0	7,554	100	0	100	$755
5	7,797	0	7,797	104	0	104	$780
		Total	**15,352**		**Total**	**204**	**$1,535**

Table 8 : Summer Weekend Daily 2020 VMT, VHT and revenue on tolled lane (Both Di

	VMT			VHT				
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total	Auto Revenue	Average Autos
4	15,246	0	15,246	203	0	203	$1,525	525
5	16,851	0	16,851	225	0	225	$1,685	522
		Total	**32,097**		**Total**	**427**	**$3,210**	

Annualized Numbers

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Annualized VMT on Tolled Lanes

Specific Analysis of Segment between I-40 and Fayetteville Year 2020

Table 1A : 2020 Annual Weekday VMT and VHT on Toll Lanes

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	77,775	167,325	277,454	302,509	444,572	598,624	83,320	122,655	342,870	1,380,878	0	3,797,983	51,591	0	97,418
2	68,044	144,129	266,833	326,111	607,268	590,492	54,980	95,044	295,775	934,669	0	3,383,344	45,827	0	136,752
3	125,411	272,495	502,116	600,735	1,023,410	1,143,996	118,613	373,493	754,873	1,578,587	0	6,493,728	90,925	0	126,452
4	46,681	96,062	180,215	222,758	403,411	358,663	37,748	93,537	224,142	901,979	0	2,565,195	35,527	0	75,344
5	76,095	145,012	248,543	279,153	434,312	587,584	52,172	95,372	273,679	717,567	0	2,909,489	39,817	0	57,345
6	36,190	59,014	86,642	84,138	107,111	187,617	14,196	37,023	104,014	554,451	0	1,270,395	17,528	0	17,528
											Totals	20,420,134		**Totals**	510,839

Table 1B : 2020 Annual Weekday VMT and VHT on Toll Lanes (Fridays)

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	14,543	31,287	51,880	56,565	83,129	111,935	15,580	22,935	64,112	258,205	0	710,171	9,647	0	9,647
2	12,723	26,950	49,894	60,978	113,551	110,414	10,281	17,772	55,306	174,770	0	632,639	8,569	0	8,569
3	23,450	50,953	93,889	112,329	191,364	213,912	22,179	69,838	141,151	295,174	0	1,214,238	17,002	0	17,002
4	8,729	17,962	33,698	41,653	75,432	67,065	7,058	17,490	41,911	168,658	0	479,656	6,643	0	6,643
5	14,229	27,115	46,474	52,198	81,210	109,870	9,755	17,833	51,174	134,175	0	544,035	7,445	0	7,445
6	6,767	11,035	16,201	15,733	20,028	35,082	2,654	6,923	19,449	103,675	0	237,546	29,569	0	29,569
											Totals	3,818,285		**Totals**	78,875

Table 2A : 2020 Annual Summer Weekend VMT and VHT on Toll Lanes

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	595,451	0	595,451	7,940	0	7,940
2	513,078	0	513,078	6,849	0	6,849
3	999,761	0	999,761	13,341	0	13,341
4	400,740	0	400,740	5,331	0	5,331
5	442,952	0	442,952	5,905	0	5,905
6	195,600	0	195,600	2,608	0	2,608
		Totals	3,147,582		**Totals**	41,975

Table 2B : 2020 Annual Summer Weekend VMT and VHT on Toll Lanes (Fridays)

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	297,726	0	297,726	3,970	0	3,970
2	256,539	0	256,539	3,424	0	3,424
3	499,881	0	499,881	6,671	0	6,671
4	200,370	0	200,370	2,665	0	2,665
5	221,476	0	221,476	2,953	0	2,953
6	97,800	0	97,800	1,304	0	1,304
		Totals	1,573,791		**Totals**	20,987

Table 3 : Total Annual 2020 VMT and VHT on Toll Lanes

		VMT			VHT			
I95 Segments	Segment Length	Auto	Truck	Totals	Auto	Truck	Total	Auto Revenue
1	28	5,401,330	0	5,401,330	73,149	0	73,149	$ 540,133
2	34	4,785,601	0	4,785,601	64,669	0	64,669	$ 478,560
3	39	9,207,608	0	9,207,608	127,939	0	127,939	$ 920,761
4	29	3,645,961	0	3,645,961	50,166	0	50,166	$ 546,894
5	32	4,117,950	0	4,117,950	56,121	0	56,121	$ 617,693
6	20	1,801,342	0	1,801,342	51,008	0	51,008	$ 180,134
			Totals	28,959,792		**Totals**	423,052	$ 1,164,587

2020 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Annualized VMT on General Purpose Lanes

Table 1A : 2020 Annual Weekday VMT on General Purpose Lanes

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	4,238,581	9,118,860	15,120,696	16,486,102	24,228,239	32,623,794	4,540,791	6,684,467	18,685,732	75,254,995	43,785,948	250,768,204	2,858,875	604,779	3,463,654
2	4,848,564	10,270,042	19,013,502	23,237,401	43,271,556	42,076,154	3,917,692	6,772,451	21,075,803	66,600,924	53,589,011	294,673,099	3,314,494	736,757	4,051,251
3	5,735,741	12,462,742	22,964,574	27,474,972	46,806,260	52,321,335	5,424,830	17,081,921	34,524,569	72,197,644	63,104,472	360,099,061	4,350,064	924,288	5,274,351
4	4,850,263	9,981,160	18,724,883	23,145,252	41,915,737	37,266,285	3,922,145	9,718,776	23,289,064	93,718,626	54,773,185	321,305,376	3,814,519	783,895	4,598,414
5	7,066,120	13,465,663	23,079,501	25,921,883	40,329,839	54,562,450	4,844,597	8,856,113	25,413,545	66,632,633	53,489,397	323,661,740	3,792,450	750,839	4,543,289
6	3,094,265	5,045,661	7,407,867	7,193,735	9,157,945	16,041,225	1,213,734	3,165,418	8,893,165	47,405,347	28,420,952	137,039,314	1,560,447	408,305	1,968,752
											Totals	1,687,546,794		**Totals**	23,899,712

Table 1B : 2020 Annual Weekday VMT on General Purpose Lanes (Fridays)

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	795,234	1,710,863	2,836,916	3,093,091	4,545,656	6,120,814	851,935	1,254,127	3,505,781	14,119,199	8,187,373	47,020,989	536,377	113,085	649,462
2	909,694	1,926,880	3,567,340	4,359,834	8,118,670	7,894,387	735,043	1,270,657	3,954,272	12,495,758	10,020,411	55,252,944	621,870	137,764	759,634
3	1,076,142	2,338,264	4,308,622	5,154,865	8,781,808	9,816,549	1,017,809	3,204,917	6,477,513	13,545,749	11,799,672	67,521,910	816,161	172,829	988,990
4	909,960	1,872,571	3,512,985	4,342,293	7,863,833	6,991,547	735,836	1,823,344	4,369,273	17,582,599	10,241,835	60,246,076	715,644	146,578	862,221
5	1,325,655	2,526,256	4,329,881	4,863,133	7,566,170	10,236,310	908,881	1,661,471	4,767,765	12,500,764	10,001,784	60,688,071	711,491	140,397	851,888
6	580,609	946,770	1,390,015	1,349,835	1,718,401	3,009,982	227,746	593,960	1,668,717	8,895,159	5,314,329	25,695,524	292,803	76,347	369,150
											Totals	316,425,514		**Totals**	4,481,345

Table 2A : 2020 Annual Weekend VMT on General Purpose Lanes

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	104,794,668	21,892,974	126,687,642	1,460,041	305,022	1,765,062
2	121,720,638	26,794,506	148,515,143	1,686,209	371,187	2,057,396
3	150,744,397	31,552,236	182,296,633	2,230,003	466,761	2,696,764
4	134,147,953	27,386,593	161,534,546	1,955,635	399,247	2,354,882
5	136,097,964	26,744,698	162,842,663	1,933,770	380,006	2,313,776
6	54,748,778	14,210,476	68,959,254	788,775	204,733	993,508
		Totals	850,835,882		**Totals**	12,181,387

Table 2B: 2020 Annual Weekend VMT on General Purpose Lanes (Fridays)

	Weekend Annual VMT			Weekend Annual VHT		
I Segments	Auto	Truck	Totals	Auto	Truck	Total
1	12,853,547	2,759,115	15,612,661	179,081	38,441	217,522
2	14,995,147	3,376,842	18,371,989	207,729	46,780	254,509
3	18,435,722	3,976,446	22,412,169	272,725	58,825	331,549
4	16,590,080	3,451,461	20,041,541	241,853	50,316	292,169
5	16,818,661	3,370,565	20,189,226	238,971	47,891	286,862
6	5,756,190	2,790,366	8,546,557	82,930	40,201	123,132
		Totals	105,174,142		**Totals**	1,505,743

Table 3: Total Annual 2020 VMT on General Purpose Lanes

		Annual Results			Weekend Annual VHT		
I-95 Segments	Segment Length	Auto	Truck	Totals	Auto	Truck	Total
1	28	363,464,087	76,625,410	440,089,497	5,034,373	1,061,327	6,095,700
2	34	423,032,405	93,780,769	516,813,174	5,830,302	1,292,488	7,122,789
3	39	521,896,945	110,432,827	632,329,772	7,668,952	1,622,702	9,291,655
4	29	467,274,465	95,853,074	563,127,539	6,727,651	1,380,036	8,107,687
5	32	473,775,256	93,606,445	567,381,700	6,676,682	1,319,133	7,995,815
6	20	189,504,527	50,736,123	240,240,649	2,724,955	729,586	3,454,542
			Totals	2,959,982,332		**Totals**	42,068,187

A-2: 2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario

Southbound

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Southbound Input Tab

Table 1 2040 Daily VMT and travel time from CS I-95 Model (considering SB direction)

	Daily VMT																
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck		Toll per Segment (2009$)	Seg. Length (miles)	Free Flow Speed (mph)	Free Flow Travel Time (min)	Congested Travel Time on the GP lanes (min)
1	3,523	8,147	12,911	13,762	18,516	56,438	10,209	15,043	25,421	42,036	42,296		0.1	8.38	75	6.704182	6.8
2	5,595	11,650	19,476	21,158	31,196	49,382	6,195	7,777	19,206	139,308	66,626		0.1	12.41	75	9.924197	10.1
3	2,582	5,385	9,478	10,799	17,645	15,613	570	2,052	6,996	98,343	37,041		0.1	6.86	75	5.491783	5.6
4	4,904	10,008	17,605	20,507	35,500	52,384	4,634	7,316	18,406	109,943	71,040		0.1	12.71	75	10.16802	10.3
5	3,053	6,576	12,521	15,913	31,677	45,709	5,975	6,225	15,333	53,485	43,637		0.1	8.49	75	6.7938	6.9
6	5,314	11,440	21,708	26,813	50,262	56,888	3,563	11,129	23,300	86,893	66,947		0.1	12.54	75	10.03531	10.2
7	4,354	9,608	17,745	21,758	38,533	53,105	5,024	18,716	28,214	88,104	65,335		0.1	12.47	75	9.974362	10.1
8	3,163	7,026	13,131	15,933	27,623	39,113	3,743	15,173	21,698	56,798	49,001		0.1	9.14	75	7.308886	7.9
9	3,963	8,447	15,463	18,215	30,386	50,162	6,706	15,473	22,429	51,644	47,270		0.1	8.70	75	6.957626	7.6
10	4,033	8,657	15,763	18,295	29,585	47,820	4,244	12,340	20,527	68,898	45,038		0.1	8.36	75	6.685788	7.4
11	3,453	7,166	13,361	16,074	28,444	42,186	6,455	15,123	19,917	77,155	50,803		0.15	8.10	75	6.483365	7.0
12	6,055	12,290	23,230	29,175	53,455	54,216	4,033	13,201	27,583	186,768	90,196		0.15	14.94	75	11.94992	12.9
13	2,462	5,184	9,628	11,950	21,868	29,245	2,942	4,194	9,728	54,696	34,980		0.15	6.01	75	4.804298	5.0
14	5,955	11,680	20,337	23,180	37,622	73,442	8,617	9,498	19,837	80,548	68,538		0.15	12.33	75	9.867858	9.9
15	5,605	10,549	17,505	19,146	28,374	47,820	2,292	6,335	15,783	61,712	48,181		0.15	8.26	75	6.604237	7.1
16	5,805	10,849	18,836	21,338	33,048	60,301	5,044	13,742	26,773	98,904	65,425		0.15	11.67	75	9.332321	10.2
17	2,993	5,475	8,797	9,238	13,081	29,065	2,182	5,214	10,089	44,377	39,463		0.1	7.54	75	6.030746	6.5
18	4,484	6,746	9,158	8,227	9,178	23,620	1,761	5,104	11,320	105,329	60,131		0.1	12.46	75	9.970682	10.7

CPI 2009	214.537
CPI 2011	224.939
Adjustment	1.05

Table 2: Summer Adjustment Factor

Season	Adjustment Factor
Summer	0.78

* Summer seasonal factor from NC DOT

Table 3: Peak Hour to daily adjustment

TOD Period	Adjustment Factor
Peak	10

Table 4: Peak hour to period adjustment

TOD Period	Adjustment Factor
Peak	1.04

Table 5: Capacities from I95 ICTDM

I95 Segments	Daily Capacity-mile	Hourly Capacity-mile	Period Duration in Hours (Weekday)	Period Duration in Hours(Weekend)	Peak Period Capacity-mile (Weekdays)	Peak Period Capacity-mile (Weekends)	# of GP lanes	# of tolled lanes	Maximum Peak Period Toll Lane Capacity-mile (Weekday)		Maximum Peak Period Toll Lane Capacity-mile (Weekend)	TOD Period	Peak Weekday Period	Peak Summer weekend Day
1	502,814	50,281	4	4	128,927	128,927	2	1	64,463		64,463		1.66	1.79
2	744,315	74,431	4	4	190,850	190,850	2	1	95,425		95,425		1.66	1.79
3	411,884	41,188	4	4	105,611	105,611	2	1	52,806		52,806		1.66	1.79
4	762,602	76,260	4	4	195,539	195,539	2	1	97,769		97,769		1.67	1.70
5	509,535	50,953	4	4	130,650	130,650	2	1	65,325		65,325		1.67	1.70
6	752,648	75,265	4	4	192,987	192,987	2	1	96,493		96,493		1.67	1.70
7	748,077	74,808	4	4	191,815	191,815	2	1	95,907		95,907		1.67	1.70
8	548,166	54,817	4	4	140,556	140,556	2	1	70,278		70,278		1.67	1.70
9	521,822	52,182	4	4	133,801	133,801	2	1	66,900		66,900		1.67	1.70
10	501,434	50,143	4	4	128,573	128,573	2	1	64,286		64,286		1.67	1.70
11	631,459	63,146	4	4	121,435	121,435	2	2	121,434		121,434		1.58	1.70
12	1,194,992	119,499	4	4	229,806	229,806	2	2	229,806		229,806		1.58	1.70
13	480,430	48,043	4	4	92,390	92,390	2	2	92,390		92,390		1.58	1.70
14	986,786	98,679	4	4	189,767	189,767	2	2	189,766		189,766		1.58	1.70
15	660,424	66,042	4	4	127,005	127,005	2	2	127,005		127,005		1.58	1.70
16	710,854	71,085	4	4	182,270	182,270	2	1	91,135		91,135		1.58	1.70
17	452,306	45,231	4	4	115,976	115,976	2	1	57,988		57,988		1.67	1.70
18	747,801	74,780	4	4	191,744	191,744	2	1	95,872		95,872		1.67	1.70

Adjustment Factor

Table 6: Toll Choice Model

Model parameter	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck
Costant for tolled route	-1.045	-1.045	-1.045	-1.045	-1.045	-1.3651	-1.3651	-1.3651	-1.045	-1.3651	-1.045
Time difference	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199
Toll value	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517
Income	0	0	0	0	0	0	0	0	0	0	0

Table 7 Off Peak Adjustment Factor

Off Peak Patronage Factor 1

Table 8: Seasonal Adjustment Factors by Month

Month	Adjustment Factor	Days in Month	Peak Months
1	1.27	31	0
2	1.09	28	0
3	0.94	31	0
4	0.81	30	0
5	0.90	31	0
6	0.89	30	30
7	0.74	31	31
8	0.70	31	31
9	0.98	30	0
10	0.99	31	0
11	0.90	30	0
12	0.90	31	0

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB

Table 8: 2040 Peak period VMT from CS I95 Model - No Toll Scenario

	Peak VMT												
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total VMT
1			975	2,254	3,572	3,807	5,123	15,614	2,824	4,162	7,033	11,630	11,702	68,696
2			1,548	3,223	5,388	5,854	8,631	13,662	1,714	2,152	5,314	38,542	18,433	104,461
3			714	1,490	2,622	2,988	4,882	4,320	158	568	1,936	27,208	10,248	57,133
4			1,365	2,786	4,900	5,708	9,881	14,580	1,290	2,036	5,123	30,601	19,773	98,042
5			850	1,830	3,485	4,429	8,817	12,722	1,663	1,733	4,268	14,887	12,146	66,829
6			1,479	3,184	6,042	7,463	13,990	15,834	992	3,098	6,485	24,185	18,633	101,385
7			1,212	2,674	4,939	6,056	10,725	14,781	1,398	5,209	7,853	24,522	18,185	97,555
8			880	1,956	3,655	4,435	7,688	10,886	1,042	4,223	6,039	15,809	13,639	70,252
9			1,103	2,351	4,304	5,070	8,457	13,962	1,866	4,307	6,243	14,374	13,157	75,194
10			1,123	2,410	4,387	5,092	8,234	13,310	1,181	3,435	5,713	19,177	12,536	76,598
11			909	1,887	3,518	4,233	7,490	11,109	1,700	3,982	5,245	20,318	13,378	73,769
12			1,595	3,236	6,117	7,683	14,077	14,277	1,062	3,476	7,264	49,182	23,752	131,720
13			648	1,365	2,535	3,147	5,759	7,701	775	1,104	2,562	14,403	9,211	49,211
14			1,568	3,076	5,355	6,104	9,907	19,340	2,269	2,501	5,224	21,211	18,048	94,603
15			1,476	2,778	4,610	5,042	7,472	12,593	604	1,668	4,156	16,251	12,688	69,336
16			1,529	2,857	4,960	5,619	8,703	15,879	1,328	3,619	7,050	26,045	17,229	94,817
17			833	1,524	2,449	2,571	3,641	8,090	607	1,451	2,808	12,352	10,984	47,309
18			1,248	1,878	2,549	2,290	2,554	6,574	490	1,421	3,151	29,317	16,736	68,208

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB (continued)

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	6.7	0	64,463	6.7	6.8	68,696	128,927	6.9	0.2	75	73
2	9.9	0	95,425	9.9	10.1	104,461	190,850	10.3	0.3	75	73
3	5.5	0	52,806	5.5	5.6	57,133	105,611	5.7	0.2	75	73
4	10.2	0	97,769	10.2	10.3	98,042	195,539	10.4	0.2	75	73
5	6.8	0	65,325	6.8	6.9	66,829	130,650	7.0	0.2	75	73
6	10.0	0	96,493	10.0	10.2	101,385	192,987	10.3	0.3	75	73
7	10.0	0	95,907	10.0	10.1	97,555	191,815	10.2	0.3	75	73
8	7.3	0	70,278	7.3	7.9	70,252	140,556	8.0	0.7	75	69
9	7.0	0	66,900	7.0	7.6	75,194	133,801	7.8	0.8	75	67
10	6.7	0	64,286	6.7	7.4	76,598	128,573	7.5	0.8	75	67
11	6.5	0	121,434	6.5	7.0	73,769	121,435	7.2	0.7	75	68
12	11.9	0	229,806	11.9	12.9	131,720	229,806	13.1	1.2	75	68
13	4.8	0	92,390	4.8	5.0	49,211	92,390	5.1	0.3	75	71
14	9.9	0	189,766	9.9	9.9	94,603	189,767	10.0	0.1	75	74
15	6.6	0	127,005	6.6	7.1	69,336	127,005	7.2	0.6	75	69
16	9.3	0	91,135	9.3	10.2	94,817	182,270	10.3	1.0	75	68
17	6.0	0	57,988	6.0	6.5	47,309	115,976	6.5	0.5	75	69
18	10.0	0	95,872	10.0	10.7	68,208	191,744	10.7	0.8	75	70

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB (continued)

Table 10-1: Estimated 2040 Toll Choice Percentage from I95 general purpose lane

			% Toll Choice										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck
1	0.2	0.88	18.6%	18.6%	18.6%	18.6%	18.6%	14.2%	14.2%	14.2%	18.6%	14.2%	0.0%
2	0.3	1.30	15.7%	15.7%	15.7%	15.7%	15.7%	11.9%	11.9%	11.9%	15.7%	11.9%	0.0%
3	0.2	0.72	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
4	0.2	1.33	15.3%	15.3%	15.3%	15.3%	15.3%	11.6%	11.6%	11.6%	15.3%	11.6%	0.0%
5	0.2	0.89	18.5%	18.5%	18.5%	18.5%	18.5%	14.1%	14.1%	14.1%	18.5%	14.1%	0.0%
6	0.3	1.32	15.6%	15.6%	15.6%	15.6%	15.6%	11.8%	11.8%	11.8%	15.6%	11.8%	0.0%
7	0.3	1.31	15.6%	15.6%	15.6%	15.6%	15.6%	11.8%	11.8%	11.8%	15.6%	11.8%	0.0%
8	0.7	0.96	18.9%	18.9%	18.9%	18.9%	18.9%	14.5%	14.5%	14.5%	18.9%	14.5%	0.0%
9	0.8	0.91	19.5%	19.5%	19.5%	19.5%	19.5%	14.9%	14.9%	14.9%	19.5%	14.9%	0.0%
10	0.8	0.88	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
11	0.7	1.27	16.5%	16.5%	16.5%	16.5%	16.5%	12.5%	12.5%	12.5%	16.5%	12.5%	0.0%
12	1.2	2.35	10.7%	10.7%	10.7%	10.7%	10.7%	8.0%	8.0%	8.0%	10.7%	8.0%	0.0%
13	0.3	0.94	18.2%	18.2%	18.2%	18.2%	18.2%	13.9%	13.9%	13.9%	18.2%	13.9%	0.0%
14	0.1	1.94	11.6%	11.6%	11.6%	11.6%	11.6%	8.7%	8.7%	8.7%	11.6%	8.7%	0.0%
15	0.6	1.30	16.2%	16.2%	16.2%	16.2%	16.2%	12.3%	12.3%	12.3%	16.2%	12.3%	0.0%
16	1.0	1.83	13.3%	13.3%	13.3%	13.3%	13.3%	10.0%	10.0%	10.0%	13.3%	10.0%	0.0%
17	0.5	0.79	19.9%	19.9%	19.9%	19.9%	19.9%	15.2%	15.2%	15.2%	19.9%	15.2%	0.0%
18	0.8	1.31	16.4%	16.4%	16.4%	16.4%	16.4%	12.5%	12.5%	12.5%	16.4%	12.5%	0.0%

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB (continued)

Table 11-1: 2040 Toll Lane

	% Toll Choice											
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total
1	181	420	665	709	954	2,224	402	593	1,310	1,657	-	9,115
2	244	507	848	922	1,359	1,632	205	257	837	4,604	-	11,415
3	142	296	520	593	969	658	24	86	384	4,145	-	7,817
4	210	428	752	876	1,517	1,696	150	237	786	3,560	-	10,212
5	157	338	643	818	1,628	1,796	235	245	788	2,102	-	8,748
6	230	495	940	1,161	2,176	1,867	117	365	1,009	2,852	-	11,212
7	189	417	770	945	1,673	1,749	165	616	1,225	2,902	-	10,652
8	166	369	690	837	1,452	1,574	151	611	1,140	2,286	-	9,276
9	215	457	837	986	1,645	2,083	278	642	1,214	2,144	-	10,502
10	222	478	869	1,009	1,632	2,025	180	523	1,132	2,918	-	10,988
11	150	311	580	697	1,234	1,392	213	499	864	2,546	-	8,486
12	171	346	655	822	1,507	1,143	85	278	777	3,938	-	9,722
13	118	249	462	573	1,048	1,071	108	154	466	2,004	-	6,253
14	182	356	620	707	1,147	1,679	197	217	605	1,842	-	7,551
15	239	450	747	816	1,210	1,549	74	205	673	2,000	-	7,964
16	203	380	659	747	1,157	1,590	133	362	937	2,609	-	8,777
17	165	303	486	511	723	1,233	93	221	558	1,883	-	6,175
18	204	308	418	375	419	819	61	177	516	3,652	-	6,949

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments SB (continued)

Table 12-1: 2040 VMT on tolled lane and checked against toll lane capacity

I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			181	420	665	709	954	2,224	402	593	1,310	1,657	-	9,115
2			244	507	848	922	1,359	1,632	205	257	837	4,604	-	11,415
3			142	296	520	593	969	658	24	86	384	4,145	-	7,817
4			210	428	752	876	1,517	1,696	150	237	786	3,560	-	10,212
5			157	338	643	818	1,628	1,796	235	245	788	2,102	-	8,748
6			230	495	940	1,161	2,176	1,867	117	365	1,009	2,852	-	11,212
7			189	417	770	945	1,673	1,749	165	616	1,225	2,902	-	10,652
8			166	369	690	837	1,452	1,574	151	611	1,140	2,286	-	9,276
9			215	457	837	986	1,645	2,083	278	642	1,214	2,144	-	10,502
10			222	478	869	1,009	1,632	2,025	180	523	1,132	2,918	-	10,988
11			150	311	580	697	1,234	1,392	213	499	864	2,546	-	8,486
12			171	346	655	822	1,507	1,143	85	278	777	3,938	-	9,722
13			118	249	462	573	1,048	1,071	108	154	466	2,004	-	6,253
14			182	356	620	707	1,147	1,679	197	217	605	1,842	-	7,551
15			239	450	747	816	1,210	1,549	74	205	673	2,000	-	7,964
16			203	380	659	747	1,157	1,590	133	362	937	2,609	-	8,777
17			165	303	486	511	723	1,233	93	221	558	1,883	-	6,175
18			204	308	418	375	419	819	61	177	516	3,652	-	6,949

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – Aggregated Segments SB

Table 8: 2040 Peak period VMT from CS I95 Model - No Toll Scenario

	Peak VMT													
I95 Aggregated Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total VMT
1			3,237	6,967	11,583	12,649	18,635	33,596	4,696	6,881	14,283	77,380	40,383	230,290
2			3,694	7,800	14,427	17,600	32,687	43,136	3,945	6,867	15,876	69,673	50,552	266,256
3			4,318	9,391	17,285	20,653	35,105	52,939	5,488	17,174	25,848	73,882	57,516	319,599
4			3,152	6,489	12,171	15,062	27,325	33,087	3,537	8,563	15,070	83,903	46,341	254,700
5			4,573	8,711	14,925	16,765	26,081	47,812	4,201	7,788	16,430	63,506	47,965	258,757
6			2,081	3,401	4,998	4,861	6,195	14,664	1,098	2,872	5,959	41,668	27,720	115,517

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	22.1	0	212,694	22.1	22.5	230,290	425,388	22.8	0.7	75	73
2	27.0	0	259,588	27.0	27.4	266,256	519,176	27.7	0.7	75	73
3	30.9	0	297,372	30.9	33.1	319,599	594,744	33.5	2.6	75	69
4	23.2	0	443,631	23.2	24.9	254,700	443,631	25.3	2.1	75	69
5	25.8	0	407,906	25.8	27.2	258,757	499,041	27.5	1.7	75	70
6	16.0	0	153,860	16.0	17.2	115,517	307,720	17.2	1.2	75	70

Table 10-1: Estimated 2040 Toll Choice Percentage from I95 general purpose lane

			% Toll Use										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck
1	0.7	2.90	7.9%	7.9%	7.9%	7.9%	7.9%	5.8%	5.8%	5.8%	7.9%	5.8%	0.0%
2	0.7	3.54	5.8%	5.8%	5.8%	5.8%	5.8%	4.2%	4.2%	4.2%	5.8%	4.2%	0.0%
3	2.6	3.18	8.5%	8.5%	8.5%	8.5%	8.5%	6.3%	6.3%	6.3%	8.5%	6.3%	0.0%
4	2.1	4.50	4.2%	4.2%	4.2%	4.2%	4.2%	3.1%	3.1%	3.1%	4.2%	3.1%	0.0%
5	1.7	4.18	4.7%	4.7%	4.7%	4.7%	4.7%	3.5%	3.5%	3.5%	4.7%	3.5%	0.0%
6	1.2	3.93	5.1%	5.1%	5.1%	5.1%	5.1%	3.7%	3.7%	3.7%	5.1%	3.7%	0.0%

* Diversion percentages calculated

Table 11-1: 2040 Toll Lane VMT

			Toll VMT											
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			255	549	913	997	1,469	1,965	275	402	1,126	4,525	0	12,475
2			213	449	831	1,014	1,883	1,833	168	292	914	2,960	0	10,556
3			366	797	1,466	1,752	2,978	3,338	346	1,083	2,193	4,658	0	18,976
4			133	274	513	635	1,153	1,025	110	265	636	2,600	0	7,344
5			216	412	706	793	1,234	1,664	146	271	777	2,211	0	8,432
6			106	173	254	247	314	548	41	107	302	1,557	0	3,648

* Diversion values calculated

Table 12-1: 2040 VMT on tolled lane and checked against toll lane capacity

I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			255	549	913	997	1,469	1,965	275	402	1,126	4,525	0	12,475
2			213	449	831	1,014	1,883	1,833	168	292	914	2,960	0	10,556
3			366	797	1,466	1,752	2,978	3,338	346	1,083	2,193	4,658	0	18,976
4			133	274	513	635	1,153	1,025	110	265	636	2,600	0	7,344
5			216	412	706	793	1,234	1,664	146	271	777	2,211	0	8,432
6			106	173	254	247	314	548	41	107	302	1,557	0	3,648

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB

Table 8: 2040 Summer Weekend VMT from CS I95 Model - No Toll Scenario

	VMT													
I95 Segments												Auto	Truck	Total VMT
1												78,792	16,177	94,969
2												118,929	25,483	144,412
3												64,816	14,168	78,984
4												102,148	25,805	127,953
5												71,366	15,851	87,217
6												107,998	24,318	132,316
7												103,584	23,733	127,317
8												73,885	17,800	91,685
9												80,964	17,171	98,134
10												83,607	16,360	99,967
11												83,305	18,454	101,759
12												148,934	32,764	181,698
13												55,177	12,706	67,883
14												105,602	24,896	130,498
15												78,143	17,502	95,644
16												107,027	23,766	130,793
17												47,408	14,335	61,743
18												67,174	21,842	89,016

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB (continued)

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekend Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	6.7	0	64,463	6.7	6.7	94,969	128,927	7.0	0.30	75	72
2	9.9	0	95,425	9.9	9.9	144,412	190,850	10.4	0.49	75	71
3	5.5	0	52,806	5.5	5.5	78,984	105,611	5.7	0.26	75	72
4	10.2	0	97,769	10.2	10.2	127,953	195,539	10.4	0.28	75	73
5	6.8	0	65,325	6.8	6.8	87,217	130,650	7.0	0.20	75	73
6	10.0	0	96,493	10.0	10.0	132,316	192,987	10.4	0.33	75	73
7	10.0	0	95,907	10.0	10.0	127,317	191,815	10.3	0.29	75	73
8	7.3	0	70,278	7.3	7.3	91,685	140,556	7.5	0.20	75	73
9	7.0	0	66,900	7.0	7.0	98,134	133,801	7.3	0.30	75	72
10	6.7	0	64,286	6.7	6.7	99,967	128,573	7.1	0.37	75	71
11	6.5	0	121,434	6.5	6.5	101,759	121,435	7.0	0.48	75	70
12	11.9	0	229,806	11.9	11.9	181,698	229,806	12.7	0.70	75	71
13	4.8	0	92,390	4.8	4.8	67,883	92,390	5.0	0.21	75	72
14	9.9	0	189,766	9.9	9.9	130,498	189,767	10.2	0.33	75	73
15	6.6	0	127,005	6.6	6.6	95,644	127,005	6.9	0.32	75	72
16	9.3	0	91,135	9.3	9.3	130,793	182,270	9.7	0.37	75	72
17	6.0	0	57,988	6.0	6.0	61,743	115,976	6.1	0.07	75	74
18	10.0	0	95,872	10.0	10.0	89,016	191,744	10.0	0.07	75	74

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB (continued)

Table 10-1: Estimated 2040 Toll Choice Percentage from I95 general purpose lane

			% Tolls										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)										Auto	Truck
1	0.3	0.88										14.4%	0.0%
2	0.5	1.30										12.1%	0.0%
3	0.3	0.72										15.4%	0.0%
4	0.3	1.33										11.7%	0.0%
5	0.2	0.89										14.2%	0.0%
6	0.3	1.32										11.9%	0.0%
7	0.3	1.31										11.9%	0.0%
8	0.2	0.96										13.7%	0.0%
9	0.3	0.91										14.2%	0.0%
10	0.4	0.88										14.5%	0.0%
11	0.5	1.27										12.3%	0.0%
12	0.7	2.35										7.6%	0.0%
13	0.2	0.94										13.8%	0.0%
14	0.3	1.94										8.9%	0.0%
15	0.3	1.30										11.9%	0.0%
16	0.4	1.83										9.4%	0.0%
17	0.1	0.79										14.6%	0.0%
18	0.1	1.31										11.6%	0.0%

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB (continued)

Table 11-1: 2040 Toll Lane VMT

	VMT		
I95 Segments	Auto	truck	Total
1	11,332	-	11,332
2	14,441	-	14,441
3	9,958	-	9,958
4	11,958	-	11,958
5	10,113	-	10,113
6	12,815	-	12,815
7	12,281	-	12,281
8	10,156	-	10,156
9	11,482	-	11,482
10	12,125	-	12,125
11	10,226	-	10,226
12	11,343	-	11,343
13	7,639	-	7,639
14	9,378	-	9,378
15	9,330	-	9,330
16	10,030	-	10,030
17	6,929	-	6,929
18	7,782	-	7,782

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments SB (continued)

Table 12-1: 2040 VMT on tolled lane and checked against toll lane capacity

I95 Segments	Auto	Truck	Total
1	11,332	-	11,332
2	14,441	-	14,441
3	9,958	-	9,958
4	11,958	-	11,958
5	10,113	-	10,113
6	12,815	-	12,815
7	12,281	-	12,281
8	10,156	-	10,156
9	11,482	-	11,482
10	12,125	-	12,125
11	10,226	-	10,226
12	11,343	-	11,343
13	7,639	-	7,639
14	9,378	-	9,378
15	9,330	-	9,330
16	10,030	-	10,030
17	6,929	-	6,929
18	7,782	-	7,782

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – Aggregated Segments SB (continued)

Table 8: 2040 Summer Weekend VMT from CS I95 Model - No Toll Scenario

	VMT													
I95 Segments													Auto	Truck	Total VMT
1													262,537	55,828	318,365
2													281,512	65,974	347,486
3													342,040	75,063	417,103
4													287,416	63,924	351,340
5													290,771	66,163	356,935
6													114,582	36,177	150,759

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekend Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	22.1	0	212,694	22.1	22.5	318,365	425,388	23.6	1.5	75	70
2	27.0	0	259,588	27.0	27.4	347,486	519,176	28.2	1.2	75	72
3	30.9	0	297,372	30.9	33.1	417,103	594,744	34.3	3.4	75	68
4	23.2	0	443,631	23.2	24.9	351,340	443,631	26.4	3.1	75	66
5	25.8	0	407,906	25.8	27.2	356,935	499,041	28.3	2.5	75	68
6	16.0	0	153,860	16.0	17.2	150,759	307,720	17.3	1.3	75	69

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – Aggregated Segments SB (continued)

Table 10-1: Estimated 2040 Toll Lane Percent from I95 General Purpose Lane

			% Toll Use	
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	Auto	truck
1	1.5	2.90	6.4%	0.0%
2	1.2	3.54	4.5%	0.0%
3	3.4	3.18	6.9%	0.0%
4	3.1	4.50	3.5%	0.0%
5	2.5	4.18	3.8%	0.0%
6	1.3	3.93	3.8%	0.0%

* Diversion percentages calculated

Table 11-1: 2040 Toll Lane VMT

	Toll VMT		
I95 Segments	Auto	Truck	Total
1	16,745	-	16,745
2	12,725	-	12,725
3	23,553	-	23,553
4	10,076	-	10,076
5	11,067	-	11,067
6	4,330	-	4,330

* Diversion values calculated

Table 12-1: 2040 VMT on tolled lane and checked against toll lane capacity

I95 Segments	Auto	Truck	Total
1	16,745	-	16,745
2	12,725	-	12,725
3	23,553	-	23,553
4	10,076	-	10,076
5	11,067	-	11,067
6	4,330	-	4,330

Northbound

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Northbound Input Tab

Table 1 2040 Daily VMT and travel time from CS I-95 Model (considering NB direction)

	Daily VMT															
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck		Toll per Segment (2009$)	Seg. Length (miles)	Free Flow Speed (mph)	Free Flow Travel Time (min)	Congested Travel Time on the GP lanes (min)
1	3,720	8,585	13,636	14,548	19,644	59,149	10,660	15,668	26,465	42,213	41,267		0.1	8.38	75	6.704182	6.8
2	5,517	11,461	18,921	20,406	29,778	47,824	5,774	7,420	18,608	142,893	53,386		0.1	12.41	75	9.924197	10.1
3	2,610	5,447	9,593	10,921	17,814	15,959	594	2,132	7,186	98,494	29,637		0.1	6.86	75	5.491783	5.6
4	5,084	10,361	18,220	21,244	36,813	54,939	4,903	7,680	19,241	110,056	56,643		0.1	12.71	75	10.16802	10.3
5	3,144	6,849	13,074	16,616	32,960	47,619	6,376	6,645	16,184	53,143	35,249		0.1	8.49	75	6.7938	6.8
6	5,468	11,851	22,492	27,930	52,896	59,528	4,139	11,930	24,601	89,398	54,227		0.1	12.54	75	10.03531	10.3
7	4,510	9,945	18,395	22,724	40,772	57,604	5,992	20,151	29,980	81,874	51,269		0.1	12.47	75	9.974362	10.2
8	3,302	7,330	13,692	16,592	28,672	40,679	3,997	16,366	23,074	57,104	38,908		0.1	9.14	75	7.308886	7.8
9	3,751	8,041	14,727	17,376	29,001	48,479	6,522	14,905	21,559	46,958	36,029		0.1	8.70	75	6.957626	7.4
10	4,204	8,940	16,330	18,949	30,693	46,225	3,430	11,866	20,722	77,498	36,678		0.1	8.36	75	6.685788	7.7
11	3,580	7,412	13,857	16,683	29,411	43,760	6,018	15,391	20,592	82,809	41,402		0.15	8.10	75	6.483365	6.9
12	6,901	14,027	26,471	33,191	60,688	62,871	5,238	16,588	32,803	203,829	74,146		0.15	14.94	75	11.94992	12.8
13	2,764	5,826	10,783	13,209	23,941	31,709	3,135	4,413	10,497	57,225	27,798		0.15	6.01	75	4.804298	5.2
14	6,923	13,585	23,669	26,943	43,721	86,363	10,170	10,915	23,029	73,123	52,048		0.15	12.33	75	9.867858	10.1
15	5,766	10,850	18,020	19,719	29,251	49,244	2,354	6,494	16,246	55,681	32,120		0.15	8.26	75	6.604237	6.9
16	6,277	11,722	20,317	22,987	35,498	65,067	5,616	14,889	28,834	93,295	44,747		0.15	11.67	75	9.332321	10.2
17	2,776	5,071	8,176	8,622	12,295	27,532	2,159	5,118	9,709	53,536	25,221		0.1	7.54	75	6.030746	6.5
18	4,810	7,273	9,904	8,919	9,999	25,860	1,941	5,506	12,214	112,049	37,214		0.1	12.46	75	9.970682	10.7

CPI 2009	214.537
CPI 2011	224.939
Adjustment	1.05

Table 2: Summer Adjustment Factor

Season	Adjustment Factor
Summer	0.78

* Summer seasonal factor from NC DOT

Table 3: Peak to daily adjustment

TOD Period	Adjustment Factor
Peak	10

Table 4: Peak hour to period adjustment

TOD Period	Adjustment Factor
Peak	1.04

Table 5: Capacities from I95 ICTDM

I95 Segments	Daily Capacity-mile	Hourly Capacity-mile	Period Duration in Hours (Weekday)	Period Duration in Hours(Weekend)	Peak Period Capacity-mile (Weekdays)	Peak Period Capacity-mile (Weekends)	# of GP lanes	# of tolled lanes	Maximum Peak Period Toll Lane Capacity-mile (Weekday)		Maximum Peak Period Toll Lane Capacity-mile (Weekend)	TOD Period	Peak Weekday Period	Peak Summer weekend Day
1	502,814	50,281	4	4	128,927	128,927	2	1	64,463		64,463	Adjustment Factor	1.60	1.68
2	744,315	74,431	4	4	190,850	190,850	2	1	95,425		95,425		1.60	1.68
3	411,884	41,188	4	4	105,611	105,611	2	1	52,806		52,806		1.60	1.68
4	762,602	76,260	4	4	195,539	195,539	2	1	97,769		97,769		1.67	1.83
5	509,535	50,953	4	4	130,650	130,650	2	1	65,325		65,325		1.67	1.83
6	752,648	75,265	4	4	192,987	192,987	2	1	96,493		96,493		1.67	1.83
7	748,077	74,808	4	4	191,815	191,815	2	1	95,907		95,907		1.67	1.83
8	548,166	54,817	4	4	140,556	140,556	2	1	70,278		70,278		1.67	1.83
9	521,822	52,182	4	4	133,801	133,801	2	1	66,900		66,900		1.67	1.83
10	501,434	50,143	4	4	128,573	128,573	2	1	64,286		64,286		1.67	1.83
11	631,459	63,146	4	4	121,435	121,435	2	2	121,434		121,434		1.78	1.80
12	1,194,992	119,499	4	4	229,806	229,806	2	2	229,806		229,806		1.78	1.80
13	480,430	48,043	4	4	92,390	92,390	2	2	92,390		92,390		1.78	1.80
14	986,786	98,679	4	4	189,767	189,767	2	2	189,766		189,766		1.78	1.80
15	660,424	66,042	4	4	127,005	127,005	2	2	127,005		127,005		1.78	1.80
16	710,854	71,085	4	4	182,270	182,270	2	1	91,135		91,135		1.78	1.80
17	452,306	45,231	4	4	115,976	115,976	2	1	57,988		57,988		1.67	1.83
18	747,801	74,780	4	4	191,744	191,744	2	1	95,872		95,872		1.67	1.83

Table 6: Toll Choice Model

Model parameter	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck
Costant for tolled route	-1.045	-1.045	-1.045	-1.045	-1.045	-1.3651	-1.3651	-1.3651	-1.045	-1.3651	-1.045
Time difference	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199
Toll value	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517
Income	0	0	0	0	0	0	0	0	0	0	0

Table 7 Off Peak Adjustment Factor

Off Peak Patronage Factor	1

Table 8: Seasonal Adjustment Factors by Month

Month	Adjustment Factor	Days in Month	Peak Months
1	1.27	31	0
2	1.09	28	0
3	0.94	31	0
4	0.81	30	0
5	0.90	31	0
6	0.89	30	30
7	0.74	31	31
8	0.70	31	31
9	0.98	30	0
10	0.99	31	0
11	0.90	30	0
12	0.90	31	0

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB

Table 8: 2040 Peak period VMT from CS I95 Model - No Toll Scenario

	Peak VMT												
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total VMT
1			992	2,289	3,636	3,879	5,239	15,773	2,843	4,178	7,057	11,257	11,005	68,148
2			1,471	3,056	5,046	5,442	7,941	12,753	1,540	1,979	4,962	38,105	14,236	96,530
3			696	1,453	2,558	2,912	4,750	4,256	158	569	1,916	26,265	7,903	53,437
4			1,415	2,884	5,071	5,913	10,246	15,291	1,365	2,138	5,355	30,632	15,766	96,076
5			875	1,906	3,639	4,625	9,174	13,254	1,775	1,850	4,505	14,791	9,811	66,204
6			1,522	3,299	6,260	7,774	14,723	16,569	1,152	3,321	6,847	24,882	15,093	101,441
7			1,255	2,768	5,120	6,325	11,348	16,033	1,668	5,609	8,344	22,788	14,270	95,528
8			919	2,040	3,811	4,618	7,980	11,322	1,112	4,555	6,422	15,894	10,829	69,504
9			1,044	2,238	4,099	4,836	8,072	13,493	1,815	4,149	6,001	13,070	10,028	68,845
10			1,170	2,488	4,545	5,274	8,543	12,866	955	3,303	5,768	21,570	10,209	76,690
11			1,062	2,199	4,111	4,949	8,725	12,982	1,785	4,566	6,109	24,567	12,283	83,338
12			2,047	4,161	7,853	9,847	18,004	18,652	1,554	4,921	9,732	60,469	21,997	159,237
13			820	1,728	3,199	3,919	7,102	9,407	930	1,309	3,114	16,977	8,247	56,753
14			2,054	4,030	7,022	7,993	12,970	25,621	3,017	3,238	6,832	21,693	15,441	109,912
15			1,711	3,219	5,346	5,850	8,678	14,609	698	1,926	4,820	16,519	9,529	72,904
16			1,862	3,478	6,027	6,819	10,531	19,303	1,666	4,417	8,554	27,677	13,275	103,611
17			773	1,411	2,276	2,400	3,422	7,663	601	1,425	2,702	14,901	7,020	44,593
18			1,339	2,024	2,757	2,482	2,783	7,198	540	1,532	3,400	31,187	10,358	65,600

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB (continued)

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	6.7	0	64,463	6.7	6.8	68,148	128,927	6.9	0.2	75	73
2	9.9	0	95,425	9.9	10.1	96,530	190,850	10.2	0.3	75	73
3	5.5	0	52,806	5.5	5.6	53,437	105,611	5.6	0.1	75	73
4	10.2	0	97,769	10.2	10.3	96,076	195,539	10.4	0.2	75	74
5	6.8	0	65,325	6.8	6.8	66,204	130,650	6.9	0.1	75	74
6	10.0	0	96,493	10.0	10.3	101,441	192,987	10.4	0.4	75	72
7	10.0	0	95,907	10.0	10.2	95,528	191,815	10.3	0.3	75	73
8	7.3	0	70,278	7.3	7.8	69,504	140,556	7.8	0.5	75	70
9	7.0	0	66,900	7.0	7.4	68,845	133,801	7.5	0.5	75	70
10	6.7	0	64,286	6.7	7.7	76,690	128,573	7.8	1.1	75	64
11	6.5	0	121,434	6.5	6.9	83,338	121,435	7.1	0.6	75	68
12	11.9	0	229,806	11.9	12.8	159,237	229,806	13.2	1.3	75	68
13	4.8	0	92,390	4.8	5.2	56,753	92,390	5.3	0.5	75	68
14	9.9	0	189,766	9.9	10.1	109,912	189,767	10.3	0.4	75	72
15	6.6	0	127,005	6.6	6.9	72,904	127,005	7.0	0.4	75	71
16	9.3	0	91,135	9.3	10.2	103,611	182,270	10.3	1.0	75	68
17	6.0	0	57,988	6.0	6.5	44,593	115,976	6.5	0.5	75	69
18	10.0	0	95,872	10.0	10.7	65,600	191,744	10.7	0.7	75	70

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB (continued)

I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck
1	0.2	0.88	18.7%	18.7%	18.7%	18.7%	18.7%	14.3%	14.3%	14.3%	18.7%	14.3%	0.0%
2	0.3	1.30	15.6%	15.6%	15.6%	15.6%	15.6%	11.9%	11.9%	11.9%	15.6%	11.9%	0.0%
3	0.1	0.72	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
4	0.2	1.33	15.3%	15.3%	15.3%	15.3%	15.3%	11.6%	11.6%	11.6%	15.3%	11.6%	0.0%
5	0.1	0.89	18.4%	18.4%	18.4%	18.4%	18.4%	14.0%	14.0%	14.0%	18.4%	14.0%	0.0%
6	0.4	1.32	15.7%	15.7%	15.7%	15.7%	15.7%	11.9%	11.9%	11.9%	15.7%	11.9%	0.0%
7	0.3	1.31	15.6%	15.6%	15.6%	15.6%	15.6%	11.9%	11.9%	11.9%	15.6%	11.9%	0.0%
8	0.5	0.96	18.6%	18.6%	18.6%	18.6%	18.6%	14.2%	14.2%	14.2%	18.6%	14.2%	0.0%
9	0.5	0.91	19.0%	19.0%	19.0%	19.0%	19.0%	14.5%	14.5%	14.5%	19.0%	14.5%	0.0%
10	1.1	0.88	20.4%	20.4%	20.4%	20.4%	20.4%	15.7%	15.7%	15.7%	20.4%	15.7%	0.0%
11	0.6	1.27	16.4%	16.4%	16.4%	16.4%	16.4%	12.5%	12.5%	12.5%	16.4%	12.5%	0.0%
12	1.3	2.35	10.8%	10.8%	10.8%	10.8%	10.8%	8.1%	8.1%	8.1%	10.8%	8.1%	0.0%
13	0.5	0.94	18.6%	18.6%	18.6%	18.6%	18.6%	14.2%	14.2%	14.2%	18.6%	14.2%	0.0%
14	0.4	1.94	11.9%	11.9%	11.9%	11.9%	11.9%	9.0%	9.0%	9.0%	11.9%	9.0%	0.0%
15	0.4	1.30	15.9%	15.9%	15.9%	15.9%	15.9%	12.0%	12.0%	12.0%	15.9%	12.0%	0.0%
16	1.0	1.83	13.3%	13.3%	13.3%	13.3%	13.3%	10.0%	10.0%	10.0%	13.3%	10.0%	0.0%
17	0.5	0.79	19.8%	19.8%	19.8%	19.8%	19.8%	15.2%	15.2%	15.2%	19.8%	15.2%	0.0%
18	0.7	1.31	16.3%	16.3%	16.3%	16.3%	16.3%	12.4%	12.4%	12.4%	16.3%	12.4%	0.0%

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB (continued)

			% Toll Choice										
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total
1			185	427	678	724	977	2,251	406	596	1,316	1,606	-	9,166
2			230	478	789	851	1,241	1,512	183	235	776	4,518	-	10,811
3			138	287	506	576	939	646	24	86	379	3,986	-	7,567
4			216	441	776	904	1,567	1,773	158	248	819	3,551	-	10,454
5			161	350	669	850	1,685	1,862	249	260	828	2,078	-	8,991
6			239	519	985	1,223	2,316	1,977	137	396	1,077	2,970	-	11,839
7			196	433	801	989	1,775	1,902	198	665	1,305	2,704	-	10,968
8			171	380	709	859	1,485	1,611	158	648	1,195	2,262	-	9,478
9			198	424	777	917	1,530	1,958	263	602	1,137	1,897	-	9,703
10			239	507	927	1,075	1,742	2,017	150	518	1,176	3,382	-	11,732
11			174	361	674	812	1,431	1,618	223	569	1,002	3,063	-	9,926
12			222	451	852	1,068	1,953	1,514	126	400	1,056	4,909	-	12,552
13			152	321	595	729	1,320	1,338	132	186	579	2,415	-	7,767
14			245	482	839	955	1,550	2,298	271	290	816	1,946	-	9,691
15			271	510	848	927	1,376	1,758	84	232	764	1,988	-	8,758
16			248	462	801	907	1,400	1,934	167	443	1,137	2,773	-	10,271
17			153	280	452	476	679	1,168	92	217	536	2,271	-	6,324
18			219	331	451	406	455	894	67	190	556	3,875	-	7,444

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – All Segments NB (continued)

Table 12-1: 2040 VMT on tolled lane and checked against toll lane capacity

I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			185	427	678	724	977	2,251	406	596	1,316	1,606	-	9,166
2			230	478	789	851	1,241	1,512	183	235	776	4,518	-	10,811
3			138	287	506	576	939	646	24	86	379	3,986	-	7,567
4			216	441	776	904	1,567	1,773	158	248	819	3,551	-	10,454
5			161	350	669	850	1,685	1,862	249	260	828	2,078	-	8,991
6			239	519	985	1,223	2,316	1,977	137	396	1,077	2,970	-	11,839
7			196	433	801	989	1,775	1,902	198	665	1,305	2,704	-	10,968
8			171	380	709	859	1,485	1,611	158	648	1,195	2,262	-	9,478
9			198	424	777	917	1,530	1,958	263	602	1,137	1,897	-	9,703
10			239	507	927	1,075	1,742	2,017	150	518	1,176	3,382	-	11,732
11			174	361	674	812	1,431	1,618	223	569	1,002	3,063	-	9,926
12			222	451	852	1,068	1,953	1,514	126	400	1,056	4,909	-	12,552
13			152	321	595	729	1,320	1,338	132	186	579	2,415	-	7,767
14			245	482	839	955	1,550	2,298	271	290	816	1,946	-	9,691
15			271	510	848	927	1,376	1,758	84	232	764	1,988	-	8,758
16			248	462	801	907	1,400	1,934	167	443	1,137	2,773	-	10,271
17			153	280	452	476	679	1,168	92	217	536	2,271	-	6,324
18			219	331	451	406	455	894	67	190	556	3,875	-	7,444

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Weekday Peak Toll Use Calculation – Aggregated Segments NB

Table 8: 2040 Peak period VMT from CS I95 Model - No Toll Scenario

	Peak VMT													
I95 Aggregated Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total VMT
1			3,159	6,798	11,240	12,233	17,930	32,782	4,541	6,725	13,936	75,627	33,144	218,115
2			3,812	8,089	14,970	18,311	34,143	45,114	4,291	7,308	16,707	70,306	40,670	263,722
3			4,388	9,535	17,575	21,054	35,944	53,715	5,550	17,615	26,535	73,323	45,336	310,568
4			3,930	8,089	15,163	18,715	33,832	41,041	4,269	10,796	18,954	102,013	42,526	299,328
5			5,626	10,727	18,395	20,663	32,179	59,534	5,381	9,582	20,206	65,889	38,245	286,426
6			2,111	3,436	5,032	4,882	6,205	14,861	1,141	2,957	6,102	46,088	17,378	110,193

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	22.1	0	212,694	22.1	22.5	218,115	425,388	22.7	0.6	75	73
2	27.0	0	259,588	27.0	27.4	263,722	519,176	27.7	0.7	75	73
3	30.9	0	297,372	30.9	33.0	310,568	594,744	33.4	2.5	75	69
4	23.2	0	443,631	23.2	24.8	299,328	443,631	25.6	2.4	75	68
5	25.8	0	407,906	25.8	27.2	286,426	499,041	27.6	1.8	75	70
6	16.0	0	153,860	16.0	17.2	110,193	307,720	17.2	1.2	75	70

Table 10-1: Estimated 2040 Toll Choice Percentage from I95 general purpose lane

			% Toll Use										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck
1	0.6	2.90	7.8%	7.8%	7.8%	7.8%	7.8%	5.8%	5.8%	5.8%	7.8%	5.8%	0.0%
2	0.7	3.54	5.8%	5.8%	5.8%	5.8%	5.8%	4.3%	4.3%	4.3%	5.8%	4.3%	0.0%
3	2.5	3.18	8.4%	8.4%	8.4%	8.4%	8.4%	6.2%	6.2%	6.2%	8.4%	6.2%	0.0%
4	2.4	4.50	4.4%	4.4%	4.4%	4.4%	4.4%	3.2%	3.2%	3.2%	4.4%	3.2%	0.0%
5	1.8	4.18	4.8%	4.8%	4.8%	4.8%	4.8%	3.5%	3.5%	3.5%	4.8%	3.5%	0.0%
6	1.2	3.93	5.1%	5.1%	5.1%	5.1%	5.1%	3.7%	3.7%	3.7%	5.1%	3.7%	0.0%

* Diversion percentages calculated

Table 11-1: 2040 Toll Lane VMT

			Toll VMT											
I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			246	530	877	954	1,399	1,898	263	389	1,087	4,378	0	12,022
2			220	467	865	1,058	1,973	1,923	183	312	965	2,997	0	10,964
3			368	800	1,474	1,766	3,015	3,348	346	1,098	2,225	4,570	0	19,009
4			171	353	661	816	1,476	1,315	137	346	827	3,270	0	9,372
5			269	513	880	988	1,539	2,094	189	337	966	2,318	0	10,093
6			107	174	255	247	314	554	43	110	309	1,717	0	3,828

* Diversion values calculated

Table 12-1: 2040 VMT on tolled lane and checked against toll lane capacity

I95 Segments			hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Aut	Truck	Total
1			246	530	877	954	1,399	1,898	263	389	1,087	4,378	0	12,022
2			220	467	865	1,058	1,973	1,923	183	312	965	2,997	0	10,964
3			368	800	1,474	1,766	3,015	3,348	346	1,098	2,225	4,570	0	19,009
4			171	353	661	816	1,476	1,315	137	346	827	3,270	0	9,372
5			269	513	880	988	1,539	2,094	189	337	966	2,318	0	10,093
6			107	174	255	247	314	554	43	110	309	1,717	0	3,828

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB

	VMT													
I95 Segments												Auto	Truck	Total VMT
1												76,924	14,814	91,738
2												110,780	19,164	129,945
3												61,295	10,639	71,934
4												112,827	22,149	134,976
5												79,226	13,783	93,009
6												121,309	21,204	142,513
7												114,159	20,047	134,206
8												82,432	15,214	97,646
9												82,631	14,088	96,720
10												93,399	14,342	107,741
11												92,120	15,924	108,044
12												177,926	28,518	206,444
13												62,886	10,691	73,577
14												122,477	20,018	142,496
15												82,163	12,354	94,517
16												117,116	17,211	134,327
17												52,786	9,862	62,648
18												77,609	14,552	92,160

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB (continued)

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekend Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	6.7	0	64,463	6.7	6.7	91,738	128,927	7.0	0.26	75	72
2	9.9	0	95,425	9.9	9.9	129,945	190,850	10.2	0.32	75	73
3	5.5	0	52,806	5.5	5.5	71,934	105,611	5.7	0.18	75	73
4	10.2	0	97,769	10.2	10.2	134,976	195,539	10.5	0.35	75	73
5	6.8	0	65,325	6.8	6.8	93,009	130,650	7.1	0.26	75	72
6	10.0	0	96,493	10.0	10.0	142,513	192,987	10.5	0.45	75	72
7	10.0	0	95,907	10.0	10.0	134,206	191,815	10.3	0.36	75	72
8	7.3	0	70,278	7.3	7.3	97,646	140,556	7.6	0.26	75	72
9	7.0	0	66,900	7.0	7.0	96,720	133,801	7.2	0.28	75	72
10	6.7	0	64,286	6.7	6.7	107,741	128,573	7.2	0.49	75	70
11	6.5	0	121,434	6.5	6.5	108,044	121,435	7.1	0.61	75	69
12	11.9	0	229,806	11.9	11.9	206,444	229,806	13.1	1.17	75	68
13	4.8	0	92,390	4.8	4.8	73,577	92,390	5.1	0.29	75	71
14	9.9	0	189,766	9.9	9.9	142,496	189,767	10.3	0.47	75	72
15	6.6	0	127,005	6.6	6.6	94,517	127,005	6.9	0.30	75	72
16	9.3	0	91,135	9.3	9.3	134,327	182,270	9.7	0.41	75	72
17	6.0	0	57,988	6.0	6.0	62,648	115,976	6.1	0.08	75	74
18	10.0	0	95,872	10.0	10.0	92,160	191,744	10.1	0.08	75	74

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB (continued)

Table 10-1: Estimated 2040 Toll Choice Percentage from I95 general purpose lane

			% Tolls										
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)										Auto	Truck
1	0.3	0.88										14.3%	0.0%
2	0.3	1.30										11.9%	0.0%
3	0.2	0.72										15.2%	0.0%
4	0.3	1.33										11.8%	0.0%
5	0.3	0.89										14.3%	0.0%
6	0.4	1.32										12.0%	0.0%
7	0.4	1.31										11.9%	0.0%
8	0.3	0.96										13.8%	0.0%
9	0.3	0.91										14.2%	0.0%
10	0.5	0.88										14.7%	0.0%
11	0.6	1.27										12.4%	0.0%
12	1.2	2.35										8.0%	0.0%
13	0.3	0.94										14.0%	0.0%
14	0.5	1.94										9.0%	0.0%
15	0.3	1.30										11.9%	0.0%
16	0.4	1.83										9.4%	0.0%
17	0.1	0.79										14.6%	0.0%
18	0.1	1.31										11.6%	0.0%

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB (continued)

Table 11-1: 2040 Toll Lane VMT

	VMT		
I95 Segments	Auto	truck	Total
1	11,020	-	11,020
2	13,215	-	13,215
3	9,341	-	9,341
4	13,301	-	13,301
5	11,296	-	11,296
6	14,570	-	14,570
7	13,633	-	13,633
8	11,398	-	11,398
9	11,698	-	11,698
10	13,724	-	13,724
11	11,464	-	11,464
12	14,269	-	14,269
13	8,779	-	8,779
14	11,043	-	11,043
15	9,795	-	9,795
16	11,025	-	11,025
17	7,719	-	7,719
18	9,001	-	9,001

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – All Segments NB (continued)

Table 12-1: 2040 VMT on tolled lane and checked against toll lane capacity

I95 Segments													Auto	Truck	Total
1													11,020	-	11,020
2													13,215	-	13,215
3													9,341	-	9,341
4													13,301	-	13,301
5													11,296	-	11,296
6													14,570	-	14,570
7													13,633	-	13,633
8													11,398	-	11,398
9													11,698	-	11,698
10													13,724	-	13,724
11													11,464	-	11,464
12													14,269	-	14,269
13													8,779	-	8,779
14													11,043	-	11,043
15													9,795	-	9,795
16													11,025	-	11,025
17													7,719	-	7,719
18													9,001	-	9,001

Table 8: 2040 Summer Weekend VMT from CS I95 Model - No Toll Scenario

	VMT													
I95 Segments													Auto	Truck	Total VMT
1													249,000	44,617	293,617
2													313,362	57,137	370,498
3													372,621	63,692	436,312
4													332,932	55,133	388,065
5													321,757	49,583	371,339
6													130,394	24,414	154,808

Iteration 1

Table 9-1: Travel time on toll scenario using BPR equation

t= t0 * (1+ 0.15*(v/c)^4) `

	Toll Lane				GP Lane						
I95 Segments	Free Flow Travel Time (min)	Total VMT on Toll Lane in Peak	Weekday Peak Capacity-mile Travelled	Estimated Toll Lane Travel Time (min)	Congested Travel Time on the GP lanes (min)	Total VMT on GP Lane in Peak	Weekend Peak Capacity-mile Travelled	Estimated GP Lane Travel Time (min)	Travel Time Savings on Toll Lane (min)	Speed on Toll Lane (mph)	Speed on GP Lane (mph)
1	22.1	0	212,694	22.1	22.5	293,617	425,388	23.3	1.2	75	71
2	27.0	0	259,588	27.0	27.4	370,498	519,176	28.5	1.5	75	71
3	30.9	0	297,372	30.9	33.0	436,312	594,744	34.5	3.5	75	67
4	23.2	0	443,631	23.2	24.8	388,065	443,631	27.0	3.8	75	65
5	25.8	0	407,906	25.8	27.2	371,339	499,041	28.4	2.6	75	68
6	16.0	0	153,860	16.0	17.2	154,808	307,720	17.3	1.3	75	69

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Summer Weekend Peak Toll Use Calculation – Aggregated Segments NB (continued)

Table 10-1: Estimated 2040 Toll Lane Percent from I95 General Purpose Lane

			% Toll Use	
I95 Segments	Travel Time Savings on Toll Lane	Toll Value (2011$)	Auto	truck
1	1.2	2.90	6.1%	0.0%
2	1.5	3.54	4.7%	0.0%
3	3.5	3.18	7.0%	0.0%
4	3.8	4.50	3.8%	0.0%
5	2.6	4.18	3.9%	0.0%
6	1.3	3.93	3.8%	0.0%

* Diversion percentages calculated

Table 11-1: 2040 Toll Lane VMT

	Toll VMT		
I95 Segments	Auto	Truck	Total
1	15,306	-	15,306
2	14,628	-	14,628
3	26,170	-	26,170
4	12,560	-	12,560
5	12,424	-	12,424
6	4,927	-	4,927

* Diversion values calculated

Table 12-1: 2040 VMT on tolled lane and checked against toll lane capacity

I95 Segments	Auto	Truck	Total
1	15,306	-	15,306
2	14,628	-	14,628
3	26,170	-	26,170
4	12,560	-	12,560
5	12,424	-	12,424
6	4,927	-	4,927

Daily (Both Directions)

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Daily VMT on Tolled Lanes

Table 1A : 2040 Weekday Daily Outputs on All Lanes (SB Direction)

	Daily VMT												Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
1	11,700	25,181	41,865	45,719	67,357	121,433	16,974	24,871	51,624	279,686	145,963	832,373	9,441	2,009	11,449
2	13,271	28,024	51,834	63,233	117,439	154,981	14,172	24,671	57,038	250,321	181,623	956,608	10,583	2,481	13,064
3	15,513	33,739	62,102	74,203	126,127	190,201	19,717	61,702	92,868	265,444	206,645	1,148,260	13,580	2,985	16,565
4	11,970	24,641	46,219	57,198	103,768	125,646	13,431	32,517	57,228	318,619	175,979	967,217	11,484	2,556	14,040
5	17,365	33,078	56,678	63,664	99,044	181,563	15,953	29,575	62,393	241,164	182,144	982,620	11,373	2,590	13,963
6	7,476	12,220	17,955	17,465	22,259	52,685	3,943	10,319	21,408	149,706	99,594	415,031	4,528	4,534	9,063
											Total	5,302,109		**Total**	**78,143**

Table 2A : 2040 Weekday Daily Outputs on General Purpose Lanes (SB Direction)

													Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
1	11,445	24,632	40,953	44,722	65,888	119,468	16,700	24,469	50,498	275,161	145,963	819,898	9,274	2,009	11,283
2	13,058	27,574	51,003	62,220	115,557	153,148	14,004	24,379	56,124	247,361	181,623	946,052	10,442	2,481	12,923
3	15,147	32,942	60,636	72,451	123,149	186,863	19,371	60,619	90,676	260,786	206,645	1,129,284	13,327	2,985	16,312
4	11,837	24,367	45,706	56,563	102,615	124,621	13,322	32,252	56,593	316,019	175,979	959,873	11,386	2,556	13,942
5	17,148	32,666	55,972	62,870	97,810	179,899	15,807	29,304	61,615	238,953	182,144	974,188	11,261	2,590	13,850
6	7,371	12,048	17,702	17,218	21,944	52,137	3,902	10,211	21,106	148,150	99,594	411,382	4,480	1,431	5,911
											Total	5,240,677		**Total**	**74,221**

Table 3A : Weekday Daily 2040 VMT , VHT and revenue on tolled lane (SB Direction)

	Weekday Peak VMT												Daily VHT			
I95	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long	Truck	Total	Auto	Truck	Total	Auto Revenu
1	255	549	913	997	1,469	1,965	275	402	1,126	4,525	0	12,475	166	0	166	$1,248
2	213	449	831	1,014	1,883	1,833	168	292	914	2,960	0	10,556	141	0	141	$1,056
3	366	797	1,466	1,752	2,978	3,338	346	1,083	2,193	4,658	0	18,976	253	0	253	$1,898
4	133	274	513	635	1,153	1,025	110	265	636	2,600	0	7,344	98	0	98	$979
5	216	412	706	793	1,234	1,664	146	271	777	2,211	0	8,432	112	0	112	$1,265
6	106	173	254	247	314	548	41	107	302	1,557	0	3,648	49	0	49	$426
											Total	61,432		**Total**	**819**	**$6,870**

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Daily VMT on Tolled Lanes (continued)

Table 1B : 2040 Weekday Daily Outputs on All Lanes (NB Direction)

	Daily VMT												Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
1	11,847	25,494	42,150	45,875	67,236	122,932	17,029	25,220	52,259	283,600	124,291	817,932	9,546	1,710	11,256
2	13,696	29,061	53,786	65,790	122,669	162,086	15,418	26,256	60,026	252,597	146,120	947,503	10,947	1,996	12,943
3	15,767	34,256	63,143	75,641	129,138	192,987	19,941	63,288	95,334	263,434	162,884	1,115,815	13,764	2,353	16,117
4	13,246	27,265	51,111	63,083	114,039	138,341	14,391	36,393	63,891	343,863	143,346	1,008,970	12,573	2,082	14,655
5	18,966	36,157	62,006	69,649	108,470	200,675	18,140	32,298	68,109	222,099	128,915	965,482	11,894	1,833	13,727
6	7,586	12,344	18,080	17,541	22,295	53,392	4,099	10,624	21,923	165,584	62,435	395,903	4,791	897	5,688
											Total	5,251,605		**Total**	**74,386**

Table 2B : 2040 Weekday Daily Outputs on General Purpose Lanes (NB Direction)

													Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
1	11,600	24,963	41,273	44,921	65,837	121,035	16,766	24,830	51,172	279,222	124,291	805,911	9,380	1,710	11,091
2	13,475	28,594	52,921	64,731	120,696	160,162	15,235	25,945	59,060	249,600	146,120	936,540	10,797	1,996	12,793
3	15,399	33,456	61,669	73,876	126,124	189,639	19,595	62,190	93,109	258,864	162,884	1,096,806	13,490	2,353	15,843
4	13,074	26,912	50,450	62,267	112,564	137,025	14,255	36,046	63,065	340,593	143,346	999,598	12,437	2,082	14,519
5	18,697	35,644	61,126	68,661	106,931	198,581	17,950	31,961	67,143	219,781	128,915	955,389	11,750	1,833	13,583
6	7,479	12,171	17,825	17,294	21,981	52,838	4,057	10,514	21,614	163,867	62,435	392,075	4,736	897	5,633
											Total	5,186,318		**Total**	**73,462**

Table 3B : Weekday Daily 2040 VMT, VHT and revenue on tolled lane (NB Direction)

	Weekday Peak VMT												Daily VHT			
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
1	246	530	877	954	1,399	1,898	263	389	1,087	4,378	0	12,022	165	0	165	$1,202
2	220	467	865	1,058	1,973	1,923	183	312	965	2,997	0	10,964	150	0	150	$1,096
3	368	800	1,474	1,766	3,015	3,348	346	1,098	2,225	4,570	0	19,009	275	0	275	$1,901
4	171	353	661	816	1,476	1,315	137	346	827	3,270	0	9,372	136	0	136	$1,406
5	269	513	880	988	1,539	2,094	189	337	966	2,318	0	10,093	143	0	143	$1,514
6	107	174	255	247	314	554	43	110	309	1,717	0	3,828	55	0	55	$383
											Total	65,287		**Total**	**924**	**$7,502**

Table 4 : Weekday Daily 2040 VMT and VHT and revenue on tolled lane (Both Directions)

	Weekday Peak VMT												Daily VHT				
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total	Auto Revenu	Average A
1	502	1,079	1,790	1,951	2,867	3,862	538	792	2,213	8,903	0	24,497	332	0	332	$2,450	886
2	433	917	1,696	2,072	3,856	3,756	351	603	1,880	5,957	0	21,520	291	0	291	$2,152	638
3	734	1,596	2,940	3,518	5,992	6,686	692	2,181	4,418	9,228	0	37,985	528	0	528	$3,799	983
4	304	627	1,175	1,452	2,628	2,341	246	611	1,462	5,870	0	16,716	234	0	234	$2,229	575
5	485	925	1,586	1,781	2,773	3,758	336	608	1,744	4,528	0	18,524	256	0	256	$2,779	574
6	212	346	508	494	628	1,101	84	217	611	3,274	0	7,476	104	0	104	$872	374
											Total	**126,719**		**Total**	**1,743**	**$14,280**	

Table 5A : Summer Weekend Daily 2040 VMT and VHT on all Lanes (SB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
1	262,537	55,828	318,365	3,720	794	4,514
2	281,512	65,974	347,486	3,913	919	4,832
3	342,040	75,063	417,103	5,022	1,110	6,132
4	287,416	63,924	351,340	4,332	968	5,299
5	290,771	66,163	356,935	4,236	967	5,203
6	114,582	36,177	150,759	1,651	523	2,173
			1,941,987		**Total**	**28,154**

Table 6A : Summer Weekend Daily 2040 VMT and VHT on General Purpose Lanes (SB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
1	245,792	55,828	301,620	3,497	794	4,291
2	268,787	65,974	334,761	3,743	919	4,662
3	318,487	75,063	393,550	4,708	1,110	5,818
4	277,340	63,924	341,264	4,198	968	5,165
5	279,704	66,163	345,867	4,088	967	5,056
6	110,252	36,177	146,429	1,593	523	2,116
			687,131		**Total**	**10,221**

Table 7A: Summer Weekend Daily 2040 VMT, VHT and revenue on tolled lane (SB Direction)

	VMT			VHT			
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
1	16,745	0	16,745	223	0	223	$1,675
2	12,725	0	12,725	170	0	170	$1,272
3	23,553	0	23,553	314	0	314	$2,355
4	10,076	0	10,076	134	0	134	$1,008
5	11,067	0	11,067	148	0	148	$1,107
6	4,330	0	4,330	58	0	58	$433
		Total	**21,143**		**Total**	**282**	**$7,850**

Table 5B : Summer Weekend Daily 2040 VMT on all Lanes (NB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
1	249,000	44,617	293,617	3,482	626	4,108
2	313,362	57,137	370,498	4,397	804	5,201
3	372,621	63,692	436,312	5,497	946	6,444
4	332,932	55,133	388,065	5,133	855	5,988
5	321,757	49,583	371,339	4,707	728	5,435
6	130,394	24,414	154,808	1,879	353	2,231
			2,014,640		**Total**	**29,406**

Table 6B: Summer Weekend Daily 2040 VMT and VHT on General Purpose Lanes (NB Direction)

	VMT			VHT		
I*95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
1	233,694	44,617	278,311	3,278	626	3,904
2	298,733	57,137	355,870	4,202	804	5,006
3	346,450	63,692	410,142	5,148	946	6,095
4	320,372	55,133	375,505	4,966	855	5,820
5	309,333	49,583	358,915	4,541	728	5,269
6	125,468	24,414	149,881	1,813	353	2,166
			1,928,625		**Total**	**28,259**

Table 7B: Summer Weekend Daily 2040 VMT, VHT and revenue on tolled lane (NB Direction)

	VMT			VHT			
I*95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
1	15,306	0	15,306	204	0	204	$1,531
2	14,628	0	14,628	195	0	195	$1,463
3	26,170	0	26,170	349	0	349	$2,617
4	12,560	0	12,560	167	0	167	$1,256
5	12,424	0	12,424	166	0	166	$1,242
6	4,927	0	4,927	66	0	66	$493
		Total	**86,015**		**Total**	**1,147**	**$8,602**

Table 8: Summer Weekend Daily 2040 VMT, VHT and revenue on tolled lane (Both Directions)

	VMT			VHT				
I*95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total	Auto Revenue	Average Autos
1	32,051	0	32,051	427	0	427	$3,205	1,159
2	27,353	0	27,353	365	0	365	$2,735	811
3	49,723	0	49,723	663	0	663	$4,972	1,286
4	22,636	0	22,636	302	0	302	$2,264	779
5	23,491	0	23,491	313	0	313	$2,349	728
6	9,256	0	9,256	123	0	123	$926	463
		Total	**164,511**		**Total**	**2,193**	**$16,451**	

Annualized Numbers

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Annualized VMT on Tolled Lanes

Table 1A : 2040 Annual Weekday VMT and VHT on Toll Lanes

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	104,614	225,140	373,290	406,979	598,073	805,585	112,108	165,128	461,535	1,856,922	0	5,109,374	69,199	0	129,791
2	90,314	191,182	353,729	432,110	804,148	783,393	73,112	125,830	392,062	1,242,550	0	4,488,431	60,593	0	170,632
3	153,154	332,917	613,230	733,662	1,249,806	1,394,467	144,321	454,840	921,455	1,924,777	0	7,922,628	110,040	0	158,855
4	63,481	130,673	245,022	302,770	548,185	488,197	51,400	127,516	305,021	1,224,215	0	3,486,479	48,815	0	102,192
5	101,241	192,940	330,750	371,520	578,323	783,915	69,984	126,844	363,659	944,493	0	3,863,670	53,376	0	74,994
6	44,304	72,256	105,996	102,968	131,053	229,738	17,419	45,356	127,455	682,806	0	1,559,352	21,617	0	21,617
											Totals	26,429,935		**Totals**	658,081

Table 1B : 2040 Annual Weekday VMT and VHT on Toll Lanes (Fridays)

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	19,561	42,098	69,800	76,099	111,832	150,633	20,963	30,877	86,301	347,219	0	955,383	12,939	0	12,939
2	16,887	35,748	66,142	80,799	150,365	146,484	13,671	23,529	73,310	232,340	0	839,275	11,330	0	11,330
3	28,638	62,251	114,666	137,185	233,697	260,746	26,986	85,049	172,299	359,907	0	1,481,423	20,576	0	20,576
4	11,870	24,434	45,816	56,614	102,503	91,286	9,611	23,844	57,035	228,911	0	651,924	9,128	0	9,128
5	18,931	36,077	61,846	69,469	108,139	146,581	13,086	23,718	67,999	176,607	0	722,453	9,981	0	9,981
6	8,284	13,511	19,820	19,254	24,505	42,958	3,257	8,481	23,832	127,675	0	291,577	36,468	0	36,468
											Totals	4,942,036		**Totals**	100,422

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Annualized VMT on Tolled Lanes

Table 2A : 2040 Annual Summer Weekend VMT and VHT on Toll Lanes

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	842,478	0	842,478	11,233	0	11,233
2	718,997	0	718,997	9,587	0	9,587
3	1,307,017	0	1,307,017	17,427	0	17,427
4	595,001	0	595,001	7,933	0	7,933
5	617,490	0	617,490	8,233	0	8,233
6	243,307	0	243,307	3,244	0	3,244
		Totals	4,324,289		**Totals**	57,657

Table 2B : 2040 Annual Summer Weekend VMT and VHT on Toll Lanes (Fridays)

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	421,239	0	421,239	5,617	0	5,617
2	359,498	0	359,498	4,793	0	4,793
3	653,508	0	653,508	8,713	0	8,713
4	297,501	0	297,501	3,967	0	3,967
5	308,745	0	308,745	4,117	0	4,117
6	121,653	0	121,653	1,622	0	1,622
		Totals	2,162,145		**Totals**	28,829

Table 3 : Total Annual 2040 VMT and VHT on Toll Lanes

		VMT			VHT			
I95 Segments	Segment Length	Auto	Truck	Totals	Auto	Truck	Total	Auto Revenue
1	28	7,328,475	0	7,328,475	98,987	0	98,987	$ 732,847
2	34	6,406,201	0	6,406,201	86,302	0	86,302	$ 640,620
3	39	11,364,576	0	11,364,576	156,756	0	156,756	$ 1,136,458
4	29	5,030,905	0	5,030,905	69,843	0	69,843	$ 670,787
5	32	5,512,358	0	5,512,358	75,707	0	75,707	$ 826,854
6	20	2,215,889	0	2,215,889	62,952	0	62,952	$ 258,520
			Totals	37,858,404		**Totals**	550,548	$ 1,497,641

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Annualized VMT on General Purpose Lanes

Table 1A : 2040 Annual Weekday VMT on General Purpose Lanes

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	5,788,868	12,458,259	20,656,195	22,520,374	33,094,713	44,577,486	6,203,568	9,137,454	25,539,259	102,753,772	56,367,249	339,097,197	3,883,034	774,152	4,657,186
2	6,525,347	13,813,261	25,557,521	31,220,709	58,101,078	56,601,550	5,282,467	9,091,461	28,327,180	89,776,424	68,357,840	392,654,839	4,432,178	934,249	5,366,427
3	7,485,553	16,271,608	29,972,180	35,858,408	61,085,393	68,155,821	7,053,835	22,230,713	45,036,937	94,075,204	77,073,059	464,298,711	5,584,594	1,111,553	6,696,146
4	6,228,627	12,821,377	24,041,134	29,707,310	53,787,037	47,901,096	5,043,305	12,511,639	29,928,111	120,117,899	66,602,070	408,689,604	4,997,214	972,923	5,970,136
5	8,845,600	16,857,560	28,898,335	32,460,513	50,529,295	68,492,250	6,114,629	11,082,629	31,773,678	82,522,314	64,877,909	402,454,712	4,807,374	923,915	5,731,289
6	3,801,068	6,199,178	9,093,887	8,834,065	11,243,620	19,710,184	1,494,420	3,891,299	10,934,941	58,580,862	33,794,656	167,578,180	1,920,742	485,193	2,405,935
											Totals	2,174,773,242		**Totals**	30,827,120

Table 1B : 2040 Annual Weekday VMT on General Purpose Lanes (Fridays)

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	1,086,059	2,337,315	3,875,344	4,225,086	6,208,955	8,363,258	1,163,862	1,714,293	4,791,464	19,277,810	10,539,903	63,583,349	728,503	144,756	873,258
2	1,224,256	2,591,580	4,794,984	5,857,485	10,900,656	10,619,322	991,072	1,705,698	5,314,615	16,843,439	12,781,980	73,625,088	831,545	174,692	1,006,236
3	1,404,385	3,052,761	5,623,163	6,727,495	11,460,399	12,786,901	1,323,389	4,170,765	8,449,504	17,649,708	14,411,606	87,060,078	1,047,741	207,845	1,255,586
4	1,168,523	2,405,358	4,510,243	5,573,247	10,090,730	8,986,497	946,151	2,347,249	5,614,671	22,534,748	12,453,675	76,631,092	937,503	181,923	1,119,427
5	1,659,475	3,162,556	5,421,461	6,089,742	9,479,528	12,849,461	1,147,133	2,079,152	5,960,888	15,481,566	12,131,280	75,462,243	901,885	172,759	1,074,645
6	713,216	1,163,187	1,706,338	1,657,586	2,109,705	3,698,335	280,407	730,147	2,051,786	10,991,864	6,319,138	31,421,710	360,400	90,724	451,124
											Totals	407,783,560		**Totals**	5,780,277

Table 2A : 2040 Annual Weekend VMT on General Purpose Lanes

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	143,077,183	28,183,624	171,260,808	2,021,230	398,146	2,419,376
2	163,673,718	34,178,920	197,852,638	2,290,796	478,372	2,769,169
3	196,267,124	38,536,529	234,803,653	2,908,997	571,174	3,480,171
4	172,192,005	33,301,035	205,493,041	2,637,536	510,086	3,147,622
5	170,102,746	32,438,955	202,541,701	2,491,858	475,203	2,967,061
6	67,428,132	16,897,328	84,325,459	974,253	244,145	1,218,398
		Totals	1,096,277,299		**Totals**	16,001,797

Table 2B : 2040 Annual Weekend VMT on General Purpose Lanes (Fridays)

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	17,539,763	3,551,909	21,091,672	247,782	50,177	297,959
2	20,154,476	4,307,480	24,461,956	282,084	60,288	342,372
3	24,003,667	4,856,658	28,860,325	355,773	71,984	427,757
4	21,266,662	4,196,843	25,463,505	325,750	64,285	390,035
5	20,997,957	4,088,197	25,086,154	307,602	59,889	367,490
6	7,095,942	3,353,501	10,449,442	102,528	48,454	150,981
		Totals	135,413,054		**Totals**	1,976,595

2040 Express Lanes/Concept 1 (Full Corridor Toll) Scenario – Annualized VMT on General Purpose Lanes (continued)

Table 3 : Total Annual 2040 VMT on General Purpose Lanes

Annual Results					Weekend Annual VHT		
I95 Segments	Segment Length	Auto	Truck	Totals	Auto	Truck	Total
1	28	496,390,340	98,642,685	595,033,025	6,880,549	1,367,231	8,247,780
2	34	568,968,301	119,626,220	688,594,521	7,836,603	1,647,601	9,484,204
3	39	680,144,915	134,877,853	815,022,768	9,897,106	1,962,555	11,859,661
4	29	599,723,618	116,553,623	716,277,241	8,898,003	1,729,217	10,627,220
5	32	592,008,468	113,536,341	705,544,809	8,508,719	1,631,766	10,140,485
6	20	233,410,169	60,364,622	293,774,791	3,357,922	868,517	4,226,439
			Totals	3,814,247,155		**Totals**	54,585,789

A-3: 2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario

Southbound

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Southbound Input Tab

Table 1 2020 Daily VMT and travel time from CS I-95 Model (considering SB direction)

	Daily VMT																
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck		Toll per Segment (2009$)	Seg. Length (miles)	Free Flow Speed (mph)	Free Flow Travel Time (min)	Congested Travel Time on the GP lanes (min)
1	2,683	6,196	9,820	10,460	14,074	42,902	7,768	11,431	19,329	31,951	30,730		0.1	8.38	75	6.704182	6.9
2	4,224	8,789	14,694	15,965	23,533	37,246	4,675	5,866	14,484	105,082	46,515		0.1	12.41	75	9.924197	10.3
3	1,952	4,074	7,167	8,168	13,343	11,811	430	1,552	5,295	74,372	25,865		0.1	6.86	75	5.491783	5.7
4	3,704	7,577	13,313	15,515	26,856	39,618	3,503	5,535	13,924	83,161	49,938		0.1	12.71	75	10.16802	10.4
5	2,352	5,065	9,649	12,262	24,414	35,224	4,604	4,795	11,821	41,220	30,760		0.1	8.49	75	6.7938	7.0
6	4,184	8,999	17,087	21,100	39,558	44,773	2,803	8,758	18,338	68,386	47,836		0.1	12.54	75	10.03531	10.4
7	3,513	7,748	14,314	17,547	31,080	42,822	4,054	15,095	22,752	71,059	47,206		0.1	12.47	75	9.974362	10.3
8	2,613	5,796	10,841	13,153	22,802	32,281	3,093	12,522	17,917	46,885	35,825		0.1	9.14	75	7.308886	8.1
9	3,263	6,957	12,732	15,005	25,024	41,310	5,525	12,742	18,468	42,531	34,253		0.1	8.70	75	6.957626	8.0
10	3,263	6,987	12,742	14,784	23,903	38,637	3,423	9,970	16,586	55,664	32,381		0.1	8.36	75	6.685788	7.7
11	2,833	5,866	10,951	13,173	23,313	34,564	5,295	12,392	16,316	63,221	37,767		0.075	8.10	75	6.483365	7.0
12	5,205	10,560	19,969	25,084	45,955	46,615	3,473	11,351	23,713	160,566	65,534		0.075	14.94	75	11.94992	12.8
13	2,092	4,414	8,208	10,190	18,648	24,944	2,512	3,583	8,298	46,645	25,014		0.075	6.01	75	4.804298	5.0
14	5,185	10,180	17,717	20,200	32,782	63,992	7,507	8,278	17,287	70,188	47,456		0.075	12.33	75	9.867858	9.9
15	4,985	9,389	15,585	17,037	25,254	42,551	2,032	5,635	14,054	54,923	33,863		0.075	8.26	75	6.604237	7.1
16	5,185	9,689	16,826	19,068	29,519	53,872	4,504	12,272	23,923	88,356	45,564		0.075	11.67	75	9.332321	10.1
17	2,793	5,095	8,198	8,608	12,192	27,076	2,032	4,865	9,399	41,350	27,126		0.1	7.54	75	6.030746	6.5
18	4,274	6,436	8,748	7,848	8,758	22,552	1,682	4,875	10,800	100,548	40,679		0.1	12.46	75	9.970682	10.8

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Southbound Input Tab (continued)

CPI 2009	214.537
CPI 2011	224.939
Adjustment	1.05

Table 2: Summer Adjustment Factor

Season	Adjustment Factor
Summer	0.78

* Summer seasonal factor from NC DOT

Table 3: Peak Hour to daily adjustment

TOD Period	Adjustment Factor
Peak	10

Table 4: Peak hour to period adjustment

TOD Period	Adjustment Factor
Peak	1.04

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Southbound Input Tab (continued)

Table 5: Capacities from I95 ICTDM

I95 Segments	Daily Capacity-mile	Hourly Capacity-mile	Period Duration in Hours (Weekday)	Period Duration in Hours(Weekend)	Peak Period Capacity-mile (Weekdays)	Peak Period Capacity-mile (Weekends)	# of GP lanes	# of tolled lanes	Maximum Peak Period Toll Lane Capacity-mile (Weekday)		Maximum Peak Period Toll Lane Capacity-mile (Weekend)	TOD Period	Peak Weekday Period	Peak Summer weekend Day
1	502,814	50,281	4	4	128,927	128,927	2	1	64,463		64,463		1.66	1.79
2	744,315	74,431	4	4	190,850	190,850	2	1	95,425		95,425		1.66	1.79
3	411,884	41,188	4	4	105,611	105,611	2	1	52,806		52,806		1.66	1.79
4	762,602	76,260	4	4	195,539	195,539	2	1	97,769		97,769		1.67	1.70
5	509,535	50,953	4	4	130,650	130,650	2	1	65,325		65,325		1.67	1.70
6	752,648	75,265	4	4	192,987	192,987	2	1	96,493		96,493		1.67	1.70
7	748,077	74,808	4	4	191,815	191,815	2	1	95,907		95,907		1.67	1.70
8	548,166	54,817	4	4	140,556	140,556	2	1	70,278		70,278		1.67	1.70
9	521,822	52,182	4	4	133,801	133,801	2	1	66,900		66,900		1.67	1.70
10	501,434	50,143	4	4	128,573	128,573	2	1	64,286		64,286		1.67	1.70
11	631,459	63,146	4	4	121,435	121,435	2	2	121,434		121,434		1.58	1.70
12	1,194,992	119,499	4	4	229,806	229,806	2	2	229,806		229,806		1.58	1.70
13	480,430	48,043	4	4	92,390	92,390	2	2	92,390		92,390		1.58	1.70
14	986,786	98,679	4	4	189,767	189,767	2	2	189,766		189,766		1.58	1.70
15	660,424	66,042	4	4	127,005	127,005	2	2	127,005		127,005		1.58	1.70
16	710,854	71,085	4	4	182,270	182,270	2	1	91,135		91,135		1.58	1.70
17	452,306	45,231	4	4	115,976	115,976	2	1	57,988		57,988		1.67	1.70
18	747,801	74,780	4	4	191,744	191,744	2	1	95,872		95,872		1.67	1.70

Adjustment Factor

Model parameter	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck
Costant for tolled route	-1.045	-1.045	-1.045	-1.045	-1.045	-1.3651	-1.3651	-1.3651	-1.045	-1.3651	-1.045
Time difference	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199
Toll value	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517
Income	0	0	0	0	0	0	0	0	0	0	0

Table 7 Off Peak Adjustment Factor

Off Peak Patronage Factor	1

Table 8: Seasonal Adjustment Factors by Month

Month	Adjustment Factor	Days in Month	Peak Months
1	1.27	31	0
2	1.09	28	0
3	0.94	31	0
4	0.81	30	0
5	0.90	31	0
6	0.89	30	30
7	0.74	31	31
8	0.70	31	31
9	0.98	30	0
10	0.99	31	0
11	0.90	30	0
12	0.90	31	0

Northbound

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Northbound Input Tab

Table 1 2020 Daily VMT and travel time from CS I-95 Model (considering NB direction)

	Daily VMT																
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck		Toll per Segment (2009$)	Seg. Length (miles)	Free Flow Speed (mph)	Free Flow Travel Time (min)	Congested Travel Time on the GP lanes (min)
1	2,614	6,032	9,581	10,221	13,802	41,558	7,490	11,008	18,595	29,659	35,506		0.1	8.38	75	6.707179	6.9
2	3,922	8,149	13,453	14,509	21,172	34,003	4,105	5,275	13,230	101,596	45,867		0.1	12.41	75	9.93195	10.2
3	1,854	3,869	6,814	7,757	12,653	11,335	422	1,514	5,104	69,958	25,450		0.1	6.86	75	5.48749	5.6
4	3,542	7,220	12,696	14,803	25,652	38,282	3,416	5,352	13,407	76,688	48,820		0.1	12.69	75	10.15262	10.3
5	2,273	4,952	9,452	12,013	23,829	34,427	4,610	4,804	11,701	38,420	30,535		0.1	8.44	75	6.752342	6.9
6	3,992	8,651	16,419	20,388	38,613	43,454	3,021	8,709	17,958	65,259	49,045		0.1	12.69	75	10.15355	10.5
7	3,297	7,270	13,447	16,611	29,804	42,109	4,380	14,730	21,915	59,850	47,529		0.1	12.52	75	10.01673	10.3
8	2,416	5,363	10,017	12,138	20,976	29,760	2,924	11,973	16,880	41,776	36,694		0.1	8.96	75	7.167342	7.9
9	2,711	5,811	10,642	12,557	20,958	35,034	4,713	10,771	15,580	33,934	34,031		0.1	8.51	75	6.806166	7.5
10	2,945	6,263	11,440	13,274	21,502	32,382	2,403	8,313	14,516	54,291	34,637		0.1	8.74	75	6.99146	7.8
11	2,607	5,398	10,091	12,149	21,418	31,868	4,383	11,208	14,995	60,304	38,206		0.075	7.94	75	6.353429	6.8
12	4,926	10,012	18,895	23,692	43,320	44,878	3,739	11,841	23,415	145,496	69,132		0.075	14.75	75	11.80356	12.7
13	1,954	4,120	7,625	9,340	16,928	22,420	2,217	3,121	7,422	40,462	26,958		0.075	6.22	75	4.972222	5.1
14	4,888	9,592	16,711	19,023	30,868	60,976	7,180	7,707	16,259	51,628	50,920		0.075	12.60	75	10.08214	10.1
15	4,190	7,884	13,095	14,330	21,256	35,785	1,710	4,719	11,806	40,463	32,681		0.075	8.00	75	6.398275	6.9
16	4,561	8,517	14,762	16,702	25,793	47,278	4,081	10,818	20,951	67,787	45,972		0.075	11.65	75	9.31881	10.0
17	1,933	3,531	5,693	6,004	8,561	19,170	1,503	3,564	6,760	37,276	27,105		0.1	7.55	75	6.040092	6.5
18	3,265	4,938	6,724	6,055	6,788	17,556	1,318	3,738	8,292	76,067	41,355		0.1	12.44	75	9.955978	10.7

CPI 2009	214.537
CPI 2011	224.939
Adjustment	1.05

Table 2: Summer Adjustment Factor

Season	Adjustment Factor
Summer	0.78

* Summer seasonal factor from NC DOT

Table 3: Peak to daily adjustment

TOD Period	Adjustment Factor
Peak	10

Table 4: Peak hour to period adjustment

TOD Period	Adjustment Factor
Peak	1.04

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Northbound Input Tab (continued)

I95 Segments	Daily Capacity-mile	Hourly Capacity-mile	Period Duration in Hours (Weekday)	Period Duration in Hours(Weekend)	Peak Period Capacity-mile (Weekdays)	Peak Period Capacity-mile (Weekends)	# of GP lanes	# of tolled lanes	Maximum Peak Period Toll Lane Capacity-mile (Weekday)		Maximum Peak Period Toll Lane Capacity-mile (Weekend)	TOD Period	Peak Weekday Period	Peak Summer weekend Day
1	502,814	50,281	4	4	128,927	128,927	2	1	64,463		64,463		1.60	1.68
2	744,315	74,431	4	4	190,850	190,850	2	1	95,425		95,425		1.60	1.68
3	411,884	41,188	4	4	105,611	105,611	2	1	52,806		52,806		1.60	1.68
4	762,602	76,260	4	4	195,539	195,539	2	1	97,769		97,769		1.67	1.83
5	509,535	50,953	4	4	130,650	130,650	2	1	65,325		65,325		1.67	1.83
6	752,648	75,265	4	4	192,987	192,987	2	1	96,493		96,493		1.67	1.83
7	748,077	74,808	4	4	191,815	191,815	2	1	95,907		95,907		1.67	1.83
8	548,166	54,817	4	4	140,556	140,556	2	1	70,278		70,278		1.67	1.83
9	521,822	52,182	4	4	133,801	133,801	2	1	66,900		66,900		1.67	1.83
10	501,434	50,143	4	4	128,573	128,573	2	1	64,286		64,286		1.67	1.83
11	631,459	63,146	4	4	121,435	121,435	2	2	121,434		121,434		1.78	1.80
12	1,194,992	119,499	4	4	229,806	229,806	2	2	229,806		229,806		1.78	1.80
13	480,430	48,043	4	4	92,390	92,390	2	2	92,390		92,390		1.78	1.80
14	986,786	98,679	4	4	189,767	189,767	2	2	189,766		189,766		1.78	1.80
15	660,424	66,042	4	4	127,005	127,005	2	2	127,005		127,005		1.78	1.80
16	710,854	71,085	4	4	182,270	182,270	2	1	91,135		91,135		1.78	1.80
17	452,306	45,231	4	4	115,976	115,976	2	1	57,988		57,988		1.67	1.83
18	747,801	74,780	4	4	191,744	191,744	2	1	95,872		95,872		1.67	1.83

Adjustment Factor

Table 6: Toll Choice Model

Model parameter	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck
Costant for tolled route	-1.045	-1.045	-1.045	-1.045	-1.045	-1.3651	-1.3651	-1.3651	-1.045	-1.3651	-1.045
Time difference	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199
Toll value	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517
Income	0	0	0	0	0	0	0	0	0	0	0

Table 7 Off Peak Adjustment Factor

Off Peak Patronage Factor	1

Table 8: Seasonal Adjustment Factors

Month	Adustment Factor	Days in Month	Peak Months
1	1.27	31	0
2	1.09	28	0
3	0.94	31	0
4	0.81	30	0
5	0.90	31	0
6	0.89	30	30
7	0.74	31	31
8	0.70	31	31
9	0.98	30	0
10	0.99	31	0
11	0.90	30	0
12	0.90	31	0

Daily (Both Directions)

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Daily VMT on Tolled Lanes

Table 1A : 2020 Weekday Daily Outputs on All Lanes (SB Direction)

	Daily VMT												Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
1	8,859	19,058	31,681	34,594	50,949	91,959	12,872	18,848	39,108	211,405	103,110	622,444	7,195	1,430	8,625
2	10,240	21,641	40,049	48,877	90,828	119,616	10,911	19,089	44,083	192,767	128,535	726,635	8,232	1,770	10,002
3	12,652	27,487	50,629	60,489	102,810	155,050	16,096	50,329	75,723	216,140	149,665	917,070	11,333	2,215	13,548
4	10,130	20,840	39,128	48,447	87,915	106,123	11,281	27,327	48,327	270,432	128,314	798,264	9,592	1,840	11,433
5	15,355	29,258	50,129	56,305	87,555	160,416	14,044	26,185	55,264	213,467	126,883	834,860	9,941	1,784	11,725
6	7,067	11,531	16,946	16,456	20,950	49,628	3,714	9,739	20,200	141,898	67,806	365,935	4,290	4,296	8,586
											Total	4,265,208		**Total**	**63,918**

Table 2A : 2020 Weekday Daily Outputs on General Purpose Lanes (SB Direction)

													Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
1	8,662	18,635	30,977	33,825	49,817	90,442	12,660	18,537	38,239	207,918	103,110	612,823	7,067	1,430	8,496
2	10,072	21,285	39,391	48,074	89,335	118,165	10,778	18,857	43,358	190,429	128,535	718,278	8,120	1,770	9,890
3	12,325	26,776	49,321	58,926	100,153	152,065	15,786	49,360	73,767	211,979	149,665	900,123	11,107	2,215	13,322
4	9,870	20,305	38,123	47,202	85,656	104,089	11,065	26,803	47,085	265,248	128,314	783,759	9,399	1,840	11,239
5	14,855	28,305	48,495	54,470	84,702	156,487	13,700	25,544	53,463	208,239	126,883	815,142	9,678	1,784	11,462
6	6,910	11,276	16,571	16,092	20,487	48,813	3,653	9,579	19,752	139,566	67,806	360,505	4,218	977	5,195
											Total	4,190,629		**Total**	**59,605**

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Daily VMT on Tolled Lanes (continued)

Table 3A : Weekday Daily 2020 VMT , VHT and revenue on tolled lane (SB Direction)

	Weekday Peak VMT												Daily VHT			
I95	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long	Truck	Total	Auto	Truck	Total	Auto Revenu
4	260	536	1,005	1,245	2,259	2,034	216	524	1,242	5,184	0	14,505	193	0	193	$1,088
5	500	953	1,634	1,835	2,853	3,929	344	641	1,801	5,228	0	19,718	263	0	263	$1,479
											Total	34,224		**Total**	**456**	**$2,567**

Table 1B : 2020 Weekday Daily Outputs on All Lanes (NB Direction)

	Daily VMT												Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
1	8,390	18,050	29,847	32,487	47,627	86,897	12,017	17,798	36,929	201,214	106,823	598,079	6,811	1,481	8,292
2	9,807	20,823	38,567	47,204	88,094	116,163	11,048	18,865	43,066	180,368	128,399	702,403	7,904	1,768	9,672
3	11,368	24,706	45,546	54,581	93,240	139,285	14,420	45,787	68,892	189,851	152,891	840,567	10,178	2,263	12,441
4	9,488	19,530	36,611	45,181	81,665	99,166	10,338	26,170	45,833	246,262	134,297	754,540	8,894	1,926	10,820
5	13,639	25,993	44,568	50,055	77,917	144,039	12,971	23,244	49,016	159,878	129,573	730,893	8,455	1,822	10,277
6	5,198	8,469	12,417	12,058	15,349	36,726	2,821	7,301	15,052	113,344	68,459	297,194	3,296	986	4,282
											Total	3,923,675		**Total**	**55,784**

Table 2B : 2020 Weekday Daily Outputs on General Purpose Lanes (NB Direction)

													Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
1	8,214	17,671	29,221	31,806	46,628	85,543	11,830	17,521	36,154	198,080	106,823	589,491	6,692	1,481	8,173
2	9,649	20,487	37,946	46,444	86,675	114,783	10,916	18,641	42,373	178,225	128,399	694,538	7,795	1,768	9,563
3	11,094	24,110	44,446	53,264	90,990	136,785	14,162	44,965	67,229	186,444	152,891	826,379	9,968	2,263	12,231
4	9,215	18,967	35,556	43,880	79,313	97,036	10,116	25,607	44,512	240,970	134,297	739,469	8,678	1,926	10,604
5	13,146	25,055	42,960	48,248	75,105	140,134	12,620	22,614	47,246	155,544	129,573	712,245	8,193	1,822	10,015
6	5,084	8,283	12,144	11,794	15,013	36,128	2,775	7,183	14,722	111,500	68,459	293,085	3,237	986	4,223
											Total	3,855,208		**Total**	**54,810**

Table 3B : Weekday Daily 2020 VMT, VHT and revenue on tolled lane (NB Direction)

	Weekday Peak VMT												Daily VHT			
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
4	273	563	1,055	1,301	2,352	2,131	222	562	1,320	5,291	0	15,070	216	0	216	$1,130
5	492	938	1,609	1,807	2,812	3,905	352	630	1,769	4,334	0	18,648	262	0	262	$1,399
											Total	33,718		**Total**	**478**	**$2,529**

Table 4 : Weekday Daily 2020 VMT and VHT and revenue on tolled lane (Both Directions)

	Weekday Peak VMT												Daily VHT				
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total	Auto Revenu	Average A
4	534	1,098	2,060	2,546	4,611	4,165	438	1,086	2,562	10,475	0	29,576	410	0	410	$2,218	1,018
5	993	1,892	3,242	3,641	5,665	7,834	696	1,271	3,570	9,562	0	38,366	525	0	525	$2,877	1,189
											Total	**67,942**		**Total**	**935**	**$5,096**	

Table 5A : Summer Weekend Daily 2020 VMT and VHT on all Lanes (SB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
1	198,634	39,437	238,071	2,775	553	3,328
2	217,259	46,690	263,949	3,006	647	3,653
3	278,758	54,366	333,124	4,133	812	4,946
4	243,358	46,610	289,968	3,534	682	4,216
5	257,171	46,090	303,261	3,646	658	4,304
6	108,295	24,630	132,925	1,559	356	1,915
			1,561,298		**Total**	**22,361**

Table 6A : Summer Weekend Daily 2020 VMT and VHT on General Purpose Lanes (SB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
1	186,460	39,437	225,897	2,613	553	3,165
2	207,589	46,690	254,279	2,877	647	3,524
3	258,754	54,366	313,119	3,867	812	4,679
4	224,650	46,610	271,260	3,285	682	3,966
5	232,190	46,090	278,280	3,313	658	3,971
6	101,859	24,630	126,489	1,473	356	1,829
			1,469,325		**Total**	**21,134**

Table 7A: Summer Weekend Daily 2020 VMT, VHT and revenue on tolled lane (SB Direction)

	VMT			VHT			
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
4	18,708	0	18,708	249	0	249	$1,403
5	24,981	0	24,981	333	0	333	$1,874
		Total	43,689		**Total**	**583**	**$3,277**

Annualized Numbers

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Annualized VMT on Tolled Lanes

Table 1A : 2020 Annual Weekday VMT and VHT on Toll Lanes

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
4	111,292	229,022	429,653	531,086	961,803	868,697	91,433	226,531	534,357	2,184,820	0	6,168,694	85,414	0	85,414
5	207,034	394,539	676,221	759,502	1,181,653	1,633,867	145,081	265,188	744,604	1,994,424	0	8,002,113	109,525	0	109,525
											Totals	14,170,808		**Totals**	194,939

Table 1B : 2020 Annual Weekday VMT and VHT on Toll Lanes (Fridays)

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
4	20,810	42,824	80,339	99,306	179,844	162,434	17,097	42,358	99,917	408,531	0	1,153,461	15,971	0	15,971
5	38,713	73,773	126,444	142,016	220,953	305,511	27,128	49,587	139,231	372,930	0	1,496,286	20,480	0	20,480
											Totals	2,649,747		**Totals**	36,451

Table 2A : 2020 Annual Summer Weekend VMT and VHT on Toll Lanes

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
4	968,496	0	968,496	12,884	0	12,884
5	1,228,303	0	1,228,303	16,376	0	16,376
		Totals	2,196,798		**Totals**	29,259

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Annualized VMT on Tolled Lanes

Table 2B : 2020 Annual Summer Weekend VMT and VHT on Toll Lanes (Fridays)

Weekend Annual VMT				Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
4	484,248	0	484,248	6,442	0	6,442
5	614,151	0	614,151	8,188	0	8,188
		Totals	1,098,399		**Totals**	14,630

Table 3 : Total Annual 2020 VMT and VHT on Toll Lanes

VMT					VHT			
I95 Segments	Segment Length	Auto	Truck	Totals	Auto	Truck	Total	Auto Revenue
4	29	8,774,899	0	8,774,899	120,710	0	120,710	$658,117
5	32	11,340,853	0	11,340,853	154,568	0	154,568	$850,564
			Totals	20,115,752		**Totals**	275,279	$1,508,681

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Annualized VMT on General Purpose Lanes

Table 1A : 2020 Annual Weekday VMT on General Purpose Lanes

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	4,238,581	9,118,860	15,120,696	16,486,102	24,228,239	32,623,794	4,540,791	6,684,467	18,685,732	75,254,995	43,785,948	250,768,204	2,858,875	604,779	3,463,654
2	4,848,564	10,270,042	19,013,502	23,237,401	43,271,556	42,076,154	3,917,692	6,772,451	21,075,803	66,600,924	53,589,011	294,673,099	3,314,494	736,757	4,051,251
3	5,735,741	12,462,742	22,964,574	27,474,972	46,806,260	52,321,335	5,424,830	17,081,921	34,524,569	72,197,644	63,104,472	360,099,061	4,350,064	924,288	5,274,351
4	4,743,589	9,761,624	18,313,121	22,636,530	40,994,982	37,026,541	3,897,167	9,655,460	22,775,924	93,123,753	54,773,185	317,701,877	3,762,947	783,895	4,546,842
5	6,858,265	13,069,569	22,400,657	25,159,430	39,143,700	54,123,835	4,805,985	8,784,673	24,665,900	66,067,704	53,489,397	318,569,116	3,720,964	750,839	4,471,803
6	3,058,615	4,987,529	7,322,521	7,110,856	9,052,437	15,982,398	1,209,279	3,153,805	8,790,695	47,231,118	28,420,952	136,320,204	1,550,116	408,305	1,958,421
											Totals	1,678,131,560		**Totals**	23,766,323

Table 1B : 2020 Annual Weekday VMT on General Purpose Lanes (Fridays)

	Weekday Annual VMT												Weekday Annual VHT		
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Totals	Auto	Truck	Total
1	962,895	2,071,568	3,435,029	3,745,214	5,504,026	7,411,278	1,031,550	1,518,537	4,244,913	17,095,979	8,187,373	47,020,989	649,462	113,085	762,548
2	1,111,220	2,353,743	4,357,616	5,325,672	9,917,207	9,643,239	897,878	1,552,147	4,830,265	15,263,957	10,020,411	55,252,944	759,634	137,764	897,397
3	1,304,024	2,833,412	5,221,011	6,246,452	10,641,433	11,895,289	1,233,338	3,883,586	7,849,183	16,414,181	11,799,672	67,521,910	988,990	172,829	1,161,819
4	1,074,764	2,211,710	4,149,240	5,128,803	9,288,314	8,389,176	882,989	2,187,657	5,160,386	21,099,232	10,241,835	59,572,271	852,578	146,578	999,156
5	1,545,513	2,945,233	5,047,997	5,669,687	8,821,048	12,196,828	1,083,031	1,979,630	5,558,470	14,888,383	10,001,784	59,735,820	838,521	140,397	978,917
6	724,578	1,181,533	1,734,687	1,684,544	2,144,499	3,786,190	286,475	747,128	2,082,493	11,188,932	5,314,329	25,561,060	367,219	76,347	443,566
											Totals	314,664,994		**Totals**	5,243,403

2020 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Annualized VMT on General Purpose Lanes (continued)

Table 2A : 2020 Annual Weekend VMT on General Purpose Lanes

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	105,014,905	21,672,737	126,687,642	1,463,109	301,953	1,765,062
2	126,482,201	22,032,943	148,515,143	1,752,171	305,225	2,057,396
3	153,341,001	28,955,632	182,296,633	2,268,416	428,349	2,696,764
4	133,580,197	27,386,593	160,966,790	1,947,358	399,247	2,346,605
5	135,312,613	26,744,698	162,057,312	1,922,611	380,006	2,302,617
6	46,706,717	22,140,950	68,847,667	672,912	318,988	991,900
		Totals	849,371,187		**Totals**	12,160,344

Table 2B : 2020 Annual Weekend VMT on General Purpose Lanes (Fridays)

	Weekend Annual VMT			Weekend Annual VHT		
I95 Segments	Auto	Truck	Totals	Auto	Truck	Total
1	12,235,819	3,376,842	15,612,661	171,449	47,047	218,497
2	14,995,147	3,376,842	18,371,989	207,827	46,780	254,607
3	18,435,722	3,976,446	22,412,169	275,488	58,825	334,312
4	16,306,202	3,451,461	19,757,663	226,727	50,316	277,043
5	16,425,986	3,370,565	19,796,550	236,161	47,891	284,052
6	5,700,397	2,790,366	8,490,763	121,877	40,201	162,078
		Totals	104,441,794		**Totals**	1,530,589

Table 3 : Total Annual 2020 VMT on General Purpose Lanes

	Annual Results				Weekend Annual VHT		
I95 Segments	Segment Length	Auto	Truck	Totals	Auto	Truck	Total
1	28	371,253,970	77,022,900	448,276,869	5,142,896	1,066,865	6,209,761
2	34	437,814,379	89,019,206	526,833,585	6,034,126	1,226,525	7,260,651
3	39	536,293,222	107,836,222	644,129,444	7,882,956	1,584,290	9,467,247
4	29	472,387,361	95,853,074	568,240,436	6,789,609	1,380,036	8,169,645
5	32	476,554,138	93,606,445	570,160,582	6,718,257	1,319,133	8,037,390
6	20	185,867,426	58,666,596	244,534,022	2,712,123	843,842	3,555,965
			Totals	3,002,174,939		**Totals**	42,700,659

A-4: 2040 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario

Southbound

2040 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Southbound Input Tab

Table 1 2040 Daily VMT and travel time from CS I-95 Model (considering SB direction)

	Daily VMT																
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck		Toll per Segment (2009$)	Seg. Length (miles)	Free Flow Speed (mph)	Free Flow Travel Time (min)	Congested Travel Time on the GP lanes (min)
1	3,523	8,147	12,911	13,762	18,516	56,438	10,209	15,043	25,421	42,036	42,296		0.1	8.38	75	6.704182	6.8
2	5,595	11,650	19,476	21,158	31,196	49,382	6,195	7,777	19,206	139,308	66,626		0.1	12.41	75	9.924197	10.1
3	2,582	5,385	9,478	10,799	17,645	15,613	570	2,052	6,996	98,343	37,041		0.1	6.86	75	5.491783	5.6
4	4,904	10,008	17,605	20,507	35,500	52,384	4,634	7,316	18,406	109,943	71,040		0.1	12.71	75	10.16802	10.3
5	3,053	6,576	12,521	15,913	31,677	45,709	5,975	6,225	15,333	53,485	43,637		0.1	8.49	75	6.7938	6.9
6	5,314	11,440	21,708	26,813	50,262	56,888	3,563	11,129	23,300	86,893	66,947		0.1	12.54	75	10.03531	10.2
7	4,354	9,608	17,745	21,758	38,533	53,105	5,024	18,716	28,214	88,104	65,335		0.1	12.47	75	9.974362	10.1
8	3,163	7,026	13,131	15,933	27,623	39,113	3,743	15,173	21,698	56,798	49,001		0.1	9.14	75	7.308886	7.9
9	3,963	8,447	15,463	18,215	30,386	50,162	6,706	15,473	22,429	51,644	47,270		0.1	8.70	75	6.957626	7.6
10	4,033	8,657	15,763	18,295	29,585	47,820	4,244	12,340	20,527	68,898	45,038		0.1	8.36	75	6.685788	7.4
11	3,453	7,166	13,361	16,074	28,444	42,186	6,455	15,123	19,917	77,155	50,803		0.075	8.10	75	6.483365	7.0
12	6,055	12,290	23,230	29,175	53,455	54,216	4,033	13,201	27,583	186,768	90,196		0.075	14.94	75	11.94992	12.9
13	2,462	5,184	9,628	11,950	21,868	29,245	2,942	4,194	9,728	54,696	34,980		0.075	6.01	75	4.804298	5.0
14	5,955	11,680	20,337	23,180	37,622	73,442	8,617	9,498	19,837	80,548	68,538		0.075	12.33	75	9.867858	9.9
15	5,605	10,549	17,505	19,146	28,374	47,820	2,292	6,335	15,783	61,712	48,181		0.075	8.26	75	6.604237	7.1
16	5,805	10,849	18,836	21,338	33,048	60,301	5,044	13,742	26,773	98,904	65,425		0.075	11.67	75	9.332321	10.2
17	2,993	5,475	8,797	9,238	13,081	29,065	2,182	5,214	10,089	44,377	39,463		0.1	7.54	75	6.030746	6.5
18	4,484	6,746	9,158	8,227	9,178	23,620	1,761	5,104	11,320	105,329	60,131		0.1	12.46	75	9.970682	10.7

CPI 2009	214.537
CPI 2011	224.939
Adjustment	1.05

Table 2: Summer Adjustment Factor

Season	Adjustment Factor
Summer	0.78

* Summer seasonal factor from NC DOT

Table 3: Peak Hour to daily adjustment

TOD Period	Adjustment Factor
Peak	10

Table 4: Peak hour to period adjustment

TOD Period	Adjustment Factor
Peak	1.04

Table 5: Capacities from I95 ICTDM

I95 Segments	Daily Capacity-mile	Hourly Capacity-mile	Period Duration in Hours (Weekday)	Period Duration in Hours(Weekend)	Peak Period Capacity-mile (Weekdays)	Peak Period Capacity-mile (Weekends)	# of GP lanes	# of tolled lanes	Maximum Peak Period Toll Lane Capacity-mile (Weekday)		Maximum Peak Period Toll Lane Capacity-mile (Weekend)	TOD Period	Peak Weekday Period	Peak Summer weekend Day
1	502,814	50,281	4	4	128,927	128,927	2	1	64,463		64,463		1.66	1.79
2	744,315	74,431	4	4	190,850	190,850	2	1	95,425		95,425		1.66	1.79
3	411,884	41,188	4	4	105,611	105,611	2	1	52,806		52,806		1.66	1.79
4	762,602	76,260	4	4	195,539	195,539	2	1	97,769		97,769		1.67	1.70
5	509,535	50,953	4	4	130,650	130,650	2	1	65,325		65,325		1.67	1.70
6	752,648	75,265	4	4	192,987	192,987	2	1	96,493		96,493		1.67	1.70
7	748,077	74,808	4	4	191,815	191,815	2	1	95,907		95,907		1.67	1.70
8	548,166	54,817	4	4	140,556	140,556	2	1	70,278		70,278		1.67	1.70
9	521,822	52,182	4	4	133,801	133,801	2	1	66,900		66,900		1.67	1.70
10	501,434	50,143	4	4	128,573	128,573	2	1	64,286		64,286		1.67	1.70
11	631,459	63,146	4	4	121,435	121,435	2	2	121,434		121,434		1.58	1.70
12	1,194,992	119,499	4	4	229,806	229,806	2	2	229,806		229,806		1.58	1.70
13	480,430	48,043	4	4	92,390	92,390	2	2	92,390		92,390		1.58	1.70
14	986,786	98,679	4	4	189,767	189,767	2	2	189,766		189,766		1.58	1.70
15	660,424	66,042	4	4	127,005	127,005	2	2	127,005		127,005		1.58	1.70
16	710,854	71,085	4	4	182,270	182,270	2	1	91,135		91,135		1.58	1.70
17	452,306	45,231	4	4	115,976	115,976	2	1	57,988		57,988		1.67	1.70
18	747,801	74,780	4	4	191,744	191,744	2	1	95,872		95,872		1.67	1.70

Adjustment Factor

Table 6: Toll Choice Model

Model parameter	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck
Costant for tolled route	-1.045	-1.045	-1.045	-1.045	-1.045	-1.3651	-1.3651	-1.3651	-1.045	-1.3651	-1.045
Time difference	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199
Toll value	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517
Income	0	0	0	0	0	0	0	0	0	0	0

Table 7 Off Peak Adjustment Factor

Off Peak Patronage Factor	1

Table 8: Seasonal Adjustment Factors by Month

Month	Adjustment Factor	Days in Month	Peak Months
1	1.27	31	0
2	1.09	28	0
3	0.94	31	0
4	0.81	30	0
5	0.90	31	0
6	0.89	30	30
7	0.74	31	31
8	0.70	31	31
9	0.98	30	0
10	0.99	31	0
11	0.90	30	0
12	0.90	31	0

Northbound

2040 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Northbound Input Tab

Table 1 2040 Daily VMT and travel time from CS I-95 Model (considering NB direction)

	Daily VMT															
I95 Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck		Toll per Segment (2009$)	Seg. Length (miles)	Free Flow Speed (mph)	Free Flow Travel Time (min)	Congested Travel Time on the GP lanes (min)
1	3,720	8,585	13,636	14,548	19,644	59,149	10,660	15,668	26,465	42,213	41,267		0.1	8.38	75	6.704182	6.8
2	5,517	11,461	18,921	20,406	29,778	47,824	5,774	7,420	18,608	142,893	53,386		0.1	12.41	75	9.924197	10.1
3	2,610	5,447	9,593	10,921	17,814	15,959	594	2,132	7,186	98,494	29,637		0.1	6.86	75	5.491783	5.6
4	5,084	10,361	18,220	21,244	36,813	54,939	4,903	7,680	19,241	110,056	56,643		0.1	12.71	75	10.16802	10.3
5	3,144	6,849	13,074	16,616	32,960	47,619	6,376	6,645	16,184	53,143	35,249		0.1	8.49	75	6.7938	6.8
6	5,468	11,851	22,492	27,930	52,896	59,528	4,139	11,930	24,601	89,398	54,227		0.1	12.54	75	10.03531	10.3
7	4,510	9,945	18,395	22,724	40,772	57,604	5,992	20,151	29,980	81,874	51,269		0.1	12.47	75	9.974362	10.2
8	3,302	7,330	13,692	16,592	28,672	40,679	3,997	16,366	23,074	57,104	38,908		0.1	9.14	75	7.308886	7.8
9	3,751	8,041	14,727	17,376	29,001	48,479	6,522	14,905	21,559	46,958	36,029		0.1	8.70	75	6.957626	7.4
10	4,204	8,940	16,330	18,949	30,693	46,225	3,430	11,866	20,722	77,498	36,678		0.1	8.36	75	6.685788	7.7
11	3,580	7,412	13,857	16,683	29,411	43,760	6,018	15,391	20,592	82,809	41,402		0.075	8.10	75	6.483365	6.9
12	6,901	14,027	26,471	33,191	60,688	62,871	5,238	16,588	32,803	203,829	74,146		0.075	14.94	75	11.94992	12.8
13	2,764	5,826	10,783	13,209	23,941	31,709	3,135	4,413	10,497	57,225	27,798		0.075	6.01	75	4.804298	5.2
14	6,923	13,585	23,669	26,943	43,721	86,363	10,170	10,915	23,029	73,123	52,048		0.075	12.33	75	9.867858	10.1
15	5,766	10,850	18,020	19,719	29,251	49,244	2,354	6,494	16,246	55,681	32,120		0.075	8.26	75	6.604237	6.9
16	6,277	11,722	20,317	22,987	35,498	65,067	5,616	14,889	28,834	93,295	44,747		0.075	11.67	75	9.332321	10.2
17	2,776	5,071	8,176	8,622	12,295	27,532	2,159	5,118	9,709	53,536	25,221		0.1	7.54	75	6.030746	6.5
18	4,810	7,273	9,904	8,919	9,999	25,860	1,941	5,506	12,214	112,049	37,214		0.1	12.46	75	9.970682	10.7

CPI 2009	214.537
CPI 2011	224.939
Adjustment	1.05

Table 2: Summer Adjustment Factor

Season	Adjustment Factor
Summer	0.78

* Summer seasonal factor from NC DOT

Table 3: Peak to daily adjustment

TOD Period	Adjustment Factor
Peak	10

Table 4: Peak hour to period adjustment

TOD Period	Adjustment Factor
Peak	1.04

Table 5: Capacities from I95 ICTDM

I95 Segments	Daily Capacity-mile	Hourly Capacity-mile	Period Duration in Hours (Weekday)	Period Duration in Hours(Weekend)	Peak Period Capacity-mile (Weekdays)	Peak Period Capacity-mile (Weekends)	# of GP lanes	# of tolled lanes	Maximum Peak Period Toll Lane Capacity-mile (Weekday)		Maximum Peak Period Toll Lane Capacity-mile (Weekend)	TOD Period	Peak Weekday Period	Peak Summer weekend Day
1	502,814	50,281	4	4	128,927	128,927	2	1	64,463		64,463	Adjustment Factor	1.60	1.68
2	744,315	74,431	4	4	190,850	190,850	2	1	95,425		95,425		1.60	1.68
3	411,884	41,188	4	4	105,611	105,611	2	1	52,806		52,806		1.60	1.68
4	762,602	76,260	4	4	195,539	195,539	2	1	97,769		97,769		1.67	1.83
5	509,535	50,953	4	4	130,650	130,650	2	1	65,325		65,325		1.67	1.83
6	752,648	75,265	4	4	192,987	192,987	2	1	96,493		96,493		1.67	1.83
7	748,077	74,808	4	4	191,815	191,815	2	1	95,907		95,907		1.67	1.83
8	548,166	54,817	4	4	140,556	140,556	2	1	70,278		70,278		1.67	1.83
9	521,822	52,182	4	4	133,801	133,801	2	1	66,900		66,900		1.67	1.83
10	501,434	50,143	4	4	128,573	128,573	2	1	64,286		64,286		1.67	1.83
11	631,459	63,146	4	4	121,435	121,435	2	2	121,434		121,434		1.78	1.80
12	1,194,992	119,499	4	4	229,806	229,806	2	2	229,806		229,806		1.78	1.80
13	480,430	48,043	4	4	92,390	92,390	2	2	92,390		92,390		1.78	1.80
14	986,786	98,679	4	4	189,767	189,767	2	2	189,766		189,766		1.78	1.80
15	660,424	66,042	4	4	127,005	127,005	2	2	127,005		127,005		1.78	1.80
16	710,854	71,085	4	4	182,270	182,270	2	1	91,135		91,135		1.78	1.80
17	452,306	45,231	4	4	115,976	115,976	2	1	57,988		57,988		1.67	1.83
18	747,801	74,780	4	4	191,744	191,744	2	1	95,872		95,872		1.67	1.83

Table 6: Toll Choice Model

Model parameter	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long distance auto	Truck
Costant for tolled route	-1.045	-1.045	-1.045	-1.045	-1.045	-1.3651	-1.3651	-1.3651	-1.045	-1.3651	-1.045
Time difference	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199	0.1199
Toll value	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517	-0.517
Income	0	0	0	0	0	0	0	0	0	0	0

Table 7 Off Peak Adjustment Factor

Off Peak Patronage Factor	1

Table 8: Seasonal Adjustment Factors by Month

Month	Adjustment Factor	Days in Month	Peak Months
1	1.27	31	0
2	1.09	28	0
3	0.94	31	0
4	0.81	30	0
5	0.90	31	0
6	0.89	30	30
7	0.74	31	31
8	0.70	31	31
9	0.98	30	0
10	0.99	31	0
11	0.90	30	0
12	0.90	31	0

Daily (Both Directions)

2040 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Daily VMT on Tolled Lanes

Table 1A : 2040 Weekday Daily Outputs on All Lanes (SB Direction)

	Daily VMT												Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
4	11,970	24,641	46,219	57,198	103,768	125,646	13,431	32,517	57,228	318,619	175,979	967,217	11,471	2,556	14,027
5	17,365	33,078	56,678	63,664	99,044	181,563	15,953	29,575	62,393	241,164	182,144	982,620	11,360	2,590	13,950
											Total	1,949,837		**Total**	**27,977**

Table 2A : 2040 Weekday Daily Outputs on General Purpose Lanes (SB Direction)

													Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
4	11,652	23,985	44,989	55,677	101,007	123,150	13,165	31,871	55,706	312,289	175,979	949,469	11,235	2,556	13,791
5	16,781	31,965	54,771	61,522	95,712	176,968	15,550	28,826	60,294	235,060	182,144	959,594	11,053	2,590	13,643
											Total	1,909,063		**Total**	**27,434**

Table 3A : Weekday Daily 2040 VMT , VHT and revenue on tolled lane (SB Direction)

	Weekday Peak VMT												Daily VHT			
I95	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long	Truck	Total	Auto	Truck	Total	Auto Revenu
4	318	656	1,230	1,522	2,761	2,496	267	646	1,523	6,330	0	17,748	237	0	237	$1,479
5	584	1,113	1,906	2,141	3,332	4,595	404	749	2,099	6,104	0	23,026	307	0	307	$1,727
											Total	40,774		**Total**	**544**	**$3,206**

Table 1B : 2040 Weekday Daily Outputs on All Lanes (NB Direction)

	Daily VMT												Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
4	13,246	27,265	51,111	63,083	114,039	138,341	14,391	36,393	63,891	343,863	143,346	1,008,970	12,573	2,082	14,655
5	18,966	36,157	62,006	69,649	108,470	200,675	18,140	32,298	68,109	222,099	128,915	965,482	11,894	1,833	13,727
											Total	1,974,451		**Total**	**28,382**

2040 Express Lanes/Concept 2 (Partial Corridor Toll) Scenario – Daily VMT on Tolled Lanes (continued)

Table 2B : 2040 Weekday Daily Outputs on General Purpose Lanes (NB Direction)

													Daily VHT		
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total
4	12,836	26,422	49,530	61,133	110,513	135,143	14,059	35,551	61,916	335,915	143,346	986,365	12,245	2,082	14,327
5	18,240	34,773	59,633	66,985	104,320	194,896	17,617	31,368	65,503	215,704	128,915	937,954	11,502	1,833	13,335
											Total	1,924,319		**Total**	**27,662**

Table 3B : Weekday Daily 2040 VMT, VHT and revenue on tolled lane (NB Direction)

	Weekday Peak VMT												Daily VHT			
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total	Auto Revenue
4	410	843	1,581	1,951	3,526	3,197	333	841	1,976	7,948	0	22,605	328	0	328	$1,695
5	726	1,383	2,372	2,665	4,150	5,778	522	930	2,606	6,395	0	27,527	391	0	391	$2,065
											Total	50,132		**Total**	**720**	**$3,760**

Table 4 : Weekday Daily 2040 VMT and VHT and revenue on tolled lane (Both Directions)

	Weekday Peak VMT												Daily VHT				
I95 Aggregated Segments	hbw_i1	hbw_i2	hbw_i3	hbw_i4	hbw_i5	hbo	hbs	nhb	nhbaw	Long Distance Auto	Truck	Total	Auto	Truck	Total	Auto Revenu	Average A
4	728	1,499	2,810	3,473	6,287	5,694	599	1,487	3,498	14,278	0	40,353	565	0	565	$3,363	1,389
5	1,310	2,496	4,279	4,806	7,481	10,374	926	1,679	4,704	12,499	0	50,553	698	0	698	$3,792	1,567
											Total	**90,906**		**Total**	**1,263**	**$7,154**	

Table 5A : Summer Weekend Daily 2040 VMT and VHT on all Lanes (SB Direction)

	VMT			VHT		
I95 Aggregated Segments	Auto	Truck	Total	Auto	Truck	Total
4	287,416	63,924	351,340	4,306	968	5,274
5	290,771	66,163	356,935	4,211	967	5,178
			708,274		**Total**	**10,452**

APPENDIX B:

TRAFFIC & REVENUE RESULTS

Appendix B: Traffic & Revenue Results

Express Lanes/Concept 1: Full Express Lanes

Table 1. Vehicle-miles traveled forecast, by segment

Year	Total VMT	Segment #1	Segment #2	Segment #3	Segment #4	Segment #5	Segment #6
2020	7,764,000	0	0	0	3,646,000	4,118,000	0
2021	10,138,596	0	0	2,235,696	3,715,200	4,187,700	0
2022	14,638,040	0	0	6,596,240	3,784,400	4,257,400	0
2023	14,852,400	0	0	6,671,700	3,853,600	4,327,100	0
2024	17,958,400	0	0	9,638,800	3,922,800	4,396,800	0
2025	21,527,084	0	3,321,984	9,746,600	3,992,000	4,466,500	0
2026	21,825,624	0	3,373,824	9,854,400	4,061,200	4,536,200	0
2027	24,051,100	0	5,352,600	9,962,200	4,130,400	4,605,900	0
2028	28,205,750	3,826,950	5,433,600	10,070,000	4,199,600	4,675,600	0
2029	28,593,218	3,886,718	5,514,600	10,177,800	4,268,800	4,745,300	0
2030	31,399,500	6,365,300	5,595,600	10,285,600	4,338,000	4,815,000	0
2031	31,823,600	6,461,700	5,676,600	10,393,400	4,407,200	4,884,700	0
2032	34,297,400	6,558,100	5,757,600	10,501,200	4,476,400	4,954,400	2,049,700
2033	34,742,200	6,654,500	5,838,600	10,609,000	4,545,600	5,024,100	2,070,400
2034	35,187,000	6,750,900	5,919,600	10,716,800	4,614,800	5,093,800	2,091,100

2035	35,631,800	6,847,300	6,000,600	10,824,600	4,684,000	5,163,500	2,111,800
2036	36,076,600	6,943,700	6,081,600	10,932,400	4,753,200	5,233,200	2,132,500
2037	36,521,400	7,040,100	6,162,600	11,040,200	4,822,400	5,302,900	2,153,200
2038	36,966,200	7,136,500	6,243,600	11,148,000	4,891,600	5,372,600	2,173,900
2039	37,411,000	7,232,900	6,324,600	11,255,800	4,960,800	5,442,300	2,194,600
2040	37,858,500	7,328,500	6,406,200	11,364,600	5,030,900	5,512,400	2,215,900
2041	38,371,600	7,441,400	6,500,400	11,485,100	5,112,400	5,593,400	2,238,900
2042	38,891,800	7,556,000	6,596,000	11,606,800	5,195,200	5,675,600	2,262,200
2043	39,419,300	7,672,400	6,693,000	11,729,800	5,279,400	5,759,000	2,285,700
2044	39,954,200	7,790,600	6,791,400	11,854,100	5,364,900	5,843,700	2,309,500
2045	40,496,500	7,910,600	6,891,200	11,979,800	5,451,800	5,929,600	2,333,500
2046	41,046,400	8,032,400	6,992,500	12,106,800	5,540,100	6,016,800	2,357,800
2047	41,603,800	8,156,100	7,095,300	12,235,100	5,629,800	6,105,200	2,382,300
2048	42,169,100	8,281,700	7,199,600	12,364,800	5,721,000	6,194,900	2,407,100
2049	42,742,300	8,409,200	7,305,400	12,495,900	5,813,700	6,286,000	2,432,100
2050	43,323,600	8,538,700	7,412,800	12,628,400	5,907,900	6,378,400	2,457,400
2051	43,913,100	8,670,200	7,521,800	12,762,300	6,003,600	6,472,200	2,483,000
2052	44,510,700	8,803,700	7,632,400	12,897,600	6,100,900	6,567,300	2,508,800
2053	45,116,600	8,939,300	7,744,600	13,034,300	6,199,700	6,663,800	2,534,900

2054	45,731,100	9,077,000	7,858,400	13,172,500	6,300,100	6,761,800	2,561,300
2055	46,354,100	9,216,800	7,973,900	13,312,100	6,402,200	6,861,200	2,587,900
2056	46,985,800	9,358,700	8,091,100	13,453,200	6,505,900	6,962,100	2,614,800
2057	47,626,300	9,502,800	8,210,000	13,595,800	6,611,300	7,064,400	2,642,000
2058	48,275,800	9,649,100	8,330,700	13,739,900	6,718,400	7,168,200	2,669,500
2059	48,934,500	9,797,700	8,453,200	13,885,500	6,827,200	7,273,600	2,697,300
2020-2025	86,878,520	0	3,321,984	34,889,036	22,914,000	25,753,500	0
2026-2030	134,075,192	14,078,968	25,270,224	50,350,000	20,998,000	23,378,000	0
2031-2035	171,682,000	33,272,500	29,193,000	53,045,000	22,728,000	25,120,500	8,323,000
2036-2040	184,833,700	35,681,700	31,218,600	55,741,000	24,458,900	26,863,400	10,870,100
2041-2045	197,133,400	38,371,000	33,472,000	58,655,600	26,403,700	28,801,300	11,429,800
2046-2050	210,885,200	41,418,100	36,005,600	61,831,000	28,612,500	30,981,300	12,036,700
2051-2055	225,625,600	44,707,000	38,731,100	65,178,800	31,006,500	33,326,300	12,675,900
2056-2059	191,822,400	38,308,300	33,085,000	54,674,400	26,662,800	28,468,300	10,623,600
Total	**1,402,936,012**	**245,837,568**	**230,297,508**	**434,364,836**	**203,784,400**	**222,692,600**	**65,959,100**

Table 2. Gross Toll Revenue forecast, by segment

Year	Gross Toll Revenues (YOE$)	Segment #1	Segment #2	Segment #3	Segment #4	Segment #5	Segment #6
2020	$ 1,529,500	$0	$0	$0	$718,300	$811,200	$0
2021	$ 1,896,000	$0	$0	$299,600	$750,500	$845,900	$0
2022	$ 2,575,000	$0	$0	$910,300	$783,400	$881,300	$0
2023	$ 2,675,000	$0	$0	$940,700	$817,000	$917,300	$0
2024	$ 3,202,900	$0	$0	$1,397,600	$851,200	$954,100	$0
2025	$ 3,820,400	$0	$491,700	$1,442,500	$890,200	$996,000	$0
2026	$ 3,971,000	$0	$512,800	$1,497,900	$926,000	$1,034,300	$0
2027	$ 4,433,400	$0	$835,000	$1,554,100	$966,500	$1,077,800	$0
2028	$ 5,222,900	$612,300	$869,400	$1,611,200	$1,007,900	$1,122,100	$0
2029	$ 5,428,400	$637,400	$904,400	$1,669,200	$1,050,100	$1,167,300	$0
2030	$ 6,044,100	$1,069,400	$940,100	$1,728,000	$1,093,200	$1,213,400	$0
2031	$ 6,272,900	$1,111,400	$976,400	$1,787,700	$1,137,100	$1,260,300	$0
2032	$ 6,875,500	$1,154,200	$1,013,300	$1,848,200	$1,186,200	$1,312,900	$360,700
2033	$ 7,149,600	$1,204,500	$1,056,800	$1,920,200	$1,231,900	$1,361,500	$374,700
2034	$ 7,412,500	$1,248,900	$1,095,100	$1,982,600	$1,282,900	$1,416,100	$386,900
2035	$ 7,705,500	$1,301,000	$1,140,100	$2,056,700	$1,334,900	$1,471,600	$401,200

2036	$ 8,003,500	$1,354,000	$1,185,900	$2,131,800	$1,387,900	$1,528,100	$415,800
2037	$ 8,306,600	$1,408,000	$1,232,500	$2,208,000	$1,441,900	$1,585,600	$430,600
2038	$ 8,624,900	$1,463,000	$1,279,900	$2,285,300	$1,501,700	$1,649,400	$445,600
2039	$ 8,948,700	$1,518,900	$1,328,200	$2,363,700	$1,562,700	$1,714,300	$460,900
2040	$ 9,278,200	$1,575,600	$1,377,300	$2,443,400	$1,625,000	$1,780,500	$476,400
2041	$ 9,630,100	$1,637,100	$1,430,100	$2,526,700	$1,692,200	$1,851,400	$492,600
2042	$ 10,018,000	$1,707,700	$1,490,700	$2,623,100	$1,761,200	$1,924,000	$511,300
2043	$ 10,414,800	$1,780,000	$1,552,800	$2,721,300	$1,832,000	$1,998,400	$530,300
2044	$ 10,803,100	$1,846,400	$1,609,600	$2,809,400	$1,909,900	$2,080,400	$547,400
2045	$ 11,229,200	$1,922,300	$1,674,600	$2,911,100	$1,989,900	$2,164,300	$567,000
2046	$ 11,665,200	$2,000,100	$1,741,100	$3,014,600	$2,072,000	$2,250,300	$587,100
2047	$ 12,141,000	$2,088,000	$1,816,400	$3,132,200	$2,156,200	$2,338,300	$609,900
2048	$ 12,609,400	$2,169,800	$1,886,300	$3,239,600	$2,248,400	$2,434,600	$630,700
2049	$ 13,119,100	$2,262,100	$1,965,200	$3,361,400	$2,342,900	$2,533,300	$654,200
2050	$ 13,609,500	$2,348,100	$2,038,500	$3,472,800	$2,440,000	$2,634,300	$675,800
2051	$ 14,142,500	$2,445,000	$2,121,100	$3,599,000	$2,539,500	$2,737,700	$700,200
2052	$ 14,700,500	$2,544,300	$2,205,800	$3,727,400	$2,647,800	$2,850,200	$725,000
2053	$ 15,271,200	$2,646,000	$2,292,400	$3,858,200	$2,758,900	$2,965,400	$750,300
2054	$ 15,887,600	$2,759,400	$2,389,000	$4,004,400	$2,872,800	$3,083,400	$778,600

2055	$ 16,485,200	$2,866,400	$2,479,900	$4,140,100	$2,989,800	$3,204,200	$804,800
2056	$ 17,143,300	$2,985,400	$2,581,100	$4,291,600	$3,116,300	$3,334,800	$834,100
2057	$ 17,816,500	$3,107,400	$2,684,700	$4,445,800	$3,246,100	$3,468,600	$863,900
2058	$ 18,505,400	$3,232,400	$2,790,800	$4,602,900	$3,379,400	$3,605,600	$894,300
2059	$ 19,258,800	$3,370,400	$2,907,900	$4,776,600	$3,522,800	$3,753,200	$927,900
2020-2025	$ 15,698,800	$ -	$ 491,700	$ 4,990,700	$ 4,810,600	$ 5,405,800	$ -
2026-2030	$ 25,099,800	$ 2,319,100	$ 4,061,700	$ 8,060,400	$ 5,043,700	$ 5,614,900	$ -
2031-2035	$ 35,416,000	$ 6,020,000	$ 5,281,700	$ 9,595,400	$ 6,173,000	$ 6,822,400	$ 1,523,500
2036-2040	$ 43,161,900	$ 7,319,500	$ 6,403,800	$ 11,432,200	$ 7,519,200	$ 8,257,900	$ 2,229,300
2041-2045	$ 52,095,200	$ 8,893,500	$ 7,757,800	$ 13,591,600	$ 9,185,200	$ 10,018,500	$ 2,648,600
2046-2050	$ 63,144,200	$ 10,868,100	$ 9,447,500	$ 16,220,600	$ 11,259,500	$ 12,190,800	$ 3,157,700
2051-2055	$ 76,487,000	$ 13,261,100	$ 11,488,200	$ 19,329,100	$ 13,808,800	$ 14,840,900	$ 3,758,900
2056-2059	$ 72,724,000	$ 12,695,600	$ 10,964,500	$ 18,116,900	$ 13,264,600	$ 14,162,200	$ 3,520,200
Total	**$ 383,826,900**	**$ 61,376,900**	**$ 55,896,900**	**$ 101,336,900**	**$ 71,064,600**	**$ 77,313,400**	**$ 16,838,200**

Express Lanes/Concept 2: Partial Express Lanes (I-40 to Fayetteville)

Table 3. Vehicle-miles traveled forecast, by segment

Year	VMT	Segment #1	Segment #2	Segment #3	Segment #4	Segment #5	Segment #6
2020	20,115,800	0	0	0	8,774,900	11,340,900	0
2021	20,470,100	0	0	0	8,943,400	11,526,700	0
2022	20,824,400	0	0	0	9,111,900	11,712,500	0
2023	21,178,700	0	0	0	9,280,400	11,898,300	0
2024	21,533,000	0	0	0	9,448,900	12,084,100	0
2025	21,887,300	0	0	0	9,617,400	12,269,900	0
2026	22,241,600	0	0	0	9,785,900	12,455,700	0
2027	22,595,900	0	0	0	9,954,400	12,641,500	0
2028	22,950,200	0	0	0	10,122,900	12,827,300	0
2029	23,304,500	0	0	0	10,291,400	13,013,100	0
2030	23,658,800	0	0	0	10,459,900	13,198,900	0
2031	24,013,100	0	0	0	10,628,400	13,384,700	0
2032	24,367,400	0	0	0	10,796,900	13,570,500	0
2033	24,721,700	0	0	0	10,965,400	13,756,300	0
2034	25,076,000	0	0	0	11,133,900	13,942,100	0
2035	25,430,300	0	0	0	11,302,400	14,127,900	0

2036	25,784,600	0	0	0	11,470,900	14,313,700	0
2037	26,138,900	0	0	0	11,639,400	14,499,500	0
2038	26,493,200	0	0	0	11,807,900	14,685,300	0
2039	26,847,500	0	0	0	11,976,400	14,871,100	0
2040	27,201,900	0	0	0	12,145,400	15,056,500	0
2041	27,616,400	0	0	0	12,344,600	15,271,800	0
2042	28,037,300	0	0	0	12,547,100	15,490,200	0
2043	28,464,600	0	0	0	12,752,900	15,711,700	0
2044	28,898,400	0	0	0	12,962,000	15,936,400	0
2045	29,338,900	0	0	0	13,174,600	16,164,300	0
2046	29,786,100	0	0	0	13,390,700	16,395,400	0
2047	30,240,200	0	0	0	13,610,300	16,629,900	0
2048	30,701,200	0	0	0	13,833,500	16,867,700	0
2049	31,169,300	0	0	0	14,060,400	17,108,900	0
2050	31,644,600	0	0	0	14,291,000	17,353,600	0
2051	32,127,200	0	0	0	14,525,400	17,601,800	0
2052	32,617,100	0	0	0	14,763,600	17,853,500	0
2053	33,114,500	0	0	0	15,005,700	18,108,800	0
2054	33,619,600	0	0	0	15,251,800	18,367,800	0

2055	34,132,400	0	0	0	15,501,900	18,630,500	0
2056	34,653,000	0	0	0	15,756,100	18,896,900	0
2057	35,181,600	0	0	0	16,014,500	19,167,100	0
2058	35,718,300	0	0	0	16,277,100	19,441,200	0
2059	36,263,200	0	0	0	16,544,000	19,719,200	0
2020-2025	126,009,300	0	0	0	55,176,900	70,832,400	0
2026-2030	114,751,000	0	0	0	50,614,500	64,136,500	0
2031-2035	123,608,500	0	0	0	54,827,000	68,781,500	0
2036-2040	132,466,100	0	0	0	59,040,000	73,426,100	0
2041-2045	142,355,600	0	0	0	63,781,200	78,574,400	0
2046-2050	153,541,400	0	0	0	69,185,900	84,355,500	0
2051-2055	165,610,800	0	0	0	75,048,400	90,562,400	0
2056-2059	141,816,100	0	0	0	64,591,700	77,224,400	0
Total	**1,100,158,800**	**0**	**0**	**0**	**492,265,600**	**607,893,200**	**0**

Table 4. Gross Toll Revenue forecast, by segment

Year	Gross Toll Revenues (YOE$)	Segment #1	Segment #2	Segment #3	Segment #4	Segment #5	Segment #6
2020	$ 1,971,300	$0	$0	$0	$859,900	$1,111,400	$0
2021	$ 2,067,500	$0	$0	$0	$903,300	$1,164,200	$0
2022	$ 2,144,900	$0	$0	$0	$938,500	$1,206,400	$0
2023	$ 2,244,900	$0	$0	$0	$983,700	$1,261,200	$0
2024	$ 2,347,100	$0	$0	$0	$1,029,900	$1,317,200	$0
2025	$ 2,429,500	$0	$0	$0	$1,067,500	$1,362,000	$0
2026	$ 2,535,500	$0	$0	$0	$1,115,600	$1,419,900	$0
2027	$ 2,643,800	$0	$0	$0	$1,164,700	$1,479,100	$0
2028	$ 2,754,000	$0	$0	$0	$1,214,700	$1,539,300	$0
2029	$ 2,866,400	$0	$0	$0	$1,265,800	$1,600,600	$0
2030	$ 2,981,000	$0	$0	$0	$1,317,900	$1,663,100	$0
2031	$ 3,097,700	$0	$0	$0	$1,371,100	$1,726,600	$0
2032	$ 3,216,500	$0	$0	$0	$1,425,200	$1,791,300	$0
2033	$ 3,362,200	$0	$0	$0	$1,491,300	$1,870,900	$0
2034	$ 3,485,600	$0	$0	$0	$1,547,600	$1,938,000	$0
2035	$ 3,636,500	$0	$0	$0	$1,616,200	$2,020,300	$0

2036	$ 3,764,600	$0	$0	$0	$1,674,800	$2,089,800	$0
2037	$ 3,920,800	$0	$0	$0	$1,745,900	$2,174,900	$0
2038	$ 4,053,500	$0	$0	$0	$1,806,600	$2,246,900	$0
2039	$ 4,215,100	$0	$0	$0	$1,880,300	$2,334,800	$0
2040	$ 4,379,500	$0	$0	$0	$1,955,400	$2,424,100	$0
2041	$ 4,556,700	$0	$0	$0	$2,036,900	$2,519,800	$0
2042	$ 4,738,300	$0	$0	$0	$2,120,500	$2,617,800	$0
2043	$ 4,952,800	$0	$0	$0	$2,219,000	$2,733,800	$0
2044	$ 5,143,900	$0	$0	$0	$2,307,200	$2,836,700	$0
2045	$ 5,339,700	$0	$0	$0	$2,397,800	$2,941,900	$0
2046	$ 5,570,000	$0	$0	$0	$2,504,100	$3,065,900	$0
2047	$ 5,806,100	$0	$0	$0	$2,613,200	$3,192,900	$0
2048	$ 6,017,500	$0	$0	$0	$2,711,400	$3,306,100	$0
2049	$ 6,265,000	$0	$0	$0	$2,826,100	$3,438,900	$0
2050	$ 6,518,700	$0	$0	$0	$2,943,900	$3,574,800	$0
2051	$ 6,811,000	$0	$0	$0	$3,079,400	$3,731,600	$0
2052	$ 7,077,900	$0	$0	$0	$3,203,700	$3,874,200	$0
2053	$ 7,351,500	$0	$0	$0	$3,331,300	$4,020,200	$0
2054	$ 7,665,300	$0	$0	$0	$3,477,400	$4,187,900	$0

2055	$ 7,986,900	$0	$0	$0	$3,627,400	$4,359,500	$0
2056	$ 8,282,100	$0	$0	$0	$3,765,700	$4,516,400	$0
2057	$ 8,619,500	$0	$0	$0	$3,923,600	$4,695,900	$0
2058	$ 8,965,300	$0	$0	$0	$4,085,600	$4,879,700	$0
2059	$ 9,356,000	$0	$0	$0	$4,268,400	$5,087,600	$0
2020-2025	$ 13,205,200	$ -	$ -	$ -	$ 5,782,800	$ 7,422,400	$ -
2026-2030	$ 13,780,700	$ -	$ -	$ -	$ 6,078,700	$ 7,702,000	$ -
2031-2035	$ 16,798,500	$ -	$ -	$ -	$ 7,451,400	$ 9,347,100	$ -
2036-2040	$ 20,333,500	$ -	$ -	$ -	$ 9,063,000	$ 11,270,500	$ -
2041-2045	$ 24,731,400	$ -	$ -	$ -	$ 11,081,400	$ 13,650,000	$ -
2046-2050	$ 30,177,300	$ -	$ -	$ -	$ 13,598,700	$ 16,578,600	$ -
2051-2055	$ 36,892,600	$ -	$ -	$ -	$ 16,719,200	$ 20,173,400	$ -
2056-2059	$ 35,222,900	$ -	$ -	$ -	$ 16,043,300	$ 19,179,600	$ -
Total	**$ 191,142,100**	**$ -**	**$ -**	**$ -**	**$ 85,818,500**	**$ 105,323,600**	**$ -**

ATKINS

1616 E. Millbrook Rd, Suite 310
Raleigh, NC 27609-4968

Mark.Boggs@atkinsglobal.com
Office: 919.876-6888
Direct: 919.431.5263
Fax: 919.876.6848

CAMBRIDGE SYSTEMATICS

pdowell@camsys.com
Office: 404-460-2606