Project Description

Introduction

The North Carolina State Ports Authority (the "Authority") requests 2024 RAISE funding to rehabilitate barge berths to restore cargo handling capacity and efficiency at the Port of Morehead City (the Port). The ***Modernization and Revitalization of Barge Berths*** project will restore the Port's two barge berths to a state of good repair, ensuring the continued productivity of the Port, regional employment, and export of agricultural commodities to support the global agri-food supply chain.

The Port of Morehead City is one of two deep water ports owned by the Authority, integral to the economic development and supply chain needs of the region's businesses, offering bulk, breakbulk, specialty cargo, and warehousing services that connect the state with the global economy. Located four miles off the Atlantic Ocean, within 700 miles of more than 70% of the US industrial base, and with over one million sq. ft. of covered storage, the Port is well poised to address current and future cargo needs. Rail service including on-dock rail is provided by Norfolk Southern. In FY23, the Port of Morehead City facilitated the movement of nearly 1.4 million short tons of bulk and breakbulk cargo, reflecting 12% year-on-year growth.[1] This growth was driven in large part by agricultural commodities, such as fertilizer, grain, feed, and forest products.

The barge berths at the Port's Phosphoric Acid Terminal, which are over 50 years old, are the focus of this RAISE grant application. These barge berths are leased by the Port's largest tenant by volume: PCS Phosphate Company Inc., commonly known as Nutrien, which is the world's largest provider of crop inputs and services, primarily shipping dry and liquid fertilizer products through the Port.

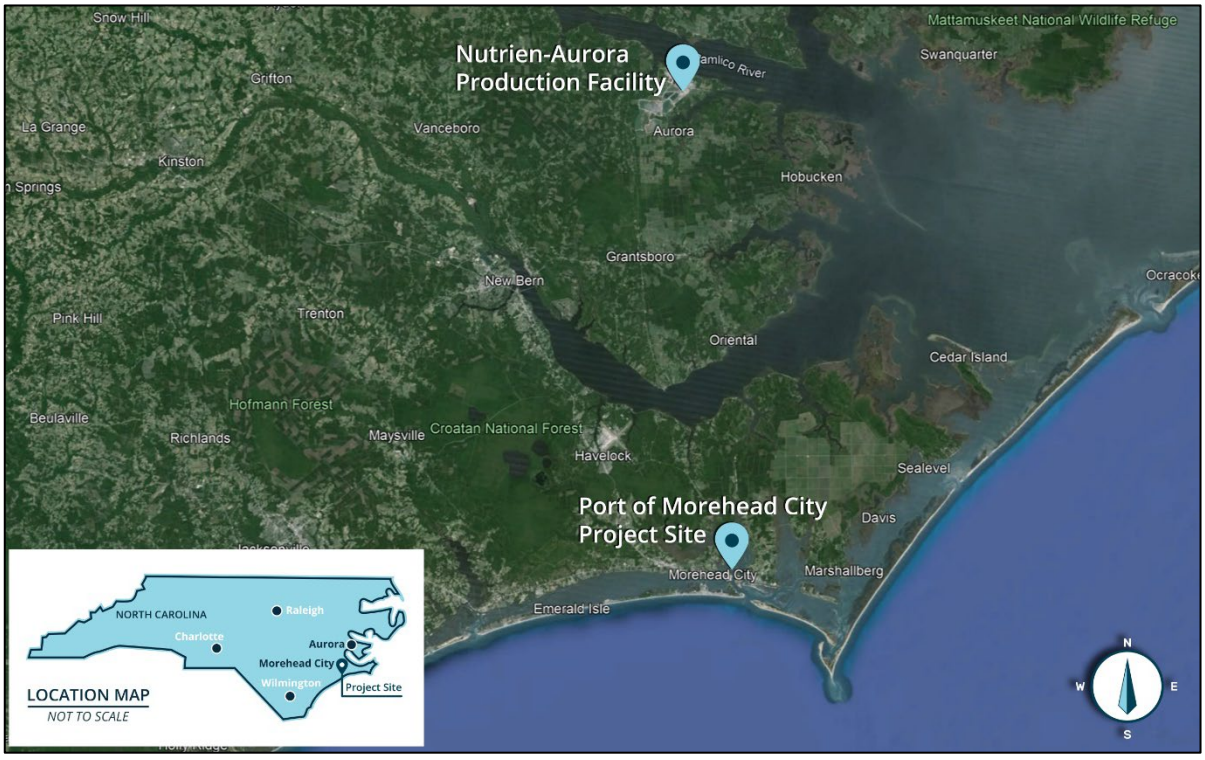

Figure 1. The project at the Port of Morehead City will support the Port's largest tenant, Nutrien, which ships cargo from their production facility 57 nautical miles upriver in Aurora.

[1] North Carolina Ports 2023 Annual Report.

In May 2022, Nutrien conducted a stability analysis of the terminal's eastern bulkhead. This analysis found that **most of the bulkhead has already reached the end of its useful life with failure imminent**. As a result of these findings, the East Barge Berths, which formerly accommodated liquid barges, has been closed and the North Barge Berths, which accommodates dry barges, is currently operating at reduced capacity and will be closed by 2027 due to safety concerns.

Scope of Work

The existing bulkhead consists of a Z-type sheet pile with a reinforced concrete cap on the top that provides protection and stability against the aggressive marine environment. The 2022 stability analysis report revealed substantial corrosion in the sheet piles, as well as extensive voids, porosity, and reinforcing steel loss in the concrete cap at multiple locations. The bollards across the terminal's barge berths have exhibited moderate to severe corrosion, and existing fenders lack sufficient thickness to properly absorb berthing impact energy. Additionally, a geotechnical report from August 2023 performed by S&ME revealed signs of scouring at the southeast and northeast corners exceeding 40 feet below the mean low water level. The ***Modernization and Revitalization of Barge Berths*** project will address these compounding deficiencies to restore the Port's currently limited cargo handling capabilities.

The proposed project will construct new sheet pile bulkheads in front of the existing bulkheads at the North, East, and South Barge Berths (the South Berth does not accept cargo and functions as a stabilizing area). The project scope also includes the installation of a modern anchorage system, including a redesigned concrete cap, high-performance fenders, and upgraded mooring hardware to enhance barge berth stability. The project improvements will stay within the footprint of the existing bulkhead and do not include changes to utilities, stormwater infrastructure, or site drainage.

Figure 2. Map of Project Scope Components

The length of the proposed bulkhead is approximately 1496 linear feet and will consist of steel sheet piles. The bulkhead is designed to handle a mooring load of 18 tons for design

vessels with dimensions of 260'x52'x14'. The existing timber bull rail on the East barge berth will be replaced with a new yellow fiberglass rail to add site safety. Existing bollards will be field cleaned using abrasive material to eliminate flaked steel, rust, and existing coatings. Subsequently, new three-part marine coatings will be applied for corrosion protection. To prevent further scouring at the southeast and northeast corners of the bulkhead, ripraps will be installed in the ground below.

Transportation Challenge

The East Barge Berths have been removed from service due to safety concerns. Without this project, the North Barge Berths will also be removed from service in the next three years. The Phosphoric Acid Terminal was purpose-built to accommodate this cargo, with liquid storage tanks and dry storage silos, manifold and conveyor systems, and high-strength "booster pumps" on-site. Without the ability to access the barges berths at the terminal, Nutrien must use other berths at the Port, undertaking additional operational costs and navigating significant inefficiencies.

Nutrien is currently using Berth 1, as marked in Figure 3, to offload the liquid barges that formerly used the East Barge Berths. This liquid cargo must be pumped to the storage tanks, a distance approximately three times farther from Berth 1 than under normal operations, and without the specialized equipment at the East Barge berth. Nutrien is currently renting an on-site generator, forklifts, and other equipment at Berth 1, in addition to using barge pumps as the primary power source to maintain liquid operations, which is costly and generates unnecessary wear on its barge fleet.

Figure 3. Map of Project Scope Components

The North Barge Berths are restricted to unloading only one barge at a time due to near-term stability concerns at either end of the bulkhead. However, after the year 2027, the risk of failure will be too great, and the barge berths will be closed. Due to the large volume of liquid barges that would already be traveling the narrow marine passage under the Newport River Bridge and using the Port's other berths, along with all other Port tenants on a first-come,

first-served basis, it will not be viable to continue transporting dry cargo by barge after the North Barge Berths' failure. Diversion to rail is significantly constrained by limited capacity at the Port, resulting in the majority of this hazardous cargo being transportation by truck along a 70-mile highway route to reach the Port and export berths. This diversion would mean over 26,000 additional truck trips each year would travel through the rural disadvantaged community of Morehead City, which has a population under 10,000. In addition to noise pollution and roadway deterioration, additional truck traffic would lead to substantial increases in freight costs, greenhouse gas emissions, highway congestion, and the risk of crashes resulting in property damage, injuries, and fatalities.

The ***Modernization and Revitalization of Barge Berths*** project will restore the terminal bulkhead to a state of good repair, allowing Nutrien to berth two barges each at the North and East Barge Berths and will keep this cargo moving via marine highways versus surface transportation. The Project is anticipated to produce over $90.6 million of benefits in avoided emissions, congestion, noise, and crashes; operational and labor cost savings; and supply chain savings, with a total BCA of 3.41.

Project Location

Morehead City is a port town located on the eastern coast of North Carolina with a population of 9,560 (2020 Census). The Port of Morehead City and the project area are located in Carteret County Census Tract 9704.02. According to the USDOT Project Location Verification Tool, the project is in a Rural area, Historically Disadvantaged Community, and Area of Persistent Poverty.

According to the EPA's EJScreen, 29% of the population of Morehead City are people of color, 46% are low income, and 18% have less than a high school education. According to the USDOT Equity Explorer, this tract ranks 85% for Transportation Cost Burden and is disadvantaged for both environmental burden and social vulnerability.

Figure 4. Aurora phosphate fertilizer facility, 2012. Source: Nutrien

The Port operates under Foreign Trade Zone 214, attracting businesses involved in international trade such as Nutrien.[2] Nutrien's exports through the Port originate from its phosphate operations facility in Aurora, North Carolina, 57 nautical miles upstream. This facility – which supports over 2,000 permanent and contracted jobs – is located in Beaufort County Census Tract 9308, which is also identified by the USDOT tool as a Historically Disadvantaged Community. According to current CJEST data, this community falls in the 79th percentile for low-income and unemployment and at or above the 94th percentile for four of the five climate change indicators.

The Port of Morehead City is one of fifteen Strategic Seaports as designated by the U.S. Department of Defense, and as such must maintain the capability and capacity to meet the national security needs of the nation. The Port must have a readiness plan for how the Port will be used during a contingency, training of personnel, and security. Improved infrastructure will promote the retention of the Strategic Seaport designation and ensure the Port's capabilities to respond to national emergencies and provide transportation and material readiness.

The Port of Morehead City terminal is accessible via water, rail, and truck. Interstates 95 and 40 are easily accessed via US Highways 70 and 17. The intercoastal waterway connecting Aurora to Morehead City is part of designated M-95, a marine alternative to I-95 as part of America's Marine Highway Program, an initiative to move more cargo on the water rather than on crowded highways. The strategic advantage of the Port is further amplified by its proximity to the Coastal Carolina Regional Airport (EWN), a full-service commercial airport spanning over 785 acres. This positioning and access to a multimodal transportation network make the Port an attractive choice for suppliers seeking efficient transportation to and from major industrial centers. Therefore, the ***Modernization and Revitalization of Barge Berths*** aligns with broader economic goals, promising to foster businesses, create job opportunities, and support sustained economic growth through this $18,887,540 RAISE grant.

[2] International Trade Association. Zone Information. https://ofis.trade.gov/Zones.