

***Charlotte and
Statesville to
Raleigh***

PHASE I REPORT



**MAY
2005**

**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING BRANCH**

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Carolina Department of Environment and Natural Resources and the North Carolina Department of Commerce, defines a new focus for NCDOT to improve, protect, and maximize the capacity of existing highway corridors deemed critical to statewide mobility and regional connectivity. The SHC concept represents an opportunity for NCDOT in partnership with corridor stakeholders to create a long-range corridor vision. This vision encompasses decision-making consistency, land use and transportation relationships, and roadway design and operational elements.

NCDOT has identified the US 64–NC 49 Corridor as a Strategic Highway Corridor. The US 64–NC 49 corridor is considered to possess the following characteristics consistent with Strategic Highway Corridors criteria:

- Potential to carry significant traffic, including substantial truck traffic.
- Connect existing major activity centers.
- Connect existing and planned Interstate facilities.
- Potential to serve as an Interstate reliever.
- Part of the National Highway System (NHS).

US 64–NC 49 Corridor Study Goals and Objectives

The US 64–NC 49 Corridor Study goal and objectives were derived from the broader purpose and goals of the NCDOT Strategic Highway Corridors concept. They were drafted through collaboration between the Study Team and the Corridor Development Team. The Corridor Development Team (CDT) is an advisory committee developed to oversee both technical and non-technical matters. The CDT was comprised of NCDOT staff-level individuals with a comprehensive knowledge of the regional study area, Metropolitan Planning Organization (MPO) and Rural Planning Organization (RPO) staff who work closely within the corridor study area, and local elected/appointed officials and staff who represent a specific municipality along the corridor.

Study Goal

“To develop a transportation system consistent with the Strategic Highway Corridors concept definition that will serve the mobility needs of people and freight to and through Central North Carolina while addressing the environmental and economic development opportunities of the public.”

Study Objectives

1. Enhance transportation connectivity and mobility.
2. Serve as a reliever to I-40 and I-85.
3. Improve safety.
4. Support regional and local transit plans.



5. Support economic development.
6. Support local land use plans.
7. Optimize costs and benefits to system users and funding agencies.
8. Be sensitive to environmental and social factors.

The intent of the US 64–NC 49 Corridor Study is to develop a facility “master plan” improvement strategy for the enhancement and long-term preservation of passenger and freight mobility. Phase 1 of the study defines the corridor “vision” (Chapter 8, Phase 1 Report) with a broad implementation concept to achieve the vision. Definition of the corridor vision was conducted in five major steps as outlined below and described in the sections that follow:

- Definition of Need
- Definition of Alternatives
- Development of Evaluation Criteria
- Evaluation of Alternatives
- Recommended Corridor Vision

In addition to the corridor vision, Phase 1 of the study also produced the following products, which will support future project phases and continued stakeholder involvement:

- A Problem Statement that describes the need for improvements to the US 64–NC 49 Corridor as they relate to the corridor’s function as a Strategic Highway Corridor. (Chapter 4, Phase 1 Report)
- A description of land use policy guidelines that address land use/mobility issues and may be used to balance land use and transportation objectives in support of the corridor vision. (Chapter 9, Phase 1 Report)
- A description of corridor preservation methods that may be helpful in controlling project costs. (Chapter 10, Phase 1 Report)

Definition of Need

The factors and conditions that substantiate the need for a corridor improvement vision are based on an extensive evaluation and assessment of existing and anticipated conditions (Chapter 3, Phase 1 Report) within the immediate US 64–NC 49 Corridor and within the 19-county study area. The existing conditions evaluation included an assessment of demographics, land use, environmental features, and the multimodal transportation system. The factors and conditions have been organized based on the purposes of the Strategic Highway Corridors concept as well as the Strategic Highway Corridors selection criteria as developed by NCDOT and adopted by the North Carolina Board of Transportation.



Criterion - Mobility

Long-distance east-west mobility across the central portion of North Carolina is compromised by the limited number of available high-speed facilities. I-40 and I-85 are the only full control of access facilities traversing east-west across the central portion of the state, which is the most heavily populated and urbanized area of North Carolina. These Interstates carry large numbers of commercial vehicles, short-distance local travelers, and long-distance travelers. Extended periods of congestion are prevalent in the urbanized areas through which I-40 and I-85 pass. The US 64–NC 49 Corridor is the most direct alternative corridor to I-40 and I-85. Origin and destination surveys show that some travelers making long-distance interstate and intercounty trips in and through the central portion of North Carolina appear to be consciously diverting to US 64 and NC 49 as an alternative to using I-40 and I-85. Freight carriers and travelers could benefit from more efficient route options between Raleigh and Charlotte and Raleigh and Statesville.

Criterion - Connectivity

Existing activity centers served either directly or indirectly (via US 421) by the US 64–NC 49 Corridor include Charlotte, Concord, Kannapolis, Greensboro, High Point, Winston-Salem, Burlington, Durham, Chapel Hill, Cary, and Raleigh. The Corridor also serves the major airports in Charlotte, the Triad, and the Triangle areas.. US 64 and NC 49 provide east-west connectivity between north-south Interstate routes in the regional study area. Improvements to the US 64 and NC 49 Corridor would improve connectivity between the major activity centers along and in the vicinity of these routes and to the north-south oriented Interstate routes in the region.

Criterion – Interstate Reliever

Although I-40 and I-85 provide access to numerous cities and activity centers in the region, Interstate mobility from the Raleigh area west to Charlotte and Statesville is hindered by congestion through the urban centers. Presently, I-85 in Mecklenburg County experiences heavy congestion throughout much of the day, with LOS E or F conditions observed during peak travel periods. Heavy congestion levels also were identified along the portion of I-40 between Winston-Salem and Greensboro and along the I-40/I-85 overlap section to the east. Similar high congestion levels are prevalent in the Raleigh/Durham area on I-40.

Travel demand forecasts for the year 2030 anticipate substantial increases in both locally generated and through travel demands on I-40 and I-85. It is unlikely that significant improvements to these facilities will occur beyond those identified in the 2004-2010 NCDOT Transportation Improvement Program (TIP). Over the long term, improvements to alternative travel corridors such as US 64 and NC 49 will be needed to ensure the continuation of adequate regional and statewide mobility. Origin-destination surveys indicate that US 64 and NC 49 are already being used by some travelers for long distance trips, and that drivers appear to be consciously diverting to US 64 and NC 49 as an alternative to using the more heavily traveled I-40 and I-85.



Purpose – Foster Economic Prosperity

Many communities within the US 64–NC 49 Corridor believe that transportation alternatives are vital to their prospective economic initiatives and development needs and serve as the means to becoming more self-supporting with a mixture of residential and commercial/service growth available to encourage a viable tax base. The Yadkin-Pee Dee Lakes Project, also known as the "North Carolina Central Park Project," is a formal effort to develop the region as a major tourism/recreational and cultural/historic destination. With this area lying at the junction of US 64 and NC 49, any improvements to these facilities would serve to further enhance and strengthen the development of the region.

Purpose – Protect the State’s Transportation Investment

There are finite funds available for transportation system improvements throughout North Carolina. Prioritizing needs and having a clear vision of the ultimate function of the US 64–NC 49 Corridor will help direct funds for projects beyond the timeframe of the state’s TIP more efficiently and could help preserve the functioning of the corridor as a major travel facility for the longer term.

Purpose Promote Environmental Stewardship

The NCDOT Environmental Stewardship Policy (February 7, 2002) states NCDOT is “committed to planning, designing, constructing, maintaining and managing an interconnected transportation system while striving to preserve and enhance our natural and cultural resources.” Early planning and an overall vision for the entire corridor, along with the early involvement of local communities and state and federal resource agencies, can provide opportunities for long-term collaboration on preserving and enhancing natural resources in the corridor area and for consideration of how the corridor’s overall vision and the development of individual projects can help preserve the cultural and social values of communities along the corridor.

Definition of Alternatives

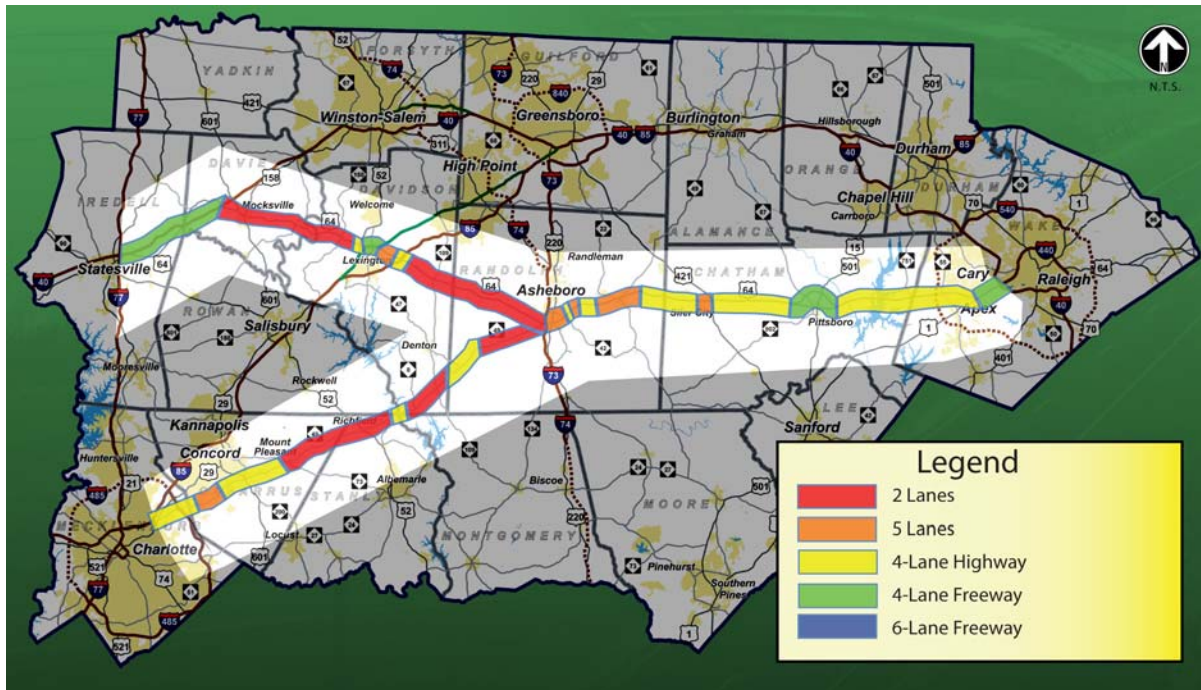
A No-build (Baseline) alternative and four Build Alternatives were defined and evaluated during the course of this study. These alternatives address the project’s goal and objectives and encompassed a range of investment options. Each of the alternatives was defined in terms of its primary physical and operational characteristics. Summary descriptions of the alternatives are provided below.

No-build (Baseline) Alternative

Typically, a No-build Alternative is defined as an alternative that incorporates “planned” improvements that are included in the fiscally constrained long-range plan, and/or “committed” improvements such as those in the state DOT’s transportation improvement program (TIP) or local agency’s capital improvement program (CIP). However, the US 64–NC 49 Corridor Study is evaluating the compilation of all of the currently “planned” and “committed” improvements to US 64 and NC 49 as an investment alternative. Therefore, for

the purposes of this study, the No-build Alternative is defined as only the “existing” facility for US 64 and NC 49, which consists of the present physical and operational condition of the facility, plus those improvements that were under construction at the time of the analysis. The remaining transportation network within the study area includes committed and planned improvements as defined previously. **Figure ES.2** shows the existing number of lanes and general facility type on US 64 and NC 49.

Figure ES.2: Existing Number of Lanes on US 64 and NC 49



Existing Plus Committed (E+C) Alternative

This alternative includes those improvements for US 64 and NC 49 contained in the financially constrained long-range transportation plans of the study area Metropolitan Planning Organizations, the NCDOT TIP, and local government capital improvement programs. Descriptions of these projects are provided in **Table ES.1**.

Figure ES.3 shows the number of lanes and general facility types that would result across the study corridor following implementation of all defined elements of the E+C Alternative. Characteristics of the E+C Alternative are provided in **Table ES.2**.



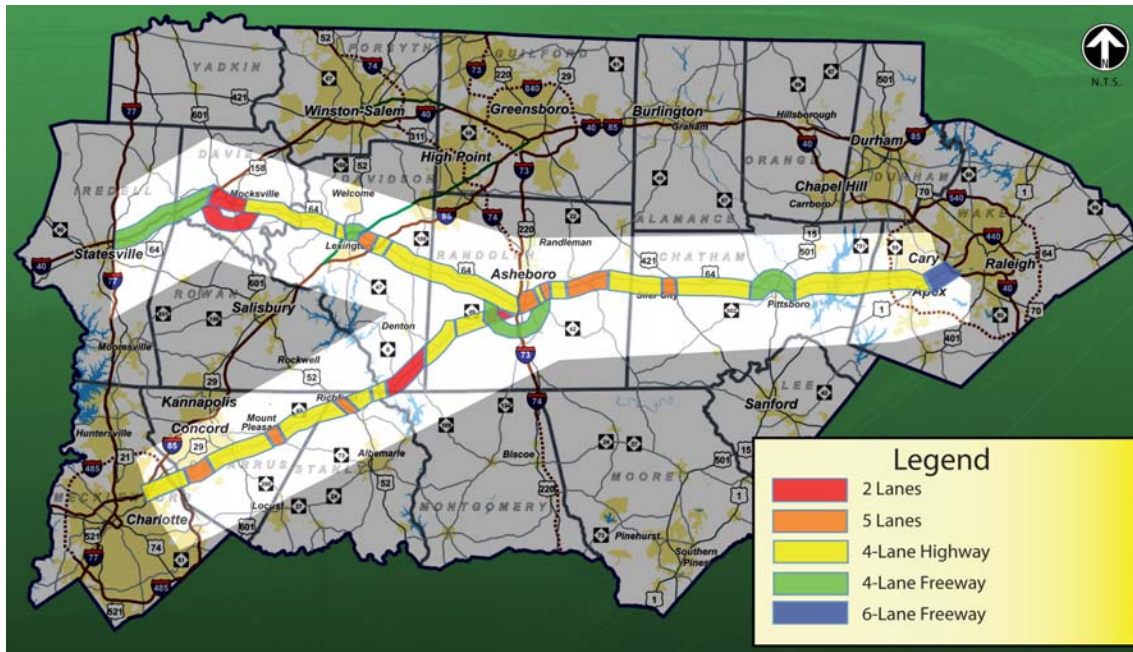
Table ES.1: US 64 and NC 49 NCDOT TIP (2004-2010) Projects

ROUTE	TIP #	LIMITS	LENGTH	IMPROVEMENT
NC 49	R-2533	Harrisburg to Yadkin River	29.3 mi.	Widen to multi-lanes.
NC 49	R-2535	SR 1174 West of Farmer to Asheboro Bypass (R-2536) West of SR 1193	9.7 mi.	Widen to four-lane, divided facility.
US 64	R-2220	East of I-85 Bus. in Lexington to US 220 in Asheboro	28.5 mi.	Widen to four-lanes
US 64	R-3111	US 64 East of Mocksville to US 601 West of Mocksville.	6.1 mi.	Two-lane Bypass on four-lane R/W.
US 64	R-3602	US 601 South of Mocksville to US 52 in Lexington.	14.0 mi.	Widen to multi-lanes and upgrade interchange at US 52.
US 64	R-2536	US 64 West to US 64 East.	13.5 mi.	Four-lane freeway on new location with interchanges at US 220, NC 49, and zoo access at NC 159.
US 64/ US 1	U-3101	US 64 to South of SR 1313 (Walnut Street).	2.6 mi.	Rehabilitate pavement, additional travel lanes, and modify SR 1313 interchange.

Table ES.2: E+C Alternative Characteristics

Operating Speed	Less than 55 mph
Right-of-way	Varies
Type of Access	<ul style="list-style-type: none"> • Interchanges. • Signalized intersections. • Unsignalized intersections. • Driveway access.

Figure ES.3: E+C Alternative – Number of Lanes



E+C Enhanced Alternative

An enhancement of the E+C Alternative would provide for a continuous four-lane, divided facility from Charlotte to Asheboro and from Statesville to Asheboro and on to Raleigh. Major improvement elements of the E+C Enhanced Alternative include the following:

- Implement all TIP projects.
- Upgrading all remaining two-lane segments to four-lane, divided roadways. (Mocksville Bypass (A) and two-lane segment of NC 49 (B) in Davidson County)
- New location of four-lane, divided segments with full control of access around urban areas now planned to have or presenting having five-lane sections. (Harrisburg (C), Mount Pleasant (D), Richfield (E), Ramseur (F), Siler City (G), and Lexington (H) between I-85 Business and I-85)
- Enhancement of the four-lane, divided section of US 64 through Lexington (I) to improve safety and operations.
- Freeway-to-freeway interchanges (free-flowing) at other freeways (J).
- Consolidation of driveways along all existing and committed four-lane, divided segments.
- Conversion of signalized intersections with major crossroads to grade-separated interchanges where appropriate along all existing and committed four-lane, divided segments.

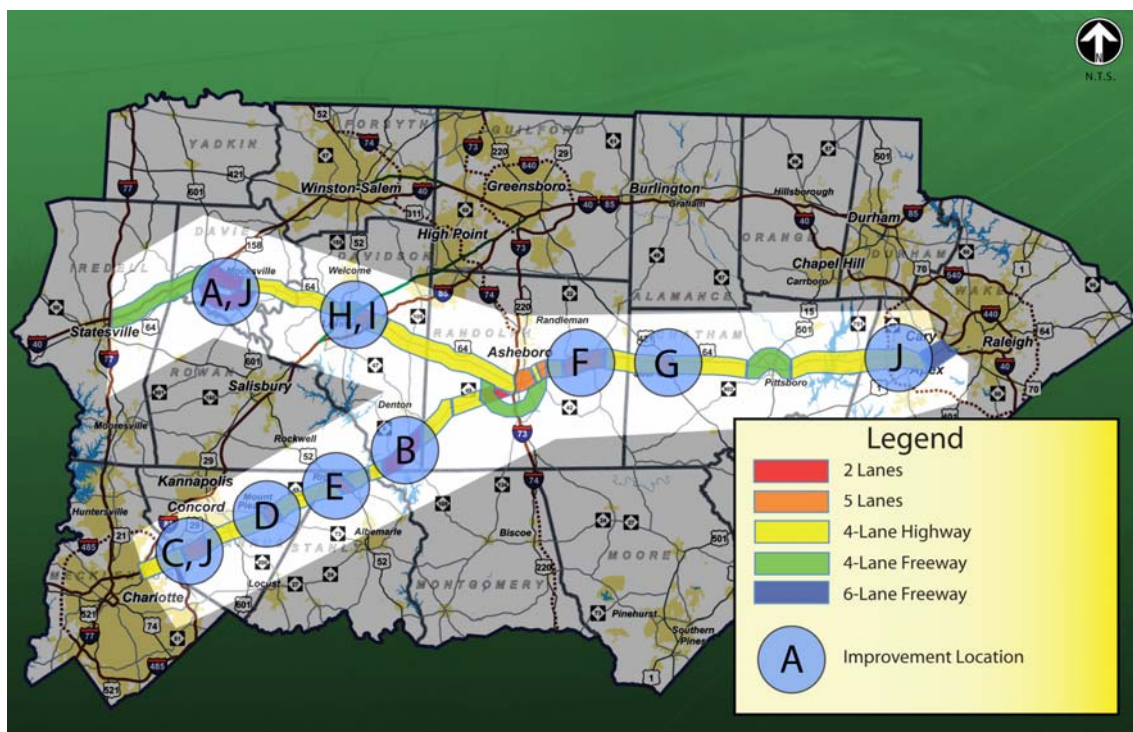
Figure ES.4 identifies where the suggested improvements to the E+C Alternative would be made to create the E+C Enhanced Alternative. The general characteristics of the E+C Enhanced Alternative are described in **Table ES.3**. The E+C Enhanced Alternative improves

the US 64–NC 49 corridor to a combination of a Freeway, Expressway Type-I and Expressway Type-II, as indicated in the NCDOT Facility Type & Control of Access Definitions in **Appendix E**.

Table ES.3: E+C Enhanced Alternative Characteristics

Operating Speed	55 mph +
Right-of-way	250 feet +
Type of Access	<ul style="list-style-type: none"> • Interchanges. • No new signalized intersections with removal or bypassing of existing signalized intersections. • Consolidated driveway access.

Figure ES.4: E+C Enhanced Alternative Improvement Locations



Expressway Alternative

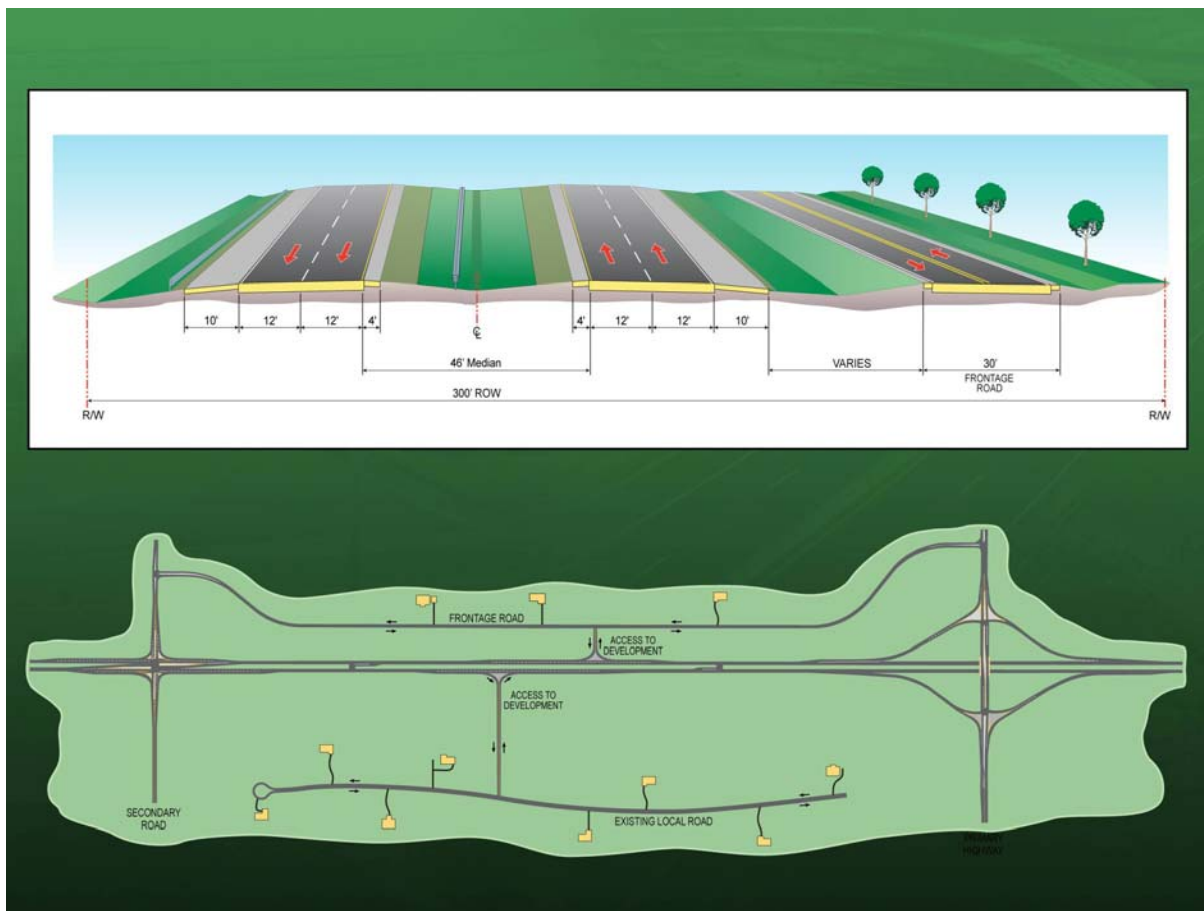
This alternative, consistent with the NCDOT Expressway-Type I facility type definition, would provide a high level of mobility with low to moderate direct access to adjacent land parcels over the entire length of the US 64 and NC 49 corridor. The typical section is a four-lane, divided highway with a frontage or access road along one or both sides, with access to the facility provided via interchanges, unsignalized intersections, or consolidated driveways.

A typical roadway cross section and access plan are shown in **Figure ES.5**. The general characteristics of this alternative are outlined in **Table ES.4**.

Table ES.4 Expressway Alternative Characteristics

Operating Speed	55 mph +
Right-of-way	300 feet
Type of Access	<ul style="list-style-type: none"> • Interchanges. • Unsignalized intersections • Consolidated driveway access.

Figure ES.5: Expressway Alternative Typical Section and Access Plan



Freeway Alternative

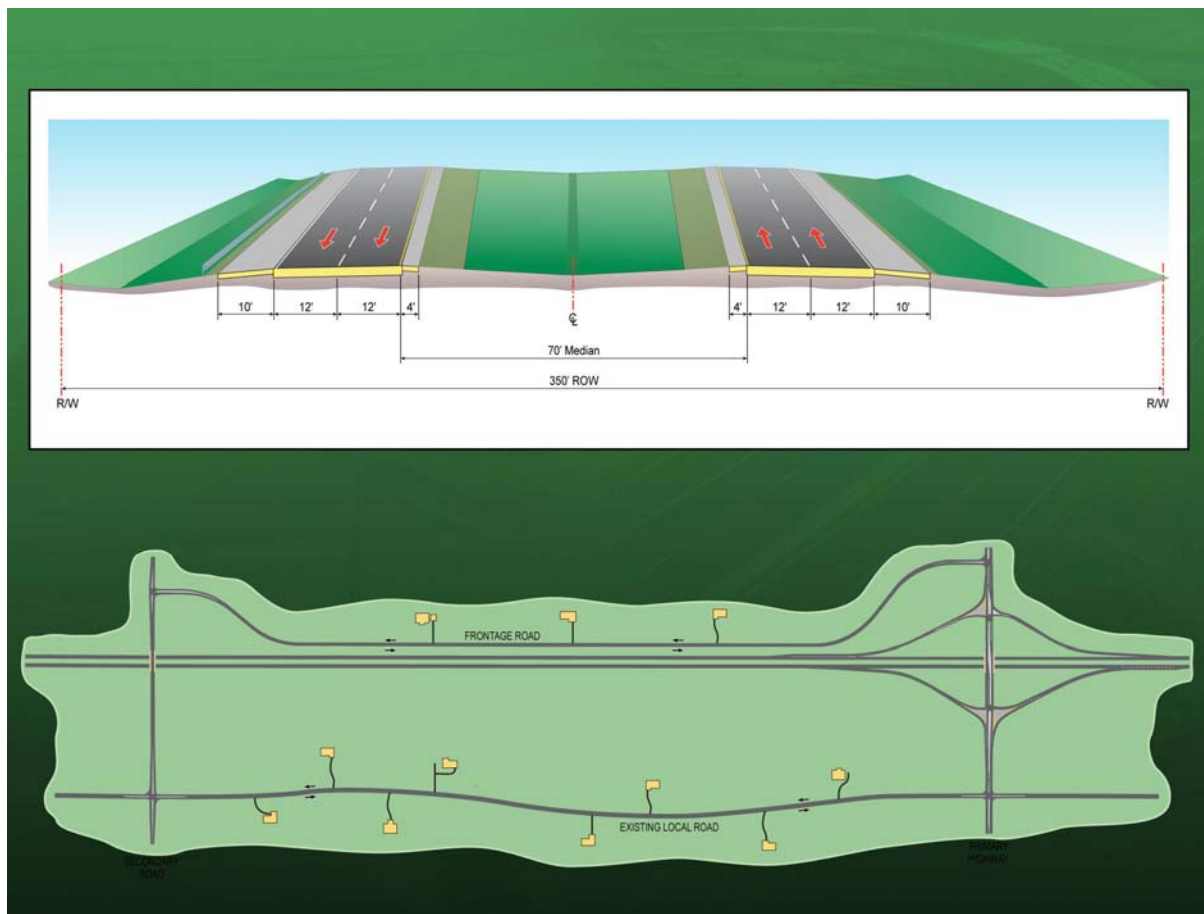
This alternative would provide a high degree of mobility and full control of access over the entire length of US 64 and NC 49, similar to that provided by I-40 and I-85. Access would only be allowed via grade separated interchanges. The typical roadway cross section and

access plan are shown in **Figure ES.6**. The general facility characteristics for this alternative are outlined in **Table ES.5**.

Table ES.5: Freeway Alternative Characteristics

Operating Speed	65 mph +
Right of Way	400 feet
Type of Access	Interchanges only

Figure ES.6: Freeway Alternative Typical Section and Access Plan



Development of Evaluation Criteria

The degree to which the corridor alternatives achieved the project objectives were determined through the application of evaluation criteria that reflected the objectives. Evaluation criteria were developed in coordination with the Corridor Development Team. The evaluation criteria are defined by measures of effectiveness (MOE), which are the actual data against



which the relative performance of each alternative is evaluated. The resulting criteria, and their associated measures of effectiveness, are presented in **Figure ES.7**.

Figure ES.7: Evaluation Criteria and Measures of Effectiveness

TIER 1 ALTERNATIVES EVALUATION MATRIX	
Study Objective Category	Measure of Effectiveness
Evaluation Criteria	Measure of Effectiveness
MOBILITY BENEFITS	
Travel Time	Percent reduction in travel time from Charlotte and Statesville to Raleigh vs. baseline condition.
Travel Diversion I-85 and I-40	Percent Interstate traffic reduction from baseline condition.
Safety	Reduction in accidents using National (and/or Statewide) average accident rates by facility type vs. baseline condition.
Accommodation of Transit Plans	Alternative's potential to facilitate implementation of transit initiatives.
GROWTH MANAGEMENT BENEFITS	
Development Pattern Impacts	Potential to direct growth consistent with locally desired development patterns and policies.
ECONOMIC BENEFITS	
Accessibility	Percent change in number of jobs or households within specified travel times to specific destinations vs. baseline condition.
Development Opportunity	Potential for improved access to future development that includes major employers.
ENVIRONMENTAL ISSUES	
Sensitivity to environmental factors	Potential for adverse impact based on facility footprint and location.
Sensitivity to social factors	Potential for adverse impact based on facility footprint and location.
COST EFFECTIVENESS BENEFITS	
Transportation User Benefits	Travel time, operating, and safety cost savings relative to the baseline condition.
Capital Cost	Estimate of probable cost.
User Benefits / Capital Costs	Calculated ratio.

Evaluation of Alternatives

As shown in **Figure ES.8**, the performance of each of the four corridor improvement alternatives was rated as “Good”, “Better”, or “Best” with regard to its degree of satisfaction of each of the defined evaluation criteria. The Build alternatives were compared against the No-build (Baseline) condition. The results of the alternatives evaluation is shown in **Figure ES.9**.

Figure ES.8: Alternatives’ Rating Scale



A summary of the conclusions drawn from the evaluation of alternatives in **Figure ES.9** are presented below. These conclusions were utilized in framing the recommendations for the corridor vision:

- The E+C Alternative provides sufficient user benefits compared to the investment level and effectively serves a short-term need for safety improvement and capacity enhancement.
- The E+C Enhanced Alternative provides user benefits similar to the Expressway Alternative, but at a substantially reduced cost.
- The Expressway Alternative substantially improves corridor mobility and diverts a good percentage of traffic from the I-40/I-85 Corridor; however, the capital cost is nearly as much as the Freeway Alternative with less overall user benefit.
- The Freeway Alternative provides the greatest mobility improvement and traffic diversion from the I-40/I-85 Corridor, but at the highest capital cost.



Figure ES.9: Alternatives' Evaluation Matrix

Study Objective Category		Measure of Effectiveness	Alternative		
			E+C	E+C Enhanced	Expressway
MOBILITY BENEFITS					
Travel Time	Percent reduction in travel time from Charlotte and Statesville to Raleigh vs. baseline condition.	○	◐	◑	●
Travel Diversion I-85 and I-40	Percent interstate traffic reduction from baseline condition.	○	◐	◑	●
Safety	Reduction in accidents using National (and/or Statewide) average accident rates by facility type vs. baseline condition.	○	◐	◑	●
Accommodation of Transit Plans	Alternative's potential to facilitate implementation of transit initiatives.	○	○	○	○
GROWTH MANAGEMENT BENEFITS					
Development Pattern Impacts	Potential to direct growth consistent with locally desired development patterns and policies.	●	◐	◑	○
ECONOMIC BENEFITS					
Accessibility	Percent change in number of jobs or households within specified travel times to specific destinations vs. baseline condition.	○	○	○	○
Development Opportunity	Potential for improved access to future development that includes major employers.	○	●	○	◐
ENVIRONMENTAL ISSUES					
Sensitivity to environmental factors	Potential for adverse impact based on facility footprint and location.	●	◐	○	○
Sensitivity to social factors	Potential for adverse impact based on facility footprint and location.	●	◐	○	○
COST EFFECTIVENESS BENEFITS					
Transportation User Benefits	Travel time, operating, and safety cost savings relative to the baseline condition.	○	◐	◑	●
Capital Cost	Estimate of probable cost.	●	◐	○	○
User Benefits / Capital Costs	Calculated ratio.	●	◐	○	◐



Corridor Vision

The establishment of a consensus-based vision for the US 64–NC 49 Corridor is an important planning step to provide long-term direction for all roadway improvements to US 64 and NC 49 within the defined study area. The vision defines the major characteristics of a substantial financial investment and provides the means to build stakeholder commitment to major facility modifications and enhancements. The vision also provides an implementation strategy through the identification of a logical sequence of facility improvements, outlining the “evolution” of the corridor from the current physical and operational characteristics to the ultimate facility type. The vision is not defined by a year of achievement, but serves as the “beacon on the horizon” to guide and direct the desired physical and operational characteristics of the US 64–NC 49 Corridor.

It is clear from the alternatives’ evaluation that the Freeway Alternative best satisfies the purposes and criteria of a Strategic Highway Corridor. Unfortunately, it is also clear that the near term implementation of the Freeway Alternative is not financially feasible. Therefore, it is the Study Team’s and Corridor Development Team’s recommendation that the Freeway Alternative serve as the ultimate “Corridor Vision” with achievement of the vision occurring through the staged implementation of necessary improvements.

While it is not within the scope of this study to develop specific design guidelines, it is the recommendation of the Study Team that the roadway improvements encompassing the vision be developed in context with the surroundings to take advantage of the corridor’s contours and natural beauty. Design elements such as a wide vegetated median, decorative retaining walls and structures, and attractive signing can all be used effectively to blend the facility into its surroundings. Examples of such design elements from the Baltimore-Washington Parkway are shown in **Figure ES.10**.

Implementation steps to achieve the vision are described below.

Step 1

The first step toward the vision is the implementation of the improvements contained in the NCDOT TIP (FY 2004-2010). Although several of these projects, such as the US 64 Asheboro Southern Bypass and the US 1/US 64 improvements through Cary are consistent with the Freeway Alternative definition, the majority of the other projects are multi-lane widenings of existing two-lane highways with no control of access. The TIP projects are in various stages of project development. These projects should be reviewed for opportunities to provide consolidated driveways and allow for the conversion of signalized intersections to interchanges without disruption to established project delivery dates. Such project enhancements have the potential to not only improve safety and traffic operations in the near term, but to advance the facility closer to the ultimate vision of a freeway across the corridor. In addition to proceeding with current NCDOT TIP projects, an access management plan

Figure ES.10: Baltimore-Washington Parkway

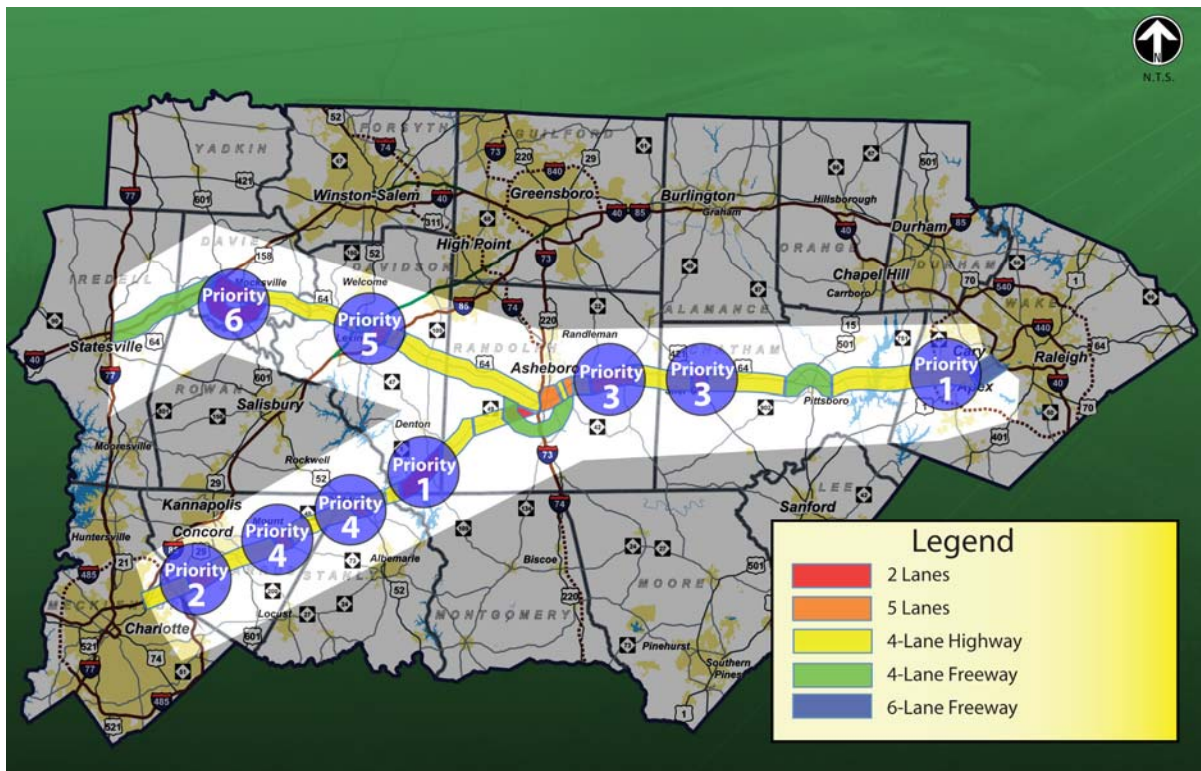


should be developed and implemented to protect the existing four-lane sections of US 64 and NC 49 between the urban areas from the creation of new driveways and signalized intersections. Where possible, the number of existing driveways should be consolidated into a reduced number of access points.

Step 2

The second step in achieving the ultimate corridor vision would be to implement those improvements identified as elements of the E+C Enhanced Alternative. All of these projects would be consistent with the ultimate Freeway Alternative. **Figure ES.11** identifies these improvement projects along with a suggested implementation priority ranking. Project 1 (near Raleigh) and Project 2 (near Charlotte) should be implemented as soon as possible as they are the most critical in making the US 64–NC 49 route between Charlotte and Raleigh an attractive alternative to I-40 and I-85. Implementation of these projects would improve the corridor to a combination of a Freeway, Expressway-Type I, and Expressway-Type II. Through careful monitoring of traffic volume, traffic operations, and accidents, the sequence of the remaining projects 3 through 6 may be adjusted as appropriate.

Figure ES.11: E+C Enhanced Improvements with Priority Ranking



Step 3

The final step in achieving the vision entails connecting all of the “freeway” portions of the corridor. Such improvements may consist of an upgrade of the facility on existing alignment, or may require the construction of a new location facility. As defined by the Study Team, there are three major segments of the study corridor. Given what is presently known with regard to safety, traffic volume, traffic operations, and land development patterns, the Study Team envisions the following priority for segment improvement:

- Asheville to Raleigh
- Charlotte to Asheville
- Statesville to Asheville

Conclusion

NCDOT has recognized the limitations of continuing to widen the Interstates and constructing new roads to facilitate regional mobility and freight carrying capacity that often result in a great expense to the environment and urban structure. With the update to the state’s Long-Range Statewide Multimodal Transportation Plan, NCDOT has a new emphasis on targeted mobility improvements. The Strategic Highways Corridors concept promotes the need to improve, protect, and maximize the capacity of existing highways deemed critical to



statewide mobility and regional connectivity. It represents an opportunity for NCDOT in coordination with stakeholders to consider long-term visions, decision-making consistency, land use partnerships, and overarching design/operational changes.

It is within this context that NCDOT initiated a corridor study of the US 64–NC 49 Corridor in September 2003 with Phase 1 conducting a regional assessment of transportation needs and evaluating broad alternative roadway investment strategies to meet those needs. The principal products include the following:

- Problem Statement
- Consensus-Based Vision
- Land Use Policy Guidelines
- Corridor Preservation Methods

These four products provide a solid foundation upon which future project development phases can build. Continuing beyond Phase I, NCDOT will use these products to:

- Support the need for improvements to US 64 and NC 49 as they relate to the corridor's function as a Strategic Highway Corridor.
- Promote continued stakeholder involvement.
- Ensure that improvements are consistent with the overarching corridor vision in terms of design characteristics, operations, and esthetics.
- Work with local agencies to develop land use plans that are consistent with and support the corridor vision.
- Develop a corridor preservation plan specific to US 64 and NC 49.
- Serve as a preface and supporting documentation for improvement projects that enter the environmental document phase.