I-95 Corridor Planning and Finance Study (T.I.P. Project I-5133)

Purpose and Need Report

Prepared for the North Carolina Department of Transportation

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Introduction and Background

The North Carolina Department of Transportation (NCDOT), in cooperation with the Federal Highway Administration (FHWA), initiated the Interstate 95 (I-95) Corridor Planning and Finance Study (I-95 Study) to determine the required capacity, safety, and rehabilitation requirements of the I-95 corridor within North Carolina from the South Carolina state line to the Virginia state line, a distance of approximately 182 miles. From south to north, I-95 passes through the following North Carolina counties: Robeson, Cumberland, Harnett, Johnston, Wilson, Nash, Halifax, and Northampton.

I-95 is one of the most vital transportation facilities on the east coast of the United States, serving such metropolitan areas as Miami, Washington, D.C., Baltimore, Philadelphia, New York, and Boston. It is the major north-south artery in the east for freight traffic carrying goods into and out of North Carolina. As such, this interstate is critical to the North Carolina economy. Trucks currently account for approximately 23 percent of daily traffic on I-95 in North Carolina (NCDOT, 2009).

The I-95 Study is designed to develop the purpose and need for improvements to the I-95 corridor and to assist in the development and evaluation of alternatives in order to determine those to be advanced for further study pursuant to the National Environmental Policy Act (NEPA). It is anticipated that potential alternatives will include improvements within or immediately adjacent to the existing I-95 right of way. Several financing strategies, including tolling, will also be evaluated as part of the study.

The I-95 Study follows FHWA "Planning and Environment Linkages" (PEL) guidance as defined in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) Act. The PEL guidance ensures that environmental, community, and economic goals are addressed in the early stages of federally funded transportation projects. PEL is intended to inform subsequent NEPA studies by working with resource agencies to come to an agreement on logical termini and eliminate certain alternatives to streamline the project development process.

This report describes the purpose and need for improvements to I-95 in North Carolina. It is based on two documents completed as part of the I-95 Study, an environmental screening and a study area needs assessment. The environmental screening document was a screening-level evaluation based on currently available geographic information system (GIS) information for land use, zoning, demographics, natural resources, cultural resources, and hazardous waste sites (Michael Baker Engineering, 2010). Selected ground-truthing was conducted to gauge the accuracy of the existing GIS information and identify potential problem areas.

The study area needs assessment report provided an overview of existing safety conditions, traffic operations and design elements within the I-95 corridor (PBS&J, 2010a). This assessment

summarized the current traffic, safety, and condition of I-95 in North Carolina. It was developed to help understand the design and maintenance requirements, as well as the funding issues, associated with improvements to I-95.

1.0 I-95 FACILITY NEEDS

Construction of I-95 in North Carolina began in the 1950s and consisted of a 4-lane, median divided interstate highway stretching from Robeson County to Northampton County when it was completed in 1980. Various sections of I-95 were improved between 1998 and 2008. NCDOT spent $110 million on pavement rehabilitation, bridge reconstruction, and preservation projects on approximately 35 miles of I-95, primarily in the southern portion of the corridor. Other sections have not been improved since initial construction was completed. For this reason, the needs of the facility vary throughout the project length. However, the following needs were most commonly encountered during the needs assessment:

- Capacity deficiencies
- Structural deficiencies
- Geometric deficiencies
- Safety deficiencies
- Funding deficiencies.

1.1 Capacity Deficiencies

Current (2008) and projected future (2040) traffic for segments of I-95 in North Carolina are included in Appendix 1 (PBS&J, 2010a). Based on 2008 traffic data, the Average Annual Daily Traffic (AADT) for segments of I-95 ranges from 29,000 vehicles per day (vpd) between exits 107 and 119 (Johnston and Wilson Counties) to 46,000 vpd between exits 73 and 79 (Harnett and Johnston Counties). If no improvements are made to I-95, it is projected that the AADT for I-95 in 2040 will range from 32,100 vpd between exits 116 and 119 (Wilson County) to 98,200 vpd between exits 46 and 49 in Cumberland County.

The effectiveness of a roadway segment in serving traffic demand is measured in terms of level of service. Level of service (LOS) is a qualitative measure of traffic conditions and driver perception. It is based on such factors as speed, travel time, maneuverability, interruptions, comfort, convenience, and safety. The LOS is defined with letter designations from A through F, which can be applied to both roadway segments and intersections. LOS A represents the best operating conditions and LOS F represents the worst. In urban areas, LOS D or better is considered acceptable. LOS C or better is desirable in rural and suburban areas where trip lengths are longer. Table 1 describes the traffic conditions generally associated with each LOS designation.

Table 1. Level of Service Classifications and Conditions

LEVEL OF SERVICE (LOS)	TRAFFIC FLOW CONDITIONS
A	Free flow operations. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The general level of physical and psychological comfort provided to the driver is still high.
B	Reasonably free flow operations. The ability to maneuver within the traffic stream is only slightly restricted and the general level of physical and psychological comfort provided to the driver is still high.
C	Flow with speeds at or near free flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted and lane changes require more vigilance on the part of the driver. The driver notices an increase in tension because of the additional vigilance required for safe operation.
D	Speeds decline with increasing traffic. Freedom to maneuver within the traffic stream is more noticeably limited. The driver experiences reduced physical and psychological comfort levels.
E	At lower boundary, the facility is at capacity. Operations are volatile because there are virtually no gaps in the traffic stream. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.
F	Breakdowns in traffic flow. The number of vehicles entering the highway section exceeds the capacity or ability of the highway to accommodate that number of vehicles. There is little or no room to maneuver. The driver experiences poor levels of physical and psychological comfort.

Source: Transportation Research Board, 2000

LOS estimates were developed for existing I-95 (based on 2008 traffic data) and for projected conditions (with no improvements to I-95) in 2040. These data are shown in Appendix 1. In 2008, most segments of I-95 were rated as LOS C (42 segments). A total of 8 segments were rated as LOS B and 7 were rated as LOS D (areas including exits 17 through 20 in Robeson County, exits 56 to 58 in Cumberland County, exits 71 to 72 in Harnett County, and exits 73 to 79 in Harnett and Johnston Counties).

In 2040, there is one segment (exits 116 through 119 in Wilson County) projected to operate at LOS B and8 segments projected to operate at LOS C. From exit 13 in Robeson County to exit 107 in Johnston County, all segments are projected to operate at LOS D, E, or F, including a

continuous stretch from exit 17 in Robeson County to exit 79 in Johnston County where all segments are projected to operate at LOS F.

1.2 Structural Deficiencies

Throughout the I-95 corridor, there are places where bridges cross over the interstate and areas where I-95 crosses over streams, railroads, or other roadways. There are also areas of I-95 that are in need of resurfacing or more extensive roadway subgrade (i.e., beneath the pavement) repairs. The following structural deficiencies have been identified along the I-95 corridor based on data from NCDOT.

Bridges. There are currently 73 bridges that carry the mainline of I-95 over roadways, railroads, and bodies of water. There are also 119 bridges that carry crossroads over I-95. Summaries of reported bridge conditions along I-95, based on regularly-updated Bridge Inspection Reports, by location, are shown in Table 2 and Table 3. Note that NCDOT was unable to provide bridge inspection reports for some bridges on and along I-95, so the tables do not sum to the 192 total bridges.

Table 2. Condition of Bridges on I-95*

County	Condition of Bridges		
	Poor	Fair	Good
Robeson	0	12	2
Cumberland	0	11	3
Harnett	0	2	0
Johnston	2	9	0
Wilson	0	1	5
Nash	0	11	1
Halifax	0	4	4
Northampton	0	2	0

Source: PBS&J, 2010a

*Infrastructure ratings are as follows: Good: exceeds accepted standards; Fair: meets accepted standards; Poor: falls below accepted standards

Table 3. Condition of Bridges over I-95*

County	Condition of Bridges		
	Poor	**Fair**	**Good**
Robeson	2	13	4
Cumberland	1	19	5
Harnett	4	1	0
Johnston	0	16	5
Wilson	0	11	1
Nash	0	14	4
Halifax	0	11	1
Northampton	1	3	0

Source: PBS&J, 2010a

*Infrastructure ratings are as follows: Good: exceeds accepted standards; Fair: meets accepted standards; Poor: falls below accepted standards

Currently, 24 overpass bridges on I-95 do not meet the minimum vertical clearance requirement of 16 feet, making them functionally obsolete. The state of North Carolina mandates that no vehicle shall exceed a height of 13 feet, 6 inches (NC General Statute 20-116), and there are no overpass bridges on I-95 that are less than this height. The number of height deficient bridges by county are:

- Robeson County, 7 bridges
- Cumberland County, 5 bridges
- Harnett County, 4 bridges
- Johnston County, 3 bridges
- Wilson County, 0 bridges
- Nash County, 0 bridges
- Halifax County, 5 bridges
- Northampton County, 1 bridge.

There are six bridges categorized as structurally deficient and twelve categorized as functionally obsolete among the 73 bridges along the I-95 roadway. Additionally, there are 20 bridges categorized as structurally deficient and 32 as functionally deficient on bridges that cross over I-95.

Pavement Condition. The condition of pavement on I-95 was determined based on NCDOT's 2008 Pavement Condition Ratings and is shown in Table 4. Pavement sections with a rating of 75 or more are considered to be in Good condition, between 50 to 74 in Fair condition, and less than 50 in Poor condition. Areas of pavement in Poor and Fair conditions were found in parts of Nash County (15 miles of Poor and 13 miles of Fair) and Halifax County (13 miles of Poor and 10 miles of Fair). In Johnston County, 2 miles were listed in Fair condition. All other paved

areas (303 miles of pavement) were listed in Good condition. Although the pavement conditions along the I-95 corridor are generally sufficient, the study area needs assessment report found that the pavement structure was in need of reconstruction and continued resurfacing efforts would not extend the life of the facility as intended.

Table 4. Condition of Pavement on I-95

County	Condition of Pavement (Miles per Category)		
	Poor (<50)	Fair (50-75)	Good (>75)
Robeson	0	0	77
Cumberland	0	0	60
Harnett	0	0	18
Johnston	0	2	59
Wilson	0	0	33
Nash	15	14	23
Halifax	30	10	19
Northampton	0	0	15

Source: PBS&J, 2010a

1.3 Geometric Deficiencies

Federal Highway Administration (FHWA) roadway design standards have changed since construction of I-95 began in the 1950s. Certain portions of I-95 do not meet these updated requirements, primarily in the areas of ramp configuration and interchange spacing. There are also certain portions of I-95 with less than recommended sight distances.

Ramp Configuration. Currently, there are 56 interchanges along the I-95 corridor. Of the ramps at these interchanges, 45 have less than optimal distance for either accelerating onto I-95 or decelerating off I-95; 6 ranked as Poor and 39 ranked as Fair. Of the ramps listed as being in Poor Condition, 4 are in Johnston County and one each are in Robeson and Harnett Counties, as shown in Table 5.

Table 5. Interchanges with Poor Exit or Entrance Ramp Designs

County	Location	Mile marker	Direction	Ramp
Robeson	NC 211 (N. Roberts Ave.) interchange	20	northbound	Loop on-ramp
Harnett	SR 1811 (Bud Hawkins Rd.) interchange	70	southbound	Loop off-ramp
Johnston	NC 210 interchange	95	northbound	Loop on-ramp
Johnston	US 70 interchange	97	northbound	Loop on-ramp
Johnston	SR 1927 (E. Anderson St.) interchange	98	southbound	Southbound loop on-ramp
Johnston	SR 2339 (Bagley Rd.) interchange	105	northbound	Northbound on-ramp

Source: PBS&J, 2010a

Additionally, there are several ramps along the I-95 corridor where an access road ties into the entrance or exit ramp for I-95. This type of design may increase the potential for accidents along the interchange ramp and contribute to the inefficient operation of the ramp.

Interchange Spacing. Interchange spacing can influence freeway traffic operations. The American Association of State Transportation and Highway Officials (AASTHO) "A Policy on Geometric Design of Highways and Streets" (AASHTO Green Book) recommends a minimum interchange spacing of 1.0 miles in urban areas and 3.0 miles in rural areas. AASHTO notes that this distance is considered a general rule and other site-specific factors (weaving volume, signage, lengths of the deceleration and acceleration lanes, etc.) impact appropriate interchange spacing distances. Of the 56 total interchanges along the I-95 corridor in NC, there are 23 instances where the interchanges to not meet the current minimum interchange spacing requirements established by the FHWA (see Table 6).

Table 6. I-95 Freeway Segments with Undesirable Interchange Spacing

County	Area Type	Interchange Spacing (miles)	Segment Start	Segment End
Robeson	Rural	1.6	NC 20 (W. Broad St.) (Exit 31)	US 301 (Exit 33)
Cumberland	Rural	1.0	I-95 Business (Exit 40)	NC 59 (Chickenfoot Rd.) (Exit 41)
Cumberland	Rural	2.6	NC 59 (Chickenfoot Rd.) (Exit 41)	SR 2341 (Claude Lee Rd.) (Exit 44)
Cumberland	Rural	2.2	SR 2341 (Claude Lee Rd.) (Exit 44)	NC 87 (Exit 46)
Cumberland	Rural	2.7	NC Highway 53/210 (Cedar Creek Rd.) (Exit 49)	NC 24 (Exit 52)
Cumberland	Rural	1.0	SR 1832 (Murphy Rd.) (Exit 55)	I-95 Business (Exit 56)
Cumberland	Rural	1.9	I-95 Business (Exit 56)	I-295 (Fayetteville Outer Loop) / US 13 (Exit 58)
Harnett	Rural	1.2	SR 1811 (Bud Hawkins Rd.) (Exit 70)	SR 1002 (Long Branch Rd.) (Exit 71)
Harnett	Rural	1.7	SR 1002 (Long Branch Rd.) (Exit 71)	SR 1793 (Pope Rd.) (Exit 72)
Harnett	Urban	0.6	SR 1793 (Spring Branch Rd.) (Exit 72)	US 421 (Cumberland St.) (Exit 73)
Harnett	Rural	1.9	US 421 (Cumberland St.) (Exit 73)	SR 1808 (Jonesboro Rd.) (Exit 75)
Harnett	Rural	2.0	SR 1808 (Jonesboro Rd.) (Exit 75)	SR 1709 (Hodges Chapel Rd.) (Exit 77)
Harnett/ Johnston	Rural	2.6	SR 1709 (Hodges Chapel Rd.) (Exit 77)	NC 50 (Exit 79)
Johnston	Rural	1.6	NC 50 (Exit 79)	I-40 (Exit 81)
Johnston	Rural	2.2	SR 1178 (Keen Rd.) (Exit 87)	US 701 (Exit 90)
Johnston	Rural	2.1	NC 210/US 70 (Exit 95)	US 70 Alternate (Exit 97)
Johnston	Rural	1.2	US 70 Alternate (Exit 97)	SR 1927 (Pine Level Selma Rd.) (Exit 98)
Johnston	Rural	1.2	SR 2137 (Pittman Rd.) (Exit 101)	SR 2130 (East Main St.) (Exit 102)
Johnston	Rural	2.1	SR 2130 (East Main St.) (Exit 102)	SR 2339 (Bagley Rd.) (Exit 105)
Johnston	Rural	1.4	SR 2339 (Bagley Rd.) (Exit 105)	SR 2342 (Princeton Kenly Rd.) (Exit 106)
Johnston	Rural	1.2	SR 2342 (Princeton Kenly Rd.) (Exit 106)	US 301 (Exit 107)
Wilson	Rural	2.1	I-795/US 264 (Exit 119)	US 264 Alternate (Raleigh Rd.) (Exit 121)

Source: PBS&J, 2010a

1.4 Safety Deficiencies

Based on historic crash data (1990 to 2008), I-95 has a lower total crash rate than comparable interstates in North Carolina, but a higher rate of fatal crashes (see Table 7).

Table 7. Comparison of Historical Crash Rates from 1990-2008 on NC Interstates

Interstate	Total Crash Rate (Total Crashes per 100 Million Vehicle Miles)	Fatal Crash Rate (Fatal Crashes per 100 Million Vehicle Miles)	Injury Crash Rate (Injury Crashes per 100 Million Vehicle Miles)
I-95	58.9	1.61	22.7
I-85	85.0	0.76	31.8
I-77	91.0	0.64	33.6
I-40	65.3	0.59	25.0
I-26	61.0	0.67	23.5

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"

A safety analysis of the I-95 corridor, using The Traffic Engineering Accident Analysis System's Strip Analysis Reports for each county and the Interstate Crash Data spreadsheet (both provided by NCDOT), was performed to establish general crash trends and identify specific crash hot spots. Based on this analysis, fatal crashes are an issue in Robeson and Nash Counties, where safety ratios are less than 1.0 (0.58 for Robeson and 0.79 for Nash). This indicates that fatal crash rates in these counties are statistically greater than average. For non-fatal crashes, the I-95 actual crash rate in all counties is substantially below the critical crash rate, which is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. Overall crash data for I-95 is shown in Table 8. Crash data for I-95 sorted by county are provided in Tables 9 through 16.

Table 8. Overall Crash Rate for I-95 from the South Carolina State Line to the Virginia State Line (I-5133), September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	4,328	60.19	84.80	86.59
Fatal	70	**0.97**	0.56	0.71
Non Fatal	1,213	16.87	23.80	24.75
Night	1,367	19.01	23.08	24.02
Wet	950	13.21	18.47	19.31

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"

1-Statewide rate for North Carolina Interstate Highways

2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

Table 9. Overall Crash Rate for I-95 in Robeson County

September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	1207	79.30	84.80	88.72
Fatal	24	**1.58**	0.56	0.91
Non Fatal	349	22.93	23.80	25.89
Night	355	23.32	23.08	25.14
Wet	314	**20.63**	18.47	20.31

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"
1-Statewide rate for North Carolina Interstate Highways
2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

Table 10. Overall Crash Rate for I-95 in Cumberland County

September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	610	46.36	84.80	89.01
Fatal	6	0.46	0.56	0.94
Non Fatal	188	14.29	23.80	26.05
Night	194	14.74	23.08	25.30
Wet	130	9.88	18.47	20.46

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"
1-Statewide rate for North Carolina Interstate Highways
2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

Table 11. Overall Crash Rate for I-95 in Harnett County

September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	213	48.85	84.80	92.17
Fatal	2	0.46	0.56	1.26
Non Fatal	60	13.27	23.80	24.76
Night	66	15.14	23.08	26.98
Wet	27	6.19	18.47	21.97

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"
1-Statewide rate for North Carolina Interstate Highways
2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

Table 12. Overall Crash Rate for I-95 in Johnston County

September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	713	59.89	84.80	89.23
Fatal	10	0.84	0.56	0.96
Non Fatal	158	13.27	23.80	26.17
Night	220	18.48	23.08	25.41
Wet	118	9.91	18.47	20.56

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"
1-Statewide rate for North Carolina Interstate Highways
2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

Table 13. Overall Crash Rate for I-95 in Wilson County

September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	236	43.50	84.80	91.40
Fatal	4	0.74	0.56	1.18
Non Fatal	78	14.38	23.80	27.34
Night	97	17.88	23.08	26.57
Wet	48	8.85	18.47	21.60

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"
1-Statewide rate for North Carolina Interstate Highways
2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

Table 14. Overall Crash Rate for I-95 in Nash County

September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	601	58.47	84.80	89.57
Fatal	13	**1.26**	0.56	0.99
Non Fatal	175	17.03	23.80	26.35
Night	210	20.43	23.08	25.59
Wet	128	12.45	18.47	20.72

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"
1-Statewide rate for North Carolina Interstate Highways
2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

Table 15. Overall Crash Rate for I-95 in Halifax County

September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	606	68.46	84.80	89.95
Fatal	9	1.02	0.56	1.03
Non Fatal	160	18.08	23.80	26.55
Night	177	20.00	23.08	25.79
Wet	152	17.17	18.47	20.90

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"
1-Statewide rate for North Carolina Interstate Highways
2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

Table 16. Overall Crash Rate for I-95 in Northampton County

September 1, 2006 to August 31, 2009

Rate	Crashes	Crashes per 100 MVM (Crash Rate)	Statewide Rate[1]	Critical Rate[2]
Total	142	51.69	84.8	94.12
Fatal	2	0.73	0.56	1.48
Non Fatal	45	16.39	23.8	28.82
Night	48	17.47	23.08	28.02
Wet	33	12.01	18.47	22.92

Source: NCDOT Traffic Safety Unit "Historical Interstate Data by Route"
1-Statewide rate for North Carolina Interstate Highways
2-The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is far enough above an average that something besides chance must be the cause. The critical crash rate was calculated based on the statewide crash rate with a 95% confidence interval.

1.5 Funding Deficiencies

Past analysis by the NCDOT has estimated the future investment needs for the I-95 corridor to address the issues described above. These previous planning efforts, completed between 2003 and 2010, estimated funding needs between $3 and $4 billion for long-range improvements to the I-95 corridor, including roadway widening from 4-lanes to 8-lanes, bridge replacement, pavement reconstruction, congestion management, and routine maintenance (PBS&J, 2003, 2010b). The current State Transportation Improvement Program (STIP) only has funding to address a small portion of the currently projected needs for I-95; current funds primarily allow for resurfacing and bridge rehabilitation.

Based on NCDOT's Long-Range Statewide Multimodal Transportation Plan (NCDOT, 2004), the total amount available for transportation improvements and maintenance over the next 25

years is $55 billion (in constant 2001 dollars). The same plan also estimated that NCDOT has approximately $85 billion in multimodal transportation needs. Clearly, these projected financial needs far exceed the funding currently captured by the current STIP funding mechanism.

Without additional funding, the I-95 projects in the 2009-2015 TIP could not be completed before 2025 at the current rate that projects have been funded. Assuming an ongoing funding stream to the I-95 corridor of $365 million every six years, or $61 million per year, it would take 65 years to address the $4 billion in currently needed improvements to I-95, assuming constant buying power.

2.0 I-95 PROJECT PURPOSE

Based on the discussion above, the purpose of improvements to the I-95 corridor in North Carolina is to:

- Improve infrastructure
    - Improve bridges (replace functionally obsolete and structurally deficient bridges along the I-95 corridor)
    - Improve pavement (rehabilitate existing pavement and sub-pavement to provide a roadway that is capable of handling the projected future traffic volumes)
    - Improve interchange ramp designs (correct functionally obsolete ramp configurations)
    - Improve interchange spacing (correct interchange spacing to meet current FHWA requirements.
- Improve capacity (widen roadway to accommodate predicted future traffic volumes and provide an acceptable LOS).
    - Improve urban segments to LOS D or better in the design year (2040)
    - Improve rural segments to LOS C or better in the design year (2040)
- Reduce the fatality rate along I-95 corridor (through changes/upgrades to roadway geometry or the use of intelligent transportation systems (ITS), guardrail, rumble strips, etc.)
- Develop a feasible funding strategy that will allow the identified improvements to be fully implemented within a reasonable timeframe.

3.0 REFERENCES

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APPENDIX 1

Traffic Estimates

Table A-1. I-95 Mainline Traffic Operations for 2008

Segment From	Segment to	County	AADT	# Lanes	2008 LOS
South Carolina State Line	NC 130 (Exit2)	Robeson	30,000	4	B
NC 130 (Exit2)	SR 2455 (Raynham Rd.) (Exit 7)	Robeson	31,000	4	B
SR 2455 (Raynham Rd.) (Exit 7)	SR 1003 (South Chicken Rd.) (Exit10)	Robeson	32,000	4	B
SR 1003 (South Chicken Rd.) (Exit10)	US74 (Exit14)	Robeson	34,000	4	C
US74 (Exit14)	NC 72 (Exit17)	Robeson	35,000	4	C
NC 72 (Exit17)	SR 1536 (Carthage Rd.) (Exit19)	Robeson	45,000	4	D
SR 1536 (Carthage Rd.) (Exit19)	NC 211 (North Roberts Ave.) (Exit20)	Robeson	44,000	4	D
NC 211 (North Roberts Ave.) (Exit20)	US 301 (Fayetteville Rd.) (Exit 22)	Robeson	40,000	4	C
US 301 (Fayetteville Rd.) (Exit 22)	US 301 (Exit 25)	Robeson	37,000	4	C
US 301 (Exit 25)	NC 20 (W. Broad St.) (Exit 31)	Robeson	37,000	4	C
NC 20 (W. Broad St.) (Exit 31)	US 301 (Exit 33)	Robeson	38,000	4	C
US 301 (Exit 33)	I-95 Business (Exit 40)	Robeson/ Cumberland	39,000	4	C
I-95 Business (Exit 40)	NC59 (Chickenfoot Rd.) (Exit 41)	Cumberland	32,000	4	B
NC59 (Chickenfoot Rd.) (Exit 41)	SR2341 (Claude Lee Rd.) (Exit 44)	Cumberland	36,000	4	C
SR2341 (Claude Lee Rd.) (Exit 44)	NC87 (Exit 46)	Cumberland	38,000	4	C
NC87 (Exit 46)	NC 53/210 (Cedar Creek Rd.) (Exit 49)	Cumberland	40,000	4	C
NC 53/210 (Cedar Creek Rd.) (Exit 49)	NC24 (Exit 52)	Cumberland	35,000	4	C
NC24 (Exit 52)	SR 1832 (Murphy Rd.) (Exit 55)	Cumberland	33,000	4	C
SR 1832 (Murphy Rd.) (Exit 55)	I-95 Business (Exit56)	Cumberland	33,000	4	C
I-95 Business (Exit56)	I-295 (Fayetteville Outer Loop) /US13 (Exit 58)	Cumberland	44,000	4	D[2]
I-295 (Fayetteville Outer Loop) /US13 (Exit 58)	SR1815 (Wade Stedman Rd.) (Exit 61)	Cumberland	43,000	4	C
SR1815 (Wade Stedman Rd.) (Exit 61)	NC2 (Godwin Falcon Rd.) (Exit 65)	Cumberland	43,000	4	C
NC2 (Godwin Falcon Rd.) (Exit 65)	SR 1811 (Bud Hawkins Rd.) (Exit 70)	Cumberland Harnett	43,000	4	C
SR 1811 (Bud Hawkins Rd.) (Exit 70)	SR 1002 (Long Branch Rd.)(Exit 71)	Harnett	43,000	4	C
SR 1002 (Long Branch Rd.)(Exit 71)	SR 1793 (Pope Rd.) (Exit 72)	Harnett	44,000	4	D[2]
SR 1793 (Pope Rd.) (Exit 72)	US421 (Cumberland St.) (Exit 73)	Harnett	45,000	6[1]	C

Segment From	Segment to	County	AADT	# Lanes	2008 LOS
US421 (Cumberland St.) (Exit 73)	SR 1808 (Jonesboro Rd.)(Exit 75)	Harnett	46,000	4	D[2]
SR 1808 (Jonesboro Rd.)(Exit 75)	SR 1709 (Hodges Chapel Rd.)(Exit 77)	Harnett	46,000	4	D[2]
SR 1709 (Hodges Chapel Rd.)(Exit 77)	NC50 (Exit 79)	Harnett/ Johnston	46,000	4	D[2]
NC50 (Exit 79)	I-40 (Exit 81)	Johnston	50,000	6[1]	C
I-40 (Exit 81)	SR 1178 (Keen Rd.) (Exit 87)	Johnston	33,000	4	C
SR 1178 (Keen Rd.) (Exit 87)	US701 (Exit 90)	Johnston	34,000	4	C
US701 (Exit 90)	SR 1007 (Brogden Rd.) (Exit 93)	Johnston	37,000	4	C
SR 1007 (Brogden Rd.) (Exit 93)	NC 210/US70 (Exit 95)	Johnston	37,000	4	C
NC 210/US70 (Exit 95)	US70Alternate (Exit 97)	Johnston	35,000	4	C
US70Alternate (Exit 97)	SR 1927 (Pine Level Selma Rd.)(Exit 98)	Johnston	35,000	4	C
SR 1927 (Pine Level Selma Rd.)(Exit 98)	SR2137 (Pittman Rd.) (Exit 101)	Johnston	35,000	4	C
SR2137 (Pittman Rd.) (Exit 101)	SR2130 (East Main St.)(Exit 102)	Johnston	35,000	4	C
SR2130 (East Main St.)(Exit 102)	SR2339 (Bagley Rd.) (Exit 105)	Johnston	34,000	4	C
SR2339 (Bagley Rd.) (Exit 105)	SR2342 (Princeton Kenly Rd.)(Exit 106)	Johnston	34,000	4	C
SR2342 (Princeton Kenly Rd.)(Exit 106)	US301 (Exit 107)	Johnston	33,000	4	C
US301 (Exit 107)	NC42(Exit 116)	Johnston/ Wilson	29,000	4	B
NC42(Exit 116)	I-795/US 264 (Exit 119)	Wilson	29,000	4	B
I-795/US 264 (Exit 119)	US 264 Alternate (Raleigh Rd.)(Exit 121)	Wilson	32,000	4	C
US 264 Alternate (Raleigh Rd.)(Exit 121)	NC97 (Exit 127)	Wilson/ Nash	33,000	4	C
NC97 (Exit 127)	SR 1717 (Sandy Cross Rd.) (Exit 132)	Nash	32,000	4	C
SR 1717 (Sandy Cross Rd.) (Exit 132)	US64 (Exit 138)	Nash	32,000	4	C
US64 (Exit 138)	NC43 (Exit 141)	Nash	38,000	4	C
NC43 (Exit 141)	NC4 (Exit1 45)	Nash	37,000	4	C
NC4 (Exit1 45)	NC33 (Exit 150)	Nash	36,000	4	C
NC33 (Exit 150)	NC481 (Exit 154)	Nash/ Halifax	35,000	4	C
NC481 (Exit 154)	NC561 (Exit 160)	Halifax	35,000	4	C
NC561 (Exit 160)	NC903 (Exit 168)	Halifax	35,000	4	C
NC903 (Exit 168)	NC125 (Exit 171)	Halifax	36,000	4	C
NC125 (Exit 171)	US158 (Julian R Allsbrook Hwy) (Exit 173)	Halifax	34,000	4	C
US158 (Julian R Allsbrook	NC46 (Exit 176)	Halifax/ Northampton	36,000	4	C

Segment From	Segment to	County	AADT	# Lanes	2008 LOS
Hwy) (Exit 173)					
NC46 (Exit 176)	NC48 (Exit 180)	Northampton	32,000	4	B
NC48 (Exit 180)	Virginia State Line	Northampton	33,000	4	B

Source: PBS&J, 2010a

1. Freeway segment contains 2 continuous lanes and 1 auxiliary lane in each direction.
2. These segments with LOS D are located in rural areas and thus do not meet the NCDOT minimum LOS standard.

Table A-2. Projected I-95 Mainline Traffic Operations for 2040

Segment From	Segment to	County	AADT	# Lanes	2040 LOS	Year 6 Lanes	Year 8 Lanes
South Carolina State Line	NC 130 (Exit2)	Robeson	42,200	4	D[2]	2039	Post2040
NC 130 (Exit2)	SR 2455 (Raynham Rd.) (Exit 7)	Robeson	43,200	4	D[2]	2037	Post2040
SR 2455 (Raynham Rd.) (Exit 7)	SR 1003 (South Chicken Rd.) (Exit10)	Robeson	44,800	4	D[2]	2033	Post2040
SR 1003 (South Chicken Rd.) (Exit10)	US74 (Exit14)	Robeson	48,600	4	D[2]	2026	Post2040
US74 (Exit14)	NC 72 (Exit17)	Robeson	46,600	4	D[2]	2028	Post2040
NC 72 (Exit17)	SR 1536 (Carthage Rd.) (Exit19)	Robeson	66,200	4	F	2009	Post2040
SR 1536 (Carthage Rd.) (Exit19)	NC 211 (North Roberts Ave.) (Exit20)	Robeson	63,000	4	F	2009	Post2040
NC 211 (North Roberts Ave.) (Exit20)	US 301 (Fayetteville Rd.) (Exit 22)	Robeson	56,000	4	F	2018	Post2040
US 301 (Fayetteville Rd.) (Exit 22)	US 301 (Exit 25)	Robeson	51,600	4	E	2015	Post2040
US 301 (Exit 25)	NC 20 (W. Broad St.) (Exit 31)	Robeson	49,600	4	D[2]	2018	Post2040
NC 20 (W. Broad St.) (Exit 31)	US 301 (Exit 33)	Robeson	50,600	4	E	2017	Post2040
US 301 (Exit 33)	FutureI-295 (New Interchange)	Robeson	54,800	4	E	2014	Post2040
Future I-295 (New Interchange)	I-95 Business (Exit 40)	Robeson/ Cumberland	58,000	4	F	2013	Post2040
I-95 Business (Exit 40)	NC59 (Chickenfoot Rd.) (Exit 41)	Cumberland	46,000	4	D[2]	2033	Post2040
NC59 (Chickenfoot Rd.) (Exit 41)	SR2341 (Claude Lee Rd.) (Exit 44)	Cumberland	47,400	4	D[2]	2027	Post2040
SR2341 (Claude Lee Rd.) (Exit 44)	NC87 (Exit 46)	Cumberland	53,400	4	E	2017	Post2040
NC87 (Exit 46)	NC 53/210 (Cedar Creek Rd.) (Exit 49)	Cumberland	57,400	4	F	2011	Post2040
NC 53/210 (Cedar Creek Rd.) (Exit 49)	NC24 (Exit 52)	Cumberland	46,400	4	D[2]	2029	Post2040
NC24 (Exit 52)	SR 1832 (Murphy Rd.) (Exit 55)	Cumberland	44,800	4	D[2]	2034	Post2040
SR 1832 (Murphy Rd.) (Exit 55)	I-95 Business (Exit56)	Cumberland	45,200	4	D[2]	2033	Post2040
I-95 Business (Exit56)	I-295 (Fayetteville Outer Loop) /US13 (Exit 58)	Cumberland	67,200	4	F	2009	2035
I-295 (Fayetteville Outer Loop)	SR1815 (Wade Stedman Rd.) (Exit 61)	Cumberland	71,200	4	F	2009	2032

Segment From	Segment to	County	AADT	# Lanes	2040 LOS	Year 6 Lanes	Year 8 Lanes
/US13 (Exit 58)							
SR1815 (Wade Stedman Rd.) (Exit 61)	NC2 (Godwin Falcon Rd.) (Exit 65)	Cumberland	71,600	4	F	2009	2032
NC2 (Godwin Falcon Rd.) (Exit 65)	SR 1811 (Bud Hawkins Rd.) (Exit 70)	Cumberland/ Harnett	71,600	4	F	2009	2032
SR 1811 (Bud Hawkins Rd.) (Exit 70)	SR 1002 (Long Branch Rd.)(Exit 71)	Harnett	71,200	4	F	2009	2032
SR 1002 (Long Branch Rd.)(Exit 71)	SR 1793 (Pope Rd.) (Exit 72)	Harnett	72,200	4	F	2009	2031
SR 1793 (Pope Rd.) (Exit 72)	US421 (Cumberland St.) (Exit 73)	Harnett	74,000	6[1]	F	2017	2040
US421 (Cumberland St.) (Exit 73)	SR 1808 (Jonesboro Rd.)(Exit 75)	Harnett	75,000	4	F	2009	2028
SR 1808 (Jonesboro Rd.)(Exit 75)	SR 1709 (Hodges Chapel Rd.)(Exit 77)	Harnett	75,200	4	F	2009	2028
SR 1709 (Hodges Chapel Rd.)(Exit 77)	NC50 (Exit 79)	Harnett/ Johnston	75,200	4	F	2009	2028
NC50 (Exit 79)	I-40 (Exit 81)	Johnston	80,400	6[1]	F	2013	2036
I-40 (Exit 81)	SR 1178 (Keen Rd.) (Exit 87)	Johnston	48,000	4	D[2]	2027	Post2040
SR 1178 (Keen Rd.) (Exit 87)	US701 (Exit 90)	Johnston	48,800	4	D[2]	2025	Post2040
US701 (Exit 90)	SR 1007 (Brogden Rd.) (Exit 93)	Johnston	50,800	4	E	2018	Post2040
SR 1007 (Brogden Rd.) (Exit 93)	NC 210/US70 (Exit 95)	Johnston	50,600	4	E	2019	Post2040
NC 210/US70 (Exit 95)	US70Alternate (Exit 97)	Johnston	48,000	4	D[2]	2026	Post2040
US70Alternate (Exit 97)	SR 1927 (Pine Level Selma Rd.)(Exit 98)	Johnston	47,800	4	D[2]	2026	Post2040
SR 1927 (Pine Level Selma Rd.)(Exit 98)	SR2137 (Pittman Rd.) (Exit 101)	Johnston	47,800	4	D[2]	2026	Post2040
SR2137 (Pittman Rd.) (Exit 101)	SR2130 (East Main St.)(Exit 102)	Johnston	47,400	4	D[2]	2027	Post2040
SR2130 (East Main St.)(Exit 102)	SR2339 (Bagley Rd.) (Exit 105)	Johnston	46,800	4	D[2]	2029	Post2040
SR2339 (Bagley Rd.) (Exit 105)	SR2342 (Princeton Kenly Rd.)(Exit 106)	Johnston	45,800	4	D[2]	2031	Post2040
SR2342 (Princeton Kenly Rd.)(Exit 106)	US301 (Exit 107)	Johnston	45,400	4	D[2]	2032	Post2040
US301 (Exit 107)	NC42(Exit 116)	Johnston/ Wilson	40,600	4	D[2]	2038	Post2040
NC42(Exit 116)	I-795/US 264 (Exit 119)	Wilson	41,000	4	D[2]	2037	Post2040
I-795/US 264 (Exit 119)	US 264 Alternate (Raleigh Rd.)(Exit 121)	Wilson	50,400	4	E	2022	Post2040
US 264 Alternate (Raleigh Rd.)(Exit 121)	NC97 (Exit 127)	Wilson/ Nash	52,000	4	F	2020	Post2040
NC97 (Exit 127)	SR 1717 (Sandy Cross Rd.)(Exit 132)	Nash	49,600	4	E	2023	Post2040
SR 1717 (Sandy Cross Rd.) (Exit 132)	SR 1770 (Sunset Ave.) (New Interchange)	Nash	50,200	4	E	2036	Post2040
SR 1770 (Sunset Ave.) (New Interchange)	US64 (Exit 138)	Nash	50,200	4	E	2036	Post2040
US64 (Exit 138)	NC43 (Exit 141)	Nash	62,000	4	F	2021	Post2040

Segment From	Segment to	County	AADT	# Lanes	2040 LOS	Year 6 Lanes	Year 8 Lanes
NC43 (Exit 141)	NC4 (Exit1 45)	Nash	59,400	4	F	2015	Post2040
NC4 (Exit1 45)	NC33 (Exit 150)	Nash	54,000	4	E	2020	Post2040
NC33 (Exit 150)	NC481 (Exit 154)	Nash/ Halifax	51,800	4	E	2022	Post2040
NC481 (Exit 154)	NC561 (Exit 160)	Halifax	50,000	4	E	2025	Post2040
NC561 (Exit 160)	NC903 (Exit 168)	Halifax	52,000	4	E	2022	Post2040
NC903 (Exit 168)	NC125 (Exit 171)	Halifax	50,200	4	E	2022	Post2040
NC125 (Exit 171)	US158 (Julian R Allsbrook Hwy) (Exit 173)	Halifax	41,200	4	D	Post2040	Post2040
US158 (Julian R Allsbrook Hwy) (Exit 173)	NC46 (Exit 176)	Halifax/ Northampton	45,800	4	E	2040	Post2040
NC46 (Exit 176)	NC48 (Exit 180)	Northampton	38,200	4	C	Post2040	Post2040
NC48 (Exit 180)	Virginia State Line	Northampton	39,000	4	C	Post2040	Post2040

Source: PBS&J, 2010a

1. Freeway segment contains 2 continuous lanes and 1 auxiliary lane in each direction.
2. These segments with LOS D are located in rural areas and thus do not meet the NCDOT minimum LOS standard.