

CAPE FEAR MEMORIAL BRIDGE REPLACEMENT



FY 2023 - FY 2026

NOVEMBER 27, 2023

BRIDGE INVESTMENT PROGRAM

LARGE BRIDGE PROJECT GRANTS



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- Attachment A: Letter of Commitment
- Attachment B: Letters of Support
- Attachment C: Large Bridge Application Template Workbook
- Attachment D: Benefit-Cost Analysis Model
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- Attachment F: Budget Narrative
- Attachment G: Work Plan

Link to supplemental materials

<https://connect.ncdot.gov/resources/BIP2023-CFMB/Pages/default.aspx>

Supporters of the CFMB Project

(Letters Included in Attachment B)

US Representative David Rouzer
NC Congressman Frank Iler
NC Senator Michael Lee
Wilmington City Council
North Carolina Ports
Wilmington Urban Area Metropolitan Planning Organization
Town of Belville
Town of Carolina Beach
Town of Leland
Town of Kure Beach
Town of Wrightsville Beach
Town of Navassa
Brunswick County
New Hanover County
Pender County
New Hannover County TDA
Wave Transit
Wilmington International Airport
Wilmington Chamber of Commerce
Cape Fear Cyclists
Terry Benjey Bicycle Foundation
Military Officers Association of America
Sun Coast Partners Commercial
Novant Health
Business Alliance for a Sound Economy
Cape Fear Realtors
The BDK Management Group Inc
Community Leader Louise McColl

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I. Basic Project Information

Project Description

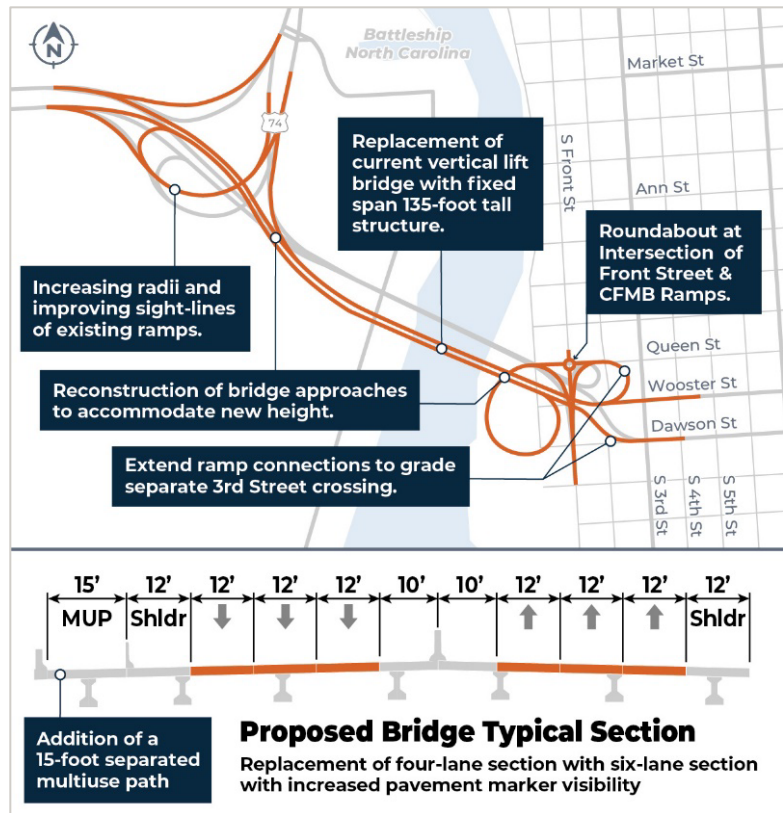
The Cape Fear Memorial Bridge (CFMB) Replacement Project (Project) will replace an existing four-lane steel vertical-lift bridge that is functionally obsolete. The bridge carries US 17/US 76/US 421 across the Cape Fear River between New Hanover and Brunswick Counties with terminations in the City of Wilmington on the east and Eagles Island (New Hanover and Brunswick counties) on the west.

The CFMB replacement is needed to improve congestion, mobility, and connectivity on a local and regional corridor that connects local communities and carries trucks transporting freight to and from the Port of Wilmington. The corridor is part of the Strategic Highway Network (STRAHNET) for military transportation, is a [NCDOT Identified Coastal Evacuation Route](#), and is on the Federal Highway Administration (FHWA) Primary Highway Freight System (PHFS). Annual repair and maintenance costs related to the bridge deck and lift mechanics are expected to increase as the bridge ages and traffic increases. Traffic delays due to repair and maintenance activities and the operation of the bridge lift cause congestion and make travel times unreliable. The current structure lacks bicycle and pedestrian facilities to support alternative modes of transportation. The Project includes the elements detailed in **Figure 1**.



The CFMB is an iconic landmark in Wilmington. The 54-year-old structure is one of two connections between two of the fastest-growing counties in North Carolina, and must be raised to accommodate barges, Coast Guard vessels, and other ships.

Figure 1: Proposed Improvements



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The Large Bridge Project Grant funds will be used for utility relocation, right-of-way acquisition, and construction of the new bridge structure and connections.

The Project primarily supports the following Bridge Investment Program (BIP) goals:

Primary Goal: State of Good Repair. The primary purpose of the Project is to address the deteriorating condition of the CFMB and its complicated movable mechanics. As of the last structural inspection in December 2021, the bridge is rated in fair condition with a grade of 6 on the deck, 5 on the superstructure and 6 on the substructure based on the 0-to-9 point scale under the National Bridge Inventory (NBI) Condition Ratings.

Replacement of the CFMB will significantly reduce the level of resources NCDOT must dedicate to maintaining the aging structure. Since 2008, the North Carolina Department of Transportation (NCDOT) has invested at least \$32.8 million in major rehabilitation activities to maintain the deck, superstructure, and substructure in a satisfactory condition. NCDOT must also spend a further \$15 million in early 2024 to replace the decking and stringers to keep the bridge operational.

In addition to these major rehabilitation projects, NCDOT spends an average of \$550,000 each year on regular maintenance and daily operations to maintain the bridge in its current condition and continue vertical lift operations.

Secondary Goal: Improved Mobility, Efficiency, or Reliability for People and Freight. The Project expands the capacity of the US 17/US76/US 421 corridor, improving mobility and efficiency between downtown Wilmington, the Port of Wilmington, and New Hanover County with Brunswick County and the greater southeastern North Carolina region. The 2021 annual average daily traffic (AADT) on the bridge was approximately 69,000 vehicles, including 8,280 trucks, according to the NBI. Traffic volumes are projected to increase to 94,900 by 2050.

According to the 2020 US Census, the City of Wilmington's, population was 115,456. According to the [North Carolina OSMB State Demographer](#), Brunswick County's 2020 population was 137,789, and New Hanover's was 226,077. The populations of New Hanover County and Brunswick County are projected to increase by 41 percent and 89 percent, respectively, over the next 30 years. These increases will make traffic congestion and unreliable travel times worse without the replacement of the rapidly deteriorating existing structure and the expansion of travel lanes.

Project Background

The need for an alternative to the existing CFMB has been discussed by NCDOT and key regional partners since 2018. NCDOT completed [a Feasibility Study](#) in 2020 that confirmed the need to replace the CFMB to address mounting on-going and future maintenance costs and travel disruptions, as well as provide capacity for the significant expected growth in population and freight demand. NCDOT has invested \$150,000 for the Feasibility Study and \$2,000,000 to develop Preliminary Design and conduct the NCDOT [Section 404/NEPA Merger](#) process, which is ongoing.

As part of the Section 404/NEPA Merger process, NCDOT is evaluating both a fixed span 135-foot structure and a 65-foot movable span structure to reduce future bridge closures and operations and maintenance costs. For the purposes of this grant application, the 135-foot fixed-span structure is expected to be the most feasible of the two alternatives. Therefore, this application focuses on the

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merits of that alternative. This is not intended to preclude any NEPA-related analyses nor the regulatory requirements/decisions of NCDOT and our agency partners.

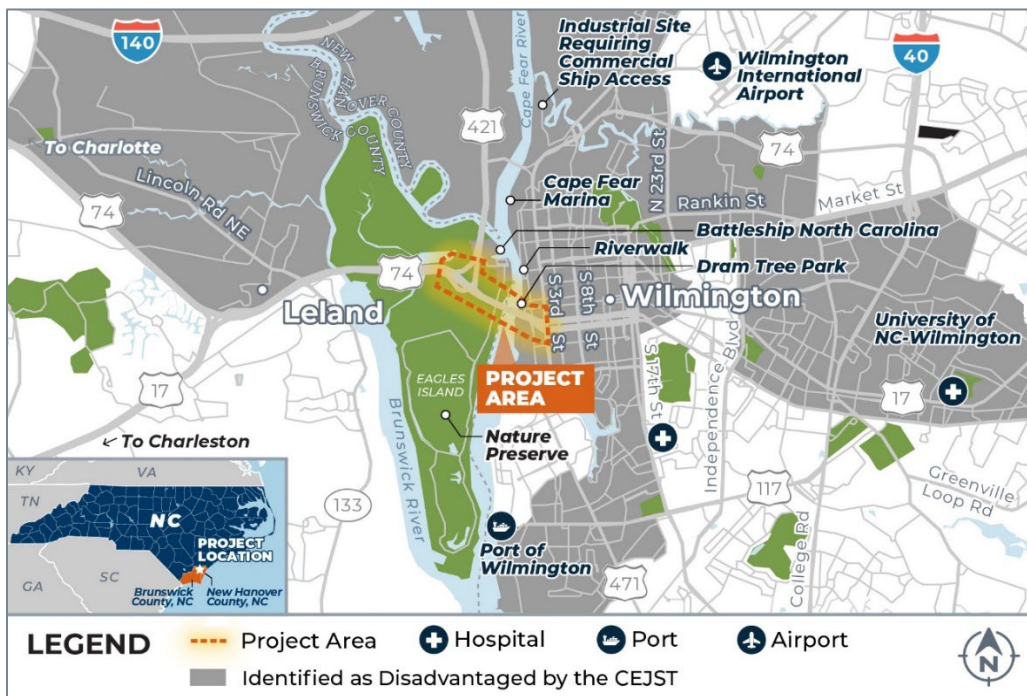
Identifying viable funding sources for a project of this magnitude is a challenge. In 2021, an unsolicited proposal went before the Wilmington Urban Area Metropolitan Planning Organization (WMPO) Board requesting support for a public-private partnership to explore the replacement of the CFMB as a toll facility. This proposal did not receive support, which is evidenced by a July 28, 2021, WMPO Resolution indicating the Board would not support implementing a toll on the bridge. This uncovered a need to explore all options surrounding the replacement of the CFMB. To promote this effort, Brunswick County, the Wilmington Chamber of Commerce, and the WMPO signed resolutions encouraging exploration of all opportunities for the replacement of the CFMB. Following this, NCDOT issued a Request for Information for an Alternative Delivery Contract option to explore alternatives for the CFMB.

NCDOT continues to identify funding opportunities for implementation, including this request for assistance for BIP funding. The funds would allow NCDOT to maximize investment of local resources, state, and federal formula funds in a critical piece of infrastructure in historic Wilmington and southeastern North Carolina.

Project Location

The CFMB carries US 17/US 76/US 421 across the Cape Fear River between New Hanover and Brunswick Counties with terminations in the City of Wilmington on the east and Eagles Island (New Hanover and Brunswick counties) on the west. The Project is located in the Wilmington, North Carolina, 2020 Census-designated urbanized area, and serves both Areas of Persistent Poverty and Historically Disadvantaged Communities. A shapefile with geospatial data is included with this application. The Project location is illustrated in **Figure 2**.

Figure 2: Project Area Map



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An operable CFMB is vital to maintaining and improving the local and regional economy. It connects local residents to a variety of businesses, including shops, restaurants, lodging, and healthcare and childcare facilities. It is used by residents, tourists, and members of the filmmaking industries. The CFMB is on a freight corridor that serves the Port of Wilmington. Ship access under the CFMB to areas north of the bridge is critical for private, military, and industrial sites.

Lead Applicant

NCDOT is the Lead Applicant. Information about the NCDOT's experience with highway programs is in the Project Readiness section of the application.

Additional Eligibility Requirements

How the Bridge Will be Maintained. Once constructed, the new structure will be added to the NCDOT's Asset Management Plan. According to the Life-Cycle Cost Study performed for the project, the 135-ft span bridge will cost \$44.3 million in constant 2022 dollars to maintain in a state of good repair over the next 50 years (\$10.8 million when discounted at 4 percent through the 50-year analysis period). This includes routine annual inspections, periodic underwater bridge inspections, annual maintenance, and two larger rehabilitations. The project is expected to be designed for a 75-year to 100-year service life. NCDOT funds bridge maintenance using a dedicated state Highway Fund. Additional information is in the State of Good Repair section of the application.

Consistency with Asset Management Plan. The Project is consistent with the performance goals and lifecycle planning in NCDOT's Asset Management Plan. Additional information is in the State of Good Repair section of the application.

Bike and Pedestrian Accommodation. The bridge replacement provides a safe accommodation for bicyclists and pedestrians with a new 15-foot-wide multiuse path separated from the general-purpose lanes over the bridge that will tie directly into the existing [Wilmington Riverwalk](#) and Dram Tree Park bike and pedestrian facilities. Additionally, the multiuse path will provide access to the recreation and tourism sites on Eagles Island, including a new direct connection to the [Battleship North Carolina](#) museum. The new path will also allow for a future trail network connection to the Belville Riverwalk in Brunswick County. The connections to these existing facilities are included in the scope of the Project. Additional information is in the Equity and Quality of Life section of the narrative.

II. National Bridge Inventory Data

A December 2021 inspection (included as part of the supplemental information) of the CFMB identified several categories of maintenance issues across the various bridge spans and components. These issues illustrate the constant maintenance needs associated with CFMB that require regular repairs and routine maintenance on a weekly basis, and major repairs and rehabilitation approximately every other year. Required NBI data points for the structure are included in the application template (Attachment C).

Critical issues identified in the most recent inspection.

- **Does not meet currently acceptable standards:** Bridge Railings, Transitions, Approach Guardrail, and Bridge Guardrail
- **Intolerable; High Priority Replacement/Corrective Action:** Deck Geometry and Underclearance

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The US 74 Flyover structure, which is part of the interchange connection on the west side of the CFMB, is also in the NBI and rated in poor condition. With the CFMB replacement structure alignment, this structure is no longer needed, and will be removed. As a result, this Project addresses two NBI structure in poor condition or at risk of falling into poor condition but does not involve “bundling” stand alone bridge projects.

Defects found in the December 2021 inspection

- Delamination/Spall: 17 instances
- Exposed Rebar: 9 instances
- Corrosion: 57 instances
- Cracking: 27 instances
- Connection Issues: 25 instances
- Impact Damage: 4 instances
- Distortion: 2 instances



Spall and Delamination



Bent Truss Sparring

III. Project Budget – Grant Funds, Sources, and Uses of All Project Funding

In response to WMPO's July 2021 meeting, NCDOT, in partnership with local stakeholders, has actively been exploring all available funding options for the replacement of the Cape Fear Memorial Bridge. These options include 1. traditional STI 2. tolling (turnpike) 3. alternative delivery (all other options including P3 and grants). Through the Department's investigation, it is likely that more than one option will need to be utilized to construct the Project.

In 2013 North Carolina passed the Strategic Transportation Investments (STI) Law. This law required the NCDOT to quantitatively evaluate and rank all projects and select only the top scoring projects for programming within the State Transportation Improvement Plan (STIP). The North Carolina Prioritization system requires that projects from all six modes of transportation overseen by NCDOT compete together with no set asides for any one mode or project type. This means that aviation, bike/ped, ferry, highway, public transportation, and rail projects compete against one another for the same allotment of funds.

The North Carolina system allows for a unique scoring system for each of the modes. The system requires that all projects are scored on a 0-to-100-point scale to allow for comparison across modes and for the citizens of North Carolina to easily understand the project scores. The STI Law also

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identifies three funding categories, Statewide Need, Regional Impact, and Division Needs, with the funding split between them on a 40 percent, 30 percent, and 30 percent basis, respectively. The STI Law further enumerates 10 criteria that must be used for the scoring of highway projects. Those criteria are Congestion, Freight, Safety, Benefit/Cost, Economic Competitiveness, Accessibility and Connectivity, Multimodal, Lane Width, Shoulder Width, and Pavement Condition. All highway projects are scored based on these criteria and the weights for those criteria which are developed by a workgroup and adopted by the Board of Transportation.

The North Carolina Prioritization system also includes some smaller funding allotments that are referred to as "Alternative Criteria" because they use a prioritization system other than the main system. One such Alternative Criteria allotment is for bridge replacement. To be eligible for this allotment a bridge replacement can only replace the existing bridge in kind. This means that projects such as the subject Project are ineligible for the bridge replacement funding allotment because of the additional travel lanes that are part of the Project in addition to the replacement of the current structure. This means that the subject project must compete in the North Carolina Prioritization System.

Due to the unique features of the Project, the Department has had challenges funding the bridge replacement through traditional STI funding mechanisms. The Bridge project is eligible for funding at the Statewide Mobility funding category. In the last prioritization round, the Project scored in the 40th percentile when compared to all other Statewide Mobility eligible projects. Historically, approximately only the top 20 percent of Statewide Mobility projects are funded while the remainder may cascade down to be considered at the Regional Impact and/or the Division Needs funding categories. This Project equates to approximately half of the Regional Impact funding bucket for a 10-year period and would take up an even larger portion of the Division Needs pot. (So essentially, if the Project were to cascade down and be funded at a lower funding category, it would significantly reduce the project portfolio for either the Region or Division category of funds.) This is not uncommon for bridge projects, as they typically struggle to compete against the needs of higher capacity roadways or corridors that also are in significant need of attention. With limited transportation funding, the Department has significantly more needs than funding availability allows. One of the criteria used to score projects in the NC Prioritization system is Benefit Cost. For this criterion, the cost is defined as the cost to NCDOT. A grant, as it is funds outside of NCDOT, would reduce the cost to NCDOT on a 1-to-1 basis. This Project has scored well in most criteria, but less well in the benefit/cost criterion. By securing this grant and reducing the cost to NCDOT, the Project will see an increase in the benefit/cost score such that it will be much more competitive in the next round of prioritization to increase its likelihood of being funded in the STIP.

NCDOT continues to explore opportunities to ensure this Project scores well enough in STI prioritization to be funded in the STIP. NCDOT tolling policy dictates that the tolling option must be initiated at the local level. Discussions of the tolling option for this Project are currently ongoing with the MPO.

Project Cost Estimate

Table 1 summarizes the \$486.5 million total project cost estimates and reflects a combination of previously incurred costs, on-going costs, and costs included in the BIP grant application. The previously incurred costs (\$150,000) were for the 2020 Feasibility Study and the \$2 million in on-

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going costs are to complete Preliminary Design and NEPA. These phases of the Project are included in both the WMPO TIP and the NCDOT STIP as described in Section VI of this application. The \$484.3 million cost estimate included in the BIP application reflects the alternative project delivery approach that will be used. As shown in the table, estimates are included for utility relocations, right-of-way acquisition, and activities that will be completed utilizing the alternative project delivery approach including final design and construction. Finally, the estimate includes a 23 percent contingency allowance to cover unanticipated cost increased during construction.

Table 1: Project Costs

Element	Cost	% of Total BIP-Eligible Project Costs
Feasibility Study (previously incurred)	\$150,000	N/A
Preliminary Design and NEPA (ongoing)	\$2,000,000	N/A
Total of Costs Prior to Grant-Eligible Project	\$2,150,000	N/A
Utility Relocation	\$3,700,000	1%
ROW	\$60,000,000	12%
Alternative Project Delivery Activities		
Final Design	\$20,000,000	4%
Construction	\$400,600,000	83%
<i>Contingency</i>	<i>\$91,980,000</i>	<i>23%*</i>
Total of BIP-Eligible Project Costs	\$484,300,000	100%
Total	\$486,450,000	

*Contingency is 23% of construction cost only.

Funding Sources

Table 2 summarizes the funding sources for future costs to successfully deliver the Project. As shown in the table, NCDOT anticipates the total federal funding share will be 80 percent, which reflects 50 percent from the requested \$242.2 million BIP grant award and 30 percent from the NCDOT's annual allocation of FHWA Bridge formula funds. The remaining 20 percent would be provided by State transportation funds that are collected through a combination of a motor fuel tax (40.5 cents per gallon), Division of Motor Vehicles (DMV) fees collected from licensed drivers and vehicle registrations, and the highway use tax on vehicle title transfers which includes a 3 percent tax on a motor vehicle's net retail value (after trade-in allowance) when a certificate of title is issued in North Carolina and an 8 percent use tax for short-term vehicle rentals. This match split is contingent upon the Project's successful scoring in the State's Prioritization process (detailed above).

Upon announcement that the CFMB Project is selected for a BIP grant award, NCDOT will work towards successfully adding this Project to the Department's next version of the STIP following the methodology defined by the STI Law. More specifically, the STI Law requires NCDOT to quantitatively evaluate and rank all projects and select only the top scoring projects for programming within the STIP. Finally, NCDOT is continuing to evaluate additional non-federal sources to implement the Project including potentially tolling the bridge. A final decision on source or sources that will provide the match will be finalized following the announcement of a BIP grant award.

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Table 2: Funding Sources for BIP-Eligible Future Expenses

Source	Uses	Funding	% of Total BIP-Eligible Costs
Non-Federal Sources (State Funds)	Final Design, ROW, Utilities, Construction	\$96,860,000	20%
BIP Grant Request	ROW, Utilities, Construction	\$242,150,000	50%
Other Federal Sources (Bridge Formula Funds)	ROW, Utilities, Construction	\$145,290,000	30%
Total		\$484,300,000	100%

Finally, as project development continues, NCDOT is committed to aligning the Project’s financial planning with BIP requirements. This includes adhering to cost-sharing requirements, accounting for potential cost increases, and ensuring the availability of funds according to obligation and expenditure deadlines. NCDOT has a long history of successful delivery of major structure replacement projects, including several within this region to replace vertical-lift bridges with fixed-span structures, and maintains a commitment to fiscal responsibility and adherence to federal guidelines.

IV. Merit Criteria

Criterion #1: State of Good Repair

The Project is a comprehensive solution to the pressing challenges related to ongoing maintenance and inadequate infrastructure to accommodate traffic on the regional transportation network. The CFMB requires extensive ongoing maintenance due to its age and mechanical features. The project aligns with the State of Good Repair criterion by ensuring improved bridge conditions, enhanced resilience, and reduced maintenance costs, backed by a strong commitment to align with NCDOT’s asset management goals and regional transportation needs.

Bridge Condition and Urgency for Replacement

The CFMB, built in 1969, is currently rated in fair condition. The most recent inspection in December 2021 highlights such critical issues as cracking, corrosion, and connection problems. Recent inspections revealed that bridge railings, transitions, and guardrails do not meet current acceptable standards. Specifically, the deck geometry appraisal and underclearance appraisal call for high-priority replacement and corrective action.

The existing bridge requires extensive maintenance to keep it safe and open to traffic and to maintain the complex systems associated with the movable span. The intensive maintenance regime involves weekly on-site inspections and biannual electrical and machinery inspections. In addition, a 24/7 bridge tender must stay on the structure to raise or lower the vertical lift, conduct regular inspections, and manage minor repairs, an additional cost to NCDOT. The fixed-span replacement structure will eliminate this ongoing cost. Because the CFMB is such a critical regional and economic connection in southeastern North Carolina, NCDOT must prioritize its current budgets to proactively rehabilitate the structure and replace failing parts, in some cases at the expense of other pressing needs in the state.

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This Project both reduces the future operational and maintenance (O&M) burden related to this bridge and frees up resources to maintain a state of good repair of the NCDOT system in the region.

NCDOT must currently repair steel-deck grid fractures on a weekly basis. The deck – already more susceptible to wear and tear than a standard roadway surface because it is an open-grid steel deck – faces heavy passenger and freight vehicle traffic.

Delaying replacement of the CFMB and associated infrastructure will continue to be costly and make it increasingly difficult to maintain a state of good repair. As shown in **Table 3**, annual routine maintenance costs alone for the new structure are projected to be less than 10 percent of what NCDOT currently spends.

Table 3: O&M Cost Comparison

O&M Type	Existing Structure (2023 dollars)	New Structure (2023 dollars)
Routine Maintenance (annual)	\$550,000	\$53,500
Critical Structural Inspections (every other year)	\$300,000	\$272,000 \$40,000 (underwater)
Major Rehabilitation & Preservation	\$8.6 million (every 2.6 years)	\$9.4 million (single, less robust rehabilitation 20 years)
Five-Year Total	\$21.9 million (2023-2028)	\$880,000 (first five years of operations – 2032-2037)

Alignment with Transportation Asset Management Plan (TAMP)

NCDOT will be responsible for maintaining the new bridge and connecting infrastructure associated with this Project. The [NCDOT's 2022 TAMP](#) outlines a strategic and systematic process of operating, maintaining, and upgrading physical assets effectively throughout their lifecycle.

NCDOT employs a comprehensive and data-driven approach to the development of the TAMP that includes inventories, performance targets, lifecycle planning, risk management analysis, and a financial plan and investment strategy. NCDOT's Bridge Management System (BMS) incorporates nearly four decades of bridge condition data, deterioration curves, and decision trees to recommend optimal improvements based on unit costs. The increasing number of structurally deficient bridges on the state system led to the creation of the State Bridge Program for major rehabilitation and replacement, with a goal to reduce structurally deficient bridges to 10%.

To fund the State Bridge Program, in 2014, the North Carolina General Assembly authorized state funds corresponding to a 15-year option for bridge replacement and rehabilitation, providing a consistent and reliable source of funding for the reconstruction and preservation of bridges.

Bridges are prioritized within the BMS based on condition. The CFMB places an increasing burden on limited Preservation resources and is a strong candidate for replacement based on NCDOT asset management criteria.

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NCDOT’s 2022 TAMP sets a goal of no more than 5% of total bridge deck area in poor condition – half the target of 10% required by FHWA. At over 250,000 square ft, if CFMB were to fall into poor condition, it could affect NCDOT’s ability to meet its statewide goal for bridges in poor condition.

Transportation Network Significance

The CFMB plays a vital role in the STRAHNET, facilitating the movement of military, freight, and civilian traffic. Its replacement is crucial for maintaining the operational integrity of important transportation corridors—US 17, US 76, and US 421. On the state level, the CFMB provides strategic network mobility and access to the Port of Wilmington, located approximately 2.5 miles south of the bridge. Proximity to the Port of Wilmington makes the CFMB a critical lifeline for [North America’s most productive port](#), but also compounds maintenance issues with its disproportionate amount of truck traffic, as well as vibrations that shorten the lifespan of structure components.

Proposed Improvements and Future Resilience

The new bridge design meets modern geometric and load standards, resolving the current functional obsolescence issues and enhancing safety, capacity, and efficiency.

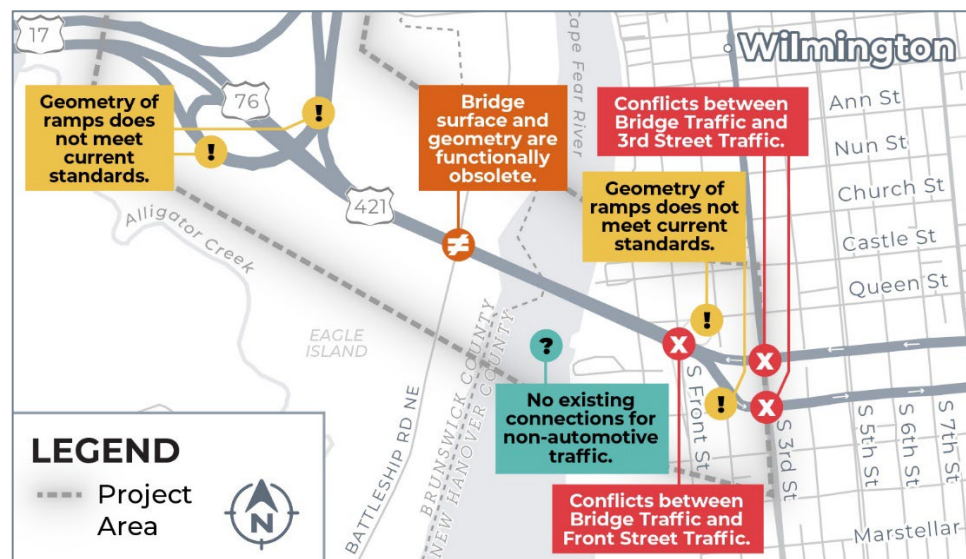
NCDOT is dedicated to improving the resilience of its structures statewide. Design considerations, such as materials that are more resistant to hurricane impacts as well as advanced scour protection, are standard practice for NCDOT. These factors are especially critical to this Project because of the heightened risk profile of the region as discussed in the Climate Change, Sustainability, and Resiliency section of this application.

Criterion #2: Safety and Mobility

Reduces Crashes and Protects Motorized and Non-Motorized Users

The current CFMB and the configuration of the connections to the local roadway network present safety issues that contribute to a high number of crashes, as shown in **Figure 3**. There are 99 documented crashes each year within the Project area, according to NCDOT crash data. NCDOT [Planning](#)

Figure 3: Existing Safety Issues Addressed by the Project



[Level Safety Score Data](#) shows that the roadways on either side of the bridge have a high crash rate and more severe crashes compared to similar facilities.

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Ramp Geometry. Deficiencies in ramp geometry each year contribute to over 20 crashes resulting in an injury. The Project improves the geometry of these ramp connections on both sides of the bridge. On the west side, where the structure ties into the interchange of US 17 and US 74, the Project increases ramp radii merge distance and widens lanes and shoulders. On the east side, where the bridge ties into the downtown Wilmington street network, the Project removes the conflicts between bridge traffic and 3rd Street traffic by extending the structures to grade separate the two crossings of 3rd Street and extend acceleration/deceleration distances.

Bridge Geometry and Deck. The bridge itself has substandard lane widths and shoulders for modern vehicle and truck travel. Under existing conditions, the lane width is 11 feet, outside shoulder width is 4 feet, and inside shoulder width is 2 feet; proposed build conditions increase these dimensions to 12, 12, and 11 feet, respectively. The open grid decking of the movable span becomes slick during rainy conditions, and the mechanical components limit visibility. The Project design addresses these issues with improved roadway geometry, including wider lanes and shoulders; safer surface materials; more visible pavement markings; and improved lighting.

The Project is expected to significantly reduce the total number of crashes, both within the Project area and in the region. The BCA accounts for safety benefits associated with creating safer connections to the infrastructure on either end of the bridge, improving roadway geometry and navigability, and avoiding detours associated with future lane closures (detailed in the Mobility section below). During the 30-year analysis period, starting the first full year the new bridge is open in 2032, the Project is statistically expected to result in 1,504 fewer crashes, including 4.7 fewer fatal crashes.

Table 4: Crash Reduction Within Project Area (30-Year Analysis Period)

Crash Type	No-Build Crashes	Build Crashes	Avoided Crashes
Fatal	9.0	5.8	3.2
Incapacitating Injury	35.9	20.2	15.8
Non-Incapacitating Injury	242.6	191.2	51.4
Minor Injury	871.7	693.4	178.3
Property Damage Only	3,280.	2,515.0	764.9
Total	4439.2	3425.6	1,013.6

Table 5: Crash Reduction from Avoided Detours (30-Year Analysis Period)

Crash Types	Statewide Rate (per 100 million Vehicle Miles Traveled)*	Avoided Crashes
Fatal Crashes	1.24	1.5
Injury Crashes	75.06	90.0
Other Crashes	333.68	398.5
Total	409.98	490.0

*[North Carolina 2022 Traffic Crash Facts](#)

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Bike/Pedestrian and Vehicle Conflicts on Bridge. Bicycle and pedestrian travel is not currently permitted across the CFMB or on its interchanges. Still, some people walk or bike along these facilities anyway. [NCDOT severe and fatal crash data](#) shows several bicyclists and pedestrians have been seriously injured or killed on or near the bridge over the past decade, including two pedestrians seriously injured in the summer of 2022. In 2016 (prior to the analysis period included in the BCA), a pedestrian was killed during daylight hours when struck from behind walking along US 17. No alcohol was involved for either the driver or the pedestrian.

The Project adds a multiuse path that separates bicycle and pedestrian traffic from vehicle traffic and connects to trail systems on both the east and west side of the bridge, creating a safe alternative and eliminating the dangerous conflict that led to the prior pedestrian and bicyclist injuries and deaths.

Bike/Pedestrian and Vehicle Conflicts at Front Street Intersection. The existing connection between the CFMB and the street network of downtown Wilmington poses hazards for non-motorized roadway users. [WMPO data](#) shows a history of bicycle and pedestrian crashes at three of the four intersections that access the bridge on the east side. Two of these are loop ramps connecting to Front Street, which has a bicycle lane, but is designated as “Not Recommended” by the [WMPO bike suitability map](#). A 25-year-old pedestrian was injured at one of these ramps when “trapped” by multiple vehicles.

The Project mitigates these issues by rerouting both loop ramps into a single roundabout connection with Front Street, giving non-motorized roadway users a much simpler and safer way to travel north and south.

Person Miles Traveled Expected to be Impacted by the Project

The Project is expected to impact an average of 58,319 person-miles of travel on an average day over the life of the new structure. This describes the number of person miles that would travel on structures in poor condition on an average day without the Project, including the CFMB and the US 74 Flyover.

This calculation is based on NBI data for current and future AADT as well as length of both the CFMB and flyover structure. Vehicle occupancy rates come from travel demand modeling associated with this Project and include 1.48 people per passenger vehicle and 1 person per truck.

Improves Mobility, Efficiency, or Reliability for People and Freight

The Project improves efficiency and reliability of movement for people and freight both for existing and estimated travel demands. The travel time and distance assumptions for current and future traffic demands are captured in detail in the BCA model and technical appendix (Attachments D and E). Overall travel demand for current and future years is based on the CFMB Project traffic forecast, finalized in September 2023. The Project team used a microsimulation model to determine impacts of the Project in terms of speed/delay within the Project area.

Traffic delays on the bridge that impact mobility, efficiency, and reliability are due to lane and bridge closures for maintenance, traffic stoppages when the bridge is raised for river traffic, and insufficient capacity and related congestion. The Project improves mobility for people and freight motorized users by:

1. Avoiding lane and bridge closures required for operations and maintenance of the existing bridge. The need for these closures, as well as their frequency, is detailed in the State of Good Repair

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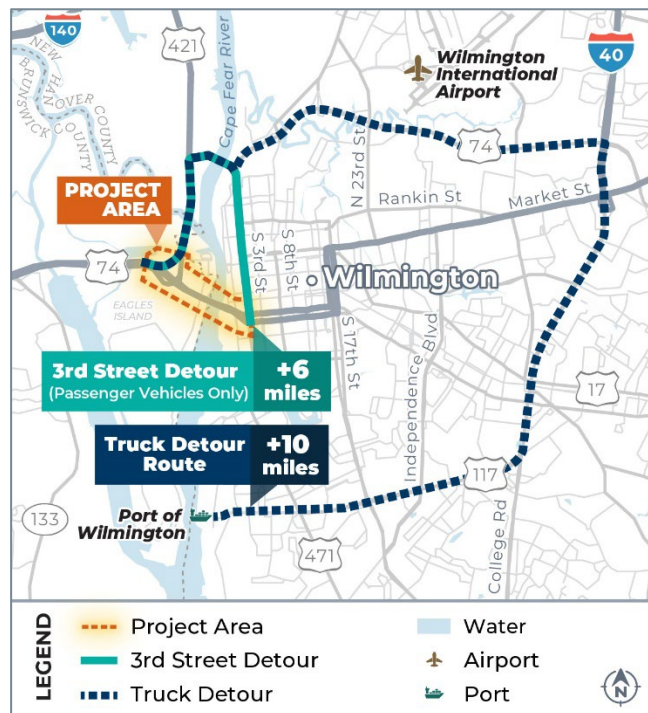
section of the narrative. The outcomes for the different types of closures were modeled, based on historical data and input from NCDOT Bridge Maintenance Division staff, to illustrate the vehicles miles traveled that will be saved by avoiding the need for the closures. The types and lengths of closures include:

- **Nighttime lane closures:** Commonly used for isolated deck repair needs, and specifically avoids traffic impacts, occurring between 9pm and 5am. The analysis assumes this closure type maintains one lane of traffic in each direction (bidirectional half capacity). The Work Zone User Impact analysis estimates no traffic impacts associated with this closure type (which tracks with the intent).
- **Partial lane closures:** Most frequently utilized approach when daytime work or inspections are required. The analysis assumes this closure type maintains one lane of traffic in each direction (bidirectional half capacity), and assumes that when faced with a potential queue, a portion of vehicles will detour rather than wait through the queue.
- **Directional lane closures:** Some rehabilitation projects, including deck replacement, require a closure that will close both lanes in one direction of traffic at a time, so drivers can only travel eastbound (for half the rehabilitation time) or westbound (for the other half), forcing vehicles to detour in the other direction.
- **Full closures:** In the unlikely event that a bridge inspection reveals a crack in the truss, or a gear is sheared during a bridge lift operation, the entire bridge will have to be closed for emergency repair (zero capacity). In this case, all vehicles are required to detour for the duration of the closure.

When traffic is backed up, passenger and freight traffic sometimes detours through local streets. The nearest crossing of the Cape Fear River is the Isabel Holmes Bridge, 1.7 miles north of the CFMB as the crow flies. To reach this crossing, passenger vehicles must drive north on 3rd Street through downtown Wilmington, adding an extra three miles to their trip. However, this route is not accessible to trucks, which must instead circumnavigate the city on highways, adding an extra ten miles per trip if they are coming from or going to the Port of Wilmington. The detour routes are depicted in **Figure 4**.

Based on the BCA model, by avoiding most of these closures, the Project saves 4 million miles of vehicle travel on detour routes each year on average over the life of the bridge. The Project also saves over 873,500 hours of travel time each year, including detour time as well as traffic congestion in the Project area.

Figure 4: Detour Routes



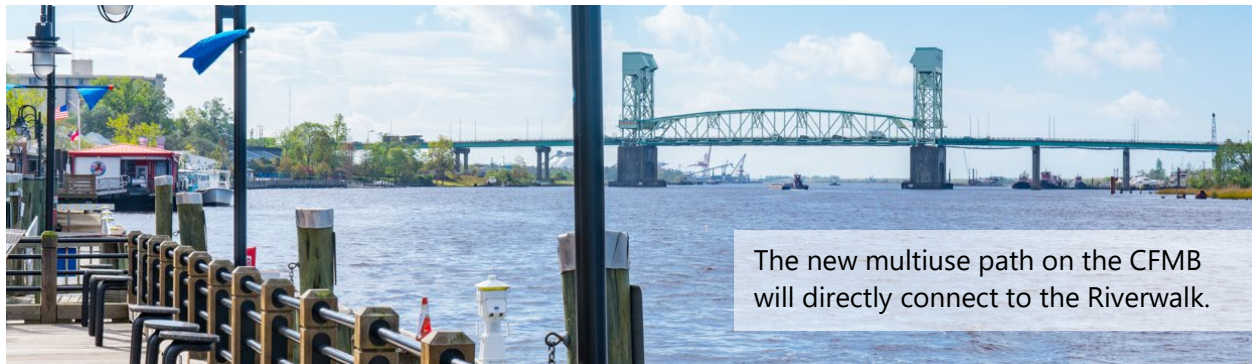
2. Avoiding traffic stoppages required to lift the existing bridge and allow boats to travel underneath, always allowing uninterrupted access to both vehicles (across the bridge) and boats

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(underneath the new, higher bridge structure). The Project saves 30,800 hours per year of vehicle travel time associated with these lifts.

3. Expanding the capacity of the highway. By adding a travel lane, widening the roadway, and improving interchange geometry, the Project allows for more consistent travel speeds and prevents congestion, saving an estimated 569,000 vehicle hours per year on average.

Criterion #3: Economic Competitiveness and Opportunity



Provides Equitable Access to Jobs

NCDOT intends to utilize Disadvantaged Business Enterprises (DBEs) to implement the Project. NCDOT has several programs that facilitate the certification of businesses as small or disadvantaged and encourage their participation in NCDOT projects. These programs include the [Minority & Women Business Enterprise Certification](#), [Small-Business Enterprise Certification](#), [Small Professional Services Firm Certification](#), and [Unified Certification Program](#). The North Carolina Department of Administration (NCDOA) also administers the [Historically Underutilized Business Program](#) which promotes historically underutilized businesses in State Government contracting and procurement to foster their growth. The DBE engage plan and utilization goal for the Project will be finalized following the announcement of the BIP grant award and will address Federal Procurement Process requirements.

The NCDOT Office of Civil Rights [On-The-Job \(OTJ\) Training Program](#) is a statewide workforce development program that will be utilized to the extent possible in the implementation of the Project. This program's mission is to assist disadvantaged individuals, minorities, women, and veterans enter the highway construction industry. The program strives to expose youth to the highway construction industry using various forms of outreach including career fairs and other school events. The program works with partner consultants to provide quality training to individuals that will ensure they achieve a pre-determined skill level by the conclusion of the program, further building a diverse and well positioned workforce.

Under this program, NCDOT created the [Highway Construction Trades Academy](#) (HCTA) in March 2021. This Academy offers a course for those 18 years of age and above who wish to work in the construction industry. The course provides an opportunity for participating students to earn their OSHA 10, CPR and flagger certification, offers CDL permit preparation, and introduces Heavy Equipment Operation. These courses are offered various times a year in different locations to increase accessibility. Since its start, the Academy has placed dozens in work roles with partner

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agencies. The program prepares individuals to be able to take on a variety of roles through training in the classroom and in the field, as illustrated in this [Success Story](#) video published on the HCTA website. Academy graduates are prepared to work on projects such as the CFMB Replacement Project.

Improves Supply Chains

The [North Carolina Statewide Multimodal Freight Plan](#) estimates that NC's transportation system will move more than 1.14 billion tons of freight with a value of \$1.86 trillion in 2023. This represents a weight increase of 57 percent and value increase of 94 percent since 2017.

Maintaining the connection provided by the CFMB is vital to providing access to this critical Port and maintaining access to regional and national markets. This will become increasingly important as [NC Ports](#) reports that it experiences 12 percent year-over-year growth for general cargo volume and that the Port of Wilmington and Port of Morehead City moved about 4.6 million short tons of bulk and breakbulk cargo in Fiscal Year 2023. In addition, intermodal volume increased 74.2 percent during that time frame, accounting for 9 percent of total container volume.

Freight traffic traveling to and from the Port of Wilmington travels on the CFMB. The existing bridge has narrow lanes and insufficient capacity to handle current and projected freight traffic demand, and congestion impedes mobility. The current geometry for turn movements is deficient, causing delays. When the bridge is closed for repairs, trucks must rely on lengthy detour routes (detailed in Criterion #2 above). The travel modeling conducted as part of the BCA indicates that the Project saves an average of 203,000 hours and 543,000 miles per year for trucks.

Supports a Strong Economy

The structure's current condition results in lack of travel time reliability, potential safety concerns, and does not provide dedicated pedestrian and bike facilities. The CFMB provides vital connections to and from businesses, employment centers, and tourist attractions that contribute to the vitality of the local and regional economies. Improving access to these destinations with added capacity and travel time reliability contributes to continued growth and prosperity of the area. The multiuse path provides new multimodal transportation options where they did not previously exist and further support disadvantaged community members, particularly those who do not have a car.

Tourism Industry. The CFMB is located right outside of Wilmington, a historic port city in southeastern North Carolina. The city has several appealing destinations to encourage tourism, including a performing arts center, waterfront park with an amphitheater, an event pier, and a variety of hotels, restaurants, and a convention center. The bridge is a short distance from the Marina, Battleship North Carolina, the Wilmington Historic District, and numerous other museums and shops. The city's downtown is vibrant and houses museums, a riverfront, and riverwalk that follows the Cape Fear River.

New Hanover County is also home to many desirable destinations including three different beaches along the Atlantic Ocean. It has a large percentage of rental units and second homes, as is common in other coastal areas.

Employment. The bridge serves as a connection to jobs opportunities on either side of the Cape Fear River, which without the addition of the multiuse path, is impassable without an automobile.

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Implementation of this Project will provide new transportation options to job opportunities for disadvantaged community members who otherwise are limited to opportunities on one side of the river.

The area possesses strong industries in research & technology, education, healthcare, and finance, with large employers including the Port of North Carolina, Thermo Fisher Scientific (formerly Pharmaceutical Product Development), New Hanover Regional Medical Center, and UNC-Wilmington.

Education. The Bridge serves as a connection to several schools and colleges, including the [University of North Carolina at Wilmington](#) and [Cape Fear Community College](#) offering career training opportunities in a variety of fields. Cape Fear Community College (the fifth largest in North Carolina) is located in a disadvantaged community, according to the CEJST Tool, and is within walking and bicycling distance from the CFMB. It provides job training courses in several industries and has partnerships with over 30 employers. The new multiuse path will provide new access to job training opportunities to disadvantaged community members who may not have access to an automobile.

Criterion #4: Climate Change, Sustainability, Resiliency, and the Environment

Reduces Pollution or Greenhouse Gasses

As part of [Executive Order 246](#) in 2022, the State of North Carolina has created a [plan](#) to reduce greenhouse gas emissions by 50 percent below 2005 levels. NCDOT is committed to identifying opportunities to reduce emissions through all its projects, including the CFMB replacement. Evaluation of design choices, material selection, and construction methods will all prioritize emission reduction.

The reduced travel congestion and avoided detours detailed in Criterion #2 significantly reduce pollution and greenhouse gas emissions, preventing approximately 5,000 metric tons of CO₂ emissions per year.

Additionally, the new multiuse path supports mode shifts from vehicle travel to walking and biking, which do not produce emissions. In order to estimate how many trips would shift from vehicles to active transportation modes, the Project Team used National Household Travel Survey data associated with mode splits, along with smartphone-based trip distance data from Replica. The analysis assumes 28 percent of vehicle trips under one mile from origin to destination that currently travel over the bridge would shift to bikes or pedestrians instead. As trip length increases, the share of trips expected to shift to active transportation decreases exponentially. The complete methodology is detailed in the BCA Appendix. The results of this analysis are summarized in Error! Reference source not found..

Table 6: Active Transportation Mode Shift Associated with the Project

Variable	Values (Average per Year)
Vehicle-miles reduced	363,362
Total vehicle trips shifted	53,902
Person-trips shifted to walking	42,621
Person-trips shifted to biking	37,153
<i>Person trips account for average vehicle occupancy rates calculated for this Project.</i>	

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Improves Resiliency of At-Risk Infrastructure

According to the [FEMA National Risk Index](#), the Risk Index Rating for New Hanover County is “relatively high.” This is due to the County’s high-risk rating for hurricanes and ice storms, along with relatively high-risk ratings for heat waves, tornados, and wildfires. The FEMA National Risk Index indicates there is a relatively high expected annual loss due to natural hazards compared to the rest of the United States, especially regarding hurricanes, lightning, ice storms, and winter weather.

Currently only two bridges cross the Cape Fear River in the Wilmington area, the CFMB and Isabel Holmes Bridge to the north. Should the bridge fail, all roadway users would be detoured to the Isabel Holmes Bridge, which has only two travel lanes in each direction.

The Project will provide a safe and reliable evacuation option on the [NCDOT Identified Coastal Evacuation Route](#). Together, the CFMB and Isabel Holmes Bridge provide adequate evacuation times. However, poor weather conditions and high-risk weather events could cause mechanical moving parts to fail and render the CFMB inoperable. In addition to the disruptions mentioned above, this poses significant risk to residents and emergency responders. The time needed to evacuate would greatly increase in the event the CFMB was inoperable and all evacuating traffic was funneled through the Isabel Holmes Bridge, which is also a movable bridge and therefore susceptible to travel disruption. Implementation of the fixed-span bridge will eliminate the need to acquire and retain parts to maintain bridge functionality, improving the reliability of US 17 as an evacuation route. The Project will increase the bridge’s capacity, facilitating the efficient movement of more people in the event of an emergency.

Addresses Disproportionate Negative Effects on Disadvantaged Communities

The Project is located within several disadvantaged communities. Currently, there is no way for these communities to bike or walk across the existing bridge. The Project will add a separated, 15-foot multiuse path on the bridge, encouraging a shift to more bicycle and pedestrian trips. These shifts will reduce congestion and idling, decreasing traffic related emissions within the surrounding disadvantaged communities. This multiuse path serves the additional purpose of providing alternative modes of transportation for those disadvantaged individuals without automobiles. As this bridge is on a NCDOT Identified Coastal Evacuation Route, this is especially critical, as it provides individuals with multiple safe transportation options in the case of an emergency.

Finally, NCDOT is committed to engaging disadvantaged communities in project development and implementation so that the Project considers the unique needs of these communities in the project design and during construction. More information is in the Equity and Quality of Life criterion.

Criterion #5: Equity and Quality of Life

The Project will improve the quality of life for local, regional, or national users of the facility, including historically disadvantaged communities and those located in areas of persistent poverty.

The Project is located within several disadvantaged census tracts according to the [Climate and Economic Justice Screening Tool](#). All of the impacted census tracts were identified for a high percentage of low-income households. The census tracts were also identified for one or more of the following factors: high probability of building loss, projected wildfire risk, proximity to superfund

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sites, proximity to traffic and volume, anticipated agriculture loss rate, lack of indoor plumbing, wastewater discharge, high unemployment, and a variety of health issues.

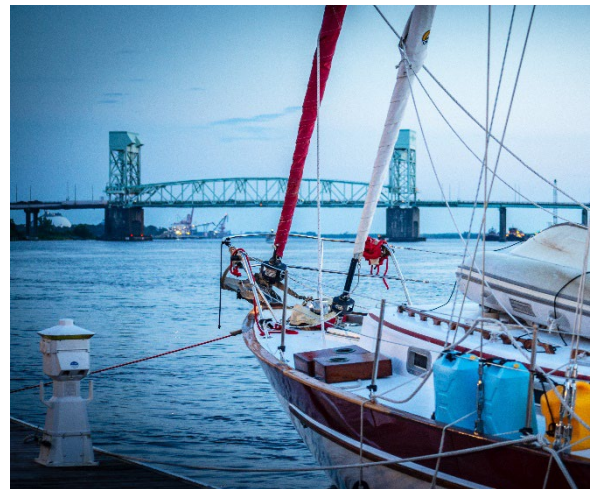
The [North Carolina's Equity & Transportation Disadvantage Screening Tool](#) identifies three block groups in the Project area as having an Environmental Justice score of 7 out of 12. The other two block groups have scores of 6 out of 12. This score considers the relative concentration of racial minorities, ethnic minorities, and people with low incomes in comparison to the average for a given area.

The same tool tracks Transportation Disadvantage, and it identifies that all the block groups containing the Project have a Transportation Disadvantage Index Score of at least 10 out of 21. Two block groups received a score of 15 out of 21. Two received a score of 13.5 out of 21 and the last received a score of 10 out of 21. This score considers carless households; low-income individuals; individuals with impairments; people 15 and under; seniors; and members of the Black, Indigenous, Persons of Color (BIPOC) population.

Finally, smartphone-based travel data from Replica shows that 39.7 percent of people who travel over the CFMB meet the threshold for "low-income" as defined by the EPA's [EJ Screen tool](#).

Engages Communities in Project Planning, Development, and Implementation

NCDOT is committed to conducting continuous, meaningful public engagement during project development and implementation. The Public Engagement Plan, which is currently in development, will identify equitable and meaningful outreach strategies to proactively seek full representation from the community, consider public comments and feedback, and incorporate that feedback into the Project. A variety of involvement tools will be implemented, considering those presented in the [USDOT Promising Practices for Meaningful Public Involvement in Transportation Decision-Making](#) publication.



The Public Engagement Plan will outline the early and continual involvement and representation of residents, business owners, the Historic Wilmington Foundation, river pilots, environmental advocacy groups, bicycle advocacy groups, the NC Ports Authority, and other stakeholders.

NCDOT will create opportunities for members of the public to engage with the Project, including at public meetings and virtually through a project website. Considerations will be made for those without access to the internet and to provide opportunities for the public to engage at a variety of times, to accommodate all work shifts. Information will be provided in a timely fashion, with adequate public notice over a variety of platforms.

Actions to Prevent and Mitigate Displacement

It is standard practice in the NCDOT Section 404/NEPA [Merger Process](#) to consider potential displacement. The process considers if there are unusually large numbers of relocations and strives for avoidance and minimization of any such impacts.

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Additionally, the public engagement process will include public and stakeholder meetings discussing the Project, allowing for discussions about concerns regarding displacement surrounding the project from multiple points of interest.

Incorporates Non-Vehicular and Public Transportation

Affordable Transportation Choices

The 15-foot multiuse path on the new bridge will provide an affordable, safe way for disadvantaged community members to cross the Cape Fear River without an automobile to job opportunities and daily needs in Wilmington and recreational opportunities on Eagles Island where there previously was none. Wilmington has a regional multimodal network that provides extensive access to surrounding businesses, educational opportunities, health care facilities, and recreational destinations. The Project will improve the health, safety, and quality of life of disadvantaged community members by providing transportation choices to community members and removing damaging accessibility restrictions.

Reducing Vehicle Dependency

The multiuse path will provide choice to users, encouraging more transitions to bicycling and walking and reducing vehicle dependency. The expected mode shift associated with the Project is detailed in **Table 6**. The path ties into existing regional bicycle and pedestrian trail networks to create a safe and accessible alternative to automobile travel, two of the guiding principles cited in the Wilmington Comprehensive Greenway Plan.

The new multiuse path directly ties into the [Wilmington Riverwalk](#) and Dram Tree Park. The Wilmington Riverwalk (a boardwalk) spans from Nun Street to Isabel Holmes Bridge through Riverfront Park. Not far from the Wilmington Riverwalk are the [Gary Shell Cross City Trail](#) and the [River to Sea Bikeway](#). The River to Sea Bikeway, implemented as part of the Wilmington Comprehensive Greenway Plan, provides 10 miles of both on- and off-street bicycle route and connects Wilmington to Wrightsville Beach. It begins at Market Street, less than a mile from where the Cape Fear Memorial Bridge exits to Front Street and crosses the Gary Shell Cross City Trail. The Gary Shell Cross City Trail is a 15-foot multiuse path that is primarily off-street and runs by James E.L. Wade Park, the University of North Carolina Wilmington Campus (UNCW), the Cameron Art Museum, and several other city parks.

Increases Accessibility

The CFMB serves as a connection to residences and businesses on either side of the Cape Fear River. These include Dram Tree Park, the Wilmington Historic District, Battleship North Carolina, museums, hotels, shops, restaurants, schools (including the Cape Fear Community College), the James Avery Memorial Garden, and the waterfront which are currently inaccessible safely by bridge without an

“Many of our club members try to commute to work by bicycle, but our current infrastructure makes that impossible for those who need to cross the Cape Fear River. We are confident that a safe pedestrian bridge crossing will boost bicycle ridership between downtown Wilmington and Brunswick County for both transportation and exercise.”

Mark Johnnie
President, Cape Fear Cyclists

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automobile. The Project will increase bridge capacity, providing more people access to the destinations on either side of the bridge.

Criterion #6: Innovation

The Project is being considered for a design-build approach, which will streamline the final design and construction phases, resulting in faster project completion, increased collaboration, and cost savings. NCDOT has a formal project delivery approach selection process that will be conducted as part of NEPA to determine the delivery approach that provides the best value.

NCDOT's innovative and proactive approach to improving structural resiliency through design elements will be applied to the replacement of the CFMB. For example, NCDOT is completing the construction of the Harkers Island bridge, a 3200-foot-long bridge entirely reinforced with fiber-reinforced polymer (FRP) reinforcing bars and prestressing strands, greatly improving corrosion resistance and durability in a coastal environment (similar to that of the CFMB). NCDOT has also been a leader in robustly addressing design for durability, resistance to scour, and improved reliability of foundation designs in coastal bridges, as evidenced by not only the Harkers Island bridge, but also their 2.8-mile-long Marc Basnight and 2.4-mile long Rodanthe bridges, producing bridges designed to withstand severe storms and endure harsh environments to provide reliable, resilient service within their transportation network.

V. Benefit-Cost Analysis

The results of the Benefit-Cost Analysis show that the Project generates monetizable and discounted benefits that exceed the Project's costs with a 7 percent discount rate, based on a benefit-cost ratio (BCR) of 1.24 (Table 7). Attachment E describes the benefits and costs associated with the Project and the estimation methodology consistent with the USDOT BCA Guidance for Discretionary Grant Programs ("BCA Guidance").

Annual costs and benefits are computed and summarized over the Project's life cycle, covering a 30-year operating period, in accordance with BCA Guidance. Costs are accounted per year from 2023 to expected construction completion in 2031, and the Project is assumed open to traffic immediately after completion. Non-discounted capital costs of the Project are estimated at \$441.5 million in 2021

Table 7: Project Benefits and Costs

Millions of 2021\$	Undiscounted	Discounted at 7%
Travel Time Savings	\$1,300.1	\$240.6
Safety Benefits	\$141.3	\$28.0
Vehicle Operating Cost Savings	\$68.9	\$12.9
Emissions Reduction Savings	\$15.3	\$6.2
Journey Quality Benefits	\$2.7	\$0.6
Health Benefits	\$15.0	\$3.1
Operation & Maintenance Cost Savings	\$103.8	\$22.6
Residual Value	\$219.7	\$14.7
Total Benefits	\$1,867.0	\$328.5
Total Costs	\$441.5	\$264.1
Net Present Value (NPV)	\$1,425.5	\$64.4
Project Evaluation Metrics		
Benefit-Cost Ratio (BCR)		1.24
Internal Rate of Return (%)		8.5%

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dollars, or \$264.1 million when discounting at 7 percent. This will result in \$328.5 million in discounted benefits, generating a BCR of 1.24. The estimated internal rate of return for the Project is 8.5 percent. The Project simultaneously generates three key changes from existing conditions that drive benefits: capacity and safety improvements, replacement of the vertical-lift bridge with the fixed-span bridge, and the addition of active transportation facilities.

Capacity and safety improvements on the bridge and approaches would lead to benefits in travel time savings, emissions reduction, and user safety benefits. Travel time and vehicle emissions are both reduced as a result of speed improvements tied to the enhanced capacity provided by the Project's proposed lane expansion and new ramp alignments. Additional lanes, increased lane and shoulder widths, resurfaced pavement with more visible markings, and converting an intersection to a roundabout all contribute to improved vehicle safety conditions on and around the Project area, generating safety benefits.

Replacement of the vertical-lift component with a fixed-span structure would lead to savings in travel times, vehicle emissions, and O&M costs. Allowing ships to pass under the bridge without affecting traffic will reduce the time vehicles spend idling and queueing during and after vertical lifts. This leads to faster average travel times and reduces harmful pollutants emitted.

The new structure will require less-intensive inspections, less ongoing maintenance, and significantly fewer major rehabilitations compared to the older, more complicated structure, leading to a net savings in operations and maintenance costs.

Major rehabilitations on the current structure require some lane closures, leading to traffic delays, which in turn motivates some vehicles to take a longer detour route to avoid delays. This leads to overall longer travel times and miles traveled on average, and translates to more travel time, out-of-pocket vehicle operating costs, and accidents and emissions along the detour route. Replacing the bridge avoids all these undesirable impacts.

The addition of a new pedestrian and bicyclist facility would induce some vehicle trips to shift modes to active transportation trips. Reducing vehicle-miles traveled also reduces harmful pollutants and vehicle operating costs, while increasing health benefits associated with mortality reduction. The physical pedestrian and bicycle facilities improve the journey quality of all active transportation trips across the bridge, both for mode-shifted trips and altogether new trips. The physical separation of pedestrians and bicyclists from vehicle traffic provides safer conditions for all road users, leading to an increase in monetized safety benefits.

Benefits from each category are summarized in **Table 7**, while a full discussion of project outcomes and their impact on each benefit category is included in Attachment E. The analysis also qualitatively considers benefits from improved emergency vehicle response times across the bridge, crash-related congestion reduction, and improved efficiency and redundancy across the bridge for anything from routine maintenance needs to an emergency evacuation from the city. Attachments D and E contain the full BCA technical memorandum and model.

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VI. Project Readiness and Environmental Risk

Technical Feasibility and Technical Competency

Current Status. Currently, the Project is progressing through Section 404/NEPA Merger Process, which includes developing detailed designs and technical specifications. This phase has involved rigorous analysis and planning to ensure the technical viability of the Project to gain concurrence from permitting and resource agencies, as well as stakeholders on key decision points, such as purpose and need, study area, detailed study alternatives, and preferred alternative selection.

NCDOT has established [robust design criteria](#) based on contemporary engineering standards, ensuring the new bridge meets current and future transportation needs. This includes considerations for load capacity, traffic flow efficiency, and structural resilience, as well as [bicycle/pedestrian](#) and [complete streets](#) standards.

Cost Estimate Basis: The costs and project elements presented in the application are based on conceptual design associated with the 135-foot alternative being considered in the Section 404/NEPA Merger Process. Unit prices were developed considering bid history from the last six to nine months, quantity and scale of each pay item, location, constructability and phasing, and local line-item scarcity (i.e., borrow), as well as market volatility over the last few years caused by inflation, supply chain issues, and labor shortages. Input and pricing information from structures subject-matter experts was considered related to the bridge costs.

Contingency Measures: To accommodate any unforeseen changes during the remaining design and construction phases, a contingency level of 23 percent has been applied to anticipated construction costs and incorporated into the budget.

Capacity for Successful Delivery: NCDOT, which has experience with federal programs and federal procurement standards, will administer and monitor the Project throughout the process to ensure successful delivery. A detailed work plan is included as Attachment G. NCDOT has extensive experience delivering projects of a similar scale under the Federal-aid process. NCDOT recently completed the replacement of the Herbert C. Bonner Bridge in Dare County, North Carolina. The new \$252 million, 2.8-mile-long Marc Basnight Bridge was designed to provide a 100-year service life; resist up to 84 feet of scour; minimize environmental impacts; and provide a safe, reliable structure into the next century.

Federal Requirements Compliance: NCDOT is committed to full compliance with all applicable Federal requirements, including but not limited to, Title VI/Civil Rights mandates. This commitment ensures that the Project will be inclusive, offering equal participation opportunities and benefits without discrimination based on race, color, national origin, sex, age, or disability.

Project Schedule

Project Delivery Approach: NCDOT is evaluating options to deliver the Project with alternative methods, which might be design-build or CM/GC. This integrated approach allows for overlapping design and construction phases, potentially reducing the overall timeline and improving efficiency. The Project schedule was developed in partnership with NCDOT's Alternative Delivery Unit, based on

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previous experience with projects of similar scale. A more detailed discussion of work plan and schedule can be found in Attachment G.

The schedule represented in **Figure 5** shows that the Project is anticipated to receive a NEPA decision document by February of 2026, and the Project can proceed to the next stage of project development (procurement of an alternative delivery contractor to complete final design, utility clearance, permitting, and ROW acquisition) immediately thereafter. The obligation of BIP funds for right-of-way, utility clearance, and construction is expected in March 2026, six months prior to the obligation deadline for FY 2023 funds. Construction is expected to begin 14 months after initial obligation and be complete ahead of the expenditure deadline for FY 2023 BIP funds. NCDOT is committed to adhering to this timeline, ensuring timely progress and successful project completion.

Figure 5: Project Schedule

Phase / Milestone	2023	2024	2025	2026	2027	2028	2029	2030	2031
Preliminary Design									
Alternatives Analysis									
NEPA (Section 404/NEPA Merger)									
<i>Obligation of BIP Funds</i>				◆					
Procurement									
Final Design									
Utility Clearance									
Permitting (USACE, USCG, NOAA, NCDWR, etc.)									
ROW Clearance and Acquisition									
Preliminary PS&E Approval				◆					
Public Involvement									
Construction									
<i>BIP Expenditure</i>									◆

Right-of-Way (ROW): ROW needs have been identified as part of the conceptual design process. Estimates for the cost associated with acquisitions and easements are included in the budget for this application. NCDOT has extensive experience navigating the ROW process in accordance with 49 CFR 24, 23 CFR 710 as detailed in the [NCDOT Right of Way manual](#). As part of the initial project scoping process, NCDOT has committed to minimizing disruption and maintaining community cohesion.

Required Approvals

Environmental Permits and Reviews

NCDOT is currently utilizing the Section 404/NEPA Merger Process to expedite project development and environmental review, including permitting, which is expected to be complete by February 2026. The Project is currently in the Alternatives Analysis process, after which a NEPA class of action will be determined. Known environmental impacts and possible mitigation measures are outlined in the Project Initiation Form, included in [the Supplemental Materials](#).

The Merger Process involves concurrence points with multiple government agencies, including FHWA, U.S. Army Corps of Engineers, N. C. Department of Environmental Quality, U.S. Environmental Protection

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Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, N.C. Wildlife Resources Commission, N.C. Department of Cultural Resources, U.S. Coast Guard, U.S. Forest Service, National Park Service, and Wilmington Urban Area Metropolitan Planning Organization (WMPO). NCDOT will also coordinate with Cherokee Nation as per [NCDOT's Standard Tribal Coordination Protocol](#).

NCDOT has identified the following permits and approvals required for the Project. Past experience with similar projects, as well as close ongoing communication with relevant agencies throughout the Section 404/NEPA Merger process, will help to identify required approvals and streamline approvals now and into the procurement of an alternative delivery contractor/final design so that the Project can be constructed within the planned timelines.

- **U.S. Army Corps of Engineers:** Section 404, 408, and Section 10 permits.
- **U.S. Coast Guard:** Section 9 permit for bridge construction.
- **NOAA Fisheries and U.S. Fish and Wildlife Service:** Endangered Species Section 7 Consultation.
- **NC Division of Water Resources:** Section 401 Water Quality Certification.
- **NC Division of Coastal Management:** CAMA Permit for Brunswick and New Hanover Counties.
- **Highway Stormwater Program:** Stormwater Management Plan.

The Project will impact the natural environment within the Cape Fear River, shoreline, and Eagles Island wetlands in Brunswick County. However, the Wilmington Local Historic District and the downtown business district of the City of Wilmington are not anticipated to have direct impacts. The Project team is committed to minimizing impacts on archaeological resources in the Cape Fear River and on any resources determined eligible for the National Register of Historic Places. Ongoing discussions with the Federal Highway Administration (FHWA) are being conducted to ensure compliance with NEPA and other applicable Federal environmental reviews and approvals. The Project's compliance with Title VI/Civil Rights requirements is also being ensured.

State and Local Approvals

The Project requires coordination and approvals from the WMPO and respective county governments. WMPO and both counties are part of the Section 404/NEPA Merger team and will continue to be involved in major project decision points. The Project was adopted into the [WMPO Transportation Improvement Program \(TIP\)](#) and the [NCDOT State Transportation Improvement Program \(STIP\)](#) in June of 2023 for Preliminary Engineering (Project ID HB-0039). When a funding package for future phases is committed, including in the event of a successful BIP application as described in Section III, those phases will be added to both the TIP and STIP. The WMPO is an air quality attainment area; therefore, air quality conformity is not required.

Building Community Support

The Project has a broad range of supporters, including state and federal elected officials, public agencies, commercial interests, and community members. Letters of support for this grant application are included in Attachment B. A robust public engagement strategy is in place to include early and continual involvement. This strategy focuses on representing diverse community members and stakeholders, including downtown residents, business owners, Historic Wilmington Foundation, environmental advocacy groups, N.C. State Ports Authority, river pilots, and bicycle advocates. Public engagement was conducted during the Feasibility Study and has widespread public support. During the development of the [Cape Fear Moving Forward 2045 Metropolitan Transportation Plan](#), 18

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comments were received specifically requesting bike/pedestrian accommodations to cross the river between New Hanover and Brunswick Counties activities. This contributed to the priority placed on incorporating the multiuse path into the Project.

Federal Transportation Requirements Affecting State and Local Planning

The Project was conceived as a Federal-aid highway project, and project development activities (past and future) factor requirements associated with 23 U.S.C. 134 and 135. The Project is identified as a priority in the WMPO's [Cape Fear Moving Forward 2045 Metropolitan Transportation Plan](#).

Project Risks and Mitigation Strategies

NCDOT has not identified any risks that could impact its successful delivery of the Project. NCDOT's formal Risk Assessment process was initiated during project planning where potential uncertainties were documented as part of the Feasibility Study. Initial uncertainties identified for this Project are associated with its high public profile and its location in a sensitive human and natural environment. There is the possibility of business and residential relocations in a potential Environmental Justice and low-income community. NCDOT is conducting a robust community outreach and public involvement process to address the effects of the Project on minority and low-income communities.

The Project will impact the natural environment within the Cape Fear River, shoreline, and Eagles Island wetlands in Brunswick County. The Section 404/NEPA Merger process has involved the relevant agencies to identify potential impacts and assist avoidance and mitigation early in the process. The Wilmington Local Historic District and the Wilmington downtown business district are not anticipated to have direct impacts. NCDOT is committed to minimizing impacts on archaeological resources in the Cape Fear River and on any resources determined eligible for the National Register of Historic Places. Ongoing refinement of construction costs, public involvement, and contingency planning will support adherence to the Project budget and schedule.

NCDOT has formalized a [Risk Management process](#) that applies to all agency projects. This process prescribes continuous actions to mitigate risk throughout the project lifecycle and has proven effective at keeping major projects on schedule and within budget.

VII. Administration Priorities and Departmental Strategic Plan Goals

Support and documentation related to the Project's alignment with Administration Priorities and Departmental Strategic Plan goals is included in Attachment C: Large Bridge Application Template.

