

NORTH CAROLINA

MARITIME Strategy

NC Maritime Strategy Proposed Port Infrastructure for Non-Containerized Cargo

**Prepared for the
North Carolina Department of Transportation**

by

**AECOM
in association with URS**

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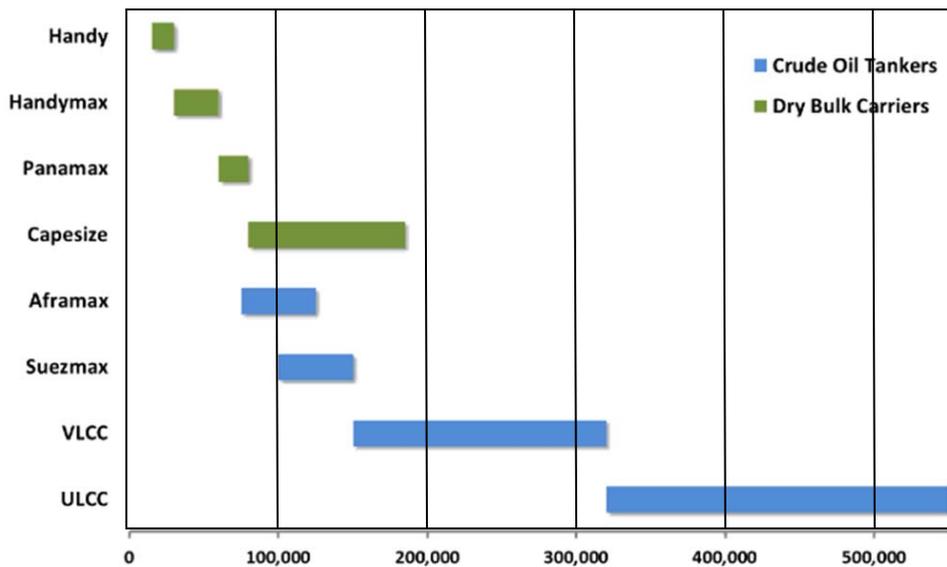
In addition to containerized goods, the port of North Carolina handles a variety of other cargoes. The most prominent of these are:

- Wood products in breakbulk or bulk pellets
- Chemicals and phosphates in bulk
- Grain in bulk
- Roll-on roll-off (RO/RO) cargo
- Breakbulk project cargo, especially that related to the wind power industry.

The port currently operates facilities in Wilmington and Morehead City, but other sites are under consideration for future expansion. This memo describes the required infrastructure for non-container freight activity in North Carolina.

Figure 1 shows the gross tonnage of vessels by class. Most dry bulk and breakbulk vessels fall into the “Handy” or “Handymax” class.

Figure 1: Vessel Tonnage by Classification



Source: UNCTAD (2000) Review of Maritime Transport. Lloyd's Register information sheet.

Most berths at North Carolina ports were designed for Panamax vessels. Figure 1 shows that this is adequate for virtually all types of breakbulk or dry bulk vessels expected to call at North Carolina ports.

Although ongoing maintenance is required to maintain wharf structures in good working order, no additional investment should be needed to enhance the water depth or mooring capability of wharf structures in North Carolina to accommodate additional non-container traffic.

Table 1 highlights the specific terminal elements of each of the major non-container cargo types under consideration.

Table 1: Operating Characteristics by Cargo Type

	Existing facilities in NC?	Ship load/unload via:	Cargo moved within terminal via:
Breakbulk wood products	Yes	Ship crane or dockside crane	Forklifts and tractors
Bulk wood pellets	No	Conveyor	Conveyors
Bulk Grain	No	Conveyor	Conveyors
Ro/Ro	No	Vehicle ramp	Vehicles being shipped
Wind power components	No	Ship crane or dockside crane	Tractors and trailers
Bulk Phosphates	Yes	Conveyor	Conveyors

As Table 1 illustrates, breakbulk and Ro/Ro cargo is often moved with the equipment on the ship, and only requires a paved open area for storage in the port. Existing NC port terminals are already equipped to handle Ro/Ro and breakbulk type cargos. Figure 2 shows a typical Ro/Ro operation where a vessel ramp is deployed to allow vehicles to be driven off onto the terminal.

Figure 2: Example Ro/Ro Operation



If the volume of cargo becomes high enough, space constraints will become an issue and more overall port space will be required. At low volumes however, cargos such as Ro/Ro or breakbulk handling of wind turbine components can likely be handled with no new infrastructure.

Bulk materials are typically moved via conveyors and require their own specialized facilities. The Port of Morehead City already has extensive infrastructure for handling phosphates in bulk. In Figure 3, taken from the Port's Website, the domes and warehouses used for phosphate storage are shown on the left side of the image.

Figure 3: Port of Morehead City Aerial Photo



The Port does not currently have dedicated facilities for wood pellets or grain. AECOM believes that there may be significant demand for moving these products via the Port of North Carolina in the future. AECOM has developed conceptual site locations for new bulk facilities at either Radio Island at Morehead City or the North Property at Wilmington as shown in Figures 4 and 5 respectively.

Figure 4: Port of Morehead City Grain Terminal Footprint

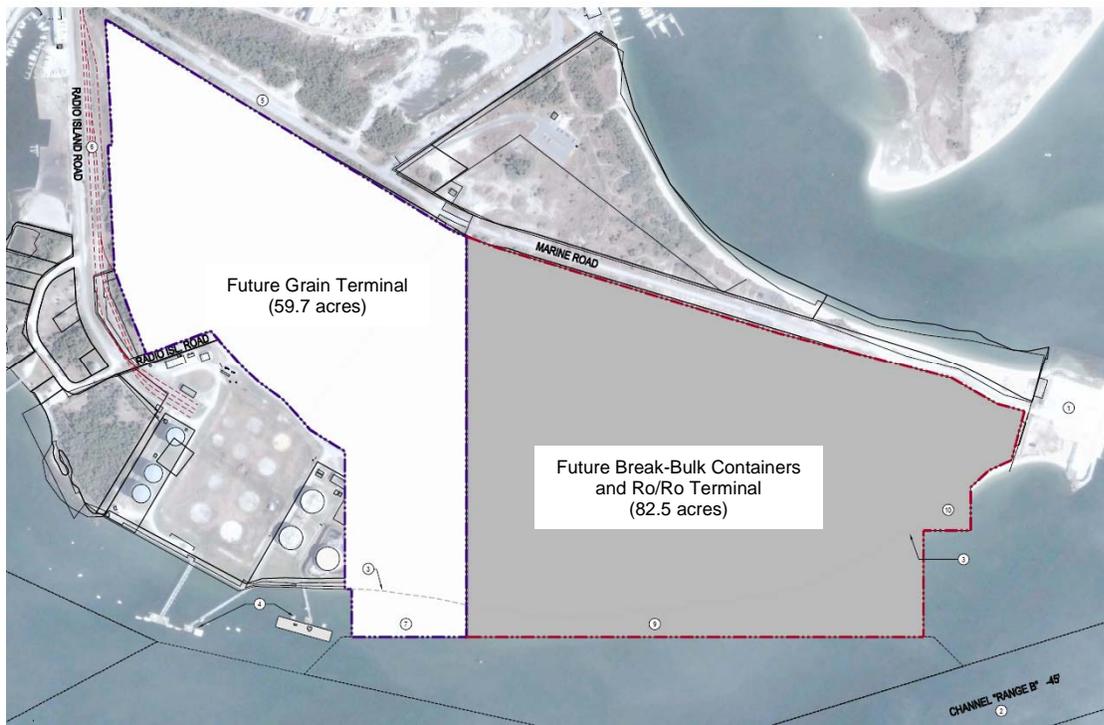


Figure 5: Port of Wilmington Grain Terminal and Ro/Ro Footprint



For future developments in non-container cargo handling where no berth structure exists, AECOM recommends that the Port design for at least Panamax vessel size to give flexibility in use over the life of the berth.

Figure 6, an aerial photograph of the inner harbor at the Port of Vancouver Canada, shows two separate grain terminals operating with a vessel on berth. The terminals are separated by the Vanterm container terminal in the center of the image.

Figure 6: Grain Terminals at the Port of Vancouver Canada



New facilities for either grain or wood pellet handling in North Carolina will likely be similar to those shown for grain handling in Vancouver. The product will be moved between high density storage silos and the vessel via conveyor systems. These systems will likely be enclosed to allow for all-weather operations and to minimize dust emissions.

The silos will allow for rail and truck access. Product is discharged by gravity through the bottom of the truck or railcar into a pit with a conveyor system. This conveyor discharges into the top of the silo. Another conveyor removes material from the bottom of the silo and takes it to a loader arm which can be maneuvered lengthwise along a ship.