

GRAHAM

Greater Rural Access and Highways to Accelerate Mobility



BICYCLE & PEDESTRIAN



CLIMBING LANES



UPGRADES



ITS COMPONENTS



SAFETY

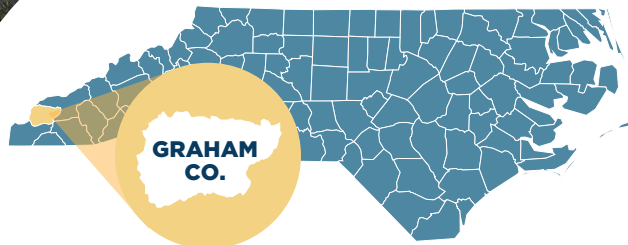
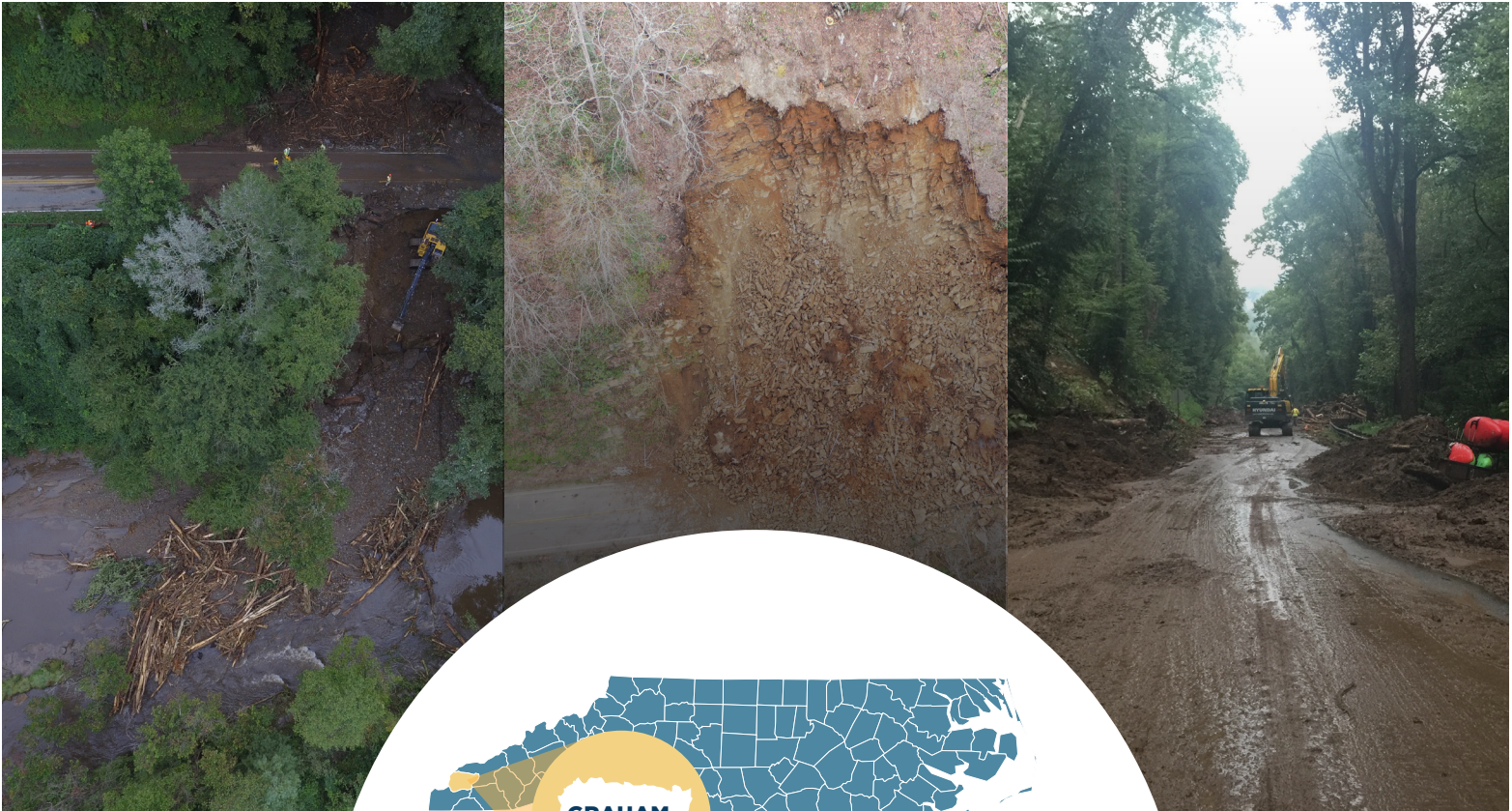


STATE OF GOOD REPAIR



WILDLIFE CROSSING

Project Description



**USDOT MPDG Investment Program
GRANT APPLICATION
AUGUST 2023**



Project Overview

Greater Rural Access and Highways to Accelerate Mobility (GRAHAM, or the Project) will invest in the development of an approximate 12-mile portion of Corridor K of the Appalachian Development Highway System (ADHS) in Graham County, North Carolina, one of the last sections of the ADHS to be completed. Consistent with the ROUTES Initiative, the Project has been developed to address this rural corridor's unique challenges while delivering on USDOT's priority transportation goals of safety, mobility, and economic competitiveness.

Statement of Work

The Project will add alternating climbing and passing lanes (2+1 design) along NC 143 and NC 28 between Robbinsville and the Stecoah Valley; improve retaining walls, embankments, and drainage; construct new sidewalks in Robbinsville along US 129 and NC 143; install a 0.6 mile multi-use path in the Stecoah Valley to improve multimodal access to services, businesses and educational opportunities; and improve Appalachian National Scenic Trail (ANST) access and safety, by building a new land bridge to allow pedestrians and bicyclists, as well as wildlife, to safely cross NC 143. GRAHAM will modernize and bring Corridor roads into a state of good repair by constructing wider 10-foot shoulders (including 8-foot paved shoulders), improving horizontal and

vertical alignments, and widening travel lanes to meet NCDOT standards. The Project will also install two Dynamic Message Signs (DMS), six Dynamic Trailblazers, and a new closed-circuit television camera (CCTV) system at the intersection of US 129 and NC 143 in Robbinsville, allowing for enhanced signal coordination at five Corridor intersections. Collectively, these individual investments will work together to modernize one of the last segments of Corridor K, addressing multiple national goals (23 U.S. C. § 150) and mitigating system vulnerabilities by improving the safety, condition, and reliability of the Corridor.

Technical and Engineering Considerations

Corridor K is characterized by steep, mountainous topography, the navigation of which has led to current roadway design features that include steep grades, sharp curves, narrow lanes, and varying shoulder widths and materials.

These design features have required the NCDOT to dictate a variety of speed limits along the route, which result in speed changes for motorists that can be unforeseen and have resulted in frequent crashes at multiple locations along existing roadways (labeled "hot spots"). The Project will incorporate countermeasures to address these dangerous roadway deficiencies and better utilize



existing roadway segments; as well as introduce segments at new locations to alleviate congestion and safety concerns, and provide better travel time reliability.

Some of the new roadway segments will require the construction of bridges and tunnels in challenging geotechnical conditions. Extreme care must be taken during construction to alleviate/mitigate the propensity for landslides onto existing roadways and properties as construction operations may include boring and blasting. Kinematic analyses using stereographic methods should also be performed to identify rock slope stability. Where kinematic analyses suggest potential slope instability, equilibrium analyses should then be performed to evaluate the factor of safety against sliding. Rock fall hazards should be assessed using rock fall simulation models such as the Colorado Rockfall Simulation Program (CRSP).

Providing/maintaining sufficient access to properties adjacent to Corridor K in this mountainous rural area of North Carolina is also essential, but could present some complex challenges.

Current Design Status

Final Design for ADHS section A-0009C was completed on August 2022, and ROW was completed in July 2022. To increase the opportunity for regional and local contractors to potentially bid on this Project, A-0009C has been split into four sections, thus lowering the cost of each contract and allowing construction to proceed in phases based on available ADHS funding. These phases are currently anticipated to occur as follows: CA - let August 2022, CB - let September 2022, CC - let December 2022, and CD, schedule still to be determined. Additional funding will be needed to complete the CD portion and all other improvements to Corridor K.

NCDOT has already completed the Project's National Environmental Policy Act (NEPA) process through an Environmental Assessment, resulting in a Finding of No Significant Impacts (FONSI) for the recommended alignment. The FONSI was signed on March 19, 2021. Topographical surveys, geotechnical investigations, and hydrological studies were undertaken as part of the Design Study (November 2019) and the Environmental

Assessment. A geo-environmental study report was completed in December 2019. Traffic noise studies were completed in April 2020. Hazardous material considerations were considered in tandem with the hydrological studies, as part of the area's rock formation contains acidic rock. Archeological investigation was also undertaken to inform the route selection. Cost estimates have been developed and refined through value engineering.

Transportation Challenges

Given the challenges associated with this region's mountainous terrain and sensitive natural habitat, the Project is among the last of the ADHS corridors to be completed. Roadways within the study area typically have steep grades and sharp curves, and may have paved or unpaved shoulders of varying widths or no shoulders at all. The roadway network in Graham County is limited, having only three highways: US 129, NC 143, and NC 28. Grades along these routes often exceed 6% in mountainous areas – most notably near Stecoah Gap on NC 143, where the grade reaches 8%.

Local travel from Robbinsville to Stecoah in Graham County is limited to three two-lane roads: US 129, NC 143, and NC 28. Travel reliability along these roadways is impaired by any type of blockage or disruption, including those due to winter weather, fog, washouts, landslides, fallen trees, traffic incidents, vehicle breakdowns, slow-moving vehicles, etc. Such situations adversely affect travel times as travelers must wait until roadways are cleared or back track and detour around them.

In addition, steep grades, narrow shoulder widths, and sharp curves on US 129, NC 143, and NC 28 affect travel speed and opportunities to pass slower vehicles. US 129 between NC 143 and SR 1155, and NC 143 between the 3-lane section at SR 1275 and SR 1277, are predicted to exceed capacity by 2040 (2015 Graham County CTP).

All paved roads into and out of Graham County are primarily two-lane and there is thus an inability to pass slower vehicles over substantial distances ("up to 19 miles" according to the [2015 Graham County CTP](#)¹). A combination of steep grades, tight curves, and heavy vehicles causes impaired mobility and constrained freight movement as well

(2015 Graham County CTP). Emergency medical response times are also frequently affected by roadway conditions and the volume/type of traffic encountered while responding to emergencies. This factor has resulted in loss of life incidents according to input provided by local officials (Project Team Meeting - September 30, 2015, through October 1, 2015).

Consistent with the federal government's ROUTES Initiative, this Project has been developed to address the rural Corridor K's unique challenges, while delivering on the USDOT's priority transportation goals of safety, mobility, and economic competitiveness. The Project improves travel reliability and emergency response by addressing topographic challenges, adding climbing and passing lanes along NC 143 and NC 28, between Robbinsville and the Stecoah Valley. It expands active transportation access to federal lands used for recreation by constructing new sidewalks, a multi-use path, and a new land bridge that will allow pedestrians and wildlife to safely cross NC 143. The Project will also improve access to the area's significant natural areas, supporting the local recreational/tourism economy. ITS enhancements built into the Project will help to overcome the area's "remoteness" by providing tools for managing emergencies and road closures along US 19/74, which occur frequently due to flooding, downed trees, and geotechnical failures. US 129, NC 143, and NC 28 are vital detours, but with only a single lane in each direction and inadequate communications to travelers, any increased traffic along the route leads to congestion and travel delays.

Collectively, the Project's slate of planned investments will work together to modernize one of the last segments of Corridor K, addressing multiple national goals (23 U.S. C. § 150) and mitigating system vulnerabilities by improving the safety, condition, and reliability of the corridor. By investing in the delivery of these outcomes, the Project supports the economic vitality of this tourist-dependent economy. Without a Rural grant, construction cost increases will delay the delivery of these long-planned improvements. The Project is tailored to this remote area's specific needs through an engaged collaboration

described in the "Project History" section of this Project Description narrative.

Project History

This project was first proposed under the Appalachian Regional Development Act of 1965 and has reached various stages of development over the past several decades. Historically, the Graham County portion of Corridor K was presented as a four-lane, median-divided highway at a new location, with 0.5-mile dual tunnels under Stecoah Gap. This design was pursued for a number of years, resulting in a Final Environmental Impact Statement (Final EIS) in 1984 and a Draft Supplemental EIS in 2008. After a pause in 2011 to conduct a regional study and develop County Comprehensive Transportation Plans, the Project's planning was restarted in 2015.

In July 2015, transportation and resource agency leadership met to reinitiate studies under a "fresh look" approach that emphasized early and continuous input from and participation of a new "Project team," comprised of local elected officials and local government staff members, Tribal representatives, and federal/state regulatory and resource agency representatives. This Project team included representatives from the Eastern Band of Cherokee Indians, the North Carolina Department of Transportation (NCDOT), the Federal Highway Administration (FHWA), the Appalachian Regional Commission (ARC), the Southwestern Commission, the Appalachian Trail Conservancy, and the Graham and Cherokee County Commissioner's and County Manager's offices, and the Graham County Economic Development Director.

This team worked together to identify the needs of the study area and conduct traffic studies to determine design options that would meet those needs. Traffic studies were used to evaluate the number and type of lanes for the Project with the goal of finding a "right-size" design that best addressed mobility and reliability issues while minimizing impacts to natural and archaeological resources. As such, the current selected option is a two-lane design with passing and climbing lanes as needed to meet the Project's purpose, which

1 <https://connect.ncdot.gov/projects/planning/TPBCTP/Graham%20County/Graham%20CTP%20Final%20Report.pdf>

includes an overpass crossing for the safety of pedestrian and animal travelers.

Broader Context

The ADHS is a 3,090-mile system of State, US, and Interstate routes established by Congress in 1965. It is organized into lettered corridors that all together provide a safe, efficient regional transportation system; generate economic development in previously isolated areas; supplement the Interstate system; and provide local residents of this Appalachian region with access to regional, national, and international markets. Corridor K is part of the original ADHS authorized by Congress in 1965 and stretches from I-75 near Cleveland, TN to Corridor A (US 23) near Dillsboro, NC. The Project's section of Corridor K, known as A-0009C, is part of North Carolina's State Transportation Improvement

Program (STIP) and, as noted previously, will be one of the last ADHS corridors to be completed. Additional funding is critical to its completion.

Location

A-0009C has been planned to include 12.6 miles of roadway modernization and multi-modal improvements on US 129 in Robbinsville, NC; on NC 143 between US 129 in Robbinsville and NC 28 at Johnson Gap; and on NC 28 between NC 143 and Edwards Gap in Graham County, NC. The ITS components of the Project are located along the A-0009C corridor, as well as along US 19/74 between Andrews, NC and Fontana Lake, transiting across Graham, Swain, and Cherokee Counties.

2020 Transportation Disadvantaged Populations Benefitting from GRAHAM

Census Tract	Component	APP/ HDC	Poverty	Minority	Zero Vehicle Households	Disability	Over 65	Under 18
9203	ITS, roadway improvements, sidewalks	HDC, APP	37%	34%	23%	21%	16%	22%
9202	ITS, roadway improvements, land bridge	-	8%	5%	10%	25%	22%	21%
9201	ITS, roadway improvement, multi-use path	-	4%	4%	-	20%	29%	19%
9603.01	ITS	APP	15%	11%	2%	23%	22%	14%
9301.02	ITS		12%	0.1%	-	22%	28%	16%
Robbinsville, NC²	ITS, roadway improvements, sidewalks	HDC, APP	43.8%	26.7%	19%	26.7%	20%	21%
Graham County	-	-	14%	14%	7%	22%	24%	20%
North Carolina	-	-	14%	37%	6%	13%	16%	22%

State and County FIPS = 37075

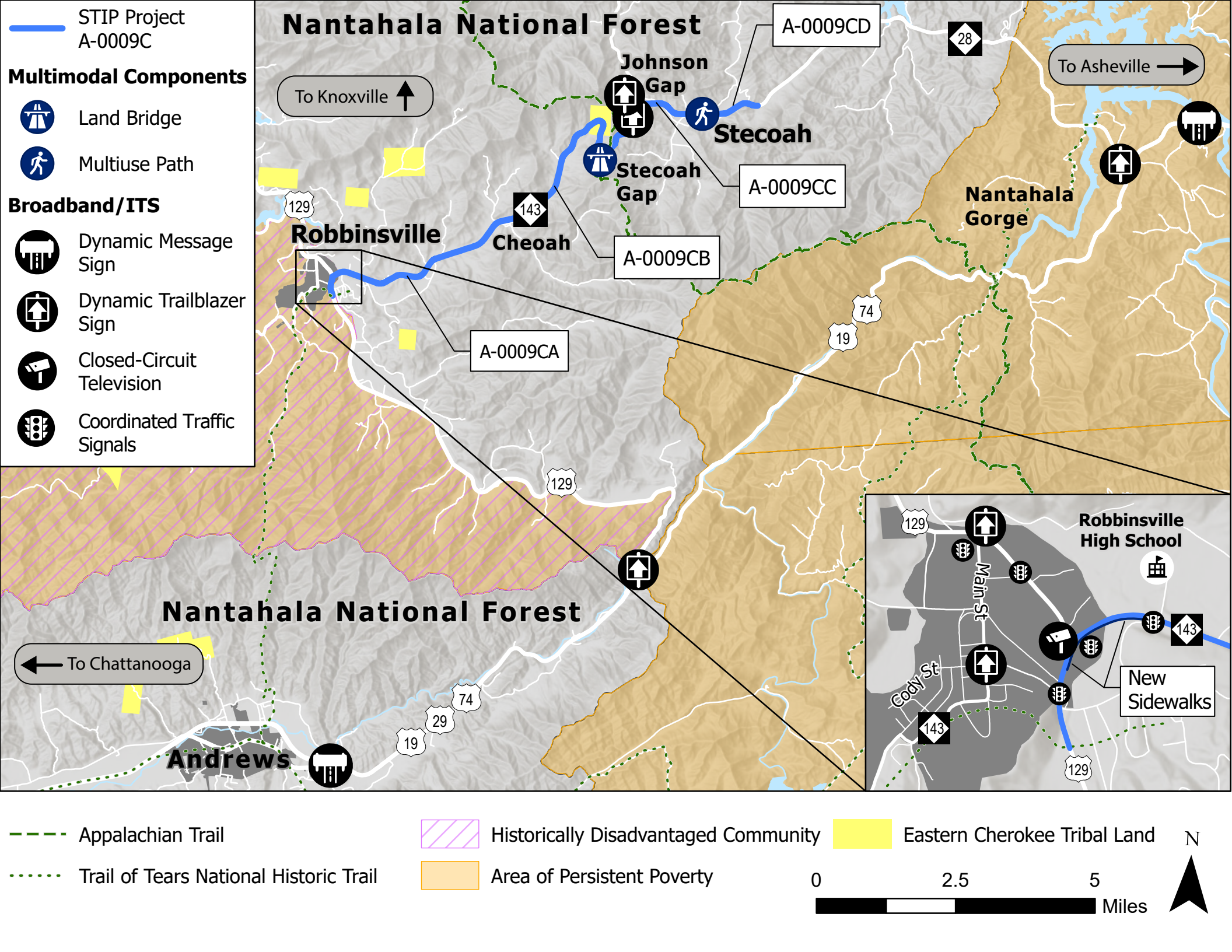
Demographics for each Census Tract were calculated based on U.S. Census Bureau ACS 5-year Estimates (2016-2020) collected at the Block Group level.

APP: Area of Persistent Poverty

HDC: Historically Disadvantaged Community

2 https://data.census.gov/profile/Robbinsville_town,_North_Carolina?g=160XX00US3757020





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