

PURPOSE AND NEED AND STUDY AREA DEFINED

Replacement of Bridge Number 640013 (Cape Fear Memorial Bridge)
over the Cape Fear River

New Hanover and Brunswick Counties

STIP Project HB-0039

North Carolina Department of Transportation

Division 3



MERGER CONCURRENCE POINT NUMBER 1

December 14, 2023 / 10:00 AM – 12:00 PM

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Figures (attached)

Figure 1: Vicinity Map

Figure 2: Environmental Features Map

Figure 3: Other Projects in Area

1. Introduction

The purpose of this meeting is to reach concurrence on CP 1, Purpose and Need and Study Area defined.

Lead federal agency: Federal Highway Administration (FHWA)

Primary points of contact for the subject project are:

Agency	Name
FHWA	Seth Wilcher
U.S. Army Corps of Engineers (USACE)	Thomas Steffens
North Carolina Division of Water Resources (NCDWR)	Hannah Sprinkle
North Carolina Department of Transportation (NCDOT)	Trace Howell

1.1 Project Description

NCDOT proposes to replace Bridge # 640013 over the Cape Fear River on US 421 in New Hanover and Brunswick Counties. Based on the 2020 Feasibility Study, NCDOT identified two alternatives for consideration in project development as listed below. Each alternative includes the following typical section: three 12-foot lanes in each direction separated by a 22-foot median, 10-foot inside shoulders, 15-foot multi-use path on the north side of the bridge, and 12-foot outside paved shoulders.

- Alternative A: Movable span 65' vertical clearance
- Alternative B: Fixed span 135' vertical clearance with trumpet interchange improvements

Both alternatives would modify the existing eastern loop ramps at S. Front Street and tie into the current one-way pair of Wooster Street and Dawson Street in downtown Wilmington. Across the river, the bridging of Eagle Island wetlands would extend to the US 17/US 74/ US 421 interchange, with possible ramp modifications to that interchange with Alternative B. The proposed study area shown in Figure 1 encompasses all such modifications.

The proposed project is approximately 0.66 miles in length with a proposed design speed of 50 miles per hour over the river. The project is programmed in the 2024-2033 State Transportation Improvement Program (STIP) as project HB-0039 for preliminary engineering only. The project location is shown in Figure 1.

1.2 Project History and Merger Plan

The Wilmington Metropolitan Planning Organization (WMPO) *Cape Fear Moving Forward 2045* Metropolitan Transportation Plan (MTP) was adopted November 18, 2020. The MTP identified the subject project as "US 76/421/17/17 BUS/Cape Fear Memorial Bridge Replacement". The project is ranked 58th out of 79 projects in the Fiscally-Constrained Roadway Project List, and is identified as RW-127 with a planning year of 2040. The Plan describes the Cape Fear Memorial Bridge Replacement as a targeted infrastructure improvement.

As noted above, the project is included in the current STIP as project HB-0039 and is being managed by NCDOT Division 3. The current cost estimates for the project are shown in **Table 1**. The proposed project schedule is included in **Table 2** and is based on the Merger Plan. The schedule and cost estimates are draft and subject to change.

Table 1. Cost Estimates

Phase	Estimated Costs	
	Alternative A: 65' Vertical Clearance Movable Structure	Alternative B: 135' Vertical Clearance Fixed Structure
Right of Way	\$5,640,000	\$41,715,000
Utilities	\$1,998,000	\$3,688,000
Construction Total	\$744,200,000	\$400,600,000
Total	\$751,839,000	\$446,003,000

NOTE: All cost estimates are preliminary and subject to change.

Table 2. Project Schedule*

Milestone	Anticipated Date
CP 2	Winter 2024
CP 2A meeting	Winter/Spring 2024
Public Meeting	Winter 2024
CP 3 (LEDPA Determination)	Fall 2024
CP 4A	Winter 2024/2025
CP 4B	TBD
CP 4C	TBD
Begin ROW Acquisition	Post Year
Begin Construction	Post Year

*Draft, subject to change

1.3 Other Projects Nearby

The NCDOT 2024-2033 STIP includes the following projects that intersect the HB-0039 study area:

- U-5734 (Front Street Widening) is scheduled for right-of-way (ROW) in 2025 and construction in 2027.
- HS-2003Q proposes upgrading the traffic signal, pavement markings, and adding pedestrian accommodations to the intersection of US 17 (Dawson Street) at US 421 (3rd Street). The project is scheduled for construction in 2026.

The WMPO Cape Fear *Moving Forward 2045 Metropolitan Transportation Plan (MTP)* includes the following projects intersecting the study area:

- RW-93 (US 17/76/Wooster Street streetscape improvements) planned for construction in 2030.
- RW-92 (US 17/76/Dawson Street streetscape improvements) planned for construction in 2030.

- BP-1 proposes on-street bicycle lanes along 5th Street from Campbell Street to Greenfield Lake Park.
- BP-669 proposes crosswalk improvements at 3rd Street and Dawson Street with construction planned for 2025.
- BP-370 proposes sharrows on Front Street from Ann Street to the Cape Fear Memorial Bridge, with construction planned after 2045.

Additionally, the City of Wilmington is currently studying the Wilmington Rail Realignment Project which is studying the realignment of the existing CSX freight rail line between Navassa (Davis Yard) and the Port of Wilmington. The preferred alternative for the project crosses the Cape Fear River just south of the existing bridge.

2. Existing Conditions

2.1 Transportation Features

The existing Cape Fear Memorial Bridge carries US 17 Business/ US 76/ US 421, a freeway, across the Cape Fear River, linking the City of Wilmington’s urban core on the east with one of the fastest growing counties in North Carolina, Brunswick, on the west.¹ The existing bridge is a four-lane steel center-span vertical-lift bridge on a non-interstate Strategic Highway Network (STRAHNET) route.² The posted speed limit along US 17 Business / US 76/ US 421 eastbound is 45 mph and 55 mph westbound over the bridge.

Table 3 lists basic information about each facility, including NCDOT’s functional classification, 2021 Average Annual Daily Traffic (AADT), existing lanes, lane width, functional classification, and posted speed limit.

Table 3. Existing Roadway Characteristics

Facility	Existing Feature		Functional Classification ³	2021 AADT (vpd*) ⁴
	Lanes (width in feet)	Speed Limit (mph)		
US 17/76	4	45	Freeway	55,000-84,999
US 421	4	35	Other Principal Arterial	10,000 – 19,999
Front Street	2	25	Minor Arterial	2,000-4,999

* “vehicles per day”

Annual average daily traffic (AADT) volumes in 2023 over the Cape Fear Memorial Bridge are approximately 65,200 vehicles per day (vpd).⁵ These volumes are expected to increase to 94,900 vpd in 2050 in the No-Build scenario.

¹ The Brunswick County Data Book, Summer 2023 (<https://www.brunswickcountync.gov/wp-content/uploads/2023/08/Data-Book-2023-Draft-Communications-Approved.pdf>)

² Strategic Highway Network (STRAHNET) is a Department of Defense designation given to roads that provide “defense access, continuity, and emergency capabilities for movements of personnel and equipment in both peace and war.”

³ NCDOT Functional Class Mapper, <https://www.arcgis.com/home/item.html?id=029a9a9fe26e43d687d30cd3c08b1792>

⁴ NCDOT Annual Average Daily Traffic Mapper, <https://ncdot.maps.arcgis.com/apps/webappviewer/index.html?id=964881960f0549de8c3583bf46ef5ed4>

⁵ HB-0039 Traffic Forecast, September 26, 2023

In the 2023 Base Year No-Build Scenario, 2 of 12 freeway sections operate at LOS E or F in both the AM and PM peak periods.⁶ With the expected increase in traffic volumes along the corridor in 2050, further operational degradation at the intersections is expected without improvements to the corridor. In the 2050 No-Build Scenario, 6 of 12 freeway segments operate at a LOS E or worse in the AM peak period and 9 of 12 freeway segments in the PM peak period.

2.2 Environmental Features

Environmental resources in the project area are shown in the Environmental Features Map (Figure 3). The study area is part of the Brunswick River- Cape Fear River basin (U.S. Geological Survey [USGS] Hydrologic Unit [HUC] 030300050503). There are no water supply watersheds (WS-I or WS-II) within or within 1.0 mile downstream of the study area. Both banks of the Cape Fear River are identified as Primary Fish Nursery Areas. The Cape Fear River is also classified as an anadromous fish spawning area by the North Carolina Division of Marine Fisheries (NCDMF) and the North Carolina Wildlife Resources Commission (NCWRC). The Cape Fear River is also designated as critical habitat for the Atlantic Sturgeon with documentation for both Shortnose Sturgeon and Atlantic Sturgeon. The waters of the Cape Fear River north of the bridge are designated as joint waters, and waters south of the bridge as coastal waters. The Cape Fear River is classified as a 303(d) stream for Dissolved Oxygen, from upstream mouth of Toomers Creek to Greenfield Creek.

The study area falls in a sensitive environmental and historic area of North Carolina. The eastern portion of the project is located in downtown Wilmington in the Wilmington Historic District, a National Register Historic District, and the western portion of the project is located in Brunswick County in a primarily undeveloped area. Dram Tree Park is located on the east side of the river north of the Cape Fear Memorial Bridge within the study area, and is subject to Section 6(f) protections. Eagle Island lies between the Cape Fear and Brunswick Rivers and consists of approximately 2,100 acres that are primarily wetlands and remain undeveloped.

Other resources located within the study area include the below:

- The Cape Fear Historic Byway is located in downtown Wilmington and follows Front Street and Castle Street within the project area.
- The Wilmington Riverwalk follows the east bank of the Cape Fear River, including within the project area.
- There are two community resources within the study area, Healing Waters Holy Temple Church of God and Grandma and Grandpa's Daycare.
- Eleven hazardous materials sites are located within the project study area: two active underground storage tanks (USTs), six non-UST Abandoned Storage Tank Incidents, and three brownfield sites.
- Wetlands are located within the project study area, including potential CAMA Areas of Environmental Concern.
- The entirety of study area from the eastern bank of the Cape Fear River to the west is located in a 100-Year floodplain.
- US Army Corps of Engineers Section 408 projects and resources.

⁶ HB-0039 Draft Capacity Analysis Report, November 2023

3. Project Purpose and Need

3.1 Identified Needs

The need for this project can be described as follows:

The NCDOT 2020 Feasibility Study for this project states the bridge replacement is needed to accommodate the high growth areas of New Hanover and Brunswick Counties and truck traffic increases that support the growing population, military preparedness, and port activities in southeastern North Carolina. The corridor is a part of the Strategic Highway Network (STRAHNET) for military transportation and serves as a strategic corridor for hurricane evacuation. The 2021 annual average daily traffic (AADT) on the bridge was approximately 69,000 vehicles, including 8,280 trucks, according to the National Bridge Inventory (NBI). Traffic volumes are projected to increase to 94,900 by 2050, based on the 3.27% annual growth rate projected by the NBI. The Cape Fear Memorial Bridge was constructed in 1969 and is also classified as functionally obsolete by the NBI.

Structure Safety Reports compiled for NCDOT indicate the bridge condition was rated fair in 2016, and the deck, superstructure, and substructure Condition Ratings were all rated satisfactory in 2018. These elements were awarded a grade of six out of nine under the National Bridge Inventory Condition Ratings. Repair and maintenance costs are expected to increase as the bridge ages and traffic increases. In 2019, approximately \$15 million was spent on a major rehabilitation for the bridge, and average annual maintenance costs were estimated at \$550,000. NCDOT is completing another major deck rehabilitation in Spring 2024 with an estimated construction cost of \$13 million.

3.2 Proposed Purpose

The purpose for the proposed project is to replace the functionally-obsolete US 17/ 74/ 421 bridge over the Cape Fear River (Cape Fear Memorial Bridge) and to address the forecasted capacity needs of the bridge corridor in the design year.

4. Project Study Area Defined

The proposed Project Study Area was developed to address the Purpose and Need of HB-0039 and is shown in figures attached. The study area ranges between approximately 750 - 2,700 feet wide and begins just east of Alligator Creek and extends approximately 3 miles east along US 17/ 74/ 421 to the study area terminus near S. 6th Street in downtown Wilmington. The study area also extends along the following intersecting roads:

- Approximately 2,200 linear feet north along US 17
- Approximately 1,800 linear feet south along S. Front Street
- Approximately 900 linear feet south along S. 3rd Street, S. 4th Street, and S. 5th Street

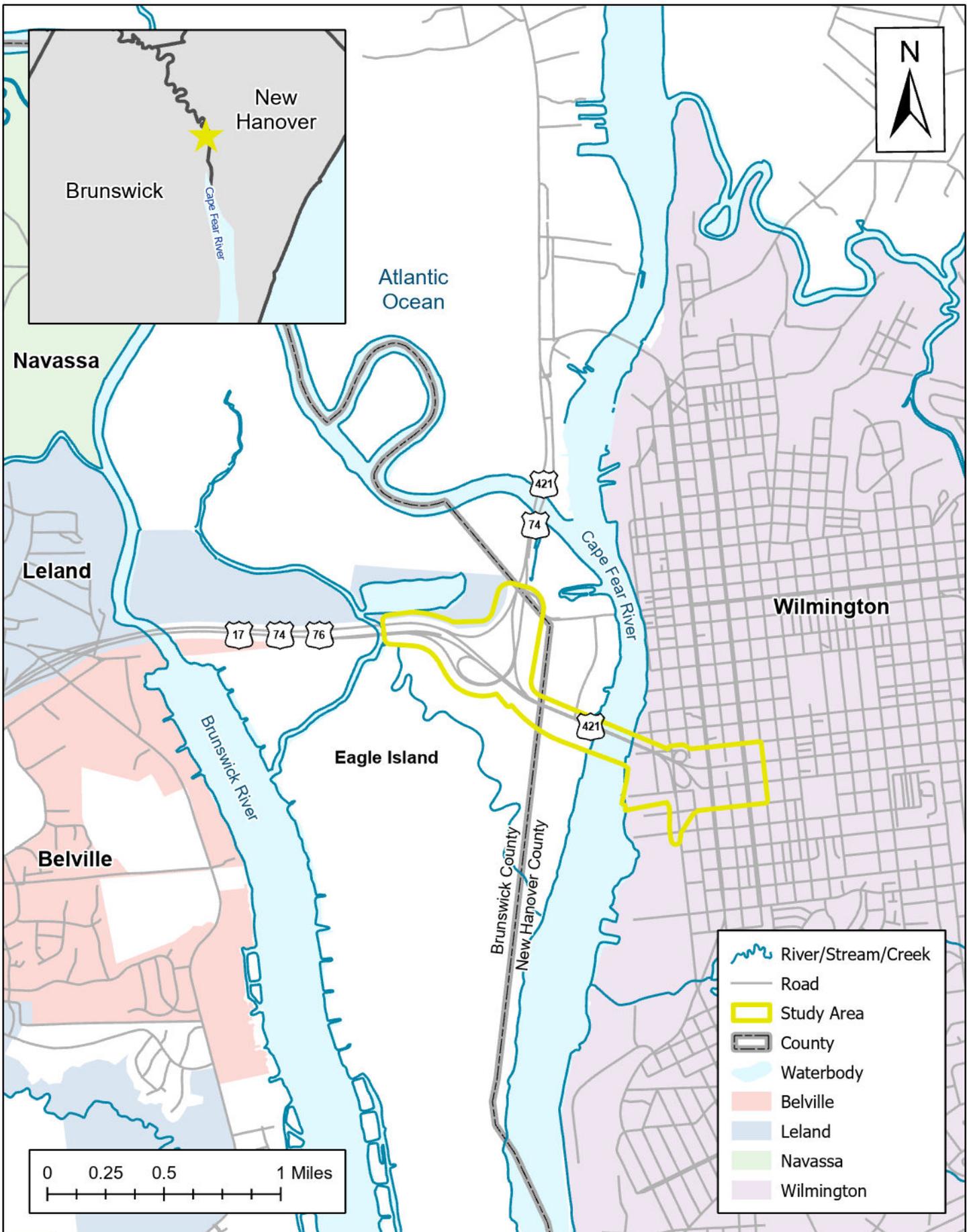
5. Avoidance and Minimization

Avoidance and minimization measures will be implemented throughout the project development process.

6. Merger Plan Review/Next Steps

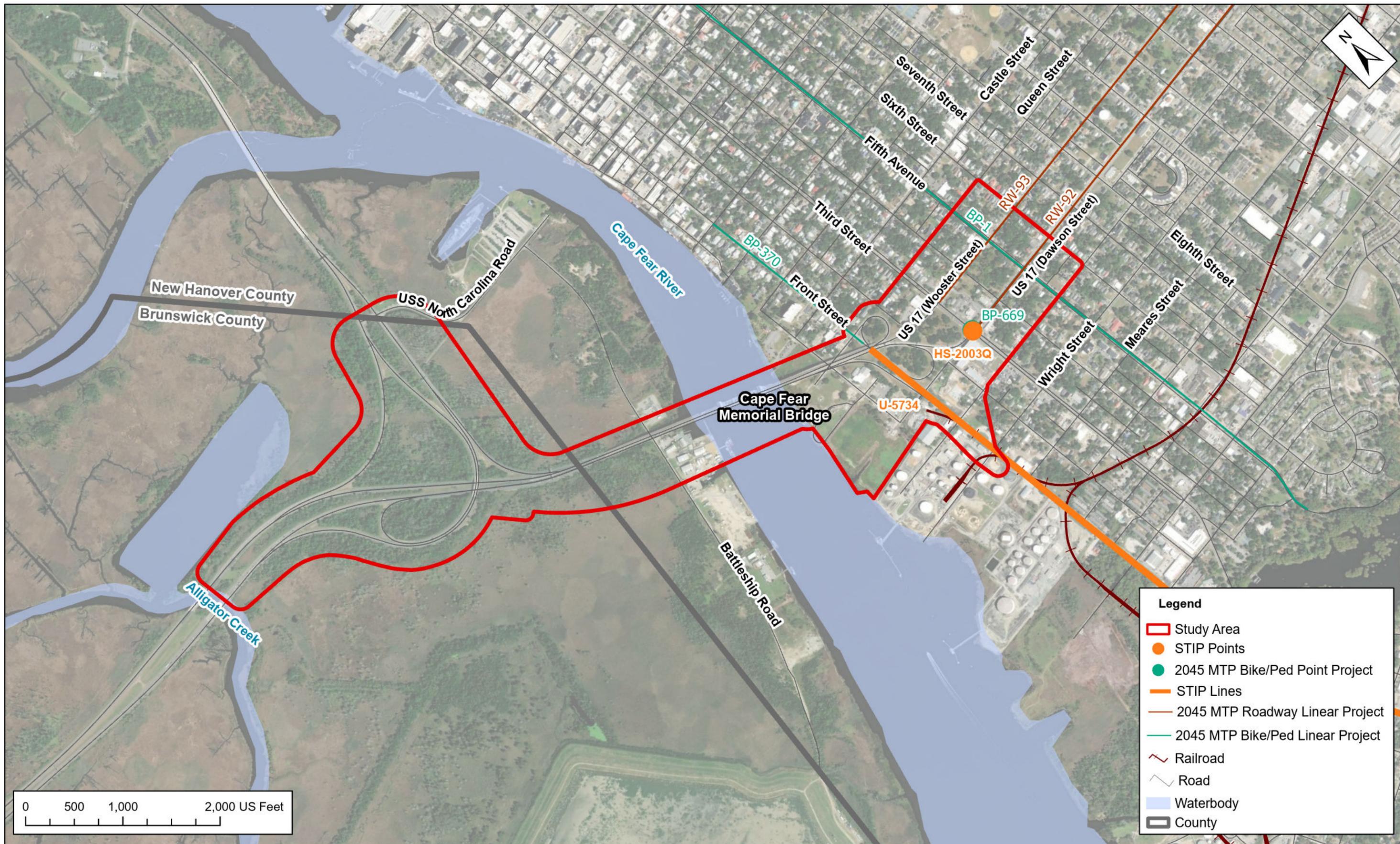
Based on the Merger Plan for the project, NCDOT proposes that the next Merger Meeting, CP 2 (Alternatives Considered) take place in Early 2024 and CP 2A (Major Hydraulic Crossing Structures and Alignment Defined) take place Winter/Spring 2024. Prior to the next Merger Meeting, NCDOT is expected to complete the Hydraulic Planning Report, natural systems studies, and functional roadway designs based on surveyed data will be available for review.

It is anticipated that both the CP 2 and CP 2A meetings will be held within the following calendar year; Merger Team members will be notified of any changes that require a revision of this timetable through an updated Merger Plan, which will be updated throughout the project development process and serve as a living document.



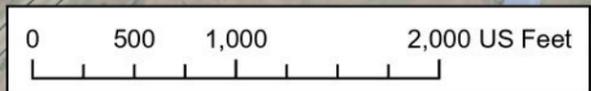
VICINITY MAP
 HB-0039 | BRUNSWICK & NEW HANOVER COUNTY
 FIGURE 1





Legend

- ▭ Study Area
- STIP Points
- 2045 MTP Bike/Ped Point Project
- STIP Lines
- 2045 MTP Roadway Linear Project
- 2045 MTP Bike/Ped Linear Project
- ~ Railroad
- Road
- ▭ Waterbody
- ▭ County



OTHER PROJECTS IN AREA

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