



I. PROJECT DESCRIPTION

The North Carolina Department of Transportation (NCDOT) seeks Multimodal Project Discretionary Grant (MPDG) INFRA or Mega funds to maintain the project schedule for the shovel ready 321 CONNECT (Calibrating Our National Network to Encourage Commerce and Tourism) project. The funding will allow NCDOT to move forward with 2024 - 2033 State Transportation Improvement Program (STIP) project U-4700. MPDG funds will allow the construction of NCDOT STIP Project U-4700A. Due to funding, the project has been split into multiple construction phases. U-4700A will improve US 321 from US 70 to US 321 Business in Hickory and is the only funded phase in the current STIP. The schedule for this portion of the project has already been delayed due to escalating materials costs. 321 CONNECT funding will allow NCDOT to construct critically needed improvements to US 321 in this western Piedmont area, including the replacement of two bridges over the Catawba River.

forward facility that meets current and future needs. These upgrades include the installation of broadband along US 321 from Gastonia, NC to Lenoir, NC, in addition to adding cameras and ITS infrastructure that will prepare the corridor for future automated/connected vehicle use.

Broadband will not only allow US 321 to meet these future needs, but will also serve to improve educational opportunities for those who live near US 321. This is critically needed in an area where more than 10 percent of the population lack a high school diploma. US 321 passes through several internet data hubs in north central North Carolina. This would allow connections to the Apple data center in Maiden, four planned Microsoft data centers in Catawba County, and the Google data center in Lenoir. NCDOT currently lacks a funding source for these much-needed improvements.

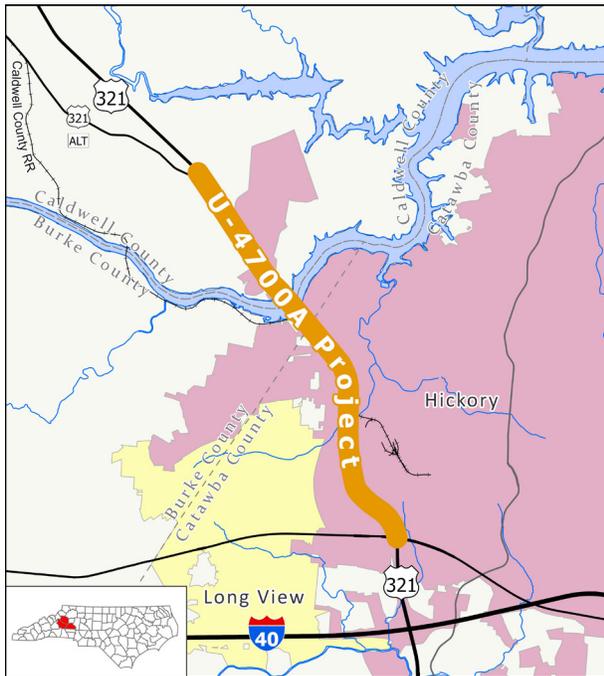


Figure 1: 321 CONNECT U-4700A Improvements

The project will also install a flood gauge on Frye Creek near US 321, which will be connected to North Carolina's Flood Inundation Mapping and Alert Network for Transportation (FIMAN-T). FIMAN-T was developed as a partnership between NCDOT and NC Emergency Management (NCEM) to provide NCDOT officials and emergency management stakeholders with real-time and forecasted flood inundation depths along roads, bridges, and other NCDOT assets in support of risk-based decision-making during flooding events. The application features an interactive dashboard allowing users to navigate between current conditions, modeled scenarios, and forecasted conditions where available. The system reports critical emergency response information such as bridge freeboard (the distance between the water surface and the bridge's low chord elevation) allowing for a more informed response by NCDOT, NCEM, and other stakeholders. This application allows for a timely response to increased precipitation events caused by climate change.

NCDOT realizes that the transportation network must be prepared to meet the needs of a rapidly changing world. 321 CONNECT funding will allow NCDOT to upgrade US 321 into a connected, technologically-

Located in the rolling hills of the North Carolina Piedmont and bordered to the north by the Catawba River, the City of Hickory has long been a gateway to the northwestern part of the state. Through most



of the late 19th and 20th centuries, the economy of Hickory was based on hosiery and textile mills and furniture building. The City was named after Hickory Tavern, which opened in 1859. The first school opened in the area in 1868. This combination of manufacturing and educational focus drove growth in the area through the 1980s, when Hickory suffered industry and job losses, which continued through the recession of 2008.

Hickory leaders and citizens rallied to develop a plan to transform the City and passed a \$40 million bond referendum to fund an extensive bicycle and pedestrian network. Since then, Hickory has leveraged the \$40 million bond funds to secure an additional \$50 million in state and federal grants for complementary projects and is in the process of constructing the Hickory Trail, a network of bicycle and pedestrian facilities that connect downtown areas across US 321 to the Hickory Airport and Museum and LP Frans Stadium, which is home to the minor league baseball team, Hickory Crawdads.

The Hickory Trail project combined with further actions by the City have spurred additional investment both in existing businesses as well as new industries. Today, Commscope and Corning Optical Communications both employ over 1,000 people. On March 23, 2023, CommScope and Corning announced they will invest over \$540 million, combined, to

build American-made fiber optic cables, with the aim to expand access to broadband internet in rural areas. Merchant Distributors, Inc. is the major food distribution company for independent groceries in western North Carolina and is the largest employer in Caldwell County. Hickory has also maintained its historic furniture industry, serving customers throughout the United States.

As detailed in the Benefit/Cost Analysis (BCA), the project provides a Benefit/Cost Ratio of 1.53, with a total benefit of \$443,487,245 and a Net Present Value (NPV) of \$239,299,697.

1.1 PROJECT CHALLENGES AND SOLUTIONS

Roadway and Bridge Challenges

US 321 in the western Piedmont of North Carolina is a transportation corridor for statewide mobility and regional connectivity. The facility is part of the National Highway System and is classified as a North Carolina Strategic Transportation Corridor (Corridor D). Corridor D connects I-85 and I-40 to northwestern North Carolina (the Boone area and points north and west), providing vital linkages for freight and tourism.

US 321 from Hickory to Lenoir is showing its age in both design and deteriorating conditions. US 321 was constructed in the 1950s and early 1960s, and many segments of the facility have not been substantially upgraded since their initial construction. The project area is characterized by rolling topography and the prevailing design criteria during construction of the facility do not provide the sight distances nor horizontal alignment to which current drivers have become accustomed. These factors may have contributed to the 1,966 crashes that were recorded on US 321 from Hickory to Lenoir between 2018 and 2023. In addition, since 2007, there have been 25 bicyclist and pedestrian crashes along US 321 from US 70 to just north of the Catawba River bridges. This includes 19 pedestrian crashes and six bicyclist crashes. The crashes resulted in four fatalities and 17 crashes resulted in injuries (classified as possible injuries or serious injuries).

CAPITAL COSTS	\$265,445,000
PROJECT COSTS (NPV 2021)	\$156,456,544
TOTAL NET BENEFIT	\$443,487,245
TOTAL NET BENEFIT (NPV 2021)	\$239,299,697
BENEFIT-COST RATIO	1.53



An at-grade crossing of US 321 and Caldwell County Railroad (CWCY), a shortline railroad, just south of the Catawba River crossing is utilized by four trains per week. At-grade rail crossings, regardless of the amount of train traffic, can cause delays and present a continual risk of railroad/motor vehicle collisions.

The most significant challenge to the corridor are the aging bridges that cross the Catawba River. As of June 2022, the bridge rating for the southbound bridge (0367) was 36.94 out of 100 and the facility, which was constructed in 1962, is considered structurally deficient. The inspection noted metal deterioration in one location, which is considered a critical find, as well as ten additional items that were assigned as priority maintenance. Cracking was noted in the surface

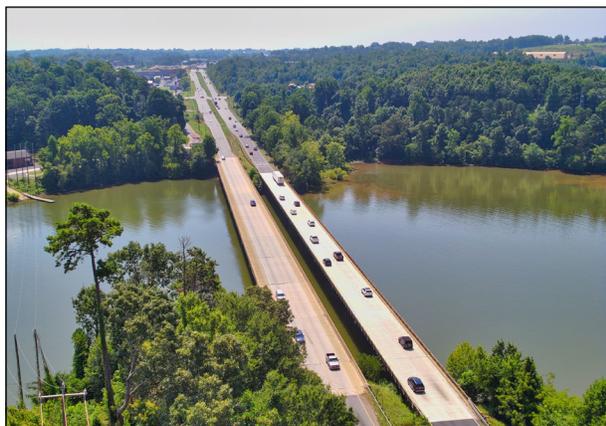


Figure 2: US 321 Bridges Over Catawba River

asphalt of the structure, which required additional maintenance activities. The northbound bridge (0366) was also inspected in June 2022. The structure had a sufficiency rating of 69.48 out of 100 and is also considered structurally deficient. The structure, which was built in 1983, has corrosion and cracking, with some exposed rebar noted. A total of nine items were assigned as priority maintenance activities.

Roadway and Bridge Solutions

321 CONNECT will substantially upgrade the corridor, widening the facility to accommodate current and future traffic demands and replacing both bridges over the Catawba River. The project will also improve the safety of the facility by improving the roadway

geometry where possible, installing a pedestrian crossing at 2nd Avenue SW, and developing reduced conflict intersections at 2nd Avenue NW and other locations as appropriate. In addition, the project will repurpose the existing northbound bridge over the Catawba River as a bicyclist and pedestrian facility. Finally, 321 CONNECT will provide the funding necessary to install broadband, not only along the U-4700A corridor, but on US 321 from Gastonia to Lenoir. This will enable electronic messaging and other ITS solutions that will provide substantial operation and safety benefits to the western Piedmont region of North Carolina.

Based on the Benefit-Cost Analysis, the project derives an estimated \$161.2 million with a net present value in 2021 dollars of \$38.9 million in net benefits due to safety improvements.



Figure 3: 321 CONNECT Broadband & ITS

Technology Challenges

There is a well-defined need to install broadband in as many communities as possible, especially in rural and small urban areas. According to the Brookings Institute, "Increasing access and usage of broadband infrastructure in rural areas (and the amenities, digital skills, online education, and job search opportunities that come with it) lead to higher property values,

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increased job and population growth, higher rates of new business formation, and lower unemployment rates, according to researchers at the Federal Reserve Bank of Richmond. Broadband installation can improve life and health outcomes, offering access to remote healthcare providers, online social networks, and educational opportunities. A cost benefit analysis of rural broadband installation in Indiana observed three to four-fold returns on investment, not including state and local governments' cost savings on medical expenditures and additional tax revenues from increased incomes."

Broadband improvements would be particularly beneficial to the residents of the US 321 corridor. In the U-4700A project area, every census tract has a high percentage of residents that have no more than a high school education (ranging from 15 to 24 percent for the individual tracts). There are also multiple 2020 census tracts (37035010700, 37035010900, and 37027031402) with low life expectancies in the top 90th percentile. These are of particular concern because in the U-4700A project area 63 percent of the population live in census tracts identified as Historically Disadvantaged Communities (HDCs).

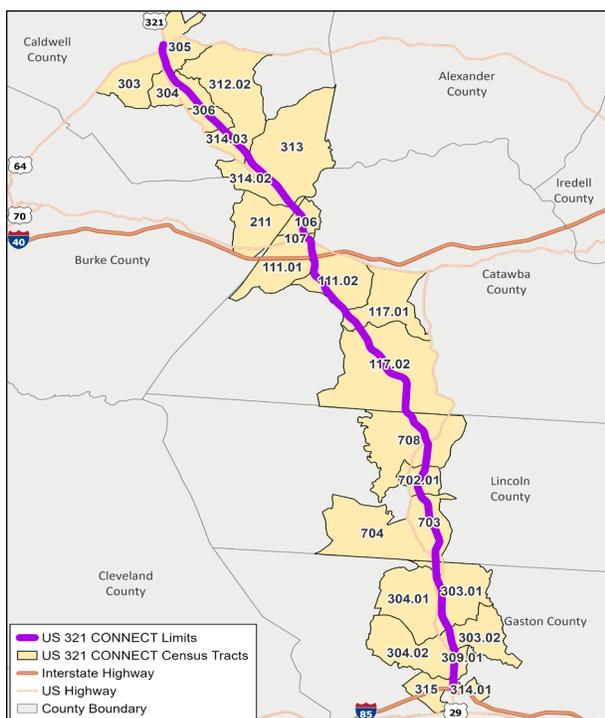


Figure 4: 321 CONNECT Census Tracts

321 CONNECT benefits would extend beyond the U-4700A project area. For the census tracts on US 321 from US 74 in Gaston County to Lenoir in Caldwell County, 38 percent qualify as Areas of Persistent Poverty (APPs) and 65 percent qualify as Historically Disadvantaged Communities (HDCs).

321 CONNECT is a 50 percent rural and 50 percent urban, based on the length of the corridor. All urban census tracts within U-4700A are part of the Hickory Urban Area. Those census tracts that make up the Broadband portion of 321 CONNECT are within the Hickory, Lincolnton, and Gastonia Urban Areas.



Figure 5: 321 CONNECT Urban & Rural Areas

Technology Solutions

There is no funding currently available for widespread broadband installation for the 321 CONNECT corridor. Failure to act now means that the inevitably required upgrades to the US 321 corridor to accommodate automated/connected vehicles to operate will be further delayed. 321 CONNECT will allow for not only installation of fiber for NCDOT uses but will also enable cost effective private fiber installation along the project corridor, which will provide lasting societal benefits.



Fiber optic cable and ITS benefits were estimated to provide savings and reliability benefits worth \$48.3 million, with a net present value in 2021 dollars of \$11.7 million.

Funding Challenges

NCDOT has recognized the need to improve US 321 and has developed STIP project U-4700 to address these concerns. However, continually rising construction costs put the project schedule at risk. The construction schedule has been pushed to State fiscal year 2026 and additional delays are possible, if project costs continue to increase.

Funding Solutions

321 CONNECT would significantly advance the construction timeline of the proposed U-4700 improvements. U-4700A is by far the most costly phase of the proposed U-4700 project, due to site constraints for right of way in Hickory and the need to replace the bridges over the Catawba River. It is also the part of the corridor with the greatest congestion. Any advancement of the project will provide the benefits described more quickly and will reduce maintenance needs for the bridges and other parts of the corridor.

Because U-4700A has completed the required National Environmental Policy Act documentation and is currently purchasing right of way, NCDOT can assure rapid and smooth delivery of the project. Partial ROW acquisition was initiated in 2019. Construction costs for the project were updated in January 2023.

Supplemental Materials can be found on the [321 CONNECT website](#).