Accommodating Mega-Ships at Existing Wharves

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National Cargo Trends

- U.S. Cargo Will Double in Volume by 2020
- Panama Canal Commission Forecast East Coast Cargo to Triple by 2020
- Latin American Trade and Transportation Study (2001)
  - 13 Southern US States Will Reach Capacity Between 2008 and 2012
The “China Factor”

- U.S. Ports as a Whole are Experiencing an Increase in Container Trade with Asia
- East Coast Ports In Particular are Seeing a Significant Increase in Container Trade with Asia
  - All-Water Shipping Routes Both Inexpensive and Stable
National Cargo Forecasts

- All Cargo Growth Forecasts are Based on “Unconstrained” Growth

- Port Infrastructure is a Potential Constraint to Growth
  - Aging or Inadequate Terminal Facilities Cannot Accommodate Additional Cargo
Growth in Container Ship Sizes

➢ The *MSC Pamela* is Currently the Largest Container Ship in the World

- 9,200 TEUs
- 1,053 Feet Long
- 150 Feet Wide
- 49-Foot Draft
# Container Ship Evolution

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>TEUs</td>
<td>1,700</td>
<td>2,300</td>
<td>4,800</td>
<td>8,000+</td>
<td>13,000+</td>
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<tr>
<td>Boxes</td>
<td>&lt;10 Boxes Wide</td>
<td>10 Boxes Wide</td>
<td>13-16 Boxes Wide</td>
<td>17 Boxes Wide</td>
<td>21 Boxes Wide</td>
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<tr>
<td>Width</td>
<td>&lt;30’ Draft</td>
<td>33’ Draft</td>
<td>44’ Draft</td>
<td>48’ Draft</td>
<td>44’ Draft</td>
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<tr>
<td>Length</td>
<td>450’ Length</td>
<td>620’ Length</td>
<td>900’ Length</td>
<td>1,150’ Length</td>
<td>1,350’ Length</td>
</tr>
</tbody>
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**The Virginia Port Authority**
On-Dock Operations

Container Vessel Arrives at the Marine Terminal
On-Dock Operations

Specialized Cranes Unload Containers from the Ship
Straddle Carrier Picks Up Container from Wharf
Container Yard Operations

Containers are Stored in the Yard Until They Are Picked up By a Trucker or Loaded Onto a Train
Container Yard Operations

Straddle Carriers Remove the Container from Storage and Load it onto Trucks
The 1.98 Million TEUs Handled by The Port of Virginia in 2005 Were Transported to Inland Markets Using:

- Barge (10% of TEUs)
- Rail (25% of TEUs)
- Truck (65% of TEUs)
Introduction to The Port of Virginia

- In the Year 2005, VPA Handled 1.98 Million TEUs of Containerized Cargo
  - 9.4% Increase Over 2004

- VPA is Currently Ranked:
  - 7th Largest Container Port in the U.S.
  - 2nd Largest Port on the East Coast in Terms of General Tonnage
VPA Containerized Cargo Forecast

Over 7 Million TEUs by 2030

1.8 Million TEU’s in 2004
10% Increase From 2003

Source: VPA Master Plan. Forecast numbers represent average increase over the forecast period.
What is Required to Accommodate Growth?

➢ Good Access to Deep Water
  ◦ Allows Largest Ships to Call
  ◦ Largest Ships can Move Cargo for the Least Cost

➢ Good Access to Road & Rail Lines
  ◦ Facilitates and Speeds Distribution to Origin and Destination Points Locally and Nationally

➢ Good Port Infrastructure
  ◦ Wharves, Cranes, and Container Yard
  ◦ Efficient Cargo Transfer
The Port of Virginia
Deep Water Access

Hampton Roads Channel Improvements

Newport News Channel
Norfolk Harbor Channel
Craney Island
Portsmouth
Norfolk

Chesapeake Bay Bridge Tunnel
Atlantic Ocean Channel

50 Ft. Inbound Channel Underway
Total Project Cost $30.6 M
Local Sponsor Cost $18.2 M

55 Ft. Channel Authorized
(Includes 60 Ft. Atlantic Ocean Channel)
Total Project Cost $198.6 M
Local Sponsor Cost $122.8 M

Existing Marine Terminals
Maersk Terminal (Under Construction)
Proposed Craney Island Marine Terminal
50 Ft. Elements Under Construction
50 Ft. Elements Completed
55 Ft. Authorized Elements

800' Turning Basin
45' Depth
40' Depth
56' Depth
Hampton Roads Intermodal Network

Map showing the Hampton Roads area with various ports, highways, and proposed projects including:
- Port Facility
- CIDMMA
- Interstate/Highway
- Proposed Third Crossing
- 50/55 Ft Channel
- Railroad
- Proposed Maersk Terminal
- Proposed Craney Island Railway
- Proposed Craney Island Terminal
The Port of Virginia
Marine Terminal Locations

- Proposed Craney Island Marine Terminal
- APM/Maersk Terminal (Under Construction)
The Port of Virginia History

- Three Marine Terminals Constructed Over Time
- Terminals Were Constructed by Various Agencies
- Some Structures Date Back to 1918
- Approximately Half of the Existing Container Cranes are First and Second Generation (13 Containers Wide)
Norfolk International Terminals
Norfolk International Terminals

- NIT Container Terminal Opened in 1967

- Container Berth 1
  - Built in 1918
  - 740-feet (226 m)

- Crane #1
  - Purchased in 1967
  - 50-ft Gage (15.2 m)
  - 13-wide Container Reach
  - Operating Wheel Loads (kips/ft)
    - LS: 14
    - WS: 16
Norfolk International Terminals

Terminal & Wharf Expansion in 1969

- Cranes #2 & #3
  - Purchased in 1969
  - 50-ft Gage (15.2 m)
  - 13-wide Container Reach
  - Operating Wheel Loads (kips/ft)
    - LS: 17
    - WS: 19

- Container Berth 2
  - Built in 1969
  - 849-feet (259 m)
Norfolk International Terminals

- Terminal & Wharf Expansion in 1975 & 1978

- Container Berth 3
  - Built in 1978
  - 1,104-feet (336 m)

- Crane #4
  - Purchased in 1978
  - 50-ft Gage (15.2 m)
  - 13-wide Container Reach
  - Operating Wheel Loads (kips/ft)
    - LS: 22
    - WS: 20
Norfolk International Terminals
South Terminal

- Terminal & Wharf Expansion in 1989

- **Container Berth 4**
  - Built in 1989
  - 1,540-feet (469 m)

- **Cranes #5, #6 & #7**
  - Purchased in 1989
  - 50-ft Gage (15.2 m)
  - 17-wide Container Reach
  - Operating Wheel Loads (kips/ft)
    - LS: 23
    - WS: 30
NIT South Backlands
NIT South Renovation
Overall Project Goals

- Upgrade Aging and Obsolete Terminal Infrastructure
- Keep Pace With Containerized Cargo Forecasts
- Accommodate Increasing Container Ship Sizes
- Allow for Operational Conversions (Rubber-Tire Gantry v. Straddle Carrier)
NIT South Renovation
Overall Project Goals

➢ Full Renovation of NIT South Terminal
   ▶ 4,230 Feet (1,289 Meters) of Wharf
   ▶ 8 New Suez-Class Container Cranes
   ▶ 140 Acres (57 Hectares) of Container Yard
   ▶ New Stormwater Treatment Systems
   ▶ Environmental Impacts Included 5.1 Acres of River Bottom and .02 Acres of Vegetated Tidal Wetlands
NIT South Backlands
Warehouse Demolition
NIT South Wharf
Stage 1 Construction
NIT South Wharf
Stage 1 Construction
NIT South Wharf
Arrival of First Shipment of Cranes
NIT South Wharf
First Shipment of Cranes
NIT South Wharf
Stage 2 Construction
NIT South Wharf
Stage 2 Construction
NIT South Wharf
Stage 3 Construction
NIT South Wharf
Second Shipment of Cranes

The Virginia Port Authority
NIT South Wharf
Stage 3 Construction
NIT South Wharf
Arrival of Elevating Girder Crane
NIT South Wharf
Stage 4 Construction
Completed NIT South Wharf
NIT South Backlands
Stage 1 Completed
NIT South Backlands
Completion of Remaining Stages
Under-Wharf Detention Basin
Section View
Under-Wharf Detention Basin
Plan View
Under-Wharf Detention Basin

- Met Treatment Requirements
- Located in Unused, Available Space Under Wharf
- Installation Concurrent with Wharf Construction
- Can Accommodate Sediment Volumes Anticipated Over the Life of the Structure
- Obviated Need for 7-Acre (3-Hectare) Treatment Pond
Plum Point Park
Environmental Restoration

- VPA Believed NIT Renovation Project Deserved High-Profile Mitigation Project
- “Landscape Approach” Convinced Regulatory Agencies of Project Benefits

<table>
<thead>
<tr>
<th>Proposed Mitigation Type</th>
<th>Compensatory Mitigation Ratio</th>
<th>Required Mitigation for NIT Renovation Impact</th>
<th>Proposed Plum Point Compensation</th>
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<tbody>
<tr>
<td>Tidal Wetlands</td>
<td>2:1</td>
<td>10 acres</td>
<td>1 acre creation</td>
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<tr>
<td>Submerged Lands</td>
<td>1:1</td>
<td>5 acres</td>
<td>1 acre restored</td>
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<tr>
<td>Open Space Preservation</td>
<td>20:1</td>
<td>100 acres</td>
<td>5 acres preserved and enhanced</td>
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Plum Point Park
Environmental Restoration

- 5-Acre Tract of Unused Land Along Norfolk’s Urban Waterfront
- Eroding Shoreline
- Low Valued Vegetation
- Adjacent Waterway Littered With Debris

Plum Point - April 2002
Plum Point Park
Environmental Restoration

- 1 Acre of Spartina Grass Wetlands Creation
- 1 Acre of Submerged Bottom Land Restoration
- 5 Acres of Open Space Preservation and Enhancement

Plum Point – November 2005
NIT South Terminal
Prior to Renovation Project