

NC Strategic Transportation Corridors: Vision Plan

Performance Measures Technical Memorandum

NCDOT

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Corridor D: U.S. 321



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1. Introduction

In 2015, the North Carolina Department of Transportation (NCDOT) identified a network of key multi-modal transportation corridors called Strategic Transportation Corridors (STC) to support smart planning, help set long-term investment decisions, and ensure that North Carolina’s economic prosperity goals are achieved. The STCs are intended to promote transportation system connectivity, provide high levels of mobility, and improve access to important state and regional activity centers. A key element in the advancement of the STCs is the development of corridor master plans, to identify a high-level corridor mobility vision and associated corridor improvement action strategies.

The purpose of the master plan is to:

- Identify a mobility vision and broad improvement strategies for an entire corridor,
- Guide improvements and development in a manner that defines a long-term vision and performance level for the corridor, and
- Help protect the corridor’s key functions as defined in the corridor profiles.

NCDOT has initiated the development of a master plan vision for STC U.S. 321. Corridor D – U.S. 321 runs from the South Carolina state line to the Tennessee state line passing through Gastonia, Hickory, and Boone.

At the outset of STC, NCDOT established overarching goals and objectives for the program, as identified in **Table 1**.

Table 1. STC Goals and Objectives

Goals	Objectives
System Connectivity: Provide essential connections to national transportation networks critical to interstate commerce and national defense.	Provide a continuous, consistent network of reliable, higher speed interstate, defense, and major freight routes. For system connectivity, corridors should provide functional classification and facility type consistent with those attributes; corridors should have high capacity consistent with speed and reliability objectives.
Mobility: Facilitate high volume inter-regional movements of people and goods across the state.	Serve major inter-regional travel corridors with high levels of service, moving higher volumes of passenger or freight traffic, and provide multiple transportation modes or routes for the opportunity of choice and flexibility in travel or shipping in the corridor.
Economic Prosperity: Support efficiency of transport logistics and economic development throughout the state for economic regions and clusters of existing and emerging activity centers.	Provide high-quality access to defined intrastate activity center clusters and to nearby critical activity centers in surrounding states and ensure access to at least one strategic corridor for each multi-county region of Tier 1 Economic Development counties.

Accurate data will serve as the foundation for master plan vision development. The information available to define the corridors and their needs depends on the availability of complete, current, and reliable data. To assist in developing a master plan vision for U.S. 321, performance measures were collected from local, state, and federal planning documents along the U.S. 321 corridor and are catalogued in this memorandum.

2. Corridor U.S. 321

This memo focuses on U.S. 321/CSX (Corridor D), which runs from the South Carolina state line to the Tennessee state line. The corridor is 94 miles long, and U.S. 321’s primary role is to provide access to Boone, Lenoir, Hickory,

and Gastonia from the northwest (Tennessee) and south (South Carolina). U.S. 321 and the CSX rail line traverse Gaston, Lincoln, Catawba, Caldwell, and Watauga counties; Highway Divisions 11, 12, and 13; and the High Country Rural Planning Organization (RPO), Isothermal RPO, Greater Hickory Metropolitan Planning Organization (MPO), and Gaston Cleveland Lincoln MPO.

The character of Corridor U.S. 321 changes significantly from South Carolina to Tennessee. The corridor varies from no control of access to full control of access along its length and provides a variety of travel experiences. In general, U.S. 321 has limited to no control of access through the urban areas of the corridor (including Gastonia, Hickory, Lenoir, and Boone). U.S. 321 generally serves the smaller towns (including Lincolnton, Granite Falls, Pinewood, Hudson, Sawmills, Joycetown, and Whitnell), with a business route. One notable exception to this is in Blowing Rock, where environmental constraints require the route to pass relatively close to the town's downtown area. In general, it is possible to travel at relatively high speed between Gastonia and Boone, with varying levels of access along the route.

Corridor U.S. 321 serves three of the state's top tourism counties (Gaston, Catawba, and Watauga) and is identified as an important activity center connection. The southern half of Corridor U.S. 321 from Gastonia to Hickory is also identified as a high truck volume area (urban/suburban > 2,500 per day; rural > 1,500 per day) with portions identified as high total traffic volume (urban/suburban > 30K per day; rural > 15K per day).

2.1. Corridor Segments

From a high-level perspective, the corridor can be broken into five major segments as shown in **Table 2**. Segments 1 and 5 primarily serve local traffic, while segments 2 through 4 are regional connectors. The segments shown in this table were identified during the corridor inspection and will be further refined through the STC planning process. Segment definitions and specifications were drawn from the NCDOT Facility Types & Control Access Definitions (2005), shown in **Appendix A: Highway Access Control**.

Table 2. Corridor U.S. 321 Segments

Segment No.	Segment	Control of Access	Sidewalks/Trails
1	South Carolina to Gastonia	No Control	Yes, irregularly connected through Gastonia
2	Gastonia to Hickory	Full Control	No
3	Hickory to Lenoir	Limited Control	Yes, irregularly connected through Hickory
4	Lenoir to Boone	Partial Control	Yes, irregularly connected in Lenoir and Blowing Rock; small sidewalk north of Blowing Rock through Mystery Hill
5	Boone to Tennessee	Limited to Partial Control	No

3. Performance Measures

Consistent with the vision set for the STC network, it is in the public interest that the primary facilities on the STC network provide long-term, high-quality levels of service in terms of safety, travel speed, and reliability. To understand whether the STC goals and objectives are being met, it is necessary to define expectations and measure performance. NCDOT is strongly aligned with recent rulemaking by the Federal Highway Administration (FHWA) to adopt performance measures to assess system performance. National performance measures are included in **Table 3**.

Table 3. National Performance Measures

National Goal Area	Goal	Performance Measure	NCDOT Targets
Safety ¹	To achieve a significant reduction in traffic fatalities and serious injuries on all public roads	Number of Fatalities	1,207.3 (2018)
		Rate of Fatalities	1.114 (2018)
		Number of Serious Injuries	2,161.2 (2018)
		Rate of Serious Injuries	1.988 (2018)
	Cut the fatalities and serious injuries in North Carolina in half based on the 2013 figures, reducing the total annual fatalities by 630 fatalities and the total injuries by 1,055 serious injuries before 2030	Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries	In development
Infrastructure Condition	To maintain the highway infrastructure asset system in a state of good repair	Percentage of Pavements in Good Condition (Interstate)	>=37.0% (4 year)
		Percentage of Pavements in Poor Condition (Interstate)	<=2.2% (4 year)
		Percentage of Pavements in Good Condition (Non-Interstate National Highway System [NHS])	>=27.0% (2 year)
		Percentage of Pavements in Poor Condition (Non-Interstate NHS)	<=4.7% (4 year)
		Percentage of Bridges in Good Condition (NHS)	<=33.0% (2 year)
		Percentage of Bridges in Poor Condition (NHS)	<=9.0% (4 year)
System Reliability	To improve the efficiency of the surface transportation system	Percent of Reliable Person-Miles Traveled (Interstate)	>=80% (2 year) >=75.0% (4 year)
		Percent of Reliable Person-Miles Traveled (Non-Interstate NHS)	>=70.0% (4 year)
Environmental Sustainability	To enhance the performance of the transportation system while protecting and enhancing the natural environment	Total Emissions Reduction (Charlotte Urbanized Area)	2-year target: VOC: 0.252 kg/day NOx: 2.360 kg/day 4-year target: VOC: 0.504 kg/day NOx: 4.720 kg/da

National Goal Area	Goal	Performance Measure	NCDOT Targets
Congestion Reduction	To achieve a significant reduction in congestion on the NHS	Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita on the NHS	<=34.0% (4 year)
		Percent of Non-Single Occupancy Vehicle (SOV) Travel	<=21.0% (4-year target)
Freight Movement & Economic Vitality	To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development	Interstate Truck Travel Time Reliability	1.65 (2 year) 1.70 (4 year)

¹ The NCDOT Targets for the Safety National Goal Area are five-year averages from 2014-2018.

At this time, performance measures for the Strategic Transportation Corridors will be based on the national performance measures above.

Appendices



Appendix A. Highway Access Control

Roadways are categorized into different levels of control of access describing the amount of connectivity provided to adjacent land uses and other roadways. These levels are listed below in **Table A-1** in order of mobility function.

Table A-1. Control of Access Definitions

Classification	Description
Full Control	Connectivity provided only via ramps at interchanges. All cross-streets are grade separated and no driveway connections are allowed. A control of access fence is placed along the entire length of the facility and at a minimum of 1000 feet beyond the ramp intersections on the minor facility at interchanges if possible.
Limited Control	Connectivity provided only via ramps at interchanges for major crossings and at-grade intersections for minor crossings and service roads. No driveway connections allowed. A control of access fence is placed along the entire length of the facility, except at intersections, and at a minimum of 1000 feet beyond the ramp intersections on the minor facility at interchanges if possible.
Partial Control	Connectivity provided via ramps at interchanges, at-grade intersections, and driveways. Private driveway connections are generally at a maximum of one per parcel. The use of shared or consolidated connections is highly encouraged, and connections may be restricted or prohibited if alternate access is available through adjacent public facilities. A control of access fence is placed along the entire length of the facility, except at intersections and driveways, and at a minimum of 1000 feet beyond the ramp terminals on the minor facility at interchanges if possible.
No Control	Connectivity provided via ramps at interchanges, at-grade intersections, and driveways. No physical restrictions (i.e., a control of access fence) exist. Private driveway connections are generally at a maximum of one per parcel. Additional connections may be considered if they are justified and if such connections do not negatively impact traffic operations and public safety.

Information taken from NCDOT Facility Type & Control of Access Definitions
<https://connect.ncdot.gov/projects/planning/TPB%20Documents/NCDOT%20Facility%20Types%20-%20Control%20of%20Access%20Definitions.pdf>

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