

ADDENDUM to the
**FINAL ALTERNATIVES DEVELOPMENT AND ANALYSIS
REPORT**

For

**ADMINISTRATIVE ACTION
ENVIRONMENTAL IMPACT STATEMENT**

**Gaston East-West Connector
Gaston and Mecklenburg Counties**

STIP Project No. U-3321
State Project No. 8.2812501
Federal Aid Project No. STP-1213(6)



FINAL VERSION

October 15, 2008

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Prepared for:



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FINAL VERSION

October 15, 2008

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Gaston East-West Connector
Addendum to the Final Alternatives Development and Analysis Report
STIP Project No. U-3321
Gaston and Mecklenburg Counties

NOTE: Two methods are used in this report to help the reader more readily see the organization of this addendum. The Table of Contents below is color-coded. Black text indicates sections that have not been changed from the original Report. Blue text indicates sections that have been updated or have had new information added. Red text indicates new sections. In the body of the report, paragraphs and tables that have been updated or are new have a dashed line along the left side.

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- B. Volume to Capacity Ratio Maps
- C. Tables of 2025 Projected Traffic Volumes for I-85, US 29-74 and US 321
- D. Design Criteria and Typical Cross-Sections
- E. Preliminary Corridor Segment Evaluation Matrix
- F. Draft Traffic Technical Memorandum for the Functional Design Corridors (Without Appendices)
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ADDENDUM APPENDICES (Follows Appendices)

(All Addendum Appendices included on enclosed CD)

- Add. A. Letter dated May 21, 2007, from NCTA to NCDOT Regarding the Gaston East-West Connector as a Toll Facility
- Add. B. Year 2030 Traffic Forecasts
- Add. C. Travel Time Contours from the 2030 Metrolina Model under the No-Build Alternative, Improve Existing Roadways Alternative (Scenario 4+/4a), and New Location Alternative (Toll Scenario)
- Add. D. Information Regarding Elimination of Corridor Segment K1D

ADDENDUM PREFACE

This is a new section of the report.

P.1 PURPOSE OF THIS ADDENDUM

The Final Alternatives Development and Evaluation Report for the Gaston East-West Connector (Garden Parkway) was completed in February 2007. This addendum updates information that has changed since the preparation of the report and adds new information to the evaluation. This addendum reassesses the previous alternatives development process, screening, and Detailed Study Alternative (DSA) selection in the context of the project now being advanced solely as a toll candidate project.

One major change in this addendum is the addition of new information regarding traffic projections and traffic operations. In the Final Alternatives Development and Evaluation Report, year 2025 traffic projections from the 2025 Gaston travel demand model were used. Since then, year 2030 traffic projections from the 2030 Metrolina regional travel demand model became available. In this addendum, traffic forecasts and traffic operations analyses for several of the scenarios discussed in the Final Alternatives Development and Evaluation Report were updated using the 2030 Metrolina regional travel demand model. Both the original year 2025 traffic information and the updated year 2030 traffic information are included in this addendum.

Another major addition is the elimination of four Detailed Study Alternatives (DSAs) from the original set of sixteen identified in the Final Alternatives Development and Evaluation Report (February 2007). New information since came to light to eliminate Corridor Segment K1D from further consideration. Corridor Segment K1D was included in four DSAs.

P.2 ORGANIZATION OF THIS ADDENDUM

For ease of tracking changes and updates, this addendum retains the original section numbering from the February 2007 report, with some new sections added describing year 2030 traffic forecasts and operations analyses.

The Table of Contents is color-coded, indicating whether a section remains unchanged (black text), has been updated (blue text), or is a new section (red text).

Updated paragraphs and new paragraphs are marked in the report with a dashed line along the left side of the paragraph, as they are in this Preface.

At the beginning of each section there is a note in arial italics font stating whether there were any changes or updates to the original section, or that it is a new section.

P.3 CONCLUSIONS REACHED IN THIS ADDENDUM

As documented in this addendum, the updated and new information added to the Final Alternatives Development and Evaluation Report did not change the decisions on which alternative concepts to eliminate from further study. New and updated information, including information on tolling issues, did not change the process for identifying and selecting New Location Alternative corridors. However, new information regarding the Allen Steam Station's operations led to the elimination of four of the sixteen Detailed Study Alternatives originally identified in the report. The four DSAs eliminated; DSAs 6, 24, 65, and 78, were those that included Corridor Segment K1D.

INTRODUCTION

1 PROJECT DESCRIPTION

1.1 PROJECT LOCATION

| *There are no updates or additions to this section, **Figure 1**, or **Figure 2**.*

The proposed project, the Gaston East-West Connector, is located in southern Gaston County and western Mecklenburg County, North Carolina. The overall project study area is shown in **Figure 1** and is generally bounded by:

- I-85 to the north
- The South Carolina State line to the south
- I-485 and the Charlotte-Douglas International Airport to the east
- The I-85/US 29-74 interchange and Crowder's Mountain State Park to the west

Figure 2 shows the existing number of lanes and characteristics of I-85, US 29-74, and US 321.

1.2 PROPOSED ACTION AND PROJECT PURPOSE

| *This section updated based on the updated Purpose and Need Statement (June 2008).*

| The purpose of the proposed action is to improve east-west transportation mobility in the area around the
| City of Gastonia, between Gastonia and the Charlotte metropolitan area, and particularly to establish
| direct access between the rapidly growing area of southeast Gaston County and west Mecklenburg
| County. This project purpose is based on the following:

- Need to improve mobility, access and connectivity within southern Gaston County and between southern Gaston County and Mecklenburg County.
- Need to improve traffic flow on the sections of I-85, US 29-74 and US 321 in the project study area and improve high-speed, safe regional travel service along the I-85/US 29-74 corridor.

1.3 BACKGROUND INFORMATION

■ *This section updated with events occurring since the February 2007 completion of the Alternatives Development and Evaluation Report. This includes an updated STIP and a decision to advance the Gaston East-West Connector solely as a toll candidate project.*

■ The Gaston East-West Connector is Project Number U-3321 in the North Carolina Department of Transportation's (NCDOT) *2009-2015 Transportation Improvement Program (STIP)*.

STIP Project U-3321 is one of two projects (the other is STIP Project R-2608) that make up the project locally known as the "Garden Parkway". The proposed Garden Parkway concept first appeared on the *Gaston Urban Area Thoroughfare Plan* in 1991. The Garden Parkway appears on the *2030 Long Range Transportation Plan* as a future freeway from US 321 north of Gastonia, extending around the west side of Gastonia, across I-85, then south and east to I-485/NC 160 in Mecklenburg County. STIP Project R-2608 is a project with independent utility, also known as the US 321 Bypass. STIP Project R-2608 is not included in the Gaston East-West Connector Study.

■ In February 2005, the North Carolina Turnpike Authority (NCTA) Board selected the Gaston East-West Connector as a candidate toll facility and the project is now being studied by the NCTA. All activities related to development of the alternatives described in this report were managed by the NCDOT, considering the build alternatives as non-toll facilities. There was an overlap period in 2005 while NCDOT completed the major tasks associated with achieving Concurrence Point 2 in the NEPA/404 Merger Process (See Part III) and identifying the Detailed Study Alternatives (achieved September 20, 2005). From this point until May 2007, the build alternatives were considered as both non-toll facilities and toll facilities.

■ In a letter dated May 21, 2007, from the NCTA to the NCDOT, it was agreed that the Gaston East-West Connector should proceed from this date forward considering only toll alternatives for inclusion in the EIS. This decision was based on the consideration that it would be unlikely for NCDOT to implement the project as a non-toll facility due to funding issues. The letter is included in **Addendum Appendix A**. More discussion of this issue is provided in **Section I.7.4**.

1.4 REPORT PURPOSE AND ORGANIZATION

■ *There are no updates or additions to this section.*

This report documents the alternatives development and evaluation process that resulted in the identification of the Detailed Study Alternatives to be carried forward in the project's Draft Environmental Impact Statement (DEIS).

This report is divided into four main parts:

- Part I – First Screening of Alternative Concepts
- Part II – Second Screening of Preliminary Alternatives
- Part III – Agency Coordination and Public Involvement
- Part IV - References and Supporting Documentation

In Part I, basic alternative concepts were evaluated to determine if they were reasonable and practicable based on their ability to meet purpose and need, their impacts, and their consistency with transportation plans. They included:

- No-Build Alternative
- Transportation System Management (TSM) Alternative
- Transportation Demand Management (TDM) Alternative
- Mass Transit Alternative
- Multi-Modal Alternative
- Improve Existing Facilities Alternatives
- New Location Alternatives

In Part II, the alternative concepts that made it through the first screening process are further refined and screened to arrive at the specific Detailed Study Alternatives.

Part III summarizes the agency coordination and public involvement activities conducted up to the point the Detailed Study Alternatives were selected. The project followed the process for agency concurrence and coordination contained in the NEPA/404 Merger 01 Memorandum of Agreement signed by NCDOT, Federal Highway Administration (FHWA), US Army Corps of Engineers (USACE), and the NC Department of Environment and Natural Resources (DENR). Concurrence Points 1 (Purpose and Need) and 2 (Detailed Study Alternatives) were achieved in July 2002 and September 2005, respectively.

Part IV lists the references and project-specific supporting documentation cited in this alternatives development report.

2 SUMMARY OF ALTERNATIVES ELIMINATED AND ALTERNATIVES SELECTED FOR DETAILED STUDY

Sections 2.1 and 2.2 were updated as described under each section.

Each of the basic alternative concepts (listed in **Section 1.4**) was evaluated to determine whether it would meet the project's purpose and need, and whether it would be reasonable and practicable to implement. Those alternatives that could not fulfill the purpose and need for the project, had excessive impacts, or were considered impractical were eliminated from further consideration.

2.1 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

This section updated to include toll considerations under the discussions of the TDM Alternative and the Improve Existing Roadways Alternatives. This section also updated to add the reasons why the alternatives listed below were eliminated from further consideration. New and updated information contained in this addendum did not change the decision on which alternative concepts to eliminate from further consideration.

- Transportation System Management (TSM) Alternatives
 - The TSM Alternative includes improvements to traffic operations and traffic control for existing US 29-74, US 321, and the I-85 interchanges, such as intersection improvements (additional turn lanes, longer queue lengths, etc.) and/or signal coordination. The TSM Alternative was eliminated from further consideration because it would not meet the project's purpose and need.

- Transportation Demand Management (TDM) Alternative
 - The TDM Alternative includes demand management strategies currently being implemented in Gaston and/or Mecklenburg County such as staggered work hours and flex-time (employer focused) and one additional measure not currently being implemented, which is to convert existing lanes on I-85 to high-occupancy vehicle (HOV) lanes or high-occupancy toll (HOT) lanes. North Carolina legislation (GS 136-89.186) prohibits "converting any segment of the non-tolled State Highway system to a toll facility", so a TDM Alternative incorporating HOT lanes is not possible without a change in State law. The TDM Alternative was eliminated from further consideration because it would not meet the project's purpose and need. Also, since conversion of a general purpose lane to a HOT lane would require a change in State law, this was an additional factor for eliminating this type of improvement.

- The Mass Transit Alternative and Multi-Modal Alternative

- The Mass Transit Alternative primarily is based on planning efforts being conducted by the Charlotte Area Transit System (CATS) for the West Corridor (Mecklenburg County) and by the Gaston Urban Area Metropolitan Planning Organization (GUAMPO) for transit service in Gaston County and connecting to CATS' system. The Multi-Modal Alternative is a combination of mass transit with other alternatives. This alternative was eliminated because it would not meet the project's purpose and need.

- The Improve Existing Roadways Alternative

- Several different scenarios were considered to improve existing roadways. These are also referred to in this report as Scenarios 4+, 4a, and 8. These scenarios include combinations of widening I-85 and US 29-74; with combinations of intersection, ramp, and cross-street improvements; TSM improvements; and feeder road capacity improvements.

- A variation of these Improve Existing Roadways scenarios was considered in this addendum. The variation was to consider the new capacity lanes on I-85 as toll and/or toll/HOT lanes.

- The Improve Existing Roadways Alternatives, without or without tolls, were eliminated from further consideration because they would have impacts to the human and natural environments and engineering issues that make these alternatives not reasonable or practicable for this project. In addition, Improve Existing Roadways Alternative Scenarios 4+ and 4a, which would widen I-85 and US 29-74, would not meet the project's purpose and need elements of providing improved connectivity and mobility between southern Gaston County and Mecklenburg County and within southern Gaston County.

2.2 ALTERNATIVES RETAINED FOR DETAILED STUDY

- *This section is updated to remove the four New Location Alternatives that include Corridor Segment K1D. Figure 3 and Table 1 also were updated.*

The No-Build Alternative (also referred to as Scenario 1 in this report) is being retained for comparison purposes throughout the planning process, in accordance with the NEPA regulations (40 CFR Section 1502.14(d)) and FHWA guidelines (Technical Advisory T6640.8; Section V.E.1). This scenario does not assume any capacity improvements to I-85 or to US 29-74.

- Of the six basic alternative concepts evaluated, only the New Location Alternative concept (also referred to as Scenarios 5 and 5a in the Alternatives Development and Evaluation Report) would fulfill the

project's purpose and need, would be feasible and practicable for implementation, and could be constructed as a toll facility. For the New Location Alternative, which would be a fully controlled-access highway, numerous pre-preliminary corridor segments were developed and screened as both toll and non-toll facilities.

From these pre-preliminary corridor segments, ninety endpoint to endpoint preliminary New Location Alternatives were further evaluated, resulting in the selection of sixteen Detailed Study Alternatives (DSAs). As detailed in this addendum, these DSAs were later reduced to twelve based on subsequent information that eliminated Corridor Segment K1D from consideration.

Figure 3a and Table 1 show the 1,400-foot wide corridor segments that comprise the twelve DSAs. **Figure 3b** shows each alternative individually from endpoint at I-85 to endpoint at I-485. Study areas are wider than 1,400 feet at areas where interchanges and/or service roads will be considered. These twelve DSAs will be carried forward for detailed study as toll facilities only.

In a letter dated May 21, 2007, from the NCTA to the NCDOT, it was agreed that the Gaston East-West Connector should proceed from this date forward considering only toll alternatives for inclusion in the EIS. This decision was based on the consideration that it would be unlikely for NCDOT to implement the project as a non-toll facility due to funding issues. The letter is included in **Addendum Appendix A**.

Table 1. Detailed Study Alternatives

Detailed Study Alternative #	West Area - generally west of US 321	Central Area – Generally east of US 321 and west of NC 279 or the South Fork Catawba River	East Area – generally east of NC 279 or the South Fork Catawba River
	H Segments	J Segments	K Segments
4	H2A-H3	J4a-J4b-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
5	H2A-H3	J4a-J4b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K4A
9	H2A-H3	J4a-J4b-J2c-J2d-JX4-J1e-J1f	K1A-K3A-K3B-K3C
22	H2A-H2B-H2C	J3-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
23	H2A-H2B-H2C	J3-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K4A
27	H2A-H2B-H2C	J3-J2c-J2d-JX4-J1e-J1f	K1A-K3A-K3B-K3C
58	H1A-H1B-H1C	J1a-JX1-J2d-J5a-J5b	K2A-KX1-K3B-K3C
64	H1A-H1B-H1C	J1a-J1b-J1c-J1d-J1e-J1f	K1A-K1B-K1C-K4A
68	H1A-H1B-H1C	J1a-J1b-J1c-J1d-J1e-J1f	K1A-K3A-K3B-K3C
76	H1A-HX2	J2a-J2b-J2c-J2d-J5a-J5b	K2A-KX1-K3B-K3C
77	H1A-HX2	J2a-J2b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K4A
81	H1A-HX2	J2a-J2b-J2c-J2d-JX4-J1e-J1f	K1A-K3A-K3B-K3C

Refer to **Updated Figure 3** for a map of the Detailed Study Alternatives and their corridor segments

PART I – FIRST SCREENING OF ALTERNATIVE CONCEPTS

I.1 OVERVIEW

New information regarding the 2030 Metrolina regional travel demand model was included as an addition to this section.

This first screening of alternative concepts evaluated each alternative concept's ability to meet the project's purposes and needs and whether it would be feasible and practicable to implement. Each alternative was developed to the point needed to make these determinations.

Alternative concepts evaluated include:

- No-Build Alternative (travel demand model Scenario 1)
- Transportation System Management (TSM) Alternative
- Transportation Demand Management (TDM) Alternative
- Mass Transit Alternative and Multi-Modal Alternative
- Improve Existing Roadways Alternatives (Scenarios 2, 3, 4, 4+, 4a, and 8)
- New Location Alternatives (Scenarios 5 and 5a)

At the time many of the analyses were conducted for the development of project alternatives, the planning horizon year was 2025 and there were two travel demand models covering the project study area; one for the Gaston County area and one for the Mecklenburg County area. The majority of the proposed project lies within the Gaston urban area, but it does cross over into western Mecklenburg County. In order to model travel demand for the proposed project, a portion of the highway network in the Mecklenburg travel demand model was appended to the Gaston travel demand model (Transportation Demand Technical Memorandum, 2005).

In May 2005, GUAMPO updated their Long-Range Transportation Plan and air quality conformity analysis. The *2030 Long-Range Transportation Plan* uses a new Metrolina travel demand model that has a horizon year of 2030 and that covers a 13-county region. This regional 2030 travel demand model was developed by the Charlotte Department of Transportation in cooperation with the Mecklenburg-Union MPO (MUMPO) and the GUAMPO. Where necessary, traffic forecasts using the 2030 Metrolina travel demand model (April, 2006 version) are included in this addendum. A discussion of the 2030 Metrolina travel demand model compared to the 2025 Gaston travel demand model is included in **Section 1.8**.

I.2 NO-BUILD ALTERNATIVE

I.2.1 ALTERNATIVE DESCRIPTION

| *There are no updates or additions to this section.*

The No-Build Alternative is the baseline comparative alternative for the design year (2025 at the time the analyses were conducted). This alternative also is referred to as Scenario 1. The No-Build Alternative assumes that the transportation systems for Gaston and western Mecklenburg Counties would evolve as currently planned in their respective Long-Range Transportation Plans (LRTPs), but without major improvements to the existing I-85/US 29-74 corridor, or new access and connectivity to western Mecklenburg County. However, several minor spot “improvements” were incorporated into the No-Build scenario. These improvements assumed the addition of traffic signals at six (6) currently unsignalized intersections.

I.2.2 TRAFFIC OPERATIONS

| *After the discussion of No-Build Alternative traffic operations based on the 2025 Gaston travel demand model is an addition to this section based on traffic forecasts for 2030 using the 2030 Metrolina travel demand model. **Figure 4** is updated to reflect the 2030 projected conditions.*

Year 2025 Traffic Operations. Traffic operations analyses for the No-Build Alternative are documented in detail in the Purpose and Need Statement (June 2002). Several freeway segments along I-85 and intersections along US 29-74 are projected to operate at LOS F during future 2025 peak hours under the No-Build Alternative. The PM peak period was predicted to be more congested than the AM peak period.

In addition to degraded levels of service, the number of hours of congestion during the morning and evening peak periods would increase (see **Section I.8.1**). Traffic between Gaston County and western Mecklenburg County would continue to experience delays and congestion along I-85, which is the primary connection between Gaston and Mecklenburg Counties.

Along I-85 in Gaston County from the Mecklenburg County line to the US 29-74 junction, data on reported incidents was collected from NCDOT Incident Management. For a one year period between 2000 and 2001, 2,399 reported incidents occurred along this section of I-85. These incidents frequently affect travel on I-85 by causing traffic slowdowns, lane closures, and temporary detours onto US 29-74 (a roadway with no access control and numerous commercial driveways).

Above average crash rates along US 29-74 and US 321 would be expected to continue, and likely would increase, in the future due to the projected increase in traffic volumes and turning movements along US 29-74 and US 321.

Year 2030 Traffic Operations. Traffic operations analyses for the No-Build Alternative are documented in detail in the Updated Purpose and Need Statement (June 2008). Updated **Figure 4** shows the 2030 traffic volumes and levels of service (LOS) on I-85, I-485, US 29-74, and US 321 in the study area under the No-Build Alternative. The length of I-85 in the study area is projected to operate at LOS E-F in 2030. US 29-74 in the study area is projected to operate at LOS F east of McAdenville. I-485 is projected to operate at LOS E.

Based on the 2030 Metrolina travel demand model, the number of hours of congestion during the morning and evening peak periods and daily would increase 3-6 times over 2006 base year conditions (M/A/B, Traffic Forecasts for Toll Alternatives, May 2008). Traffic between Gaston County and western Mecklenburg County would continue to experience delays and congestion along I-85, which is the primary connection between Gaston and Mecklenburg Counties.

Along I-85 in Gaston County from the Mecklenburg County line to the US 29-74 junction, data on reported incidents was collected from NCDOT. In 2007, there were 2,589 reported incidents along I-85 in the study area from mile marker 10 to mile marker 29 (NCDOT Intelligent Transportation Systems Unit, IMAP Information, email dated May 8, 2008). These incidents frequently affect travel on I-85 by causing traffic slowdowns, and sometimes lane closures and temporary detours onto US 29-74 (a roadway with no access control and numerous commercial driveways).

I.2.3 DECISION ON WHETHER TO RETAIN FOR DETAILED STUDY

There are no updates or additions to this section.

DECISION: Retain the No-Build Alternative for Comparison Purposes

The No-Build Alternative would not meet the project's purposes. It would not improve mobility, access or connectivity in southern Gaston County, nor between southern Gaston County and Mecklenburg County. It would not improve traffic flow on I-85, US 29-74, or US 321. However, in accordance with the National Environmental Policy Act (NEPA) (40 CFR 1502.14(d)) and FHWA guidelines (Technical Advisory T6640.8; p.16), the No-Build Alternative will be given full consideration in the DEIS to provide a baseline for comparison with the Detailed Study Alternatives.

I.3 TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVE

I.3.1 ALTERNATIVE DESCRIPTION

There are no updates or additions to this section. There are no changes to **Table 2** or **Figure 5**.

Transportation system management (TSM) measures typically consist of adding low-cost, minor transportation improvements to increase the capacity of an existing facility. There are two main types of TSM minor roadway improvements: operational and physical (see examples in side box).

The TSM Alternatives evaluated for the proposed project considered minor improvements along existing US 29-74, US 321, the I-85 interchange, and major cross-streets. These consisted of traffic signal coordination and access control measures, and intersection improvements such as interchange ramp improvements, new intersection turn lanes and extensions of turn lanes to hold longer queues.

The following 58 intersection and ramp improvements at nineteen locations, listed in **Table 2** by roadway, were included in the TSM Alternative. The locations of these intersections are shown in **Figure 5**. The locations include the ramps and/or ramp termini intersections at eleven exits along I-85, six intersections along US 29-74, and two intersections along US 321.

<p><u>Examples of TSM Operational Improvements</u></p> <ul style="list-style-type: none"> • Traffic law enforcement • Access control • Signal coordination • Turn prohibitions • Speed restrictions • Signal phasing or timing changes <p><u>Examples of TSM Physical Improvements</u></p> <ul style="list-style-type: none"> • Turn lanes • Intersection realignment • Improved warning and information signs • New signals or stop signs • Intersection geometric and signalization improvements

Table 2. TSM Alternative Roadway Improvements

I-85
<ol style="list-style-type: none"> 1. Add a 2nd lane on the southbound exit ramp to NC 274 (Exit 14). 2. Add a 2nd lane on the southbound exit ramp to US 321 (Exit 17). 3. Add a 2nd lane on the southbound exit ramp to NC 7 (Exit 19). 4. Add a 2nd lane on the northbound exit ramp to NC 279 (Exit 20). 5. Add a 2nd lane on the northbound exit ramp to Old 273/NC 7 (Exit 26). 6. Add a 2nd lane on the southbound exit ramp to Old 273/NC 7 (Exit 26). 7. Add a 2nd lane on the southbound exit ramp to NC 273 (Exit 27). 8. Add a 2nd acceleration lane for the southbound entrance ramp from I-485
I-85 Ramp Termini:
<ol style="list-style-type: none"> 1. Add a 2nd left-turn bay on the Edgewood Road (Exit 13) southbound exit ramp. 2. Add a 2nd left-turn bay on the NC 274 (Exit 14) southbound exit ramp.

Table 2. TSM Alternative Roadway Improvements

<ol style="list-style-type: none"> 3. Add a 2nd right-turn bay on the NC 7 (Exit 19) southbound exit ramp. 4. Add a 2nd left-turn bay on the NC 279 (Exit 20) northbound exit ramp. 5. Add a 2nd left-turn bay on the Cox Road (Exit 21) northbound exit ramp. 6. Add a 2nd left-turn bay on the Cox Road (Exit 21) southbound exit ramp. 7. Lengthen the existing right-turn bay on the Cox Road (Exit 21) southbound exit ramp. 8. Add a 2nd left-turn bay on the Main Street (Exit 22) northbound exit ramp. 9. Lengthen the existing right-turn bay on the Main Street (Exit 22) northbound exit ramp. 10. Add a 2nd left-turn bay on the Old NC 273/NC 7 (Exit 26) northbound exit ramp. 11. Add a 2nd left-turn bay on the Old NC 273/NC 7 (Exit 26) southbound exit ramp. 12. Add a 2nd left-turn bay on the NC 273 (Exit 27) northbound exit ramp. 13. Lengthen the existing right-turn bay on the Sam Wilson Road (Exit 29) southbound exit ramp.
US 29-74:
<ol style="list-style-type: none"> 1. Add a 2nd eastbound left-turn bay at Edgewood Road. 2. Lengthen both of the existing eastbound left-turn bays at NC 279 (New Hope Road). 3. Lengthen both of the existing westbound left-turn bays at NC 279 (New Hope Road). 4. Add a 2nd westbound left-turn bay at Cox Road. 5. Add a 2nd westbound left-turn bay at Redbud Drive/Main Street. 6. Lengthen the existing westbound right-turn bay at Redbud Drive/Main Street. 7. Add a 2nd westbound left-turn bay at Wesleyan Drive. 8. Add a 2nd eastbound left-turn bay at NC 273. 9. Lengthen existing westbound left-turn bay at NC 273. 10. Add a 2nd westbound right-turn bay at NC 273.
US 321:
<ol style="list-style-type: none"> 1. Add a southbound left-turn bay at Garrison Boulevard. 2. Add a northbound left-turn bay at Garrison Boulevard. 3. Add a northbound right-turn bay at Hudson Boulevard.
Edgewood Road:
<ol style="list-style-type: none"> 1. Add a southbound left-turn bay at the I-85 northbound exit ramp termini. 2. Add a northbound right-turn bay at the I-85 northbound exit ramp termini. 3. Add a northbound left-turn bay at US 29-74. 4. Add a southbound right-turn bay at US 29-74.
Hudson Boulevard:
<ol style="list-style-type: none"> 1. Add a 2nd westbound left-turn bay at US 321.
NC 7 (Ozark Avenue):
<ol style="list-style-type: none"> 1. Add a 2nd northbound left-turn bay at the I-85 southbound exit ramp termini.
NC 279 (New Hope Road):
<ol style="list-style-type: none"> 1. Add a 2nd northbound left-turn bay at the I-85 southbound exit ramp termini. 2. Add a 2nd southbound left-turn bay at the I-85 northbound exit ramp termini. 3. Add a 2nd northbound left-turn bay at US 29-74. 4. Lengthen the existing northbound right-turn bay at US 29-74. 5. Add a 2nd southbound left-turn lane at US 29-74.

Table 2. TSM Alternative Roadway Improvements

Cox Road:
<ol style="list-style-type: none"> 1. Add a 2nd northbound left-turn bay at the I-85 southbound exit ramp termini. 2. Add a 2nd southbound left-turn bay at the I-85 northbound exit ramp termini. 3. Add a 2nd southbound through lane at US 29-74.
Main Street:
<ol style="list-style-type: none"> 1. Add a 2nd southbound left-turn bay at US 29-74.
Wesleyan Drive:
<ol style="list-style-type: none"> 1. Add a 2nd northbound left-turn bay at US 29-74. 2. Add a 2nd northbound right-turn bay at US 29-74.
Old NC 273:
<ol style="list-style-type: none"> 1. Add a 2nd northbound left-turn bay at the I-85 southbound exit ramp termini. 2. Add a southbound right-turn bay at NC 7 (McAdenville Road).
NC 7:
<ol style="list-style-type: none"> 1. Add a westbound right-turn bay at the I-85 northbound exit ramp termini. 2. Add a 2nd northbound through lane at Old NC 273.
NC 273:
<ol style="list-style-type: none"> 1. Add 2nd southbound left-turn bay at US 29-74. 2. Lengthen the existing southbound right-turn bay at US 29-74.
Sam Wilson Road:
<ol style="list-style-type: none"> 1. Add a southbound right-turn bay at the I-85 southbound exit ramp termini.

I.3.2 TRAFFIC OPERATIONS

Text was added to this section based on traffic forecasts for 2030 under the No-Build Alternative. The original section discusses traffic operations based on the 2025 Gaston travel demand model. Traffic operations analyses discussed in this section were not rerun using the 2030 Metrolina forecasts. A qualitative discussion of how traffic operations likely would change comparing the 2025 forecasts and the 2030 No-Build Alternative is provided below.

The intersection and ramp improvements included as part of the TSM Alternative (see **Table 2**) came from the traffic operations analyses conducted for the Improve Existing Roadways Alternatives (improve I-85 and/or US 29-74) (PBS&J, 2004). The nineteen improvement locations are areas where potential deficiencies in intersection or ramp operations became apparent when evaluating 2025 corridor traffic operations for the Improve Existing Roadways Alternatives using the computer model CORSIM. Note that in addition to being evaluated as part of the TSM Alternative, the TSM Alternatives intersection improvements also were incorporated into three Improve Existing Roadways Alternatives (Scenarios 4+, 4a, and 8) (See **Section I.6.1**).

The 58 specific improvements listed in **Table 2** were developed based on the results of the CORSIM modeling efforts and best professional judgment, and represent improvements that would provide the best opportunity to maximize traffic operation efficiency in the 2025 peak hours (LOS D or better) at these locations. The CORSIM model was not rerun with these improvements. It was not necessary to rerun the CORSIM model with these improvements in order to draw conclusions or make decisions on the TSM Alternative's ability to meet the project's purpose and need.

- Generally, traffic volumes under the No-Build Alternative are projected to be higher in 2030 than in 2025. It is likely the same locations would have potential deficiencies, and there may be more areas of potential deficiencies in intersection or ramp operations. Therefore, the 58 specific improvements identified using the 2025 traffic projections are still adequate to characterize the TSM Alternative at this level of study.

In addition to the intersection improvements, traffic signal coordination and access control were considered. Signal coordination or signal phasing and timing modifications would not be effective along most of the US 29-74 corridor in the project study area due to the wide spacing of signalized intersections outside the City of Gastonia.

Access control would not be effective along existing US 29-74 since limiting turning movements between signalized intersections would increase the turning movement volumes at signalized intersections. Similarly, access control measures such as prohibiting turn movements to increase capacity would not be practical on existing US 29-74 due to the need to provide access to the numerous commercial and residential driveways along the roadway.

Other minor TSM-type physical and operational improvements that would increase capacity at intersections would not be effective for the project area since congestion along existing US 29-74 primarily is caused by through traffic conflicting with turning traffic. TSM improvements alone would not enable US 29-74 to function adequately.

Since I-85 is a controlled-access highway with no intersections, TSM improvements would not be feasible on I-85.

I.3.3 DECISION ON WHETHER TO RETAIN FOR DETAILED STUDY

There are no updates or additions to this section. The decision to eliminate the TSM Alternative from detailed study is still valid.

DECISION: Eliminate the TSM Alternative from Detailed Study

In general, TSM improvements typically are low-cost measures that are effective in solving localized site-specific capacity, safety, and operational problems in urban areas. Alone, they would not meet the U-3321 Project’s more regional purposes and needs, as described below.

PROS	CONS
<ul style="list-style-type: none"> • Relatively low cost • Improved safety and reduced delay at intersections and interchanges • Some improvements to traffic flow along US 29-74 	<ul style="list-style-type: none"> • Continued congestion and poor levels of service on I-85 • Continued congestion on US 29-74 • Does not improve connectivity • Lengthy construction period and traveler delays due to need for numerous spot improvements • Potential impacts to businesses

Although signal coordination and intersection improvements at I-85 ramp termini and selected locations along US 29-74 and US 321 would improve traffic flow somewhat along US 29-74, US 321, and cross-streets over I-85, congestion and poor levels of service would continue to be projected on I-85 and congestion would continue on US 29-74 and US 321. TSM improvements on I-85 ramp termini, US 29-74 and US 321 would not improve access and connectivity in southern Gaston County nor between southern Gaston County and Mecklenburg County.

Construction timeframes for each individual intersection improvement project may not be lengthy, but implementing all of them as the TSM Alternative would result in a prolonged construction period and numerous traveler delays, particularly along US 29-74. US 29-74 also is a developed commercial corridor, and intersection improvements such as new turn lanes would require additional right of way, which would likely impact businesses along the corridor.

On August 17, 2004, the NEPA/404 Merger Team concurred that the TSM Alternative should be eliminated from further study. The concurrence form, which was signed in July 2005, is included in **Appendix A**.

I.4 TRANSPORTATION DEMAND MANAGEMENT ALTERNATIVE

I.4.1 ALTERNATIVE DESCRIPTION

The description of this alternative was updated to include recent data on CATS' programs and to include discussion of HOT lanes.

Transportation demand management measures include measures and activities that change traveler behavior. Typically, they do not involve major capital improvements. The TDM Alternative includes demand management strategies currently implemented in Gaston and/or Mecklenburg County such as staggered work hours and flex-time (employer focused), and ridesharing. An additional measure not currently implemented in the project study area, high occupancy vehicle (HOV) lanes, also was considered.

Ridesharing, such as carpools and vanpools, is generally viewed as more convenient than bus transit with regard to access, door-to-door times, and comfort. Presently, CATS actively promotes ridesharing to employment destinations in the Charlotte area by providing a car rideshare matching service and a vanpool program. CATS also promotes employer programs for managing travel demand.

No data is available on the success of the car rideshare matching service. The CATS vanpool program, started in 1986, operates 85 vanpools. Two travel from Gastonia, one to US Airways and one to Uptown Charlotte and one travels from Kings Mountain to US Airways (CATS website: <http://www.charmeck.org/Departments/CATS/Commute+Options/Vanpool+List.htm>, accessed May 13, 2008)

CATS operates the Employer Transportation Coordinator (ETC) Program to promote alternative transportation options in the workplace. There are 55 employers in the program (<http://www.charmeck.org/Departments/CATS/Transit+Programs/ETC+Program.htm>, accessed May 13, 2008).

High-Occupancy Vehicle (HOV) lanes, usually requiring two or more passengers per vehicle, are most commonly used in heavily developed urbanized corridors, usually on controlled-access facilities, to provide an incentive for ridesharing and to facilitate efficient traffic flow. If these lanes are tolled, they are High-Occupancy Toll (HOT) lanes.

HOT lanes typically allow buses, carpools and vanpools to travel at no-charge in the reserved lanes, while single-occupant vehicles must pay a toll. North Carolina legislation (GS 136-89.187) prohibits "converting any segment of the non-tolled State Highway system to a toll facility", so a TDM Alternative that converts existing general purpose lanes into HOT lanes is not possible under current State law.

I.4.2 TRAFFIC OPERATIONS

The only updates to this section are an update to the Charlotte region's vehicle occupancy rate and to include HOT along with HOV.

Staggered work hours, flex-time, or modified workweeks can be implemented on a corridor level by large employers along the corridor who experience congestion at their entrances or exits. Although the I-85/US 29-74 corridor does contain some large businesses, it is not expected that such adjustments to work schedules would significantly reduce peak hour traffic volumes within the project study area.

Most of the traffic volume along the I-85/US 29-74 corridor is along I-85, and commuters using existing I-85 generally are commuting to employment centers in Charlotte and Mecklenburg County. As described above, the Charlotte Area Transit System (CATS) has an active program to encourage use of TDM measures.

Based on surveys conducted in 2007 in the central business district of Charlotte, vehicle occupancy in the Charlotte area is about 1.1 persons per vehicle (Charlotte Department of Transportation, 2006). A much higher participation rate, beyond that which can reasonably be expected, would be required before ridesharing, vanpooling, HOV/HOT, and other travel demand measures would have a noticeable impact on traffic conditions along the I-85/US 29-74 corridor.

Converting a general purpose lane on I-85 to HOV or HOT would reduce traffic capacity and, consequently, would not alleviate congestion on this interstate. Congestion on I-85 likely would worsen for travelers in the general purpose lanes not using the HOV/HOT. Congestion and traffic flow on US 29-74 and US 321 also would not improve under this alternative.

I.4.3 DECISION ON WHETHER TO RETAIN FOR DETAILED STUDY

This section updated to include HOT lanes. The decision to eliminate the TDM Alternative from detailed study remains valid.

DECISION: Eliminate the TDM Alternative from Detailed Study

TDM measures would promote ridesharing, and an HOV or HOT lane would provide travel time savings for users. However, the TDM Alternative, with or without conversion of a general purpose lane on I-85 to HOV or HOT, would not meet the U-3321 Project's purposes and needs.

PROS	CONS
<ul style="list-style-type: none"> Promotes ridesharing Travel time savings for HOV users 	<ul style="list-style-type: none"> Continued congestion on non-HOV lanes of I-85 No noticeable improvements to traffic flow on US 29-74 Would not improve connectivity Conversion to HOT lanes would require state legislative approval.

TDM measures would not improve connectivity in southern Gaston County nor between southern Gaston County and western Mecklenburg County. They also would not improve traffic flow along existing I-85, US 29-74, and US 321. Also, conversion of a general purpose lane to a HOT lane would require a change in State law, which is an additional factor for eliminating this type of improvement.

On August 17, 2004, the NEPA/404 Merger Team concurred that the TDM Alternative should be eliminated from further study. The concurrence form, which was signed in July 2005, is included in **Appendix A**.

I.5 MASS TRANSIT ALTERNATIVE AND MULTI-MODAL ALTERNATIVE

I.5.1 ALTERNATIVE DESCRIPTION

*The alternative description did not change. Updates are included in **Sections I.5.1.1 and I.5.1.2** for existing transit services and studies.*

The Mass Transit Alternative would include bus or rail passenger service. A major advantage of mass transit is it can provide high-capacity, energy-efficient movement in densely traveled corridors. It also serves high and medium density areas by offering an option for automobile owners who do not wish to drive, as well as service to those without access to an automobile. A Multi-Modal Alternative would incorporate mass transit with roadway improvements.

Separate studies of mass transit are being undertaken in Gaston and Mecklenburg Counties. Existing services and the status of the transit studies are described below.

I.5.1.1 Existing Transit Services

*This section was updated to include recent data on transit programs. **Figure 6** did not change.*

Gastonia Transit. Bus service is available in Gastonia through Gastonia Transit, which provides service to over 325,000 passengers annually. **Figure 6** shows the existing bus routes. The bus fleet consists of seven (7) 35-foot transit buses, three (3) demand response vans, and the only compressed natural gas (CNG) bus in the state of North Carolina (Gastonia Transit, General Information website: www.cityofgastonia.com/city_serv/general/transit/transit.cfm, accessed April 18, 2008).

All bus routes begin and end at Bradley Station at the corner of Oakland Street (SR 1001) and Main Avenue in Gastonia. There are a total of nine bus routes, of which three serve US 29-74 and three serve US 321 (Gastonia Transit, Route Map website:

www.cityofgastonia.com/city_serv/general/pdf%20files/NC%20Gastonia%20Int%20%202005.pdf, accessed April 18, 2008).

CATS. The Charlotte Area Transit System (CATS), in partnership with Gastonia, has established Express Bus service to uptown Charlotte. Route 85x, the Gastonia Express, runs four times in the morning and twice in the evening. The express bus makes one stop between the Bradley Station and Uptown Charlotte at the Abbey Plaza Shopping Center at the corner of US 29-74 and NC 273 (Park Street [North of NC 7]) in Belmont. Total travel time on the express route is about one hour (Charlotte Area Transit System website: www.charmeck.org/Departments/CATS/Home.htm, accessed April 21, 2008).

Table 3 lists the average monthly ridership on Route 85x from 2002 through 2005. As shown in the table, ridership has been increasing an average of 26 percent per year since 2002.

Table 3. Average Monthly Ridership on CATS Route 85X – Gastonia Express

Year	Average Monthly Ridership	Percent Change Over Previous Year
2002	1,774	--
2003	2,236	26%
2004	2,802	25%
2005	3,856	38%
2006	4,838	26%
2007	5,541	15%

Source: CATS, February 2006 and June 2008

In western Mecklenburg County, Route 2 runs along US 29/74 (Wilkinson Boulevard) to Old Dowd Road at Distribution and Marketing Services, Inc. This route runs to Old Dowd Road four times a day on weekdays only. Route 55 also provides service in western Mecklenburg County, running along Westinghouse Boulevard from the Sharon Road West Station to Steele Creek Road (NC 160). This route operates every half-hour during the morning and afternoon rush hours and otherwise every hour, on weekdays only (Charlotte Area Transit System website: www.charmeck.org/Departments/CATS/Home.htm, accessed April 21, 2008).

Amtrak. Amtrak provides passenger rail service in Gastonia and Charlotte. There are currently three routes that service the area: the Crescent route runs daily between New York City and New Orleans with many stops in between, including Charlotte and Gastonia; the Piedmont route provides daily trips between Charlotte and Raleigh; and the Carolinian route provides daily service between Charlotte and New York City with stops in Raleigh, Richmond, Washington, DC, Baltimore and Philadelphia. These routes operate on the Norfolk-Southern and CSX rail lines, which also provide freight train service (Amtrak website: www.amtrak.com, accessed April 14, 2008).

Freight Rail Lines. An active Norfolk Southern (NS) freight rail line parallels Wilkinson Boulevard from western Mecklenburg County to the Town of Lowell in Gaston County (See **Figure 1**). The rail line crosses the Catawba River approximately 0.7 miles south of the existing US 29-74 crossing. In Lowell, the rail line turns northward and crosses I-85 near Exits 22 and 19 while paralleling NC 7 (Ozark Avenue, Lowell Road) between the two crossings. Finally, the rail line parallels US 29-74 (Franklin Boulevard) in

Gastonia before turning northwest and crossing I-85 near Exit 14 and exiting the project study area. Due to the freight traffic along this active NS rail line, any future transit service would have limited accessibility.

An active NS rail line (Carolina and Northwestern line) parallels US 321 in the project study area from I-85 to York County, South Carolina.

1.5.1.2 Transit Studies

*This section was updated to include the most recent information on the status of transit planning for the CATS West Corridor project. **Figure 7** was updated to show the West Corridor Locally Preferred Alternative.*

Mecklenburg County. CATS is planning and implementing a major expansion of its mass transit service throughout the county. In November 1998, Mecklenburg County citizens approved a local sales and use tax (one-half percent) to support implementation of the *2025 Integrated Transit/Land Use Plan*.

Five major mass transit corridors were identified in the *2025 Integrated Transit/Land Use Plan*. One of the five major corridors is the West Corridor. The Metropolitan Transit Commission (MTC) adopted the following multi-phased approach for the West Corridor in August 2006 (CATS website, <http://www.charmeck.org/Departments/CATS/Rapid+Transit+Planning/West+Corridor/>, accessed May 14, 2008):

1. Adopting Streetcar from Center City to the Airport as the long-term Locally Preferred Alternative (2024)
2. Implementing upgraded bus service to the Airport (immediate)
3. Implementing Enhanced Bus improvements in the Wilkinson Boulevard, West Boulevard / Tyvola, and Freedom Drive corridors (2008)

Enhanced bus service in the West Corridor will be designed and implemented along Wilkinson Boulevard, Freedom Drive and West Boulevard beginning in 2008. This enhanced bus service will provide a more direct and faster service to the Charlotte-Douglas International Airport with bus stops designed specifically for the quicker service. Streetcar design activities are scheduled to begin in 2024 (CATS website, <http://www.charmeck.org/Departments/CATS/Rapid+Transit+Planning/West+Corridor/>, accessed May 14, 2008).

The proposed West Corridor Streetcar locally Preferred Alternative is a 6.4 mile alignment that will operate from Trade Street to Cedar Street to West Morehead Street, then along Wilkinson Boulevard to Harlee Avenue, terminating at the airport employee parking lot on Harlee Avenue. Updated **Figure 7** shows this alignment. The Streetcar will travel in mixed traffic in the curb lanes. Ten stops have been identified. No park and ride lots have been included. The Streetcar will operate at 10-minute headways in the peak period, and 15-minute headways in the off-peak times and weekends.

Gaston County. The City of Gastonia and the GUAMPO completed a report titled *Gastonia Rapid Transit Alternatives Study: Corridor and Modal Options* (December 2005) that studied improving transit in the Gastonia-Charlotte corridor. The report provided the following selected recommendations (pages 5-10 and 5-11):

- “The Gaston urban area’s strategy at this point should be to plan for Bus Rapid Transit (BRT), but keep modal and alignment options open. Light Rail Transit (LRT) in Gaston County without LRT in the West Corridor [of Mecklenburg County] makes no sense.”
- “Major capital facility design and construction in Gaston County’s extension of the West Corridor should only follow firm commitments to those activities in Mecklenburg County, but some intermediate steps can be taken earlier to establish the area’s commitment to rapid transit. Gastonia’s best alternative depends to a large extent on CATS’ decision as to mode and alignment in the West Corridor. However, at least one other element of BRT could be implemented without selecting an alignment. The multi-modal center serving downtown Gastonia could be built before an alignment is selected, since the recommended site is convenient to all of them.”
- “Increased service frequency on the 85X route and service to additional points in the Gaston urban area, and possibly direct service to Charlotte-Douglas International Airport, should be implemented. To the extent resources permit.”

I.5.2 TRAFFIC OPERATIONS

| There are no updates or additions to this section.

Transit services would not be expected to divert substantial volumes of traffic off of I-85, US 29-74 or US 321 or change traffic flow conditions on I-85, US 29-74 or US 321 compared to the No-Build Alternative. **Table 4** shows the percent of commuters that used transit in Gaston and Mecklenburg Counties in 2000, along with comparative data on two other urban areas in North Carolina, Wake and Forsyth Counties. Even with a robust program in place, such as is the case in Mecklenburg County, a Mass Transit Alternative would have only a small effect on daily traffic flows, possibly diverting up to 2 percent of commuters. This decrease in commuter traffic would not be enough to change the projected congestion on I-85, US 29-74 or US 321.

Table 4. Percent of Commuters Using Transit in 2000

County	Percent of Commuters Using Transit
Gaston	0.3%
Mecklenburg	2.6%
Wake	1.2%
Forsyth	1.5%

Source: 2000 US Census

I.5.3 DECISION ON WHETHER TO RETAIN FOR DETAILED STUDY

There are no updates or additions to this section. The decision to eliminate the Mass Transit Alternative and Multi-Modal Alternative from detailed study is still valid.

DECISION: Eliminate the Mass Transit Alternative and Multi-Modal Alternative from Detailed Study

Rapid transit service would provide increased mobility between Gaston County and Mecklenburg County by providing an alternative mode choice. If the alternative was on new alignment as a dedicated rapid transit alignment, it could also improve connectivity

PROS	CONS
<ul style="list-style-type: none"> Provides increased mobility by providing an alternative mode If on new alignment, could improve connectivity 	<ul style="list-style-type: none"> Continued congestion and no noticeable improvement to traffic flow on I-85 and US 29-74 High construction, operation, and maintenance costs for fixed guideway alternatives

between the two counties. However, the Mass Transit Alternative (either new rapid transit or expanded bus service) would not divert enough vehicular traffic to noticeably improve traffic flow on I-85, US 29-74, or US 321 to meet the project’s purposes and needs.

Construction costs for a Mass Transit Alternative that is on dedicated right of way would be high. There is no program currently in place in the state or in Gaston County to fund such improvements. The Mass Transit Alternative for the Gaston East-West Connector project would need to extend through Mecklenburg County to connect to the terminus of the West Corridor, which is not scheduled for construction until 2024.

As described in the previous section, GUAMPO is studying transit as a separate project, while still supporting the Garden Parkway (of which the Gaston East-West Connector is an independent piece) as their top priority. Combining mass transit with road improvements in a Multi-Modal Alternative also would not be practicable. The mass transit element would add substantial costs to any alternative that includes road improvements, but would do very little to improve traffic flow on I-85, US 29-74, and US 321. Pure roadway improvement alternatives are evaluated in **Section I.6** (Improve Existing Roadways Alternatives) and **Section I.7** (New Location Alternatives).

On August 17, 2004, the NEPA/404 Merger Team concurred that the Mass Transit Alternative and Multi-Modal Alternative should be eliminated from further study. The concurrence form, which was signed by the NEPA/404 Merger Team Review Board at a later Review Board meeting in July 2005, is included in **Appendix A**.

I.6 IMPROVE EXISTING ROADWAYS ALTERNATIVES

I.6.1 ALTERNATIVE DESCRIPTIONS

There are no changes to **Figures 8 through 11**. Additional information is included below about tolling options for the Improve Existing Roadways Alternatives. The additional impacts and issues resulting from the toll options are discussed as new information in **Section I.6.3**. The 2030 Metrolina travel demand model was not run for Improve Existing Roadway Alternatives toll options, as it was not necessary for the decision-making process.

Several different combinations of improvements were developed for the Improve Existing Roadways Alternatives. These are named Scenarios 2, 3, 4, 4+, 4a, and 8, as described below and shown in **Figures 8 through 11**. Scenarios 2 and 3, which are subsets of the other scenarios, were interim scenarios developed to evaluate the sensitivities in the travel demand model of improving capacity on I-85 and US 29-74. Scenarios 2 and 3 were not evaluated as potential Improve Existing Roadways Alternatives. Also, as studies progressed, Scenario 4 was replaced by Scenario 4+. Scenarios 2, 3, and 4 are described below to provide context for the descriptions of Scenarios 4+, 4a, and 8.

*Scenario 2 – Improve I-85 to 8 lanes (see **Figure 8**)*

Widen I-85 to eight lanes in each direction (addition of one through-lane in each direction) from the existing 8-lane area at Exit 26 (Belmont) west through Gastonia to the interchange of US 29-74 and I-85 (Exit 10). This scenario does not include any improvements to ramps or overpasses in the I-85 corridor.

*Scenario 3 – Improve US 29-74 to 6 lanes (see **Figure 8**)*

Existing US 29-74 is six lanes wide through much of the study area, with four-lane sections existing over the Catawba River and South Fork Catawba River and also west of Gastonia. Widening US 29-74 to more than six lanes would not be practicable. There are numerous commercial driveways along US 29-74 and high demand for turn movements at intersections and all along each block. It would not be desirable to have an eight-lane cross-section on a non-controlled access roadway. There would be too many lanes for drivers to safely maneuver across to make turns.

Improvements to US 29-74 under the Improve Existing Roadways Alternatives would include widening the bridges over the Catawba River and the South Fork Catawba River to six lanes and widening the four-lane section from Myrtle School Road (west of Gastonia) west to I-85 to six lanes. This scenario does not include any turn-lane improvements on US 29-74 or on any other arterials in the project study area.

*Scenario 4 – Improve I-85 to 8 lanes and US 29-74 to 6 lanes (see **Figure 8**)*

Scenario 4 is a combination of Scenarios 2 and 3. This alternative was replaced by Scenario 4+ after a corridor-level traffic analysis was conducted (PBS&J, 2005).

*Scenario 4+ - Improve I-85 to 8 lanes and US 29-74 to 6 lanes with TSM-type measures (See **Figure 9**)*

Scenario 4+ is Scenario 4 with intersection/ramp improvements and improvements to cross streets of I-85, US 29-74 and US 321. Based on the results of a corridor level traffic operations analysis (CORSIM) for Scenario 4 (PBS&J, 2004), a list was developed of additional improvements that would be needed along and in the direct vicinity of the I-85 and US 29-74 corridor that would help maximize the efficiency of traffic operations along the corridor. This list included measures such as adding turn lanes or additional lanes at interchange ramps. The improvements in Scenario 4+ include widening I-85 and US 29-74, the 58 improvements listed under the TSM Alternative, and the following cross-street improvements:

I-85 Ramp	Add a 2 nd acceleration lane for the southbound entrance ramp from I-485.
US 321	Add a 3 rd southbound through lane in the vicinity of the I-85 interchange
NC 274 (Bessemer City Rd)	Add a 3 rd southbound through lane in the vicinity of the I-85 interchange.
Garrison Blvd	Widen to six lanes in the vicinity of US 321.
NC 7 (Ozark Ave)	Add a 3 rd southbound through lane starting at the I-85 southbound exit ramp termini and ending south of the I-85 interchange.
NC 7	Add a 2 nd northbound through lane at Old NC 273.
Sam Wilson Rd	Add a 2 nd southbound through lane at the I-85 southbound exit ramp termini.

*Scenario 4a - Improve Existing I-85 to 10 lanes (See **Figure 10**)*

Scenario 4a is Scenario 4+ with the following modifications:

- Widen I-85 to ten lanes from Exit 19 (Ozark Avenue) east to Exit 29 at I-485 (widen I-85 to 8 lanes from Exit 14 east to Exit 19 and widen US 29-74 to 6 lanes). This is the minimum number of general purpose lanes estimated to be needed for I-85 to operate at a basic freeway segment Level of Service (LOS) D or better in 2025 (See **Section I.8.4** for a definition and discussion of levels of service).
- Capacity increases on the following road segments that connect I-85 and US 29-74:

NC 279 (New Hope Rd)	Widen to 6 lanes from just north of I-85 to US 29-74.
Cox Rd	Widen to 6 lanes from just north of I-85 to US 29-74.
Cox Rd	Widen to 4 lanes from US 29-74 south to Garrison Blvd/Armstrong Park Drive/Gardner Park Ave (this road has three names in the Cox Road vicinity).
Redbud Dr	Widen to 4 lanes from US 29-74 south to NC 279.

NC 7 at I-85 Exit 26	Widen to 4 lanes from north of I-85 to US 29-74.
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- Considerations were included in the travel demand model to account for intersection improvements along US 29-74 and at interstate ramps that would result from implementing the improvements recommended in Scenario 4+.

*Scenario 8 - Scenario 4a plus capacity improvements to north/south feeder roads (See **Figure 11**)*

Scenario 8 started with Scenario 4a (Improve Existing I-85 to 10 lanes). Added to this were capacity improvements (one lane in each direction) to north/south feeder roads that connect southern Gaston County to US 29-74 and I-85, as had been suggested in a general way by some of the environmental resource agencies. These were suggested as a potential way for the Improve Existing Roadways Alternative to meet the connectivity aspect of the project’s purpose and need.

Below is a list of the ten roadways where capacity improvements were added in the Gaston County 2025 travel demand model (approximately 51 miles of improvements). The list was developed with input from the GUAMPO. It does not include all the feeder roads that have exits on I-85, just those the GUAMPO determined would be most effective at improving access to/from southern Gaston County and I-85/US 29-74.

NC 273	Widen south from I-85 to NC 279 at the Botanical Garden (4-lane divided).
NC 7	Widen from Exit 27 south to NC 273 (4-lane divided).
NC 279 (New Hope Road)	Widen from Exit 20 on I-85 south to NC 273 at the Botanical Garden (5 lanes).
Redbud Drive	Widen from Exit 22 at I-85 south to NC 279 (4-lane divided).
NC 274 (Union New Hope Road)	Widen from Robinwood Road south past the airport continuing on Union New Hope Road swinging northwest to NC 279 (4-lane divided).
Robinwood Road	Widen from NC 279 New Hope Road south to NC 274 (4 lanes).
Robinson Road	Widen from NC 274 south to US 321 (5 lanes).
Various Names	Beginning at NC 274 (Bessemer City Rd) at Exit 14, widen south to Myrtle School Road, continuing south on Myrtle School Rd all the way to US 321. This road changes names to David Road then Stagecoach Road before meeting up with US 321. (4-lane divided or 5 lane).
NC 274	Widen from State Line to Union New Hope Road (4-lane divided).
US 321	Widen to 6 lanes from State Line to I-85. (Note: This widening would impact the City’s main historic district, but the widening would be necessary to handle existing and projected future traffic.)

Toll Options for the Improve Existing Roadways Alternatives. Improve Existing Roadways Scenarios 4+, 4a, and 8 all include widening I-85 (by 1-2 general purpose lanes in each direction) as a component of each alternative. This widening was considered in the February 2007 Alternatives Development and Evaluation Report as additional non-toll capacity on I-85. Another way to consider this new capacity could be as toll lanes. The existing lanes on I-85, by North Carolina law (GS 136-89.187), cannot be tolled, but the new capacity could be tolled.

The following paragraphs describe three toll options considered for the new capacity on I-85. These options, from most to least intensive improvements and right of way requirements, include constructing a fully barrier-separated toll facility, constructing toll or HOT lanes with a lower level of physical separation from the non-toll lanes (such as delineating buffer zones by pavement markings), or reconfiguring existing pavement to add the toll or HOT lanes.

If the additional one to two lanes were added as a physically-separated toll facility, the toll lanes would be located to the inside of the general purpose lanes. The additional capacity could be in the form of bi-directional or reversible toll lanes. Since there is only a narrow existing median (a jersey barrier and paved shoulders), new pavement would need to be added to the outside of the existing pavement and the lanes reconfigured.



Reversible Lanes on I-394 in Minneapolis, MN
(Source: FHWA)

The physical separation would include jersey barriers and additional shoulders, and access ramps to and from the toll lanes, which would require significantly more right of way than a standard widening. Also, significantly more right of way would be required at interchanges. In this option, the toll lanes would need their own ramps as either nested interchanges with existing non-toll facility ramps, or at new interchanges constructed for the toll lanes only. The tight spacing of many of the interchanges through Gastonia east of US 321 (about one mile apart) will result in the toll lanes having less interchanges through Gaston County than the general purpose lanes, and less accessibility for people traveling to/from Gaston County. A fully barrier-separated toll facility could be used by vehicles with and without electronic toll collection transponders, as the controlled access would provide the ability to capture video images of license plates entering and exiting, enabling the NCTA to identify and bill owners of vehicles using the facility.

If the additional capacity in each direction was constructed with a lower level of physical separation, the right-of-way requirements would still be greater than if the additional lanes were general purpose lanes. As in the previous option, the new lanes would need to be located to the inside of the general purpose lanes. Since there is only a narrow existing median (a jersey barrier and paved shoulders), new pavement would need to be added to the outside of the existing pavement and the lanes reconfigured.



I-405 HOV Lanes in Orange County, CA

The separation between the toll/HOT lanes and general purpose lanes would be provided via pavement marking or a physical barrier such as pylons. The toll/HOT lanes would need additional right of way to account for a recommended minimum 4-foot buffer zone between the toll/HOT lanes and the general purpose travel lanes, and a wider (14-foot) inside shoulder to provide room for enforcement activities (HOV Systems Manual, National Cooperative Research Program (NCHRP) Report 414, 1998). A separation, or buffer zone, of at least four feet is recommended by FHWA as a desirable condition for HOT lanes (A Guide for Hot Lane Development).

Although there would be less physical separation between the toll/HOT lanes and the general purpose lanes, access into and out of the toll or HOT lanes would need to occur at specific locations along the highway to capture appropriate toll charges. The access areas could be indicated by changing the buffer zone pavement marking to a dashed line, indicating vehicles can pass into and out of the toll/HOT lanes. Access into and out of the toll/HOT lanes would need to be between interchanges, and designed with sufficient weaving length to allow vehicles to safely enter and exit. There would then need to be sufficient length provided from the access point to the next downstream interchange so vehicles would be able to cross the general purpose lanes to the interchange exit ramp. Due to close spacing between interchanges on I-85 in the project area, and the presence of curves, access to/from the toll/HOT lanes would be limited and would not be provided between every interchange. The reduced access points would provide less accessibility for people traveling to/from Gaston County than under a non-toll option for widening I-85.

The third option for tolling lanes is to reconfigure existing pavement to add one new lane in each direction (Scenario 4+ only). This type of option currently is being studied by transportation planners in the Charlotte region as part of the Fastlanes study (www.charmeck.org/fastlanes). The Fastlanes study is examining the feasibility of various types of fast lanes (e.g.; HOV, HOT, special use lanes) on major highways in the Charlotte region, including I-85, I-77, I-485, I-277, US 321, US 74, US 521, NC 24-27, and NC 16). The study will determine the technical, financial and institutional feasibility of dedicating lanes on major highways in the Charlotte region for active traffic management. The study is being funded by the North Carolina Department of Transportation, the Mecklenburg-Union, Gaston Urban Area and Cabarrus-Rowan metropolitan planning organizations (MPOs), the Rock Hill-Fort Mill Area

Transportation Study and the Town of Mooresville (Fastlanes project website: www.charmeck.org/fastlanes). The study is expected to be released in late 2008.

For I-85 through the Gastonia area, the Fastlanes study is evaluating the feasibility of providing one additional managed lane in each direction by restriping the existing pavement. Currently, I-85 in the Gastonia area has three 12-foot travel lanes in each direction and 10-foot inside and outside shoulders. Restriping could add one additional lane by reducing the existing inside shoulder to two feet and having the resulting four lanes in each direction be 11 feet wide, which is substandard for an interstate facility. These are major design exceptions that would need to be approved by NCDOT and FHWA before this reconfiguration could proceed.

If the new lane added as a result of restriping was a HOT lane, the two-foot shoulder would effectively eliminate the ability for a trooper to enforce the occupancy requirement. Automated vehicle occupancy verification technologies are currently being tested in the United States, however there is no existing facility that has deployed this technology. A two-foot inside shoulder would make enforcement difficult. Installing toll-collection equipment would be a challenge since there would be little room in the center of the roadway.

If the new lane added as a result of restriping was a toll-only lane, the limited two-foot shoulder would be undesirable from a customer service standpoint. Any vehicles that break down within the single toll lane would block the toll lane until such time they could be safely removed. Also, the installation of toll equipment within a narrow median/shoulder area could potentially pose design challenges if there are system limitations on proximity of equipment located overhead and at ground level.

I.6.2 TRAFFIC OPERATIONS - CONCLUSIONS

*The following is additional information based on toll options and on forecasts from the 2030 Metrolina travel demand model for Scenario 4a (widen I-85 to 8-10 lanes, widen US 29-74 to 6 lane as a non-toll facility) (see added **Sections 1.8.5 – 1.8.7**).*

Various traffic operations analyses conducted for the Improve Existing Roadways Alternatives using the 2025 Gaston Travel demand model and the 2030 Metrolina travel demand model are described in detail in **Section I.8**. Conclusions from these analyses are summarized below.

Year 2025 regional network statistics demonstrate a reduction in congested travel for the Improve Existing Roadways Alternatives Scenarios 4+, 4a, and 8.

Statistics for the entire modeled 2025 roadway network were generated from the regional travel demand model. These statistics are for AM and PM peak periods and include vehicle miles traveled, vehicle hours traveled, congested vehicle miles, and congested vehicle hours.

Under Scenario 4+, capacity improvements made to existing I-85 (widen to 8 lanes) and US 29-74 (widen to 6 lanes) would reduce the congested vehicle miles traveled and the congested vehicle hours traveled in the 2025 network compared to the No-Build Alternative. Total vehicle miles and vehicle hours traveled would be similar to the No-Build Alternative. These results are consistent with the expectation that capacity improvements to the primary routes through Gaston County (I-85 and US 29-74) would result in a noticeable change in predicted regional congestion, including the reduction of congested vehicle miles and congested vehicle hours.

It follows that the regional model shows that by increasing capacity further on I-85 to eight to ten lanes (Scenario 4a) would result in a further reduction in congested vehicle miles and congested vehicle hours compared to the No-Build Alternative and Scenario 4+ (I-85 at 8 lanes).

The largest reductions in congested vehicle miles and congested vehicle hours compared to the No-Build Alternative would occur under Scenario 8, which would not only improve I-85 to eight to ten lanes and US 29-74 to six lanes, but also widen, and therefore relieve congestion on, approximately 51 miles of north/south feeder roads connecting southern Gaston County and I-85 and US 29-74.

Year 2030 regional network statistics demonstrate an increase in congested travel for the Improve Existing Roadways Alternative Scenarios 4+/4a compared to the No-Build Alternative.

Statistics for the modeled 2030 roadway network were generated from the 2030 Metrolina regional travel demand model. These statistics are for AM and PM peak periods and daily totals, and include vehicle miles traveled (VMT), vehicle hours traveled (VHT), congested VMT, and congested VHT. Results from the 2030 Metrolina travel demand model differ from the 2025 Gaston travel demand model. Although general trends can be inferred, direct comparisons should not be made between the two models. The 2030 Metrolina travel demand model is for a different year, covers a larger region, uses more recent land use and population forecasts, and incorporates more recent travel pattern and trip table information.

Under Scenario 4+/4a, capacity improvements made to existing I-85 (widen to 8-10 lanes) and US 29-74 (widen to 6 lanes) result in so much increased traffic volume due to the latent demand for travel between Gaston and Mecklenburg Counties, that total VMT in Gaston County in 2030 increases from 8,512,000 VMT under the No-Build Alternative to 9,550,000 VMT under Scenarios 4+/4a. This is a 12 percent increase. As used in this report, latent demand means trips people desire to make over the Catawba River between Gaston County and Mecklenburg County that are not being made under existing conditions, but would be made if capacity over the Catawba River is increased.

Likewise, 2030 VHT are greater under Scenario 4+/4a than they are under the No-Build Alternative (267,000 VHT versus 234,900 VHT). Year 2030 congested VHT and VMT in Gaston County also are greater under Scenario 4+/4a than under the No-Build Alternative. As a

percent of total VMT and total VHT, the congested VMT and congested VHT are highest for the Improve Existing Roadways Alternative Scenarios 4+/4a, compared to the No-Build Alternative and the New Location Alternative (Toll and Non-Toll Scenarios). This may be due to higher congestion on roadways leading to the improved I-85, and the congestion projected to still occur on the improved I-85.

A review of these numbers suggest that local travelers are willing to drive farther on local roadways to reach I-85 if there is greater capacity provided on I-85, and that there is a large demand for travel across the Catawba River between Gaston and Mecklenburg Counties. Also, since no improvements are made to the feeder roads connecting Gaston County travelers to I-85 under Scenarios 4+/4a, these increased numbers of travelers would experience more congestion on these feeder roadways, contributing to Gaston County's congested VHT and VMT.

A reduction in 2030 congested VMT and VHT compared to Scenarios 4+/4a likely would occur under Scenario 8. Scenario 8 would not only improve I-85 to eight to ten lanes and US 29-74 to six lanes, but also widen, and therefore relieve congestion on, approximately 51 miles of north/south feeder roads connecting southern Gaston County to/from I-85 and US 29-74.

Based on the 2025 Gaston travel demand model, latent demand for Interstate travel exists in the area

When I-85 is widened under the Improve Existing Roadways Alternatives, additional traffic volumes are attracted to I-85. East of US 321, average daily traffic volumes on I-85 increase an average of 4 percent under Scenarios 4+ and Scenario 4a. East of US 321, PM peak hour traffic volumes on I-85 increase an average of 11 percent under Scenario 4+, 16 percent under Scenario 4a, and 19 percent under Scenario 8.

There is so much latent demand in the study area for highway travel, that adding the one lane in each direction on I-85 (as under Scenario 4+) attracted an average of 1,300 additional vehicles per hour in the PM peak along I-85 east of US 321 compared to the No-Build Alternative (Scenario 1). Adding two lanes in each direction on I-85 (widening to 10 lanes) under Scenario 4a attracted an average of 1,900 additional vehicles per hour in the PM peak east of US 321. Widening the north/south feeder roads to the interstate, as under Scenario 8, attracted an average of 2,250 additional vehicles per hour to I-85 in the PM peak compared to the No-Build Alternative (Scenario 1).

Based on the 2030 Metrolina travel demand model, latent demand for Interstate travel exists in the area.

When I-85 is improved under the Improve Existing Roadways Alternative Scenarios 4+/4a, additional traffic volumes are attracted to I-85. There is so much latent demand in the study area for highway travel, that adding one to two lanes in each direction on I-85 under Scenarios 4+/4a attracted an average of 17 percent more vehicles per hour to I-85 compared to the No-Build

Alternative. Widening the north/south feeder roads to the interstate, as under Scenario 8, would be expected to attract even more vehicles to I-85.

Widening I-85 to a constant 8 lanes through the project study area under Scenario 4+ would not provide enough capacity to fulfill demand. This is also projected to be true for Scenario 4+ under a toll option. Even if I-85 was widened to 8-10 lanes (as under Scenario 4a), levels of service on I-85 would continue to be LOS F in the eastern half of the study area. Although the Improve Existing Roadways Alternatives were not modeled as toll options using the Metrolina travel demand model, modeling of the New Location Alternative as a toll option showed that more than one lane in each direction would be needed under the New Location Alternative Toll Scenario to carry projected traffic.

Based on the 2025 Gaston travel demand model, the regional travel demand model volume/capacity ratio maps indicate improvements to traffic flow on I-85 and US 29-74, but not on US 321

The 2025 regional travel demand model was used to produce color-coded maps for various scenarios showing ratios of projected traffic volumes divided by modeled roadway capacity. The maps indicate general levels of congestion on network roadway segments. Comparing maps from different scenarios can reveal the general effects each scenario would have on network congestion.

Each roadway was color-coded to represent the volume to capacity ratio for the peak 2-hour period, with colors ranging from worst to best, respectively: red, yellow, green, and blue. Red is a volume to capacity ratio above 1.2. Yellow represents a volume to capacity ratio of 1.0 – 1.2. Green is a volume to capacity ratio of 0.8 – 1.0, and blue is a volume to capacity ratio less than 0.8. In addition, relative volumes for each roadway are indicated by line width.

In the year 2025, existing I-85 is expected to be highly congested through the project area under the No-Build Alternative. Widening I-85 to eight lanes and US 29-74 to six lanes (Scenario 4+) results in noticeable improvements to PM peak hour traffic flows on I-85 and US 29-74. Under Scenario 4+, there are no red segments along I-85 and fewer red and yellow segments along US 29-74. Volume to capacity ratios along US 321 do not noticeably change, remaining at primarily yellow and red.

As more capacity is added to I-85 under Scenario 4a (widen I-85 to 8-10 lanes), volume to capacity ratios on I-85 improve further. Most of the segments along I-85 are blue and green. There are also some improvements on US 29-74, as more traffic diverts to use widened I-85. Volume to capacity ratios along US 321 are not affected, remaining at primarily yellow and red.

As expected, the most improvements to volume to capacity ratios are seen under Scenario 8, which includes widening I-85 to ten lanes, and widening of several north/south feeder roads (approximately 51 miles worth) connecting to southern Gaston County (including US 321).

Under this scenario, I-85 is entirely blue (volume to capacity ratio of < 0.8). US 29-74 would experience more improvements in traffic flow than under Scenarios 4+ or 4a, possibly because the widened feeder roads allow for more options to reach I-85 and US 29-74. US 321 also shows improvements in volume to capacity ratios south of US 29-74, because it would be widened under Scenario 8.

Based on the 2030 Metrolina travel demand model, only small improvements to traffic flow and level of service on I-85 would be achieved with the Improve Existing Roadways Alternatives.

I-85 is projected to operate primarily at LOS F in 2030, regardless of the alternative. Under the Improve Existing Roadways Alternative Scenario 4+/4a and Scenario 8, most improvements in traffic flow that would be achieved along I-85 by adding additional lanes would be offset by the increase in traffic volumes attracted to the facility. LOS on I-85 would improve to LOS D-E only west of US 321 under Scenario 4+. Under Scenario 4a, LOS also would improve to LOS E between Exits 19 and 22. LOS on I-85 also likely would not improve under Scenario 8 because the widened north-south feeder roads would allow more traffic to reach I-85.

If the new lanes on I-85 were tolled, the toll rate could be adjusted to manage level of service in the tolled lanes, which would improve traffic flow for only those lanes. Tolled lanes would have less accessibility than if the new capacity were general purpose lanes because access to/from the toll lanes could not be provided at every interchange through Gaston County.

I-485 is projected to operate primarily at LOS E under the No-Build Alternative. Under the Improve Existing Roadways Alternative Scenarios 4+/4a, LOS would degrade to LOS F. This is likely to be the case also under Scenario 8.

Under the No-Build Alternative, US 29-74 is projected to operate primarily at LOS D or better west McAdenville and LOS F east of McAdenville. Under the Improve Existing Roadways Alternative Scenarios 4+/4a, LOS would improve compared to the No-Build Alternative west of Myrtle School Road (US 29-74 would be widened in this location). The Improve Existing Roadways Alternative Scenarios 4+/4a would result in slightly higher traffic volumes on US 29-74 west of NC 279 (New Hope Rd) compared to the No-Build Alternative. This is likely due to the fact that travelers wanting to use the widened I-85 under Improve Existing Roadways Alternative Scenario 4+/4a would use portions of improved US 29-74 to get there. Scenario 8 could result in higher volumes on US 29-74 compared to Scenarios 4+/4a, heightening the trend shown under Scenarios 4+/4a, as travelers can more easily reach I-85 and US 29-74 via the widened north-south feeder roads, and may use portions of US 29-74 to access I-85.

The 2030 level of service along US 321 would be similar for all evaluated alternatives. Levels of service are LOS D or better through the project area, except near the I-85 ramps, where levels of service would be LOS F. Improve Existing Roadway Alternatives Scenarios 4+/4a would result

in an increase in traffic volumes along US 321 in the study area on average of about 15 percent, as more people use US 321 to travel to a widened I-85.

The Improve Existing Roadways Alternatives would not improve east-west connectivity or mobility within southern Gaston County or between Gaston and Mecklenburg Counties, and travel times for most intra- and inter-county trips would lengthen.

Currently, there are no continuous east-west routes in southern Gaston County. The roads in southern Gaston County generally run north-south. With the exception of US 321, which is four lanes wide with no-access control, all primary roads in southern Gaston County (NC routes and SR routes) are two-lane roadways with no access control. Therefore, improvements to existing roads in southern Gaston County could not improve east-west connectivity, would not improve travel times, and would only nominally improve mobility.

Travel times within southern Gaston County and between Gaston and Mecklenburg Counties would lengthen somewhat under the Improve Existing Roadway Alternative Scenarios 4+/4a (**Section I.8.8**). Under these scenarios, more vehicles are using the network roads to reach I-85 and US 29-74, which reduces speeds on roadways throughout the network (**Section I.8.5**). If the new capacity on I-85 were tolled, travel time savings may improve, but some of these savings would be offset because vehicles would still need to drive on congested roadways to reach the interstate. Also, for inter-county travel, travelers must use I-85 or US 29-74 to cross over the river, which constrains traffic flow. Travel times under Scenario 8 likely would be better, as more capacity is provided on north-south feeder roads, but travel time savings would not reach the levels achieved by a New Location Alternative.

I.6.3 IMPACT CONSIDERATIONS

The additional impacts and issues resulting from a toll option for adding new capacity to I-85 are discussed as new information in this section.

Several potential impacts were considered in the evaluation of the Improve Existing Roadways Alternatives. Impacts analyzed were for Scenario 8 since this scenario (which improved the north/south feeder roads) provided the best opportunity to meet the purpose and need out of all the Improve Existing Roadways Alternatives. However, discussions below of impacts from improvements to I-85 and US 29-74 also would apply to Scenarios 4+ and 4a. Impacts from the toll options for adding new capacity to I-85 would be greater than discussed below due to the larger footprint required for right of way, particularly at interchanges under the toll option that would construct fully-separated toll lanes.

Scenario 8 includes numerous improvements to north/south feeder roads in southern Gaston County as shown in **Figure 11**. Most of these improvements are widenings of existing US and NC routes, such as US 321, NC 7, NC 273, NC 274, and NC 279, to four or five-lane roadways.

The estimates of potential impacts were based on information obtained from NCDOT and Gaston County GIS databases, aerial photography, and preliminary field observations. Potential impacts for Scenario 8 have been organized into two categories, environmental and engineering. Potential impacts from improving the existing east-west roadways, I-85, and US 29-74 are discussed for both categories, along with impacts due to the feeder route improvements.

In general, improvements to existing I-85 and US 29-74 likely would have an overall lesser impact on the natural environment than a new location alternative. However, impacts to the human environment may be equal to or greater than a new location alternative for Scenario 8.

Table 5 lists the potential impacts from the north/south feeder route improvements. **Figures 12a-e** show representative north/south feeder road segments on aerial photography. Further discussion of these impacts, and impacts due to improving US 29-4 and I-85, is provided below.

Table 5. Potential Impacts from Widening North/South Feeder Routes Included in Scenario 8

Issue	North/South Feeder Road ¹										Total
	1	2	3	4	5	6	7	8	9	10	
Total Length (miles)	8.0	1.4	11.0	1.8	8.2	3.1	3.6	5.2	2.1	10.8	55
Length of improvements (miles)	6.3	1.4	8.2	1.8	8.2	3.1	3.6	5.2	2.1	10.8	51
Churches	2	4	12	4	6	2	-	8	1	5	44
Utilities (# of transmission crossings)	4	-	2	4	2	1	2	3	-	5	23
Residences	Med	Med	High	High	Med	High	Med	High	Med	High	High
Businesses	Low	High	Med	Med	Low	Low	Low	Med	Med	High	Med
Parks/Recreation Areas	-	1	1	-	-	-	-	-	-	-	2
Community Facilities	1	2	4	-	4	-	-	-	-	2	13
Potential Historic Sites or Districts (based on Phase I survey)	4	-	6	-	2	-	2	-	-	6	20
Streams (# of crossings / # of bridges)	2 / 2	1 / 0	-	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	-	2 / 3	10/10
NWI Wetlands (# of crossings)	-	1	-	-	-	-	-	-	-	-	1
Floodplains (# of crossings)	1	1	-	1	1	1	1	2	-	4	12
Known Hazardous Materials Sites	-	-	-	-	-	-	-	-	-	2	2

The north south feeder roads are:

1. NC 273 south to NC 279 at the Botanical Garden (4-lane divided)
2. NC 7 from Exit 27 south to NC 273 (4-lane divided)
3. NC 279 (New Hope Rd) from Exit 20 on I-85 south to NC 273 at the Botanical Garden (5 lanes)
4. Redbud Dr from Exit 22 at I-85 south to NC 279 (4-lane divided)

Table 5. Potential Impacts from Widening North/South Feeder Routes Included in Scenario 8

Issue	North/South Feeder Road ¹										Total
	1	2	3	4	5	6	7	8	9	10	

5. NC 274 (Union New Hope Rd) Robinwood Rd south past the airport continuing on Union/New Hope Rd swinging northwest to NC 279 (4-lane divided)
6. Robinwood Rd from NC 279 New Hope Rd south to NC 274 (4 lanes)
7. Robinson Rd from NC 274 south to US 321 (5 lanes)
8. NC 274 at Exit 14 south to Myrtle School Rd, continuing south on Myrtle School Rd to US 321. (4-lane divided or 5 lane)
9. NC 274 from State Line to Union/S. New Hope Rd (4-lane divided)
10. US 321 widened to 6 lanes from State Line to I-85.

1.6.3.1 Potential Human Environment Impacts

There are no updates or additions to this section. As stated above, impacts from a toll option for adding new capacity to I-85 would be greater than a non-toll option due to the larger footprint required, particularly at interchanges.

Potential impacts to the human environment would be greatest for improvements along US 321, NC 279, and NC 273. The following human environment impacts along the feeder routes would be in addition to the human environment impacts associated with improvements along I-85 and US 29-74.

Relocations and Community Facilities Impacts. Widening sections of the north/south feeder routes would impact residences, businesses, churches, community facilities along these roadways. NC 279 (Road 3 in Table 5) and NC 274 (Road 8) could potentially impact twenty churches along the approximate sixteen miles of improvements. In general, potential residential impacts are greatest along existing two-lane routes such as NC 273, NC 279, and NC 274 where single-family homes and their individual driveways are located on both sides of the roadway. Potential business impacts would be greatest near or between I-85 and US 29-74, such as along US 321 (Road 10) and NC 7 (Road 2). **Figure 12b** shows the high density development along US 321. **Figure 12c** shows a segment of NC 7 where business impacts could occur.

Potential community facility impacts would be greatest along NC 279 (Road 3) and NC 274 (Road 5). **Figure 12d** shows a section of NC 279 (Road 3) with a high potential for impacts to community facilities, churches, Forest View High School, a library, and potential historic properties.

Parks. Two roadway sections have the potential to impact parks based on additional roadway widening. Widening of NC 7 through Belmont could impact Crescent Park (**Figure 12c**), and the widening of NC 279 could impact the Daniel Stowe Botanical Garden.

Historic Sites and Districts. A Phase I survey of historic architectural resources was conducted in May 2003 for the New Location Alternatives study area. The Phase I survey also identified known historic sites and districts on or eligible for the National Register of Historic Places located in the I-85 and US 29-74 corridors.

Historic sites and districts are located along existing US 29-74 (Franklin Boulevard) and US 321 (York Street). The intersection of these two roadways is in Gastonia's Downtown Historic District (National Register of Historic Places). Impacts to the District would be unavoidable. **Figure 12b** shows the Downtown Historic District in Gastonia. Improvements to US 29-74 (Wilkinson Boulevard) through Belmont could impact the Belmont Historic District.

There are a total of twenty potential historic sites that could potentially be impacted by north/south feeder road improvements. **Figure 12d** shows some of the potential historic sites along NC 279.

Hazardous Materials Sites. Two known hazardous material sites could be impacted by widening US 321. The two hazardous material sites are RCRA or CERCLA sites; AB Carter, Inc. and Woody's Tire Fire. The AB Carter, Inc. site generated, treated, and land-disposed wastewater and sludge from a chroming and nickel plating operation for the textile industry. The Woody's Tire Fire site was used to store used tires, with roughly 50,000 to 100,000 tires that caught on fire.

1.6.3.2 Potential Natural Environment Impacts

There are no updates or additions to this section. As stated above, impacts from a toll option for adding new capacity to I-85 would be greater than a non-toll option due to the larger footprint required.

Potential impacts to the natural environment could occur along existing US 29-74, where approximately 6.3 miles of improvements would be necessary to upgrade to six lanes along the corridor. Where improvements are necessary, there are several stream and floodplain crossings. Six bridge crossings would be required, one over the Catawba River, one over the South Fork of the Catawba River, and four west of Myrtle School Road.

Potential impacts to the natural environment would be greatest for feeder road improvements along US 321 (Road 10) and NC 273 (Road 1) as a result of multiple stream crossings and bridge replacements. Improvements to US 321 would require crossing two streams (one crossing is an existing potentially historic bridge) with three new bridges. Also, four floodplains would be crossed.

Improvements to NC 273 would require crossing two streams with two new bridges one of which would be over the South Fork of the Catawba River.

1.6.3.3 Potential Engineering Issues

This section updated to include a statement about the potential engineering issues related to the toll option for the Improve Existing Roadways Alternative scenarios.

The discussion of potential engineering issues associated with widening I-85 applies to whether the widening is tolled or non-toll. However, the engineering issues would be more complex and result in more impacts under the toll options.

Constructability. I-85 would be widened to eight to ten lanes throughout the study area under Scenarios 4+, 4a, and 8. The total length of proposed improvements along I-85 would be approximately 16 miles for Scenario 4+ and 20.5 miles for Scenarios 4a and 8. All interchanges along I-85 in the project study area (a total of 11) would need to be reconstructed in order to meet current AASHTO design standards and to provide enough space under the bridges to accommodate the additional lanes. In addition to work at the eleven interchanges in the project study area, there are fifteen cross street bridges and six railroad bridges that would need to be replaced because of inadequate horizontal clearances for additional lanes. **Figure 12e** shows an example of one of the substandard interchanges in the project study area (I-85 at Ozark Avenue [Exit 19]) where an interchange and a railroad bridge would have to be reconfigured if improvements were made to existing I-85.

Maintenance of Traffic and Travel Delays. The re-construction of interchanges and replacement of structures along I-85 would result in lengthy construction periods with significant driver delays through these construction zones for an extended period of time. Complex traffic control plans would be required to provide for the safety of the motorists and the construction workers. There are no controlled-access routes between Gaston and Mecklenburg Counties that could serve as an alternate route to I-85 during construction. Currently, when incidents occur on I-85, traffic is rerouted to US 29-74, which has no access control and a high density of commercial driveways and traffic signals.

In order to maintain existing traffic patterns to the extent possible, the new bridge structures over the interstate would need to be constructed on new alignments, and where possible, adjacent to the existing structures. These reconstructions and realignments would impact adjacent businesses.

Safety, Bridge Replacement, and Construction Schedule. The construction of new bridge structures would result in increased driver delay and could impact driver safety during the construction period. In order to attempt to minimize these delays, it would be recommended to stagger the replacement of these bridges within the project study area limits. By staggering this construction, there could be a delay of ten years or more before widening of I-85 could be completed, resulting in continued driver delays. This estimated construction schedule was based on NCDOT Division 12 Construction Engineer's professional judgment and experience.

Diversion of Traffic Patterns. There would likely be increased driver delays and potential economic impacts to local merchants as a result of changes in travel patterns due to construction for widenings and intersection improvements along a majority of this east-west corridor. Structural issues related to bridges would not be as prevalent along US 29-74 when compared to I-85.

Construction of feeder route improvements outside of the urban areas would be disruptive to traffic patterns in southern Gaston County, which currently suffers from the lack of east-west connectivity. Improving the feeder routes while constructing or making improvements along existing I-85 and US 29-74 also would reduce mobility and increase travel times between Gaston and Mecklenburg County. Completion of the I-85 and US 29-74 improvements first would extend the already extremely lengthy construction period.

1.6.3.4 Inconsistency with Local Thoroughfare Plans and Comprehensive Land Use Plans

This section updated to reference the 2030 Long-Range Transportation Plans for GUAMPO and MUMPO. The Improve Existing Roadways Alternatives would not be consistent with local transportation and land use plans as either a toll or non-toll facility.

The Improve Existing Roadways Alternatives would not be consistent with local transportation and land use plans. The Gaston Urban Area Metropolitan Planning Organization (GUAMPO) recommends a new location highway to improve east-west mobility in southern Gaston County in the 2030 Long-Range Transportation Plan (LRTP).

The Mecklenburg-Union MPO's 2030 LRTP also identifies a transportation need for an additional crossing of the Catawba River.

The comprehensive land use plans of both Gaston County and Mecklenburg County show southeast Gaston County and western Mecklenburg County as high growth areas. Both comprehensive plans show a new roadway connection across the Catawba River between these two high growth areas. Western Mecklenburg County is planned to be a major employment center. The Charlotte-Douglas International Airport is already a major employment center and the airport is proposing a new intermodal facility in the southwest portion of their property that will add jobs and truck traffic to the airport area.

1.6.4 DECISION ON WHETHER TO RETAIN FOR DETAILED STUDY

Additional information about toll options for increasing capacity on I-85 is added to this section. The decision to eliminate the Improve Existing Roadways Alternatives from detailed study is still valid.

DECISION: Eliminate the Improve Existing Roadways Alternatives from Detailed Study

The reasons for eliminating each of the Improve Existing Roadways Alternative Scenarios (4+, 4a, and 8) are described below. The discussions also address adding the new capacity on I-85 as either non-toll or toll/HOT lanes.

Improve Existing Roadways Alternative

Scenarios 4+ and 4a. These Improve Existing Roadways Alternative Scenarios, with new I-85 lanes as non-toll or toll/HOT, were eliminated from further study based on the following reasons:

PROS	CONS
<ul style="list-style-type: none"> Provides additional capacity on I-85 through the Gaston County portion of the project study area. Scenario 4a also would increase capacity over the Catawba River. Avoids impacts associated with a new location facility. 	<ul style="list-style-type: none"> Does not improve connectivity or travel times in southern Gaston County Does not improve connectivity or travel times between southern Gaston County and Mecklenburg County. Would result in the greatest construction delays of all alternative concepts. Would disrupt local and through travelers for an extended period of time. Bridge deck construction for I-85 widening would require intermittent closures of I-85, with poor alternatives available for off-site detours for I-85 traffic.

1. Improving existing I-85 and US 29-74 under Scenario 4+ or

Scenario 4a (with two-four new I-85 lanes as non-toll or toll/HOT) would not meet the need for connectivity between southern Gaston County and western Mecklenburg County.

Geographically, southern Gaston County and western Mecklenburg County are isolated from each other by the Catawba River. There are no crossings of the Catawba River south of US 29-74 until the NC 49 Buster Boyd Bridge in York, South Carolina, about 11 miles downstream from US 29-74. People would still have to travel north on two-lane roadways, many through downtown areas, and some through historic districts, to go east and west. If the new capacity under Scenario 4+ or Scenario 4a were tolled, accessibility of these lanes through Gaston County would be less than if the lanes were added as general purpose lanes because access would be provided at limited locations along the roadway.

Travel times between Gaston and Mecklenburg Counties would not improve compared to the No-Build Alternative, and in many instances would get longer. If the new capacity on I-85 were tolled, travel time savings may improve, but some of these savings would be offset because vehicles would still need to drive on congested roadways to reach the interstate. Also, for inter-county travel, travelers must use I-85 or US 29-74 to cross over the river, which constrains traffic flow.

2. South of US 29-74 there are no continuous east-west roadways in the southern half of Gaston County. Improvements to I-85 (with new I-85 lanes as non-toll or toll/HOT) and US 29-74 proposed under Scenario 4+ or 4a would not improve east-west mobility within southern Gaston County, and travel times for intra-county travel would generally be slightly longer.
3. I-85 is projected to operate primarily at LOS F in 2030, regardless of the alternative. Under the Improve Existing Roadways Alternative Scenario 4a and Scenario 4+, most improvements in traffic flow that would be achieved along I-85 by adding additional lanes would be offset by the increase in traffic volumes attracted to the facility. LOS on I-85 would improve to LOS D only west of US 321 under Scenarios 4+/ 4a. If the new lanes were toll lanes, traffic flow for those lanes would improve, but traffic flow for the general purpose lanes would not.

4. While improving existing I-85 under Scenario 4+ or Scenario 4a would increase traffic capacity (as either non-toll or toll/HOT) along I-85 in the study area, they are not reasonable or practical alternatives due to travel delays during construction, long construction duration, and community disruption caused by the required improvements to existing I-85. At a minimum, Scenario 4+ and Scenario 4a would require construction at eleven interchanges and fifteen cross street bridges along I-85, and replacement of six bridges along US 29-74. Constructing the new capacity as a separated toll facility would incur more construction impacts due to the need for wider footprints at interchanges, and possibly new interchanges. There are no controlled-access routes between Gaston and Mecklenburg Counties that could serve as an alternate route to I-85 during construction. Currently, when incidents occur on I-85, traffic is rerouted to US 29-74, which has no access control and a high density of commercial driveways and traffic signals.
5. Improve Existing Roadways Alternative Scenario 4+ and Scenario 4a would not be consistent with the local transportation plan (GUAMPO's 2030 LRTP), which shows a new location highway through southern Gaston County, connecting southern Gaston County and western Mecklenburg County and no planned widening of I-85 in the project area.
6. Implementing Scenario 4+ by reconfiguring existing pavement would avoid the need for additional right of way (and the issues associated with the increased footprint) described in Item 4 above. However, this option would result in substandard lanes (11 feet wide) and a 2-foot inside shoulder that would be major design exceptions for an interstate type facility. Also, as a toll option, the substandard inside shoulder would not allow for toll enforcement activities and would not provide a breakdown lane for disabled vehicles that could block the toll/HOT lanes. The lack of buffer between the toll/HOT lane and the general purpose lanes would not be desirable. Although this option (as an HOV facility or HOT facility) may be found to have merit under the purposes of the Fastlanes study (study to be released in late 2008), it would not meet the purpose and need for this project.

Improve Existing Roadways Alternative Scenario 8. This Improve Existing Roadways Alternative Scenario, with two to four new I-85 lanes as non-toll or toll/HOT and widening of north-south feeder roads, was eliminated from further study based on the following reasons:

1. Scenario 8 would provide some nominal improvement to connectivity between southern Gaston County and western Mecklenburg County by improving existing I-85 and US 29-74, and also widening the north-south feeder roads from southern Gaston County to

PROS	CONS
<ul style="list-style-type: none"> • Provides additional capacity on I-85 through the study area, including over the Catawba River. • Avoids impacts associated with a new location facility. • Provides improvements to congestion in the travel network of Gaston County. 	<ul style="list-style-type: none"> • Does not improve connectivity in southern Gaston County • Provides minimal improvements to connectivity between southern Gaston County and Mecklenburg County. • Provides minimal improvements to mobility and access to/from southern Gaston County. • Provides little to no travel time savings compared to the No-Build Alternative • Would result in the greatest construction delays of all alternative concepts. • Would disrupt local and through travelers for an extended period of time. • Bridge deck construction for I-85 widening would require intermittent closures of I-85, with poor alternatives available for off-site detours for I-85 traffic. • Would have high levels of impacts to the human and natural environments.

provide improved access to the widened east-west I-85 and US 29-74. However, people in southern Gaston County would still have to travel north on non-controlled access roadways, many through downtown areas, and some through historic districts, to go east and west. Even considering the improvements to approximately 51 miles of north/south feeder roads included in Scenario 8, connectivity between southern Gaston County and Mecklenburg County would still not be direct.

Travel times between Gaston and Mecklenburg Counties would not improve compared to the No-Build Alternative, and in many instances would get longer. If the new capacity on I-85 were tolled, travel time savings may improve, but some of these savings would be offset because vehicles would still need to drive on congested roadways to reach the interstate. Also, for inter-county travel, travelers must use I-85 or US 29-74 to cross over the river, which constrains traffic flow. Travel times under Scenario 8 likely would be better, as more capacity is provided on north-south feeder roads, but travel time savings would not reach the levels achieved by a New Location Alternative.

2. South of US 29-74 there are no continuous east-west roadways in the southern half of Gaston County. Improvements to I-85 and US 29-74, and the additional improvements to north/south feeder roads proposed under Scenario 8, would not improve east-west mobility or travel times within southern Gaston County.

3. While improving existing I-85 would improve traffic capacity and operations along I-85 in the study area, it is not a reasonable or practical alternative due to travel delays during construction, long construction duration, and community disruption caused by the required improvements to existing I-85 and, under Scenario 8, the 51 miles of north-south feeder routes in the study area to

improve access to the interstate. Scenario 8 would, at a minimum, require construction at eleven interchanges and fifteen cross street bridges along I-85 and replacement of six bridges along US 29-74. Constructing the new capacity as a separated toll facility would incur more construction impacts due to the need for wider footprints at interchanges, and possibly new interchanges. Scenario 8 also would require replacing ten bridges along the feeder routes. There are no controlled-access routes between Gaston and Mecklenburg Counties that could serve as an alternate route to I-85 during construction. Currently, when incidents occur on I-85, traffic is rerouted to US 29-74, which has no access control and a high density of commercial driveways and traffic signals.

4. Scenario 8 would impact the human environment considerably within the entire project study with impacts to businesses, residences, community facilities, safety, travel patterns, and historic sites. Potential impacts to the human environment would be greatest for improvements along US 321, NC 279, and NC 273. Potential impacts to the natural environment would be greatest for improvements along US 321 and NC 273 due to the stream crossings and bridge replacements. Potential impacts to the natural environment along existing US 29-74 would include six new bridge crossings.
5. Improve Existing Roadways Alternative Scenario 8 would not be consistent with the local transportation plan (GUAMPO's 2030 LRTP), which shows a new location highway through southern Gaston County connecting southern Gaston County and western Mecklenburg County, and no planned widening of I-85 in the project area.

Appendix A includes the NEPA/404 merger process concurrence forms documenting the decision to eliminate the Improve Existing Roadways Alternatives from further study.

I.7 NEW LOCATION ALTERNATIVES

I.7.1 HISTORY OF ALTERNATIVE IN LOCAL TRANSPORTATION PLANS

This section was updated to include information about tolling and the limits of the project.

The Gaston Urban Area Metropolitan Planning Organization (GUAMPO) has recommended improvements to east-west mobility in southern Gaston County through construction of a new location roadway. The need for improved east-west mobility and the bypass concept was first identified in 1989 during the citizen participation process associated with the update of the Gaston Urban Area Thoroughfare Plan. The GUAMPO held five citizen workshops, six public meetings, and thirteen formal public hearings before adopting the US 321/74 Bypass (an early local name for the Garden Parkway) on their 1991 Plan.

The GUAMPO's Transportation Advisory Committee (TAC) oversees state and federal road projects within the Gaston Urbanized Area. In 1992, the TAC requested the Mecklenburg-Union MPO (MUMPO) TAC to place the US 321/74 Bypass on their thoroughfare plan. In 1994, the MUMPO TAC adopted a conceptual regional thoroughfare plan proposed by the Charlotte Committee of 100, which included the US 321/74 Bypass.

In 1996, a citizens advisory council was formed to serve as an advisory board to the Gaston Urban Area TAC. This group, later called the US 321/74 Bypass Citizens' Committee, consisted of 40 Gaston County residents. From 1997 through 1999, the US 321/74 Bypass Citizens' Committee met on a monthly basis in an effort to select a corridor for the "Bypass". The Citizens' Committee recommended to the Gaston Urban Area TAC the existing proposed location of the bypass facility as it has appeared on the 1999 Gaston Urban Area Thoroughfare Plan and in subsequent updates of the Thoroughfare Plan (See **Figure 13**).

In September 2000, the GUAMPO TAC passed a resolution that it "supports the use of alternative funding methods to accelerate construction of the US 321/74 Bypass, including methods that would require the payment of a toll by motorists." (2030 Long Range Transportation Plan, p. 74).

In November 2001, the Gaston Urban Area TAC approved a motion to use the name *Garden Parkway* (as in Daniel Stowe Botanical Garden) in reference to the "US 321/74 Bypass."

In the Gaston Urban Area 2030 Long Range Transportation Plan (LRTP) (adopted May 2005), the Garden Parkway is recognized as two projects; the Gaston East-West Connector (STIP Project U-3321) extending from I-85 west of Gastonia to I-485 and the US 321 Bypass (STIP Project R-2608) extended from US 321 north of Gastonia to I-85 west of Gastonia (Gaston Urban Area 2030 LRTP, May 2005, p. 71).

I.7.2 ALTERNATIVE DESCRIPTION

*This section includes new information related to the New Location Alternative as a toll facility. There are no changes to **Figure 13**.*

During this initial screening to determine whether the New Location Alternatives would be reasonable and would meet the project purpose and need, the concept of the New Location Alternative was represented by the alignment and interchange locations shown on the GUAMPO's 2030 Long Range Transportation Plan and Thoroughfare Plan. The alignment and interchange locations are shown in **Figure 13**.

The New Location Alternatives would extend from I-85 west of Gastonia, through southern Gaston County, to connect to I-485 and NC 160 in Mecklenburg County. There would be new bridge crossings of the South Fork Catawba River and the Catawba River.

Freeway-to-freeway interchanges would be provided at I-85 and at I-485. Service interchanges are proposed at US 29-74, Linwood Road, US 321, Robinson Road, Bud Wilson Road, NC 274 (Union Road), NC 279 (New Hope Road), NC 273 (Southpoint Road), and Dixie River Road.

- The New Location Alternatives were originally developed and evaluated as controlled-access non-toll highways. This was supported by the volume of traffic projected to use a new highway facility in 2025, and is also supported by the projected 2030 traffic volumes (toll and non-toll scenarios).

Two non-toll new location scenarios were evaluated in the regional 2025 Gaston travel demand model, Scenarios 5 and 5a. Scenario 5 is a four-lane new location highway and Scenario 5a is a six-lane new location highway. The locations of the alignment and interchanges were the same for both scenarios, and they both were projected to have similar 2025 traffic volumes under the 2025 Gaston travel demand model.

New Location Alternatives to the north of I-85 and US 29-74 were not considered. One of the primary needs for the project is to improve mobility, access, and connectivity in southern Gaston County and between southern Gaston County and Mecklenburg County. Alignments in the northern half of Gaston County would not serve the southern half of Gaston County.

- The 2030 Metrolina travel demand model was used to model the traffic volumes on the New Location Alternative under two scenarios, as a toll facility and as a non-toll facility. Since this was done after the Detailed Study Alternatives were identified, three of the Detailed Study Alternatives (DSAs) were selected as representative alternatives to model. The representative alternatives were DSA 64 (the southernmost alternative), DSA 4 (northernmost alternative), and DSA 77 (a crossover alternative).

- Although the NCDOT and NCTA agreed in May 2007 that the project should proceed from that date forward considering only toll alternatives (**Section 1.3**), this addendum includes information from the 2030 Metrolina travel demand model for both a Toll Scenario and a Non-Toll Scenario. This allows the reader to review the potential traffic effects from tolling the new facility.

I.7.3 TRAFFIC OPERATIONS

- *Traffic operations are discussed in detail in **Section 1.8**. Below are additions to the summarized traffic operations discussion that relate to results based on the 2030 Metrolina travel demand model.*

Original Section Title:

1.7.3.1 2025 Traffic Volumes on the New Location Alternative

New Section Title:

1.7.3.1 2025 and 2030 Traffic Volumes on the New Location Alternative

Below are additions to this section relating to traffic volumes from the 2030 Metrolina travel demand model. There are no changes to **Table 6** in the original document. **Table 6b** is added to present the year 2030 information.

Table 6 shows the 2025 average daily traffic volumes (ADT) and AM and PM peak hour traffic volumes that would occur on the Scenario 5/5a representative New Location Alternative. The 2025 Gaston travel demand model output showed the same traffic volumes for Scenario 5 (four-lane new location highway) and Scenario 5a (six-lane new location highway). In 2025, the New Location Alternative is projected to attract around 42,000-56,400 ADT. **Section II.5.2** describes the traffic projections and operations analyses conducted for the New Location Alternative functional designs.

Table 6. 2025 Traffic Volumes on the New Location Alternative – Scenarios 5 and 5a

Between Interchanges		ADT Total	PM Peak Hour			AM Peak Hour		
			EB	WB	Total	EB	WB	Total
I-85	US 29-74	53,600	2,937	2,701	5,638	1,229	1,573	2,802
US 29-74	Linwood Rd	51,800	2,954	2,739	5,693	1,260	1,447	2,706
Linwood Rd	US 321	43,700	2,371	2,442	4,813	1,051	963	2,013
US 321	Robinson Rd	42,000	2,140	2,365	4,505	1,122	836	1,958
Robinson Rd	Bud Wilson Rd	44,800	2,239	2,530	4,769	1,243	897	2,140
Bud Wilson Rd	NC 274 (Union Rd)	52,400	2,486	2,838	5,324	1,524	1,062	2,585
NC 274 (Union Rd)	NC 279 (New Hope Rd)	50,200	2,332	2,932	5,264	1,535	913	2,448
NC 279 (New Hope Rd)	NC 273 (Southpoint Rd)	56,400	2,574	3,328	5,902	1,826	979	2,805
NC 273 (Southpoint Rd)	Dixie River Rd	52,700	2,277	3,108	5,385	1,689	688	2,376
Dixie River Rd	I-485	46,200	2,288	3,091	5,379	1,738	1,177	2,915

ADT-Average Daily Traffic volume EB-Eastbound WB-Westbound

Table 6b shows the 2030 average daily traffic volumes (ADT) that would occur along the three modeled representative New Location Alternatives under a toll scenario and a non-toll scenario. As shown in the table, the ADTs for each scenario are similar for the three alternatives. As expected, in 2030, the New Location Alternative would carry higher traffic volumes as a non-toll facility than as a toll facility, generally about twice as much traffic volume.

Table 6b. Year 2030 Traffic Volumes on a New Location Alternative – Toll and Non-Toll Scenarios

Segment	Modeled Alternative					
	4*		64		77*	
	Toll Traffic	Non-Toll Traffic	Toll Traffic	Non-Toll Traffic	Toll Traffic	Non-Toll Traffic
I-85 to US 29/74	12,800	25,000	10,000	16,700	12,200	22,500
US 29/74 to Linwood Road	20,800	42,500	11,400	35,500	18,000	43,100
Linwood Road to Lewis Road	15,400	47,400	9,600	35,300	17,400	46,500

Table 6b. Year 2030 Traffic Volumes on a New Location Alternative – Toll and Non-Toll Scenarios

Segment	Modeled Alternative					
	4*		64		77*	
	Toll Traffic	Non-Toll Traffic	Toll Traffic	Non-Toll Traffic	Toll Traffic	Non-Toll Traffic
Lewis Road to US 321	15,400	47,400	14,200	44,500	17,400	46,500
US 321 to Robinson Road	20,000	52,400	18,800	49,400	21,400	53,000
Robinson Road to Bud Wilson Road	29,200	61,200	29,400	57,600	30,400	62,600
Bud Wilson Road to NC 274	28,000	59,600	28,600	57,200	28,200	58,400
NC 274 to NC 279	31,600	61,600	35,000	62,600	34,800	65,200
NC 279 to NC 273	42,200	78,400	44,200	79,000	43,400	82,000
NC 273 to Dixie River Road	58,400	106,400	61,800	105,200	60,600	110,800
Dixie River Road to I-485	55,400	96,800	54,400	89,400	53,000	93,800

* Modeled alternative does not have an interchange at Lewis Road

1.7.3.2 Traffic Operations on Existing Roadways - Conclusions

Additional information is included in this section based on forecasts from the 2030 Metrolina travel demand model for the New Location Alternative as a toll facility and a non-toll facility.

Various traffic operations analyses conducted for the New Location Alternative using the 2025 Gaston travel demand model (Non-Toll Scenario) and the 2030 Metrolina travel demand model (Toll and Non-Toll Scenarios) are described in detail in **Section I.8**, together with the Improve Existing Roadways Alternatives. Conclusions from these analyses are summarized below.

Based on the 2025 Gaston travel demand model, substantial diversion of traffic off of I-85 and US 29-74 is projected to occur if a New Location highway were built

Average daily traffic volumes on I-85 east of US 321 would be an average of 24 percent lower with a New Location Alternative than under the No Build Alternative. In the PM peak hour, average traffic volumes would be about 21 percent lower on I-85 compared to the No Build Alternative. A New Location Alternative also would reduce traffic on US 29-74 and US 321 by about 13 percent.

Based on the 2030 Metrolina travel demand model, some diversion of traffic off of I-85 and US 29-74 is projected to occur in 2030 if a New Location highway was built.

Average daily traffic volumes (ADT) on I-85 east of US 321 would be an average of 6 percent lower with a New Location Alternative Non-Toll Scenario, and 2 percent lower with a New Location Alternative Toll Scenario, compared to the No Build Alternative. As a non-toll facility, the New Location Alternative would attract more vehicles choosing between using I-85 or the new facility. Due to the latent demand for travel between Gaston and Mecklenburg Counties, I-85 continues to attract vehicles, even as some are diverted to the New Location Alternative. This trend is stronger in the 2030 Metrolina travel demand model than in the 2025 Gaston travel demand model.

Based on the 2025 Gaston travel demand model, 2025 regional network statistics demonstrate a reduction in congested travel for a New Location Alternative

A New Location Alternative would increase vehicle miles traveled compared to the No-Build Alternative and the Improve Existing Roadways Alternatives, but decrease vehicle hours traveled. This is an expected result because travelers are willing to drive farther to access an uncongested route that will save them time.

Although regional vehicle miles traveled would be higher, a new location roadway would result in lower congested vehicle hours and lower congested vehicle miles on the roadway network than widening I-85 to eight lanes (Scenarios 4+). The New Location Alternative would reduce congested vehicle hours about as effectively as widening I-85 to eight to ten lanes (Scenario 4a).

Only when I-85, US 29-74 and all the north/south feeder roads to I-85 and US 29-74 (approximately 51 miles of roadway) are widened (Scenario 8), does the 2025 travel demand model show the non-new location alternative reducing congested vehicle miles and congested vehicle hours substantially more than a new location alternative concept.

Based on the 2030 Metrolina travel demand model, 2030 regional network statistics demonstrate a reduction in congested travel for a New Location Alternative.

A New Location Alternative, either Toll or Non-Toll Scenario would increase VMT and VHT on the network compared to the No-Build Alternative. Compared to the Improve Existing Roadway Alternative Scenarios 4+/4a, the New Location Alternative (Toll or Non-Toll Scenario) would result in the same vehicle miles traveled, but less vehicle hours traveled.

Although regional vehicle miles traveled would be higher, a new location toll facility would result in slightly lower congested vehicle hours and congested vehicle miles on the roadway network compared to the No-Build Alternative, and much lower congested vehicle miles and congested vehicle hours compared to Improve Existing Roadway Alternative Scenarios 4+/4a.

As a percent of total VMT and total VHT, the congested VMT and congested VHT are lowest for the New Location Alternatives, with the Toll Scenario having the best performance compared to all alternatives.

This bigger difference in the New Location Alternative compared to the Improve Existing Roadway Alternative Scenarios 4+/4a is due to the fact that latent demand “fills up” the new capacity on a widened I-85, resulting in increased congestion on I-85 and increased congestion on the roads connecting to I-85.

Although not specifically modeled using the 2030 Metrolina travel demand model, Scenario 8 (which includes widening north/south feeder roads in addition to I-85 and US 29-74) could be expected to have less congested VMT and VHT than the Improve Existing Roadways Alternative Scenarios 4+/4a, since there would be more capacity in the network.

The 2025 Gaston travel demand model volume/capacity ratio maps indicate improvements to traffic flow on I-85 and US 29-74, and US 321 under the New Location Alternative

Both New Location Alternative Scenarios 5 and 5a would have the same effect on improving general levels of network congestion, and both would reduce network congestion over the No-Build Alternative (Scenario 1). The new highway and bridge across the Catawba River between Gaston and Mecklenburg County would be uncongested, and enough traffic would be diverted from existing I-85 and US 29-74 to reduce congestion on these existing routes to levels similar to that experienced under Scenario 4+ (widening I-85 to eight lanes and US 29-74 to six lanes). Improvements to volume/capacity ratios on US 321 south of I-85 also would be improved under Scenarios 5 and 5a as traffic reroutes to the new highway.

Based on the 2025 Gaston travel demand model, traffic operations would be better on I-85 with a new location freeway in place compared to the No Build Alternative and Improve Existing Roadways Alternative Scenario 4+ (widen I-85 to eight lanes).

Building a new location roadway (Scenario 5a) generally resulted in better or equal average levels of service on I-85 than improving these existing roadways under Scenario 4+ (widen I-85 to eight lanes).

Based on the 2030 Metrolina travel demand model, traffic operations would be better on I-85 and on segments of US 29-74 with a new location freeway in place compared to the No-Build Alternative.

Building a new location roadway as either a non-toll or toll facility (representative Alternative DSA 64) generally would result in less 2030 traffic volumes (and therefore slightly better traffic flow) on I-85 compared to the No-Build Alternative, even though the LOS would remain LOS F.

Building a new location roadway as either a non-toll facility or a toll facility would result in less 2030 traffic volumes on US 29-74 along the most congested section (east of McAdenville) compared to the No-Build Alternative and the Improve Existing Roadway Alternative Scenarios 4+/4a. Between McAdenville and Belmont, levels of service would improve from LOS F to LOS D-E.

The New Location Alternative (Non-Toll and Toll Scenarios) would improve east-west connectivity within southern Gaston County and would improve travel times for intra- and inter-county travel.

The New Location Alternative (Non-Toll or Toll Scenario) would provide a controlled-access east-west route across southern Gaston County, where no continuous routes exist today. The New Location Alternative would improve access and mobility and result in travel time savings within southern Gaston County. For example, travel distances would be greatly reduced (from 16.8 miles to 11 miles), and travel times would be cut in half (from approximately 22 minutes to 11 minutes) for a person traveling from the residential areas on the Belmont peninsula (the land between the South Fork Catawba River and Catawba River) to businesses/industry on US 321 (Section I.8.8).

Under the New Location Alternative (Toll Scenario), travel times would noticeably improve for cross-county travel in southern Gaston County. For example, travel from the Belmont peninsula westward to US 321 would be reduced by about 9 minutes (about 40 percent) compared to the No-Build Alternative. Likewise, travel times from southwest Gaston County eastward to the Daniel Stowe Botanical Garden area would be reduced about 8 minutes (about 27 percent) compared to the No-Build Alternative. Travel times under the New Location Alternative (Non-Toll Scenario) are expected to be the same as under the Toll Scenario (Section I.8.8).

Under the New Location Alternative (Toll Scenario), travel times savings also would be substantial for most inter-county trips. For example, a trip to/from southern Gaston County (Belmont Peninsula or southwest Gaston County) or south Gastonia from/to the Charlotte-Douglas International Airport would take about 20 minutes less (30-40 percent reduction). A trip from the Charlotte-Douglas International Airport to downtown Gastonia or downtown Belmont would be reduced by about 10 minutes (about a 15 percent reduction). Travel times under the New Location Alternative (Non-Toll Scenario) are expected to be the same as under the Toll Scenario (Section I.8.8).

I.7.4 DECISION ON WHETHER TO RETAIN FOR DETAILED STUDY

Additional information about a toll option for the New Location Alternative was added above. The decision regarding retaining the New Location Alternative for detailed study is revised below to discuss this alternative concept both as a non-toll facility and a toll facility.

DECISION: Retain the New Location Alternative (Toll Scenario) for Detailed Study

The New Location Alternative (Non-Toll and Toll Scenarios) would meet the project’s purpose and need. Also, this alternative concept would be consistent with local transportation plans.

The New Location Alternative (Non-Toll or Toll Scenarios) would improve connectivity between southern Gaston County and western Mecklenburg County by linking the counties with a new crossing of the Catawba River approximately halfway between the I-85 and US 29-74 crossings and

the NC 49 crossing in South Carolina. Substantial travel time savings for inter-county travel would be achieved compared to the No-Build Alternative.

PROS	CONS
<ul style="list-style-type: none"> Improves connectivity and travel times between southern Gaston County and western Mecklenburg County by providing a new crossing of the Catawba River. Improves connectivity, mobility, and travel times within southern Gaston County. Improves traffic flow and some levels of service on I-85, US 29-74, and US 321. Could serve as a controlled-access alternate route during incidents on I-85. 	<ul style="list-style-type: none"> A new location highway would have substantial construction and right of way costs. Impacts to the natural environment likely would be greatest compared to the other alternative concepts. A New Location Alternative Non-Toll Scenario is not economically feasible within the long-range planning timeframe of 2030.

The New Location Alternative would improve mobility, connectivity, and travel times within southern Gaston County by providing a direct and continuous east/west route across this part of the county.

Traffic flow on I-85, US 29-74, and US 321 would improve under the New Location Alternative because traffic would divert from these roads to use the new highway. Also, when incidents occur on I-85, or on the New Location Alternative, there would be another controlled-access detour route available.

However, while the New Location Alternative Non-Toll Scenario would meet the purpose and need, it is not economically feasible. The current NCDOT 2009-2015 STIP does not include funding for right-of-way acquisition or construction for this project, and traditional (non-toll) transportation funding for this project is not likely in the foreseeable future (as acknowledged in the May 21, 2007 letter from the NCTA to the NCDOT [Addendum Appendix A]). There are many other priority projects statewide and, due to funding constraints, there is not enough funding available from traditional sources in the foreseeable future to construct the Gaston East-West Connector as a non-toll road. The GUAMPO, as part of the metropolitan planning process, has decided to allocate the limited available federal and state funds to other projects. In their 2030 Long-Range Transportation Plan, the Gaston East-West Connector is listed

as the number one project on the Unmet Needs List. In September 2000, the GUAMPO TAC passed a resolution that it supports the use of alternative funding methods, including methods that would require the payment of a toll by motorists (2030 Long Range Transportation Plan, p. 74).

Based on these planning decisions, the New Location Alternative Non-Toll Scenario is not economically feasible and therefore is not a reasonable alternative. Therefore, only the New Location Alternative Toll Scenario is carried forward for detailed study.

I.8 INITIAL SCREENING OF TRAFFIC OPERATIONS ON EXISTING ROADS

New information based on forecasts from the 2030 Metrolina travel demand model for the No-Build Alternative, Improve Existing Roadways Alternative Scenarios 4+/4a as a non-toll facility, and the New Location Alternative Toll and Non-Toll Scenarios are included in new Sections 1.8.5 through 1.8.7 at the end of Section 1.8. There were no changes to Sections 1.8.1 through 1.8.4, which are based on the 2025 Gaston travel demand model. Table numbers in new Sections 1.8.5 through 1.8.7 mirror the numbers of the corresponding year 2025 table. For example, regional network statistics using the 2025 Gaston travel demand presented in Section 1.8.1 are shown in Table 7. Regional network statistics using the 2030 Metrolina travel demand model presented in Section 1.8.5 are shown in Table 7b. In addition, a new Section 1.8.8, was added to discuss connectivity, mobility and travel times within southern Gaston County and between southern Gaston County and Mecklenburg County.

There are substantial differences between the previously used travel demand model for the Gaston Urban Area, the 2025 Gaston travel demand model, and the more current 2030 Metrolina travel demand model. The 2025 Gaston travel demand model's modeled area was the Gaston Urban Area only. External stations needed to be included in the 2025 Gaston travel demand model to account for trips to and from Mecklenburg County and other surrounding counties. The 2030 Metrolina travel demand model covers a 13-county region, including Gaston County and Mecklenburg County in a single model. The 2030 Metrolina travel demand model also uses updated population and land use forecasts that extend out to 2030, and updated travel pattern assumptions and trip tables. The April 13, 2006 version of the 2030 Metrolina travel demand model was used because this was the version current at the time the updated forecasting activities began. The Metrolina travel demand model is updated on a continual basis.

As listed below, using the 2025 Gaston travel demand model, the No-Build Alternative, various Improve Existing Roadway Alternative scenarios, and New Location Alternative scenarios were evaluated in several ways to estimate their effects on traffic operations region-wide and along I-85, US 29-74 and US 321.

- **Regional travel statistics** from the 2025 regional travel demand model. These include: total network vehicle miles traveled, congested vehicle miles traveled, total vehicle hours traveled, and congested vehicle hours traveled. Time periods include daily, morning (AM) two-hour peak period and evening (PM) two-hour peak period.

- **Volume/capacity ratio maps** from the regional travel demand model. These maps are color-coded to show volume to capacity ratios (a measure of congestion) on network roadways for the 2025 AM and PM peak periods (2-hour periods).
- **Year 2025 average daily traffic (ADT) volumes and PM peak hour traffic volumes.** This data shows the traffic diversion from, or attraction to, major routes under the various Improve Existing Alternatives and New Location Alternatives. The regional travel demand model projects that the highest 2025 traffic volumes occur in the evening (PM) peak period.
- **Basic freeway segment levels of service (LOS) for I-85.** Levels of service (an indicator of congestion) were calculated for various alternative scenarios using Highway Capacity Manual methods for freeway segments.

Using the 2030 Metrolina travel demand model, the following scenarios were modeled to estimate their effects on 2030 traffic operations region-wide and along existing major roadways: the No-Build Alternative, a combined Improve Existing Roadways Alternative Scenario 4+/4a, and New Location Alternative Non-Toll and Toll scenarios (using representative DSA 64).

The combined Improve Existing Roadways Alternative Scenario 4+/4a included widening I-85 to eight lanes where it is currently six lanes (west of Exit 26) and to ten lanes where it is currently eight (east of Exit 26 – where the demand is highest). These improvements are at a level between the two individual scenarios. Scenario 4+ includes widening I-85 to eight lanes west of Exit 26. Scenario 4a includes widening I-85 to eight lanes west of Exit 19 and to ten lanes east of Exit 19. Improvements to US 29-74 are the same under all three scenarios. Since the 2025 projected daily traffic volumes for the two scenarios were almost the same, and 2025 regional statistics were similar, this combination of Scenarios 4+ and 4a modeled in the 2030 Metrolina model provided a representative forecast that could be used for either scenario.

Improve Existing Roadways Alternative Scenario 8 was not modeled because it was not necessary, as this alternative was eliminated more for its impacts to the human and natural environments. **Section I.6.4** includes more discussion on why these scenarios were eliminated.

Of the three representative DSAs used to create forecasts for the New Location Alternative (Non-Toll and Toll Scenarios), DSA 64 was used to evaluate effects region-wide and on existing I-85, I-485, US 29-74 and US 321 for comparison to the No-Build Alternative and Improve Existing Roadways Alternative Scenarios 4+/4a. Based on year 2025 travel demand modeling efforts for the DSAs as non-toll facilities, the DSAs were relatively close in projections, with DSA 64 appearing to divert the least traffic from I-85 and US 29-74. Using this alternative as a representative alternative provides an estimate of the lower range of the project's ability to reduce traffic volumes on the area's major roadways as either a toll facility or a non-toll facility. Other DSAs were estimated to be as or more effective at diverting traffic.

- **Regional travel statistics** for 2030 from the Metrolina regional travel demand model. These include: total network vehicle miles traveled, congested vehicle miles traveled, total vehicle hours traveled, and congested vehicle hours traveled. Time periods include daily, morning (AM) two-hour peak period and evening (PM) two-hour peak period.
- **Year 2030 average daily traffic (ADT) volumes.** This data shows the traffic diversion from, or attraction to, major routes under the various alternative scenarios compared to the No-Build Alternative.
- **Levels of service (LOS) for I-85, I-485, US 29-74, and US 321.** Levels of service (an indicator of congestion) were calculated for various alternative scenarios using Highway Capacity Manual methods.

I.8.1 Regional Statistics from the 2025 Travel Demand Model

There are no updates or additions to this section. See **Section 1.8.5** for regional statistics from the 2030 Metrolina travel demand model.

Table 7 lists the regional network-wide statistics for the year 2025 for the No-Build Alternative, three Improve Existing Roadways Alternative scenarios, and two New Location Alternative scenarios. The statistics include: total network vehicle miles traveled, congested vehicle miles traveled, total vehicle hours traveled, and congested vehicle hours traveled.

The statistics are generated by the 2025 Gaston travel demand model. Total network vehicle miles traveled are the total miles traveled by the projected traffic on all roadways included in the model. Total vehicle hours traveled are the total hours spent on the roadways by all trips generated in the model. Congested vehicle miles are the miles traveled on roadways with volume to capacity ratios greater than 1.0. Congested vehicle hours traveled are the total hours all vehicles spent on roadways with volume to capacity ratios greater than 1.0.

The values in **Table 7** for Scenario 4+ show that capacity improvements made to existing I-85 (widen to 8 lanes) and US 29-74 (widen to 6 lanes) would reduce the congested vehicle miles traveled and the congested vehicle hours traveled in the 2025 network compared to the No-Build Alternative. Total vehicle miles and vehicle hours traveled would be similar to the No-Build Alternative. These results are consistent with the expectation that capacity improvements to the primary routes through Gaston County (I-85 and US 29-74) would result in a noticeable change in predicted regional congestion, including the reduction of congested vehicle miles and congested vehicle hours.

Table 7. Regional Travel Demand Model Statistics Under Various Scenarios

Scenario	Description	2025 Vehicle Miles Traveled (VMT) in 1000's			2025 Vehicle Hours Traveled (VHT) in 1000's		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
1	No-Build Alternative	7,646	832	1,378	227.2	24.9	46.6
4+	Improve Existing I-85 to 8 lanes and US 29-74 to 6 lanes with TSM-type measures	7,612	828	1,376	228.9	25.4	45.9
4a	Scenario 4+, except improve I-85 to 10 lanes	--	828	1,375	--	25.2	44.4
8	Scenario 4a plus widening north/south feeder roads	--	824	1,370	--	24.8	43.3
5	New Location Alternative – 4-lane highway	7,814	843	1,410	223.7	24.3	43.3
5a	New Location Alternative – 6-lane highway	--	843	1,409	--	24.3	43.4
		2025 Congested VMT in 1000's			2025 Congested VHT in 1000's		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
1	No-Build Alternative	4,149	115.7	721.1	115.6	4.9	25.5
4+	Improve Existing I-85 to 8 lanes and US 29-74 to 6 lanes with TSM-type measures	3,431	109.5	539.1	102.6	5.2	21.0
4a	Scenario 4+, except improve I-85 to 10 lanes	--	102.7	392.5	--	4.9	16.8
8	Scenario 4a plus widening north/south feeder roads	--	78.4	300.2	--	4.0	13.9
5	New Location Alternative – 4-lane highway	2,917	97.3	471.7	89.3	4.3	17.5
5a	New Location Alternative – 6-lane highway	--	99.3	472.6	--	4.4	17.6

Source: Gaston East-West Connector Transportation Demand Modeling Technical Memorandum, February 2005.

-- = information not available.

It follows that the regional model shows that by increasing capacity further on I-85 to eight to ten lanes (Scenario 4a) would result in a further reduction in congested vehicle miles and congested vehicles hours compared to the No-Build Alternative and Scenario 4+ (I-85 at 8 lanes).

The largest reductions in congested vehicle miles and congested vehicle hours compared to the No-Build Alternative would occur under Scenario 8, which would not only improve I-85 to eight to ten lanes and US 29-74 to six lanes, but also widen, and therefore relieve congestion on, approximately 51 miles of north/south feeder roads connecting southern Gaston County to/from I-85 and US 29-74.

A New Location Alternative would increase vehicle miles traveled compared to the No-Build Alternative and the Improve Existing Roadways Alternatives, but decrease vehicle hours traveled. This is an expected result because travelers are willing to drive farther to access an uncongested route that will save them time.

Although regional vehicle miles traveled would be higher, a new location roadway would result in lower congested vehicle hours and lower congested vehicle miles on the roadway network than widening I-85 to eight lanes (Scenario 4+). The New Location Alternative would reduce congested vehicle hours and vehicle miles traveled about as effectively as widening I-85 to eight to ten lanes (Scenario 4a).

I.8.2 Volume/Capacity Ratio Maps from the Regional Travel Demand Model

| *There are no updates or additions to this section.*

The 2025 Gaston travel demand model was used to produce color-coded maps for various scenarios showing ratios of projected traffic volumes divided by modeled roadway capacity. The maps indicate general levels of congestion on network roadway segments. Comparing maps from different scenarios can reveal the general effects and trends each scenario would have on network congestion.

Time periods evaluated included the AM peak two-hour period (7:00 to 9:00 am) and the PM peak two-hour period (4:00 to 6:00 pm). Scenarios 1, 4+, 4a, 8, 5, and 5a were evaluated.

The traffic volumes are represented on the maps by the bandwidth, or thickness, of the roadways. For example, I-85 shows the largest bandwidth since the traffic volumes are higher than other roadways. The color coding of each roadway represents the volume to capacity ratio for the peak 2-hour period, with colors ranging from worst to best, respectively: red, yellow, green, and blue. Red is a volume to capacity ratio above 1.2. Yellow represents a volume to capacity ratio of 1.0 – 1.2. Green is a volume to capacity ratio of 0.8 – 1.0, and blue is a volume to capacity ratio less than 0.8. *(Please note these are not values that can be converted to HCS levels of service since they were not generated using all the input needed to determine an HCS level of service.)*

The PM peak two-hour period is projected to be the most congested time of day, so this discussion focuses on the PM peak two-hour period. For comparison, the PM peak two-hour period volume/capacity ratio maps for various scenarios are shown together in **Figures 14 and 15** as described below:

Figure 14 - Scenario 1 (No-Build)
Scenario 4+ (Widen I-85 to 8 lanes, US 29-74 to 6 lanes and include TSM measures)
Scenario 4a (Scenario 4+, with widening of I-85 to 8-10 lanes)
Scenario 8 (Scenario 4a, with widening of north/south feeder roads)

Figure 15 - Scenario 1 (No-Build)
Scenario 5 (New Location - 4-lane highway)
Scenario 5a (New Location – 6-lane highway)

Appendix B includes all the individual volume/capacity ratio maps.

As shown in **Figure 14**, in the year 2025, existing I-85 is expected to be highly congested (red segments) through the project area under the No-Build Alternative. Widening I-85 to eight lanes and US 29-74 to six lanes (Scenario 4+) results in noticeable improvements to PM peak period traffic flows on I-85 and US 29-74. Under Scenario 4+, there are no red segments along I-85 and fewer red and yellow segments along US 29-74. Volume to capacity ratios along US 321 do not noticeably change, remaining at primarily yellow and red.

As more capacity is added to I-85 under Scenario 4a (widen I-85 to 8-10 lanes), volume to capacity ratios on I-85 improve further. Most of the segments along I-85 are blue and green. There are also some improvements on US 29-74, as more traffic diverts to use widened I-85. Volume to capacity ratios along US 321 are not affected, remaining at primarily yellow and red.

As expected, the most improvements to volume to capacity ratios are seen under Scenario 8, which includes widening I-85 to ten lanes, and widening of several north/south feeder roads (about 50 miles worth) connecting to southern Gaston County (including US 321). Under this scenario, I-85 is entirely blue (volume to capacity ratio of < 0.8) on **Figure 14**. US 29-74 would experience more improvements in traffic flow than under Scenarios 4+ or 4a, possibly because the widened feeder roads allow for more options to reach I-85 and US 29-74. US 321 also shows improvements in volume to capacity ratios south of US 29-74, because it would be widened under Scenario 8.

A review of Scenarios 5 and 5a in **Figure 15** show that both would have the same effect on general levels of network congestion, and both would improve network congestion over the No-Build Alternative (Scenario 1). The new highway and bridge across the Catawba River between Gaston and Mecklenburg County are projected to be uncongested, and enough traffic would be diverted from existing I-85 and US 29-74 to reduce congestion on these existing routes to levels similar to that experienced under Scenario 4+ (widening I-85 to eight lanes and US 29-74 to six lanes). Improvements to volume/capacity ratios on US 321 south of I-85 also would be improved under Scenarios 5 and 5a as traffic volumes divert to the new highway.

I.8.3 Year 2025 Traffic Volumes

■ *There are no updates or additions to this section. See **Section 1.8.6** for Year 2030 traffic volumes.*

This section discusses the 2025 ADT volumes and PM peak hour volumes (total for US 29-74 and US 321 and westbound direction for I-85 (signed as I-85 South)) as these most clearly showed trends and differences between scenarios. **Appendix C** contains the 2025 average daily traffic (ADT) volumes and AM and PM peak hour traffic volumes for each direction of travel on I-85, US 29-74 and US 321 under various scenarios. The peak hour volumes were assumed to be a typical 55 percent of the two-hour peak period volumes generated by the 2025 regional travel demand model.

Note that Scenario 8 was created later in the alternatives development process, when the focus was on understanding and addressing peak period traffic volumes and patterns. Therefore, average daily traffic volumes were not run in the 2025 regional travel demand model for Scenario 8, only peak period traffic volumes. However, the peak period runs were sufficient to clearly see trends when compared with other scenarios.

1.8.3.1 Year 2025 Traffic Volumes on US 321

Table 8 shows the annual average daily traffic volumes projected for US 321 in the project study area under various scenarios and the percent difference between the No-Build Alternative and each scenario. **Table 9** shows similar comparisons of the PM peak hour.

As shown in **Tables 8 and 9**, Improve Existing Roadway Alternative Scenarios 4+ and 4a would not substantially affect traffic volumes on US 321.

Table 8. Year 2025 Average Daily Traffic Volumes on US 321 – Various Scenarios

US 321 Segment (South to North)	Scenario 1	Scenario 4+		Scenario 4a		Scenario 5		Scenario 5a	
	ADT	ADT	% chng	ADT	% chng	ADT	% chng	ADT	% chng
SC State Line to Robinson Rd	25,000	25,000	0.0%	25,000	0.0%	25,000	0.0%	25,072	0.3%
Robinson Rd to Crawford Rd	17,300	17,200	-0.6%	17,200	-0.6%	17,100	-1.2%	17,203	-0.6%
Crawford Rd to Crowders Creek Rd	20,800	20,800	0.0%	20,800	0.0%	19,400	-6.7%	19,784	-4.9%
Crowders Creek Rd to Stagecoach Rd	31,300	32,300	3.2%	32,200	2.9%	21,400	31.6%	20,921	-33.2%
Stagecoach Rd to Hudson Blvd	37,100	37,000	-0.3%	37,000	-0.3%	29,800	19.7%	29,692	-20.0%
Hudson Blvd to Garrison Blvd	42,000	42,100	0.2%	42,000	0.0%	42,000	0.0%	37,104	-11.7%
Garrison Blvd to US 29-74	22,000	23,700	7.7%	22,600	2.7%	20,900	-5.0%	20,853	-5.2%
US 29-74 to I-85	28,800	28,800	0.0%	28,500	-1.0%	25,800	10.4%	25,775	-10.5%
North of I-85	38,700	39,100	1.0%	39,000	0.8%	39,000	0.8%	37,642	-2.7%

ADT = Average daily traffic volumes

% chng = percent change compared to Scenario 1 – No Build Alternative

Table 9. Year 2025 PM Peak Hour Volumes on US 321 – Various Scenarios

US 321 Segment (South to North)	Scen 1	Scenario 4+		Scenario 4a		Scenario 8		Scenario 5		Scenario 5a	
	vph	vph	% Chng	vph	% Chng	vph	% Chng	vph	% Chng	vph	% Chng
SC State Line to Robinson Rd	2,498	2,498	0.0%	2,498	0.0%	2,498	0.0%	2,498	0.0%	2,498	0.0%
Robinson Rd to Crawford Rd	1,805	1,749	-3.1%	1,744	-3.4%	1,706	-5.5%	1,750	-3.0%	1,750	-3.0%
Crawford Rd to Crowders Creek Rd	2,112	2,118	0.3%	2,107	-0.2%	2,041	-3.4%	2,151	1.8%	2,146	1.6%
Crowders Creek Rd to Stagecoach Rd	3,135	3,152	0.5%	3,163	0.9%	3,147	0.4%	2,003	-36.1%	2,003	-36.1%
Stagecoach Rd to Hudson Blvd	3,224	3,157	-2.1%	3,185	-1.2%	3,443	6.8%	2,525	-21.7%	2,542	-21.2%
Hudson Blvd to Garrison Blvd	3,587	3,631	1.2%	3,587	0.0%	3,847	7.2%	3,146	-12.3%	3,191	-11.0%
Garrison Blvd to US 29-74	1,991	2,022	1.6%	1,964	-1.4%	2,415	21.3%	1,744	-12.4%	1,744	-12.4%
US 29-74 to I-85	2,657	2,679	0.8%	2,536	-4.6%	2,404	-9.5%	2,355	-11.4%	2,349	-11.6%
North of I-85	3,147	3,356	6.6%	3,355	6.6%	3,411	8.4%	3,075	-2.3%	3,229	2.6%

vph = total vehicles per hour in the PM peak, northbound and southbound

% chng = percent change compared to Scenario 1 – No Build Alternative

Scenario 8, which would improve north/south feeder roads as part of the alternative, including US 321, predicts an increase in traffic volumes on US 321 north of Crowders Creek Road. There would be a decrease in traffic on US 321 between US 29-74 and I-85 as travelers likely would use less congested routes that have also been improved under Scenario 8.

Scenarios 5 and 5a (New Location Roadway Alternatives) would affect US 321 in the same way. They would divert about 10-20 percent of the US 321 traffic north of Crowders Creek Road.

1.8.3.2 Year 2025 Traffic Volumes on US 29-74

Table 10 shows the annual average daily traffic volumes projected for US 29-74 in the project study area under various scenarios and the percent difference between the No-Build Alternative and each scenario.

Table 11 shows similar comparisons of the PM peak hour.

Table 10. Year 2025 Average Daily Traffic Volumes On US 29-74 – Various Scenarios

US 29-74 Segment (West to East)	Scenario 1	Scenario 4+		Scenario 4a		Scenario 5		Scenario 5a	
	ADT	ADT	% chng	ADT	% chng	ADT	% chng	ADT	% chng
West of Edgewood Rd	40,700	40,800	0.2%	40,700	0.0%	40,300	-1.0%	40,300	-1.0%
Edgewood Rd to Shannon Bradley Rd	15,900	16,700	5.0%	16,600	4.4%	39,000	145.3%	39,000	145.3%
Shannon Bradley Rd to Myrtle School Rd	15,300	13,300	-13.1%	13,300	-13.1%	11,800	-22.9%	11,800	-22.9%
Myrtle School Rd to Bessemer City Rd	18,100	16,800	-7.2%	16,800	-7.2%	16,400	-9.4%	16,400	-9.4%
Bessemer City Rd to Linwood Rd	13,800	13,300	-3.6%	13,300	-3.6%	12,900	-6.5%	12,900	-6.5%
Linwood Rd to US 321	21,500	21,300	-0.9%	21,400	-0.5%	18,200	-15.3%	18,200	-15.3%
US 321 to NC 274	29,200	29,000	-0.7%	29,100	-0.3%	25,700	-12.0%	25,700	-12.0%
NC 274 to NC 279	36,600	35,100	-4.1%	36,000	-1.6%	33,900	-7.4%	33,600	-8.2%
NC 279 to Cox	32,500	31,900	-1.8%	32,500	0.0%	31,300	-3.7%	31,300	-3.7%
Cox Rd to Redbud Rd	52,600	52,200	-0.8%	46,100	-12.4%	50,400	-4.2%	50,200	-4.6%
Redbud Rd to Lowell-Bethesda Rd	46,400	45,800	-1.3%	45,400	-2.2%	43,100	-7.1%	42,900	-7.5%
Lowell-Bethesda to Wesleyan	33,800	30,600	-9.5%	29,800	-11.8%	29,800	-11.8%	30,000	-11.2%
Wesleyan Rd to Lakewood Rd	57,600	54,400	-5.6%	52,800	-8.3%	46,700	-18.9%	46,700	-18.9%
Lakewood Rd to NC 7	49,200	46,700	-5.1%	45,100	-8.3%	42,400	-13.8%	42,400	-13.8%
NC 7 to NC 273	35,000	32,600	-6.9%	31,200	-10.9%	28,600	-18.3%	28,800	-17.7%
NC 273 to I-485	37,300	30,400	-18.5%	29,800	-20.1%	20,900	-44.0%	20,900	-44.0%

ADT = Average daily traffic volumes

% chng = percent change compared to Scenario 1 – No Build Alternative

Table 11. Year 2025 PM Peak Hour Volumes On US 29-74 – Various Scenario

US 29-74 Segment (West to East)	Scenario 1	Scenario 4+		Scenario 4a		Scenario 8		Scenario 5		Scenario 5a	
	vph	vph	% chng	vph	% chng	vph	% chng	vph	% chng	vph	% chng
West of Edgewood Rd	4,170	4,235	1.6%	4,219	1.2%	4,131	-0.9%	4,027	-3.4%	4,076	-2.3%
Edgewood Rd to Shannon Bradley Rd	2,080	2,289	10.0%	2,250	8.2%	1,876	-9.8%	3,543	70.3%	3,499	68.2%
Shannon Bradley Rd to Myrtle School Rd	1,722	1,771	2.8%	1,777	3.2%	1,755	1.9%	1,134	-34.1%	1,194	-30.7%
Myrtle School Rd to Bessemer City Rd	1,915	1,854	-3.2%	1,859	-2.9%	1,678	-12.4%	1,607	-16.1%	1,661	-13.3%
Bessemer City Rd to Linwood Rd	1,909	1,579	-17.3%	1,562	-18.2%	1,436	-24.8%	1,513	-20.7%	1,507	-21.1%
Linwood Rd to US 321	1,936	1,788	-7.6%	1,766	-8.8%	1,810	-6.5%	1,645	-15.0%	1,645	-15.0%
US 321 to NC 274	2,591	2,470	-4.7%	2,464	-4.9%	2,322	-10.4%	2,294	-11.5%	2,294	-11.5%
NC 274 to NC 279	3,917	3,674	-6.2%	3,796	-3.1%	3,685	-5.9%	3,532	-9.8%	3,542	-9.6%
NC 279 to Cox Rd	3,779	3,614	-4.4%	3,141	-16.9%	2,563	-32.2%	3,312	-12.4%	3,339	-11.6%
Cox Rd to Redbud Dr	4,318	4,538	5.1%	4,285	-0.8%	3,938	-8.8%	4,466	3.4%	4,466	3.4%
Redbud Dr to Lowell-Bethesda Rd	4,940	4,477	-9.4%	4,257	-13.8%	4,114	-16.7%	4,065	-17.7%	4,070	-17.6%
Lowell-Bethesda Rd to Wesleyan Dr	4,736	3,900	-17.7%	3,268	-31.0%	2,789	-41.1%	3,559	-24.9%	3,559	-24.9%
Wesleyan Dr to Lakewood Rd	6,606	5,594	-15.3%	4,945	-25.1%	4,874	-26.2%	5,121	-22.5%	5,083	-23.1%
Lakewood Rd to NC 7	5,841	5,082	-13.0%	4,797	-17.9%	4,549	-22.1%	4,832	-17.3%	4,791	-18.0%
NC 7 to NC 273	4,576	4,362	-4.7%	3,565	-22.1%	3,345	-26.9%	3,438	-24.9%	3,410	-25.5%
NC 273 to Sam Wilson Rd	4,010	3,410	-15.0%	3,070	-23.4%	3,015	-24.8%	2,168	-45.9%	2,162	-46.1%
Sam Wilson Rd to I-485	3,416	3,680	7.7%	3,355	-1.8%	3,295	-3.5%	1,992	-41.7%	1,997	-41.5%

vph = vehicles per hour in the PM peak hour – eastbound and westbound combined.

% chng = percent change compared to Scenario 1 – No Build Alternative

As shown in **Tables 10 and 11**, the Improve Existing Roadways Alternatives (Scenarios 4+, 4a, and 8) and the New Location Roadway Alternatives (Scenarios 5 and 5a) generally result in decreased traffic on US 29-74. Traffic is diverted from US 29-74 to either a widened I-85 under the Improve Existing Roadways Alternatives or a new highway under the New Location Roadway Alternatives.

For the Improve Existing Roadways Alternatives, traffic diversion from US 29-74 generally increases as the level of improvements increase. Therefore, Scenarios 4a and 8 project less traffic on US 29-74 than Scenario 4+. The New Location Alternatives (Scenarios 5 and 5a) affect US 29-74 in the same way, and are similar in effectiveness as Scenario 8 at reducing traffic on US 29-74. The differences in reductions from segment to segment are possibly due to changes in travel patterns that result under each scenario.

The substantially higher volumes on the segment from Edgewood Road to Shannon Bradley Road that would occur under the New Location Alternatives is due to the interchange that would be located in this area for access to the new location highway. This also results in lower volumes between Shannon Bradley Road and Myrtle School Road for the New Location Alternatives compared to the other alternatives.

1.8.3.3 Year 2025 Traffic Volumes on I-85

Table 12 shows the annual average daily traffic volumes projected for I-85 in the project study area under various scenarios and the percent differences between the No-Build Alternative and each scenario.

Table 13 shows similar comparisons of the PM peak hour. The PM peak hour volumes under each scenario are graphically compared in **Chart 1**.

As shown in **Tables 12 and 13** and **Chart 1**, when I-85 is improved under the Improve Existing Roadways Alternatives, additional traffic volumes are attracted to I-85. Under the New Location Alternatives, traffic volumes decrease on I-85 as they are diverted to the new highway. New Location Alternative Scenarios 5 and 5a resulted in close to the same traffic volumes on I-85.

East of US 321, average daily traffic volumes on I-85 increase an average of 4 percent under Scenario 4+ and Scenario 4a. Under Scenarios 5 and 5a, average daily traffic volumes decrease by an average of 24 percent.

East of US 321, PM peak hour traffic volumes increase an average of 11 percent under Scenario 4+, 16 percent under Scenario 4a, and 19 percent under Scenario 8. Under the New Location Alternative Scenarios 5 and 5a, PM peak hour traffic volumes on I-85 decrease by an average of 21 percent.

As **Chart 1** graphically shows, there is so much latent demand in the study area for highway travel, that adding the one lane in each direction on I-85 (as under Scenario 4+) attracted an average of 1,300 additional vehicles per hour in the PM peak along I-85 east of US 321 compared to the No-Build Alternative (Scenario 1). Adding two lanes in each direction on I-85 (widening to 10 lanes) under Scenario 4a attracted an average of 1,900 additional vehicles per hour in the PM peak east of US 321. Widening the north/south feeder roads to the interstate, as under Scenario 8, attracted an average of 2,250 additional vehicles per hour to I-85 in the PM peak compared to the No-Build Alternative (Scenario 1).

Table 12. Year 2025 Average Daily Traffic Volumes on I-85 – Various Scenarios

Between I-85 Exits (West to East)	Scenario 1	Scenario 4+		Scenario 4a		Scenario 5		Scenario 5a	
	ADT	ADT	% chng	ADT	% chng	ADT	% chng	ADT	% chng
10B (US 29-74) to 13 (Edgewood Rd)	68,600	68,600	0.00%	68,600	0.00%	68,600	0.00%	68,600	0.00%
13 to 14 (NC 274 – Bessemer City Rd)	90,400	90,600	0.22%	90,600	0.22%	73,300	-18.92%	73,300	-18.92%
14 to 17 (US 321)	100,400	101,200	0.80%	101,300	0.90%	77,000	-23.31%	77,000	-23.31%
17 to 19 (Ozark Ave)	122,200	123,900	1.39%	124,200	1.64%	97,200	-20.46%	97,200	-20.46%
19 to 20 (NC 279)	144,000	147,900	2.71%	147,400	2.36%	115,600	-19.72%	115,600	-19.72%
20 to 21 (Cox Rd)	132,000	136,300	3.26%	137,000	3.79%	103,500	-21.59%	103,500	-21.59%
21 to 22 (Redbud Dr)	142,300	153,000	7.52%	153,900	8.15%	113,800	-20.03%	113,800	-20.03%
22 to 23 (NC 7 – McAdenville Rd)	141,200	148,500	5.17%	150,900	6.87%	107,000	-24.22%	107,000	-24.22%
23 to 26 (Abbey College)	147,700	152,300	3.11%	154,400	4.54%	113,300	-23.29%	113,300	-23.29%
26 to 27 (NC 273-Park St)	134,300	137,500	2.38%	139,600	3.95%	96,800	-27.92%	97,600	-27.33%
27 to 29 (Sam Wilson Rd)	129,800	136,700	5.32%	137,300	5.78%	93,500	-27.97%	93,500	-27.97%
29 to 30 (I-485)	141,000	145,700	3.33%	146,300	3.76%	95,100	-32.55%	95,100	-32.55%

ADT = Average daily traffic volumes

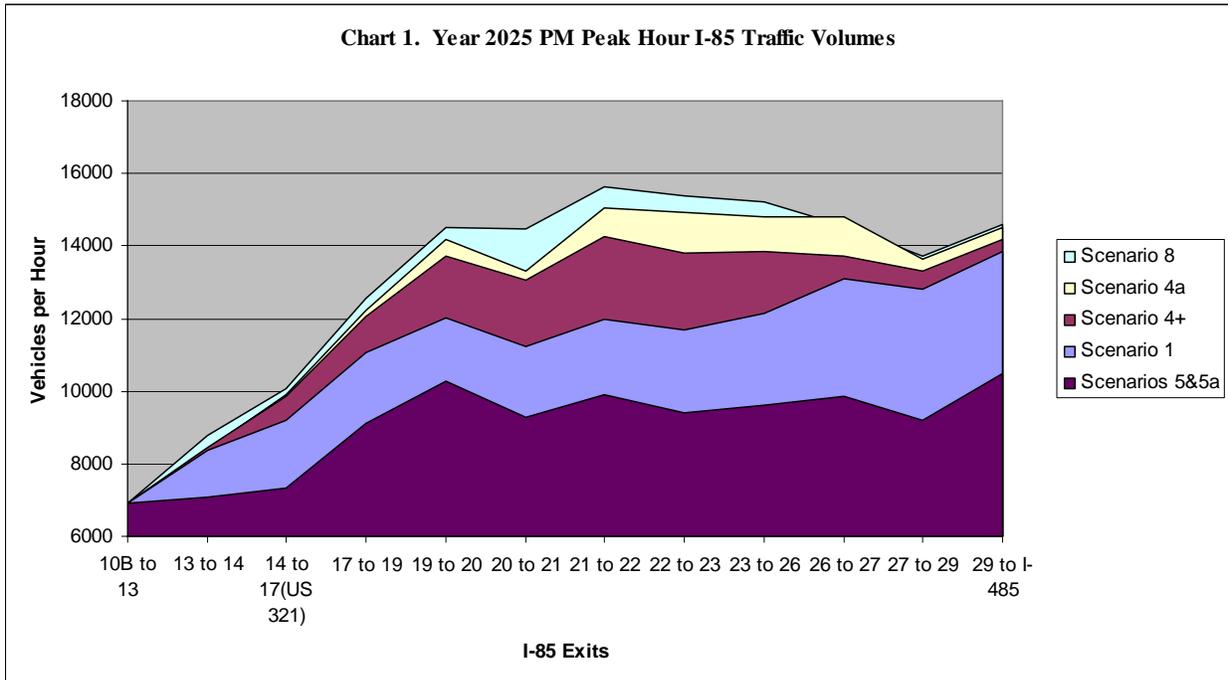
% chng = percent change compared to Scenario 1 – No Build Alternative

Table 13. Year 2025 PM Peak Hour Volumes On I-85 – Various Scenario

Between I-85 Exits (West to East)	Scenario 1		Scenario 4+		Scenario 4a		Scenario 8		Scenario 5		Scenario 5a	
	vph	% chg	vph	% chg	vph	% chg	vph	% chg	vph	% chg	vph	% chg
10B (US 29-74) to 13 (Edgewood Rd)	6,906	0.0%	6,903	0.0%	6,906	0.0%	6,909	0.0%	6,909	0.0%	6,909	0.0%
13 to 14 (NC 274 – Bessemer City Rd)	8,354	1.1%	8,448	1.1%	8,425	0.8%	8,768	5.0%	6,282	-24.8%	7,068	-15.4%
14 to 17 (US 321)	9,201	7.0%	9,845	7.0%	9,884	7.4%	10,082	9.6%	7,134	-22.5%	7,343	-20.2%
17 to 19 (Ozark Ave)	11,054	9.0%	12,051	9.0%	12,247	10.8%	12,568	13.7%	9,153	-17.2%	9,130	-17.4%
19 to 20 (NC 279)	12,022	14.2%	13,734	14.2%	14,164	17.8%	14,493	20.6%	10,307	-14.3%	10,269	-14.6%
20 to 21 (Cox Rd)	11,215	16.6%	13,079	16.6%	13,304	18.6%	14,465	29.0%	9,252	-17.5%	9,268	-17.4%
21 to 22 (Redbud Dr)	11,961	19.2%	14,257	19.2%	15,048	25.8%	15,626	30.6%	9,906	-17.2%	9,917	-17.1%
22 to 23 (NC 7 – McAdenville Rd)	11,669	18.2%	13,795	18.2%	14,939	28.0%	15,384	31.8%	9,356	-19.8%	9,389	-19.5%
23 to 26 (Abbey College)	12,149	14.0%	13,844	14.0%	14,792	21.8%	15,213	25.2%	9,565	-21.3%	9,598	-21.0%
26 to 27 (NC 273- Park St)	13,094	4.9%	13,740	4.9%	14,820	13.2%	14,553	11.1%	9,884	-24.5%	9,873	-24.6%
27 to 29 (Sam Wilson Rd)	12,830	3.8%	13,316	3.8%	13,658	6.5%	13,712	6.9%	9,180	-28.4%	9,208	-28.2%
29 to 30 (I-485)	13,835	2.6%	14,191	2.6%	14,527	5.0%	14,586	5.4%	10,434	-24.6%	10,478	-24.3%

vph = vehicles per hour in the PM peak hour on I-85 North (eastbound in project area) and I-85 South (westbound in project area) combined.

% chng = percent change compared to Scenario 1 – No Build Alternative



I.8.4 Year 2025 Basic Freeway Segment Levels of Service on I-85

There are no updates or additions to this section. See **Section 1.8.7** for Year 2030 levels of service.

I.8.4.1 Model Methodology and Assumptions

The 2025 PM peak hour is projected to have higher volumes than the AM peak hour, and in the PM peak hour, I-85 South (westbound direction away from Charlotte) had higher volumes than I-85 North. Therefore, the PM peak hour for I-85 South was the condition chosen for analysis of levels of service under the various Improve Existing Roadways Alternatives and New Location Alternatives scenarios.

The computer program HCS 2000 - Basic Freeway Segments was used to estimate year 2025 PM peak hour levels of service on I-85 South (westbound direction in the project area) under various scenarios.

The following assumptions were used in the model.

Trucks - 11% in peak hour
Peak Hour Factor (PHF) - .90
Free Flow Speed - 70 mph
Terrain Type – Rolling

In addition, location specific assumptions include an interchange density of 0.63 interchanges per mile (based on measurements along I-85 from Exit 10B east to I-485). The New Location Alternative – Scenarios 5 and 5a had virtually the same projected PM peak hour and were evaluated together.

A detailed analysis for merging/diverging/weaving was not conducted for every scenario, nor was this level of detail necessary to evaluate concepts and trends at this stage of alternatives development. Only basic freeway segments between interchanges were modeled. The merging/diverging/weaving traffic could influence the level of service along the freeway. The effect could be to degrade level of service, with the possible result being the need for collector-distributor roads or auxiliary lanes. This type of effect would occur under any of the scenarios.

Levels of Service (LOS)

The Transportation Research Board defines LOS in categories A through F.

LOS A represents ideal, free-flow conditions, while LOS F represents forced, or breakdown, flow with 'stop and go' conditions.

Generally, LOS D is considered the lowest limit at which traffic flow is desirable during peak periods in urban areas. Traffic flow at LOS D is considered stable, but becoming susceptible to congestion and unstable flow.

1.8.4.2 Levels of Service on I-85 South in the 2025 PM Peak Hour

Table 14 lists the levels of service along I-85 South (in the project area, I-85 South is the westbound direction), projected to occur under the various Improve Existing Roadways Alternatives and New Location Alternatives. **Chart 2** graphically compares the levels of service.

As shown in **Table 14** and **Chart 2**, all Improve Existing Roadways Alternatives and New Location Alternatives would generally improve levels of service on I-85 during the 2025 PM peak hour. Improve Existing Roadways Alternatives - Scenarios 4a and 8, which would widen I-85 to 10 lanes, would result in the best levels of service on I-85 compared to the other evaluated alternatives. Scenarios 5 and 5a would result in worse levels of service on I-85 than Scenarios 4a and 8, but better overall levels of service than Scenario 4+.

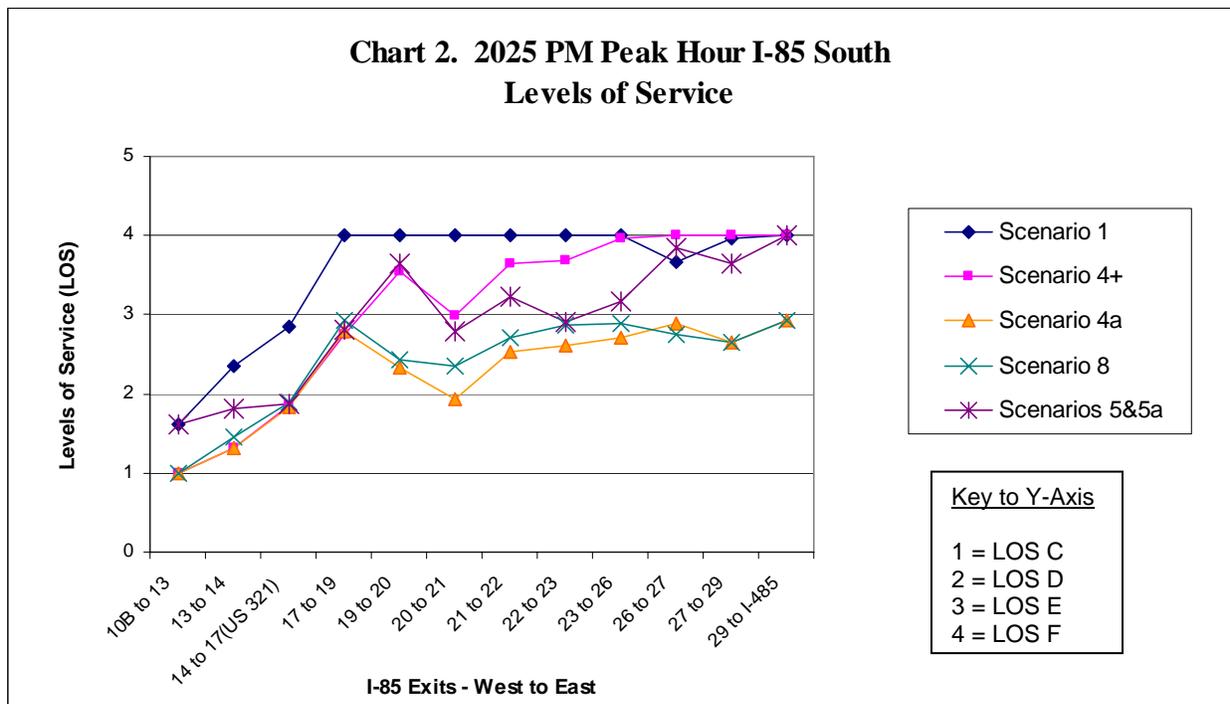


Table 14. Basic Freeway Segment Levels of Service –I-85 South in 2025 PM Peak Hour

Between I-85 Exits (West to East)	Scenario 1			Scenario 4+			Scenario 4a			Scenario 8			Scenarios 5 & 5a		
	SB vph	# Lanes	LOS	SB vph	# Lanes	LOS	SB vph	# Lanes	LOS	SB vph	# Lanes	LOS	SB vph	# Lanes	LOS
10B (US 29-74) to 13 (Edgewood Rd)	3,490	3	C	3,490	4	C	3,490	4	C	3,490	4	C	3,490	3	C
13 to 14 (NC 274 – Bessemer City Rd)	4,278	3	D	4,290	4	C	4,290	4	C	4,494	4	C	3,729	3	C
14 to 17 (US 321)	4,735	3	D	5,115	4	C	5,104	4	C	5,192	4	C	3,817	3	C
17 to 19 (Ozark Ave)	5,647	3	F	6,248	4	D	6,296	4	D	6,463	4	D	4,697	3	D
19 to 20 (NC 279)	6,060	3	F	6,980	4	E	7,289	5	D	7,436	5	D	5,264	3	E
20 to 21 (Cox Rd)	5,693	3	F	6,545	4	D	6,687	5	C	7,315	5	D	4,686	3	D
21 to 22 (Redbud Dr)	6,120	3	F	7,068	4	E	7,579	5	D	7,838	5	D	5,016	3	E
22 to 23 (NC 7 – McAdenville Rd)	6,042	3	F	7,101	4	E	7,684	5	D	8,074	5	D	4,796	3	D
23 to 26 (Abbey College)	6,390	3	F	7,315	4	F	7,834	5	D	8,118	5	D	4,983	3	E
26 to 27 (NC 273-Park St)	7,077	4	E	7,508	4	F	8,104	5	D	7,909	5	D	5,379	4	D
27 to 29 (Sam Wilson Rd)	7,313	4	F	7,563	4	F	7,745	5	D	7,755	5	D	5,264	4	C
29 to 30 (I-485)	7,713	4	F	7,981	4	F	8,158	5	D	8,173	5	D	5,896	4	D

SB vph = vehicles per hour on I-85 South (westbound direction in the project area).
 LOS = Levels of Service

I.8.5 Regional Statistics from the 2030 Travel Demand Model

This is a new section of the Alternatives Development and Evaluation Report.

Table 7b lists the regional network-wide statistics for the year 2030 for the No-Build Alternative, Improve Existing Roadways Alternative Scenarios 4+/4a, and the New Location Alternative Non-Toll and Toll Scenarios. The statistics are for the portion of the network in Gaston County and include: total and congested VMT, total and congested VHT, and congested VMT and congested VHT as percentages to total VMT and VHT.

Table 7b. 2030 Regional Travel Demand Model Statistics for Gaston County Under Various Scenarios

Scenario	Description	2030 Vehicle Miles Traveled (VMT) in 1000's			2030 Vehicle Hours Traveled (VHT) in 1000's		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
1	No-Build Alternative	8,512	2,058	2,308	234.9	70.3	78.6
4+/4a	Improve Existing Roadways Alternatives	9,559	2,431	2,580	267.0	84.5	89.1
Non-Toll	New Location Alternative	9,646	2,316	2,589	255.6	74.0	85.3
Toll	New Location Alternative	9,473	2,294	2,569	255.8	75.2	84.5
		2030 Congested VMT in 1000's			2030 Congested VHT in 1000's		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
1	No-Build Alternative	1,536	691	783	129.2	66.6	58.5
4+/4a	Improve Existing Roadways Alternatives	1,884	875	911	168.4	82.3	79.0
Non-Toll	New Location Alternative	1,648	689	875	144.1	62.4	75.6
Toll	New Location Alternative	1,528	698	758	124.0	59.0	59.7
		2030 Congested VMT as a Percent of Total VMT			2030 Congested VHT as a Percent of Total VHT		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
1	No-Build Alternative	18.0%	33.6%	33.9%	55.0%	94.7%	74.4%
4+/4a	Improve Existing Roadways Alternatives	19.7%	36.0%	35.3%	63.1%	97.4%	88.7%
Non-Toll	New Location Alternative	17.1%	29.7%	33.8%	56.4%	84.3%	88.6%
Toll	New Location Alternative	16.1%	30.4%	29.5%	48.5%	78.5%	70.7%

Source: Forecasts prepared by Martin/Alexiou/Bryson using the 2030 Metrolina travel demand model, 2008.

The statistics are generated by the regional travel demand model. Total network VMT are the total miles traveled by the projected traffic on all roadways included in the Gaston County portion of the 2030 Metrolina travel demand model. Total vehicle hours traveled are the total hours spent on the roadways by all trips generated in the model for the Gaston County portion of the model. Congested vehicle miles are the miles traveled on roadways with volume to capacity ratios greater than 1.0. Congested vehicle hours traveled are the total hours all vehicles spent on roadways with volume to capacity ratios greater than 1.0.

Comparison of VMT and VHT. The values in **Table 7b** indicate that either widening I-85 (Improve Existing Roadways Alternative Scenarios 4+/4a) or constructing a New Location Alternative as either a toll or non-toll facility would result in higher total VMT and VHT compared to the No-Build Alternative, with the New Location Alternative Toll Scenario having the smallest increase over the No-Build Alternative. The 2030 VMT would be about the same for the New Location Alternative Scenarios and the Improve Existing Roadways Alternative Scenarios 4+/4a, but the VHT would be less with the new location facility. This data indicates that the new location facility would provide a quicker trip for many drivers in Gaston County in 2030.

Under Improve Existing Roadways Alternative Scenario 8, the VMT and VHT likely would be higher than under Scenarios 4+/4a because more capacity is added to the network, enabling travelers to make longer trips.

The main variable in the Metrolina travel demand model affecting trips in the project area is travel time. In general, the total number of trips made changes very little between the alternatives modeled using the 2030 Metrolina model. What changes are their destinations. For example, there is projected to be a large concentration of residential development in Gaston County not far west of the Catawba River in the vicinity of the proposed river crossing, and a large employment concentration to the east of the river (Dixie-Berryhill area). In the No-Build scenario, a trip from one of these Gaston County residences to one of these Mecklenburg County employers (for work, shopping, or other purpose) that might be 2 or 3 miles away (as the crow flies) requires either a drive to I-85 and back down, or traveling down to NC 49 and then back north. Most of these trip purposes can be satisfied more efficiently by remaining on the same side of the river, even though the trip attractor on the other side may be more desirable. Because of the travel costs involved, the less desirable destination may be selected.

Once a new river crossing is introduced (Toll or Non-Toll), a desirable destination that may have required a 20-mile, 35-minute trip might now be no more than a three-mile drive that takes less than 10 minutes. The model shows a shift in the distribution of trips to new destinations, in addition to changes in the routes selected by some trips that are crossing the river to the same destination. Furthermore, there is a domino effect in the travel demand model: this re-distribution and re-assignment of traffic reduces congestion on some secondary routes (and increases it on others), resulting in another round of re-distribution and re-assignment. This cycle is repeated for several iterations of the travel demand model, until a stable equilibrium is achieved, where no one can significantly reduce their travel costs by switching routes or destinations.

The widening of I-85 (Improve Existing Roadways Alternative Scenarios 4+/4a) has a similar, though less pronounced, effect. Additional lanes provide more capacity, reducing both congestion and travel times, so some cross-river destinations become close enough (in terms of travel times) to cause a shift, and total crossing traffic volumes increase. The re-routing effect is less pronounced under this scenario, as is the domino or ripple effect described above.

Comparison of Congested VMT and VHT. The values in **Table 7b** indicate that Improve Existing Roadways Alternative Scenarios 4+/4a and the New Location Alternative Non-Toll Scenario would result in the most congested VHT and VMT. The New Location Alternative Toll Scenario and the No-Build Alternative result in about the same congested VMT and VHT, with the New Location Alternative Toll Scenario performing slightly better. Again, these results from the regional travel demand model are likely the result of high latent demand for additional capacity over the Catawba River between Gaston County and Mecklenburg County.

As a percent of total VMT and total VHT, the congested VMT and congested VHT are highest for the Improve Existing Roadways Alternative Scenarios 4+/4a compared to the No-Build Alternative and the New Location Alternatives (Toll and Non-Toll Scenarios). This may be due to higher congestion on roadways leading to the improved I-85, and the congestion projected to still occur on the improved I-85. The New Location Alternatives have the lowest percentages, with the Toll Scenario having the best performance.

As individual scenarios, Scenario 4+ likely would have slightly higher congested VMT and VHT values than what is shown in **Table 7b** for the combined Scenario 4+/4a, and Scenario 4a may have slightly lower congested VMT and VHT. This is because Scenario 4a does provide some additional capacity on I-85 (an additional lane in each direction between Exit 19 and Exit 26) compared to the combined Scenario 4+/4a. However, the lower values for congested VMT and VHT that may occur under Scenario 4a may be offset by slightly higher projected traffic volumes, and would still be substantially higher than the values for the No-Build Alternative and the New Location Alternative (Toll and Non-Toll Scenarios).

It is notable that the Metrolina model indicates that adding capacity on I-85 under the Improve Existing Roadways Alternative Scenarios 4+/4a is projected to increase congestion throughout the network. This is a somewhat counter-intuitive outcome. Adding lanes to I-85 increases capacity, which increases travel speeds, so travelers continue to shift to use I-85. Potential demand exceeds the additional capacity, and traffic keeps shifting to I-85 until congestion builds to the point that a new equilibrium point is reached in the model. So although I-85 has been widened, much of it is still congested, but with much higher volumes of traffic on it. However, although the widened I-85 is still congested, it is not as severely congested as under the No-Build Alternative.

The other factor affecting the Improve Existing Roadways Alternative Scenarios 4+/4a results is that most of the trips diverted to the improved I-85 do not produce significant congestion benefits on other facilities. The New Location Alternatives (Toll or Non-Toll Scenarios) have an added benefit of diverting traffic from congested facilities onto roads with reserve capacity (in general). When I-85 is widened under the Improve Existing Roadways Alternative Scenarios 4+/4a, trips diverted onto I-85 tend

to come from highly-congested routes that get more congested carrying trips to I-85, so there is an increase in congested VMT. Because there are so few options for crossing the Catawba River, individual drivers can still benefit from taking a congested route, even while systemwide performance suffers. Braess's Paradox is the term for this phenomenon, recognized in complex networks (including telephone and internet service) where increasing capacity on specific links can, in certain instances, increase congestion overall.

If Improve Existing Roadways Alternative Scenario 8 were modeled, the congested VMT totals would be expected to improve over Scenarios 4+/4a, but likely not enough to show the same improvements in congested VMT achieved by the New Location Alternatives (Non-Toll or Toll Scenarios). Widening north-south feeder roads under Scenario 8 would allow more traffic to be delivered to the same bottlenecks faster. Travelers would have wider crossroads/feeder roads to sit on while waiting to get onto I-85. The effects would be to have shorter queues and higher levels of services for other trips on the crossroads/feeder roads, but this would not be enough improvements to congestion to compete with any of the New Location Alternatives.

I.8.6 Year 2030 Traffic Volumes

This is a new section of the Alternatives Development and Evaluation Report.

This section discusses the 2030 ADT volumes projected for the No-Build Alternative, Improve Existing Roadways Alternative Scenarios 4+/4a, and New Location Alternatives Non-Toll and Toll Scenarios.

Addendum Appendix B contains the 2030 average daily traffic (ADT) volume forecasts under the various scenarios.

I.8.6.1 Year 2030 Traffic Volumes on US 321

This is a new section of the Alternatives Development and Evaluation Report.

Table 8b shows the annual average daily traffic volumes projected for US 321 in the project study area under various scenarios and the percent difference between the No-Build Alternative and each scenario.

As shown in **Table 8b**, Improve Existing Roadway Alternatives Scenarios 4+/4a would result in an increase in traffic volumes along US 321 in the study area on average of about 15 percent, as more people use US 321 to travel to a widened I-85. Compared to the Improve Existing Roadways Alternative, the New Location Alternatives would increase traffic volumes more on US 321 south of the Gaston East-West Connector, but decrease the volumes from the Gaston East-West Connector to downtown Gastonia. North of downtown, the volume increases would be about the same.

Table 8b. Year 2030 Annual Average Daily Traffic Volumes on US 321 – Various Scenarios

US 321 Segment (South to North)	No-Build AADT	Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
		AADT ¹	% Change ²	AADT ¹	% Change ²	AADT ¹	% Change ²
NC/SC State Line to Gaston East-West Connector	30,900	34,200	10.7%	39,600	28.2%	42,000	35.9%
Gaston East-West Connector to Forbes Rd	30,900	34,200	10.7%	23,300	-24.6%	23,200	-24.9%
Forbes Rd to Crowders Creek Rd	20,700	23,300	12.6%	21,100	1.9%	22,400	8.2%
Crowders Creek Rd to Stagecoach Rd	23,400	26,400	12.8%	21,200	-9.4%	22,900	-2.1%
Stagecoach Rd to Davis Park Rd	23,000	26,000	13.0%	20,300	-11.7%	21,400	-7.0%
Davis Park Rd to Hudson Blvd	23,000	26,000	13.0%	20,100	-12.6%	21,200	-7.8%
Hudson Blvd to Jackson Rd	22,800	25,000	9.6%	21,900	-3.9%	22,700	-0.4%
Jackson Rd to W 3 rd Ave	17,400	19,000	9.2%	17,100	-1.7%	17,100	-1.7%
W 3 rd Ave to US 29-74 (W Franklin Blvd)	17,400	19,000	9.2%	17,800	2.3%	17,900	2.9%
US 29-74 (W Franklin Blvd) to W Airline Ave/W Long Ave	20,500	27,300	33.2%	25,300	23.4%	23,800	16.1%
W Airline Ave / W Long Ave to W Rankin Ave	20,500	27,300	33.2%	25,300	23.4%	23,800	16.1%
W Rankin Ave to Radio St	19,900	22,400	12.6%	22,400	12.6%	22,500	13.1%
Radio St to I-85 NB Ramps	22,000	24,800	12.7%	24,800	12.7%	24,800	12.7%
I-85 NB Ramps to I-85 SB Ramps	34,500	40,700	18.0%	39,600	14.8%	40,000	15.9%
I-85 SB Ramps to Rankin Lake Rd	47,000	56,600	20.4%	55,200	17.3%	54,400	15.7%

1. AADT – Annual Average Daily Traffic (vehicles per day)
2. % Chng – percent change in traffic volumes compared to the No-Build Alternative

1.8.6.2 Year 2030 Traffic Volumes on US 29-74

This is a new section of the Alternatives Development and Evaluation Report.

Table 10b shows the annual average daily traffic volumes projected for US 29-74 in the project study area under various scenarios and the percent difference between the No-Build Alternative and each scenario.

As shown in **Table 10b**, compared to the No-Build Alternative, the New Location Alternative Non-Toll Scenario is the most effective at reducing traffic volumes on US 29-74, with the most reduction on the eastern end of the project area. The Improve Existing Roadways Alternative Scenarios 4+/4a are the least effective, resulting in slightly higher traffic volumes on US 29-74 west of NC 279 (New Hope Rd) compared to the No-Build Alternative. This is likely due to the fact that travelers wanting to use the widened I-85 under Improve Existing Roadways Alternative Scenarios 4+/4a would use portions of improved US 29-74 to get there. The New Location Alternative Toll Scenario would have similar traffic volumes on US 29-74 as the Improve Existing Roadways Alternative Scenarios 4+/4a, except east of South Main Street/Redbud Drive, where traffic volumes would be less compared to the No Build Alternative.

Table 10b. Year 2030 Annual Average Daily Traffic Volumes on US 29-74 – Various Scenarios

US 29-74 Segment (West to East)	No-Build AADT	Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
		AADT ¹	% Change ²	AADT ¹	% Change ²	AADT ¹	% Change ²
Sparrow Springs Rd to Gaston East-West Connector	37,200	41,900	12.6%	48,400	30.1%	43,600	17.2%
Gaston East-West Connector to Edgewood Rd	37,200	41,900	12.6%	33,600	-9.7%	35,500	-4.6%
Edgewood Rd to Shannon Bradley Rd	35,600	37,300	4.8%	32,200	-9.6%	36,400	2.2%
Shannon Bradley Rd to Myrtle School Rd	35,400	37,200	5.1%	32,100	-9.3%	36,300	2.5%
Myrtle School Rd to Bessemer City Rd	32,200	34,300	6.5%	29,700	-7.8%	34,600	7.5%
Bessemer City Rd to Linwood Rd	21,500	21,300	-0.9%	20,000	-7.0%	23,100	7.4%
Linwood Rd to US 321 (Chester Rd)	16,400	18,600	13.4%	17,100	4.3%	19,700	20.1%
US 321 (Chester Rd) to Avon St	21,800	23,800	9.2%	21,100	-3.2%	23,000	5.5%
Avon St to Thomas St/Belvidere	22,700	23,800	4.8%	22,400	-1.3%	24,700	8.8%
Thomas St/Belvidere to NC 279 (New Hope Rd)	27,100	28,400	4.8%	26,300	-3.0%	32,100	18.5%
NC 279 (New Hope Rd) to Cox Rd/Armstrong Park Rd	24,700	23,000	-6.9%	22,300	-9.7%	26,000	5.3%

Table 10b. Year 2030 Annual Average Daily Traffic Volumes on US 29-74 – Various Scenarios

US 29-74 Segment (West to East)	No-Build AADT	Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
		AADT ¹	% Change ²	AADT ¹	% Change ²	AADT ¹	% Change ²
Cox Rd/Armstrong Park Rd to Franklin Square	39,200	35,000	-10.7%	36,700	-2.8%	39,900	1.8%
Franklin Square to Lineberger Rd	39,200	35,000	-10.7%	40,300	2.8%	43,500	10.9%
Lineberger Rd to S Main St/Redbud Dr	39,500	35,400	-10.4%	38,300	-3.0%	40,700	3.0%
S Main St/Redbud Rd to Wesleyan Dr/Market St	42,300	39,300	-7.1%	38,700	-8.5%	40,400	-4.5%
Wesleyan Dr/Market St to Lakewood Rd	59,700	56,800	-4.9%	53,000	-11.2%	56,100	-6.0%
Lakewood Rd to NC 273 (Park St)	60,100	58,100	-3.3%	47,500	-21.0%	51,800	-13.8%
NC 273 (Park St) to NC 7 (Catawba St)	72,700	71,200	-2.1%	56,100	-22.8%	61,500	-15.4%
NC 7 (Catawba St) to Old Dowd Rd	70,500	69,900	-1.0%	58,600	-16.9%	63,900	-9.4%
Old Dowd Rd to Sam Wilson Rd	52,600	52,100	-1.0%	39,600	-24.7%	45,400	-13.7%
Sam Wilson Rd to I-485 SB Ramps	58,400	59,000	1.0%	48,400	-17.1%	51,000	-12.7%
I-485 SB Ramps to I-485 NB Ramps	55,100	57,300	4.0%	47,000	-14.7%	49,300	-10.5%
East of I-485 NB Ramps	45,000	48,400	7.6%	38,800	-13.8%	40,800	-9.3%

1. AADT – Annual Average Daily Traffic (vehicles per day)
2. % Chng – percent change in traffic volumes compared to the No-Build Alternative

The higher volumes on the segment from Edgewood Road to Shannon Bradley Road that would occur under the New Location Alternatives (compared to the No-Build Alternative) are due to the new interchange providing access to the Gaston East-West Connector. This also results in lower volumes between Shannon Bradley Road and Myrtle School Road for the New Location Alternatives compared to the Improve Existing Roadways Alternative Scenarios 4+/4a.

1.8.6.3 Year 2030 Traffic Volumes on I-85

This is a new section of the Alternatives Development and Evaluation Report.

Table 12b shows the 2030 AADT projected for I-85 from Exit 10 (US 29-74) to Exit 30 (I-485) in the project study area under various scenarios, and the percent differences between the No-Build Alternative and each scenario. The projected AADT under each scenario are graphically compared in **Chart 1b**.

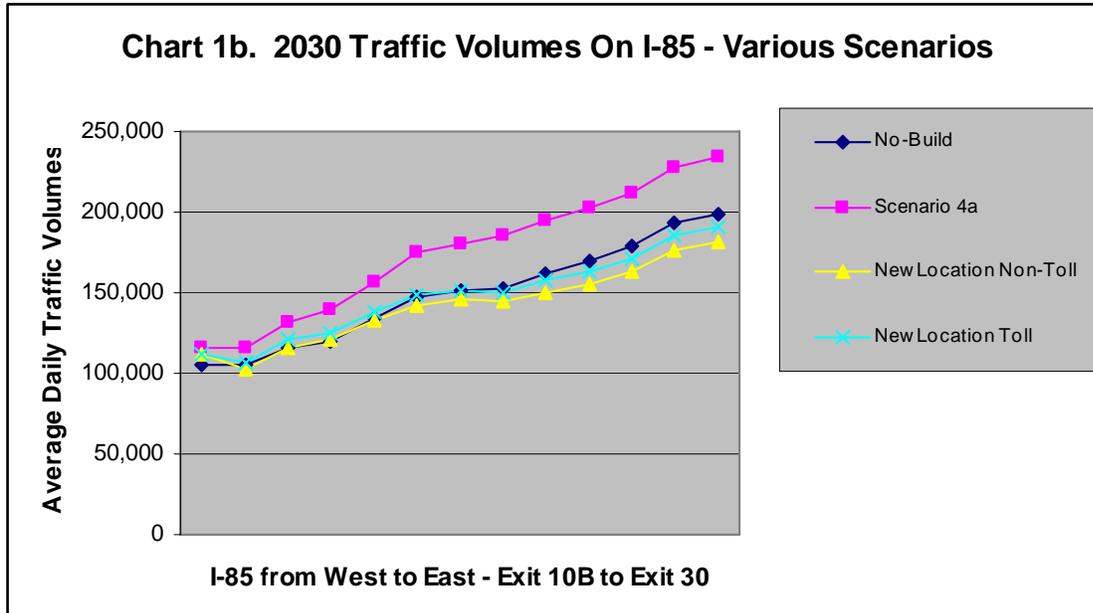
Table 12b. Year 2030 Annual Average Daily Traffic Volumes on I-85 – Various Scenarios

Between I-85 Exits (West to East)	No-Build Alternative	Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT ¹	AADT ¹	% chn ²	AADT ¹	% chn ²	AADT ¹	% chn ²
Exit 10B (US 29-74) to Gaston East-West Connector	105,000	115,200	9.7%	111,200	5.9%	111,800	6.5%
Gaston E-W Connector to Exit 13 (SR 1307 – Edgewood Rd)	105,000	115,200	9.7%	102,100	-2.8%	106,500	1.4%
13 to 14 (NC 274 – Bessemer City Rd)	115,400	131,000	13.5%	116,200	0.7%	120,400	4.3%
14 to 17 (US 321)	119,200	139,600	17.1%	121,200	1.7%	125,200	5.0%
17 to 19 (Ozark Ave)	134,600	157,200	16.8%	132,800	-1.3%	138,400	2.8%
19 to 20 (NC 279)	147,200	174,600	18.6%	142,200	-3.4%	148,200	0.7%
20 to 21 (Cox Rd)	151,000	180,000	19.2%	145,400	-3.7%	151,400	0.3%
21 to 22 (Redbud Dr)	153,000	185,400	21.2%	144,600	-5.5%	149,600	-2.2%
22 to 23 (NC 7 – McAdenville Rd)	161,600	195,200	20.8%	149,800	-7.3%	157,400	-2.6%
23 to 26 (Abbey College)	169,200	202,200	19.5%	155,000	-8.4%	162,800	-3.8%
26 to 27 (NC 273-Park St)	178,600	212,400	18.9%	163,000	-8.7%	171,000	-4.3%
27 to 29 (Sam Wilson Rd)	193,600	228,200	17.9%	175,800	-9.2%	185,200	-4.3%
29 to 30 (I-485)	198,400	234,600	18.2%	181,200	-8.7%	190,800	-3.8%

1. AADT = Annual Average daily traffic volumes

2. % chng = percent change compared to No-Build Alternative

As shown in **Table 12b** and **Chart 1b**, when I-85 is improved under the Improve Existing Roadways Alternative Scenarios 4+/4a, additional traffic volumes are attracted to I-85. Under the New Location Alternatives (Toll and Non-Toll Scenarios), traffic volumes increase slightly on I-85 west of US 321 and decrease east of US 321 compared to the No-Build Alternative, as travelers divert to the new highway. As **Chart 1b** graphically shows, there is so much latent demand in the study area for highway travel that adding the one to two lanes in each direction on I-85 under Scenarios 4+/4a attracted an average of 17 percent more vehicles per hour compared to the No-Build Alternative. Widening the north/south feeder roads to the interstate, as under Scenario 8, would be expected to attract even more vehicles to I-85.



1.8.6.4 Year 2030 Traffic Volumes on I-485

This is a new section of the Alternatives Development and Evaluation Report.

Table 12c shows the 2030 AADT projected for I-485 from in the project study area under various scenarios, and the percent differences between the No-Build Alternative and each scenario. As shown in the table, Improve Existing Roadways Alternative Scenarios 4+/4a would result in higher traffic volumes on I-485 compared to the No-Build Alternative. The New Location Alternatives would result in higher traffic volumes south of the new Gaston East-West Connector interchange at I-485, and slightly less traffic volumes north of the new interchange.

Table 12c. Year 2030 Annual Average Daily Traffic Volumes on I-485 – Various Scenarios

Between I-485 Exits (South to North)	No-Build Alternative	Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT ¹	AADT ¹	% chng ²	AADT ¹	% chng ²	AADT ¹	% chng ²
Exit 4 (NC 60 – Steele Creek Rd) to Gaston East-West Connector	100,000	110,200	10.2%	111,000	11.0%	109,000	9.0%
Gaston E-W Connector to Exit 9 (US 29-74)	100,000	110,200	10.2%	97,400	-2.6%	98,600	-1.4%
Exit 9 to Exit 10 (I-85)	41,900 ³	44,150	5.4%	48,450	15.6%	51,300	22.4%

1. AADT = Annual Average daily traffic volumes
2. % chng = percent change compared to No-Build Alternative
3. AADT for the mainline only, does not include AADT on the collector/distributor roads between the two interchanges.

I.8.7 Year 2030 Levels of Service on Existing Major Roadways

This is a new section of the Alternatives Development and Evaluation Report.

I.8.7.1 Model Methodology and Assumptions

This is a new section of the Alternatives Development and Evaluation Report.

Traffic operations analysis was conducted to calculate levels of service for major roadways surrounding the proposed project (I-85, I-485, US 321, and US 29-74) under various build and no-build scenarios. This analysis is documented in the *Traffic Operations Technical Memorandum for I-85, I-485, US 29-74, and US 231 Under Various Scenarios* (PBS&J, July 2008).

The scenarios evaluated and summarized in this section are listed below.

- Design Year 2030 – No Build Alternative
- Design Year 2030 – Improve Existing Roadways Alternative Scenarios 4+/4a
- Design Year 2030 – New Location Alternative as a Non-Toll Facility
- Design Year 2030 - New Location Alternative as a Toll Facility

Level of Service (LOS) is a “qualitative measure describing operational conditions within a traffic stream” (Transportation Research Board 2000: 2-2). The LOS is defined with letter designations from A to F that can be applied to both roadway segments and intersections. LOS A represents the best operating conditions and LOS F the worst.

All analysis was performed in accordance with the “NCDOT Congestion Management Capacity Analysis Guidelines”, as applicable.

A freeway capacity analysis was performed for the I-85 and I-485 mainlines using the North Carolina Level of Service (NC LOS) software, Version 1.3. The analysis did not include the ramp merge, ramp diverge, and weaving elements. In addition, an arterial capacity analysis was performed for US 29-74 and US 321 using the same software.

A detailed analysis for merging/diverging/weaving was not conducted for every scenario, nor was this level of detail necessary to evaluate concepts and trends at this stage of alternatives development. Only basic segments between interchanges and intersections were modeled. However, the merging/diverging/weaving traffic could influence the level of service along the freeway. The effect could be to degrade level of service, with the possible result being the need for collector-distributor roads or auxiliary lanes. This type of effect would occur under any of the scenarios.

1.8.7.2 Year 2030 Levels of Service on I-85

Table 14b lists the levels of service along I-85, projected to occur under the Improve Existing Roadways Alternative Scenarios 4+/4a and New Location Alternatives (Non-Toll and Toll Scenarios).

Table 14b. Year 2030 Levels of Service on I-85 – Various Scenarios

Between I-85 Exits (West to East)	No-Build Alternative		Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²
Exit 10B (US 29-74) to Gaston East-West Connector	105,000	E	115,200	D	111,200	E	111,800	E
Gaston E-W Connector to Exit 13 (SR 1307 – Edgewood Rd)	105,000	F	115,200	E	102,100	E	106,000	E
13 to 14 (NC 274 – Bessemer City Rd)	115,400	F	131,000	E	116,200	F	120,400	F
14 to 17 (US 321)	119,200	F	139,600	E	121,200	F	125,200	F
17 to 19 (Ozark Ave)	134,600	F	157,200	F	132,800	F	138,400	F
19 to 20 (NC 279)	147,200	F	174,600	F (E) ³	142,200	F	148,200	F
20 to 21 (Cox Rd)	151,000	F	180,000	F (E) ³	145,400	F	151,400	F
21 to 22 (Redbud Dr)	153,000	F	185,400	F (E) ³	144,600	F	149,600	F
22 to 23 (NC 7 – McAdenville Rd)	161,600	F	195,200	F	149,800	F	157,400	F
23 to 26 (Abbey College)	169,200	F	202,200	F	155,000	F	162,800	F
26 to 27 (NC 273-Park St)	178,600	F	212,400	F	163,000	F	171,000	F
27 to 29 (Sam Wilson Rd)	193,600	F	228,200	F	175,800	F	185,200	F
29 to 30 (I-485)	198,400	F	234,600	F	181,200	F	190,800	F

1. AADT = Annual Average daily traffic volumes
2. LOS = Level of Service
3. LOS F for Scenario 4+ and LOS E for Scenario 4a

As shown in **Table 14b**, I-85 is projected to operate primarily at LOS E-F, regardless of the alternative. Under the Improve Existing Roadways Alternative Scenarios 4+/4a, most improvements in traffic flow achieved by adding additional lanes would be offset by the increase in traffic volumes attracted to the facility.

Under the New Location Alternative, either the Toll or Non-Toll Scenario, traffic flow would improve somewhat due to decreases in traffic volumes compared to the No-Build Alternative, even though the LOS remains LOS F.

1.8.7.3 Year 2030 Levels of Service on I-485

Table 14c lists the 2030 levels of service along I-485, projected to occur under the Improve Existing Roadways Alternative Scenarios 4+/4a and New Location Alternative (Non-Toll and Toll Scenarios).

As shown in **Table 14c**, I-485 is projected to operate primarily at LOS E under the No-Build Alternative. Under the Improve Existing Roadways Alternative Scenarios 4+/4a, LOS would degrade to LOS F. Under the New Location Alternative, the LOS would be LOS F on I-485 south of the Gaston East-West Connector and LOS E north of the Gaston East-West Connector.

Table 14c. Year 2030 Levels of Service on I-485 – Various Scenarios

Between I-485 Exits (South to North)	No-Build Alternative		Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²
Exit 4 (NC 60 – Steele Creek Rd) to Gaston East-West Connector	100,000	E	110,200	F	111,000	F	109,000	F
Gaston E-W Connector to Exit 9 (US 29-74)	100,000	E	110,200	F	97,400	E	98,600	E
Exit 9 to Exit 10 (I-85)	41,900 ³	B	44,150 ³	B	48,450 ³	B	51,300 ³	B

1. AADT = Annual Average daily traffic volumes

2. LOS = Level of Service

3. AADT is for the mainline only and does not include AADT on the collector/distributor roads between the two interchanges.

1.8.7.4 Year 2030 Levels of Service on US 29-74

Table 14d lists the 2030 levels of service along US 29-74 projected to occur under the Improve Existing Roadways Alternative Scenarios 4+/4a and New Location Alternative (Non-Toll and Toll Scenarios).

As shown in **Table 14d**, under the No-Build Alternative, US 29-74 is projected to operate primarily at LOS D or better west McAdenville and LOS F east of McAdenville. Under the Improve Existing Roadways Alternative ScenarioS 4+/4a, LOS would improve compared to the No-Build Alternative west of Myrtle School Road, where US 29-74 would be widened to six lanes. Under the New Location Alternative (Non-Toll and Toll Scenarios), the LOS would be similar to the No-Build Alternative, even though traffic volumes would be less.

Table 14d. Year 2030 Levels of Service on US 29-74 – Various Scenarios

US 29-74 Segment (West to East)	No-Build Alternative		Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²
Sparrow Springs Rd to Gaston East-West Connector	37,200	D	41,900	B	48,400	F	43,600	F
Gaston East-West Connector to Edgewood Rd	37,200	D	41,900	B	33,600	E	35,500	E
Edgewood Rd to Shannon Bradley Rd	35,600	C	37,300	B	32,200	C	36,400	C
Shannon Bradley Rd to Myrtle School Rd	35,400	E	37,200	C	32,100	D	36,300	F
Myrtle School Rd to Bessemer City Rd	32,200	F	34,300	F	29,700	F	34,600	F
Bessemer City Rd to Linwood Rd	21,500	D	21,300	D	20,000	D	23,100	D
Linwood Rd to US 321 (Chester Rd)	16,400	D	18,600	D	17,100	D	19,700	D
US 321 (Chester Rd) to Avon St	21,800	D	23,800	E	21,100	D	23,000	D
Avon St to Thomas St/Belvidere	22,700	D	23,800	D	22,400	D	24,700	D
Thomas St/Belvidere to NC 279 (New Hope Rd)	27,100	C	28,400	C	26,300	C	32,100	D
NC 279 (New Hope Rd) to Cox Rd/Armstrong Park Rd	24,700	C	23,000	C	22,300	C	26,000	C
Cox Rd/Armstrong Park Rd to Franklin Square	39,200	D	35,000	D	36,700	D	39,900	D
Franklin Square to Lineberger Rd	39,200	F	35,400	E	40,300	F	43,500	F
Lineberger Rd to S Main St/Redbud Dr	39,500	D	35,400	D	38,300	D	40,700	D
S Main St/Redbud Rd to Wesleyan Dr/Market St	42,300	D	39,300	D	38,700	D	40,400	D
Wesleyan Dr/Market St to Lakewood Rd	59,700	F	56,800	F	53,000	F	56,100	F

Table 14d. Year 2030 Levels of Service on US 29-74 – Various Scenarios

US 29-74 Segment (West to East)	No-Build Alternative		Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²
Lakewood Rd to NC 273 (Park St)	60,100	F	58,100	F	47,500	D	51,800	F
NC 273 (Park St) to NC 7 (Catawba St)	72,700	F	71,200	F	56,100	F	61,500	F
NC 7 (Catawba St) to Old Dowd Rd	70,500	F	69,900	F	58,600	F	63,900	F
Old Dowd Rd to Sam Wilson Rd	52,600	F	52,100	E	39,600	F	45,400	F
Sam Wilson Rd to I-485 SB Ramps	58,400	F	59,000	F	48,400	F	51,000	F
I-485 SB Ramps to I-485 NB Ramps	55,100	F	57,300	F	47,000	F	49,300	F
East of I-485 NB Ramps	45,000	F	48,400	E	38,800	F	40,800	F

1. AADT = Annual Average Daily Traffic (vehicles per day)
2. LOS = Level of Service

1.8.7.5 Year 2030 Levels of Service on US 321

Table 14e lists the 2030 levels of service along US 321 projected to occur under the Improve Existing Roadways Alternative ScenarioS 4+/4a and New Location Alternative (Non-Toll and Toll Scenarios).

As shown in **Table 14e**, levels of service along US 321 are similar for all evaluated alternatives. Levels of service are LOS D or better through the project area, except near the I-85 ramps, where levels of service would be LOS F.

Table 14e. Year 2030 Levels of Service on US 321 – Various Scenarios

US 321 Segment (South to North)	No-Build Alternative		Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²
NC/SC State Line to Gaston E-WConnector	30,900	A	34,200	A	39,600	C	42,000	D
Gaston East-West Connector to Forbes Rd	30,900	A	34,200	A	23,300	D	23,200	D
Forbes Rd to Crowders Creek Rd	20,700	B	23,300	B	21,100	B	22,400	B
Crowders Creek Rd to Stagecoach Rd	23,400	C	26,400	D	21,200	C	22,900	C
Stagecoach Rd to Davis Park Rd	23,000	C	26,000	C	20,300	C	21,400	C
Davis Park Rd to Hudson Blvd	23,000	D	26,000	E	20,100	D	21,200	D

Table 14e. Year 2030 Levels of Service on US 321 – Various Scenarios

US 321 Segment (South to North)	No-Build Alternative		Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative Non-Toll Scenario		New Location Alternative Toll Scenario	
	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²	AADT ¹	LOS ²
Hudson Blvd to Jackson Rd	22,800	D	25,000	E	21,900	D	22,700	D
Jackson Rd to W 3 rd Ave	17,400	C	19,000	D	17,100	C	17,100	C
W 3 rd Ave to US 29-74 (W Franklin Blvd)	17,400	C	19,000	C	17,800	C	17,900	C
US 29-74 (W Franklin Blvd) to W Airline Ave/W Long Ave	20,500	C	27,300	C	25,300	C	23,800	C
W Airline Ave/W Long Ave to W Rankin Ave	20,500	C	27,300	C	25,300	C	23,800	C
W Rankin Ave to Radio St	19,900	D	22,400	D	22,400	D	22,500	D
Radio St to I-85 SB Ramps	22,000	D	24,800	D	24,800	D	24,800	D
I-85 SB Ramps to I-85 NB Ramps	34,500	F	40,700	F	39,600	F	40,000	F
I-85 NB Ramps to Rankin Lake Rd	47,000	E	56,600	F	55,200	F	54,400	F

1. AADT = Annual Average Daily Traffic (vehicles per day)
2. LOS = Level of Service

I.8.8 Mobility and Connectivity Measures

I.8.8.1 Mobility and Connectivity Within Southern Gaston County

South of I-85 in southern Gaston County, a lack of connecting east-west roadways makes travel circuitous and limits mobility. Currently, there are no continuous east-west routes in southern Gaston County. The roads in southern Gaston County generally in a north-south direction.

As can be seen on **Figure 3a** or **Figure 4**, a person wishing to travel from the residential subdivisions on the Belmont peninsula (the land between the South Fork Catawba River and Catawba River) to businesses and industries along US 321 in southern Gaston County cannot do so directly. They must first travel north to use westbound I-85 or US 29-74 to US 321, then south on US 321 or travel a circuitous route that might include NC 273 (Armstrong Road), NC 279 (South New Hope Road), SR 2435 (Union New Hope Road), NC 274 (Union Road), SR 2416 (Robinson Road), SR 2412 (Little Mountain Road), SR 2420 (Forbes Road) to US 321. NC 273, NC 279, SR 2435, NC 274, SR 2416, and SR 2420 are all two-lane roadways with no access control.

Using the existing routes in southern Gaston County described above, a person would travel 17 miles across southern Gaston County. A person using Southpoint Rd to I-85 to US 321 would travel approximately 22 miles. A person using the Gaston East-West Connector would have an 11-mile trip.

The approximate travel times for a person traveling within southern Gaston County were estimated using the travel time contour feature of the 2030 Metrolina travel demand model. The model generates lines showing various travel time increments (in this case, 10-minute increments) from an input starting point (origin), and can also give approximate travel times to specified destinations. The travel time contours were run for the morning peak hour for the No-Build Alternative, Improve Existing Roadways Alternative Scenarios 4+/4a, and the New Location Alternative Toll Scenario. The selected origins included the Belmont peninsula near the intersection of Southpoint Road and Armstrong Road, and southwest Gaston County near the intersection of Lewis Road and Chapel Grove Road.

The travel time contour maps are provided in **Addendum Appendix C. Table 15** shows the results for the modeled origins and selected destinations within Gaston County.

Table 15. Estimated Travel Times for Trips Within Gaston County Under Various Scenarios

Origin	Destination	Peak Period	Approximate Travel Time in 2030 (minutes)				
			No-Build Alternative	Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative - Toll Scenario	
			Travel Time	Travel Time	Time Change ¹	Travel Time	Time Change ¹
Belmont Peninsula – Southpoint Rd/ Armstrong Rd Intersection	US 321 at Robinson Road	AM	22	25	↑ 3	13	↓ 9
	Downtown Gastonia	AM	20	22	↑ 2	18	↓ 2
	Downtown Bessemer City	AM	27	32	↑ 5	25	↓ 2
Southwest Gaston County – Lewis Rd/ Chapel Grove Rd Intersection	Daniel Stowe Botanical Garden	AM	30	31	↑ 1	22	↓ 8
	Downtown Gastonia	AM	13	13	0	10	↓ 3
	Downtown Bessemer City	AM	15	14	↓ 1	12	↓ 3

Source: Travel Time Contour Maps produced by M/A/B using the 2030 Metrolina travel demand model.

1. Time change is the difference compared to the No-Build Alternative.

As shown in **Table 15**, travel times for travel within southern Gaston County would lengthen somewhat under the Improve Existing Roadway Alternative Scenarios 4+/4a. Under these scenarios, more vehicles are using the network roads to reach I-85 and US 29-74, which reduces speeds on roadways throughout the network. Travel times under Scenario 8 may be slightly better, as more capacity is provided on north-south feeder roads, but these roads are used only for short distances in east-west cross-county travel. Also, if the new capacity on I-85 were tolled, this would not have an effect on travel within southern Gaston County.

Under the New Location Alternative (Toll Scenario), travel times would noticeably improve for cross-county travel in southern Gaston County. For example, travel from the Belmont Peninsula westward to US 321 would be reduced by about 9 minutes (about 40 percent) compared to the No-Build Alternative. Likewise, travel times from southwest Gaston County eastward to the Daniel Stowe Botanical Garden area would be reduced about 8 minutes (about 27 percent) compared to the No-Build Alternative. Travel times under the New Location Alternative (Non-Toll Scenario) are expected to be the same as under the Toll Scenario.

The need for improved connectivity and east-west mobility within southern Gaston County will continue to grow as the population in this area increases. Between 1990 and 2000, southeastern Gaston County had the largest population increase in the County. According to the Gaston County Comprehensive Plan, the southeastern part of the county is expected to continue experiencing high residential growth through 2020.

1.8.8.2 Mobility and Connectivity Between Gaston County and Mecklenburg County

As was estimated for travel within southern Gaston County, the travel time contour feature of the 2030 Metrolina travel demand model also was used to estimate travel times for various origins and destinations between Gaston County and Mecklenburg County. The travel time contours were run for the peak hour (AM or PM, depending on origin) for the No-Build Alternative, Improve Existing Roadways Alternative Scenarios 4+/4a, and the New Location Alternative Toll Scenario. The selected origins included the Belmont peninsula near the intersection of Southpoint Road and Armstrong Road, southwest Gaston County near the intersection of Lewis Road and Chapel Grove Road, the Charlotte-Douglas International Airport, and south Gastonia near the intersection of Huffman Road and Robinwood Road (about halfway between the New Location Alternative corridors and I-85).

The travel time contour maps are provided in **Addendum Appendix C. Table 16** shows the results for the modeled origins and selected destinations between the two counties.

Like travel within southern Gaston County, travel times for travel between Gaston and Mecklenburg Counties would lengthen under the Improve Existing Roadway Alternative Scenarios 4+/4a compared to the No-Build Alternative. Under these scenarios, more vehicles are using the network roads to reach I-85 and US 29-74, which reduces speeds on roadways throughout the network (**Section I.8.5**). If the new capacity on I-85 were tolled, travel time savings may improve, but some of these savings would be offset because vehicles would still need to drive on congested roadways to reach the interstate. Also, for inter-county travel, travelers must use I-85 or US 29-74 to cross over the river, which constrains traffic flow. Travel times under Scenario 8 likely would be better, as more capacity is provided on north-south feeder roads, but travel time savings would not reach the levels achieved by a New Location Alternative.

Under the New Location Alternative (Toll Scenario), travel times savings would be substantial for most inter-county trips. For example, a trip to/from southern Gaston County (Belmont Peninsula or southwest Gaston County) or south Gastonia from/to the Charlotte-Douglas International Airport would take about 20 minutes less (30-40 percent reduction). A trip from the Charlotte-Douglas International Airport to downtown Gastonia or downtown Belmont would be reduced by about 10 minutes (about a 15 percent reduction). Travel times under the New Location Alternative (Non-Toll Scenario) are expected to be the same as under the Toll Scenario

Table 16. Estimated Travel Times for Trips Between Gaston and Mecklenburg Counties Under Various Scenarios

Origin	Destination	Peak Period	Approximate Travel Time in 2030 (minutes)				
			No-Build Alternative	Improve Existing Roadways Alternative Scenarios 4+/4a		New Location Alternative - Toll Scenario	
			Travel Time	Travel Time	Time Change ¹	Travel Time	Time Change ¹
Belmont Peninsula – Southpoint Rd/Armstrong Rd Intersection	Charlotte-Douglas International Airport	AM	57	65	↑ 8	34	↓ 23
Southwest Gaston County -Lewis Rd/Chapel Grove Rd Intersection	Charlotte-Douglas International Airport	AM	83	87	↑ 4	60	↓ 23
South Gastonia – Hoffman Rd/Robinwood Rd Intersection	Charlotte-Douglas International Airport	AM	68	75	↑ 7	50	↓ 18
	West of I-485 near Steele Creek Parkway	AM	55	62	↑ 7	45	↓ 10
Charlotte-Douglas International Airport	Southpoint Rd near Southpoint High School	PM	52	58	↑ 6	29	↓ 23
	Daniel Stowe Botanical Garden	PM	62	69	↑ 7	34	↓ 28
	US 321 at Robinson Road	PM	66	85	↑ 19	45	↓ 21
	Downtown Gastonia	PM	57	75	↑ 18	46	↓ 11
	Downtown Bessemer City	PM	66	80	↑ 14	57	↓ 9

Source: Travel Time Contour Maps produced by M/A/B using the 2030 Metrolina travel demand model.

1. Time change is the difference compared to the No-Build Alternative.

PART II – SECOND SCREENING OF PRELIMINARY ALTERNATIVES

The three paragraphs below are an addition to Part II of the report.

Part II of the Alternatives Development and Evaluation Report focuses on the alternative concept that made it through the first screening – a New Location Alternative. Part II describes the process of developing preliminary corridors for the New Location Alternative concept and conducting evaluations to narrow the numbers of corridors to those to be studied in detail in the Draft Environmental Impact Statement.

The second screening process and decisions documented in Part II of the Alternatives Development and Evaluation Report apply whether the New Location Alternative is a non-toll facility or a toll-facility. The functional engineering designs of the alternatives would be similar enough to not make a significant, or even notable, difference in the construction footprint used to estimate impacts in the second screening.

There are few differences in the designs of the non-toll facility compared to the toll facility. The toll facility's toll collection process is proposed to be solely electronic, so there would be no cash toll booths where a construction footprint might be wider than a non-toll facility. Some interchange ramps may have a slightly different alignment between a non-toll facility and a toll facility to ensure that cashless toll-collection sensors have adequate line-of-sight to vehicles. This difference in ramp alignments would not change the basis of the decision making documented in Part II of the Alternatives Development and Evaluation Report.

II.1 SECOND SCREENING METHODOLOGY

II.1.1 EVALUATION PROCESS

There are no changes or additions to this section. The evaluation process is applicable to both non-toll and toll facilities.

The process to develop and evaluate preliminary corridor segments to ultimately arrive at the Detailed Study Alternatives is described below.

1. A Refined Study Area for the New Location Alternatives was identified based on land suitability mapping.
2. Numerous 1,200-foot wide preliminary corridor segments were developed within the refined study area using the land suitability mapping and design criteria. These were presented to the public at the Citizens Informational Workshop Series #1 in 2003.

3. Preliminary corridor segments were reviewed with the NEPA/404 Merger Team to determine if any could be eliminated based on “fatal flaws” or high levels of estimated impacts to the human and/or natural environments compared to other segments.
4. The remaining preliminary corridor segments were connected to form endpoint-to-endpoint corridors from I-85 to I-485 and the width was widened from 1,200 feet to 1,400 feet to allow for more flexibility in establishing alignments.
5. Functional designs were prepared within these corridors, taking into consideration engineering design constraints and the locations of known sensitive human and natural resources. These are referred to as the functional design corridors. The 1,400-foot wide functional design corridor boundaries then were redrawn to be centered around the functional design alignments.
6. Impacts to the natural and human environments based on the functional designs within the functional design corridors were estimated and tabulated.
7. From the set of functional design corridors, Detailed Study Alternatives were recommended based on the estimated impacts to the natural and human environments, engineering design considerations, and input from the NEPA/404 Merger Team. These recommendations were presented to the public for comment and input at Citizens Informational Workshop Series #2.

II.1.2 DESIGN CRITERIA

The basic design criteria are the same whether the New Location Alternative is a non-toll facility or a toll facility. However, this section was updated to include a discussion about number of lanes that would be required based on 2030 Metrolina travel demand model forecasts for the Non-Toll Scenario and the Toll Scenario.

Appendix D presents the design criteria used to develop the preliminary corridor segments and functional design corridors. These criteria are based on the project’s location, function, classification, and design speed. The design criteria conform to the standards established by the American Association of State Highway and Transportation Officials (AASHTO) (2004).

The typical cross-section for the New Location Alternative Scenario 5a is shown in **Figure 16**. Other typical cross-sections for cross-streets (Y-lines) and interchange ramps and loops are included in **Appendix D**. The design criteria and typical roadway cross-section are influenced by the type of facility required to fulfill the project’s purpose and need. For the proposed project, a six-lane, median-divided, controlled-access highway is needed to adequately carry projected traffic volumes.

The proposed design speed is 70 mph for the main lines of the New Location Alternative. Three 12-foot lanes are proposed for each direction of travel, separated by a 46-foot median. The total right-of-way is

proposed to be a minimum of 350 feet. Right-of-way requirements would be greater around interchanges.

For the proposed project, a six-lane, median-divided, controlled-access highway was determined to be needed to adequately carry projected 2025 non-toll scenario traffic volumes, which were the traffic projections current at the time the design criteria were developed. The fifth and sixth lanes were added in the median (reducing the median to 46 feet). The median would be 70 feet wide if the project was designed as a four-lane facility. Under either the four-lane cross-section or the six-lane cross-section, the outside footprint of the facility would be the same. The actual number of lanes to be included in the project will be determined during final design.

II.1.3 EVALUATION CRITERIA

There are no changes or additions to this section. The evaluation criteria are applicable to both non-toll and toll facilities.

The factors listed in **Table 17** were considered in the evaluation and screening of preliminary corridor segments and/or the functional design corridors. Data on these factors were obtained from GIS databases (NCDOT, Gaston County, Mecklenburg County, US Geological Survey, US Fish and Wildlife Service), State resource agency files, aerial photography, and field visits.

Table 17. Second Screening Evaluation Factors

Factor	Impact Estimate Method		Source of Data
	Preliminary Corridor Segments	Functional Design Corridors	
Length	Miles	Miles	Calculated
Number of Interchanges	Number along Corridor	Number along functional design	Based on proposed project and design constraints
Construction Cost (Millions \$) (2005 dollars)	Not calculated	2005 dollars based on functional design estimated quantities	Based on standard unit costs
Number of Minor Road Crossings	Number counted along corridor segments	Number counted along functional designs	GIS databases
Number of Major Power Easement Crossings	Number counted along corridor segments	Number counted along functional designs	GIS databases, aerial photography
Number of Railroad Line Crossings	Number counted along corridor segments	Number counted along functional designs	GIS databases, aerial photography
Residential Relocations	Number counted within corridor segments	Number counted within functional designs	GIS databases, tax parcel mapping, aerial photography
Business Relocations	Number counted within corridor segments	Number counted within functional designs	GIS databases, tax parcel mapping, aerial photography

Table 17. Second Screening Evaluation Factors

Factor	Impact Estimate Method		Source of Data
	Preliminary Corridor Segments	Functional Design Corridors	
Low-Income or Minority Populations	Present within corridor segments	Present within corridor segments	Census data
Parks/Recreation Sites	Number counted within a 300-foot wide alignment centered in the corridor segments	Number counted within functional designs	GIS databases, aerial photography, and site visits
Schools/Libraries/ Fire Stations	Number counted within a 300-foot wide alignment centered in the corridor segments	Number counted within functional designs	GIS databases, aerial photography, and site visits
Churches	Number counted within a 300-foot wide alignment centered in the corridor segments	Number counted within functional designs	GIS databases, aerial photography, and site visits
Cemeteries	Number counted within a 300-foot wide alignment centered in the corridor segments	Number counted within functional designs	GIS databases, aerial photography, and site visits
National Historic Register Sites	Number counted within a 300-foot wide alignment centered in the corridor segments	Number counted within functional designs	NC State Historic Preservation Office, GIS databases
Properties Potentially Eligible for National Register	Number counted within a 300-foot wide alignment centered in the corridor segments	Number counted within functional designs	Phase I Historic Architectural Survey of the Refined Study Area
Hazardous Materials and Superfund Sites	Number counted within corridor segments	Number counted within functional designs	GIS databases, NC Dept. of Environment and Natural Resources
Streams	Linear feet within the corridor segments	Linear feet within functional designs	GIS databases
	Number of crossings based on the corridor centerline	Number of crossings based on the functional design centerline	GIS databases
Wetlands	Acres within the corridor segments	Acres within functional designs	USFWS National Wetland Inventory Maps
Floodplains	Linear feet crossed by corridor centerline	Linear feet crossed by functional design centerline	GIS databases
Natural Heritage Program Occurrences/Sites	Number counted within corridor segments	Number counted within functional designs	NC Natural Heritage Program
Watersheds	Number counted within corridor segments	Number counted within functional designs	GIS databases

Table 17. Second Screening Evaluation Factors

Factor	Impact Estimate Method		Source of Data
	Preliminary Corridor Segments	Functional Design Corridors	
303(d) Listed Streams	Number counted within corridor segments	Number counted within functional designs	NC Division of Water Quality
Groundwater Discharge Sites	Number counted within corridor segments	Number counted within functional designs	GIS databases

The criteria listed in **Table 17** are discussed below:

Length and Construction Cost. The design criteria described in **Section II.1.2** were used to develop the preliminary corridors. Length, number of interchanges, number of minor road crossings, and number of powerline easement crossings affect the design and construction costs of an alternative. Longer corridors with greater numbers of interchanges, grade-separated road crossings, and easement crossings generally have higher costs.

Socioeconomic Criteria. Socioeconomic criteria include residential and business relocations and impacts to community facilities (churches, libraries, parks, etc.). Corridor locations contributing to excessive community disruption or isolation were avoided where possible. A higher number of minor road crossings can indicate more disruptions to neighborhoods. Relocations of residences and businesses, and associated social or economic impacts, are often of greatest concern to the public and local officials. A higher number of residential and business relocations also represents increases in right-of-way costs.

Historic Resource Criteria. Known historic architectural sites and districts were identified through a review of county and State Historic Preservation Office files and inventories and NCDOT’s GIS database. A Phase I Historic Architectural Survey study area (Mattson, Alexander and Associates, September 2003) was conducted to identify additional properties potentially eligible for the National Register of Historic Places. Known and potential historic properties were avoided to the extent possible in the development of preliminary corridor segments and functional design corridors.

Hazardous Materials Sites. Known sites of hazardous materials or waste were obtained from NCDOT’s GIS database, and more detailed information was obtained for some sites from research at the NC Department of Environment and Natural Resources. Remediation and acquisition activities associated with hazardous materials/waste sites can increase project costs and delay construction schedules. These types of sites were avoided in the development of preliminary corridor segments and functional design corridors whenever practicable.

Natural Resource Criteria. Natural resource criteria included number of stream crossings, length of stream in segment or functional design right of way, areas of wetlands and floodplains, known protected species and natural heritage occurrence sites, and locations of watersheds and public water resources.

Construction in jurisdictional resources (wetlands and streams that would require mitigation if impacted) requires a permit from the US Army Corps of Engineers pursuant to Section 404 of the Clean Water Act, and a permit from the North Carolina Division of Water Quality pursuant to Section 401 of the Clean Water Act. The US Army Corps of Engineers and the NC Division of Water Quality (DWQ) require a permit applicant to demonstrate that all practical measures have been taken to avoid and minimize wetland impacts. Under Section 401 of the Clean Water Act, the NC DWQ also requires mitigation for all stream impacts greater than 150 linear feet.

Impacts to floodplains and streams indicate areas where culverts or bridges may be required, which represent increases in construction costs. Higher values for total areas of streams and floodplains within a corridor can indicate there will be less flexibility in designing roadway alignments within these corridors that avoid or minimize impacts to streams and floodplains.

None of the preliminary corridor segments encroached upon recorded protected species sites or watersheds/public water resources. Therefore, these two factors are not discussed in the evaluations described below.

II.2 REFINED STUDY AREA

There are no changes or additions to this section or to **Figure 17 – Refined Study Area for New Location Alternatives**. The refined study area was based on land suitability mapping that is applicable whether the New Location Alternative is a non-toll or toll facility.

Land suitability mapping was developed for the project study area by identifying constraints presented by major features of the natural and human environments. As described above, data sources included aerial photography, US Geological Survey (USGS) topographic information, Geographical Information System (GIS) databases from the NCDOT, Gaston County, and Mecklenburg County, State resource agency files, stakeholder interviews, and field visits.

The land suitability mapping information was used to create a refined study area within the overall project study that was suitable for the New Location Alternatives. The refined study area for New Location Alternatives is shown in **Figure 17**.

Primary constraints in establishing the northern boundary of the refined study area included the more densely developed areas within the City of Gastonia municipal boundaries, the Gastonia Municipal Airport, and the water supply watershed located on either side of the Catawba River in Belmont.

To the south, constraints included the North Carolina/South Carolina state line and the Daniel Stowe Botanical Garden. I-485 and the Charlotte-Douglas International Airport comprise the eastern boundary. To the west is Crowder's Mountain State Park.

II.3 DEVELOPING THE PRELIMINARY CORRIDOR SEGMENTS

There are no changes or additions to this section or to **Figure 18 – Preliminary Corridor Segments**. The refined study area was based on land suitability mapping that is applicable whether the New Location Alternative is a non-toll or toll facility.

The land suitability mapping showing known human and natural environment resources was used to develop the preliminary corridor segments. Also included was the alignment for the project shown on the Gaston Thoroughfare Plan. About 116 miles of preliminary corridor segments were developed. These are shown in **Figure 18(a-b)**.

Major constraints considered in the development of the preliminary corridor segments are described below. The refined study area was divided into three parts for this discussion: West Portion (from I-85 to US 321), Central Portion (US 321 to around NC 279 or the South Fork Catawba River), and East Portion (from around NC 279 or the South Fork Catawba River to I-485).

West Portion preliminary corridor segments are labeled beginning with A or B. Central Portion preliminary corridor segments are labeled beginning with C, D, and E. East Portion preliminary corridor segments are labeled beginning with F and G. All segments are 1,200 feet wide. The preliminary corridor segments were located to avoid or minimize impacts to known natural and human resources whenever possible.

II.3.1 PRELIMINARY CORRIDOR SEGMENTS FROM I-85 TO US 321 (WEST PORTION)

There are no changes or additions to this section.

Notable natural resources in the West Portion include Crowder's Creek and its named (Abernethy Creek, Oates Creek, Blackwood Creek, Ferguson Branch, McGill Branch) and unnamed tributaries, and a Natural Heritage Program (NHP) site, Site No. A04 – Stagecoach Road Granitic Outcrop and Wetland. Crowder's Creek has a 100-year floodplain defined and it is also a 303d listed stream, meaning its water quality has been determined by the NC Division of Water Quality as being impaired. The NHP site is divided into two nearby areas, shown in **Figures 17 and 18**, and is on privately-owned land.



McGill Branch (photo from S&ME)

Notable human resources in the West Portion include numerous churches and subdivisions, several schools and potential historic sites, and the Linwood Springs Golf Course (privately-owned but open to the public). On the east side of US 321 is a parallel railroad track directly adjacent and also a dormant Superfund site located between Forbes Road to the south and Crowder's Creek Road to the north. This Superfund site is a former heavy metal industrial plant. The railroad track parallels the east side of US 321 through the Refined Study Area for the New Location Alternatives.



Belfast Drive Area

Engineering design considerations include the need to provide appropriate spacing between a new I-85 interchange and adjacent I-85 interchanges, and the need to provide adequate horizontal curvature along each corridor length to accommodate the 70 mph design speed. The City of Bessemer City has expressed a need to maintain its access to the interstate at Exit 13 (Edgewood Road).

The potential locations for a new interchange on I-85 in the Refined Study Area are highly constrained. Existing I-85 interchanges in the Refined Study Area include Exit 10 (US 29-74), Exit 13 (Edgewood Road), Exit 14 (NC 274 - Bessemer City Road), and Exit 17 (US 321). Also in this area, an interchange with US 29-74 is desired. US 29-74 runs about one-half to one mile south of I-85 in this area and Crowder's Creek runs parallel to the south of US 29-74. There are two major tributaries to Crowder's Creek that run north/south, crossing under I-85 between Exit 13 (Edgewood Road) and Exit 14 (Bessemer City Road). Crowder's Mountain State Park constrains the western limits. Sadler Elementary School (opened in 2005) is located on the north side of US 29-74 just west of Edgewood Road.

Three potential termini at I-85 were identified for consideration as part of the development of the preliminary corridors, as shown in **Figure 18(a-b)**. The westernmost terminus is located west of Exit 13 (Edgewood Road). The next terminus to the east is located at Exit 13 (Edgewood Road). This option would need to incorporate Edgewood Road into the interchange or relocate the road. The easternmost terminus is located between Exit 13 (Edgewood Road) and Exit 14 (NC 274 – Bessemer City Road). In all cases, the upstream and downstream existing interchanges would need to be modified to accommodate the new interchange.

Moving the terminus farther east along I-85 would align the roadway so that any potential future extension north likely would impact downtown Bessemer City. Also, moving the terminus farther east likely would require modifications to Exit 10 (US 29-74) and create more impacts to Crowder's Creek. Moving the terminus farther west along I-85 could require eliminating the US 321 interchange. The US 321 interchange is constrained by an existing rail line along its eastern side. Existing interchange ramps cannot be moved to the eastern side to create room for a new interchange's ramps.

Also considered was the potential for the roadway to be extended north sometime in the future. An extension to the north is not reasonably foreseeable at this time, but an extension northward is shown on the Thoroughfare Plan. The alignment and location of the termini at I-85 took into account features to the north of I-85, including the downtown area of Bessemer City.

The segments that mimic the alignment shown on the Gaston Urban Area Thoroughfare Plan are Preliminary Corridor Segments A3, A6, and B3. Most of the area of these segments is within the 100-year floodplain of Crowder's Creek. Therefore, Preliminary Corridor Segments A4, A7 and B4 were created to be similar to the alignment shown on the Thoroughfare Plan, but these segments were shifted eastward slightly to stay out of Crowder's Creek's 100-year floodplain as much as possible, while still trying to minimize residential impacts.

II.3.2 PRELIMINARY CORRIDOR SEGMENTS FROM EAST OF US 321 TO AROUND NC 279 (CENTRAL PORTION)

▪ *There are no changes or additions to this section.*

Notable natural resources in the Central Portion of the Refined Study Area include tributaries to Crowder's Creek, including a major tributary to Crowder's Creek that runs north to south just east of US 321 and other unnamed tributaries. Other creeks in this area are Mill Creek and Catawba Creek (and their tributaries), which are tributaries to the Catawba River.

There also is a 152-acre conservation easement that lies partially within Preliminary Corridor Segments E6 and E7 on property owned by Crescent Resources LLC (the real estate arm of Duke Energy) (See **Figure 18b**). This conservation easement was secured by the Catawba Lands Conservancy, a non-profit regional land trust serving the Lower Catawba River Basin. According to the conservancy, this property includes steep slopes, mature hardwood forests, pine forests, extensive wetlands, and important riparian buffers along Catawba Creek and numerous tributaries.



Catawba Creek (Photo from S&ME)



Carolina Speedway on Union Road

Other notable human resources in the Central Portion include numerous churches and subdivisions and several potential historic sites. Forest View High School, WA Bess Elementary School, and the Union Road Branch Library are located on NC 279 (Union Road) south of Beaty Road (See **Figure 18b**). Just south of the NC 279 (Union Road) intersection with Union-New Hope Road, on the east side of Union Road, is the privately-owned Carolina Speedway. It is

approximately 28 acres in size and includes a dirt track speedway and bleachers.

The following Preliminary Corridor Segments, from west to east, are similar to the alignment shown on the Gaston Thoroughfare Plan: C1, C5, C8, D2, D4, D8, D9, E3, and E8.

II.3.3 PRELIMINARY CORRIDOR SEGMENTS FROM AROUND NC 279 TO I-485 (EAST PORTION)

This section includes an update on the status of the Allen Steam Station pollution control facilities and the addition of the name of the park in Mecklenburg County.

Notable natural resources in the East Portion of the Refined Study Area include the South Fork Catawba River, Catawba River, and Beaverdam Creek. When possible, the Preliminary Corridor Segments cross these rivers at narrow areas and in a perpendicular manner.



South Fork Catawba River

On the east bank of the South Fork Catawba River, at the end of Canal Road and The Hot Hole Lane is the Allen Fishing Access Area on land owned by Duke Energy. This public-access area has a parking lot, picnic sites, and fishing access. It is located where the Allen Steam Station's water discharge canal flows into the South Fork Catawba River. None of the Preliminary Corridor Segments are within this area.



Canal from Fishing Access Area

In Mecklenburg County, there is undeveloped parkland, Berewick District Park owned by the County on the north side of Dixie River Road, directly west of I-485.

Notable human resources in this portion of the refined study area include several potential historic sites and churches and numerous subdivisions, including riverfront developments. Other features include a power plant and associated facilities and a planned intermodal facility and new runway at the Charlotte-Douglas International Airport.

On the Belmont Peninsula (the land between the South Fork Catawba River and Catawba River) is the Allen Steam Station and associated facilities (See **Figure 18b**). The Allen Steam Station is a major coal-fired power plant owned and operated by Duke Energy. It began operations in 1957 and currently serves over one million homes. Facilities associated with the power plant include a water discharge canal, an air pollution control facility and associated future landfill, fly ash basins, a rail line, and numerous major power line easements. These facilities are described below.



Allen Steam Station

The water discharge canal bisects the Belmont peninsula to discharge water to the South Fork Catawba River. Water is drawn from the Catawba River and used for cooling purposes before being discharged to the canal, which drains to the South Fork Catawba River. None of the Preliminary Corridor Segments cross this canal.

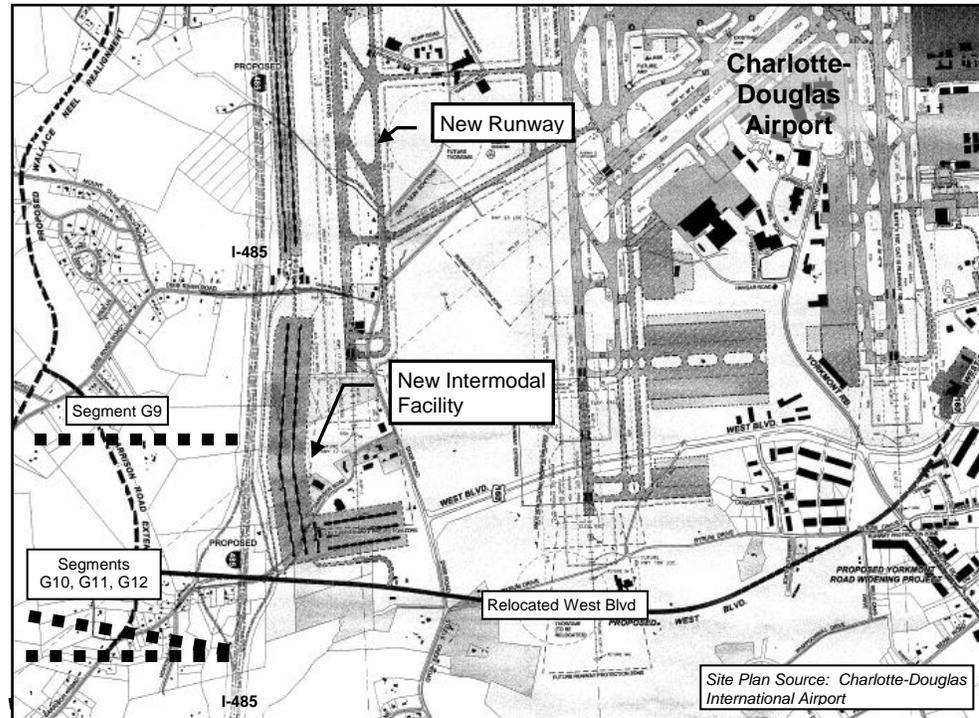
North of the power plant building, Duke Energy is constructing new pollution control devices at the Steam Station to comply with the Clean Smokestacks Bill enacted in June 2002. In 2006, the Steam Station began installing flue gas desulfurization equipment, commonly known as scrubbers. The project is expected to be completed in 2009 (Duke Energy, <http://www.duke-energy.com>, accessed May 22, 2008). The scrubbers would include a stack (estimated at 300 to 330 feet high) and require the relocation of transmission lines across the Catawba River. In addition, a landfill approximately 20 acres in size will be needed and is being planned for an area directly west of the proposed scrubbers. Both the scrubbers and the proposed landfill area are located within Preliminary Corridor Segments G3 and G-X14, which are the corridor segments similar to the Thoroughfare Plan alignment (See **Figure 18b**).

Fly ash basins are areas where byproducts of the coal energy production processes are stored. There are two fly ash basins located just south of the power plant building (See **Figure 18b**). The northern fly ash basin currently is inactive. The basin to the south currently is being used.

An active freight rail line that serves the Allen Steam Station is located along the west side of the Catawba River. Crossings of the Catawba River also will need to provide a minimum vertical clearance for the rail line.

Major above-ground power transmission lines are shown on **Figure 18(a-b)**. There are numerous major power lines radiating out from the Allen Steam Station.

The Charlotte-Douglas International Airport is constructing a new major runway to the west of their existing runways. This new runway is near and parallel to I-485 to the east. In the southwest corner of their property, the Airport plans to construct an intermodal freight facility. This facility will be about I-485 north of existing West



Boulevard (See **Figure 18b**). The Airport plans to relocate West Boulevard to the south of their property to accommodate the new intermodal facilities. Preliminary Corridor Segment G9 would be within the new intermodal area. The Airport completed their master plan for their intermodal facility in September 2003, after the Preliminary Corridor Segments were developed in August 2003.

The project terminus at I-485 is constrained by the Airport's new runway and intermodal facility and by the undeveloped parkland on the west side of I-485 north of Dixie River Road. The existing I-485 interchange to the north of the Preliminary Corridor Segments is with US 29-74 and the existing I-485 interchange to the south is with Steele Creek Road (NC 160).

II.4 IDENTIFYING THE FUNCTIONAL DESIGN CORRIDORS

The introduction to this section has additional text that states the evaluation is valid for both non-toll and toll scenarios.

This section describes how the approximately 116 miles of Preliminary Corridor Segments were evaluated to determine which corridor segments could be eliminated and which should be used to develop functional engineering designs for further screening. The corridors making it through this screening process were labeled the Functional Design Corridors. There were about 90 miles of Functional Design Corridor segments. The evaluation described in this section for identifying the functional design corridors is valid whether the New Location Alternative is a non-toll facility or a toll facility.

II.4.1 SCREENING METHODOLOGY

There are no additions or updates to this section.

Table 17 lists the evaluation factors used to estimate and compare potential impacts. Quantities of resources were estimated either within the preliminary corridor segments or within a representative 300-foot wide alignment in the center of the corridor segment, depending on the resource. The method used for each factor is listed in **Table 17** in the column ‘Impact Estimate Method – Preliminary Corridor Segments’.

The estimates are for comparison purposes only to aid in deciding between segments, and should not be considered an estimate of the actual impact of a roadway within a corridor segment. When necessary, series of preliminary corridor segments were connected to provide for a common basis of comparison, such as similar length and/or termini.

For example, the numbers of residences within a set of 1,200-foot wide corridor segments compared to the numbers of residences within another set of corridor segments with similar length and/or termini can indicate the relative ability of developing an alignment that minimizes residential impacts. It does not indicate the projected number of residences that would actually be impacted. The quantities generated in this screening evaluation were considered together with other qualitative factors, as described under each decision point in the next section.

II.4.2 SCREENING EVALUATION

There are no additions or updates to this section.

The decisions to retain preliminary corridor segments as Functional Design Corridors and to eliminate preliminary corridor segments were made by the NEPA/404 Merger Team at a meeting held on February 17, 2004. The decisions are summarized below. **Appendix E** contains the complete Preliminary Corridor Segment Evaluation Matrix spreadsheets showing the estimated impacts for all Preliminary Corridor Segments.

Sections II.4.2.1 through II.4.2.3 describe the reasons various preliminary corridor segments were eliminated. All evaluation factors listed in **Table 17** were used in comparing preliminary corridor segments. In some cases, impacts between preliminary corridor segment combinations would be similar, in other cases particular impacts would be different and would be the differentiating factors. The discussion that follows in **Sections II.4.2.1 through II.4.2.3** places emphasis on the differentiating factors.

Section II.4.2.4 describes preliminary corridor segments modified and added as a result of the screening evaluation. **Section II.4.2.5** is a summary of the remaining preliminary corridor segments for which functional designs were prepared.

11.4.2.1 Preliminary Corridor Segments in the West Portion of the Refined Study Area (from I-85 to US 321)

There are no additions or updates to this section.

Summary of Preliminary Corridor Segments Eliminated. The following Preliminary Corridor Segments in the West Portion (from I-85 to US 321) of the Refined Study Area were eliminated from consideration: A2, A3, A3a, A3-XA7, A5 (modified and given a new name – A5a), A4-XA5, A4-XA6, A6a, A6, B3, B-X1a, B-X2, B8, B-X3, and B-10 (See **Figure 18a**).

Preliminary Corridor Segment A2

Preliminary Corridor Segment A2 was eliminated. Preliminary Corridor Segment A1 will be widened to provide more flexibility at the I-85 terminus, which will have a systems interchange.

Comparison: A2 vs. A1

- Segment A2 may go through a planned new public school at US 29/74 and Edgewood Road (Sadler Elementary School). This information was discovered during the Citizens Informational Workshop Series #1 (September and December 2003). The school opened in 2005.
- Segment A2 has 173 residences and mobile homes in corridor, while Segment A1 has 58.
- Segment A2 has fewer linear feet of streams, but widening Segment A1 will allow the flexibility to minimize impacts in this segment.
- Segment A2 may have some environmental justice issues.

Factor	Segment A1	Segment A2 (Eliminated)
Length (ft)	10,493	11,152
Number of Interchanges	3	3
Minor Road Crossings	2	2
Major Transmission Line Crossings	2	2
Railroad Line Crossings	0	0
Residences in Corridor	37	91
Mobile Homes in Corridor	21	82
Businesses in Corridor	15	2
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	1
Churches in Corridor	0	0
Cemeteries in Corridor	0	1

Factor	Segment A1	Segment A2 (Eliminated)
Potential Historic Sites In or Adjacent to Corridor	0	0
Streams (Linear Ft in Corridor)	7,548	3,668
Wetlands (acres in corridor)	2	0
Floodplains (# of transverse crossings)	1	1
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	1	1
Other Perennial Streams (# of crossings)	0	0
Other Intermittent Streams (# of crossings)	4	3
Other Waterbodies in Corridor	2	3
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	0	0

Preliminary Corridor Segments A3 and A3a

Preliminary Corridor Segments A3 and A3a were eliminated. Preliminary Corridor Segments A4 and A7a were then widened to provide more flexibility for a new systems interchange at the I-85 terminus.

Comparison: A3+A3a vs. A4+A7a

- Preliminary Corridor Segments A4+A7a move the corridor away from the parallel stream.
- Widening Preliminary Corridor Segments A4+A7a at I-85 will allow the flexibility to minimize impacts to residences and businesses. Segments A4+A7a were widened to the boundary of the parallel stream.

Factor	Segment A3+A3a (Eliminated)	Segment A4+A7a
Length (ft)	4,987	5,094
Number of Interchanges	2	1
Minor Road Crossings	0	4
Major Transmission Line Crossings	2	2
Railroad Line Crossings	0	0
Residences in Corridor	43	94
Mobile Homes in Corridor	2	0
Businesses in Corridor	1	5
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	0	0

Factor	Segment A3+A3a (Eliminated)	Segment A4+A7a
Cemeteries in Corridor	0	0
Potential Historic Sites In or Adjacent to Corridor	0	0
Streams (Linear Ft in Corridor)	7,942	2,029
Wetlands (acres in corridor)	3	4
Floodplains (# of transverse crossings)	0	0
Floodplains (# of longitudinal encroachments)	1	0
Named Streams (# of crossings)	0	0
Other Perennial Streams (# of crossings)	1	0
Other Intermittent Streams (# of crossings)	4	3
Other Waterbodies in Corridor	0	3
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	0	0

Preliminary Corridor Segment A3-XA7

Preliminary Corridor Segment A3-XA7 was eliminated because it existed only to connect to Segment A3 (which was eliminated).

Preliminary Corridor Segment A5

Corridor Segment A5 was eliminated since it was desirable to create a modified segment of A5 to connect directly with Segment A4. Segment A5 had originally connected to Segment A3a and Segment A4-XA5. Corridor Segment A5a replaces the two segments A5 and A4-XA5.

Preliminary Corridor Segment A4-XA5

Preliminary Corridor Segment A4-XA5 was eliminated because Preliminary Corridor Segment A5a replaced Preliminary Corridor Segments A5 and A4-XA5.

Preliminary Corridor Segments A6a+A6+B3

Preliminary Corridors Segments A6a, A6, and B3 were eliminated. These corridor segments mimic the Gaston Urban Area Metropolitan Planning Organization (GUAMPO) Thoroughfare Plan alignment. However, these segments run along and almost entirely within the Crowder's Creek 100-year floodplain. There are also over three times as many linear feet of streams within these corridors when compared to the retained corridors.

Corridor Segments A7a+A7+B4 were developed to be similar to the GUAMPO Thoroughfare

Plan alignment, but were shifted east out of the Crowder's Creek floodplain as much as possible while still trying to minimize impacts to residential areas.

Factor	Segments A6a+A6+B3 (Eliminated)	Segments A7a+A7+B4
Length (ft)	26,079	26,166
Number of Interchanges	3	3
Minor Road Crossings	2	8
Major Transmission Line Crossings	1	1
Railroad Line Crossings	0	0
Residences in Corridor	25	87
Mobile Homes in Corridor	101	51
Businesses in Corridor	3	8
Parks/Recreation Areas in Corridor	1	1
Schools in Corridor	0	0
Churches in Corridor	1	1
Cemeteries in Corridor	1	1
Potential Historic Sites In or Adjacent to Corridor	0	0
Streams (Linear Ft in Corridor)	23,725	7,158
Wetlands (acres in corridor)	1	5
Floodplains (# of transverse crossings)	1	2
Floodplains (# of longitudinal encroachments)	5	0
Named Streams (# of crossings)	2	1
Other Perennial Streams (# of crossings)	3	2
Other Intermittent Streams (# of crossings)	7	4
Other Waterbodies in Corridor	0	4
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	1	1
Natural Heritage Program Sites in Corridor	0	1

Preliminary Corridor Segment A4-XA6

Preliminary Corridor Segment A4-XA6 was eliminated because it existed only to connect to Preliminary Corridor Segment A6 (which was eliminated).

Preliminary Corridor Segment B-X1a

Preliminary Corridor Segment B-X1a was eliminated since Preliminary Corridor Segment B-X1 is a comparable alternative. Both Segment B-X1a and Segment B-X1 provide crossover connection between the westernmost corridors and the central corridors in the West Portion of the study area.

Comparison: B-X1a+B2a vs. B1a+B-X1

Preliminary Corridor Segment B-X1a is parallel to and crosses a stream system near SR 1131 (Chapel Grove Road). SR 1131 has been identified as a possible location for an interchange, however, an interchange here would create stream impacts. The Segment B1a+B-X1 combination crosses streams in a more perpendicular manner. Other impacts are relatively similar.

Factor	Segments B-X1a + B2a (B-X1a eliminated)	Segments B1a+B-X1
Length (ft)	11,460	12,884
Number of Interchanges	0	0
Minor Road Crossings	2	6
Major Transmission Line Crossings	0	0
Railroad Line Crossings	0	0
Residences in Corridor	35	38
Mobile Homes in Corridor	0	6
Businesses in Corridor	0	0
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	0	0
Cemeteries in Corridor	0	0
Potential Historic Sites In or Adjacent to Corridor	1	0
Streams (Linear Ft in Corridor)	9,033	7,983
Wetlands (acres in corridor)	0	0
Floodplains (# of transverse crossings)	0	0
Floodplains (# of longitudinal encroachments)	1	0
Named Streams (# of crossings)	0	0
Other Perennial Streams (# of crossings)	4	3
Other Intermittent Streams (# of crossings)	1	2
Other Waterbodies in Corridor	1	2
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	0	0

Preliminary Corridor Segment B-X2

Preliminary Corridor Segment B-X2 was eliminated since B-X2a+B1 is a comparable alternative. Both Segment B-X2 and Segment B-X2a+B1 provide crossover connection between the westernmost corridors and the central corridors in the West Portion of the study area.

Comparison: B-X2 vs. B-X2a+B1

- Preliminary Corridor Segment B-X2 crosses a Crowder’s Creek unnamed tributary near SR 1131 (Chapel Grove Road) where there is a 100-year floodplain.
- Although the linear feet of streams in Segments B-X2a+B1 is greater, the impacts to streams probably would be similar between the two alternative routes, with the Segment B-X2 route crossing the wider area of the stream.
- There is a potential historic site at the edge of Preliminary Corridor Segment B-X2.
- There are less residences in the B-X2a+B1 corridor.

Factor	Segment B-X2 (Eliminated)	Segments B-X2a+B1
Length (ft)	9,964	9,968
Number of Interchanges	0	0
Minor Road Crossings	4	4
Major Transmission Line Crossings	0	0
Railroad Line Crossings	0	0
Residences in Corridor	28	20
Mobile Homes in Corridor	3	0
Businesses in Corridor	0	0
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	0	0
Cemeteries in Corridor	0	0
Potential Historic Sites In or Adjacent to Corridor	1	0
Streams (Linear Ft in Corridor)	3,966	9,973
Wetlands (acres in corridor)	0	0
Floodplains (# of transverse crossings)	1	0
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	0	0
Other Perennial Streams (# of crossings)	3	4
Other Intermittent Streams (# of crossings)	0	2
Other Waterbodies in Corridor	1	2
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	0	0

Preliminary Corridor Segment B8

Preliminary Corridor Segment B8 was eliminated because B7+B-X3 is a comparable alternative.

Comparison: B8 vs. B7+B-X3

- Preliminary Corridor Segment B8 passes through a crossroads area (Crowders Creek Road, Chapel Grove School Road and Bethany Road). There is a church in this location, as well as McGill Branch. Rerouting these major regional roads in this area to provide continuity across Preliminary Corridor Segment B8 could result in additional impact to surrounding residences and McGill Branch.
- Preliminary Corridor Segments B7+B-X3 would avoid this crossroads area.

Factor	Segment B8 (Eliminated)	Segments B7+B-X3
Length (ft)	12,538	18,947
Number of Interchanges	0	0
Minor Road Crossings	5	8
Major Transmission Line Crossings	0	0
Railroad Line Crossings	0	0
Residences in Corridor	70	94
Mobile Homes in Corridor	26	48
Businesses in Corridor	1	0
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	1	0
Cemeteries in Corridor	0	0
Potential Historic Sites In or Adjacent to Corridor	0	0
Streams (Linear Ft in Corridor)	11,294	8,658
Wetlands (acres in corridor)	0	0
Floodplains (# of transverse crossings)	1	1
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	1	2
Other Perennial Streams (# of crossings)	2	0
Other Intermittent Streams (# of crossings)	3	5
Other Waterbodies in Corridor	1	2
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	2	1
Natural Heritage Program Sites in Corridor	0	0

Preliminary Corridor Segments B-X3+B10+C9+C-X4

Preliminary Corridor Segments B-X3, B10 and C9 were eliminated from consideration due to impacts to a dormant Superfund site. Preliminary Corridors Segments B9+C-X5 also had less residential impacts.

Comparison: B-X3+B10+C9+C-X4 vs. B9+C-X5

Corridor Segment B10 passes over US 321 where there is a dormant Superfund site. This site, the AB Carter site, is located on the east side of US 321 north of Forbes Road. The NCDOT Geotechnical Unit researched the status of this site and its suitability for road construction and recommended that the site be avoided if at all possible.

The AB Carter site is a former heavy metal industrial plant. The company generated, treated, and land-disposed of wastewater and sludge from a chroming and nickel plating operation for textile machinery. Soil contamination, groundwater contamination, and surface water contamination may be expected from unlined sludge basins.

Preliminary Corridor Segments B-X3 and C9 were eliminated because they only connected to Preliminary Corridor Segment B10.

Factor	Segments B-X3+B10+C9+C-X4 (Eliminated)	Segments B9+C-X5
Length (ft)	15,837	17,131
Number of Interchanges	1	1
Minor Road Crossings	7	4
Major Transmission Line Crossings	2	1
Railroad Line Crossings	1	1
Residences in Corridor	81	38
Mobile Homes in Corridor	8	2
Businesses in Corridor	12	10
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	0	0
Cemeteries in Corridor	0	1
Potential Historic Sites In or Adjacent to Corridor	0	0
Streams (Linear Ft in Corridor)	7,301	7,356
Wetlands (acres in corridor)	0	0
Floodplains (# of transverse crossings)	1	1
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	2	1
Other Perennial Streams (# of crossings)	1	1
Other Intermittent Streams (# of crossings)	4	2

Factor	Segments B-X3+B10+C9+C-X4 (Eliminated)	Segments B9+C-X5
Other Waterbodies in Corridor	1	1
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	2	0
Groundwater Discharge Areas in Corridor	1	1
Natural Heritage Program Sites in Corridor	0	0

11.4.2.2 Preliminary Corridor Segments in the Central Portion of the Refined Study Area (from US 321 to around NC 279)

■ There are no additions or updates to this section.

Summary of Preliminary Corridor Segments Eliminated. The following Preliminary Corridor Segments in the Central Portion of the Refined Study Area were eliminated from consideration: C3, C2, C9, C3a, C7, D1, D6, E2, E5a, E-X7, E4, E5, E6, E7, F1, F3, G1, F-X10 (See **Figure 18(a-b)**).

Note that some of these segments are actually in the East Portion, but were eliminated when comparisons were made that were comprised of mostly segments in the Central Portion. Comparisons of preliminary corridor segments in the Central Portion include comparisons of the crossings of the South Fork Catawba River (which is more within the East Portion) because the comparisons needed to include several segments within the Central Portion.

A 152-acre conservation easement lies within Corridor Segments E6 and E7 on property owned by Crescent Resources LLC (real estate arm of Duke Energy). This conservation easement was secured by the Catawba Lands Conservancy, a non-profit regional land trust serving the Lower Catawba River Basin. According to the conservancy, this property includes steep slopes, mature hardwood forests, pine forests, extensive wetlands, and important riparian buffers along Catawba Creek and numerous tributaries. Due to quality of resources that the Catawba Lands Conservancy is known to obtain (as stated by the US Fish and Wildlife Service at the February 17, 2004 NEPA/404 Merger Team Meeting), Preliminary Corridor Segments E6 and E7 were eliminated by the NEPA/404 Merger Team. Consequently, Preliminary Corridor Segments F3 and E4 also were eliminated since they existed to connect to Segment E7 and Segments E6 and E7, respectively.

Preliminary Corridor Segments C3+C3a+C7+D1

Preliminary Corridor Segments C3+C3a+C7+D1 were eliminated because Preliminary Corridor Segments C1+C5+C8+D2 are a comparable alternative. Preliminary Corridor Segments C1+C5+C8+D2 mimic the GUAMPO Thoroughfare Plan alignment.

Comparison: C3+C3a+C7+D1 vs. C1+C5+C8+D2

- Preliminary Corridor Segments C3+C3a+C7+D1 would unavoidably impact major subdivisions, taking numerous residences from each. These segments also have twice as many residences within the corridor boundaries as Preliminary Corridor Segments C1+C5+C8+D2.
- Preliminary Corridor Segments C1+C5+C8+D2 have less stream length within the corridor boundaries.
- At Robinson Road, a likely interchange location, there is a potential historic site at one edge of Preliminary Corridor Segment C7 and a residential subdivision at the other edge.

Factor	Segments C3+C3a+C7+D1 (Eliminated)	Segments C1+C5+C8+D2
Length (ft)	18,328	18,347
Number of Interchanges	1	1
Minor Road Crossings	7	3
Major Transmission Line Crossings	5	5
Railroad Line Crossings	2	2
Residences in Corridor	150	74
Mobile Homes in Corridor	35	0
Businesses in Corridor	4	1
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	0	0
Cemeteries in Corridor	0	0
Potential Historic Sites In or Adjacent to Corridor	1	0
Streams (Linear Ft in Corridor)	12,914	10,221
Wetlands (acres in corridor)	0	0
Floodplains (# of transverse crossings)	0	0
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	0	0
Other Perennial Streams (# of crossings)	3	3
Other Intermittent Streams (# of crossings)	7	4
Other Waterbodies in Corridor	4	2
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	0	0

Preliminary Corridor Segment C2

Preliminary Corridor Segment C2 is eliminated because it existed only to connect to Preliminary Corridor Segment C3a.

Preliminary Corridor Segment D6

The US EPA recommended that Preliminary Corridor Segment D6 be eliminated since there were no clear advantages over parallel segments (D5+D8a+D9). Although Segment D6 contains fewer residences, it would impact more neighborhoods. It is also longer and would impact more streams. The NEPA/404 Merger Team agreed.

Comparison: D6 vs. D5+D8a+D9

Factor	Segment D6 (Eliminated)	Segments D5+D8a+D9
Length (ft)	20,281	18,967
Number of Interchanges	2	2
Minor Road Crossings	6	6
Major Transmission Line Crossings	2	2
Railroad Line Crossings	0	0
Residences in Corridor	66	80
Mobile Homes in Corridor	0	0
Businesses in Corridor	0	0
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	0	0
Cemeteries in Corridor	0	0
Potential Historic Sites In or Adjacent to Corridor	1	1
Streams (Linear Ft in Corridor)	13,301	9,285
Wetlands (acres in corridor)	1.7	0
Floodplains (# of transverse crossings)	0	0
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	0	0
Other Perennial Streams (# of crossings)	2	1
Other Intermittent Streams (# of crossings)	6	7
Other Waterbodies in Corridor	2	6
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	0	0

Preliminary Corridor Segments E-X7 and E-X8

Both Segment E-X7 and Segment E-X8 provide crossover opportunities between the northernmost corridors (E5, E5a, etc.) and the central corridors (E2, E4, etc.).

Preliminary Corridor Segment E-X8 was retained for functional design since the Segment F2 crossing of the South Fork of the Catawba River was retained.

Preliminary Corridor Segment E-X7 was eliminated because it would create a non-perpendicular crossing of Catawba Creek in a wide area of the creek and had twice as many residential impacts. It would require a grade separation of Union New Hope Road that would not be required under the comparable alternative - Segments E1+E5a.

Preliminary Corridor Segment E-X7 also was eliminated because it connected to Segment E5 which was eliminated when the Segment F1 crossing of the South Fork of the Catawba River was eliminated.

Comparison: E2+E-X7 vs. E1+E5a

Factor	Segments E2+E-X7 (Eliminated)	Segments E1+E5a
Length (ft)	12,534	13,401
Number of Interchanges	0	0
Minor Road Crossings	2	2
Major Transmission Line Crossings	0	0
Railroad Line Crossings	0	0
Residences in Corridor	14	7
Mobile Homes in Corridor	0	0
Businesses in Corridor	1	0
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	0	0
Cemeteries in Corridor	0	1
Potential Historic Sites In or Adjacent to Corridor	0	0
Streams (Linear Ft in Corridor)	9,072	6,447
Wetlands (acres in corridor)	15	16
Floodplains (# of transverse crossings)	1	1
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	1	0
Other Perennial Streams (# of crossings)	0	0
Other Intermittent Streams (# of crossings)	3	2
Other Waterbodies in Corridor	2	2
Watershed Area in Corridor	0	0

Factor	Segments E2+E-X7 (Eliminated)	Segments E1+E5a
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	0	0

Segments F2 and F4 - South Fork Catawba River Crossings

There were two preliminary crossings of the South Fork Catawba River near each other; Preliminary Corridor Segments F2 and F4. This section compares three equivalent routes that can be constructed using these segments to determine if any have dominant advantages and/or disadvantages.

Comparison: the three routes are listed below (north to south):

1. E2+E4+E6+F2 (eliminated by NEPA/404 Merger Team) (Note: F7 also was eliminated because it connects only to F2)
 2. E2+E4+E7+F3+F4 (eliminated by NEPA/404 Merger Team)
 3. E3+E-X9+F-X9a+F4
- Preliminary Corridor Segment F2 crossing route has more stream length within its corridors than the Preliminary Corridor Segment F4 crossing routes.
 - The southernmost of these routes (#3) crosses an area identified by the Gaston County Utilities Division as a potential location for a pump station and a possible future wastewater treatment plant.
 - Preliminary Corridor Segment E6 in Route #1 and Preliminary Corridor Segment E7 in Route #2 pass through a large tract of land protected by the Catawba Lands Conservancy (approximately 152 acres) with an easement. This large area has been locally identified as containing a high quality wetland area of approximately 5 acres (Philip Hayes, Crescent Resources, Personal Communication, 6/30/03).
 - There is a potential historic site at South New Hope Road under Routes #2 and #3. However, only the house at this site likely would be determined eligible (Rick Mattson, Mattson, Alexander & Associates, personal communication).
 - There is a church at South New Hope Road at Route #1.

Factor	#1	#2	#3
	Segments E2+E4+E6+F2 (E2,E4&E6 Eliminated)	Segments E2+E4+E7+F3+F4 (E2,E4,E7&F3 Eliminated)	Segments E3+E-X9+F-X9a+F4
Length (ft)	22,243	22,700	23,790
Number of Interchanges	1	1	1
Minor Road Crossings	6	6	5
Major Transmission Line Crossings	1	0	0
Railroad Line Crossings	0	0	0
Residences in Corridor	54	58	46
Mobile Homes in Corridor	0	0	15
Businesses in Corridor	1	4	3
Parks/Recreation Areas in Corridor	0	0	0
Schools in Corridor	0	0	0
Churches in Corridor	2	0	0
Cemeteries in Corridor	1	0	0
Potential Historic Sites In or Adjacent to Corridor	0	0	1
Streams (Linear Ft in Corridor)	9,948	5,880	6,267
Wetlands (acres in corridor)	10	6	9
Floodplains (# of transverse crossings)	2	2	2
Floodplains (# of longitudinal encroachments)	0	0	0
Named Streams (# of crossings)	2	2	2
Other Perennial Streams (# of crossings)	1	1	2
Other Intermittent Streams (# of crossings)	4	3	1
Other Waterbodies in Corridor	3	4	1
Watershed Area in Corridor	0	0	0
Dormant Superfund Sites in Corridor	0	0	0
Groundwater Discharge Areas in Corridor	0	0	0
Natural Heritage Program Sites in Corridor	0	0	0

Preliminary Corridor Segments E6 and E7

These corridor segments were eliminated since they pass completely through the conservation easement secured by the Catawba Lands Conservancy.

Preliminary Corridor Segments F4 and F5 - South Fork Catawba River Crossings

The NEPA/404 Merger Team recommended that both the F4 and F5 crossings be retained for functional design.

Factor	Segments E-X9+F-X9a+F4+F8	Segments E8+F5
Length (ft)	17,411	15,722
Number of Interchanges	1	1
Minor Road Crossings	5	2
Major Transmission Line Crossings	2	2
Railroad Line Crossings	0	0
Residences in Corridor	39	51
Mobile Homes in Corridor	0	0
Businesses in Corridor	1	0
Parks/Recreation Areas in Corridor	0	0
Schools in Corridor	0	0
Churches in Corridor	0	1
Cemeteries in Corridor	0	0
Potential Historic Sites In or Adjacent to Corridor	1	0
Streams (Linear Ft in Corridor)	4,143	2,339
Wetlands (acres in corridor)	7	3
Floodplains (# of transverse crossings)	3	2
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	3	2
Other Perennial Streams (# of crossings)	0	1
Other Intermittent Streams (# of crossings)	2	1
Other Waterbodies in Corridor	0	0
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	0	0

Preliminary Corridor Segments F1, F2, and F4 crossings of the South Fork Catawba River

Preliminary Corridor Segment F1 is the northernmost crossing of the South Fork Catawba River. The following comparison of three of the South Fork Catawba River crossings begins at the Union Road area and extends east to the northernmost crossing of NC 273 (Southpoint Road) at Preliminary Corridor Segment G1.

All river crossings that end at Preliminary Corridor Segment G1 (the northernmost corridor on the Belmont Peninsula) would cause substantial impacts to a large residential neighborhood west of NC 273. Therefore, Preliminary Corridor Segment G1 was eliminated.

Preliminary Corridor Segment F1 was eliminated due to unavoidable stream impacts, length, and also because it would create substantial impacts to a large residential neighborhood west of and in

the vicinity of NC 273. Basically, the F2 Crossing B and the F4 Crossing B were retained, but the endpoint at NC 273 was shifted southward to avoid the large neighborhood.

Crossing Comparison:

F1 Crossing: E1+E5a+E5+F1
 F2 Crossing A: E2+E4+E6+F2+F7
 F2 Crossing B: E1+E-X8+F2+F7
 F4 Crossing A: E2+E4+E7+F3+F4+F-X10
 F4 Crossing B: E3+E-X9+F-X9a+F4+F-X10

Factor	F1 Crossing	F2 Crossing A	F2 Crossing B	F4 Crossing A	F4 Crossing B
	Segments E1+E5a+E5 +F1 (E5a,E5,F1 Eliminated)	Segments E2+E4+E6 +F2+F7 (E2,E4,E6,F7 Eliminated)	Segments E1+E-X8+F2 +F7 (F7 Eliminated)	Segments E2+E4+E7+F3 +F4+F-X10 (E2,E4,E7,F3, F-X10 Eliminated)	Segments E3+E-X9 +F-X9a+F4 +F-X10 (F-X10 Eliminated)
Length (ft)	32,750	28,211	31,185	28,184	29,274
Number of Interchanges	2	2	2	2	2
Minor Road Crossings	8	9	8	7	6
Major Transmission Line Crossings	1	2	2	2	2
Railroad Line Crossings	0	0	0	0	0
Residences in Corridor	164	160	167	151	139
Mobile Homes in Corridor	0	0	0	0	15
Businesses in Corridor	4	1	0	4	3
Parks/Recreation Areas in Corridor	0	0	0	0	0
Schools in Corridor	0	0	0	0	0
Churches in Corridor	1	3	2	0	0
Cemeteries in Corridor	3	3	4	1	1
Potential Historic Sites In or Adjacent to Corridor	0	0	0	0	1
Streams (Linear Ft in Corridor)	13,359	11,345	12,875	7,698	8,085
Wetlands (acres in corridor)	20	10	14	6	9
Floodplains (# of transverse crossings)	3	2	2	2	2
Floodplains (# of longitudinal encroachments)	0	0	0	0	0
Named Streams (# of crossings)	1	2	2	2	2
Other Perennial Streams (# of crossings)	0	1	0	1	2
Other Intermittent Streams (# of crossings)	8	5	6	4	2
Other Waterbodies in Corridor	3	3	3	4	1
Watershed Area in Corridor	0	0	0	0	0
Dormant Superfund Sites in Corridor	0	0	0	0	0

Factor	F1 Crossing	F2 Crossing A	F2 Crossing B	F4 Crossing A	F4 Crossing B
	Segments E1+E5a+E5 +F1 (E5a,E5,F1 Eliminated)	Segments E2+E4+E6 +F2+F7 (E2,E4,E6,F7 Eliminated)	Segments E1+E-X8+F2 +F7 (F7 Eliminated)	Segments E2+E4+E7+F3 +F4+F-X10 (E2,E4,E7,F3, F-X10 Eliminated)	Segments E3+E-X9 +F-X9a+F4 +F-X10 (F-X10 Eliminated)
Groundwater Discharge Areas in Corridor	0	0	0	0	0
Natural Heritage Program Sites in Corridor	0	0	0	0	0

Preliminary Corridor Segment F-X10

Segment F-X10 was eliminated because it existed only to connect to Preliminary Corridor Segment G1.

II.4.2.3 Preliminary Corridor Segments in the East Portion of the Refined Study Area (from around NC 279 to I-485)

| There are no additions or updates to this section.

Summary of Preliminary Corridor Segments Eliminated. The following Preliminary Corridor Segments in the East Portion of the Refined Study Area were eliminated from consideration or modified: G3, G8, G-X14, G7, G9, F11, G6, G2, G-X12, G-X13, G12, and F7 (modified and given new name F7a).

Preliminary Corridor Segments G3, G8, and G-X14

The Allen Steam Station owned by Duke Energy is a major property owner in the Belmont peninsula area. Site plans for new air pollution control devices at the Steam Station have been developed by Duke Energy to comply with the Clean Smokestacks Bill enacted in June 2002. The Steam Station is installing scrubbers that would include an estimated 300-330-foot high stack and require the relocation of transmission lines across the Catawba River. In addition, a landfill approximately 20 acres in size will be needed for the air pollution control system, and it is being planned for an area directly west of the proposed scrubbers (Allen Steam Station Meeting, 7/10/03). Both the scrubbers and the proposed landfill area are located within the 1,000-foot wide corridor of the Thoroughfare Plan alignment.

A second meeting was held with representatives from the Allen Steam Station on November 12, 2003, after the preliminary corridor segments were developed. At this meeting, the Allen Steam Station representatives stated that the footprints for the scrubber facilities were the only feasible locations considered for the operational efficiency of the Steam Station. The Steam Station representatives also were concerned that the plumes of water vapor from the proposed scrubbers

could negatively impact travel on an adjacent roadway. Further evaluation of the situation would be necessary to determine impacts. This evaluation will be included in the DEIS.

Because Preliminary Corridor Segments G3, G8, and G-X14 pass through the scrubber and proposed landfill area, they were eliminated (See **Section II.4.2.4** for a discussion of segments added to the evaluation that would avoid the scrubber and proposal landfill area).

Preliminary Corridor Segments G4 and F9, which pass through the northernmost fly ash basin, were retained for functional design. There was no regulatory reason to avoid this property, and further study in the decision-making process will determine whether to retain or eliminate these corridors.

Preliminary Corridor Segment G9

Preliminary Corridor Segment G9 was eliminated because a systems interchange at I-485 (which would have ramps on both the east and west sides of I-485) cannot be constructed in this segment without directly impacting the Charlotte-Douglas International Airport's planned intermodal facility (See exhibit in **Section II.3.3**). The airport completed their master plan for their facility in September 2003 (after the initial set of preliminary corridor segments were developed in August 2003). Also, this interchange location could not tie into NC 160 (West Boulevard).

West Boulevard is being relocated east of I-485 to accommodate the future intermodal facility being planned at the Charlotte-Douglas International Airport. Relocated West Boulevard will be a four-lane divided facility and be used by truck traffic accessing the proposed intermodal facility.

Preliminary Corridor Segment G7

Segment G7 was eliminated because it existed only to connect to Preliminary Corridor Segment G9.

Preliminary Corridor Segments F11 and G6

Preliminary Corridor Segments F11 and G6 were eliminated because of unavoidable impacts to parkland owned by Mecklenburg County and length.

Preliminary Corridor Segment G6, in combination with Preliminary Corridor segment F11, traverses the southernmost portion of the Belmont peninsula and crosses the Catawba River just north of Lake Wylie.

Comparison: G6+F11 vs. G5+F10

- Segment G6 is completely within a future Mecklenburg County Public Park. Segment G5 would avoid this park land.
- Both segment combinations have about the same number of residences within their corridors. However, Segments G6+F11 would disrupt approximately four different subdivisions and Segments G5+F10 approximately two.
- Segments G6+F11 crosses 12 streams and Segments G5+F10 cross five streams.
- The widths of the Catawba River crossings for Segment G5 and Segment G6 are about the same.
- Segments G6+F11 are about one mile longer than Segments G5+F10.

Factor	Segments G6+F11 (Eliminated)	Segments G5+F10
Length (ft)	24,741	18,697
Number of Interchanges	1	1
Minor Road Crossings	6	6
Major Transmission Line Crossings	9	6
Railroad Line Crossings	0	0
Residences in Corridor	80	78
Mobile Homes in Corridor	18	18
Businesses in Corridor	0	1
Parks/Recreation Areas in Corridor	1	0
Schools in Corridor	0	0
Churches in Corridor	0	1
Cemeteries in Corridor	1	0
Potential Historic Sites In or Adjacent to Corridor	0	0
Streams (Linear Ft in Corridor)	19,135	12,368
Wetlands (acres in corridor)	10	7
Floodplains (# of transverse crossings)	2	2
Floodplains (# of longitudinal encroachments)	0	0
Named Streams (# of crossings)	2	2
Other Perennial Streams (# of crossings)	4	2
Other Intermittent Streams (# of crossings)	6	1
Other Waterbodies in Corridor	1	0
Watershed Area in Corridor	0	0
Dormant Superfund Sites in Corridor	0	0
Groundwater Discharge Areas in Corridor	0	0
Natural Heritage Program Sites in Corridor	1	0

Preliminary Corridor Segment G2

Since Preliminary Corridor Segment G2 contains part of the Allen Steam Station property planned for the NC Clean Air Project, it was eliminated by the NEPA/404 Merger Team. It was desirable to create a modified crossing of the Catawba River using a portion of Preliminary Corridor Segment G2. Segments G18 and G19 described in the next section are in proximity to Segment G2.

Preliminary Corridor Segment G12

Segment G12 was eliminated because it existed only to connect to Segments G1 and G2.

Preliminary Corridor Segments G-X12 and G-X13

Preliminary Corridor Segments G-X12 and G-X13 were eliminated since they connected only to Segments G2 and G8, respectively, and Segments G2 and G8 were eliminated. It was desirable to create a modified segment of G-X12. Preliminary Corridor Segments G18 and G19 described in the next section are in proximity to Segment G2.

Preliminary Corridor Segment F7

Preliminary Corridor Segment F7 was eliminated since it connected only to Segment G1. It was desirable to create a modified segment of F7 to connect to Segment F2. Segment F7a was created to connect to Segment F2 and to two new segments described below, G13 and G15.

11.4.2.4 Additional Preliminary Corridor Segments Considered After Initial Set of Segments Developed

■ *There are no additions or updates to this section.*

Based on the evaluation of resources within the preliminary corridor segments on the Belmont peninsula, it appeared some corridors could be moved to avoid resources. In order to track these relocated corridor segments from a historical perspective, they were given new names. The preliminary corridor segments that were added or modified are as follows:

Preliminary Corridor Segments added for consideration:

A5a, F12, F13, F-X12, F-X13, G13, G14, G15, G16, G17, G18, G19

These Preliminary Corridor Segments, described below, are not shown in the Evaluation Matrix in **Appendix E**, nor were they shown at the Citizens Informational Workshop Series #1. However they were shown and discussed by the NEPA/404 Merger Team at the Pre-Concurrence Point 2 meeting on February 17, 2004. Those Preliminary Corridor Segments retained for functional design were shown at the Citizens Informational Workshop #2.

Preliminary Corridor Segments F12, F13, F-X12 were eliminated and Preliminary Corridor Segments A5a, F-X13, G13, G14, G15, G16, G17, G18, and G19 were retained for functional design.

In the West Portion of the study area, Segment A5a was created to clarify the connection between corridor segments. Preliminary Corridor Segment A5a is a slightly modified Preliminary Corridor Segment A5. Since Segment A3 is eliminated, Segment A5a was created to tie directly with Segment 4.

Preliminary Corridor Segment F12 was created as a modification to Preliminary Corridor Segment F1 to potentially have fewer impacts through the NC 273 area. Preliminary Corridor Segment F12 was eliminated due to length and impacts to streams compared to the other crossings of the South Fork Catawba River (similar to Preliminary Corridor Segment F1). Residential impacts would be similar to the Preliminary Corridor Segment F2 crossing). Preliminary Corridor Segments F-X12 and F13 were eliminated because they only connected to Preliminary Corridor Segment F12.

Because Preliminary Corridor Segments G3, G8, and G-X14 were recommended to be eliminated due to impacts to Duke Energy's planned air pollution control facilities, another crossing (consisting of Preliminary Corridor Segments G15 and G16), was added that avoids the Duke Energy property. Preliminary Corridor Segment G16 would use a portion of G-X14, crossing the Catawba River at a skew. The skew would take advantage of land jutting out into the river, making the crossing width similar to other proposed perpendicular crossings. This segment would then cross the Belmont peninsula farther north of Preliminary Corridor Segments G3 and G8 and tie into any of the northern segments that remain for functional design (Segments F4 and F5).

Preliminary Corridor Segment G16 was one of three new corridors created to cross the Catawba River, the other two are Segments G13 and G19. The remaining corridor segments were created to connect between the three aforementioned river crossing segments of the South Fork Catawba River (F12, F4, and F5) and the three river crossing segments of the Catawba River north of the Allen Steam Station (G13, G19, and G16).

11.4.2.5 Summary of Preliminary Corridor Segments Retained for Functional Design

There are no additions or updates to this section.

Below is a list of the approximately 72 miles of preliminary corridor segments retained for functional design. Those eliminated also are listed. **Figure 19(a-b)** shows these preliminary corridor segments.

Preliminary Corridor Segments Retained for Functional Design in West Portion of Refined Study Area

A1, A4, A7, A7a, A5a

B1a, B1, B2, B2a, B-X2a, B-X1, B4, B5, B6, B7, B9

Preliminary Corridor Segments Retained for Functional Design in Central Portion of Refined Study Area

C1, C5, C6, C8, C9, C-X4, C-X5

D2, D3, D4, D5, D-X6, D7, D8, D8a, D9

E1, E3, E-X8, E8, E-X9

Preliminary Corridor Segments Retained for Functional Design in East Portion of Refined Study Area

F2, F-X9a, F4, F5, F6, F-7a, F8, F9, F10, F-X11, F-X13

G4, G5, G10, G11, G13, G14, G15, G16, G17, G18, G19

Preliminary Corridor Segments Eliminated

A2, A3, A3a, A5, A6, A6a, A3-XA7, A4-XA5, A4-XA6

B3, B8, B10, B-X1a, B-X2, B-X3

C2, C3, C3a, C4, C7

D1, D6

E2, E4, E5, E5a, E6, E7, E-X7

F1, F3, F7, F-X10, F11, F12, F-X12, F13

G1, G2, G3, G6, G7, G8, G9, G12, G-X12, G-X13, G-X14

II.5 IDENTIFYING THE DETAILED STUDY ALTERNATIVES

*The introduction to this section has additional text that states the evaluation is valid for both non-toll and toll scenarios. A new **Section II.5.5.9** has been added in this addendum to document the elimination of Corridor Segment K1D from further study after the original set of Detailed Study Alternatives was identified.*

This section describes how the functional design corridors were evaluated to identify those that should be carried forward as Detailed Study Alternatives in the Draft Environmental Impact Statement. This process is applicable to both non-toll and toll scenarios.

II.5.1 FUNCTIONAL DESIGNS

There are no additions or updates to this section.

The functional design corridor segments listed in **Section II.4.2.5** and shown in **Figure 19** were connected to form 90 endpoint-to-endpoint Functional Design Corridors from I-85 to I-485. Total lengths range from 21.4 to 25.6 miles. **Figure 20** shows the functional design corridors and the functional designs within them.

The corridor width was widened from 1,200 feet to 1,400 feet to allow for more flexibility in establishing alignments. Functional designs were prepared within these corridors, taking into consideration the design criteria (**Appendix D**), traffic projections, engineering design constraints, and the locations of known sensitive resources. The minimum right of way for the functional designs was increased to 350 feet (originally 300 feet) due to topography. The 1,400-foot wide functional design corridor boundaries then were redrawn to be centered around the functional design alignments.

Since the corridor segments were modified somewhat when they were redrawn to be centered on the functional design alignments, the functional design corridor segments were renamed. Segment labels beginning with ‘H’ are in the West Portion of the Refined Study Area. Segment labels beginning with ‘J’ are in the Central Portion, and segment labels beginning with ‘K’ are in the East Portion.

II.5.2 TRAFFIC ANALYSIS OF FUNCTIONAL DESIGNS

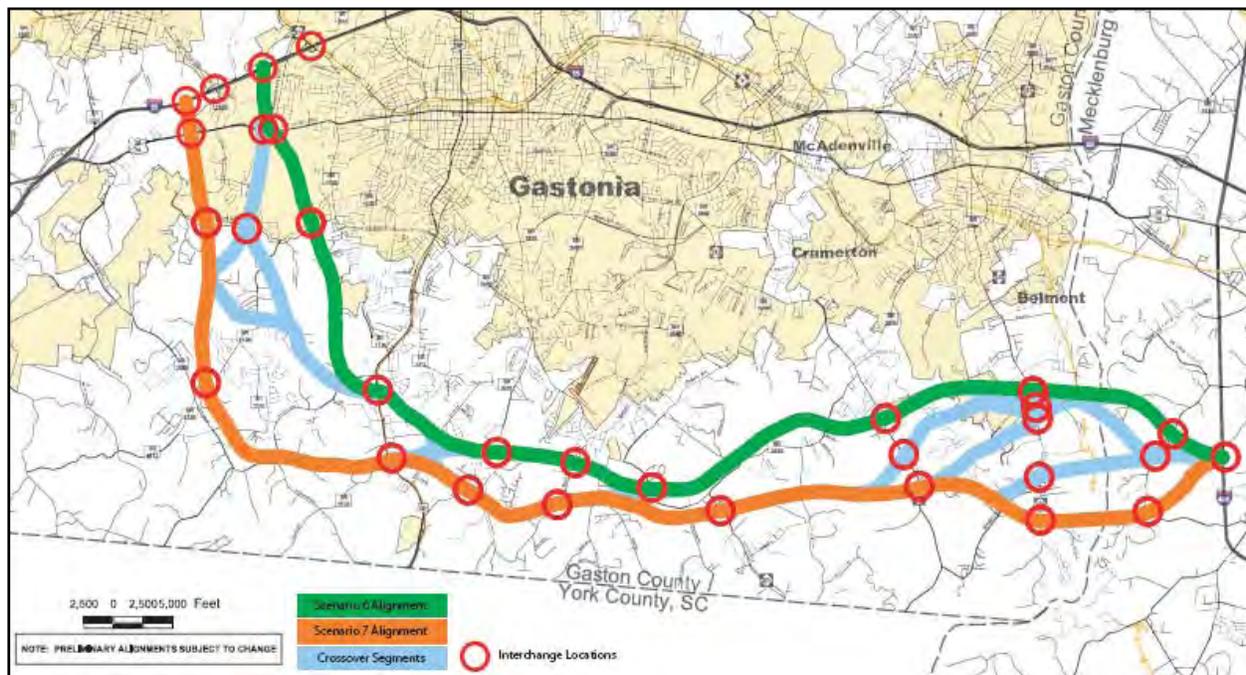
The traffic capacity analysis of the functional designs is based on the year 2025 traffic projections from the 2025 Gaston travel demand model. Since this is historical information used to develop the functional designs, no updates are included in this section to discuss 2030 traffic from the 2030 Metrolina travel demand model.

After the preliminary corridor segments were narrowed to those for which functional designs should be developed, regional travel demand forecasting and traffic operations analyses for the year 2025 were performed. These forecasts and analyses are described below.

II.5.2.1 Year 2025 Traffic Projections – Scenarios 5, 5a, 6, and 7

There are no additions or updates to this section.

With respect to traffic operations for the new location functional design corridors, two representative corridors were modeled for the travel demand forecast that covered all potential alignments for which functional designs were prepared. These are called Scenario 6 and Scenario 7, and both scenarios assumed the new location roadway would be a six-lane highway (See Section II.5.2.2 for a description of the analysis that determined the number of lanes). Scenario 6 is the northernmost of the functional design corridors (the green corridor on the map below) and Scenario 7 is the southernmost of the functional design corridors (the orange corridor on the map below).



Scenario 5a, which was modeled as a representative New Location Alternative in the earlier stages of the alternatives development process (See **Section I.7.3.1**), is a combination of functional design corridor segments that mimics the GUAMPO’s locally preferred alignment and uses a combination of northernmost, southernmost, and crossover functional design corridor segments. Scenario 5a uses the northernmost corridor segments for the western half of the project, then the southernmost corridor segment and a crossover segment for the eastern half of the project.

Table 18 lists the year 2025 average daily traffic (ADT) volumes projected for the New Location Alternative – Scenarios 5a, 6, and 7. As shown in the table, the ADT volumes for Scenario 5a are between the ADT volumes for Scenarios 6 and 7. See **Figure 20** for a map of the functional design corridors with the roadways labeled.

Table 18. Year 2025 Traffic Volumes on the New Location Alternative – Scenarios 5a, 6, and 7

New Location Alternative Mainline Segment (between interchanges)	Scenario 6 (2025 ADT)	Scenario 7 (2025 ADT)	Scenario 5a (2025 ADT)
	Northernmost functional design corridor segments	Southernmost functional design corridor segments	Combination of functional design corridor segments that mimics the Gaston Urban Area MPO Thoroughfare Plan alignment
I-85 to US 29/74	53,600	58,500	53,600
US 29/74 to Linwood Road	52,300	50,300	51,800
Linwood Road to Lewis Road	44,700	43,500	43,700
Lewis Road to US 321	44,700*	37,300	43,700*
US 321 to Robinson Road	43,700	40,100	42,000
Robinson Road to Bud Wilson Road	46,000	42,100	44,800
Bud Wilson Road to NC 274 (Union Road)	55,700	39,000	52,400
NC 274 to NC 279 (South New Hope Road)	48,100	47,900	50,200
NC 279 to NC 273 (Southpoint Road)	56,300	52,700	56,400
NC 273 to Dixie River Road	62,300	51,900	52,700
Dixie River Road to I-485	58,000	42,800	46,200

* - Scenarios 6 and 5a do not have an interchange at Lewis Road.

11.5.2.2 Traffic Capacity Analysis of the Functional Designs

■ *There are no additions or updates to this section.*

The functional designs created in the functional design corridors were developed in an iterative process between design and traffic capacity analysis for Scenarios 6 and 7. Functional designs were developed to accommodate traffic at LOS C or better. The traffic operations analysis is documented in the *Draft Traffic Technical Memorandum for the Gaston County East-West Connector Study* (PBS&J, May 2005). The body of the memorandum without the appendices is provided in **Appendix F**. Below is a summary of the traffic operations analysis methodology and results.

Analysis Methodology

The level of service (LOS) is a “qualitative measure describing operating conditions within a traffic stream” (Transportation Research Board 2000:202) (Also, see **Section I.8.4.1**). The LOS is defined with letter designations from A to F that can be applied to both roadway segments and intersections. LOS A represents the best operating conditions and LOS F the worst.

Traffic operations analysis for individual freeway elements (basic freeway segments, ramp merge/diverge area, and weave sections) was conducted using Highway Capacity Software (HCS 2000, version 4.1d), which is based on the methodologies of the Highway Capacity Manual (2000).

The 2025 PM peak hour was the time period used in the analyses. The PM peak hour has the highest traffic volumes for both directions of travel on the New Location Alternative, and therefore, represents the worst case scenario. It was assumed that a freeway element will operate with an acceptable LOS for any one-hour time period if the element operates with an acceptable LOS for the PM peak hour.

LOS C was assumed as the minimum standard for all operational elements related to new location alignments. Traffic operations assumptions were based on NCDOT Congestion Management Unit standards and recommendations, as listed below.

- 0.90 Peak Hour Factor (PHF)
- Rolling terrain
- 11 percent trucks
- Basic free flow speed of 70 mph
- Ramp free flow speed of 50 mph
- Interchange density of 0.5 interchanges per mile
- Driver population factor of 1.0

Results Summary

For both Scenario 6 and Scenario 7, analysis indicated that three basic lanes would be required in each direction (a six-lane highway) for the New Location Alternative to achieve LOS C or better with projected 2025 traffic volumes.

The service interchange form (an interchange between the New Location highway and a non-highway facility) at each location was selected based on known environmental conditions shown on the land suitability mapping. For both Scenario 6 and Scenario 7, single-lane on-ramps and off-ramps would provide acceptable LOS (LOS C or better) at all service interchanges.

The system interchanges at I-85 and I-485 (highway to highway interchanges) require several two-lane ramps, flyover ramps, collector/distributor roads, and ramp braids. Due to the close spacing between the interchanges on I-85 with Edgewood Road (Exit 13), the New Location Alternative, and Bessemer City Road (Exit 14), several ramps needed to be braided to avoid undesirable weaving conditions.

Although the New Location Alternative is planned to terminate at I-85, geometry for the I-85 systems interchange was developed so it would not preclude an extension of the New Location Alternative to the north, if an extension is programmed at some time in the future.

II.5.3 IMPACT ESTIMATE METHODOLOGY

█ *There are no additions or updates to this section.*

Impacts to the natural and human environments based on the functional designs within the functional design corridors were estimated and tabulated. **Table 17** lists the evaluation factors used to estimate and compare potential impacts. Quantities of resources were estimated based on the functional designs. The method used for each factor is listed in **Table 17** in the column 'Impact Estimate Method – Functional Design Corridors'.

The estimates are for comparison purposes only to aid in deciding between segments, but they are representative of what the actual impact of a roadway may be within a corridor segment. The quantities generated in this screening evaluation were considered together with other qualitative factors, as described under each decision point in the next section.

From the set of ninety endpoint-to-endpoint functional design alternatives, Detailed Study Alternatives were recommended based on the estimated impacts to the natural and human environments, engineering design considerations, and input from the public and the NEPA/404 Merger Team. Sixteen endpoint-to-endpoint functional design corridors were recommended as the Detailed Study Alternatives. These recommendations were presented to the public for comment and input at Citizens Informational Workshop Series #2 in January/February 2006.

II.5.4 DECISION MAKING METHODOLOGY TO IDENTIFY THE DETAILED STUDY ALTERNATIVES

■ *There are no additions or updates to this section.*

The decisions to retain or eliminate functional design corridors were made by the NEPA/404 Merger Team at a meeting held on September 20, 2005. The decisions are summarized below.

For impact quantification purposes, the functional design corridors are divided into segments and sub-segments. These are shown in **Figure 21**, with the centerlines of the functional design corridors and their labels. Close-up views of parts of **Figure 21** are used throughout the discussion.

Appendix G contains tables of impacts for individual segments/sub-segments, segment combinations (I-85 to US 321, US 321 to South Fork Catawba River, and South Fork Catawba River to I-485), and the 90 endpoint-to-endpoint preliminary alternatives.

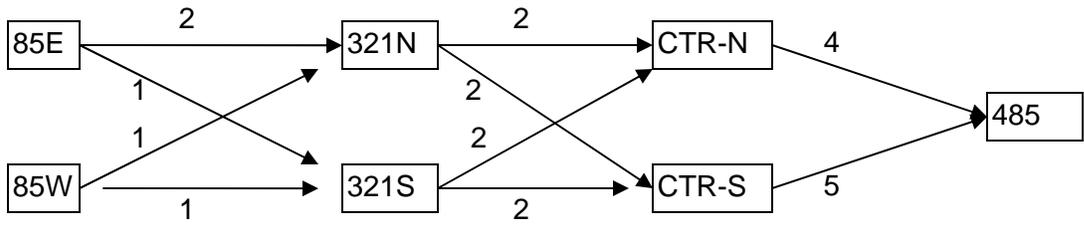
The large number of possible endpoint-to-endpoint alternatives (90) was narrowed down to about sixteen alternatives using the following process and assumptions, which required eight key decisions.

The decision-making methodology uses critical pairs of nodes (options) along the functional designs at four locations: I-85 (85E and 85W), US 321 (321N and 321S), a point west of the South Fork Catawba River (CTR-N and CTR-S), and at I-485 (485) (See **Figure 21**).

The basic premise of this comparison/decision making methodology is that at least one connection between critical pairs of nodes should be maintained, if reasonable, and redundant connections should be eliminated if possible.

The line diagram below shows the numbers of options available between nodes based on the Functional Design Corridors. Redundant options exist wherever there is a number greater than one along an arrow. For example, there are two options between I-85 (eastern node 85E) and US 321 (northern node 321N). As shown on **Figure 21**, these example options use segments H2A-H3-J4a or H2A-H2B-H2C-J3.

90 Possible Preliminary Alternatives

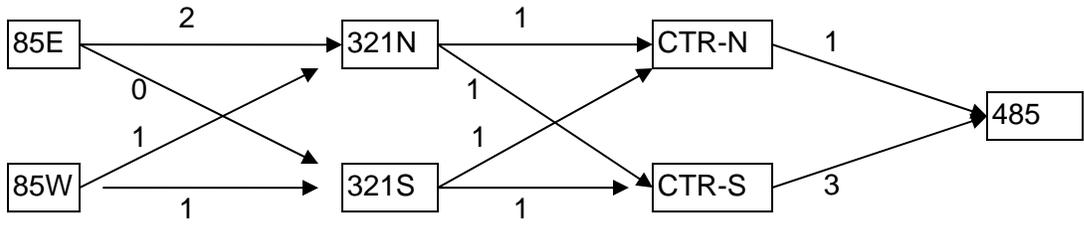


The eight key decision points under this methodology are listed below.

Key Decision Point	Node-to-Node	Decision Needed
1	85E and 85W to 321N and 321S	Choose four of five options.
2	321N to CTR-N	Choose one of the two options.
3	321N to CTR-S	Choose one of the two options.
4	321S to CTR-N	Choose one of the two options.
5	321S to CTR-S	Choose one of the two options.
6	CTR-N to 485	Choose one of the four options
7	CTR-S to 485	Choose two of the three northern options
8	CTR-S to 485	Choose one of the two southern options

These above eight key decision points resulted in 16 endpoint-to-endpoint Detailed Study Alternatives (see following diagram).

Outcome of Options for Detailed Study Alternatives



Data and comparisons for each of the eight decision points are provided below.

II.5.5 EIGHT KEY DECISION POINTS

There are no updates to the eight key decision points. After the original Detailed Study Alternatives were identified, new information came to light regarding resources within Corridor Segment K1D. This new information is described in a new section, **Section II.5.5.9**, which follows the eight key decision points.

Refer to **Figure 21** for all segment and node references. Alternatives are described from west to east.

II.5.5.1 DECISION POINT 1 – Nodes 85E and 85W to Nodes 321N and 321S

There are no additions or updates to this section.

There are five options between Node 85E and Node 321N

- H2A+H3+J4a
- H2A+H2B+H2C+J3
- H2A+H2B+HX1+H1C+J1a
- H1A+H1B+H1C+J1a
- H1A+HX2+J2a

Recommendation:

Nodes 85E and 85W to Nodes 321N and 321S:

Retain:

- **H2A+H3+J4a**
- **H2A+H2B+H2C+J3**
- **H1A+H1B+H1C+J1a**
- **H1A+HX2+J2a**

Table 19 compares the impacts of these five segment combinations. The four listed in the call-out box were retained as Detailed Study Alternatives for the following reasons:

For the alternatives beginning at Node 85E and ending at Node 321N, the eastern option (H2A+H+J4a) has higher human environment impacts, but the western option (H2A+H2B+H2C+J3) has higher natural environment impacts. Both options have potential impacts to environmental justice populations. Keeping both options allows for a decision when more detailed information about natural and human environment impacts is available.

The option from Node 85E to Node 321S (H2A+H2B+HX1+H1C+J1a) was eliminated because this option has substantially more stream impacts than other H segment combinations (about 4,080 linear feet more than the next highest impacts), and would be substantially more expensive (about \$41 million more in construction costs than the next highest construction cost).

Table 19. DECISION POINT 1 – Nodes 85E and 85W to Nodes 321N and 321S

RESOURCE	Node 85E to Node 321N		Node 85E to Node 321S	Node 85W to Node 321N	Node 85W to Node 321S
	H2A+H3 +J4a	H2A+H2B +H2C+J3	H2A+H2B+HX1+H1C+J1a (Eliminated)	H1A+HX2 +J2a	H1A+H1B +H1C+J1a
Length in feet (miles)	32,386 (6.1)	37,543 (7.1)	48,110 (9.1)	33,726 (6.4)	43,569 (8.3)
Construction Cost – 2005 Dollars	\$220.5	\$283.0	324.7	207.0	249.8
Number of Interchanges	5	5	6	5	6
Minor Road Crossings likely requiring grade separation	3	3	4	4	4
Major Transmission Line Crossings	5	9	5	3	3
Railroad Line Crossings	2	2	2	1	1
Residences in Right of Way	233	176	187	163	146
Businesses in Right of Way	31	29	37	42	46
Parks/Recreation Areas in Right of Way	1 (privately-owned golf course, minor impact)	0	0	0	0
Schools in Right of Way	0	0	0	1	1
Churches in Right of Way	3	3	4	0	1
Cemeteries in Right of Way	1	1	1	1	1
Potential Historic Sites in Right of Way	0	0	0	1	0
Low-Income or Minority Populations within R/W	Yes	Yes	Yes	Yes	Yes
Streams (# of crossings in const. limits)	47	43	58	27	38
Streams (Linear ft within const. limits exclusive of bridge crossings but inclusive of interchange ramps)	21,094	23,926	28,012	12,226	16,903
Named Streams (# of crossings)	3	5	6	4	6
Other Perennial Streams (# of crossings)	4	6	5	4	2
Other Intermittent Streams (# of crossings)	40	32	47	19	30
Other Waterbodies in Right of Way	2	2	3	5	6
Wetlands (acres within const. limits) NWI	0	0.25	0.25	1.62	1.62
Floodplains (mainline crossing length (ft))	803	3,206	1,941	2,405	1,862
303 (d) Listed Streams	Yes*	Yes	Yes	Yes	Yes
Riparian Buffer Impacts	No	No	No	No	No
Dormant Superfund Sites in Right of Way	2	2	1	1	0

Table 19. DECISION POINT 1 – Nodes 85E and 85W to Nodes 321N and 321S

RESOURCE	Node 85E to Node 321N		Node 85E to Node 321S	Node 85W to Node 321N	Node 85W to Node 321S
	H2A+H3 +J4a	H2A+H2B +H2C+J3	H2A+H2B+H X1+H1C+J1a (Eliminated)	H1A+HX2 +J2a	H1A+H1B +H1C+J1a
Groundwater Discharge Areas in Right of Way	1	2	3	1	2
Natural Heritage Program Sites in Right of Way	1 (Site A04 granitic outcrop area)	0	0	0	0

* - Although this option does not cross Crowders Creek, it runs parallel to a long length of it and crosses many of its tributaries near their confluences with the creek. This could be a water quality and stormwater management concern.

II.5.5.2 DECISION POINT 2 – Node 321N to Node CTR-N

There are no additions or updates to this section.



There are two options between Node 321N and Node CTR-N

- J4b-J2c-**J2d**-J5a-J5b-K2A (northern corridor)
- J4b-JX7-**J1c**-JX6-J5b-K2A (southern corridor)

Recommendation:
Node 321N to Node CTR-N:

Retain the northern corridor J4b-J2c-J2d-J5a-J5b-K2A for detailed study.

The option that uses **J2d** is the northern corridor and the option that uses **J1c** is the southern corridor.

Table 20 compares the impacts of these two segment combinations.

The northern corridor that uses J2d was retained for detailed study for the following reasons:

- Design is preferred (does not use segment JX7, which has a less desirable design due to a more acute angle of the alignment with US 321)
- Shorter, less expensive
- Follows original GUAMPO preferred alternative

The southern corridor has about 110 less linear feet of stream impact than the northern corridor. The differences in residential and business relocations are small (90 residences and one business for the northern compared to 88 residences and two businesses for the southern).

Potential historic resource impacts for both options are due to cross street (Y-line) improvements. These potential historic resources might be avoided during preliminary design.

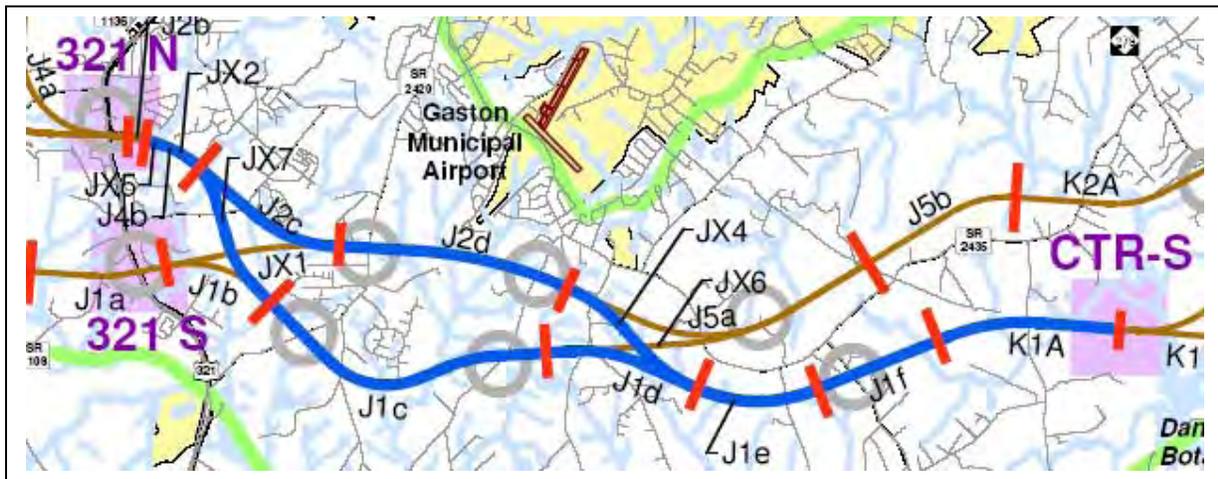
The proposed interchange areas at Robinson Road and Bud Wilson Road are less developed along the southern corridor. However, the northern corridor is shorter and likely less expensive.

Segment combinations that include JX7 or JX2 have a functional design that is not desirable. The design in this area involves a half-clover interchange at US 321 due to a railroad paralleling the east side of US 321. Segments JX7 and JX2 would cause back-to-back horizontal curves in this interchange area, and superelevations of the ramps and the mainline that would be in opposite directions, which make it difficult to tie the ramps into the mainline. This combination of design issues makes the design potentially unsafe. These design issues became apparent with the completion of the functional design.

Table 20. DECISION POINT 2 –Node 321N to Node CTR-N

RESOURCE	J4b+J2c+J2d+J5a +J5b+K2A (northern)	J4b+JX7+J1c+JX6 +J5b+K2A (southern) (Eliminated)
Length in feet (miles)	51,162 (9.7)	54,292 (10.3)
Construction Cost – 2005 Dollars	\$184.5	\$203.8
Number of Interchanges	4	4
Minor Road Crossings likely requiring grade separation	4	6
Major Transmission Line Crossings	8	8
Railroad Line Crossings	0	0
Residences in Right of Way	90	88
Businesses in Right of Way	1	2
Parks/Recreation Areas in Right of Way	0	0
Schools in Right of Way	1	1
Churches in Right of Way	2	2
Cemeteries in Right of Way	2	2
Potential Historic Sites in Right of Way	2	3
Low-Income or Minority Populations in Right of Way	No	No
Streams (# of crossings in const. limits)	31	36
Streams (Linear Ft within const. limits exclusive of bridge crossings but inclusive of interchange ramps)	13,632	13,520
Named Streams (# of crossings)	2	2
Other Perennial Streams (# of crossings)	3	3
Other Intermittent Streams (# of crossings)	26	31
Other Waterbodies in Right of Way	6	7
Wetlands (acres within const. limits) NWI	2.69	2.69
Floodplains (mainline crossing length (ft))	2,195	2,195
303 (d) Listed Streams	Yes	Yes
Riparian Buffer Impacts	Yes	Yes
Dormant Superfund Sites in Right of Way	0	0
Groundwater Discharge Areas in Right of Way	0	0
Natural Heritage Program Sites in Right of Way	0	0

II.5.5.3 DECISION POINT 3 – Node 321N to Node CTR-S



There are no additions or updates to this section.

There are two options between Node 321N and Node CTR-S:

- J4b-J2c-**J2d**-JX4-J1e-J1f-K1A (northern corridor)
- J4b-JX7-J1c-**J1d**-J1e-J1f-K1A (southern corridor)

Recommendation :
Node 321N to Node CTR-S:

**Retain the northern corridor
J4b-J2c-J2d-JX4-J1e-J1f-K1A for
detailed study.**

The option that uses **J2d** is the northern corridor and the option that uses **J1c** is the southern corridor.

Table 21 compares the impacts of these two segment combinations.

The northern corridor that uses J2d was retained for detailed study for the following reasons:

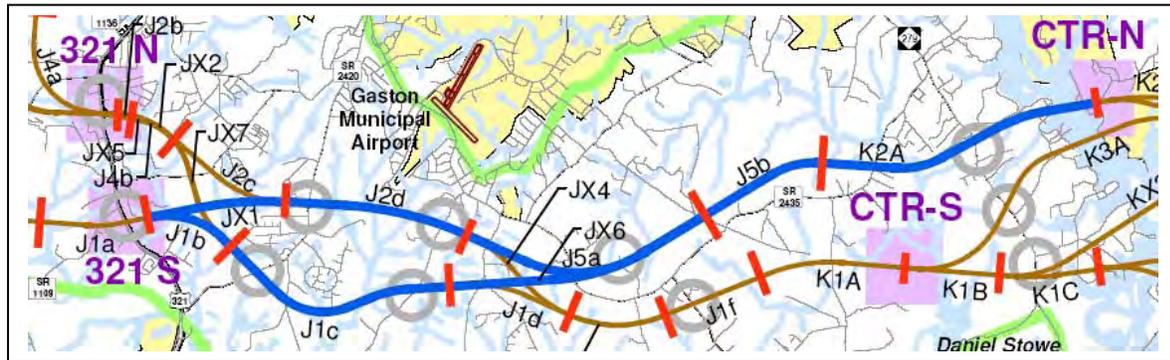
- Design is preferred (does not use segment JX7, which has a less desirable design due to a more acute angle of the alignment with US 321 (See **Section II.5.4.2**))
- Follows the original GUAMPO preferred alternative
- Shorter, likely less expensive

The southern corridor has about 820 less linear feet of stream impact. Relocations, impacts to transmission lines, and floodplains are about the same for both corridors. The proposed interchange areas at Robinson Road and Bud Wilson are less developed along the southern corridor.

Table 21. DECISION POINT 3 –Node 321N to Node CTR-S

RESOURCE	J4b+J2c+J2d+JX4 +J1e+J1f+K1A (northern)	J4b+JX7+J1c+J1d +J1e+J1f+K1A (southern) (Eliminated)
Length in feet (miles)	41,402 (7.8)	43,700 (8.3)
Construction Cost – 2005 Dollars	\$173.3	\$175.4
Number of Interchanges	3	3
Minor Road Crossings likely requiring grade separation	3	3
Major Transmission Line Crossings	6	6
Railroad Line Crossings	0	0
Residences in Right of Way	46	44
Businesses in Right of Way	1	2
Parks/Recreation Areas in Right of Way	0	0
Schools in Right of Way	0	0
Churches in Right of Way	0	0
Cemeteries in Right of Way	0	0
Potential Historic Sites in Right of Way	2	3
Low-Income or Minority Populations in Right of Way	No	No
Streams (# of crossings in const. limits)	26	28
Streams (Linear Ft within const. limits exclusive of bridge crossings but inclusive of interchange ramps)	10,936	10,113
Named Streams (# of crossings)	0	0
Other Perennial Streams (# of crossings)	4	4
Other Intermittent Streams (# of crossings)	22	24
Other Waterbodies in Right of Way	5	6
Wetlands – field observed (acres within const. limits)	0	0
Wetlands (acres within const. limits) NWI	1.15	1.15
Floodplains (mainline crossing length (ft))	583	583
303 (d) Listed Streams	No	No
Riparian Buffer Impacts	No	No
Dormant Superfund Sites in Right of Way	0	0
Groundwater Discharge Areas in Right of Way	0	0
Natural Heritage Program Sites in Right of Way	0	0

II.5.5.4 DECISION POINT 4 – Node 321S to Node CTR-N



There are no additions or updates to this section.

There are two options between Node 321S and Node CTR-N

- JX1-J2d- J5a-J5b-K2A (northern corridor)
- J1b-J1c-JX6-J5b-K2A (southern corridor)

The option that uses **J2d** is the northern corridor and the option that uses **J1c** is the southern corridor.

Table 22 compares the impacts of these two segment combinations.

Recommendation :
Node 321S to Node CTR-N:

**Retain the northern option
JX1-J2d-J5a-J5b-K2A for detailed
study.**

The northern corridor that uses J2d was retained for the following reasons:

- Shorter and more direct
- Less expensive

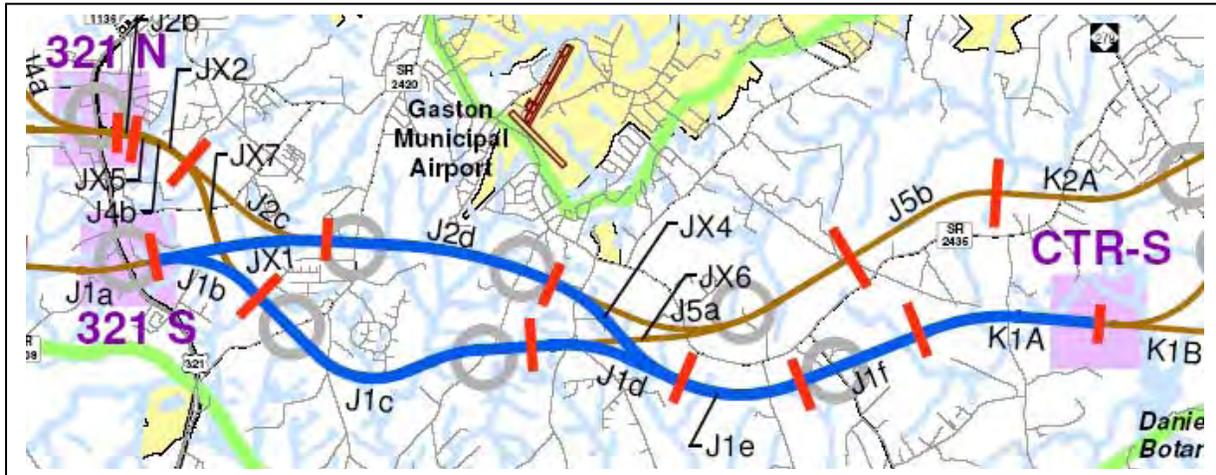
The two options have similar levels of impact. The southern corridor has about 140 less linear feet of stream impact, crosses slightly less floodplain, and has four fewer residential relocations.

The northern option that uses J2d crosses two fewer intermittent streams and has the potential to impact one less potential historic site. The northern option also is about 0.3 miles shorter and likely less expensive.

Table 22. DECISION POINT 4 –Node 321S to Node CTR-N

RESOURCE	JX1+J2d+J5a+J5b+K2A (northern)	J1b+J1c+JX6+J5b+K2A (southern) (Eliminated)
Length in feet (miles)	49,192 (9.3)	50,444 (9.6)
Construction Cost – 2005 Dollars	\$194.4	\$212.4
Number of Interchanges	4	4
Minor Road Crossings likely requiring grade separation	3	5
Major Transmission Line Crossings	5	5
Railroad Line Crossings	0	0
Residences in Right of Way	88	84
Businesses in Right of Way	1	2
Parks/Recreation Areas in Right of Way	0	0
Schools in Right of Way	1	1
Churches in Right of Way	2	2
Cemeteries in Right of Way	2	2
Potential Historic Sites in Right of Way	2	3
Low-Income or Minority Populations in Right of Way	No	No
Streams (# of crossings in const. limits)	33	36
Streams (Linear Ft within const. limits exclusive of bridge crossings but inclusive of interchange ramps)	14,127	13,983
Named Streams (# of crossings)	2	2
Other Perennial Streams (# of crossings)	3	3
Other Intermittent Streams (# of crossings)	28	31
Other Waterbodies in Right of Way	6	7
Wetlands (acres within const. limits) NWI	2.69	2.69
Floodplains (mainline crossing length (ft))	2,254	2,122
303 (d) Listed Streams	Yes	Yes
Riparian Buffer Impacts	Yes	Yes
Dormant Superfund Sites in Right of Way	0	0
Groundwater Discharge Areas in Right of Way	0	0
Natural Heritage Program Sites in Right of Way	0	0

II.5.5.5 DECISION POINT 5 – Node 321S to Node CTR-S



There are no additions or updates to this section.

There are two options between Node 321S and Node CTR-S

- JX1-J2d-JX4-J1e-J1f-K1A (northern corridor)
- J1b-J1c-J1d-J1e-J1f-K1A (southern corridor)

The option that uses **J2d** is the northern corridor and the option that uses **J1c** is the southern corridor.

Table 23 compares the impacts of these two segment combinations.

Recommendation :

Node 321S to Node CTR-S:

**Retain the southern corridor
J1b-J1c-J1d-J1e-J1f-K1A for
detailed study.**

The southern corridor that uses J1c was retained for the following reasons:

- Fewer stream impacts
- Fewer floodplain impacts
- Keeps a southern option available

The southern corridor has about the same or slightly less impacts to most resources than the northern option, including about 860 less linear feet of stream impact, 130 less linear feet of floodplain impact, and four fewer residential relocations.

The proposed interchange areas at Robinson Road and Bud Wilson Road are less developed along the southern corridor.

Table 23. DECISION POINT 5 –Node 321S to Node CTR-S

RESOURCE	JX1+J2d+JX4+J1e +J1f+K1A (northern) (Eliminated)	J1b+J1c+J1d+J1e +J1f+K1A (southern)
Length in feet (miles)	39,432 (7.5)	39,852 (7.5)
Construction Cost – 2005 Dollars	\$183.2	\$184.0
Number of Interchanges	3	3
Minor Road Crossings likely requiring grade separation	2	2
Major Transmission Line Crossings	3	3
Railroad Line Crossings	0	0
Residences in Right of Way	44	40
Businesses in Right of Way	1	2
Parks/Recreation Areas in Right of Way	0	0
Schools in Right of Way	0	0
Churches in Right of Way	0	0
Cemeteries in Right of Way	0	0
Potential Historic Sites in Right of Way	2	3
Low-Income or Minority Populations in Right of Way	No	No
Streams (# of crossings in const. limits)	28	28
Streams (Linear Ft within const. limits exclusive of bridge crossings but inclusive of interchange ramps)	11,431	10,576
Named Streams (# of crossings)	0	0
Other Perennial Streams (# of crossings)	4	4
Other Intermittent Streams (# of crossings)	24	24
Other Waterbodies in Right of Way	5	6
Wetlands (acres within const. limits) NWI	1.15	1.15
Floodplains (mainline crossing length (ft))	642	510
303 (d) Listed Streams	No	No
Riparian Buffer Impacts	No	No
Dormant Superfund Sites in Right of Way	0	0
Groundwater Discharge Areas in Right of Way	0	0
Natural Heritage Program Sites in Right of Way	0	0

II.5.5.6 DECISION POINT 6 –Node CTR-N to Node 485



There are no additions or updates to this section.

There are four options between Node CTR-N and Node I-485:

- K2B-K2C-K2D
- K2B-KX4-K3C
- KX1-KX3-K2D
- KX1-K3B-K3C

The options that use K2D cross the Catawba River at a more northerly point. **Table 24** compares the impacts of these four segment combinations. The southernmost corridor KX1-K3B-K3C was retained for the following reasons:

Recommendation :

Node CTR-N to Node I-485:

Retain KX1-K3B-K3C for detailed study.

- Segment combinations that use K3C have a better design than those using K2D.
- Shorter bridge over the Catawba River. Even though the bridge is skewed over the Catawba River for the recommended option, the bridge may end up being shorter than the options that have a straight bridge over the Catawba River. The options with the straight bridge may require a longer bridge to cross over both the railroad tracks and the river.
- Options using K3C have the fewest linear feet of stream impact.

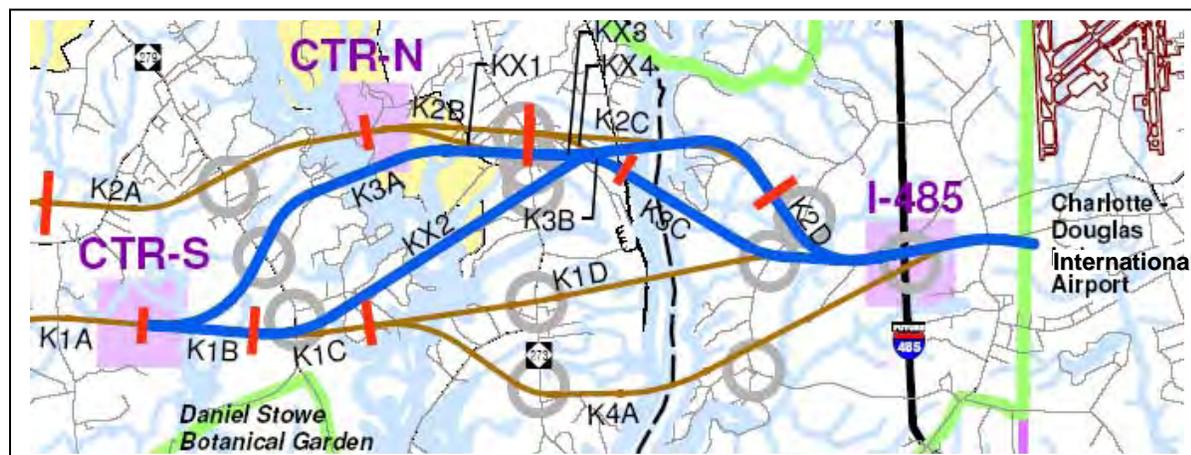
- The segment combinations using K3C have least residential impacts than the segment combinations using K2D, and of the two options using K3C, the segment combination KX1-K3B-K3C has the fewest residential impacts (107 vs 155)

Segment combinations that use Segment K2D have a less desirable design due to a curve immediately east of the Catawba River bridge and just west of I-485. This curve cannot be flattened due to space constraints related to tying into I-485.

Table 24. DECISION POINT 6 –Node CTR-N to Node I-485

RESOURCE	K2B+K2C +K2D (Eliminated)	K2B+KX4 +K3C (Eliminated)	KX1+KX3 +K2D (Eliminated)	KX1+K3B +K3C
Length in feet (miles)	30,190 (5.7)	29,524 (5.6)	30,502 (5.8)	29,370 (5.6)
Construction Cost – 2005 Dollars	\$195.1	\$205.4	\$182.6	\$188.1
Number of Interchanges	3	3	3	3
Minor Road Crossings likely requiring grade separation	0	0	0	1
Major Transmission Line Crossings	5	8	5	8
Railroad Line Crossings	1	1	1	1
Residences in Right of Way	160	155	140	107
Businesses in Right of Way	1	2	2	1
Parks/Recreation Areas in Right of Way	1	1	1	1
Schools in Right of Way	0	0	0	0
Churches in Right of Way	0	0	0	0
Cemeteries in Right of Way	1	1	1	1
Potential Historic Sites in Right of Way	1	1	1	1
Low-Income or Minority Populations in Right of Way	Yes	Yes	Yes	Yes
Streams (# of crossings in const. limits)	25	16	25	17
Streams (Linear Ft within const. limits exclusive of bridge crossings but inclusive of interchange ramps)	9,066	5,920	8,815	6,241
Named Streams (# of crossings)	4	4	4	4
Other Perennial Streams (# of crossings)	1	1	1	1
Other Intermittent Streams (# of crossings)	20	11	20	12
Other Waterbodies in Right of Way	0	0	0	0
Wetlands (acres within const. limits) NWI	0.39	0.39	0.39	0.39
Floodplains (mainline crossing length (ft))	2,142	2,382	2,458	2,382
303 (d) Listed Streams	No	No	No	No
Riparian Buffer Impacts	Yes	Yes	Yes	Yes
Dormant Superfund Sites in Right of Way	0	0	0	0
Groundwater Discharge Areas in Right of Way	0	0	0	0
Natural Heritage Program Sites in Right of Way	0	0	0	0

II.5.5.7 DECISION POINT 7 –Node CTR-S to Node I-485 – (northern alternatives)



There are no additions or updates to this section.

There are five options between Node CTR-S and Node I-485. The three northernmost are:

- K3A-KX3-K2D
- K3A-K3B-K3C
- K1B-KX2-K2D (Route most similar to the GUAMPO’s alignment)
- *Note: KX2-K3C is not feasible due to the horizontal curvature*

The options that use K2D cross the Catawba River at a more northerly point. The options that use K3A cross the South Fork Catawba River at a more northerly point.

Table 25 compares the impacts of these three segment combinations.

Segment combination K3A-K3B-K3C was retained for the following reasons:

Recommendation :
Node CTR-S to Node I-485
(northern alternatives):

Retain K3A-K3B-K3C for detailed study.

- Segment combinations that use Segment K2D have a less desirable design (see Decision Point 6, **Section II.5.4.6**)
- Segment combination K3A-K3B-K3C has 2,100 to 2,200 fewer linear feet of stream impacts.

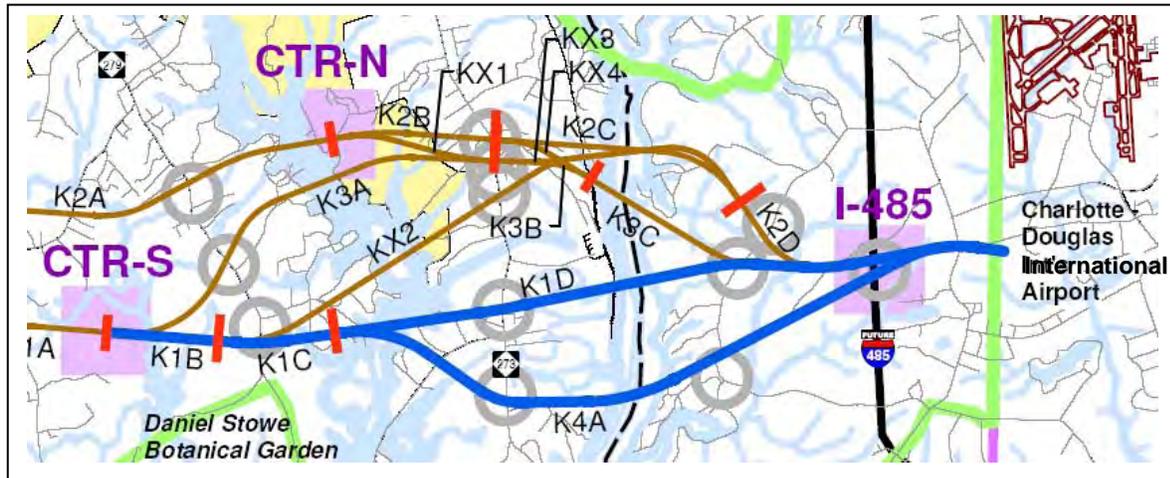
Although segment combination K3A-K3B-K3C has a better design at I-485 (does not use Segment K2D), it does impact a potential historic site located at the NC 279 interchange area (Segment K3A). The impact to the potential historic site appears unavoidable with this route. If this segment combination should be eliminated at a later stage, when more information about whether the site is potentially eligible for the

National Register of Historic Places, other alternatives to get from Node CTR-S to Node I-485 will be available through segment combinations retained under Decision Point 8. The significance of the potential historic site will be evaluated in a Phase II Historic Architectural Resources Survey that will be prepared for the Detailed Study Alternatives and summarized in the Draft EIS.

Table 25. DECISION POINT 7 –Node CTR-S to Node I-485 (northern alternatives)

RESOURCE	K3A+KX3 +K2D (Eliminated)	K3A+K3B +K3C	K1B+KX2 +K2D (Eliminated)
Length in feet (miles)	42,740 (8.1)	41,608 (7.9)	41,881 (7.9)
Construction Cost – 2005 Dollars	\$239.2	\$244.7	\$244.1
Number of Interchanges	4	4	4
Minor Rd Crossings likely requiring grade separation	0	1	0
Major Transmission Line Crossings	6	9	6
Railroad Line Crossings	1	1	1
Residences in Right of Way	152	119	123
Businesses in Right of Way	3	2	2
Parks/Recreation Areas in Right of Way	1	1	1
Schools in Right of Way	0	0	0
Churches in Right of Way	0	0	1
Cemeteries in Right of Way	1	1	0
Potential Historic Sites in Right of Way	2 (1 in interchange area)	2 (1 in interchange area)	1
Low-Income or Minority Populations in Right of Way	Yes	Yes	Yes
Streams (# of crossings in const. limits)	27	19	26
Streams (Linear Ft within const. limits exclusive of bridge crossings but inclusive of interchange ramps)	9,015	6,441	8,935
Named Streams (# of crossings)	6	6	6
Other Perennial Streams (# of crossings)	1	1	1
Other Intermittent Streams (# of crossings)	20	12	19
Other Waterbodies in Right of Way	0	0	0
Wetlands (acres within const. limits) NWI	1.16	1.16	0.75
Floodplains (mainline crossing length (ft))	4,144	4,068	4,658
303 (d) Listed Streams	Yes	Yes	Yes
Riparian Buffer Impacts	Yes	Yes	Yes
Dormant Superfund Sites in Right of Way	0	0	0
Groundwater Discharge Areas in Right of Way	0	0	0
Natural Heritage Program Sites in Right of Way	0	0	0

II.5.5.8 DECISION POINT 8 – Node CTR-S to Node I-485 (southern alternatives)



This section is updated with new information concerning the elimination of Segment K1D from further consideration. Details regarding this information are discussed in new **Section II.5.5.9**.

There are five options between Node CTR-S and Node I-485. The two southernmost are:

- K1B-K1C-K1D
- K1B-K1C-K4A

Table 26 compares the impacts of these two segment combinations.

Originally, both options were retained for detailed study. However, since the original Alternatives Development and Evaluation Report was prepared, segment combination K1B-K1C-K1D was eliminated from further study (**Section II.5.5.9**)

Segment combination K1B-K1C-K1D has a straighter alignment and fewer stream impacts. It is shorter than segment combination K1B-K1C-K4A, and has straight bridges over the South Fork Catawba River and Catawba River. However, segment combination K1B-K1C-K1D has more residential relocations (141 vs 91) and is dependent on the feasibility of constructing a roadway over or through the Allen Steam Station’s retired fly ash basin. As described in **Section II.5.5.9**, the Allen Steam Station is proposing a landfill over the retired fly ash basin, and it is not feasible to construct a roadway over this proposed landfill.

Recommendation :
 Node CTR-S to Node I-485
 (southern alternatives):

Original recommendation was to retain both K1B-K1C-K1D and K1B-K1C-K4A for detailed study.

New information described in Section II.5.5.9 resulted in K1B-K1C-K1D being eliminated from further study.

Table 26. DECISION POINT 8 – Node CTR-S to Node I-485 (southern alternatives)

RESOURCE	K1B+K1C+K1D (northernmost)	K1B+K1C+K4A (southernmost)
Length in feet (miles)	37,865 (7.2)	39,775 (7.5)
Construction Cost – 2005 Dollars	\$235.5	\$235.3
Number of Interchanges	4	4
Minor Road Crossings likely requiring grade separation	1	1
Major Transmission Line Crossings	6	6
Railroad Line Crossings	1	0
Residences in Right of Way	141	91
Businesses in Right of Way	4	0
Parks/Recreation Areas in Right of Way	1	1
Schools in Right of Way	0	0
Churches in Right of Way	2	1
Cemeteries in Right of Way	0	0
Potential Historic Sites in Right of Way	3	3
Low-Income or Minority Populations in Right of Way	Yes (near I-485)	Yes (near I-485)
Streams (# of crossings in const. limits)	15	13
Streams (Linear Ft within const. limits exclusive of bridge crossings but inclusive of interchange ramps)	4,496	5,164
Named Streams (# of crossings)	6	4
Other Perennial Streams (# of crossings)	1	1
Other Intermittent Streams (# of crossings)	8	8
Other Waterbodies in Right of Way	1	1
Wetlands (acres within const. limits) NWI	0.98	7.66
Floodplains (mainline crossing length (ft))	4,698	5,216
303 (d) Listed Streams	Yes	Yes
Riparian Buffer Impacts	Yes	Yes
Dormant Superfund Sites in Right of Way	0	0
Groundwater Discharge Areas in Right of Way	0	0
Natural Heritage Program Sites in Right of Way	0	0

II.5.5.9 Elimination of Corridor Segment K1D

This is a new section in the report.

As documented in **Part III, Section III.1.3.2**, resolution on NEPA/404 Merger Process Concurrence Point 2 (CP2 – Detailed Study Alternatives) for the subject project was reached in September 2005. Sixteen Detailed Study Alternatives (DSAs) were identified for further study in the Draft Environmental Impact Statement. Four of these DSAs, DSAs 6, 24, 65, and 78, include Detailed Study Corridor Segment K1D.

As project studies have progressed, new information has become available regarding the viability of Detailed Study Corridor Segment K1D. As discussed below, this segment has been eliminated from further study, thereby eliminating DSAs 6, 24, 65, and 78 from further consideration.

Detailed Study Corridor Segment K1D is located in the eastern portion of the project, passing just south of Duke Power's Allen Steam Station.

At the CP2 Merger meeting held September 20, 2005, it was noted that segment combinations including K1D had a straighter alignment and fewer stream impacts than comparable segment combinations; but more residential relocations. It was also noted that alternatives that included segment K1D were “dependent on the ability to construct a roadway over or through the Allen Steam Station's retired (dormant) fly ash basin.” An alignment within Corridor Segment K1D could not avoid the fly ash basin. To the north of Segment K1D is the Steam Station's active coal storage and the plant itself. To the south is the active fly ash basin.



Also, just west of the fly ash basin is an active rail line used by the Steam Station and west of the rail line is the Catawba River. These features are directly adjacent to each other and the rail line and river both must be bridged.

Constructing a roadway through the fly ash basin could have constructability issues and/or interfere with plant operations. However, no definitive data or information to make a determination was available at the time CP2 was resolved. The Merger Team elected to keep Segment K1D for further study, or until such time as data was available to revisit this decision. This additional data is now available, as described below.

In the first half of 2007, Duke Power conducted a site suitability study at the retired ash basin for the purpose of permitting a new landfill at the site. Duke Power agreed to share their geotechnical data with NCTA. At the request of the NCTA, the NCDOT Geotechnical Engineering Unit reviewed the data to reach conclusions about the suitability of the site for roadway construction. They provided their findings to NCTA in a memorandum dated June 1, 2007 (see **Addendum Appendix D**).

The fly ash basin in question is located south of the main plant and the Steam Station's active coal stockpile. As described by Duke Power, it was in use in the early to mid 1970s, but is currently inactive and covered in vegetation. An active fly ash basin is located farther south that is currently being used to store/dispose of ash waste generated by burning coal at the Steam Station. The retired fly ash basin consists of three to four cells with a total size of about 2,000 feet by 1,650 feet (about 75 acres). Fly ash was hydraulically placed with no engineering control relative to density/compaction. The ash deposit in the basin has a maximum thickness of about 58 feet.

Upon review of the data provided by Duke Power, the NCDOT Geotechnical Engineering Unit (Memorandum dated June 1 in **Addendum Appendix D**) concluded that:

“settlement/consolidation will be excessive and non-uniform. This would create an unacceptable condition in the form of waviness of the roadway surface and pavement failure. The data further indicates considerable potential for embankment failure in the form of deep seated slope instability. We conclude that roadway construction over the ash basin in its current state would not be feasible.”

Bridging the entire fly ash basin was identified by NCDOT as the only practical alternative that eliminates the risk of potential large magnitudes of differential settlement. Basically, the bridge that would span the Catawba River and the rail line would need to be continued westward over the length of the entire fly ash basin (with piers that would need to be at least 60 feet long to clear the depth of the ash in the basin). With the fly ash basin as it exists today, bridging this area would be feasible, but would have substantial costs (see teleconference with NCDOT Structures Unit dated June 6, 2007 in **Addendum Appendix C**).

Additional information from Duke Power regarding their plans for the retired fly ash basin were received in a memorandum to the NCTA dated August 7, 2007 (included in **Addendum Appendix C**). The memorandum is summarized below.

The Steam Station is adding new pollution control equipment to comply with the North Carolina Clean Smokestacks Act (NC GS 143-215.107D). In conjunction with these improvements, the Steam Station is in the process of designing, permitting, and constructing a storage area for coal combustion products over the retired fly ash basin. The Steam Station states several alternatives and sites were evaluated for the future storage area but that the retired fly ash basin was the only viable site that provided the required capacity. Design work is in progress in preparation for discussions with the NC Department of Environment and Natural Resources (NCDENR). Storage requirements will use the entire ash basin footprint and rise approximately 150 feet above the current elevation. Construction is planned to start in late 2008.

In conclusion, bridging the retired fly ash basin in its current condition appeared to be a feasible, although expensive, option for constructing an alignment in Segment K1D. However, with a new landfill over the fly ash basin rising about 150 feet in elevation, bridging is no longer a feasible option due to the elevation issues and interference with the Steam Station’s operations. Therefore, Detailed Study Alternatives that include Segment K1D (DSAs 6, 24, 65, and 78) were eliminated from further study. These are shown in **Table 27**. The environmental resource agencies agreed that DSAs 6, 24, 65, and 78 should be eliminated from further study in a Turnpike-Environmental Agency Coordination (TEAC) meeting on September 27, 2007 (meeting minutes included in **Addendum Appendix C**).

Table 27. Detailed Study Alternatives Containing Corridor Segment K1D - Eliminated From Detailed Study

Detailed Study Alternative #	West Area - generally west of US 321	Central Area – Generally east of US 321 and west of NC 279 or the South Fork Catawba River	East Area – generally east of NC 279 or the South Fork Catawba River
	H Segments	J Segments	K Segments
6	H2A-H3	J4a-J4b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K1D
24	H2A-H2B-H2C	J3-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K1D
65	H1A-H1B-H1C	J1a-J1b-J1c-J1d-J1e-J1f	K1A-K1B-K1C-K1D
78	H1A-HX2	J2a-J2b-J2c-J2d-JX4-J1e-J1f	K1A-K1B-K1C-K1D

Refer to **Figure 20** for a map of the Detailed Study Alternatives and their corridor segments

II.5.6 ALTERNATIVES RECOMMENDED FOR DETAILED STUDY

*This section updated based on the new information described in new **Section II.5.5.9** and tolling considerations.*

Based on the recommendations described in **Sections II.5.5.1 through II.5.5.8** for the eight key decision points, there were sixteen Detailed Study Alternatives (Non-Toll and Toll Scenarios) (**Figures 20 and 21**).

After these sixteen DSAs were identified and Concurrence Point 2 of the NEPA/404 Merger process was achieved, new information led to the elimination of Corridor Segment K1D (**Section II.5.5.9**). Therefore, there are twelve Detailed Study Alternatives that will be carried forward for evaluation in the Draft EIS. These are listed in **Table 1**, and the segments included in these twelve alternatives are shown in updated **Figure 3**.

These twelve DSAs will be carried through to detailed study as toll facilities only. As of May 2007, the NCTA and NCDOT acknowledged that it would be “unlikely for NCDOT to implement the project as a non-toll facility” (see letter dated May 21, 2007 from NCTA to NCDOT in **Addendum Appendix A**).

PART III – AGENCY COORDINATION AND PUBLIC INVOLVEMENT

III.1 AGENCY COORDINATION

¶ *Section III.1.3.2 is updated to include the September 27, 2007 meeting where it was agreed that Corridor Segment K1D should be eliminated from further study.*

III.1.1 SCOPING

¶ *There are no updates or additions to this section.*

A formal scoping letter, as required by NEPA, was sent by NCDOT to local, state, and federal agencies on April 7, 2003. The letter is included in **Appendix A**, along with the distribution lists and the letters of response. The purpose of the letter was to solicit comments and collect pertinent project information early in the alternatives development process. The coordination (NEPA scoping letter) between NCDOT, FHWA, and the agencies has assisted with the development of the Detailed Study Alternatives.

III.1.2 NOTICE OF INTENT

¶ *There are no updates or additions to this section.*

A Notice of Intent (NOI) to prepare a Draft Environmental Impact Statement for the project was published by the FHWA in the Federal Register on April 27, 2006 (Volume 71, No. 81, pages 24909-24910). **Appendix A** contains a copy of the NOI.

III.1.3 NEPA/SECTION 404 MERGER TEAM HISTORY

III.1.3.1 Background Information

There are no updates or additions to this section.

The project followed the Merger 01 process for agency concurrence and coordination contained in the NEPA/404 Merger 01 Memorandum of Agreement signed by NCDOT, Federal Highway Administration (FHWA), US Army Corps of Engineers (USACE), and the NC Department of Environment and Natural Resources (DENR). The NEPA/404 Merger Team for this project included the stakeholder agencies and local units of government listed in the insert box.

The NEPA/404 MERGER TEAM

The Merger Team reviews the project at various development milestones. The project's Merger Team members are:

- Federal Highway Administration (FHWA)
- NC Department of Transportation (NCDOT)
- US Army Corps of Engineers (USACE)
- US Fish and Wildlife Service (USFWS),
- US Environmental Protection Agency (US EPA)
- NC Wildlife Resources Commission (NCWRC)
- NC Department of Environment and Natural Resources (NCDENR) – Division of Water Quality (DWQ)
- State Historic Preservation Office (HPO),
- Gaston Urban Area Metropolitan Planning Organization (GUAMPO)
- Mecklenburg-Union Metropolitan Planning Organization (MUMPO).

The Merger 01 process allows agency representatives to coordinate more efficiently by providing a common forum for discussion of project issues as they relate to each agency's mission. The merger process documents how competing agency mandates are balanced during a shared decision-making process, which results in agency representatives reaching a "compromise-based decision" to the regulatory and individual agency mandates at specific project milestones (<http://www.ncdot.org/doh/preconstruct/pe/MERGER01/default.html>).

The specific project milestones, called concurrence points, are listed below. This report documents activities up to and including Concurrence Point 2.

Concurrence Point	Description
1	Purpose and Need
2	Detailed Study Alternatives to be evaluated in the Draft Environmental Impact Statement (DEIS)
2a	Bridging and Alignment Review: Identification of bridge locations and approximate lengths, culvert locations, and a review of the preliminary alignment for each alternative.
3	Selection of Least Environmentally Damaging Practicable Alternative (LEDPA)

- 4a Avoidance and Minimization: A detailed, interdisciplinary review to optimize the design and benefits of the project while reducing environmental impacts to both the human and natural environment.
- 4b Hydraulic Review: A review of the development of the drainage design.
- 4c Permit Drawings Review: A review of the completed permit drawings after the hydraulic design is complete and prior to the permit application.

III.1.3.2 Merger Team Coordination for the Project

- *This section updated with information on the coordination that occurred when new information came to light to eliminate Corridor Segment K1D from further consideration.*

The following describes the history for the Merger 01 process for this project up to Concurrence Point 2, identification of alternatives to be studied in detail in the DEIS. NCDOT managed the project through Concurrence Point 2. **Appendix A** contains the Concurrence Points 1 and 2 forms.

Concurrence Point 1 (Purpose and Need) was completed July 24, 2002.

Concurrence Point 2 (Detailed Study Alternatives) was completed in July 2005. Concurrence Point 2 (CP #2) was divided into two sections for merger meeting purposes – non-new location alternatives and new location alternatives – due to the volume of information that needed to be conveyed. The Merger Team process to achieve Concurrence Point 2 involved eight meetings. The history of these meetings is provided below.

February 17, 2004 - Pre-Concurrence Point 2 meeting (New Location Alternatives)

Identified the new location alternatives for which NCDOT should prepare functional designs prior to the new-location Concurrence Point 2 meeting.

August 17, 2004 - Partial Concurrence Point 2 Meeting (Non-New Location Alternatives)

The purpose of this merger meeting was to achieve concurrence on the non-new location alternatives to be carried forward for detailed study. Agreement on Improve Existing Roadways Alternatives could not be reached, and the decision was made to follow the process outlined in the NEPA/404 Merger 01 Memorandum of Agreement (MOA) for elevating the decision.

September 14, 2004 – Elevation Meeting #1

The project’s Merger Team members attended. Concurrence was not achieved.

September 29, 2004 – Elevation Meeting #2

The supervisors of the Merger Team members attended. Concurrence was not achieved.

October 27, 2004 – Elevation Meeting #3 (Review Board)

On October 27, 2004, in accordance with the MOA, the Review Board met to discuss the project and the issues that the Merger Team had not reached consensus on. The Review Board consists of designated senior management from FHWA, NCDOT, USACE, and NC DENR.

February 8, 2005 - Elevation Meeting #4 (Review Board)

The Review Board met to continue discussion of the project issues.

Late June/early July 2005 – Elevation Meeting #5 (Review Board)

The Review Board met and signed the Partial Concurrence Point 2 form eliminating all non-new location alternatives from further study.

September 20, 2005 – Concurrence Point 2 Meeting (New Location Alternatives)

The purpose of the meeting was to decide which of the ninety preliminary new location alternatives should be carried forward for further study. The preliminary new location corridors were narrowed to 16 Detailed Study Alternatives.

The FHWA, NCDOT, USACE, NC DWQ, SHPO, GUAMPO, and MUMPO signed the Concurrence Point 2 form regarding the New Location Alternatives to be carried forward in the DEIS. The USEPA, USFWS, and the NCWRC chose to abstain from signing the Concurrence Point 2 form. An abstention in the NEPA/404 Merger process means an agency does not actively object to a concurrence point milestone, but does not wish to sign the concurrence form. The agency agrees not to revisit the concurrence point, subject to guidance on revisiting concurrence points contained in the NEPA/404 Merger 01 Memorandum of Agreement. Representatives of these agencies provided emails with their reasons for abstaining. These are included in **Appendix A.**

After Concurrence Point 2 was signed on September 20, 2005, project studies progressed and new information became available in 2007 regarding the viability of Detailed Study Corridor Segment K1D, which is included in DSAs 6, 24, 65, and 78. **Section II.5.5.9** describes the new information in detail. Corridor Segment K1D passes over a retired fly ash basin at the Allen Steam Station coal-fired power plant. Duke Energy, which owns the power plant, is planning a new landfill over the retired fly ash basin that will rise about 150 feet in elevation. Constructing a roadway over this fly ash basin along Corridor Segment K1D is no longer a feasible option due to the landfill and interference with the Steam Station's operations. Therefore, it was recommended that Detailed Study Alternatives that include Segment K1D (DSAs 6, 24, 65, and 78) be eliminated from further study.

The NCTA presented the findings described above at a Turnpike-Environmental Agency Coordination meeting held September 27, 2007. Representatives from the following agencies were at the September

27, 2007 meeting: NCTA, FHWA, NCDOT, USACE, USEPA, USFWS, NCDWQ, and NCWRC. The attendees agreed that DSAs containing Corridor Segment K1D (DSAs 6, 24, 65, and 78) should be eliminated from further study. Meeting minutes are included in **Addendum Appendix C**.

III.2 PUBLIC INVOLVEMENT

No additional public involvement activities relevant to the alternatives development process have occurred since the original Alternatives Development and Evaluation Report. A Citizens Informational Workshop series is planned for the summer of 2008. Therefore, there are no updates or additions to this section.

The public involvement process is integral to the entire project development and decision-making process. The Public Involvement Plan for the project documents the public involvement process for the project. Public involvement activities described below are related to alternatives development and evaluation.

III.2.1 CITIZENS INFORMATIONAL WORKSHOPS

There are no updates or additions to this section.

Two series of Citizens Informational Workshops were held; the first series was held in 2003 by NCDOT and the second series was held in 2006 by the NC Turnpike Authority. All the Citizens Informational Workshops were an informal open-house format. Attendees were encouraged to sign-in, read the project handouts, view the slideshows and project displays, and to discuss the project one-on-one with Project Team representatives. There were no formal presentations given at the workshops. A Spanish translator was available at each workshop and project handouts were available in Spanish.

III.2.1.1 Citizens Informational Workshop Series #1

There are no updates or additions to this section.

The first series of Citizens Informational Workshops (CIWs) took place on September 30, December 9, and December 10, 2003. The workshops, held by the NCDOT, presented the purpose and need for the project and the preliminary alternatives being considered. Approximately 734 citizens signed in at the first series of workshops.

There were 192 written comment forms received at and following the workshops. A majority of commenters supported a new location roadway. However, about 20 percent of the commenters supported other types of alternatives, including improving I-85 and US 29-74 and mass transit. Other commenters expressed concerns about route location, wildlife habitat, river shoreline buffers and recreational uses, parks, neighborhoods, land use and sprawl, water quality, air quality, and noise.

Specific comments about locations and preferences regarding the preliminary new location alignments provided at Citizens Informational Workshop Series #1 are listed below. Refer to **Figure 18** for preliminary new location corridor segment names and **Figure 3** for Detailed Study Alternative segment names. For additional information and summaries of the comments received at the first series of workshops, refer to the *Citizens Informational Workshop Summaries* (March 2004).

Specific comments about locations and preferences regarding the preliminary new location alignments provided at Citizens Informational Workshop Series #1:

- Cross north of Paradise Point at South Fork of the Catawba River
Two out of three preliminary new location segments north of Paradise Point (Detailed Study Alternative segments K2A and K3A [formerly preliminary corridor segments F2 and F4]) have been retained for detailed study in the DEIS.
- Cross Bud Wilson Road as far south as possible
The southernmost crossing of Bud Wilson Road (Detailed Study Alternative segment J1c [formerly preliminary corridor segment C6/D3]) has been retained for detailed study in the DEIS.
- Connect to Buster Boyd Bridge in South Carolina
Connecting to the NC 49 Buster Boyd Bridge over the Catawba River at the Mecklenburg County North Carolina/York County South Carolina border would not meet the project's purpose and need.
- Use existing Hudson Boulevard as a bypass of Gastonia
Hudson Boulevard parallels US 29-74 to the south, and connects US 321 in Gastonia to Lowell-Bethesda Road on the east side of Cramerton. Hudson Boulevard currently serves as a local bypass of downtown Gastonia. Improving Hudson Boulevard would not meet the project's purpose and need. It would not improve traffic flow on I-85 (because it doesn't connect to I-85 it would not divert substantial amounts of traffic from I-85) and it would not improve connectivity in southern Gaston County nor between southern Gaston County and Mecklenburg County.
- Provide a toll road facility
In February 2005, the proposed project was adopted by the North Carolina Turnpike Authority as a candidate toll facility.
- Maintain access to Bessemer City via Exit 13 – Edgewood Road
All of the Detailed Study Alternatives would maintain this access.

- Provide a road only from Union New Hope Road to I-485
This option would not meet the project's purpose and need. It would not improve traffic flow on I-85, US 29-74 or US 321.
- Segments E8, F5, F10, and F11 are the only segments that make sense
Preliminary corridor segments E8, F5 and F10 were retained for detailed study as Detailed Study Corridor segments K3A and K4A. Preliminary corridor segment F11 was eliminated from consideration because its route would directly impact parkland and twice as many subdivisions as the route that uses preliminary corridor segment F10.
- F-X9a should be chosen over E8+F6
Both preliminary corridor segments have been retained for detailed study as Detailed Study Alternative segments K3A (formerly F-X9a) and K1C/K4A (formerly E8/F6).
- The southernmost routes are most beneficial to Daniel Stowe Botanical Garden
Two routes that pass just north of the Daniel Stowe Botanical Garden have been retained for detailed study in the DEIS.
- Put alignment as close as possible to South Carolina
Except for preliminary corridor segment F11/G6, all the southernmost preliminary corridor segments have been retained for detailed study.
- Avoid lower end of Bud Wilson Road/Sparrow Dairy Road
There are no Detailed Study Alternative segments located at the lower end of Bud Wilson Road/Sparrow Dairy Road, near the North Carolina/South Carolina state line.
- Avoid area north of Allen Steam Station, where there is too much development
There is one Detailed Study Alternative corridor north of the Allen Steam Station and two south of the Allen Steam Station.
- NC 49 should be used
Use of NC 49 in South Carolina would not meet the project's purpose and need. It would not provide connectivity between southern Gaston County and Mecklenburg County, nor would it improve traffic flow on I-85, US 29-74 or US 321.

III.2.1.2 Citizens Informational Workshop Series #2

■ *There are no updates or additions to this section.*

The second series of Citizens Informational Workshops took place January 31, February 1, and February 2, 2006. These workshops were held by the NC Turnpike Authority with assistance from the NCDOT. The purpose was to present the recommended Detailed Study Alternatives for input and comment.

Approximately 813 citizens signed in at the second series of workshops.

There were 185 written comment forms received at and following the workshops. Written comments were further categorized, summarized, and counted based on the following questions:

1. For or Against a New Roadway?
2. For or Against Improving Existing Roadways?
3. For or Against Tolls?
4. Specific Comment?
5. Corridor Preference/Choice?
6. Has/Does Not Have Natural Environment Concerns?

The following is a summary of the written comments based on the above questions. Additional information on the comments received at the second series of workshop is included in the Citizens Informational Workshop Series #2 Summary (June 2006). Comments regarding preferences and impacts and issues will be taken into consideration in the evaluation of the Detailed Study Alternatives for the DEIS.

	<u>For</u>	<u>Against</u>		
For or Against New Roadway?	34	21		
For or Against Improving Existing Roadways?	7	1		
For or Against Tolls?	3	11		
	<u>Yes</u>	<u>No</u>		
Specific Comment?	130	54		
	<u>Western</u>	<u>Middle</u>	<u>Eastern</u>	
	<u>(H1)</u>	<u>(H2)</u>	<u>(H3)</u>	
Western Area Corridor Choice (I-85 to US 321)?	6	1	12	
	<u>Northern</u>	<u>Southern</u>		
	<u>(J2/J5)</u>	<u>(J1)</u>		
Middle Area Corridor Choice (US 321 to NC 279)?	0	2		
	<u>Northern</u>	<u>Middle</u>	<u>Southern</u>	<u>K3A</u>
	<u>(K3C)</u>	<u>(K1D)</u>	<u>(K4A)</u>	<u>Crossover</u>
Eastern Area Corridor Choice (NC 279 to I-485)	9	3	4	4
	<u>Northern</u>	<u>Middle</u>	<u>Southern</u>	

	<u>(K3C)</u>	<u>(K1D)</u>	<u>(K4A)</u>
Mecklenburg County Area Corridor Choice?	10	32	1
	<u>Yes</u>	<u>No</u>	
Has Human Environment Concerns (2/2/06 Workshop only)	25	22	
	<u>Yes</u>	<u>No</u>	
Has Natural Environment Concerns (1/31/06 and 2/1/06 Workshops)	62	75	

III.2.2 LOCAL OFFICIALS MEETINGS

▮ *There are no updates or additions to this section.*

Local Officials Meetings were held prior to Citizens Informational Workshops to provide local officials with opportunities to ask questions and submit comments, as well as an opportunity for the project team to present findings and address issues. Local meetings with officials from Gaston and Mecklenburg counties were held prior to each of the two Citizens Informational Workshops series.

Other local officials meetings occurred in Gaston County with the following groups and their corresponding dates.

- 1/22/02, 9/24/02 Gaston Urban Area MPO Transportation Advisory Committee (TAC)
- 9/24/02 Gaston Urban Area MPO Technical Coordinating Committee (TCC)

III.2.3 SMALL GROUP MEETINGS

▮ *There are no updates or additions to this section.*

Throughout the study process, the project team has been available to meet with local organizations and citizens groups to discuss the project. Several meetings were held during the development of preliminary alternatives in the project study area.

The local entities interviewed for information exchange, research and data collection purposes included the following:

- Charlotte-Douglas International Airport
- Charlotte-Mecklenburg Planning Commission
- Charlotte Department of Transportation

- Gaston County Natural Resources Department
- City of Gastonia
- City of Belmont
- Belmont Planning Board
- City of Bessemer City
- Town of McAdenville
- Catawba River Foundation/Catawba Riverkeeper
- Crescent Resources, LLC
- Duke Energy (Allen Steam Station)
- Quality of Natural Resources Commission (QNRC)
- Schiele Museum of Natural History
- Village Properties - Pharr Yarns

Four outreach meetings were held with organizations, community leaders, and elementary schools in Gaston County on January 17, 2006, to identify ways to communicate with low-income and minority populations and to incorporate appropriate methods into the public involvement program to encourage participation from these populations. These interviews were with:

- Gaston Community Action
- Tabernacle Baptist Church
- HH Beam Elementary School
- Forest Heights Elementary School

During alternatives development and analysis, the following organizations and citizens groups requested small group meetings. These meetings and dates are listed below.

- 12/11/02 Gaston Chamber of Commerce
- 10/15/03 Friends of Crowder's Mountain
- 3/24/04 Gaston Chamber of Commerce
- 11/8/04 Paradise Point Neighborhood group
- 3/8/06 Medallist Development Corp.
- 3/10/06 NC League for Transportation and Logistics
- 4/19/06 Ramoth AME Zion Church
- 4/25/06 Friends of Crowder's Mountain
- 4/27/06 Brown's Cove Neighborhood group

III.2.4 OTHER OUTREACH EFFORTS

- *There are no updates or additions to this section.*

The various methods employed for communicating project information and announcements of public meetings are described below.

III.2.4.1 Newsletters and Postcards

- *There are no updates or additions to this section.*

Two newsletters and two postcards were used to provide the public with information about the project and project-related events such as Citizens Informational Workshops, and to seek comments from the public.

The first project newsletter announced the project purpose and need. The newsletter described previous studies of the ‘*Garden Parkway*’ and described future public involvement opportunities. Approximately 235 newsletters were mailed to those on the project mailing list.

The Citizens Informational Workshop on September 30, 2003 was announced via a newsletter, flyer, and newspaper advertisements. Three-hundred and four (304) newsletters announcing the meeting were sent out to people already on the Newsletter #1 mailing list (mailing list increased from first newsletter mailing), six-hundred and thirty (630) newsletters were sent to churches within the refined study area for new location alternatives, and four-hundred forty-eight (448) newsletters were distributed to municipalities and community centers within the project study area.

Post cards were used as a cost-effective way of announcing to the large number of property owners within the project study area and refined study area for new location alternatives about upcoming Citizens Informational Workshops.

The Citizens Informational Workshops on December 9 and December 10, 2003 were announced via a postcard and newspaper advertisements. Approximately 16,300 postcards were sent out to announce the December 2003 Citizens Informational Workshops. The mailing list was developed using GIS databases that included property owners in Gaston and Mecklenburg Counties located within the refined study area boundary for new location alternatives.

Approximately 17,300 postcards were sent out to announce the second series of Citizens Informational Workshops (January and February 2006). The mailing list was developed using GIS databases that included property owners in Gaston and Mecklenburg Counties located within the refined study area boundary for new location alternative, and those who had previously requested to be on the mailing list.

III.2.4.2 Project Website

- *There are no updates or additions to this section.*

A project website (www.ncdot.org/projects/gastonconnector) was created and launched in April 2005. It includes project information, documents, previous newsletters and postcards, project maps and an online comment form. The online comment form enables users to add their name to the project mailing list and/or provide comments and ask questions. The website was updated in January 2006 to announce/advertise the second series of Citizens Informational Workshops and was modified again in March 2006 with maps of the Detailed Study Alternatives. It will be updated in the future as necessary.

III.2.4.3 Toll-Free Telephone Line

- *There are no updates or additions to this section.*

A toll free telephone line (1-800-475-6402) for the project was established in July 2003. A summary of the telephone call, the identity of the caller, and response has been documented in a daily log as of March 2006.

PART IV – REFERENCES

REFERENCES

American Association of State Highway and Transportation Officials

2004 Policy on Geometric Design of Highways and Streets

Federal Highway Administration

1987 Guidance for Preparing and Processing Environmental and Section 4(f) Documents. FHWA Technical Advisory T66430.8.A. October 1987.

Gastonia, City of, and Gaston Urban Area Metropolitan Planning Organization

2005 Gastonia Rapid Transit Alternatives Study: Corridor and Modal Options. Prepared by PBQ&D, Neighboring Concepts, Inc. and Simon Resources, Inc. December 2005.

North Carolina Office of State Planning

1998 “State Demographics.”
Internet site <http://www.ospl.state.nc.us/demog/>. (August 28, 2001).

Transportation Research Board

2000 Highway Capacity Manual. National Research Council. Washington D.C. 2000.

REFERENCES ADDED IN THE ADDENDUM

Amtrak

2008 <http://www.amtrak.com>. (April 14, 2008).

Charlotte Area Transit System (CATS)

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Transit Programs

<http://www.charmeck.org/Departments/CATS/Commute+Options/Vanpool+List.htm>
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<http://www.charmeck.org/Departments/CATS/Transit+Programs/ETC+Program.htm>
(May 13, 2008)

Transit Planning

<http://www.charmeck.org/Departments/CATS/Rapid+Transit+Planning/West+Corridor>
(May 14, 2008)

Charlotte Department of Transportation

2007 Vehicle Occupancy Rate Survey for Approaches to City Center. 2006. Data provided via email from Joe McLelland of CDOT on May 16, 2008.

Gastonia, City of

2008

Gastonia Transit

Internet site: http://www.cityofgastonia.com/city_serv/general/transit/transit.cfm
(April 18, 2008)

NC Department of Transportation – Metrolina Regional Transportation Management Center

- 2007 Database of incidents on I-85 for 2007. Data provided via email from Heath Holland of the Metrolina Regional Transportation Management Center on May 14, 2008.

SUPPORTING PROJECT DOCUMENTATION

- 2002 Purpose and Need Statement – Gaston County East-West Corridor Study - TIP Project U-3321. August 5. Prepared by PBS&J for the NCDOT Project Development and Environmental Analysis Branch.
- 2002 Traffic Technical Memorandum – TIP Project U-3321. August 5. Prepared by PBS&J for the NCDOT Project Development and Environmental Analysis Branch. *This technical memorandum evaluates existing I-85, US 29-74, and US 321 under existing (2001) and future (2025) no-build conditions.*
- 2004 Phase II Traffic Analysis Technical Memorandum – Gaston County East-West Corridor Study – TIP Project U-3321. Prepared by PBS&J for the NCDOT Project Development and Environmental Analysis Branch. *This technical memorandum evaluates traffic operations on I-85 and US 29-74 under various Improve Existing Roadways Alternatives scenarios.*
- 2005 Draft Traffic Technical Memorandum – Gaston County East-West Connector Study. May. Prepared by PBS&J for the NCDOT Project Development and Environmental Analysis Branch. *This technical memorandum evaluates the traffic operations of the preliminary New Location Alternatives’ functional designs.*
- 2005 Draft Transportation Demand Modeling Technical Memorandum – Gaston County East-West Connector Study. February. Prepared by Martin/Alexiou/Bryson for the NCDOT Project Development and Environmental Analysis Branch. *This technical memorandum describes the input and output of the regional travel demand modeling tasks.*

SUPPORTING PROJECT DOCUMENTATION ADDED IN THIS ADDENDUM

- 2008 Traffic Operations Technical Memorandum for I-85, I-485, US 29-74, and US 321 Under Various Scenarios – Gaston County East-West Connector Study. May. Prepared by PBS&J for NCTA. *This technical memorandum evaluates the traffic operations on existing major roadways in the study area under the No-Build Alternative, an Improve Existing Roadways Alternative and the New Location Alternative (Non-Toll and Toll Scenarios).*
- 2008 Toll Traffic Operations Technical Memorandum – Gaston County East-West Connector Study. May. Prepared by PBS&J for NCTA. *This technical memorandum evaluates the traffic operations for the Detailed Study Alternative’ preliminary engineering designs based on 2030 Toll Scenario traffic forecasts.*
- 2008 Gaston East-West Connector (U-3321) Traffic Forecasts for Toll Alternatives. May. Prepared by Martin/Alexiou/Bryson for NCTA. *This technical memorandum provides*

forecasts based on the 2030 Metrolina travel demand model for the following scenarios:
2006 Base Year, 2006 Build Toll Scenario, 2030 No-Build Alternative, 2030 Build Non-Toll Alternative, 2030 Build Toll Alternatives, 2030 Improve Existing Roadways Alternative Scenario 4a (called No-Build With Improvement).

FIGURES

APPENDICES

Appendix A

- A-1 NEPA/404 Merger Team Concurrence Forms**
- A-2 Scoping Letter**
- A-3 Notice of Intent**

Appendix A-1

NEPA/404 Merger Team Concurrence Forms

Appendix A-2

Scoping Letter

Appendix A-3

Notice of Intent

Appendix B

Volume to Capacity Ratio Maps

Appendix C

Tables of 2025 Projected Traffic Volumes for I-85, US 29-74 and US 321

Appendix D

Design Criteria and Typical Cross-Sections

Appendix E

Preliminary Corridor Segment Evaluation Matrix

Appendix F

Draft Traffic Technical Memorandum for the Functional Design Corridors (Without Appendices)

Appendix G

Functional Design Corridor Segment Evaluation Matrix

Appendix H

Large-Scale Map of the Functional Designs in the Functional Design Corridors

ADDENDUM APPENDICES

ADDENDUM Appendix A

Letter from NCTA to NCDOT – May 21, 2007

ADDENDUM

Appendix B

Year 2030 Traffic Forecasts
Prepared by Martin/Alexiou/Bryson
May 2008

ADDENDUM Appendix C

**Travel Time Contour Maps from the 2030
Metrolina Model Under the No-Build
Alternative, Improve Existing Roadways
Alternative (Scenario 4+/4a), and New
Location Alternative (Toll Scenario)**

ADDENDUM

Appendix D

Information Regarding Elimination of Corridor Segment K1D from Detailed Study

1. Letter from Duke Energy to NCTA – August 7, 2007
2. Memorandum from NCDOT Geotechnical Engineering Unit to NCTA – June 1, 2007
3. Teleconference Record – NCDOT Structures Unit and PBS&J – June 6, 2007
4. Memorandum from NCDOT Geotechnical Unit to NCDOT Project Development and Environmental Analysis Branch – September 15, 2005
5. Meeting Minutes – Turnpike Environmental Agency Coordination Meeting – September 27, 2007

**PLEASE SEE
ENCLOSED CD
FOR THIS SECTION**