



North Carolina USDOT Grant Application

CONTINUING CORRIDOR K:

Connecting People, Goods and Services



MAY 2020

Continuing Corridor K: Connecting People, Goods, and Services
FY 2020 BUILD Grant Application

Continuing Corridor K: Connecting People, Goods, and Services

Application Information

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<https://connect.ncdot.gov/resources/BUILD2020-a9/Pages/default.aspx>

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Executive Summary

Continuing Corridor K: Connecting People, Good and Services provides two vital resources for the Appalachian Region of Western North Carolina: a reliable transportation network and a dynamic emergency response network. The reliable transportation network is under development through North Carolina STIP Project A-0009C. STIP Project A-0009C improves the current three lane section of US 129 and NC 143 in Robbinsville and corrects the two-lane deficient roadway typical of NC 143 and NC 28 from Robbinsville to Stecoah. These improvements include pedestrian facilities in Robbinsville, at the Appalachian Trail crossing on NC 143, and Stecoah, wider 8-foot shoulders including a 4-foot paved shoulder, improved horizontal and vertical alignments, and climbing and passing lanes. STIP Project A-0009C will enhance mobility and the economic vitality of Graham County through providing a reliable, safe transportation network for all users.

Similarly, the dynamic emergency response network project (fiber project) will complete a vital missing link in the existing fiber network provided by Balsam West. Providing fiber optics from Robbinsville to Almond will not only benefit the transportation network through enhanced emergency response but will provide high speed internet access to an underserved community. The fiber project will connect two Dynamic Message Signs (DMS), six Dynamic Trailblazers and one Closed Caption Television (CCTV) along Corridor K. This system will be used to enhance emergency response by reducing the time to implement the emergency messages and providing real time messaging to road users.

Continuing Corridor K: Connecting People, Good, and Services is a vital link in the overall economic vitality of Graham County and the Appalachian Development System.

I Project Description

The 2020-2029 State Transportation Improvement Program (STIP) adopted by the NCDOT Board of Transportation in September 2019, was updated to reflect a new description of A-0009. The STIP was revised to “US 19, US 74, US 129, NC 28, NC 143 in Cherokee, Graham and Swain Counties from Andrews to NC 28 east of Almond”.

Section A-0009A is described as “US 19, US 74, and US 129 from US 19 Business in Andrews to US 129”. Section A-0009C is described as “US 129, NC 143, and NC 28 from US 129 to NC 28 at Stecoah” and includes the Section previously labeled A-0009B, from Robbinsville to Cheoah. Based on this new description, the 2015 Graham County Comprehensive Transportation Plan (CTP) was amended December 3, 2019 to reflect the changes.

The revised highway recommendations for A-0009C include requesting the addition of these routes to the Federal Highway Administration’s National Highway System. The request was made to the Federal Highway Administration in April 2020 and at this writing, NCDOT awaits confirmation of approval. The focus of this BUILD Grant Application is the construction of A-0009C and closing the loop in the fiber network from Robbinsville to US 74 at Almond.

- Continuing Corridor K:*
- ✓ Completes one of the last sections of the Appalachian Development Highway System
 - ✓ Provides increased connectivity for local and commercial traffic on a vital rural route
 - ✓ Provides improved access to employment, medical facilities, commercial centers and education facilities
 - ✓ Improves safety and reliability for supporting improved quality of life for a rural population
 - ✓ Provides economic benefits and needed support for improved quality of life
 - ✓ Local stakeholders support improving existing routes

Project Overview

NCDOT’s STIP Project A-0009C is focused on improvements to existing US 129, NC 143, and NC 28 from US 129 in Robbinsville to the existing four-lane divided section of NC 28 in Stecoah. This facility is recommended as a two-lane principle arterial with climbing/passing lanes.



Continuing Corridor K: Connecting People, Goods, and Services is critical to long-distance travel in and from western North Carolina to surrounding counties. It is vital for local trips within Graham County. The project will improve roadway reliability for local and commercial traffic that moves through the area. Increased reliability is crucial for residents who must travel out of the county for jobs, education, healthcare, and other vital services, as well as for commercial traffic which use these roads to

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transport goods in and out of North Carolina. These improvements will bring about economic benefits for a rural county with a declining workforce.

The proposed NHS route will be utilized as a detour for the many slides that occur along US 74. The improved facility will provide reliable access for traffic that cannot travel through the Nantahala Gorge.

The proposed project will provide essential broadband access from Robbinsville to Almond. Based on studies by the Appalachian Regional Commission (ARC), post-deployment broadband has positive effects on employment, productivity, income, and behavior. The inclusion of broadband will help a struggling county confined by isolation distance with access to markets, critical health care, educational resources thereby connecting the area to people, services and goods.



The fiber network will complete a vital missing link in the existing network provided by Balsam West in the region. Providing fiber from Robbinsville to Almond will not only benefit the transportation network through enhanced emergency response but will provide access to an underserved community to high speed internet. The proposed fiber line will connect two Dynamic Message Signs, six Dynamic Trailblazers and one CCTV along the A-0009 corridor. This much needed communication system will be used to enhance emergency response in the area by reducing the time it takes to implement the emergency messages and providing real time messaging to road users.

Transportation Challenge

Existing conditions include roadways within the study area that typically have steep grades and sharp curves. Roadways may have paved or unpaved shoulders of varying widths or no shoulders. The roadway network in the study area is limited with only three highways; US 129, NC 143, and NC 28; providing commercial and commuter access. Grades often exceed 6% in mountainous areas, most notably is Stecoah Gap on NC 143. Steep grades, narrow lane widths and sharp curves on NC 143 and NC 28 affect travel speed and opportunities to pass slower vehicles. There is an inability to pass slower vehicles over substantial distances. Speed limits within the study area generally range from 25 miles per hour (mph) in tight curve sections to 55 mph in straighter sections with better sight distance.



As of FY 2019, 90.8% (2,805.6-miles) of the Appalachian Development Highway System is under construction or open to traffic. Given the challenges associated with Western North Carolina's mountainous terrain and sensitive natural habitat, the proposed project is among one of the last of the ADHS's corridors to be completed.

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HOT SPOTS IDENTIFIED BY CORRIDOR K FOCUS GROUP IN REGIONAL "OPT-IN" STUDY
(NOVEMBER 2014)

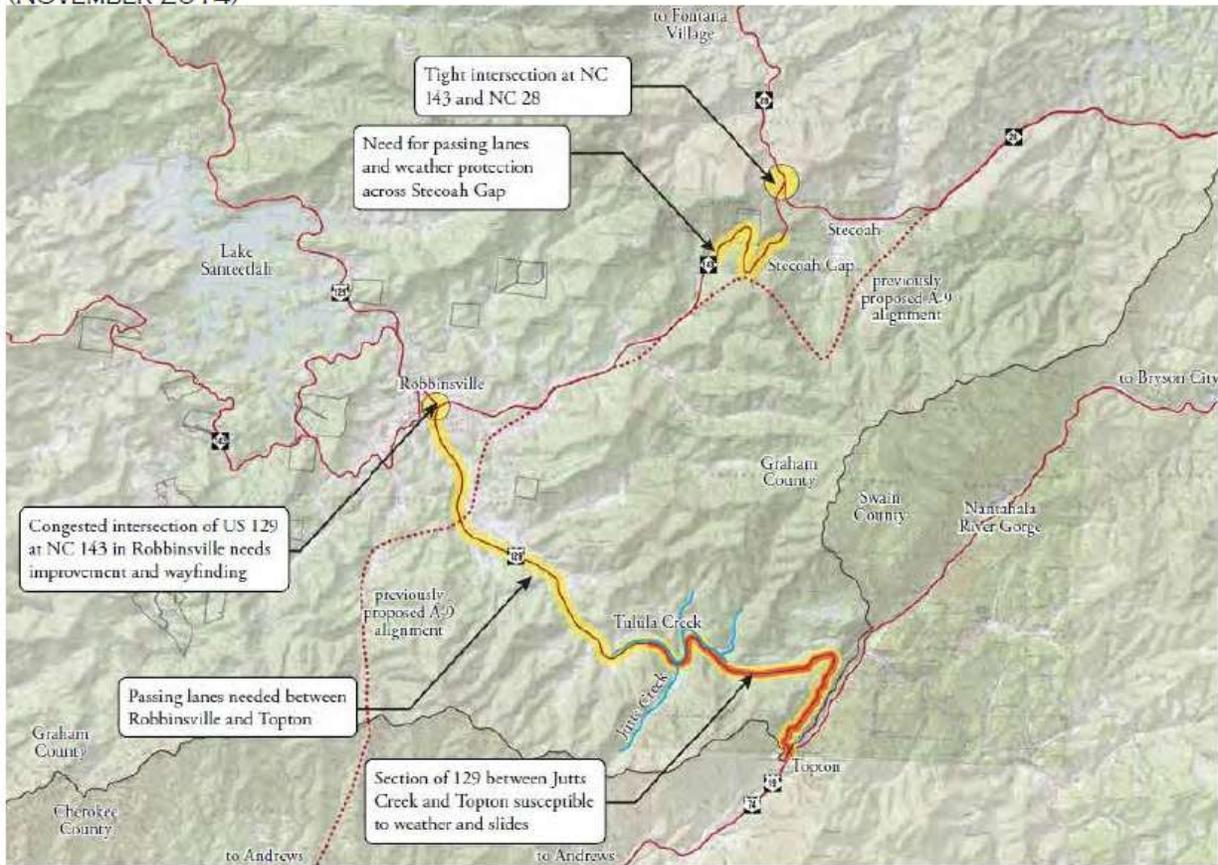


Figure 2: Hot Spot Map

The project includes proposed improvements for each route in the A-0009C study area:

- ✓ Improve existing US 129/NC 143 – this design option would maintain the existing alignment along US 129 and NC 143 between each road’s intersection with Five Point Road (SR 1275). Improvements include minimal resurfacing, grading, and the addition of a dedicated eastbound right-turn lane from US 129 to NC 143.
- ✓ Improve existing NC 143/NC 28 – This design option begins at the intersection of NC 143 and Five Point Road (SR 1275) and continues along existing NC 143, widening the facility to three lanes with alternating climbing and passing lanes to the intersection of NC 28. The design option then follows NC 28, widening the roadway to a three-lane facility with alternating climbing and passing lanes. Additional improvements include providing adequate shoulders and modifying super-elevations (cross-slopes) to improve flow along existing NC 143 and NC 28.

Project History

According to the Appalachian Regional Commission (ARC), the Appalachian Development Highway System is a 3,090-mile system of modern highway corridors designed to generate economic development in previously isolated areas, supplement the interstate system, and provide access to areas within the Region as well as to markets in the rest of the nation and overseas.

The Appalachian Development Highway System (ADHS) consists of a mixture of state, US, and Interstate routes and are designated as “letter corridors”. This system of corridors was established in 1965 by Congress to provide a safe, efficient transportation system for the Appalachian Region. The ADHS was



Figure 2: Appalachian Development Highway System

designed to generate economic development in previously isolated areas, supplement the interstate system and provide access to areas within the Appalachian region. Corridor K

connects I-75 in Cleveland, TN to US 23 (Corridor A) near Dillsboro, NC. Corridor K overlaps with US 74 and has shorter overlapping sections with US 19, US 64, US 64 Bypass, US 129 and US 441. Corridor K has two gaps, one in Tennessee and one in North Carolina. The gap in North Carolina is a 27.1-mile section from Andrews to Stecoah and is divided into two projects:

- A-0009A: Andrews to Robbinsville (US 74 and US 129)
- A-0009C (which includes A-0009B): Robbinsville to Stecoah (US 129, NC 143 and NC 28)

In 2019, a study found that the Appalachian Development Highway System provided an economic increase of \$54 billion and increased the incomes in the Appalachian region.

II Project Location

The proposed improvements to this section of Corridor K along US 129, NC 143, and NC 28 extend from Robbinsville to Stecoah in Graham County, which includes the improved existing alternative. The fiber project extends from US 129 in Robbinsville to US 74 at Almond. A federal Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) will be prepared for STIP Project A-0009C. The EA is expected to be completed in July/August 2020 and the FONSI is slated for December 2020. In April 2020, Graham County voted to support the Improve Existing Alternative. After consideration of the technical reports, local support, the Tunnel Feasibility Report and funding prioritization, NCDOT also recommends Improve Existing Alternative.

Opportunity Zone

Opportunity Zones are areas in economically distressed communities identified by the USDOT with a goal of driving investments of all types to these areas. This is a tax incentive program created to encourage long term investments in economic development and job creation in low income communities. Census tract 37075920300 is within the Corridor K study area. This tract is a candidate opportunity zone classified as a rural economically distressed area of the Appalachian Region of North Carolina. Graham County suffers from high unemployment, job scarcity and a lack of long and short-term investments in the area.

Figure 2 illustrates the proposed routes included in *Continuing Corridor K: Connecting People, Goods and Services*

STIP Project A-0009C:

- ✓ US 129 from SR 1275 (Five Points Road) to NC 143 (Sweetwater Road) (~0.2 miles)
- ✓ NC 143 (Sweetwater Road) from US 129 in Robbinsville to NC 28 at Johnson Gap (~8.8 miles)
- ✓ NC 28 from NC 143 at Johnson Gap to Edwards Gap (~2.6 miles)

Fiber Project:

- ✓ NC 143 from US 129 in Robbinsville to NC 28 at Johnson Gap (~8.8 miles)
- ✓ NC 28 from NC 143 at Johnson Gap to US 74 at Almond (~11.3 miles)

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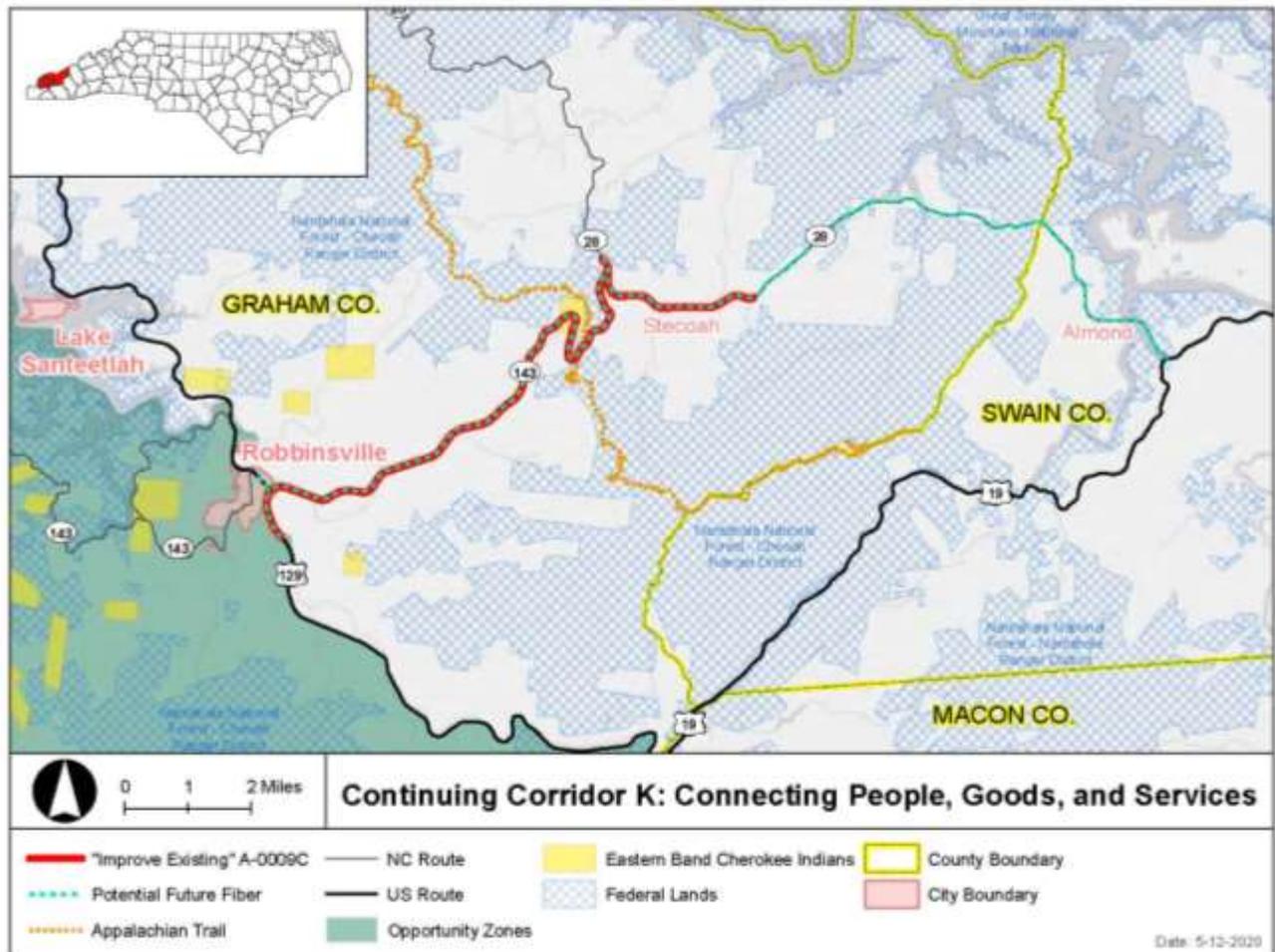


Figure 3: Continuing Corridor K

III Grant Funds, Sources and Uses of all Project Funding

This section outlines the funding strategy for the *Continuing Corridor K* project. As previously mentioned in the Project Description, A-0009C is part of Corridor K which is one of the projects still outstanding in the ARC’s ADHS plan. The list of projects competing for the use of the remaining ADHS funding by the Appalachian Regional Commission for North Carolina include:

Table #1: Projected Budget Requirements

ADHS Projects	NCDOT Let Date	NCDOT Anticipated Budget Requirement
A-0009C (Corridor K)	9/20/2022	\$133.1M*
A-0009A (Corridor K)	December 2027	\$381.2M
A-0011C (Corridor A) – under construction	11/19/2019	\$5M
Local Access Road Projects	FY 2020-2022	\$5M
A-0011D (Corridor A)	Future Years	\$74.2M

*Estimate does not include the *Continuing Corridor K* Fiber Project

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In order to complete the A-0009C section of Corridor K, NCDOT anticipates a total budget requirement of \$133.1 Million. ADHS funding committed to NCDOT currently totals approximately \$206.5 Million. The \$63.4 Million remaining after funding A-0009C, A-0011C and local access roads would be used to fund portions of proposed projects A-0011D and A-0009A.

Based on the status of each of the projects listed above, NCDOT anticipates right of way acquisition will begin September 2021 and construction in September 20, 2022 requiring an estimated \$133.1 Million. Subsequently, A-0009A is programmed to begin construction in 2028 and require an estimated \$381.2 Million.

At the time of this application, the plan is to construct A-0009C with available ADHS funding AND the \$22.1 Million FY 2020 BUILD Grant. NCDOT plans to construct the Fiber Project with the remaining \$2.9 Million FY 2020 BUILD Grant. Remaining ADHS funds and future INFRA and BUILD Grant monies will support the construction of A-0009A, A-0011D and any local access road projects.

Sources

Eligible project costs: The total estimated cost to complete A-0009C and the Fiber Project is outlined in the Table #2 below and totals just over \$136.0 Million. The Appalachian Regional Commission has committed funding of \$206.5 Million to NCDOT to be used on eligible projects in the Appalachian Region of North Carolina.

Project Budget and Planned Uses

The budget for this project is summarized in Table #2 below. NCDOT is requesting \$25,000,000 in BUILD capital funding to facilitate the construction of A-0009C, purchase and install two dynamic message signs, one CCTV, six dynamic trailblazers, and approximately 20 miles of fiber optics. This represents 18% of the total project cost. NCDOT is also asking for a waiver from the USDOT Secretary to receive 100% of the federal funds available through the grant process.

Table #2: Sources and Uses of Funds

Source	Preliminary Engineering	ROW	Utilities	Construction & Inspection	Fiber*	Total	% of Total
ADHS	\$10.2M	\$13.6M	\$6.6M	\$80.6M	0	\$111.0M	82%
BUILD	\$0.3M	\$0	\$0	\$22.1M	\$2.6M	\$25.0M	18%
Total	\$10.5M	\$13.6M	\$6.6M	\$102.7M	\$2.6M	\$136.0M	100%

*Fiber includes the construction cost of the fiber cable, DMS, Dynamic Trail Blazers and CCTV

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While these funds could be utilized for planning or right-of-way acquisition, NCDOT seeks to provide a much-needed communications system for travelers which is not currently in the project budget. The installation of approximately 20 miles of fiber optics from Robbinsville to Almond will provide high-speed broadband access in a depressed and underserved area in North Carolina. The introduction of broadband in the Appalachian communities brings the opportunity for direct access to education and health care for residents who are forced to travel long distances for college courses and medical treatment. ARC studies indicate that “broadband is associated with higher employment rates in rural counties.” As a result, the deployment of a fiber optics line from Robbinsville to Almond connecting to the existing network can transform lives of Graham and Swain County by equalizing access to information, thus providing more life opportunities.



The installation and use of DMS in Cherokee and Swain Counties would alert travelers to delays, detours and hazards during and post-storms and rockslides, accidents and road closures. These electronic signs deployed along this improved route would convey public service messages, state of emergency and current traffic conditions. Additionally, if installed prior to construction, the signs would assist during the construction period to alert drivers of delays and the current construction schedule.

Research shows that some agencies have utilized DMS to encourage public participation such as “Stay Home” messaging during the current COVID-19 Pandemic. Messaging that can be available 24 hours a day may be the only way travelers on this route may be notified about an important issue.

Currently, during an emergency, portable Variable Message Signs (VMS) are deployed from Sylva which is approximately 40 miles from the installation sites. The process of delivering and installing VMS units takes over three hours. Whereas, through integration of the new DMS units, emergency messages can be displayed in less than five (5) minutes from the time of notification. This reduction in notification time would reduce driver frustration, improve response times for commercial freight and reduce unnecessary congestion at or near the incident location.

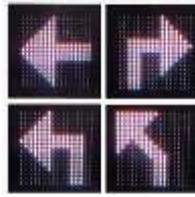
Ideally this communication messaging system would be installed prior to construction to assist in traffic management/public messaging during construction of the project. The plan is as follows:

Table #3: Proposed Fiber Project

Equipment	Location
CCTV	Robbinsville: US 129 at NC 143
Dynamic Trailblazer	US 129 at US 74 (one trailblazer); US 129 at NC 143 (two trailblazers); NC 143 at NC 28 (two trailblazers); NC 28 at US 74 (one trailblazer)
DMS	US 74 west of US 129 and US 74 east of NC 28

The **Closed-Circuit Television (CCTV)** system will allow NCDOT to monitor traffic conditions in Robbinsville at the US 129 and NC 143 intersection when the route is utilized as a detour for road closures on US 74 or during other non-emergency events. **Dynamic Trail Blazers** will help

guide motorists along alternate routes in the event of road closures due to accidents or rockslides. The **DMS** units will alert motorists of important traffic and emergency messages.



IV Selection Criteria

The Project is not only significant as it completes one of the two remaining gaps of Corridor K in the ADHS, it also positively impacts commercial travel through the state of North Carolina. US 129, NC 143 and NC 28 as part of the National Highway System will provide an alternate truck route accessing western North Carolina and rural Appalachia. The Project meets the merit criteria, both primary and secondary, while also addressing critical investment in improving transportation in a rural part of Western North Carolina. The Project will provide broadband connectivity long overdue for the residents of Graham County.

Safety

The A-0009C project is being designed with a focus on safety features. The newly released “2019 Strategic Highway Safety Plan” (SHSP) compiled for NCDOT, is a data-driven plan that shows that Graham County is the top county per residents 16 years of age or older in 8 of the 11 emphasis areas listed in the 2019 SHSP including:

- Intersection-Related Fatalities and Serious Injuries: #1 per residents 16 and older
- Lane Departure-Related Fatalities and Serious Injuries: #1 per residents 16 and older
- Alertness-Related Fatalities and Serious Injuries: #1 per residents 16 and older
- Speed-Related Fatalities and Serious Injuries: #1 per residents 16 and older
- Motorcyclists-Involved Fatalities: #1 per residents 16 and older and #7 based on total population
- Motorcyclists-Involved Serious Injuries: #1 per residents 16 and older and #7 based on total population
- Older Driver-Involved Fatalities and Serious Injuries: #1 per residents 65 and older
- Pedestrians, Bicyclists, and Personal Mobility-Involved Fatalities and Serious Injuries: #1 per total residents

NCDOT seeks to help address the safety concerns identified in the SHSP by improving the existing facilities with a focus on driver safety. The proposed improvements include:

- Full shoulders on existing roadways where either no shoulder or only partial shoulders exist to help provide a safe area for motorists to pull over if necessary and to help drivers recover from lane-departures;
- Improved sidewalks in Robbinsville on NC 143 and US 129 plus full shoulders throughout the project length help address pedestrian, bicyclist, and other personal mobility-related crashes by providing separation between motorists and other users of the roadway corridor;

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- Climbing/passing lanes to help reduce the potential for lane departure-related crashes associated with drivers passing in areas of limited sight distance due to steep grades and curves throughout the project corridor; and,
- Dynamic Messaging Signs to help inform drivers of broken-down vehicles, landslides, and/or weather conditions to help prevent additional crashes by routing traffic away from these areas.

NCDOT seeks to reduce crash frequencies throughout the corridor by implementing improvements that focus on driver safety. Such improvements include two DMS, widening from a two-lane to 2+1 facility with climbing/passing lanes, improvements to the vertical and horizontal curvature, eight-foot total shoulders including four-foot paved shoulders. Passing lanes are most important on steep grades where larger trucks cannot safely maintain full speed, allowing smaller vehicles to pass and continue along the route. Additionally, the proposed typical section aligns with one of the engineering strategies in the plan which continues to use evidence-based countermeasures to reduce crashes such as long-life edge line and centerline pavement markings.

A safety analysis was performed by the NCDOT Traffic Safety Unit to evaluate the safety effect of the proposed Improve Existing Alternative on US 129, NC 143, and NC 28. The data was gleaned from an analysis of the study area performed in January 2020 and encompassed crashes from 2015-2019. The crash values for the 2019 build scenario were calculated by applying crash modification factors according to the intended safety treatments on each segment in the study area. The crash values for the 2045 scenarios were calculated by scaling up the crash values from 2019 according to the expected increase in traffic volumes as indicated in the October 2019 traffic forecast completed by Patriot Transportation Engineering. Please see Table #4 below.

Table #4: A-0009C Study Area Crash Data

2019		2045	
Average Annual Crashes (No Build)	Average Annual Crashes (Build)	Average Annual Crashes (No Build)	Average Annual Crashes (Build)
137	92.2	168.9	113.8

NCDOT has analyzed the animal crash information provided by Patriot Transportation Engineering. The information is shown in Table #5 below. Although the number of animal crashes are relatively low in the corridor, the rural nature of the project area lends to an increase in vehicle versus animal crashes as the forecasted traffic materializes. NCDOT has coordinated with several environmental advocacy groups including Wilderness Society, Mountain True, WaysSouth, and Wildlands Network as well as NC Wildlife Resources Commission. This coordination will continue through final design to ensure all types of crashes are addressed in a reasonable and practicable manner.

Table #5: A-0009C Study Area Animal Crash Data

Route	Deer	Dog	Bear
NC 143	4	2	1

The safety benefits of A-0009C are summarized in the Benefit-Cost Analysis found in the Supplemental Material provided with this application.

State of Good Repair

Once complete, Corridor K will provide for national economic interests, enhance local economic development opportunities along and near the corridor, and provide an improved system of transportation for both routine travel and emergency travel in the event of a natural or national crisis. The project will restore the good condition of infrastructure that supports commerce and growth and reduce the barriers separating workers from employment by reducing transportation network gaps connecting this region of Appalachia to job opportunities and higher education.

The project is designed to improve the condition of existing facilities by providing safe options for turn lanes, passing/climbing lanes and wider shoulders for emergency pull-offs. The construction will correct deficient drainage systems, and deteriorating pavement conditions, stabilize steep slopes, widen lane widths and provide the infrastructure necessary to implement timely emergency response through a reliable fiber network infrastructure.

Economic Competitiveness

There will be percentage gains in same-day truck delivery markets due to the ADHS investments in *Continuing Corridor K*. There are two key findings from the “Economic Analysis of Completing the Appalachian Development Highway System” Technical Report on the ADHS website. First, the counties that were “most affected” in terms of travel efficiency benefits also tended to have the largest gain in same day truck market access. Second, the truck delivery access improvements appear more modest in percentage terms than the gain in workforce access, which is mostly due to the larger scale of delivery markets and the complimentary role of the ADHS with national highway networks for longer distance trips.

From 1965 to 2015, the ADHS has evolved to serve a role of reducing the travel time within a same-day delivery radius that is ultimately enabled by the National Highway System (NHS) and the Interstate Highway System. However, with both the NHS and the Interstate System in place, there are relatively few areas not within a same-day delivery radius of even the most remote ADHS core counties.

Enhancing NHS connectivity in local areas works towards establishing the ADHS as a regional highway foundation for a strategic network of Intermodal Corridor of Commerce. This balanced system of interconnected highway, rail and inland waterway corridors is Appalachia’s direct connection to both domestic and international markets. *Continuing Corridor K* connects Graham County to rail lines in Sylva and destinations to the north, Chattanooga to the south and the I-26 corridor which accesses the ports of South Carolina.

Graham County is the third-least populous county in North Carolina yet has the highest economic deprivation rate. Graham County historically has maintained a high unemployment rate. According to Access NC, the unemployment rate for Graham County in 2018 was 5.9% compared to an unemployment rate of 3.9% for North Carolina. Most recently, employment was adversely affected by the closure of the Stanley Furniture manufacturing plant in 2014, which resulted in a loss of over 300 jobs. While Oak Valley Hardwoods has since purchased that facility, that company only employs 23 people and exports hardwoods to Asia. Over two-thirds of Graham County is owned by the US Forest Service, severely limiting opportunities for development. Graham County is a

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member of the Mountain West Partnership which advocates for economic development in western North Carolina and assisted with the development of Balsam West Fiber in Robbinsville. The Town of Robbinsville has been selected to participate in the Downtown Strong Initiative of the NC Main Street and Rural Planning Center, which provides economic and revitalization support. *Continuing Corridor K* is another step towards lessening that deprivation rate while providing reliable roadway facilities.

Environmental Sustainability

The project area includes a wide range of environmental features such as streams, wetlands, and sensitive terrestrial communities. For the Improve Existing Alternative, minimal impacts are anticipated. According to the Natural Resources Technical Report prepared for STIP A-0009C, there are 22 potential jurisdictional streams, 11 surface waters, and 76 potential jurisdictional wetlands within the project study area. The Future Land Use Study Area (FLUSA) is larger than the natural resources project study area. The streams and associated branches within the FLUSA include twenty-five 305(b) streams, 5 trout waters, 100 public mountain trout waters, 9 trout streams, and 50 USACE western NC waters.

NCDOT does not anticipate any impacts to agricultural operations with the construction of this project. Per the A-0009C Community Impact Assessment (CIA), impacts to farmland soils eligible for protection under the Farmland Protection Policy Act (FPPA) is anticipated. However, the Improve Existing Alternative does not have a total site assessment score which exceeds the FPPA threshold, as such, farmland conversion impacts are not considered notable.

A recent traffic study performed for NCDOT on the Improve Existing Alternative showed that the proposed project will improve both the average travel time along the corridor as well as the travel time reliability of the corridor. The proposed project is expected to improve the average travel times during the AM period by 3.0% in the westbound direction and 4.5% in the eastbound direction. During the PM period the average travel times along the corridor improve by 10.7% in the westbound direction and 6.8% in the eastbound direction. The reduction in travel time will reduce the total amount of greenhouse gas emissions produced by the transport of people and freight. It is estimated that the discounted emission reduction benefits total 7%.

Quality of Life

According to the Graham County CTP, 67% of employed Graham County residents commute to jobs outside of the County. Additionally, 1,000 plus jobs in the County are filled by workers that commute in from other counties, mostly Cherokee County. The impaired mobility and constrained freight movement due to a combination of steep grades, tight curves and heavy vehicles is an issue. The impaired mobility of the existing highway network impacts emergency medical service response times resulting in the loss of life.

The project will provide safe and expanded access to essential services for commuters, truckers, and families in search of groceries, health care, higher education opportunities and emergency services personnel in this historically low employment region. Prior to the COVID-19 Pandemic, the unemployment rate of Graham County has ranged from 27.5% in 1995 to 4.4% in early 2020.

Innovation

Innovation comes in several forms on this Project. The most notable innovative technology component of the *Continuing Corridor K* Project is the installation of an interactive emergency response system through the addition of two Dynamic Message Signs, six Dynamic Trailblazers, one CCTV unit and approximately 20 miles of fiber line for broadband. Additionally, Patriot Engineering introduced an innovative approach to the travel time reliability research for the Project. The A-0009C project team has incorporated innovative project delivery since the restart of the A-0009 project in 2015 beginning with a paradigm shift toward an integrated framework for project development and the use of Quantm, an alignment optimization program.

Innovative Technology

Dynamic Message Signs are of the utmost significance to alert drivers to potential emergency situations, detours due to landslides or public service announcements like Amber/Silver Alerts, emergency evacuations, or state of emergency alerts will benefit long-distance and same-day roadway users as well as local residents.



Dynamic Trailblazers will be utilized along the US 129, NC 143 and NC 28 corridor to direct traffic along any potential detour for the US 74 Nantahala Gorge area.

CCTV will be installed as part of the emergency response of the DMS system. A CCTV system at the intersection of US 129 and NC 143 will enable emergency response personnel to monitor the operation of the intersection and modify the signal operation to adequately adjust to the change in the traffic demand during a detour.

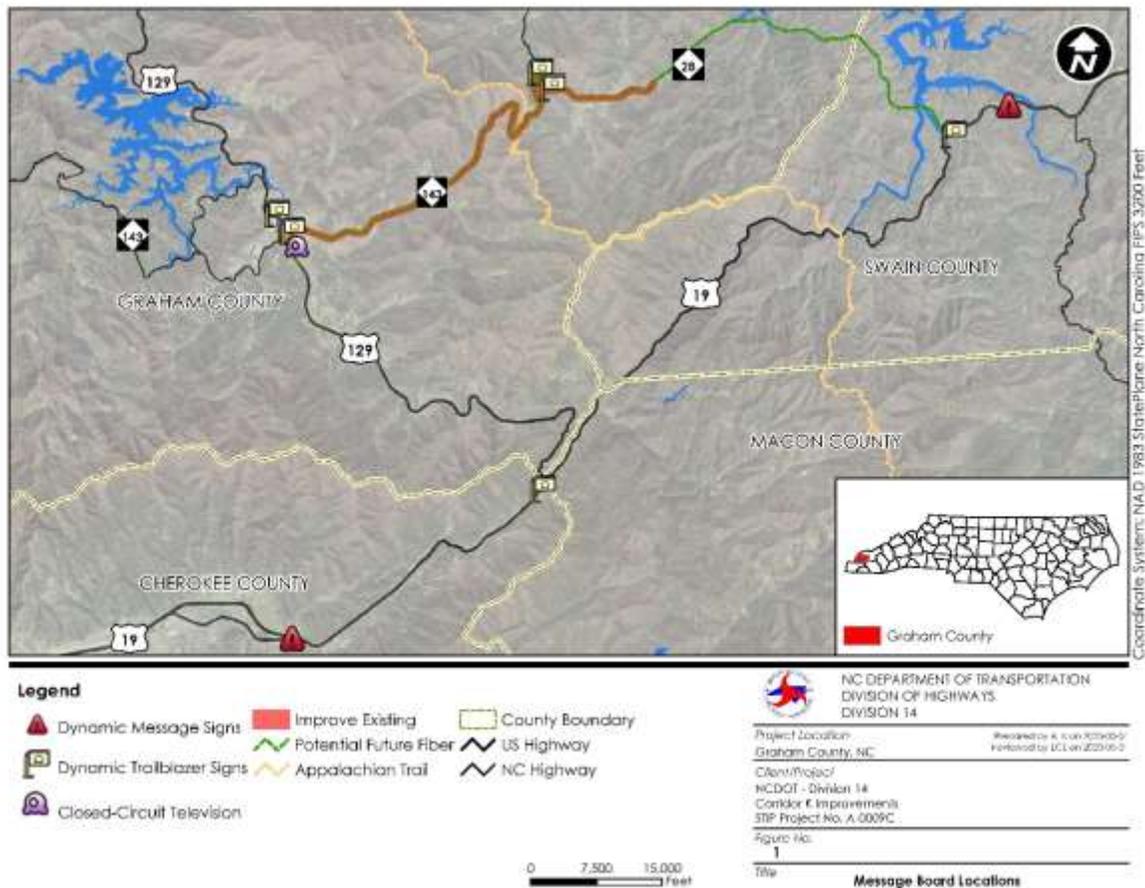


Figure 4: Proposed Fiber Project

Travel time savings research is an additional innovation. Travel time reliability is the consistency or dependability of travel times from day to day or across different times of the day. Most travelers are less tolerant of unexpected delays because such delays have larger consequences than drivers face with everyday congestion. Travelers also tend to remember the few bad days they spent in traffic, rather than an average time for travel throughout the year. Measures of travel time reliability better represent a commuter’s experience than a simple average travel time. The 95th percentile travel times, is perhaps the simplest method to measure travel time reliability. It estimates how long a delay will be on specific routes during the heaviest traffic days. The proposed project utilized an innovative method to determine the travel time reliability of the proposed project by creating a 365-day simulation model of the study area for both the build and no-build scenarios and determining the travel time for every vehicle over the one year period based on actual variations in demand collected from aggregated location based services data for 2019. The first of its kind simulation allowed for the development of a cumulative distribution function that determined both the average and 95th percentile travel times.

Based on the travel time reliability analysis performed for the project, the 95th percentile travel times show substantial reductions in travel time if the proposed project is constructed. The proposed project is expected to improve the 95th percentile travel times during the AM period by

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15.7% in the westbound direction and 12.2% in the eastbound direction. During the PM period the 95th percentile travel times along the corridor improve by 17.9% in the westbound direction and 19.0% in the eastbound direction.

Innovative Project Delivery

The preliminary engineering phase of STIP Project A-0009C has taken a more Planning Environmental Linkages (PEL) approach to project development prior to entering a more traditional NEPA phase. This approach coined a “Fresh Start” to project development allowed stakeholders from various aspects of the project to have an equal voice during the planning phase. One aspect of the “Fresh Start” was to engage Tribal Partners early and often in the planning phase. The engagement of the five Tribal Partners is important not only from potential impacts associated with the Trail of Tears but also the potential right of way impacts to Tribal lands. As indicated in the economic disparity section of this application, relocations along the corridor and particularly for Tribal Lands is difficult if not impossible to accomplish. The “Fresh Start” approach to project delivery allowed the project team to explore many ideas in a controlled environment.

Prior to entering the NEPA environmental review stage, FHWA and NCDOT team members utilized an innovative corridor planning tool called Quantm. Quantm is an alignment optimization program that develops optimized routes in consideration of design criteria inputs, construction costs, and environmental features. The software can be used to obtain a representational cost range for potential study alignments and can be used to refine an existing alignment within an established roadway corridor. The team built the Quantm 3D model to include topographic data, environmental features data, resource prioritization, design standards, and unit costs for construction. Each Quantm iteration (or Quantm “run”) evaluates hundreds of potential alignments then produces a representational set of 13 optimized alignments that meet the model’s design parameters. These alignments are not always the lowest cost, lowest earthwork, or shortest length, but rather, illustrate a representational range of design options. The Quantm model generated a multitude of individual corridors that were vetted by the project team in coordination with local government and agency representatives. The recommended study corridors were presented to the public in February 2019 and served as the basis for the detailed study alternatives evaluated in the Environmental Assessment.

Innovative Financing

Continuing Corridor K: Connecting People, Goods, and Services did not incorporate financing innovations for the project delivery. STIP Project A-0009C is anticipated to be funded with ADHS funds. As illustrated in the project funding section of this narrative, several other projects are and will be funded from the same ADHS funding source. The BUILD grant funds will be used to supplement the ADHS funds, thus ensuring adequate funding for all of NCDOT’s current ADHS obligations.

Partnership

Since 2015, the project has gained momentum and strength from fostering strong partnerships. The A-0009C Project Team consists of representatives from FHWA, NCDOT leadership and subject matter experts, Federal and State permitting agencies, ARC, Southwestern Rural Planning Organization, Appalachian Trail Conservancy, Graham and Cherokee County Commissioners and County Managers, and Graham County Economic Development Director. NCDOT worked

closely with Cherokee, Graham and Swain Counties to garner ideas and address local concerns during project development. NCDOT also worked with FHWA to involve five tribal partners including Muscogee Creek Nation, Catawba Indian Nation, Cherokee Nation, Eastern Band of Cherokee Indians and United Keetoowah Band of Cherokee Indians. Additionally, NCDOT has fostered partnerships with several environmental advocacy groups including the Southern Environmental Law Center, WaysSouth, Wilderness Society and Mountain True. Over the last five years, coordination efforts have resulted in the inclusion of pedestrian accommodations in Robbinsville and a pedestrian bridge at the Appalachian Trail. An extensive list of the coordination efforts is included in Section 4 of the preliminary draft EA. These coordination efforts have assisted in the successful delivery of a project alignment that not only meets the purpose and need of the project but is sensitive to the cultural, natural and human environment that is uniquely Graham County.

V. Environmental Risk Review

Environmental Risk

At the writing of this application, NCDOT through extensive coordination efforts has received concurrence from Federal and State environmental resource and permitting agencies on the Purpose and Need, the detailed study alternatives carried forward, and bridging decisions and alignment review for STIP Project A-0009C. The Section 106 and Section 4(f) effects meeting with FHWA, State Historic Preservation Office and other consulting parties is scheduled for June 1, 2020. NCDOT received the Archaeological Management Summary for archeological resources in the project area and will receive the final Archeological Survey Report in June 2020. This is the final information needed to complete the Environmental Assessment. All other biological and community studies or reports have been completed. The next phase of NCDOT's Section 404/NEPA Merger Process is to identify the Least Environmentally Damaging Practical Alternative and Avoidance and Minimization to optimize the design and benefits of the project. NCDOT plans to meet with the environmental agencies in October 2020 after the Environmental Assessment is published in July/August 2020 for review and the Public Hearing in September 2020.

The Fiber Project will be constructed within existing NCDOT right of way and will only require a Type 1 Categorical Exclusion checklist. This document is expected to be completed July 2021 depending on the successful award of this grant application.

NCDOT is confident the expansive coordination efforts that have occurred and will continue through project delivery will result in approval of future environmental documents and permits.

Project Schedule

Table #6 below highlights the proposed project schedule. In order to comply with NEPA requirements, the project team anticipates the approval of the Environmental Assessment (EA) in July/August 2020 and the completion of the Finding of No Significant Impact (FONSI) in December 2020. Right of way will begin FY 2022 and letting will occur in FY 2023.

Table #7 highlights the proposed project schedule for the Fiber Project.

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Table #6: A-0009C Schedule

A-0009C Schedule	
Environmental Assessment (EA)	July/August 2020
Draft Section 4(f) Evaluation	July/August 2020
Public Hearing	September 2020
CP3/CP4A	October 2020
Finding of No Significant Impact (FONSI)	December 2020
Final Section 4(f) Evaluation	December 2020
Right of Way	September 2021
404/401 Permit Approval	May 2022
Anticipated Let Date	September 20, 2022
Estimated Completion Date	December 2025

Table #7: Fiber Project Schedule

Fiber Project Schedule	
Category Exclusion (CE) Type 1	July 2021
Right of Way Certification	September 2021
Anticipated Let Date	October 12, 2021
Estimated Completion Date	May 2022

Continuing Corridor K: Connecting People, Goods and Services will meet the obligation period of September 30, 2022 and NCDOT will accept the BUILD grant funding prior to the required completion date of September 30, 2027 which meets the BUILD fund expenditure liquidation date. NCDOT plans to advertise and let a construction contract on October 12, 2021 for the Fiber Project and on September 20, 2022 for STIP Project A-0009C. Subsequent awards of the contracts are anticipated within one month of letting with construction beginning within two months of the above Let Dates.

Required Approvals

As indicated in the above schedule and environmental risk section, all remaining NEPA documentation is expected to be approved by December 2020. The project team does not anticipate any problems with the remaining required approvals listed below.

Federal Highway Administration

Section 4(f) - Protects publicly owned parks, recreation areas, and wildlife/waterfowl refuges as well as historic sites listed or eligible for listing in the National Register of Historic Places. These lands can only be used for federally funded transportation project if there is no other feasible or prudent alternative, and the project incorporates all possible planning to minimize harm.

US Department of Agriculture, Forest Service

Special Use Permit – A letter of consent and contract stipulations must be issued before the FHWA has authority to issue a Public Highway Easement across National Forest lands. The USFS considers the FHWA issued easement a special use permit.

US Army Corps of Engineers

Section 404 Permit – A permit required for the discharge of dredged or fill material in waters of the US, including wetlands. (33 USC 1344). This regulation is promulgated in the federal Water Pollution Control Act Amendments of 1972 and Section 404 of the Clean Water Act (CWA) of 1977 (33 CFR 323).

US Fish and Wildlife Service

Section 404 Permit Review – Required to determine a proposed project’s impact on public fish and wildlife resources. USFWS provides recommendations on how the proposed project could avoid or minimize impacts to existing fish and wildlife resources and their habitats, including wetlands.

Section 7 Consultation - Required to ensure that actions authorized, funded or carried out by federal agencies not jeopardize the existence of any species listed under the ESA, or destroy or adversely modify designated critical habitat of any listed species.

NC Division of Water Quality

Section 401 Water Quality Certification – Section 401 of the CWA required that any applicant for a Section 404 permit obtain a Water Quality Certification (WQC) from the State. The purpose of the certification is to confirm that the discharge of fill materials will be in compliance with the State’s applicable Water Quality Standards. An application for a USACE Section 404 Permit is considered an application for a WQC.

NC Division of Land Resources

Sedimentation Pollution Control Act - Requires sedimentation and erosion control devices at all construction sites.

NC Division of Forest Resources

Burning Permit – Required to start a fire in woodlands or within 500 feet of woodlands under the protection of the Division of Forest Resources.

Technical Capacity

NCDOT has a long history of successfully delivering federally funded projects including BUILD and INFRA awards and complying with USDOT regulations.

Financial Capacity

In accordance with the Better Utilizing Investments to Leverage Development (BUILD) program guidance, the North Carolina Department of Transportation is requesting a waiver from the local non-federal match requirement, as permitted for rural projects. The other funding source for the Project, the Appalachian Development Highway System (ADHS), is providing \$153M toward the Project. However, as a federal funding source, the ADHS’s funds cannot be counted as state or local match.

IV. Benefit Cost Analysis

A benefit cost analysis was performed to compare the benefits and cost of constructing the *Continuing Corridor K* project. This analysis will assist in the evaluation of the proposed project in terms of its ability to satisfy the transportation purpose and need. This analysis compares the selection criteria using the 7% discount rates. The project meets all selection criteria and has a positive benefit to cost ratio as shown on Table #8 below.

Table #8: Benefit-Cost Analysis for *Continuing Corridor K*

Analysis Period: (30 years)	7% Discount Rate	3% Discount Rate
	2026-2055	2026-2054
Costs (2018 \$M)		
Capital Cost	\$109.9	\$129.7
<i>Total Costs</i>	\$109.9	\$129.7
Benefits (2018 \$M)		
Economic Competitiveness Benefits		
Auto Travel Time Savings	\$7.7	\$16.4
Truck Operating Savings	\$0.5	\$1.2
Incident Management Savings	\$11.9	\$23.8
Resiliency Savings	\$24.8	\$52.2
Reliability Savings	\$26.3	\$51.5
Fiber/Broadband Benefits	\$0.3	\$0.7
Sub-Total	\$71.6	\$145.6
Safety Benefits		
Reduced Roadway Fatalities and Crashes	\$29.9	\$58.6
Sub-Total	\$29.9	\$58.6
Cost Savings		
Net Operating & Maintenance Costs	\$4.0	\$6.2
Residual Savings	\$5.7	\$21.6
Sub-Total	\$9.7	\$27.8
<i>Total Benefits</i>	\$111.2	\$232.0
Outcome		
Net Present Value (2018 \$M)	\$1.30	\$102.28
Benefit-Cost Ratio	1.01	1.79

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The 30-year period of analysis on the A-0009C project reflects the benefits and the positive outcomes in:

- ✓ Travel time savings
- ✓ Improved movement along the corridor in a rural County
- ✓ Closes one of the last remaining gaps in Corridor K for the ADHS
- ✓ Provides safer roadway infrastructure for commercial and resident travel
- ✓ Aligns with USDOT's R.O.U.T.E.S. initiative
- ✓ Viable communication system during natural disasters to ensure driver safety

For details on the BCA and methodologies used, please see the technical documents included as Attachments and in the Supplemental Materials located here:

<https://connect.ncdot.gov/resources/BUILD2020-a9/Pages/default.aspx>