

# CHARLESTON HARBOR POST 45 NAVIGATION STUDY, CHARLESTON, SOUTH CAROLINA

## INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT



MILITARY



CONSUMER GOODS



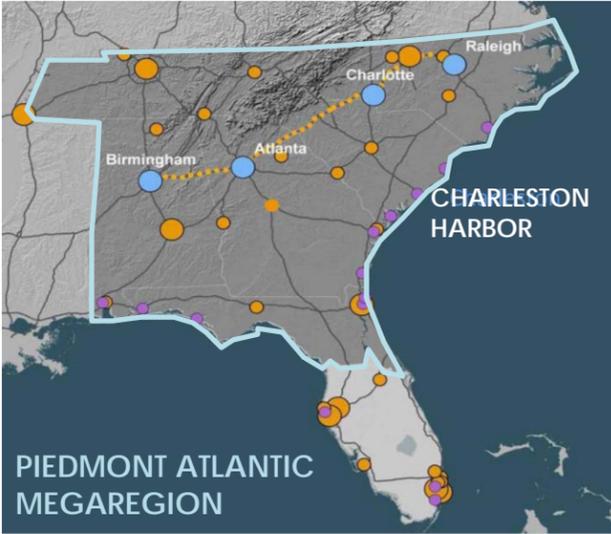
AIRCRAFT ASSEMBLY



VEHICLE-RELATED IMPORTS/EXPORTS



June 2015



PIEDMONT ATLANTIC MEGAREGION

### PROJECT OVERVIEW: VITAL PORT/STRATEGIC LOCATION

Charleston Harbor is a \$45 billion-per-year economic engine for South Carolina and the nation. The South Carolina State Ports Authority (SCSPA) is the non-federal sponsor for this project, located primarily at the confluence of the Cooper, Wando, and Ashley Rivers. In 2013, Charleston Harbor ranked 9<sup>th</sup> in container throughput and 7<sup>th</sup> in total trade value as compared to other U.S. ports. Charleston is located in the Piedmont Atlantic Megaregion, one of eight similar regions nationwide where half the nation's population growth and two-thirds of its economic growth is expected to occur over the next four decades. Examples of this trend in South Carolina include recent large-scale corporate investments in the automobile and aircraft assembly industries – providing significant growth in the regional economy and in port activity.

The port generates hundreds of thousands of jobs in the State and beyond. The harbor is located at a strategic transportation intersection, with air, rail and highway access to all regions of the United States. In anticipation of the Panama Canal expansion and the continued global shift to larger vessels, SCSPA has capitalized on its strategic location and has been proactive in developing its port infrastructure. The Wando Welch Terminal has the distinction of being one of the nation's most productive container terminals. For all of these reasons, Charleston Harbor was identified as a nationally-significant infrastructure project under the Administration's "We Can't Wait" initiative.

Charleston Harbor is a key location for trade routes such as the Far East, the Indian subcontinent, Middle East, the Mediterranean, and Europe. **Limited by restrictive channel depths and widths**, it currently receives a significant number of light loaded ships. Some ships currently wait to transit the harbor during the high end of the harbor's six-foot tide range.

**Project purpose:** The project will provide an opportunity to reduce transportation costs and transport the forecasted volume of goods into and out of the harbor on fewer, larger, and more efficient ships, driving down shipping costs for Americans and American businesses. Other benefits include improved maneuverability, net reduction in vessel calls, and reduced cross country transit of cargo.

### PLAN FORMULATION & ECONOMIC ANALYSIS

Approximately 97% of project benefits are attributable to container vessels

**Project benefits:** Project benefits would be realized through more efficient utilization of the North Charleston, Wando Welch and the New Navy Base terminals. The benefits will be derived from the economies of scale associated with the maritime industry's larger container ships that will be able to transit the port more efficiently with less congestion within the harbor. **The recommended plan (52/48)** deepens the inner harbor from 45 feet to 52 feet to the Wando Welch and New Navy Base terminals, and from 45 feet to 48 feet from the New Navy Base Terminal to the North Charleston Terminal over varying expanded bottom widths.

#### PLAN FORMULATION

**Table Top Exercise:**  
Defined widening footprint

**Incremental Analysis:**  
Widening increments evaluated independently and with deepening

**Turning Basins:** Included with widening measures due to their interdependencies

**50/48-foot Depth:** National Economic Development (NED) Plan

**52/48-foot Depth:** Locally Preferred Plan (LPP)

#### MARITIME CONTAINER VESSEL FLEET

— SUB-PANAMAX TO PANAMAX

CELLULAR CONTAINERSHIP: DRAFT: 8 – 45 FEET; TEU CAPACITY: 100-5,200

GENERATION I

LOA: 221 – 968 FEET

POST-PANAMAX: DRAFT: 35-48 FEET; TEU CAPACITY: 5,500-8,000

GENERATION II

LOA: 661 – 1,045 FEET

POST PANAMAX: DRAFT: 39-49 FEET; TEU CAPACITY: 8,000-10,000

GENERATION III

LOA: 911 – 1,205 FEET

NEW PANAMAX : DRAFT: 43-50 FEET; TEU CAPACITY: 10,000-14,000

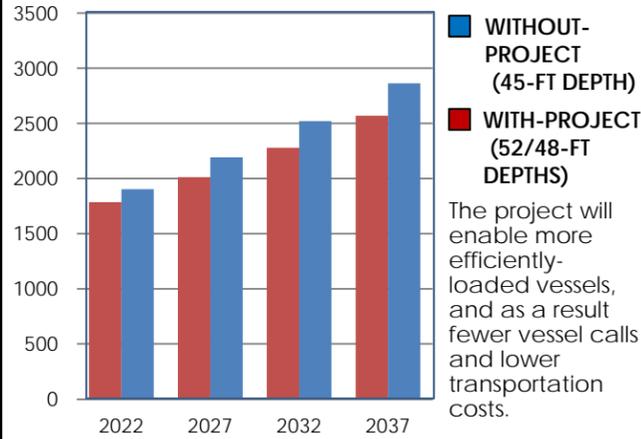
GENERATION IV\*

LOA: 1,037 – 1,201 FEET

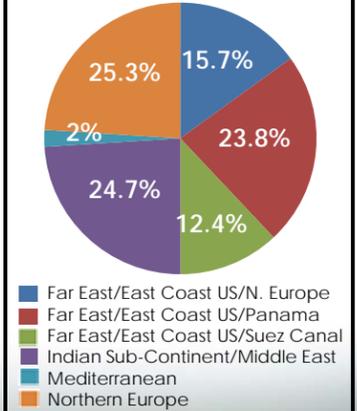
NEW POST-PANAMAX: DRAFT: 51 -53 FEET; TEU CAPACITY: 14,000+

\* In world fleet but not in the Charleston fleet forecast

#### FORECASTED CONTAINER VESSEL FLEET PER YEAR WITH AND WITHOUT-PROJECT CONDITIONS



#### TRANSPORTATION COST SAVINGS BY ROUTE (ORIGIN TO DESTINATION)



### BENEFITS & COSTS

(FY15 Discount Rate 3.375% and October 2014 Price Level as of 13 Apr 2015)

**AVERAGE ANNUAL BENEFITS/COSTS:** \$108,900,000 / \$28,000,000

**FIRST COST:** \$493,300,000

**PROJECT COST (Financial Cost):** \$521,000,000 (Includes USCG Aids to Navigation and Local Service Facility Costs)

**Federal Share:** \$180,000,000

**Non-federal Share:** \$341,000,000

#### BENEFIT-COST RATIO (BCR)

- Recommended Plan/Locally Preferred Plan (LPP) BCR: 3.9
- National Economic Development Plan (NED) BCR: 4.0

### ENVIRONMENTAL MONITORING & MITIGATION

#### WETLAND VEGETATION/SALINITY



- Impacts:**
- Project-induced salinity impacts (a potential shift from freshwater to more brackish vegetation) primarily in areas north of the North Charleston Terminal (~324 acres of freshwater habitat)

**Monitoring**

- 9-year monitoring period

**Mitigation**

- Preservation of up to 665 acres of wetlands
- Corrective action if necessary

#### THREATENED & ENDANGERED SPECIES



- No significant impacts to fish and wildlife species
- Standard protective measures will be employed to help ensure the safety of Right whales, sturgeon, and sea turtles during project construction

#### WATER QUALITY



- Dissolved Oxygen**
- Modeling indicates a reduction in dissolved oxygen (DO) within the Total Maximum Daily Load (TMDL)

- Monitoring**
- Along with salinity levels, a 9-year monitoring period will be employed as a precautionary measure
  - Corrective action if necessary

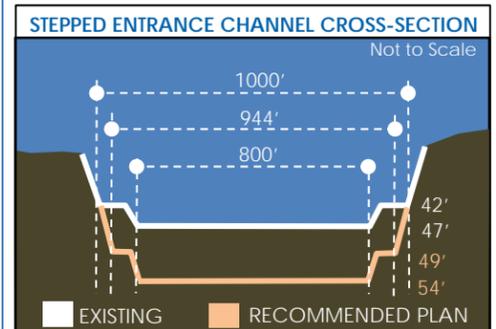
#### CULTURAL/HISTORIC RESOURCES



- Shoreline Erosion**
- Although the analysis indicates vessel wake energy on shorelines will be less with the Recommended Plan, important resources like Fort Sumter will be monitored to verify conclusions

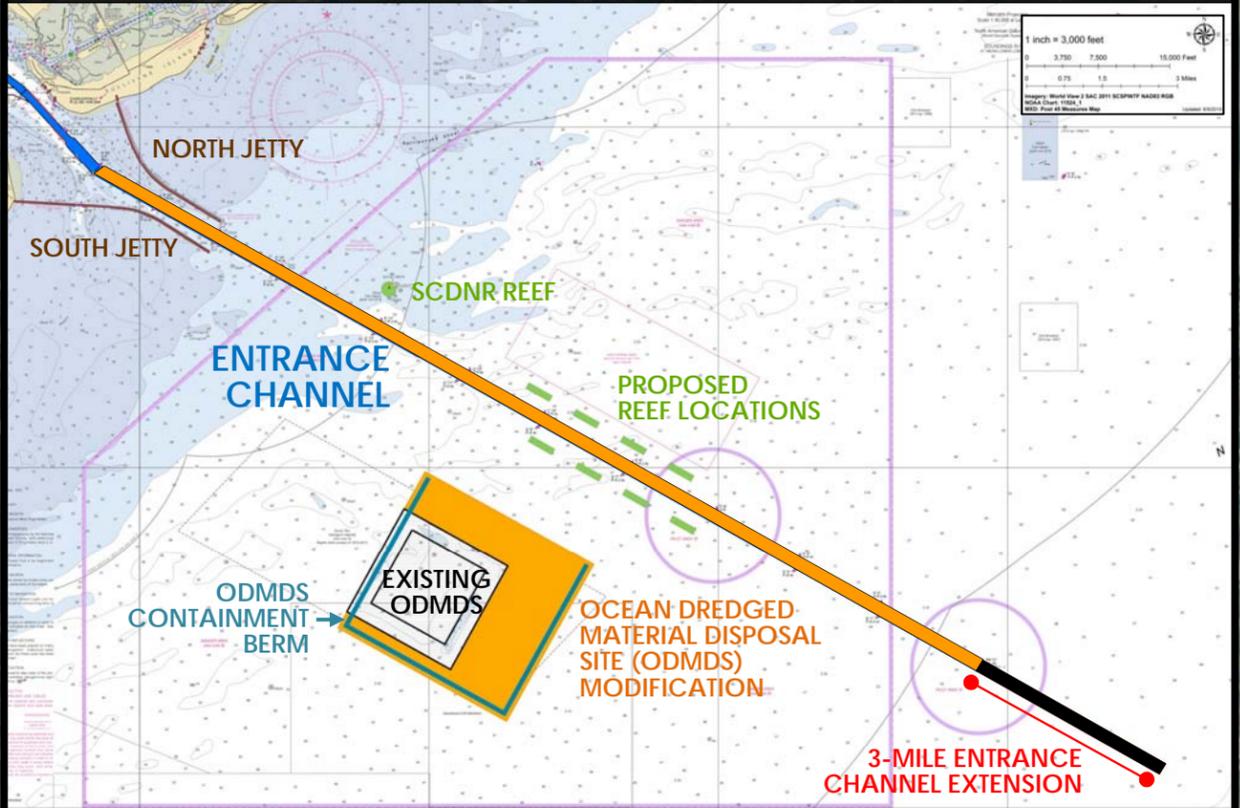
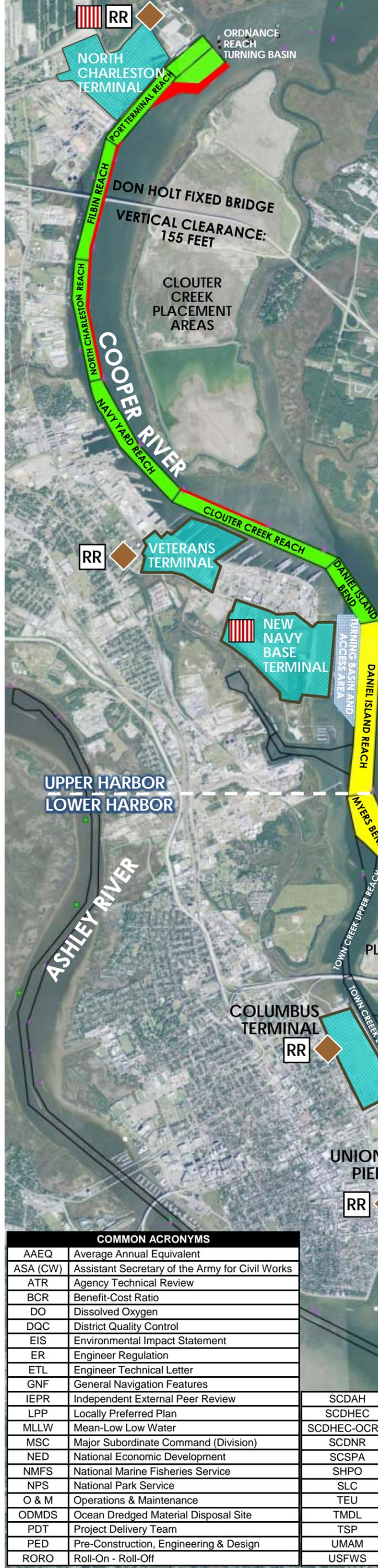
- Monitoring**
- 5-year monitoring period as a precautionary measure

#### HARDBOTTOM HABITAT



- Impacts:**
- ~20 acres of hardbottom habitat were avoided by maintaining the existing slope, but with a deeper cross-section
  - ~29 acres of unavoidable hardbottom impacts in the entrance channel

- Monitoring/Mitigation**
- 5-year monitoring period
  - Mitigation: 33-acre reef using limestone from the entrance channel; ~231 acres created as least cost disposal w/ benefit of habitat enhancement
  - Corrective action if needed



- ENGINEERING CONSIDERATIONS**
- Dredging Quantities: 40,000,000 cubic yards
  - Adequate capacity for dredged material:
    - ODMDS Modification
    - Raise dikes at existing disposal areas
  - Blasting: No
  - Advance Maintenance: Analysis validated continued use of advance maintenance at the existing rates
  - O&M: Increased cost = \$3,700,000/year
  - Project Datum:
    - In compliance with current regulation (ER 1110-2-8160)
    - Mean Lower Low Water (MLLW) and NAD83

- MEASURES**
- **Widening Measures (range from 50 to 250 feet)**  
Widening measures increase maneuverability, turning capability or create passing/turning capability
    - Filbin & N. Charleston Reaches: reduced suction effects on docked vessels
    - Clouter Creek Reach: provides for two-way traffic for smaller vessels
    - Drum Island Reach: increases navigability for two-way traffic under conditions with difficult currents
    - Wando River Lower Reach: increased navigability under difficult wind conditions
    - Hog Island/Custom House Reaches: increased navigability for two-way traffic
    - Bennis & Mt. Pleasant Reaches: increased navigability for two-way traffic and difficult wind and current conditions, respectively
  - **Segment 1 (29.5 river miles):**
    - Inner Harbor: 45' to 52' depths
    - Includes the Entrance Channel: 47/42' depths to 49/54' depths (refer to Stepped Entrance Channel Cross-section on page 1)
  - **Segment 2 (2.6 river miles): 45' to 52' depth**
  - **Segment 3 (5.8 river miles): 45' to 48' depth**
- VESSEL TYPE**
- Container
  - RR Roll On Roll Off
  - Break Bulk
- SCALE**
- 0 0.5 1 2 miles

**COMMON ACRONYMS**

AAEQ	Average Annual Equivalent
ASA (CW)	Assistant Secretary of the Army for Civil Works
ATR	Agency Technical Review
BCR	Benefit-Cost Ratio
DO	Dissolved Oxygen
DQC	District Quality Control
EIS	Environmental Impact Statement
ER	Engineer Regulation
ETL	Engineer Technical Letter
GNF	General Navigation Features
IEPR	Independent External Peer Review
LPP	Locally Preferred Plan
MLLW	Mean-Low Low Water
MSC	Major Subordinate Command (Division)
NED	National Economic Development
NMFS	National Marine Fisheries Service
NPS	National Park Service
O & M	Operations & Maintenance
ODMDS	Ocean Dredged Material Disposal Site
PDT	Project Delivery Team
PED	Pre-Construction, Engineering & Design
RORO	Roll-On - Roll-Off

SCDAH	South Carolina Department of Archives and History
SCDHEC	South Carolina Department of Health & Environmental Control
SCDHEC-OCRM	SCDHEC - Ocean & Coastal Resource Management
SCDNR	South Carolina Department of Natural Resources
SCSPA	South Carolina State Ports Authority
SHPO	State Historic Preservation Officer
SLC	Sea Level Change
TEU	Twenty-ft Equivalent Unit
TMDL	Total Maximum Daily Load
TSP	Tentatively Selected Plan
UMAM	Uniform Mitigation Assessment Method
USFWS	U.S. Fish & Wildlife Service