

# North Carolina International Terminal Cost Estimate

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## Introduction

An initial preliminary cost estimate was developed based on very conceptual descriptions of terminal and navigational elements of the proposed project. This cost estimate should be considered preliminary and conceptual in nature.

## Purpose of Estimate

The purpose of this cost estimate is to provide an opinion of cost as a pro forma estimate reflecting the approximated conceptual layout of the North Carolina International Terminal. This approximated cost is a pro forma opinion of one probable cost made: without benefit of engineered drawings; at the very earliest conceptual planning stage of the project; without an agreed project description; for the purpose of providing input to a pro forma business analysis used solely as an initial indication of business potential; and should not be considered as valid for any other purpose.

## General Project Description

The North Carolina International Terminal, Wilmington Harbor, would be built near Southport, North Carolina on 600 acres of undeveloped land in Brunswick County purchased by the North Carolina State Ports Authority. The specific details of the facility have not been fully developed; therefore, this initial preliminary estimate is created based on conceptual models developed solely for the purpose of establishing a conceptual framework from which the Pro Forma Business Plan could be developed. The conceptual framework was used to identify many of the infrastructure components, allow the use of experience and “rules of thumb” to estimate size or quantity, and then estimate a “ballpark” cost solely for the purpose of providing input to the Pro Forma Business Plan.

The project would consist of a high-density, automated container terminal and supporting intermodal rail yard with capacity for a throughput of 3.0 million twenty-foot equivalent units (TEUs) per annum; access from an interstate-grade roadway system; access from an improvements to an existing rail system. This facility would service vessels up to 12,000-TEU capacity through a navigation channel and branch channel dredged to -52.5 ft plus 2.0 ft. of overdredge. The ships would berth at a 4,600 ft. long concrete pile-supported

wharf. Additionally, the facility would contain the remaining infrastructure commonly found in similar container terminals of this type.

## General Format of the Cost Estimate

The estimate is broken down into components, to the extent they appear to be known at this time, intended to initially, and preliminarily, be consistent with the various sources of funds required to meet the total financial obligation identified. The cost components are described as follows:

**Development Cost** - Those costs assumed to be incurred by the North Carolina State Ports Authority as a means of establishing and permitting the project. These costs include environmental studies, an Environmental Impact Statement, and major permits. It is possible the source of these funds could come from elsewhere.

**Terminal Cost** - The cost of the wharf, container yard, intermodal rail yard, and on-site access roads, the branch channel and turning basin dredging.

**Rail Costs** - Those costs assumed to be borne by others to improve the existing spur servicing the site.

**Roadway Costs** - Those costs assumed to be borne by others, such as the North Carolina Department of Transportation, to provide roadway connections from the project site to the existing interstate highway system.

**Federal Navigation Channel Costs** - Those costs incurred to construct a branch channel to the terminal, a turning basin, and for the deepening of the existing Wilmington Harbor Navigation Channel. These costs are anticipated to be borne 50 percent by the Federal government as represented by the US Army Corps of Engineers and 50 percent by the State of North Carolina.

## Class of Cost Estimate

Because the intent of this cost estimate was for early validation of a pro forma business evaluation, this cost estimate is not strictly in conformance with an Association for Advancement of Cost Engineers (AACE) standard.

Because of the preliminary and conceptual nature of the project description and the lack of detail pertaining to the features of the site and site improvements, the cost estimate was prepared based on a preliminary concept development of less than 5 percent complete which generally corresponds to the Association for Advancement of Cost Engineers (AACE) standards for a Class 4 Estimate. Had the estimate been prepared under AACE standards, the estimate would have used the standard contingencies for this level of estimate, as suggested by AACE, as guidance.

## Estimate Methodology

This cost estimate is considered a high-level type of estimate because of the limited information available at the time of estimate. Costs of similar projects and rules of thumb

were the basis for many of the estimated costs. The estimate includes allowance costs and dollars per area costs as rules of thumb for certain components of the estimate.

Because of the limited information available at the time of estimate, it is not valid to categorize the estimated cost as more than the conceptualized cost that it currently represents. The current cost is a pro forma cost for use in a pro forma evaluation. In future phases of the project, more systematic and more reliable costs will be developed.

## Costing Resources

The following is a list of the various cost resources which may have been used in the development of some elements of the cost estimate:

- R.S. Means.
- Richardson Process Plant Estimating Standards.
- Mechanical Contractors Association - Labor Manual.
- National Electrical Contractors Association - Labor Unit Manual (NECA).
- CH2M HILL historical data.
- Vendor quotes on equipment, materials, and transportation where appropriate.
- Estimator judgment.

Labor unit prices are intended to reflect a burdened rate, including: workers compensation, unemployment taxes, Fringe Benefits, and medical insurance.

## Assumptions

The estimate is based on the assumption the work will be done on a competitive bid basis and the contractor will have a reasonable amount of time to complete the work. In addition, it is assumed all contractors are equal, with a reasonable project schedule, no overtime, constructed as under a single contract, and there are no liquidated damages incurred.

### Basic assumptions:

- 1) The wharf structure cost was approximated using a similar structure in which piling was driven into a dredged spoil embankment as guidance.
- 2) Dredging is based on the unit costs developed at other dredging project and dredged material disposal sites as well as using R.S. Means unit costs.
- 3) The asphalt paving estimate is based on an estimated square yard price.
- 4) The building costs are estimated per square foot.
- 5) The power to operate this terminal facility will come from the area electric grid.
- 6) Where it could determine a contractor's overhead and profit was included in the unit rates provided for other similar projects, we did not adjust those costs.
- 7) The environmental and permitting costs were pro forma and it is assumed overhead and profit, the contractor's preliminary costs, and contingency were included.

## Markups

Although specific markups were not used in the pro forma cost estimate, knowledge of the typical application and values of markups were used as guidance in the rounding off of categorized costs. Typical markups used in construction are described below.

### Material Take-off Allowance

The material take-off allowance is to cover know items which were not quantified in the estimate process either due to a lack of detail or changing definition. Dredge production labor has been increased to allow for working a 140-hour workweek during a 24-hour shift basis.

### Estimate Contingency

The estimate contingency is defined to cover “known unknowns” in the project. The selection of the estimate contingency is based on many factors. The estimate contingency defined is dependent on the complexity of the project elements and varies at difference stages of design. There is currently no design associated with this project. This project currently appears to be technologically relatively straight-forward as far as the work being accomplished is concerned. It is assumed there are no new technologies being used, no rare or unusual materials, and site access, work conditions, schedule, and weather are known factors. Probably the largest unknown on the project is the amount of rock to be encountered during dredging. The largest complexity factor is the environmental mitigation.

An example of work which is usually assigned a contingency is the dredging and the real quantity of each type of dredge material. We know dredging will need to be done, and we have a good idea of the total quantity requirements for dredged material (at least under one assumed alignment alternative), however we do not know either the breakdown of dredged material types or the quantity or location of dredged material disposition; whether disposal or beneficial use. The dredged material type and disposition is an example of a “known unknown” and so the detailed estimates have been adjusted for the pro forma estimate.

Similarly, there is no, to very limited, survey or geotechnical information available for the site.

The construction contingency amount is not intended to cover changes in scope or to allow for impacts from nature or other outside forces; those items belong in the owners’ contingency allowance.

### Escalation Rate

The escalation rate is an amount added to the base (un-escalated) cost to account for inflation in the costs for labor, materials, and equipment during the period of construction. is excluded from this estimate.

## Market Adjustment Factor

The market adjustment factor is above and beyond the typical contractor mark-ups, normal estimating contingency, and current but normal escalation factors. The Market Adjustment Factor covers:

- Busy contractors with enough work, not particularly interested in new work.
- Contractors selectively bidding jobs based on type of work.
- Contractors selectively choosing which Owner they will want to work for.
- Premium Wages in a tight labor market required to keep skilled workers and management staff.
- Availability of crafts/trades impacting workforce cost and schedule.
- Immigration impacts and uncertainty.
- Abnormal fuel impacts and uncertainty – oil/gas/energy prices.
- Abnormal material impacts of the last 2 years.
- National or global economic impacts.
- Natural disasters.

## Labor Cost Adjustments

Labor costs are those costs incurred by the labor force involved in the construction of the project. Typically, these costs would be adjusted for local area labor rates from more generic tables.

## Sales Tax

A sales tax markup would typically be intended to represent all forms of sales tax which may be applied to the elements of the project, including state and local sales taxes.

## Allowance Costs

A cost estimate may typically include numerous allowances for unknown and/or uninvestigated costs. For example, the following are among the allowances provided within the cost estimate:

- Environmental investigations.
- Environmental mitigation.

No allowance has been made at this time for the following costs:

- Archeological investigations.
- Roadway right-of-way cost.
- Land cost needed for supporting infrastructure.
- Internal costs to the Authority.
- Legal challenges.

## Monte Carlo Analysis

No probability or risk analysis of costs has been made.

## Other Factors

A preliminary conceptual cost estimate has been prepared solely for initial pro forma guidance in project evaluation and implementation from limited information available at the time of the estimate. The final cost of the project will depend upon the actual labor and material costs, competitive market conditions, final project costs, implementation schedule and other variable factors. As a result, the final project costs will vary from the estimates presented herein. Project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding. This estimate is based on material, equipment, and labor pricing as of October 2007. The Authority should be cautioned that such prices are highly subject to variation as discussed in the section on markups.

## Overall Project Cost

The following Capital Cost Summary (Table 1) represents an opinion of an approximation of the cost of the North Carolina International Terminal in October 2007 as interpolated from two boundary condition scenarios: a low-peaking operational scenario and a high-peaking operational scenario. The low-peaking costs were rounded-off, and otherwise experience-modified, to create the cost suggested for use in the Pro Forma Business model.

TABLE 1  
Capital Cost Summary

Component	Approximate Cost
<b>Responsibility of the State or the Authority</b>	
Environmental and Permitting Cost.	\$60,000,000
Terminal Development Cost	\$1,383,000,000
Non-Federal Share of Channel Deepening Cost (50%).	\$265,800,000
Subtotal of NCSPA Costs	\$1,708,800,000
<b>Responsibility of the State or the Authority</b>	
Total Roadway Improvements Costs.	\$181,500,000
Total Railroad Improvements Costs.	\$127,400,000
Federal Share of Channel Deepening Cost (50%).	\$265,800,000
Subtotal of Other Party Costs	\$574,700,000
<b>Total Project Development Cost</b>	<b>\$2,283,900,000</b>

## Excluded Costs

The cost estimate excludes specific costs or allowances for the following costs:

- Markups, including:
  - Material Takeoff Allowance.
  - Estimate Contingency.
  - Escalation Rate.

- Market Adjustment Factor.
- Labor Cost Adjustment.
- Sales taxes.
- Import duties and taxes.
- Hazardous materials detection, removal, or mitigation.
- Archeological surveys, investigations, and relocation/preservation.
- Legal or Litigation costs.
- Land Acquisition costs.
- Owner's internal costs.