



Southeastern North Carolina Passenger Rail Feasibility Study

September 2024

Created for NCDOT Rail Division by WGI, Inc



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Contents

- Executive Summary..... i
- 1. Introduction..... 1
- 2. Train Performance and Estimated Run Times.....17
- 3. Ridership19
- 4. Operational and Track Maintenance Costs23
- 5. Conceptual Infrastructure and Equipment Needs.....25
- 6. Capital Cost Estimates31
- 7. Recommendations and Next Steps.....33
- 8. Stakeholder Coordination39
- Abbreviations.....41
- References43
- Appendix.....45

Version History

Version 1 – Distributed and posted on NCDOT’s website on September 17, 2024.

Version 2 – Posted on NCDOT’s website in November 2024. Version 1 incorrectly referenced the Cape Fear and Northeast Cape Fear Rivers. The Western Route crosses the Cape Fear River and Northeast Cape Fear River and the Eastern Route crosses the Northeast Cape Fear River. The previous text only referred to the Cape Fear River. Revisions have been made in the Executive Summary, Section 1.4.3, and Section 7 to make corrections. The corrections are limited to text edits and do not change the cost estimates, analyses, and conclusions.

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Executive Summary

The Southeastern North Carolina (SENC) Passenger Rail Feasibility Study provides conceptual level capital costs, operating costs, and a range of ridership and revenue associated with a new intercity passenger service connecting Wilmington, North Carolina with the existing state-supported passenger services in Raleigh, North Carolina. The service described in this study would connect eastern North Carolina communities with communities between Raleigh and Charlotte, and the Northeast Corridor.

The recommended route for the Raleigh to Wilmington service is the Eastern Route that follows the North Carolina Railroad Company's (NCCR's) NC-Line from Raleigh to Goldsboro and follows CSX- and NCDOT-owned corridors from Goldsboro to Wilmington. This route will be pursued through the Federal Railroad Administration's Corridor Identification and Development (CID) Program. Local interest in the corridor is noted below.

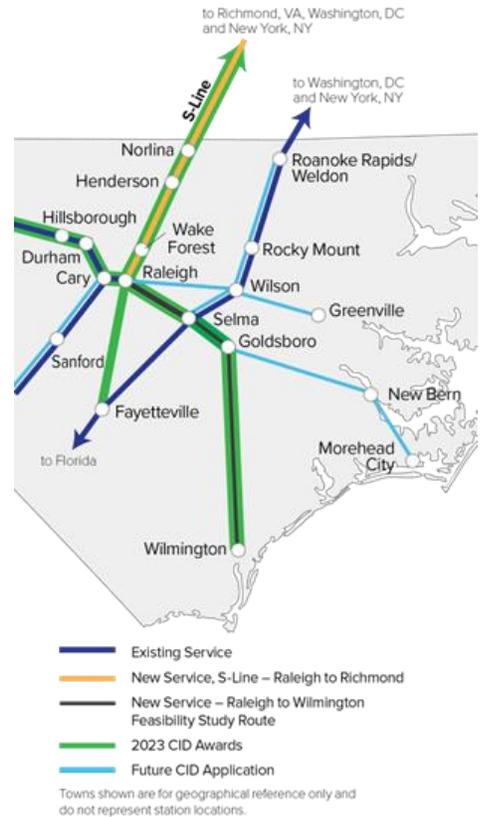


Figure ES-1 - Eastern NC Passenger Rail Corridors

"Imagine hopping aboard a train in downtown Wilmington and traveling to destinations west, north, and south of our city. ...There is growing momentum for that dream to become a reality, for Wilmington and other cities across North Carolina, as state, local MPO, and federal officials explore new funding opportunities for intercity passenger rail. ...This is an exciting moment for the possibilities of passenger rail."

Mayor Bill Saffo, City of Wilmington

"The Town of Wallace and its residents are super excited about the possibility of passenger rail returning to our area. I have spent many hours discussing this exciting opportunity with older citizens who recount their fond memories of getting on the train in Wallace and traveling to Washington DC to catch a football game or to take a quick day trip to Wilmington. Passenger rail is a crucial key to our future economic development in the 21st century."

Mayor Jason Wells, Town of Wallace

A second route, the Western Route, was also evaluated as part of this study. The Western Route connected rail lines between Raleigh, Selma, Fayetteville, Pembroke, and Wilmington. Although this study recommends the Wilmington route that goes through Goldsboro, it is noted that a separate corridor connecting Fayetteville to Raleigh will also be studied through the CID program. This



connection will provide Fayetteville with access to the Southeast Corridor and the growing North Carolina passenger rail network via Raleigh. Analysis of this separate Raleigh to Fayetteville corridor is not included in this study but will be completed through the Corridor Identification and Development Program. Figure ES-1 presents the recommended route for the Raleigh to Wilmington service and other Eastern NC routes that will be studied as part of the CID program.

Intercity passenger rail service can connect rural, suburban, and urban centers and enhance people’s access to jobs, healthcare, education, and tourism destinations. Local and state interest in establishing passenger rail service to southeastern North Carolina has existed for more than 20 years. A newly formed organization, Eastern Carolina Rail, was created in the spring of 2023 with the intent to support passenger rail service between Raleigh and Wilmington. Nationwide interest in passenger rail service has increased, in part, due to the passage of the Infrastructure Investment and Jobs Act (Bipartisan Infrastructure Law), and the Amtrak Connects US corridor vision. Intercity passenger rail ridership in North Carolina set all-time highs in 2023 and is on pace to exceed that record ridership in 2024.

This available funding and significant interest in the project represent a good opportunity to expand passenger rail to southeastern North Carolina. The following document explores the service characteristics, costs, and some of the necessary next steps to develop the SENC passenger service.

Service Characteristics and Assumptions

Service characteristics, estimated travel time, and annual (2045) ridership are as follows:

- Connects Southeastern North Carolina with train services in Selma and Raleigh.
- Three round trips per day on the corridor.
- Travel time estimated to be 2 hours and 35 minutes between Wilmington and Raleigh, compared to 3 hours and 30 minutes for the Western Route.
- Up to 100,000 Southeastern North Carolina trips connect to stations between Charlotte and Raleigh via transfers to the *Piedmont* and *Carolinian*, including 30,000 riders traveling to or from Wilmington.
- Up to 160,000 Southeastern North Carolina trips connect to Southeast Corridor stations north of Raleigh once Raleigh to Richmond is completed. Of these trips, 80,000 riders travel to or from Wilmington.
- Approximately 50,000 local riders are projected. Of them, 15,000 riders connect to Wilmington.

Recommendations

As shown in the comparison table on the following page, the Eastern Route is more direct (53 miles shorter) than the Western Route. Because it is more direct, the travel time between Raleigh and Wilmington is significantly shorter. Capital costs for the Eastern Route are \$170 million less.



Because it connects a higher number of populated areas, the Western Route is projected to attract more overall ridership than the Eastern Route, but simultaneously decreases the ridership projected in Wilmington due to the circuitousness of the route. This indicates the need to serve Wilmington through the Eastern Route, but also the need to better connect Fayetteville to the North Carolina rail network.

The annual net operating and maintenance costs of the Western Route are \$3 million to \$4 million more than the costs of the Eastern Route. The Eastern Route also creates a second rail route into Wilmington. Redundancy in the rail network can help provide resilience and reliability during natural disasters.

Considering the factors described above, the Eastern Route is recommended to provide access between Raleigh and Wilmington as the Southeastern North Carolina rail service. Figure ES-2 presents the recommended route. An additional recommendation of the report is to pursue additional and improved passenger rail service to Fayetteville to better connect it into North Carolina’s passenger rail network because it is an important node in the North Carolina and national networks.

Comparison of Routes (Costs in 2023 Dollars)

Item Description¹	Eastern Route	Western Route
Total Capital Costs	\$810M	\$980M
Corridor Length	134 miles	187 miles
Travel Time	2 hours and 35 minutes	3 hours and 30 minutes
Connecting Ridership²	130,000 to 260,000	180,000 to 350,000*
Local Ridership²	50,000	60,000
Wilmington Ridership²	70,000 to 120,000	60,000 to 110,000
Net Annual Operating and Maintenance Costs³	\$12M - \$14M	\$15M - \$18M
Network Resiliency and Interoperability	Provides second route Mitigates flood impacts Operates on lower volume freight corridors	Improves existing route to Wilmington Operates over existing higher volume freight corridors

¹ More details on costs and ridership are included in Table 7-1.
² Estimated ridership is annual riders in 2045.
³ Operating and maintenance costs are based on NCDOT’s experience and analysis of existing routes.
* Most of the additional riders on the Western Route would be captured by the Raleigh to Fayetteville route to be studied under the CID program.



Next Steps

The information in this feasibility report is conceptual but can be used to initiate conversations between key stakeholders to consider including passenger rail services and its associated station and rail infrastructure improvements. Initial steps that can be taken by local communities include the following:

- Metropolitan Planning Organizations (MPOs), Rural Planning Organizations (RPOs), and communities can include the intercity passenger service and potential station locations in their respective comprehensive transportation plans.
- MPOs and RPOs can use the information in this report to submit projects to NCDOT's Strategic Transportation Investments (STI) prioritization process for funding consideration. Funding of elements through STI could potentially be used as match for federal grants to construct the project.

NCDOT is currently beginning work through the Federal Railroad Administration's CID program for all selected corridors, including the Raleigh to Wilmington and Raleigh to Fayetteville corridors. The first step in the CID process is the creation of a scope, cost estimate and schedule to develop a Service Development Plan for each selected corridor. FRA has awarded \$500k grants for each corridor for this first step, which is 100% federally funded. Subsequent steps in the CID process require incrementally increasing levels of matching funds, which could include a combination of state funds and local funds from interested municipalities. Step 2 – Development of the Service Development Plan requires 10 percent non-federal match. Step 3 – Preliminary Engineering and Development of National Environmental Policy Act (NEPA) documents requires 20 percent non-federal match. NCDOT and local communities will discuss how this match will be comprised. Subsequent to CID, federal grants to construct these services generally also require 20 percent non-federal match.

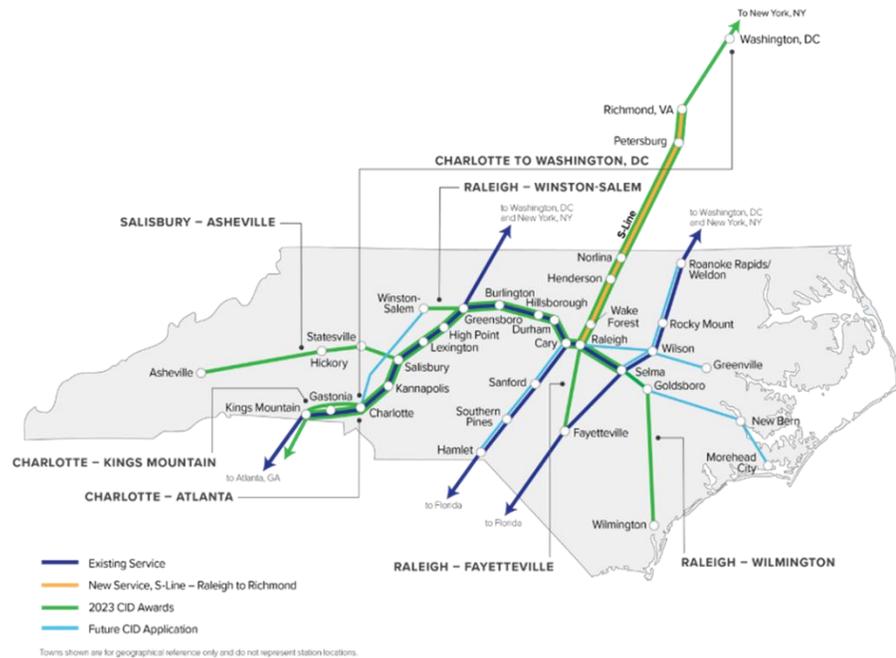


Figure ES-2 – Potential Corridors for Restored or Enhanced Passenger Rail Service

1. Introduction

The Southeastern North Carolina Passenger Rail Feasibility Study (the study) provides conceptual level capital costs, operating costs, and a range of ridership and revenue associated with a new intercity passenger service connecting Wilmington, North Carolina with the existing state-supported passenger services in Raleigh, North Carolina.

1.1 Alternative Routes Studied

The study considered two routes: a route that passes through Goldsboro and a route that passes through Fayetteville. The two studied routes are shown in Figure 1-1 and are described below:

Eastern Route

The Eastern Route connects Raleigh to Wilmington and passes through six counties. The route is approximately 134 miles long. Although station locations have not been determined, cost estimates and ridership forecasts were prepared assuming the route would include stops in Wilmington, Goldsboro, Selma, Clayton, Raleigh, and two additional stops to be determined later. Between Raleigh and Goldsboro, the route follows the NC-Line that is owned by the North Carolina Railroad Company (NCR) and carries Norfolk Southern (NS) freight trains. Just southwest of Goldsboro, a new connector track will connect the route to the CSX AC-Line to provide access to Goldsboro station. From the station, the route follows the CSX AC-Line to Wallace. CSX operates freight trains along the AC-Line, primarily carrying grain from the Midwest to hog and poultry producers in Duplin, Sampson, and Wayne Counties. The route then follows the state-owned Wallace to Castle Hayne corridor that will need to be restored. In 1986, CSX discontinued service along the 27 miles of track between Wallace and Castle Hayne, ultimately removing all track, structures, and ballast except for the Northeast Cape Fear River Bridge. NCDOT purchased the corridor and maintains the existing right-of-way. In Castle Hayne, the route reconnects with the CSX network, the CSX SE-Line. A future lead track will connect the CSX SE-Line with the planned Wilmington station.

Western Route

The Western Route included in this study traverses nine counties and is approximately 187 miles long. Although station locations have not been determined, cost estimates and ridership forecasts were prepared assuming the route would include stops in Wilmington, Lumberton, Fayetteville, Selma, Clayton, Raleigh, and one additional stop. Between Raleigh and Selma, the route follows the NC-Line that is owned by NCR and carries NS freight trains. In Selma, the route connects to the CSX A-Line



and follows it to Fayetteville and subsequently to Pembroke. The CSX A-Line is the company's primary freight corridor along the east coast. At Pembroke the route will transition to the CSX SE-Line which leads into Wilmington. A future lead track will connect the CSX SE-Line with the planned Wilmington station.

The analysis associated with the study assumes three round trips per day will be provided between Wilmington and Raleigh. In Raleigh, riders could transfer to or from one of five round trips provided by the *Piedmont* and *Carolinian* state-supported intercity services. These services provide connections to locations between Raleigh and Charlotte. Additionally, in Selma, riders of the Southeastern North Carolina service could transfer to the *Carolinian* and *Palmetto*, providing access to points north along the A-Line like Washington, DC and New York. Once the Raleigh to Richmond portion of the Southeast Corridor (S-Line) is completed, riders would be able to connect to more frequent and efficient trains to the northeast. Existing intercity passenger services in North Carolina, including, but not limited to, the *Piedmont*, *Carolinian*, and *Palmetto*, are shown in Figure 1-2. Future passenger rail services are being pursued through the Federal Railroad Administration's Corridor Identification and Development (CID) program. Figure 1-3 shows these potential services. The Raleigh to Wilmington corridor recommended by this study (Eastern Route) and a separate Fayetteville to Raleigh¹ corridor were selected to be included in the CID program. The CID program is discussed in more detail in Section 7.

¹ Note - The separate Fayetteville to Raleigh corridor is not included as part of this study, regardless of the fact that one of the potential stops on the studied Western Route is Fayetteville. The Raleigh to Fayetteville corridor will be planned through the CID program independent of the Raleigh to Wilmington corridor.



Figure 1-1. Southeastern NC Passenger Rail Routes Studied

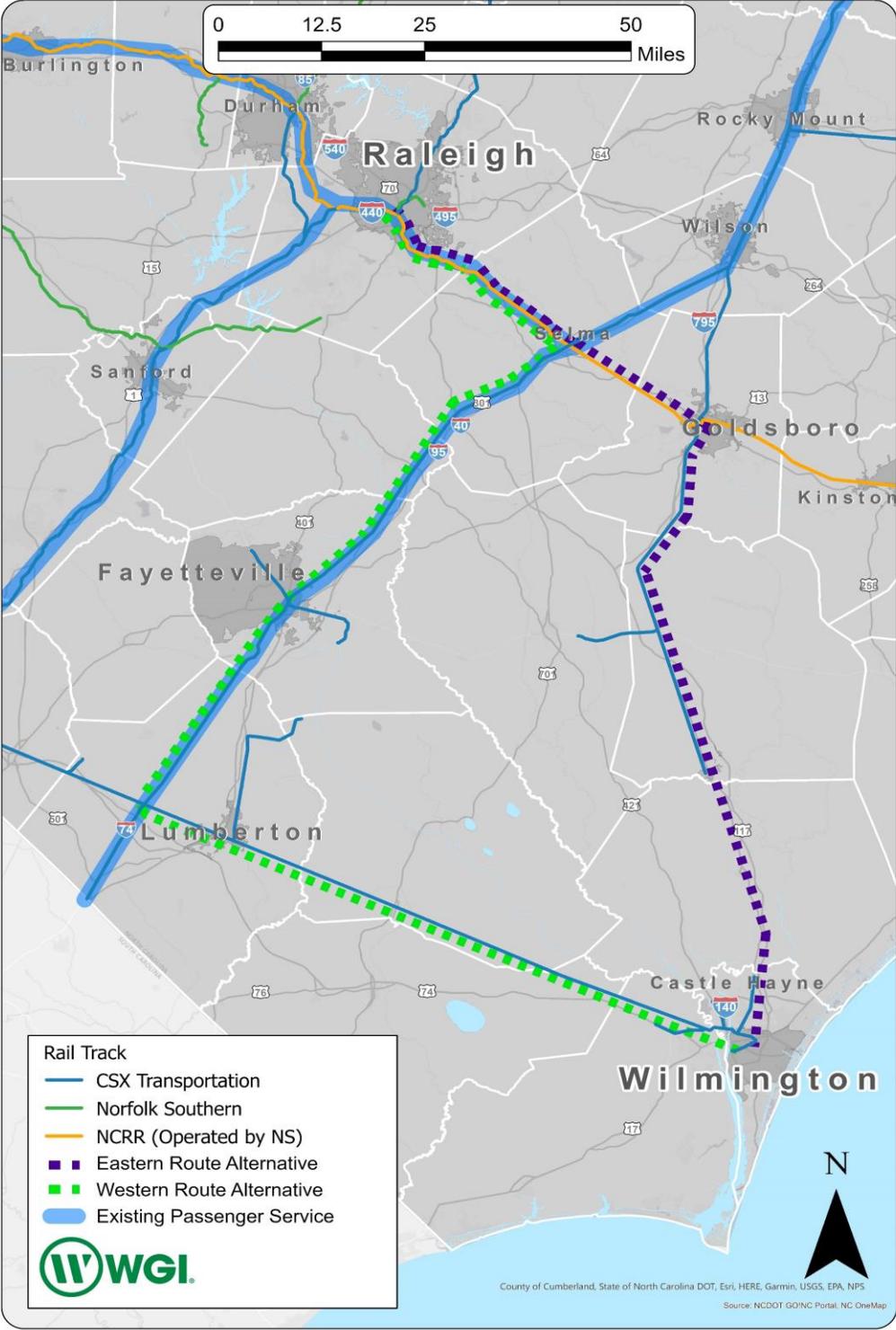


Figure 1-2. Existing North Carolina Intercity Passenger Rail Services

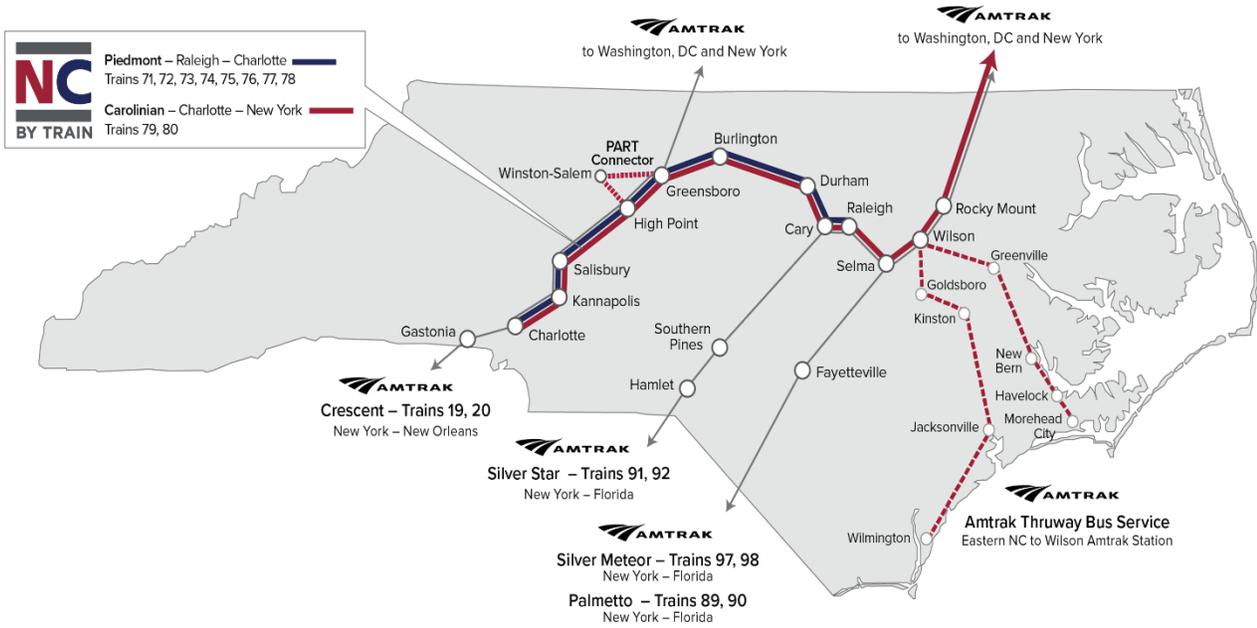
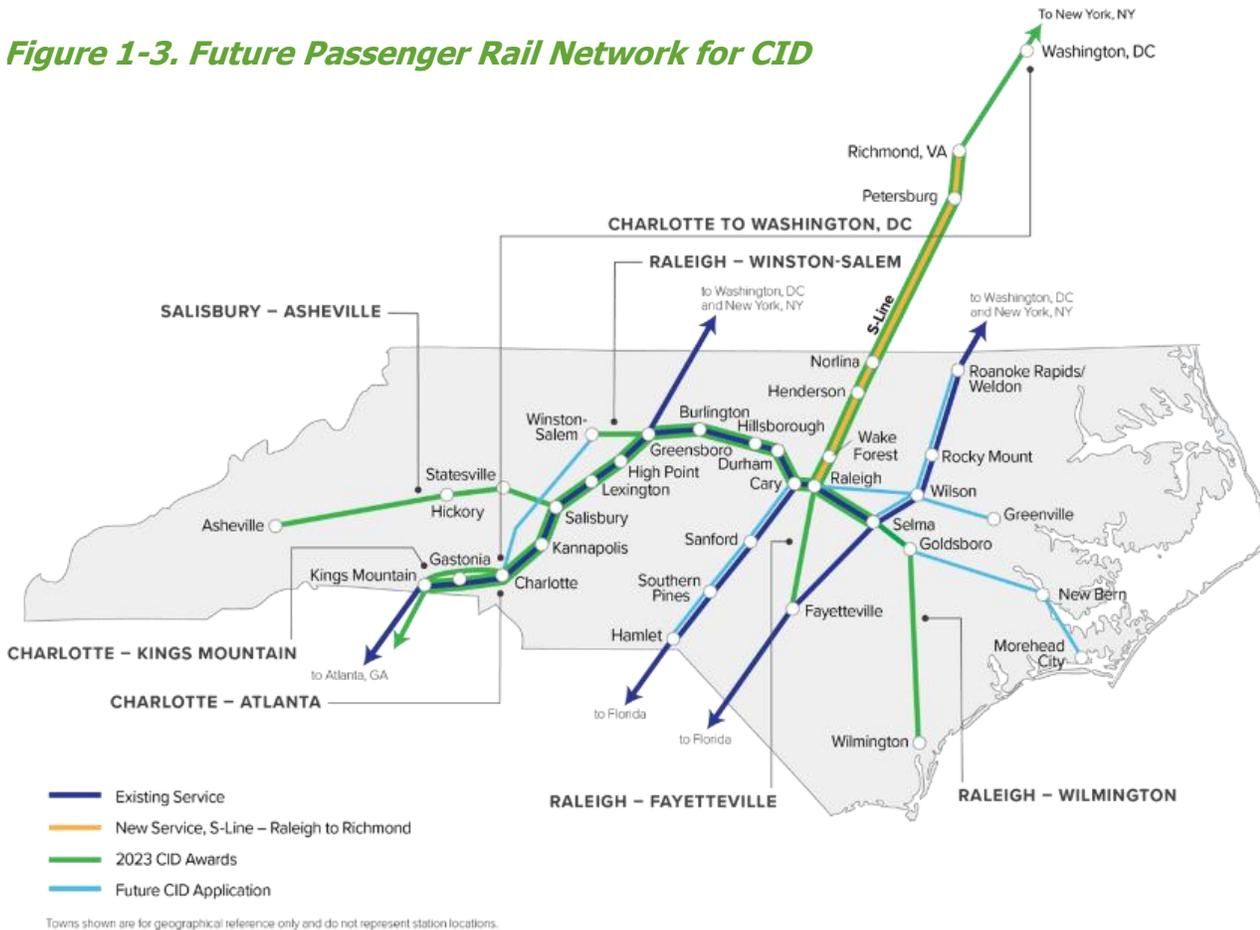


Figure 1-3. Future Passenger Rail Network for CID



1.2 Study Scope and Limitations

The objective of this study was to identify the conceptual capital and operating costs, and ridership and revenue associated with initiating proposed passenger rail services between Wilmington and Raleigh. The report does not represent a final decision by the State of North Carolina, Amtrak, or any other entity to grant or budget funds to initiate the passenger service. The estimates provided by this study can be used to pursue funding through NCDOT’s Strategic Transportation Investments (STI) prioritization process as well as other state, local, and federal sources including federal discretionary grants provided under the Bipartisan Infrastructure Law or future legislation. The infrastructure recommendations and modeling were made based on a review of infrastructure conditions and industry trends, but do not include detailed input from freight railroads. The estimates and infrastructure assumptions were prepared using information gathered through field visits, previous studies, and assumptions on freight volumes and potential passenger schedules. As the project develops, additional coordination will be needed with host freight railroads to obtain more detailed input, refine the infrastructure needed, and develop agreements to facilitate service. This study builds on previous efforts but is not a complete corridor service development plan or a benefit/cost analysis.



A mural in Mt. Olive, NC, home of the Mt. Olive Pickle Company.

1.3 Background

The history of rail operations in eastern North Carolina dates to the middle of the 19th century, when the Wilmington & Weldon (W&W) Railroad was constructed. At 161 miles, the W&W Railroad was the longest operating railroad in the world at that time, and it would eventually become a part of the growing Atlantic Coast Line Railroad, which was headquartered in Wilmington until 1960.

Although passenger rail service has not served Wilmington since the late 1960s, the area itself still attracts millions of visitors each year—many from cities that are currently served by existing state-supported and long-distance Amtrak services. Increased interest in passenger rail service has been generated through the passage of the Infrastructure Investment and Jobs Act (P.L 117-58) (commonly known as, and hereinafter referred to as, the Bipartisan Infrastructure Law (BIL)), and the Amtrak

Connects US Corridor Vision. Intercity passenger rail ridership in North Carolina set all-time highs in 2022 and 2023. A newly formed organization, Eastern Carolina Rail, was created in the spring of 2023 with the intent to support passenger rail service between Raleigh and Wilmington. In addition, the service is included in the *North Carolina Comprehensive State Rail Plan (2015)* and the *Southeast Regional Rail Plan (2020)*. Summaries of past studies are included below.

Southeastern North Carolina Passenger Rail Study – July 2005

The Southeastern North Carolina Rail Passenger Study was conducted in 2005 for NCDOT Rail Division. This study compared several route options for the re-establishment of passenger train service to Wilmington. The study also examined former stations along the proposed routes, conducted environmental screenings to determine impacts of the reconstruction of needed track, compared travel times reviewed current capacity and track conditions, and projected capital costs needed to implement service to the area. The 2005 study concluded that routes between Raleigh and Wilmington had greater potential over routes between Charlotte and Wilmington.

Eastern Infrastructure Improvement Study – January 2015

This study was conducted by NCDOT Rail Division at the request of the North Carolina General Assembly. This study assessed how improvements at three points in Eastern North Carolina's transportation network may support freight movements, expected growth, and greater economic development in the region. The three transportation network locations that were considered are: the former section of rail line between Wallace and Castle Hayne north of Wilmington (W2CH), improvements on or around the Port of Morehead City (MHC), and access and improvements on and around the Global TransPark (GTP).

NCDOT Comprehensive State Rail Plan – August 2015

As stated in the *Comprehensive State Rail Plan (CSRP)*, "...the goals and objectives for the Plan is to support the mission and goals of the North Carolina Department of Transportation (NCDOT) and the NCDOT Rail Division." The NCDOT Rail Division's mission is the "...safe and efficient movement of people and goods on North Carolina's railroads through freight, passenger and safety programs, supporting job creation and economic growth." The CSRP includes discussion of existing freight and passenger movements, railroad infrastructure, economic trends throughout the state, etc. and importantly to this study, plans and goals for the extension of existing passenger service, such as service from Raleigh to Wilmington.

Wilmington Rail Improvements – September 2017

This study was conducted by NCDOT and the North Carolina Ports Authority. It evaluated potential near-term rail and port infrastructure improvements that would improve rail access to the Port of Wilmington from CSX's Davis Yard, just north of Leland, along existing rail infrastructure traversing the



City of Wilmington and improvements to rail conditions and operations on the Port property. The report also identifies potential public funding options and includes preliminary Benefit-Cost Analyses for the two recommended programs of projects. Improvements to the Wilmington Beltline identified in this study were integrated into the Piedmont-Atlantic Intermodal Rail System grant funded through the Federal Railroad Administration’s Consolidated Rail Infrastructure and Safety Improvement Program (CRISI).

Fayetteville—Raleigh Passenger Rail Feasibility Study – August 2020

This study was conducted for NCDOT and the Capital Area and Fayetteville Area MPOs with the purpose of assessing suitability of two active rail corridors for new or additional passenger rail services. This included understanding costs for reasonably implementing such a service, conducting a preliminary estimate of anticipated passenger boardings for commuter-type scenario-driven train and frequency configurations, and determining if a Phase II exercise is viable to advance passenger rail service in one of the identified two corridors.

Southeast Regional Rail Plan – December 2020

The *Southeast Regional Rail Plan* was completed in December 2020 to develop a long-term regional passenger rail vision for the Southeast region. The Southeast Regional Rail Plan was developed by member states of the Southeast Corridor Commission and the FRA. The Southeast Corridor Commission includes Florida, Georgia, South Carolina, North Carolina, Tennessee, Virginia, and the District of Columbia. The plan outlines the potential for high-performance passenger rail and creates a 40-year vision for intercity connections in the region. The plan includes expansion of passenger rail service to Wilmington and the service’s connection to the high-performance Southeast Corridor identified between Atlanta, Georgia and Washington, DC.

1.4 Study Area Description

The two studied passenger rail corridors between Raleigh and Wilmington are 134 miles and 187 miles in length, depending on the alternative route. Wilmington is a port city located just inland from the mouth of the Cape Fear River, located in the Outer Coastal Plain region of North Carolina, which is a low, flat land along the Atlantic Ocean. The corridors pass through the rural Inner Coastal Plain that has rich, sandy soil contributing to some of the state’s best farmland.

In addition to agriculture, tourism is a major part of the local economy in Eastern North Carolina. Along with the popular beaches found along the coast, the region also contains several historic towns and landmarks, miles of waterways, and beautiful scenery. Eastern North Carolina welcomes millions of visitors every year who are hoping to take advantage of the warm weather while relaxing on the beaches, exploring the historic towns, and countless other recreational activities. The proposed



passenger rail corridor connects Raleigh in the Piedmont to Wilmington and other communities in eastern part of the state. Raleigh is the capital city of the state of North Carolina and a hub for several large multi-national corporations, as well as a robust hospital and medical facility system. Raleigh will also serve as a connection between stations on this new route and stations served by the existing *Piedmont* and *Carolinian* corridors (stations between Charlotte and Raleigh). Research Triangle Park (RTP), one of the most prominent high-tech research and development parks in the United States, is also located adjacent to the City of Raleigh. RTP is home to over 300 companies and employs tens of thousands of workers. Wilmington is the state's 8th most populous city. Wilmington



Attractions such as the Historic Downtown Wilmington, Battleship North Carolina, Fort Fisher State Park and other recreation opportunities are draws for visitors to Southeastern North Carolina.

is known for its charming riverfront along the Cape Fear River and its historical importance, being named the 'Best American Riverfront' by readers of USA Today in 2014, as well as one of The National Trust for Historic Preservation's 'Dozen Distinctive Destinations' in 2008. Wilmington is also a short drive from beaches, including Carolina and Wrightsville Beaches, providing several outdoor recreational opportunities and family-friendly activities. Additionally, the city is home to a growing number of educational and medical facilities, as well as a myriad of businesses, hotels, and restaurants which help make it a major tourism destination. There are several military bases in the region that could potentially benefit from increased passenger service depending on route, including Fort Liberty near Fayetteville along the Western Route, and Seymour Johnson Air Force Base in Goldsboro and Sunny Point Military Terminal south of Wilmington along the Eastern Route.

1.4.1 Socioeconomic Characteristics

The alternative corridors for the Raleigh-to-Wilmington passenger rail service run through six counties for the Eastern Route and nine counties for the Western Route. The Eastern Route runs through Wake, Johnston, Wayne, Duplin, Pender, and New Hanover counties. The Western Route passes through

Wake, Johnston, Harnett, Cumberland, Robeson, Bladen, Columbus, Brunswick, and New Hanover counties. Researchers used the average distance traveled (15 miles one way) to access North Carolina’s state-supported intercity passenger rail services to determine the likely service area for the proposed corridor. The areas encompassed by 15-mile buffers around the studied corridors are home to nearly 1.95 million residents for the Eastern Route and 2.46 million for the Western Route. Accounting for overlapping geographies within the existing Raleigh-to-Charlotte corridor, adding the Southeastern North Carolina Passenger Rail service would extend service to an additional 776 thousand North Carolina residents in the case of Eastern Route and 1.29 million in the case of Western Route. Some demographic data points for these populations are presented in Table 1-1. For comparison, the same data points are provided for a similar area around the existing rail service between Raleigh and Charlotte.

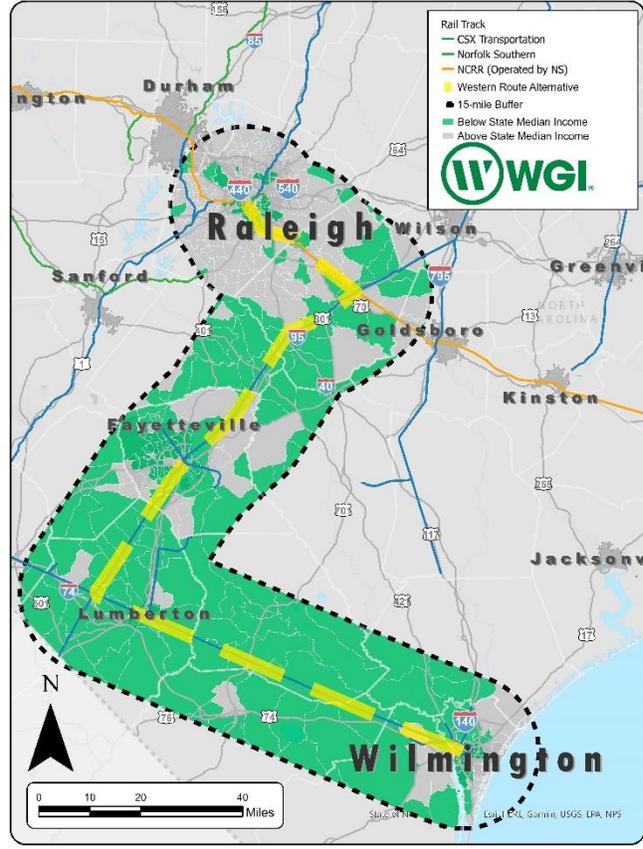
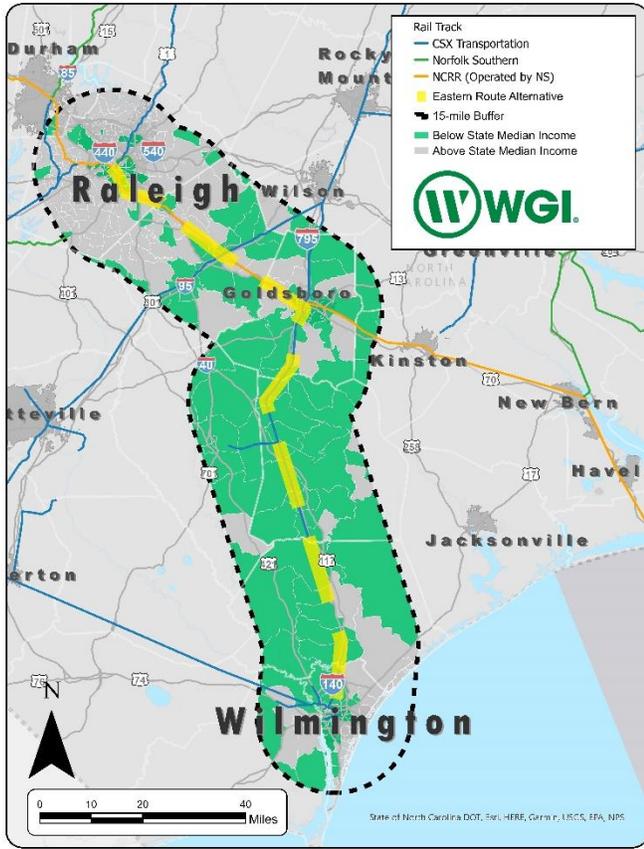
Table 1-1. Corridor Demographic Data (15-mile buffer)

	Raleigh to Wilmington Eastern Route	Raleigh to Wilmington Western Route	Raleigh to Charlotte	NC Statewide
Total Population	1,952,184	2,464,370	4,552,400	10,699,000
Median Household Income¹	\$72,909	\$66,754	\$72,145	\$56,642
Percent below Statewide Median Household Income	34.8%	46.9%	36.6%	—
Percent Zero- car Household	4.5%	4.9%	4.9%	5.6%
Percent Minority	38.2%	42.7%	42.3%	37.4%
Percent with Disability	11.1%	12.1%	10.2%	13.4%
Percent over 65 Years Of Age	13.9%	13.5%	13.5%	16.3%

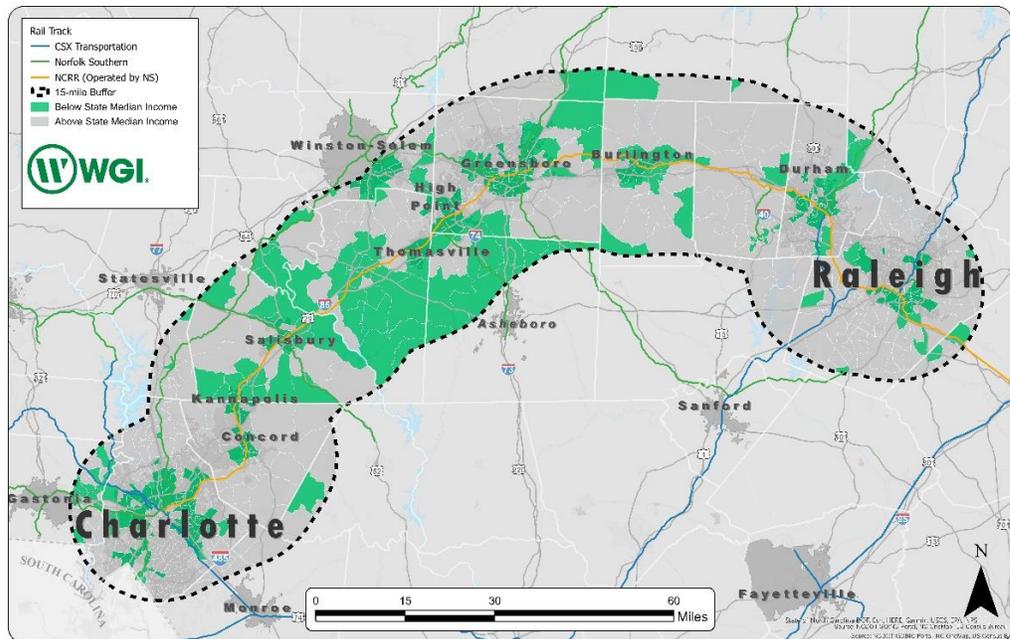
Source: US Census Bureau, American Community Survey 5-year Estimates (2016-2020), Tables B01001, B16004, B25044, B03002, B18101; US Census Bureau 2020 Decennial Census.

¹For each rail corridor, census tract median incomes were averaged to achieve an average regional median income in a 15-mile corridor buffer. The Statewide median income comes directly from Census-provided data. The percentages are based on populations that are above or below the calculated median incomes.





Figures 1-4, 1-5, and 1-6 - Median Household Income Raleigh to Wilmington and Raleigh to Charlotte, both compared to Statewide Median Household Income



The data show that despite both corridors having a median income (averaged from the census tracts included in the 15-mile buffer) higher than the state median income, much of the area along both the Eastern and the Western Routes includes census tracts where the median incomes fall below the state average.

As noted in the *Comprehensive State Rail Plan* (NCDOT, 2015), access to passenger rail service provides increased accessibility and mobility for passengers, particularly those who have limited transportation options available. Low-income and elderly riders benefit from rail and other transportation options other than individual automobiles to get from place to place, including work, school, errands, medical care, and to make recreational trips. With the passenger rail services, transportation disadvantaged populations can access locations outside of the cities and towns where they live, which benefits them by increasing their access to employment, educational, medical, social, and recreational opportunities. The Southeastern NC Passenger Rail Corridor would be a car-free connection to major metropolitan areas throughout the state such as Charlotte, Greensboro, and Raleigh. It also would connect Southeastern NC populations to rail routes along the east coast of the United States.

The addition of a passenger rail service would also benefit the state's growing population of young professionals. According to "Survey: Millennials Willing to Relocate for Better Transportation Options" (Streetsblog USA, 2014), the millennial generation (people born between 1982 and 2003) value access to a variety of transportation options while simultaneously aspiring to be less reliant on automobiles. More than half (54 percent) would consider moving to another area if it had better options to get around.

In North Carolina, which is one of the fastest growing states in the nation, having the option of multiple modes of transportation has become increasingly important. The addition of a transportation option in this region provides the ability to reach job opportunities that might otherwise be inaccessible and widens the pool of job seekers for employers. Regional jobs associated with the operations and maintenance of the trains and infrastructure would be created. If fostered by local authorities, station areas have the potential to spur transit-oriented economic development with increased density and a mix of residential and commercial uses. Investment in infrastructure such as passenger rail is critical to shaping the future of the state's economy.



1.4.2 Proposed Station Locations

As noted in the *Comprehensive State Rail Plan* (NCDOT, 2015), station area projects have contributed to quality-of-life improvements across the state. NCDOT has invested significant state and federal funds in passenger rail station improvements over the past decade. Revitalized stations can serve as a catalyst for private development in the adjacent properties, and investing in station area improvements will provide better passenger access to more of the state.



*Historic
Mitchner's
Station in
Selma, NC*

*Goldsboro, NC
historic station*



Specifically for the proposed Eastern North Carolina service, the stations in Wilmington and Raleigh will serve as the end point locations. Raleigh Union Station, located in the Downtown Raleigh's Warehouse

District, was opened in the summer of 2018, and will serve as one endpoint for the proposed corridor. Raleigh Union Station was created to provide Amtrak service to the surrounding area, but also to serve as a future multimodal transit hub. A future adjacent building will serve as the bus terminus for GoTriangle, a regional bus service. Raleigh Union Station will connect riders of the proposed passenger rail corridor to the *Carolinian*, *Piedmont*, and *Silver Star* lines, allowing access to the rest of the state and other destinations along the east coast.

Selma, a proposed intermediate stop for both the Eastern Route and the Western Route, also has an existing and active station. Selma Union Depot, also known as Selma Union Station, serves as a stop for two Amtrak passenger trains, including the *Palmetto*, whose route stretches from New York City to Savannah.



*Fayetteville
Station*

Serving as the southeastern terminus, Wilmington does not have an active rail station. However, Padgett Station, located on 3rd Street in the Historic District of Downtown Wilmington, is the first phase of a proposed multimodal

*Selma
Station*



transportation center that will serve intercity and local bus service, along with the proposed passenger rail service (*The Wilmington Urban Area Multi-Modal Transportation Center Feasibility Study*, May 2000). Padgett Station and the site of the future multimodal transportation center are located at the end of an existing rail bed, which spans from the station on 3rd Street to Smith Creek approximately 1.5-miles northeast. This corridor is owned by NCDOT.

As the planning for this service progresses, a more detailed service development plan will be needed to determine the stopping patterns associated with train frequencies. Potential variance of stopping patterns for different train frequencies can help provide access to more intermediate stations and communities. Additionally, more detailed site selection, service development planning, and environmental studies in accordance with NEPA are needed to determine station locations.

1.4.3 Rail Network Interoperability and Resiliency

The Southeastern North Carolina passenger rail service would operate on infrastructure owned and/or operated by host freight railroads. Infrastructure must be constructed so that operations of passenger trains do not negatively impact the movement of freight on the network. Under both alternatives, the passenger rail corridor follows a portion of the North Carolina Railroad where Norfolk Southern operates. The Eastern Route transitions to the CSX AC-Line and CSX SE-Line. The Western Route moves from NCRR onto the CSX A-Line and then the CSX SE-Line. The CSX A-Line is that railroad's primary north-south corridor along the east coast. It is one of the busiest railroad corridors in North Carolina. It is anticipated that a second main would be needed along much of the A-Line, but coordination with CSX would be required to fully define the needed infrastructure and identify any operational concerns. The Eastern Route, though it would still require infrastructure and coordination to ensure interoperability, would not follow corridors as busy as the A-Line. The addition of passenger trains to busier freight corridors increases the infrastructure needed to ameliorate potential conflicts between freight and passenger trains. As stated, the addition of passenger service be coordinated the freight railroad companies, as part of the CID program, to minimize conflicts and congestion to optimize the flow of goods and passengers on the network.

Network resiliency and reliability are also considerations in developing passenger service and rail infrastructure. Recent hurricanes, Hurricanes Matthew (2016) and Florence (2018), caused significant flooding in eastern North Carolina. Twice in the last three years, flooding caused by hurricanes required the closure of I-40 and I-95 in eastern North Carolina for multiple days. The flooding also affected CSX Transportation's SE line, which runs between Lumberton and Wilmington. Shutdowns in major transportation routes restrict the flow of people and commerce along the east coast and southeastern North Carolina. Shutdowns also impede relief efforts during times of distress. Major storms are

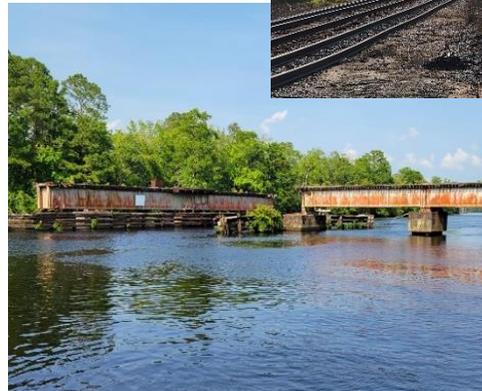


predicted to become both more common and more intense, furthering the need for redundancies in the southeast transportation network to provide service during future disastrous events. Construction of a second route to Wilmington, the Eastern Route, would provide network redundancy. The Eastern Route would not be immune to flooding, but as a second connection, it would lessen the likelihood that Wilmington and Military Ocean Terminal – Sunny Point would be without a rail connection. In addition, to help manage and mitigate flooding, flood gates are proposed to be installed along the Western Route, along the CSX SE-Line. The use of these flood gates may interrupt service on the Western Route. Rob Armstrong, the City of Lumberton’s Public Works Director, noted in an interview in February 2024 that “... construction on the floodgate will start once another infrastructure project, the widening of an I-95 bridge, finishes.” (Spectrum News1, February 27, 2024). Construction of the I-95 widening is planned to be completed in late 2027 (NCDOT Projects, March 14, 2024).

*Hilton Railroad
Drawbridge in
Wilmington, NC*



An additional area where reliability may be an issue is the location of movable bridges along the proposed alternative routes. Movable bridges are subject to periodic malfunctions associated with weather, boat strikes and machinery failure that may cause the bridge to be unusable. Both alternative routes suggested for the Southeastern Passenger Service have existing movable bridges along their corridors. Along the Eastern Route, the Northeast Cape Fear River Bridge on the abandoned Wallace to Castle Hayne portion of corridor is a swing bridge. This bridge will need to be replaced to utilize the Eastern Route for passenger rail service. The project cost estimates account for rehabilitation of this rail corridor including this bridge. Although a final determination has not been made, a fixed span bridge could potentially be used on the Eastern Route. Along the Western Route are the movable span bridges over the Cape Fear River and the Hilton Railroad Drawbridge on the Northeast Cape Fear River just north of downtown Wilmington. Movable span bridges would likely have to be maintained on the Western Route. These bridges are currently utilized for freight trains moving in and out of Wilmington.



*Northeast Cape
Fear River
Railroad Bridge
in Castle Hayne,
NC*

Finally, in regards resiliency, it was noted in the Eastern Improvement Infrastructure Study (2015) that Department of Defense (DoD) identifies restoration of Wallace to Castle Hayne section of track as a

high priority to ensure redundancy and that it would enable a second line of access to Wilmington and the rest of the rail network for freight movement.

1.5 Road Network / Travel Time

There are two major highways that help people move in and out of the southeastern region of the state: Interstate 40 which travels generally north-south across the southeastern portion of the state from Raleigh to Wilmington, and US 70 which travels east-west from Raleigh through to New Bern. Additionally, Interstate 95 travels north-south bisecting the eastern third of the region. There are also other major highways, such as US 421 and US 74, that traverse throughout the eastern part of the state.

A typical 129-mile drive between downtown Raleigh and downtown Wilmington takes approximately 2 hours and 10 minutes. Auto travelers in Wilmington and Raleigh would need to add 20% or more to their estimated journey time to assure reliability if arriving at a specific time of day is important to their trip purpose; this concept is called the 'planning time index' and reflects the needed additional buffer to avoid being late (Texas A&M Transportation Institute, 2023). This increases the amount of time estimated for a trip to at least 2 hours, 36 minutes. For some intermediate stops, it would take approximately 70 minutes to drive from Raleigh to Goldsboro and then an additional 1 hour and 53 minutes to drive from Goldsboro to Wilmington. From Raleigh to Fayetteville, it would take about 90 minutes to drive and then an additional 2 hours and 18 minutes to drive to Wilmington.



Goldsboro streetscape sculpture

The addition of passenger rail service to the southeastern region of North Carolina would provide another connection for residents to access a more extensive travel network, which may be more affordable and more accessible than current options.

1.6 Other Modes of Transportation

Apart from personal car travel, there are limited travel options between Wilmington and Raleigh. The only viable option is a Greyhound bus from downtown Raleigh to Wilmington. The typical Greyhound schedule is 3 hours and 5 minutes. An additional trip on Wave Transit is needed to get to downtown Wilmington. The standard Greyhound route from Raleigh starts at the station off Capital Blvd (US 1),

using I-40 east to US 70; taking US 70 east into Goldsboro; heading south on US 117 to Wallace and finally reconnecting to I-40 east into Wilmington. The Greyhound bus station in Wilmington is located on Cando Street, southwest of the intersection of US 117 / NC 132 (College Road) and US 74 (Martin Luther King Jr. Parkway). Passengers can transfer to the local bus service at the station.



2. Train Performance and Estimated Run Times

Three daily frequencies or round trips between Wilmington and Raleigh were analyzed for this feasibility study. It is possible that NCDOT would begin service with a lower number of frequencies and grow to a third round-trip as the service becomes established and utilization increases. The service can be reevaluated at that time and adding additional frequencies can be considered. It should be noted that the analysis is preliminary and will need to be refined with more detailed information on freight trains along the corridor.



Siding in Warsaw, NC

At-grade crossing in Allenton, NC



Wye connection in Warsaw, NC

To determine the run time for the proposed service, NCDOT used Berkely Simulation Software Rail Traffic Controller (RTC) modeling software. This software allows for large system scale 'dispatching' of trains, both freight and passenger, singly or in a mixed-use scenario. Multiple factors were considered within this model, including a maximum authorized speed of 79 mph, terrain/steepness of grade, radius of curves, stoppage times for passengers to board and unload, number of trains, interoperability with other trains during travel, and more. This type of model is utilized to establish run times, develop operating plans, diagnose bottlenecks, evaluate various capital improvement

scenarios, and assess the impact of adding new trains to a network, but for this study, only the individual train performance aspect of the software was used to determine expected run times.

The proposed corridors between Wilmington and Raleigh consist of approximately 134 miles for the Eastern Route and 187 miles for the Western Route. Multiple scenarios were evaluated in this study, with different sets of intermediate stations and stopping patterns which would potentially allow more



than six locations to be served. However, decisions regarding selection of specific station locations and stopping patterns were not determined. These decisions will be made as a part of future, more detailed service development plan. RTC train performance analyses estimated the travel time for both route options.

Table 2-1 lays out travel time comparisons among modes for the journey from Wilmington to Raleigh on both the Eastern Route and the Western Route. For the Eastern Route, the train journey duration would be comparable to driving and approximately 30 minutes shorter than riding the bus. For the Western Route, the train journey would be approximately 1 hour longer than driving and comparable to taking the bus. Bus times are based on current, typical Greyhound intercity bus schedules.

Table 2-1. Travel Time Comparison by Mode

	Train		Automobile	Bus
	Eastern Route	Western Route		
Raleigh to Wilmington	2 hrs. 35 min.	3 hrs. 30 mins.	2 hrs. 20 min. to 2 hrs. 41 min.	3 hrs. 5 min.



3. Ridership

NCDOT developed a statewide intercity passenger rail ridership estimate model to predict ridership on Wilmington to Raleigh corridor and other existing and planned corridors throughout the state. The probability distribution model predicts the average daily ridership by station pairs and is sensitive to train frequency, scheduled travel time, delay, fare, as well as population and employment characteristics around each station. The ridership estimates for this rail feasibility intercity model are based upon NCDOT datasets on ridership and train service characteristics for the *Piedmont* and *Carolinian* services between June 2009 and January 2020 (to exclude service disruptions during the COVID-19 pandemic).

The train travel times between stations along the Wilmington to Raleigh routes and to stations between Charlotte and Raleigh were used to estimate local riders on the Southeastern North Carolina corridor, and riders that would

be expected to transfer to stations along the *Piedmont* and *Carolinian* routes between Charlotte and Raleigh. Future travel times along the Richmond to Raleigh portion (S-Line) of the Southeast Corridor were used to estimate

Passengers board an Amtrak train



future riders connecting to those services. An estimated thirty additional minutes of 'dwell' at connecting stations were included in travel times for riders transferring to the *Piedmont*, *Carolinian*, or other Amtrak services.

Based on this statewide model, the 2045 estimated ridership is approximately 50,000 local trips for the Eastern Route and 60,000 for the Western Route between Wilmington and Raleigh. For the Eastern Route, approximately 50,000 to 100,000 additional riders would be anticipated to connect to stations between Raleigh and Charlotte. For the Western Route, approximately 60,000 to 120,000 additional riders would be anticipated to connect to stations between Raleigh and Charlotte. SENC riders could connect to existing *Carolinian* and *Palmetto* trains.



In the future, as the Raleigh to Richmond portion (S-Line) of the Southeast Corridor is constructed (see Figure 3-1), more frequent and efficient connections to stations north of Raleigh will be available. These connections would provide an additional 80,000 to 160,000 riders using the Eastern Route with connections to future destinations including, but not limited to, stations north of Raleigh, Peterburg and Richmond, Virginia, Washington, DC, and points served by the Northeast Corridor. An additional 120,000 to 230,000 riders from the Western Route would connect to stations facilitated by S-Line construction.

The Eastern Route has higher ridership serving Wilmington. Of the estimated riders on the Western Route, 60,000 to 110,000 travel to or from Wilmington. The number of estimated riders traveling to or from Wilmington on the Eastern Route is 70,000 to 120,000.

To be conservative, a range of 50% to 100% of connecting trips is included in ridership, revenue, and passenger-mile estimates in this study. The mileage of each was applied to calculate projected passenger-miles for the service. For planning purposes, a projected yield of approximately \$0.17 per passenger mile (the current yield for the *Piedmont* service) was applied to the passenger-miles to estimate revenue. A \$0.17 yield results in a potential \$24 fare (reflecting current 2023 pricing assumptions) to travel the distance from Wilmington to Raleigh. The ticket price is an assumption and may change prior to service implementation. Table 3-1 presents the conceptual ridership, passenger-miles, and revenue of the service.

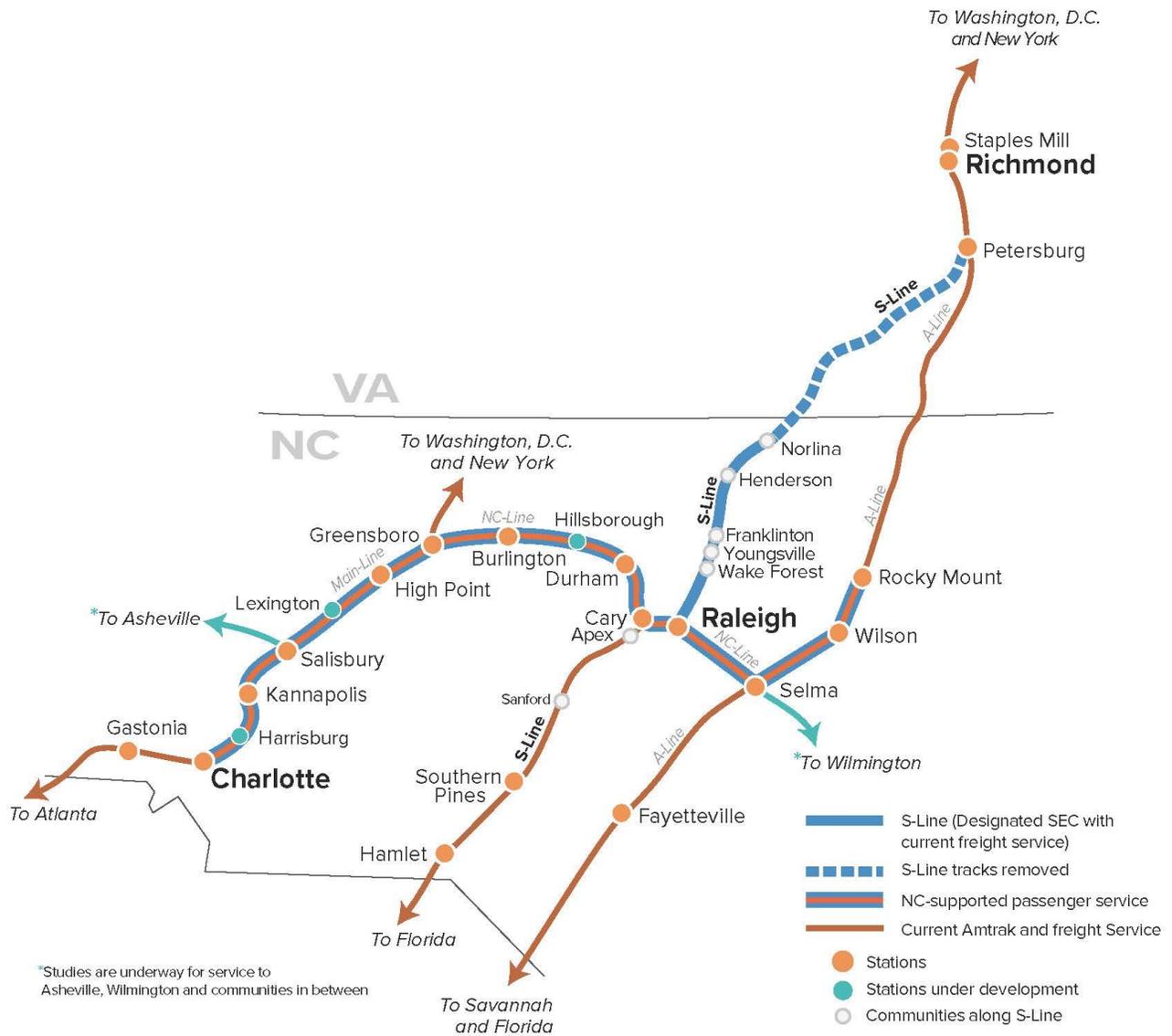
While ridership of the Western Route on its own is estimated to be higher, the additional riders on the would be captured by the Raleigh to Fayetteville route to be studied under the CID program. Implementing both the Eastern Route and a direct Raleigh to Fayetteville corridor will have greater total ridership.

Table 3-1. Conceptual Ridership - 2045

	Eastern Route (riders per year in thousands)	Western Route (riders per year in thousands)
Local Trips	50	60
Connecting Trips between SENC and Piedmont Stations	50-100	60-120
Connecting Trips between SENC and S-Line Stations North of Raleigh	80-160	120-230
Total	180-310	240-410
Wilmington Riders (Connecting and Local)	70-120	60-110



Figure 3-1. Piedmont / Carolinian and S-Line Network



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4. Operational and Track Maintenance Costs

Conceptual annual operating and maintenance costs were calculated by applying unit costs associated with the *Piedmont* service to the corridor length and number of trains anticipated on the Southeastern North Carolina corridor. Operating costs are based on costs per train-mile developed from Amtrak payments and other recent operating costs for the *Piedmont* service. Operating costs of \$44.67 per train-mile were applied to the new SENC service characteristics. Track signal and maintenance costs were derived from costs per mile incremental maintenance payments, based on long-term agreements between NCDOT and NS, in 2021 for track and signal improvements made to the Greensboro to Raleigh section of the Piedmont Corridor (Funston siding and Haw River siding). Finally, net operating costs are the difference between the annual operating costs and annual train revenue. Conceptual annual financial results are detailed in Table 4-1.

Table 4-1. Conceptual Annual Financial Results (2023 Dollars)

Item Description	Eastern Route	Western Route
Track and Signal Maintenance	\$2.5M	\$3.3M
Operating Costs	\$13M	\$18M
Ticket Revenue	\$2.2M - \$4.0M	\$3.6M - \$6.4M
Net Operating Costs	\$9.1M - \$11M	\$12M - \$15M
Total Annual Net Operating and Maintenance Costs	\$12M - \$14M	\$15M - \$18M



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5. Conceptual Infrastructure and Equipment Needs

5.1 Track, Signal, and Crossing Infrastructure

To add three daily round trip passenger trains to the existing lines between Raleigh and Wilmington, infrastructure improvements have been assumed to provide capacity for passenger and freight operations, as well as increasing authorized speed to historically achievable levels. Because most of the current lines between Raleigh and Wilmington consist of single-track, infrastructure upgrades are proposed. In addition, upgrades to accommodate higher authorized track speed, new signals, and implementation of Positive Train Control (PTC) were budgeted in this study.

An analysis of existing infrastructure was completed for track classification relative to supporting passenger trains up to the maximum of 79 mph proposed for this service. Track Classifications range on a scale of 1 to 4, with Class 1 supporting the slowest moving trains and Class 4 supporting faster moving trains. Each classification also has different restrictions on the maximum track speed for freight and passenger train movements. In general, a higher classification will also result in a smoother travel experience. The various lines between Raleigh and Wilmington are maintained at varying levels of track classification and will require investment to achieve FRA Class 4 for the desired maximum speed and ride quality. Costs to bring the entire track to Class 4 are included in the cost estimate.

Costs associated with upgrading highway-rail at-grade crossings and associated signals are also included in the estimate. Generally, the costs are associated with improving the existing at-grade crossings and signal devices rather than proposing grade separations. A mix of active and passive crossing signals and infrastructure are present. Subsequent analyses may evaluate the potential for closure or grade separation of some crossings for safety and reliability.



Beyond general improvements to the track along the length of the corridor, site specific improvements are proposed. The proposed improvements are predominantly upgrading, lengthening, or adding new sidings to ensure the fluid movement of both freight and passengers throughout the corridor. These specific improvements are included with an approximate milepost map in the Appendix. The physical location of improvements to be made in this study were based on historic freight activity and the locations of existing freight sidings along the corridor. Freight traffic is a major consideration when determining required infrastructure upgrades. The CSX A-Line between Pembroke and Selma is one of the most heavily utilized train lines in the state. Improvements resulting in a second track along that entire length is proposed to provide the necessary capacity for the reliable movement of both freight and passenger trains. Currently, of the 80 miles of track between Pembroke and Selma approximately 60% is single track.

*Crews
complete
track
construction
activities*



*Rail in the
corridor
south of
Goldsboro*

The Eastern Route will require the restoration of the Wallace to Castle Hayne corridor. The corridor is owned by NCDOT and connects to the CSX AC-Line in Wallace and the CSX SE-Line in Castle Hayne. Restoration of the line helps provide the most direct route for passenger trains between Wilmington and Raleigh and could potentially provide an

additional freight route for shippers that are located along the 27-mile corridor. Any new freight connections would have to be coordinated with CSX. The route could also provide a more direct connection between the Port of Wilmington, the CCX Intermodal facility, and the balance of the CSX network in the Mid-Atlantic and Midwest. In past studies, the Department of Defense has expressed interest in restoration of the corridor to provide direct and redundant access to the port. An evaluation of the Wallace to Castle Hayne Rail Restoration can be found in the Eastern Infrastructure Improvement Study, conducted by the NCDOT Rail Division for the North Carolina General Assembly.

In-depth railroad coordination for the various lines may reveal additional or alternate locations of conflicts between train types. The purpose of this analysis was to arrive at a reasonable budget for upgrades to the lines, rather than the specific location of improvements to address conflicts among passenger or freight trains.

*NCDOT rail
corridor near 3rd
Street in
Downtown
Wilmington*



In addition to the signalization of control points, the corridor must be upgraded to include PTC. A PTC system is designed to prevent train-to-train collisions, control speeds to eliminate over-speed derailments, prevent incursions into established work zones, and prevent the movements of trains through switches left in the wrong position. It is estimated that 105 miles of the 134-mile Eastern Route will need to have PTC installed. Significantly more of the Western Route already has PTC installed along the tracks. It is estimated that only 6 miles of track along this route will need to have PTC installed. PTC costs are based on a cost per mile of \$225,000 in 2019 dollars (\$262,945 per mile in 2023 dollars) included for NS in a report titled *Sensor System Benefits and Costs in Positive Train Control, Bridges and Others* (North Dakota State University, 2019).

5.2 Stations

The two endpoints of the passenger rail corridor are Wilmington and Raleigh. Union Station, located in downtown Raleigh, currently supports intercity passenger rail service along the *Piedmont* and *Carolinian* routes and other Amtrak services which extend across the state and along the east coast to New York City. There are also existing active passenger stations at Selma and Fayetteville that are utilized by Amtrak for the *Silver Meteor* and *Palmetto* trains.

A new station will need to be constructed in Wilmington regardless of which alternative is ultimately selected. Costs for a new station in Wilmington are included in the estimates. There are currently budgeted funds for stations along each of the two proposed corridors. Possible stations or improvements along the Eastern Route include Goldsboro, Selma, Clayton, and Raleigh, with allowance



for two additional stops. Possible stations or improvements along the Western Route include Lumberton, Fayetteville, Selma, Clayton, and Raleigh, with allowance for one additional stop. At the time of this study, final station locations have not been determined.

Station tracks will need to be constructed at the proposed Wilmington station and those costs are included in the cost estimates. Separate station tracks are not currently budgeted at intermediate stations. It should be noted that traditionally, NCDOT has partnered with communities to pursue grants to help with construction of stations. In addition, through agreements with towns and cities, NCDOT has helped fund ongoing maintenance of station buildings. NCDOT, municipalities, and their respective MPOs/RPOs will need to work together and consider including passenger rail services and its associated station and rail infrastructure improvements in their long-range planning. Additional details for planning and potential funding are discussed in Section 7.

Stations in Fayetteville, NC and Burgaw, NC



5.3 Equipment and Maintenance Facility

NCDOT developed a conceptual equipment and maintenance facility estimate based on two types of passenger equipment that have been recently demonstrated to meet the FRA Buy America statute: Venture trainsets manufactured by Siemens, substantially similar to the Amtrak Airo™, and FLIRT (Fast



Marketing photos for Siemens Venture trains.



Light Intercity and Regional Train) trainsets manufactured by Stadler. Venture trains, manufactured by Siemens, have been selected by Amtrak to replace much of its fleet for regional and state-supported routes. FLIRT (Fast Light Intercity and Regional Train) trains, produced by Swiss company Stadler Rail, can reach speeds of 124 miles per hour. FLIRT sets are an alternative to Venture trains for lower volume, regional train operations. Because Amtrak has selected Venture trainsets to replace their fleet, using Venture trainsets may provide the most interoperability with other corridors and routes, but using trainsets that interoperate may provide more capacity than is needed early in the development of the Southeastern North Carolina service.

Equipment costs in this report are based on Venture trainsets and associated maintenance facility for estimating purposes. Daily operation of three round trips between Wilmington and Raleigh can be accomplished with two active trainsets. In addition to the two active trainsets, an additional trainset is required to provide spare capacity to facilitate equipment maintenance rotation and provide reliability of operations. Accordingly, the estimates included in this report are based on the costs for three train sets. Equipment costs were derived from Amtrak’s costs for their Airo™ contract with Siemens, as gathered from Amtrak’s *Consolidated Financial Statements – Years Ended September 30, 2022, and 2021*. An additional evaluation will be needed to make any final decisions on equipment needs.

A service and maintenance facility will be necessary to support the proposed passenger rail operations. The facility will need to be located near one end of the corridor, in Raleigh or Wilmington. This facility

will cover basic day-to-day cleaning and service operations, as well as minor mechanical repairs. Locations for a maintenance facility would need to be relatively contiguous with existing rail lines and large enough to accommodate a minimum of three trainsets. At the concept level, it is anticipated a maintenance facility for the Venture trainsets would require a 10-acre site. A maintenance facility for FLIRTs would require a site of 22 acres. A larger site is predicted for FLIRTs because of the lack of interoperability with other parts of the Amtrak fleet. A smaller site is predicted for Venture trainsets because of existing and planned maintenance facilities elsewhere. Larger land areas may be needed to ensure appropriately shaped sites can be utilized. More detailed site selection, layout, and design will be needed as plans for the service develop. Cost estimates for the maintenance facility are based on unit costs associated with conceptual estimates for upgrades to NCDOT's Charlotte Passenger Rail Facility (CPRF).



6. Capital Cost Estimates

Capital costs for the improvements described in Section 5 are summarized below. All costs are conceptual and are subject to change pending freight railroad coordination.

Table 6-1. Conceptual Capital Costs

Item Description	Eastern Route¹	Western Route¹
Track Infrastructure and Class of Track Improvements	\$344M	\$522M
Grade Crossing and Grade Crossing Signal Upgrades	\$59M	\$81M
Rail Signal Infrastructure (excluding PTC)	\$73M	\$87M
Positive Train Control (PTC)	\$41M	\$3M
Stations²	\$71M	\$65M
Equipment (3 Train Sets)	\$161M	\$161M
Maintenance Facility	\$59M	\$59M
Total Capital Costs	\$808M	\$978M

¹ The conceptual costs shown include 10% project administration costs, 10% for engineering, 5% for mobilization, bonds, and insurance, and 35% for contingencies.

² Budget for stations or improvements at Wilmington, Raleigh, and allowance for five additional intermediate stops. Final station locations have not been determined.



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7. Recommendations and Next Steps

Table 7-1. summarizes characteristics and costs of the alternative routes.

Table 7-1. Comparison of Alternatives (Costs in 2023 Dollars)

Item Description	Eastern Route	Western Route
Total Capital Cost¹	\$810M	\$980M
Corridor Length	134 miles	187 miles
Travel Time	2 hours and 35 minutes	3 hours and 30 minutes
Connecting Ridership, annual (2045)	130,000 to 260,000	180,000 to 350,000*
Local Ridership, annual (2045)	50,000 riders	60,000 riders
Wilmington Ridership (Connecting and Local), annual (2045)	70,000 to 120,000	60,000 to 110,000
Net Annual Operating and Maintenance Costs²	\$12M - \$14M	\$15M - \$18M
Network Resiliency and Interoperability	Provides second rail route to Wilmington Mitigates flood impacts Operates on lower volume freight corridors	Improves existing route to Wilmington Operates over existing higher volume freight corridors

¹ The conceptual costs shown include 10% project administration costs, 10% for engineering, 5% for mobilization, bonds, and insurance, and 35% for contingencies. Table 6-1 provides a detailed breakdown of Capital Costs.

² Operating and maintenance costs are based on NCDOT’s experience and analysis of the *Piedmont* and *Carolinian* services, operated by Amtrak. Table 4-1 provides a detailed breakdown net Operating and Maintenance Costs.

* Most of the additional riders on the Western Route would be captured by the Raleigh to Fayetteville route to be studied under the CID program.



The Eastern Route is more direct (53 miles shorter) than the Western Route. Because it is more direct, the travel time between Raleigh and Wilmington along the Eastern Route is almost a full hour shorter. Capital costs for the Eastern Route are \$170 million less than the Western Route.

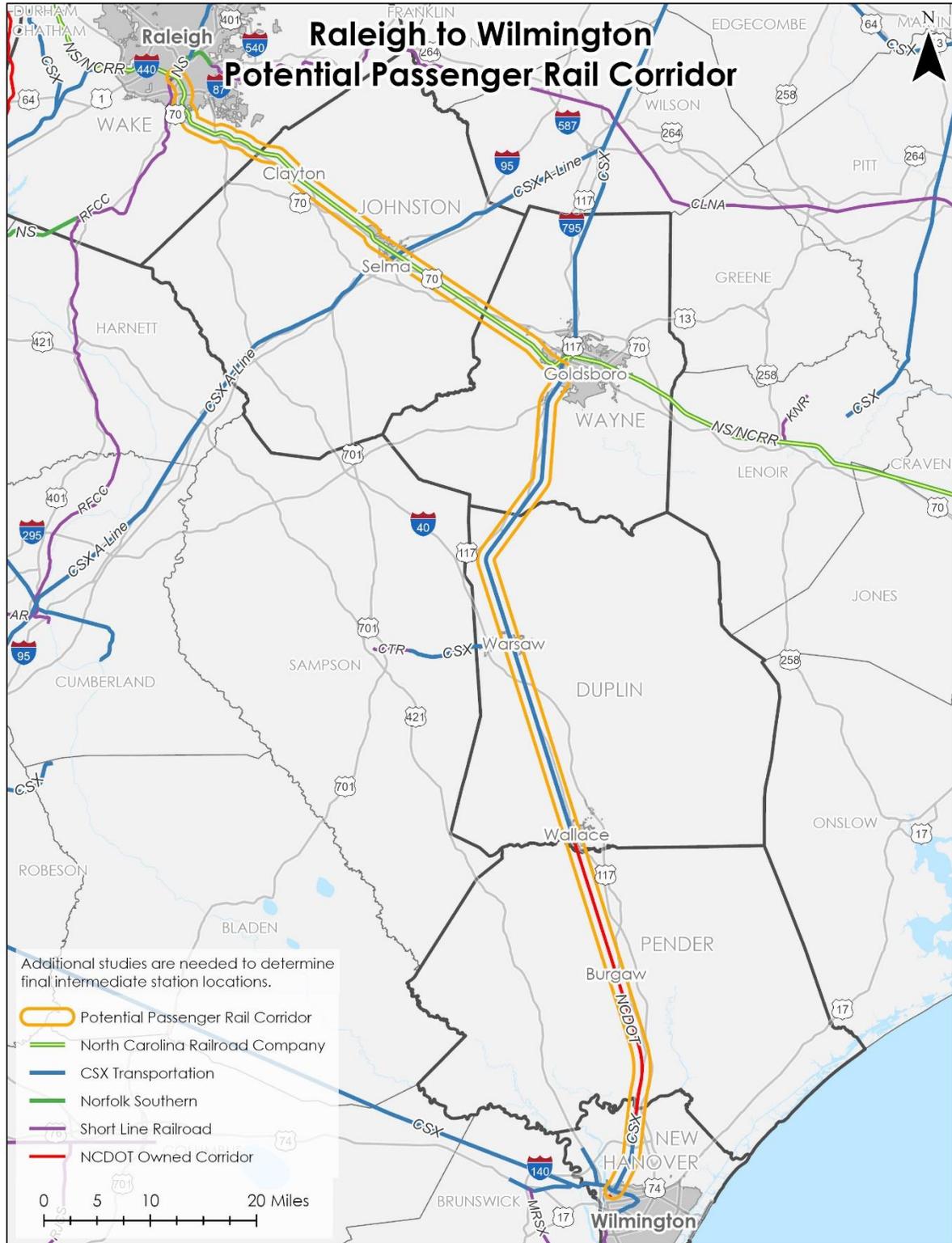
Both routes improve the overall rail network in North Carolina and could provide potential passenger transportation options, but the Eastern Route creates a second rail route into Wilmington. Redundancy in the rail network can help provide resilience and reliability during natural disasters. The Eastern Route would not be immune to flooding, but would provide a second connection, lessening the likelihood that Wilmington would be without a rail connection. In addition, reliability is an issue at locations with movable span bridges along the proposed alternative routes. Movable bridges are subject to periodic malfunctions associated with weather, boat strikes and machinery failure that may cause the bridge to be unusable. It is anticipated that the Western Route would require the use of a movable span bridge over the Cape Fear River and the Hilton Railroad Draw Bridge over the Northeast Cape Fear River. The bridges provide freight access to Wilmington. The Eastern Route would require the replacement of the existing swing span over the Northeast Cape Fear River. Although a final determination has not been made, a fixed span bridge could potentially be used on this route, providing enhanced reliability.

Because it connects a higher number of populated areas, the Western Route is projected to attract more overall ridership than the Eastern Route, but the route is longer and circuitous. The revenue from the additional ridership on the Western Route does not fully offset the increased operating costs of the longer route. After including revenue from local and connecting riders, the annual net operating and maintenance costs of the Western Route are \$3 million to \$4 million more than the net operating costs of the Eastern Route.

Considering the factors described above, the Eastern Route is recommended to provide access between Raleigh and Wilmington as the Southeastern North Carolina rail service. Figure 7-1 presents the recommended alternative for this feasibility study. An additional recommendation is to pursue additional intercity passenger rail services to connect Fayetteville to North Carolina's future passenger rail network. Both the Raleigh to Wilmington and Raleigh to Fayetteville corridors have been included in the Federal Railroad Administration's Corridor Identification and Development Program.



Figure 7-3. Recommended Route for Southeastern NC Passenger Rail



The information provided in this feasibility report is conceptual and can be used to initiate conversations between NCDOT, MPOs, RPOs, CSX, NS, Amtrak, and other key stakeholders on design requirements and the pursuit of funding to reestablish passenger rail between Wilmington and Raleigh.



*New
railroad
bridge near
Lumberton,
NC*

Municipalities and their respective MPOs/RPOs will need to work together and consider including passenger rail services and its associated station and rail infrastructure improvements in the regions' comprehensive transportation plans (CTP) and long-range transportation plans (LRTP). MPOs and RPOs can use the information in the report to submit the project for

funding consideration through the NCDOT STI prioritization process which allocates available project funding based on data-driven scoring and local input. If the project scores well enough to receive state transportation funds in STI, it will be included in the State Transportation Improvement Program (STIP). MPOs and RPOs should consider submitting component projects into STI.

State funds secured through the STI process may also be used as leverage or match to pursue a federal competitive discretionary grant significantly reducing the burden on state funds for development. A federal grant will help offset up to 80% of the costs associated with the project. The most appropriate federal grant program is the FRA's Federal State Partnership for Intercity Passenger Rail. When it is time to submit an application for this program, letters of support from communities along the corridor will be needed.

To obtain federal funds for further study and development of the corridor and to better position the corridor for a potential future federal grant, NCDOT submitted an application to FRA for the Raleigh to Wilmington corridor to be included in the newly created CID program. The CID program was created by the 2021 Bipartisan Infrastructure Law which directed FRA to "...build a foundation for a long-term rail program" related to intercity passenger rail services. This corridor was submitted by NCDOT to the CID program through FRA's Spring 2023 submittal process. NCDOT also submitted an application for a Raleigh to Fayetteville service. Figure 7-2 shows the corridors NCDOT submitted for consideration and those awarded, including Raleigh to Wilmington and Raleigh to Fayetteville.

*Track bed in
Downtown
Wallace, NC*



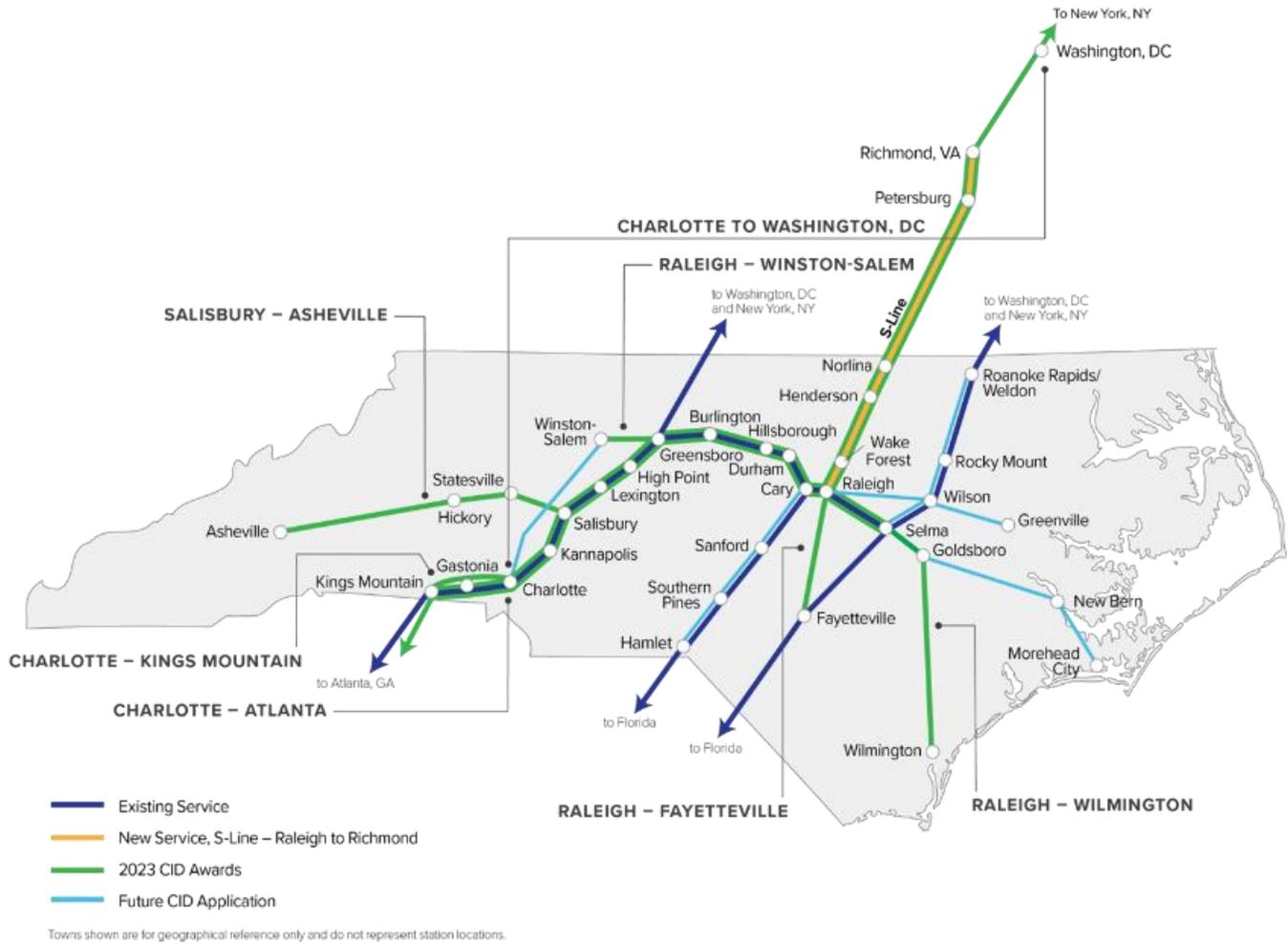
The first step in the CID process is the creation of a scope, estimate and schedule to develop a Service Development Plan for each selected corridor. FRA has awarded \$500k grants for each corridor that are 100% federally funded. NCDOT is currently initiating this step and will include stakeholders in scoping discussions.

The CID program will fund 90 percent of the costs to develop a Service Development Plan (step 2) for the project. A Service Development Plan is a high-level business, operating, and capital plan with the objectives of demonstrating operational and financial feasibility, and the value of the proposed service. The Service Development Plan would build on the work associated with this feasibility study. The Service Development Plan would also include railroad coordination to ensure the recommended infrastructure is sufficient for safe and efficient passenger and freight movement. Following the Service Development Plan, the CID program will fund 80 percent of the costs to prepare environmental documentation in compliance with the National Environmental Policy Act (step 3).

Step 2 - Development of the Service Development Plan requires 10 percent non-federal match. Step 3 – Preliminary Engineering and Development of National Environmental Policy Act (NEPA) documents requires 20 percent non-federal match. During and following the scoping process associated with CID, NCDOT and local communities will discuss how this match will be comprised. It is FRA's intent that projects that move through the CID steps will be eligible for and positioned for grants through programs like the Federal State Partnership for Intercity Passenger Rail. These right-of-way and construction grants will generally require 20 percent non-federal match.



Figure 7-2. Potential Passenger Rail Services being considered for CID



8. Stakeholder Coordination

The NCDOT Rail Division began the coordination outreach process by notifying CSX, NS, Amtrak, and NCRR of initiation of the feasibility study. Letters were sent to these stakeholders in May and June 2022. In those letters, NCDOT noted they would share the draft report with the railroads for their review and comments. As noted previously, more intensive railroad coordination is needed as planning for this passenger corridor proceeds.

NCDOT also met and coordinated with MPOs and RPOs during the development of this study. Meetings or calls that were held are listed below. In general, NCDOT presented information on the status of passenger rail in North Carolina, the status of the Southeast High Speed Rail corridor, and the proposed service characteristics for the Southeastern North Carolina service. Each meeting included an opportunity to discuss concerns identified by the stakeholders and provided contact information for the feasibility study team.

CAMPO, FAMPO, WMPO and Goldsboro RPO Virtual Meeting / Call	September 12, 2022
CAMPO	November 16, 2022
Fayetteville, FAMPO Virtual Meeting / Call	June 28, 2023
Fayetteville, FAMPO	November 17, 2023
	February 16, 2024

Town of Clarkton, NC



In addition to meetings associated with this study, a rail community meeting was held at Raleigh Union Station on Feb. 21, 2023. The rail community meeting was held with communities along 12 potential rail corridors throughout the state to present and discuss FRA’s CID program. Cities, towns, and counties along the SENC corridor were among the invitees and attendees. At the meeting, NCDOT noted that it was applying to the FRA CID program for the Southeast North Carolina corridor.



To ensure community participation, a draft of this report was circulated to CSX, NS, NCR, Amtrak, and the following local governmental and community organizations:

Cape Fear RPO	Eastern Carolina RPO
Mid Carolina RPO	Raleigh
Lumber River RPO	Fayetteville
Fayetteville Area MPO	Goldsboro
Capital Area MPO	Wilmington
Wilmington Urban Area MPO	Burgaw
Upper Coastal Plain RPO	Wallace
Goldsboro MPO	Warsaw
Eastern Carolina Rail	

NCDOT will remain in contact with the stakeholders throughout the study process to provide relevant updates and move toward next steps.

A newly formed organization, Eastern Carolina Rail, was created in the spring of 2023 with the intent to support passenger rail service in Eastern North Carolina. Eastern Carolina Rail will focus on gathering public support, creating awareness, and conducting community and stakeholder outreach in order to assist NCDOT in making rail service to eastern North Carolina a reality. Ongoing outreach efforts will include this newly formed organization going forward.



Abbreviations

CATS	Charlotte Area Transit System
CID	Corridor Identification and Development Program
CPRF	Charlotte Passenger Rail Facility
CTP	Comprehensive Transportation Plan
DOT	Department of Transportation
FLIRT	Fast Light Intercity and Regional Train
FRA	Federal Railroad Administration
GIS	Geographic Information System
LRTP	Long Range Transportation Plan
MP	Milepost
mph	Miles per hour
MPO	Metropolitan Planning Organization
NB	Northbound
NC	North Carolina
NCDOT	North Carolina Department of Transportation
NCRR	North Carolina Railroad Company
NEPA	National Environmental Policy Act
NS	Norfolk Southern
PIP	Piedmont Improvement Program
PTC	Positive Train Control
RPO	Rural Planning Organization
RR	Railroad
RTC	Rail Traffic Controller software
SENC	Southeastern North Carolina
SB	Southbound
STIP	State Transportation Improvement Plan
STI	Strategic Transportation Investments
TAC	Transportation Advisory Committee
TCC	Technical Coordinating Committee
TPO	Transportation Planning Organization



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Appendix

Proposed Infrastructure Improvements

Eastern Route – Raleigh-Goldsboro-Wilmington

Project Identifier	Project Description	Milepost
NS 1	Extend South Raleigh Siding	83.8 – 85.5 ¹
NS 2	Extend Auburn Siding	90.3 – 94.5
NS 3	Extend Powhatan Siding	100.0 – 102.5
NS 4	Construct Mainline Bypass at Selma	106.9 – 108.9
NS 5	Construct South Yard Bypass at Selma	109.5 – 111.7
NS 6	Construct Siding near Rosewood	120.9 – 123.0
NS 7	Construct NS / CSX Connection Track at Goldsboro	NC 127.5 – AC 160.5 ²
CSX G1	Goldsboro Station Tracks	160.0 - 160.3
CSX G2	Construct Siding at Dudley	165.4 – 167.0
CSX G3	Rehabilitate Siding at Mount Olive	174.9 – 176.1
CSX G4	Construct Siding at Calypso	177.6 – 179.1
CSX G5	Construct Bypass at Warsaw	186.9 – 188.7
CSX G6	Upgrade Industrial Wye	199.5
CSX G7	Construct Siding at Rosehill	200.0 – 201.5
CSX G8	Upgrade Industrial Siding	202.1 – 202.9
CSX G9	Upgrade Industrial Siding	202.3 – 203.1



Project Identifier	Project Description	Milepost
CSX G10	Upgrade Industrial Siding	203.2 – 205.0
G11	Restore Mainline (Wallace to Castle Hayne)	AC 208.0 – SE 371.8 ³
CSX G12	Construct Siding at Castle Hayne	370.5 – 369.0
CSX G13	Lead and Station Track at Wilmington	364.6
NCDOT SW 1	Construct Track from Smith Creek to Wilmington Station	ACB 242.3 to 1.42 ⁴

¹ Milepost associated with NS' NC-Line.

² Track corridor and associated mileposts changed from NS' NC-line to CSX's AC line.

³ Track corridor and associated mileposts changed from CSX's AC-line at Wallace to CSX's SE-line at Castle Hayne. The intervening unused corridor is owned by NCDOT.

⁴ Track corridor and associated mileposts changed from CSX's ACB-line to unused corridor owned by NCDOT.

Proposed Infrastructure Improvements

Western Route – Raleigh-Selma-Pembroke-Wilmington

Project Identifier	Project Description	Milepost
NS 1	Extend South Raleigh Siding	MP 83.8 – 85.5 ¹
NS 2	Extend Auburn Siding	MP 90.3 – 94.5
NS 3	Extend Powhatan Siding	MP 100.0 – 102.5
NS 4	Construct Mainline Bypass at Selma	MP 106.9 – 108.9
CSX	Double Track Selma to Pembroke	MP 161 - 241 ²
CSX P1	Construct Siding at Lowe	MP 290.7 – 293.1 ³
CSX P2	Construct Siding at Northwest	MP 349.8 – 352.2



Project Identifier	Project Description	Milepost
CSX P3	Construct Bypass at Davis Yard	MP 356 – MP 359
CSX P4	Upgrade Lead at Yadkin Junction	MP 362.4
CSX P5	Lead and Station Track at Wilmington	363.8
NCDOT SW 1	Construct Track from Smith Creek to Wilmington Station	ACB 242.3 to 1.42 ⁴

¹ Mileposts associated with NS' NC-Line.

² Mileposts associated with CSX's A-line.

³ Mileposts associated with CSX's SE-line

⁴ Track corridor and associated mileposts changed from CSX's ACB-line to unused corridor owned by NCDOT.



Approximate Milepost Locations

