

2-23-2018

Building Resilient Infrastructure

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BUILDING RESILIENT INFRASTRUCTURE

Hampton Roads Sea Level Rise / Flooding Adaption Forum February 23, 2018





Common Solutions

Hard Defense – Structures to hold back coastal flooding and protect against wave damage

Retreat – Moving assets away from the risk areas

Elevation – Raising structures above expected water levels

Retrofit– Adapting at risk assets to be more resilient to inundation

Green Infrastructure – Living shorelines for flood and erosion protection



Santa Rosa Island Range Complex

Eglin Air Force Base, Florida

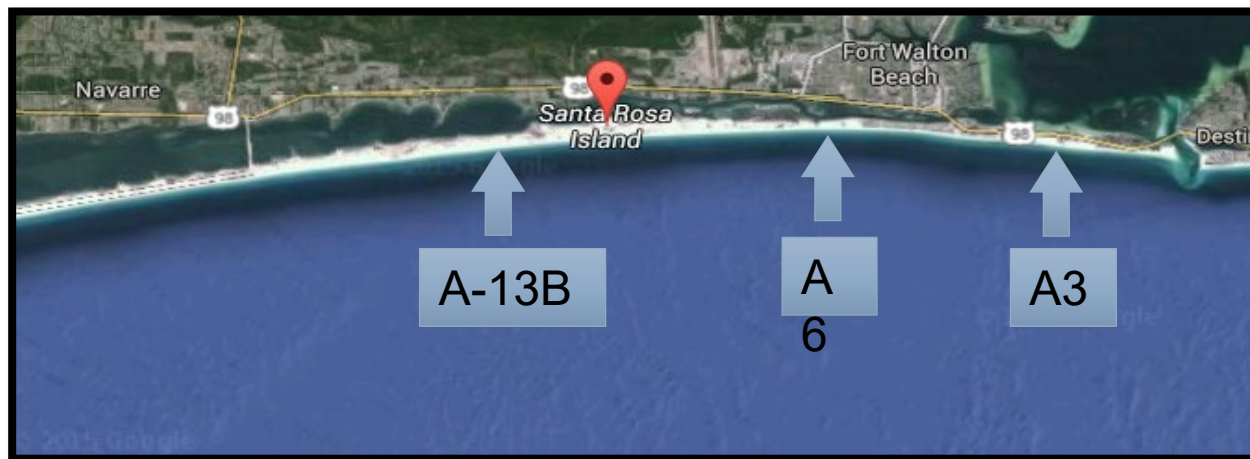


Santa Rosa Island Range Complex

Eglin Air Force Base, Florida



Site A-13B



Site A6



Site A3



Santa Rosa Island Range Complex

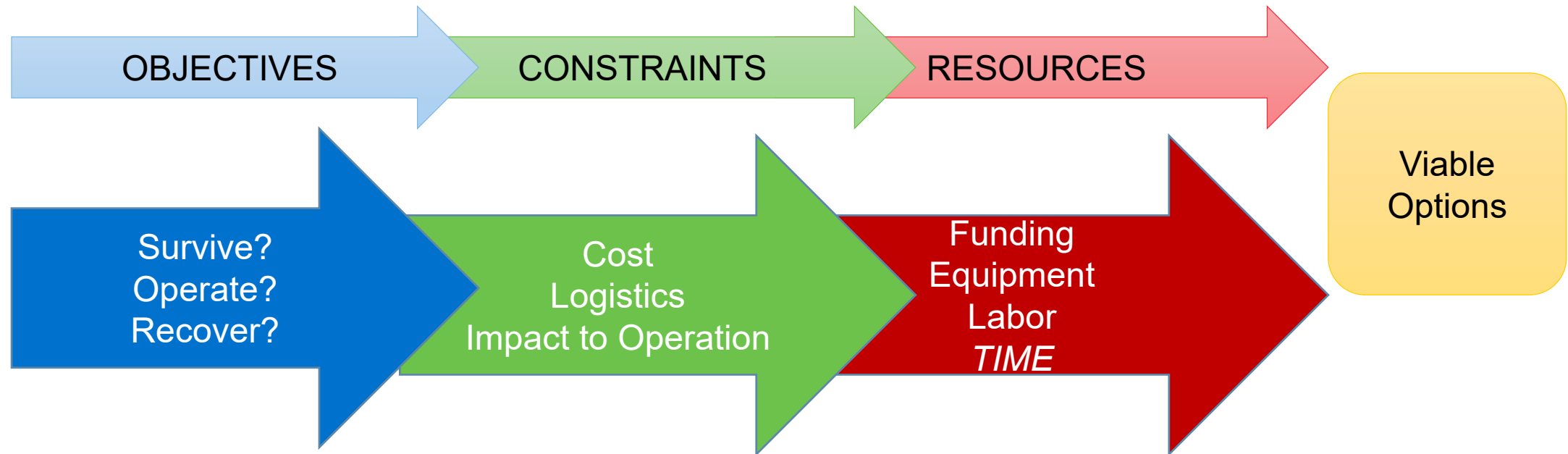


Eglin Air Force Base, Florida





Client Approach





Newport News Shipbuilding

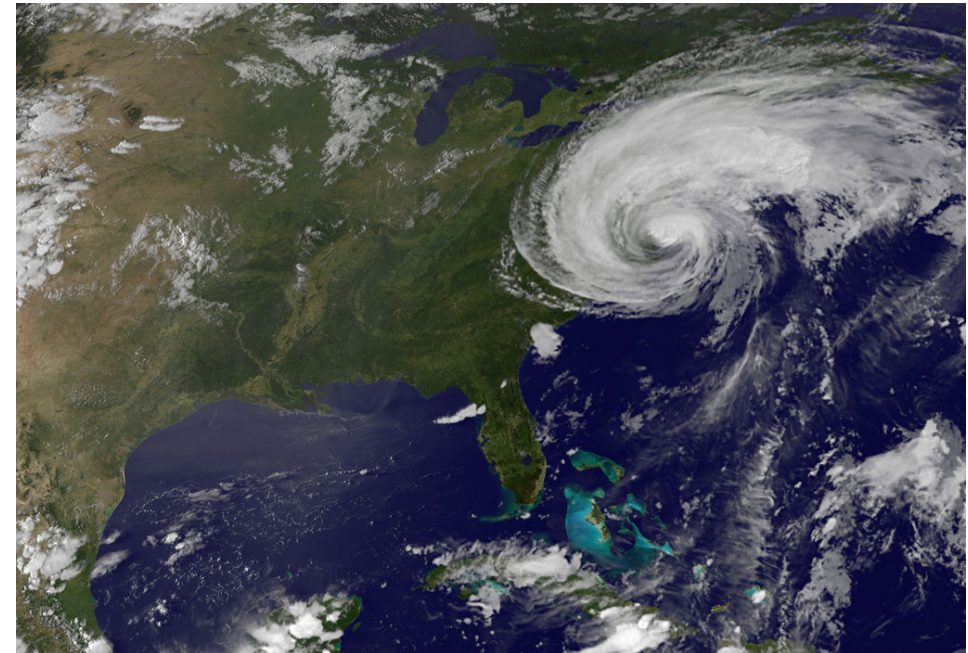
Newport News, Virginia



Hurricane Irene prompted Newport News Shipbuilding to investigate its vulnerability and resilience option to coastal flooding in a two step process

1. Hindcast study of coastal flooding which includes Sea Level Rise
2. Investigation of resilience options balancing risk with cost of implementation

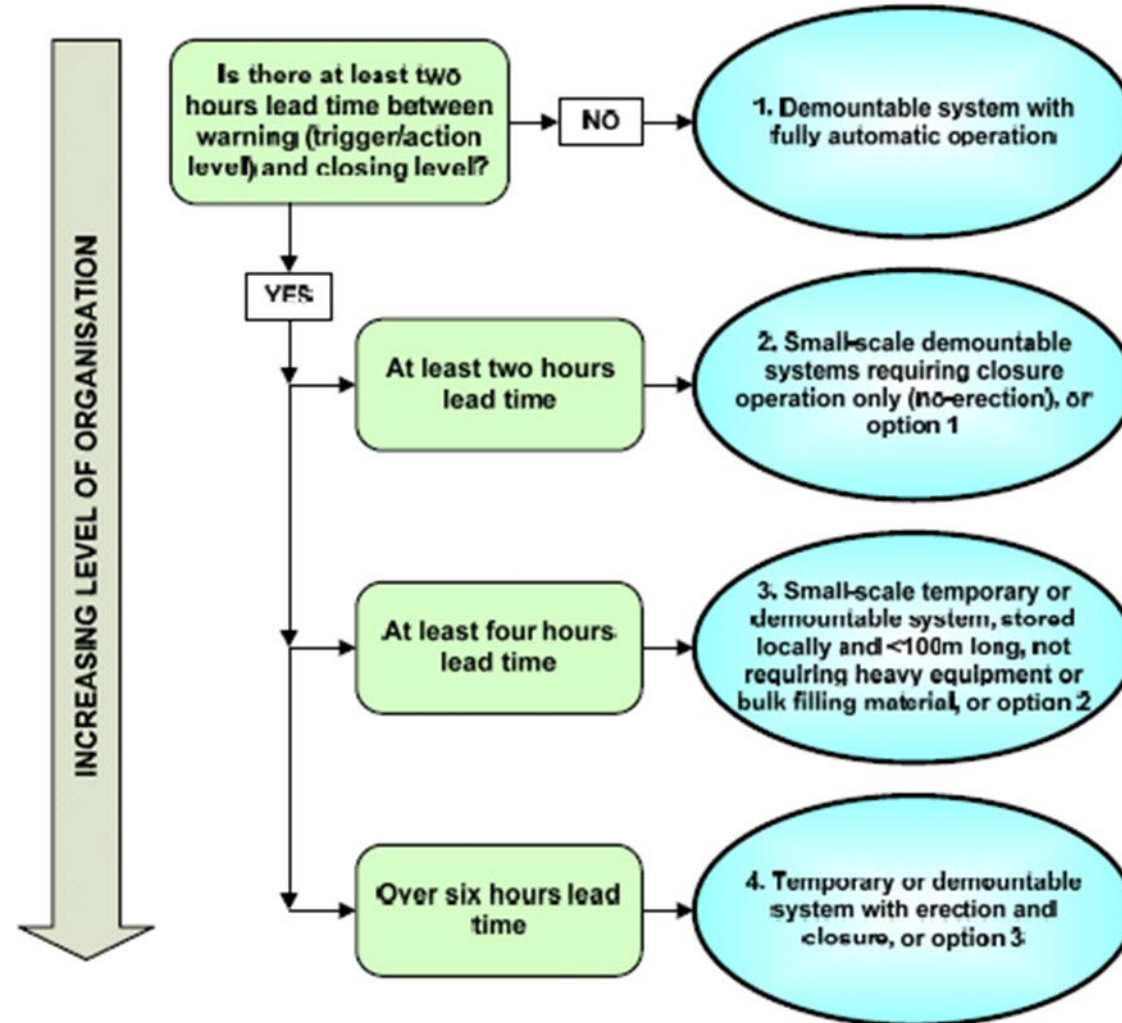
Credit Halcrow, a CH2M Company, 2011





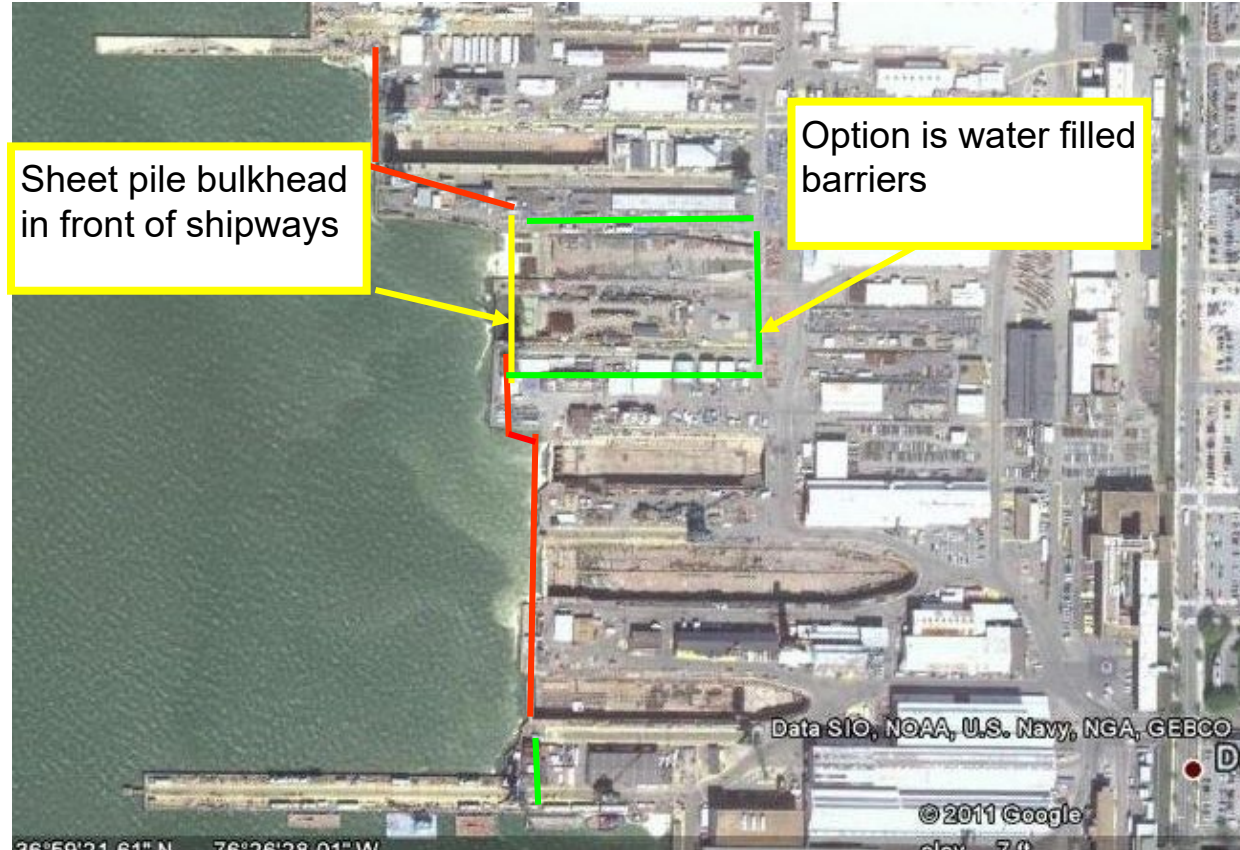
Guidance for Selection of Flood Mitigation Methods

Newport News, Virginia






Newport News Shipbuilding

Newport News, Virginia



Sheet pile bulkhead in front of shipways

Option is water filled barriers

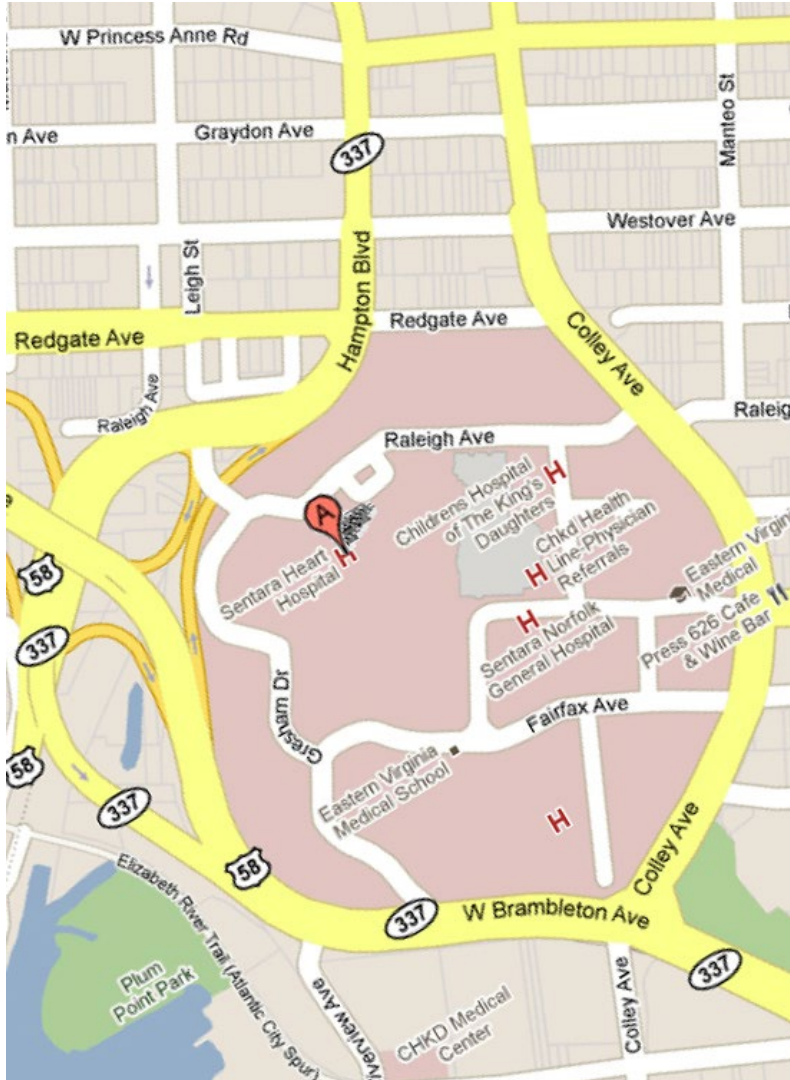
-  Temporary or Demountable Barrier
-  Fixed Barrier
-  Sheet Pile Bulkhead

2012 Conceptual Coastal Flood Defense Plan

- Shipyard split into 3 Zones
- Various combinations of flood defense mechanisms considered
- Flood defenses scaled back to focus on critical infrastructure
 - What to sacrifice
 - What to protect

Sentara Hospital - Norfolk

Norfolk, Virginia



Risk Assessment Study to Identify the Vulnerabilities in a Category 2 Hurricane

- *Field Investigation*
- *Feasibility Study*
- *Survey*
- *Design and Construction Services*
- *Relocation of Existing Utilities*



Norfolk Sentara Hospital

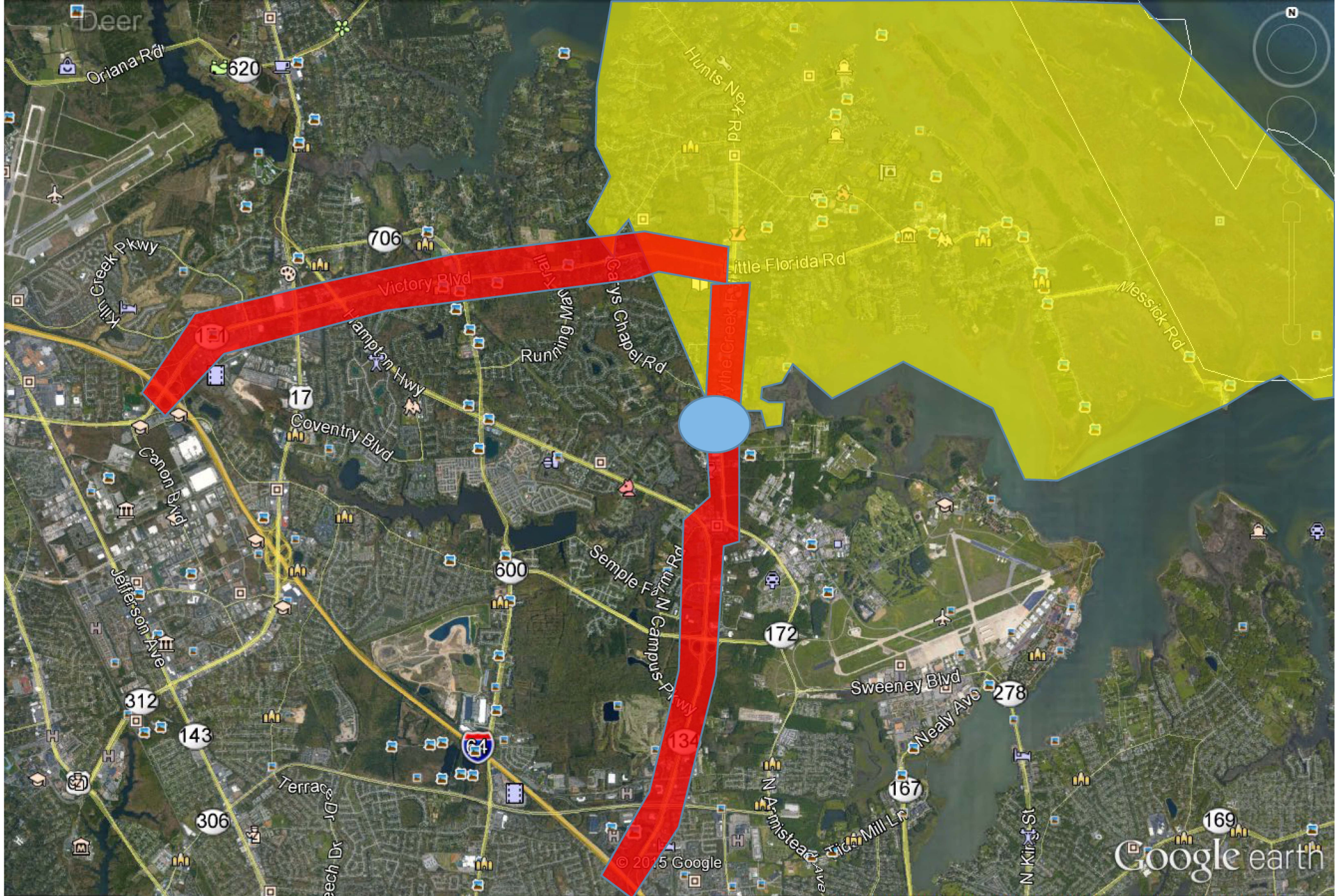
Norfolk, Virginia



Norfolk Sentara Hospital

Norfolk, Virginia







Wythe Creek Road Hampton and Poquoson, Virginia





Wythe Creek Road Hampton and Poquoson, Virginia

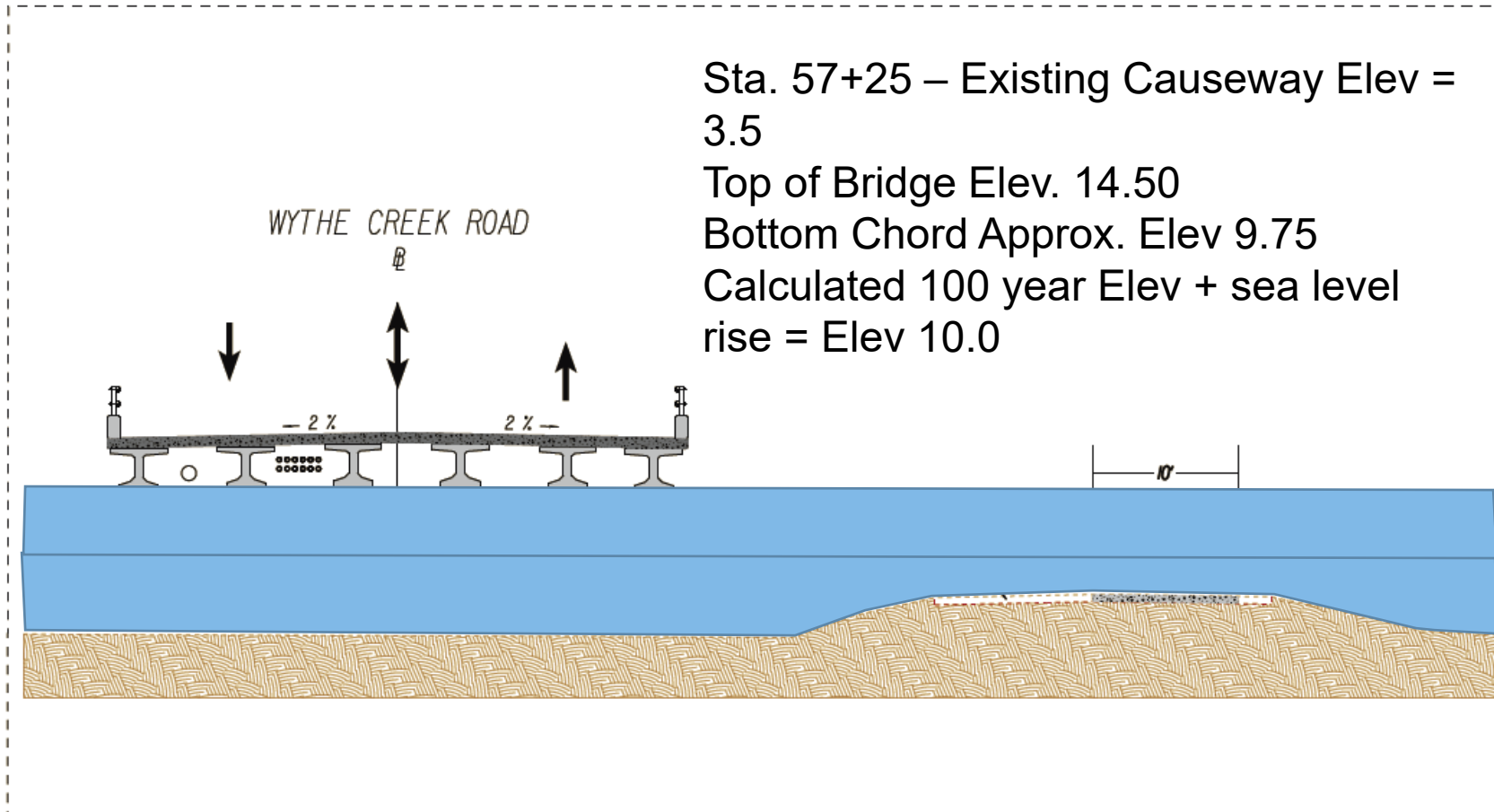
October 2015



Bridge Typical Section

Wythe Creek Road Improvements

Sta. 57+25 – Existing Causeway Elev = 3.5
 Top of Bridge Elev. 14.50
 Bottom Chord Approx. Elev 9.75
 Calculated 100 year Elev + sea level rise = Elev 10.0



Centerville Turnpike Movable Bridge Chesapeake, Virginia





Centerville Turnpike Movable Bridge

Chesapeake, Virginia



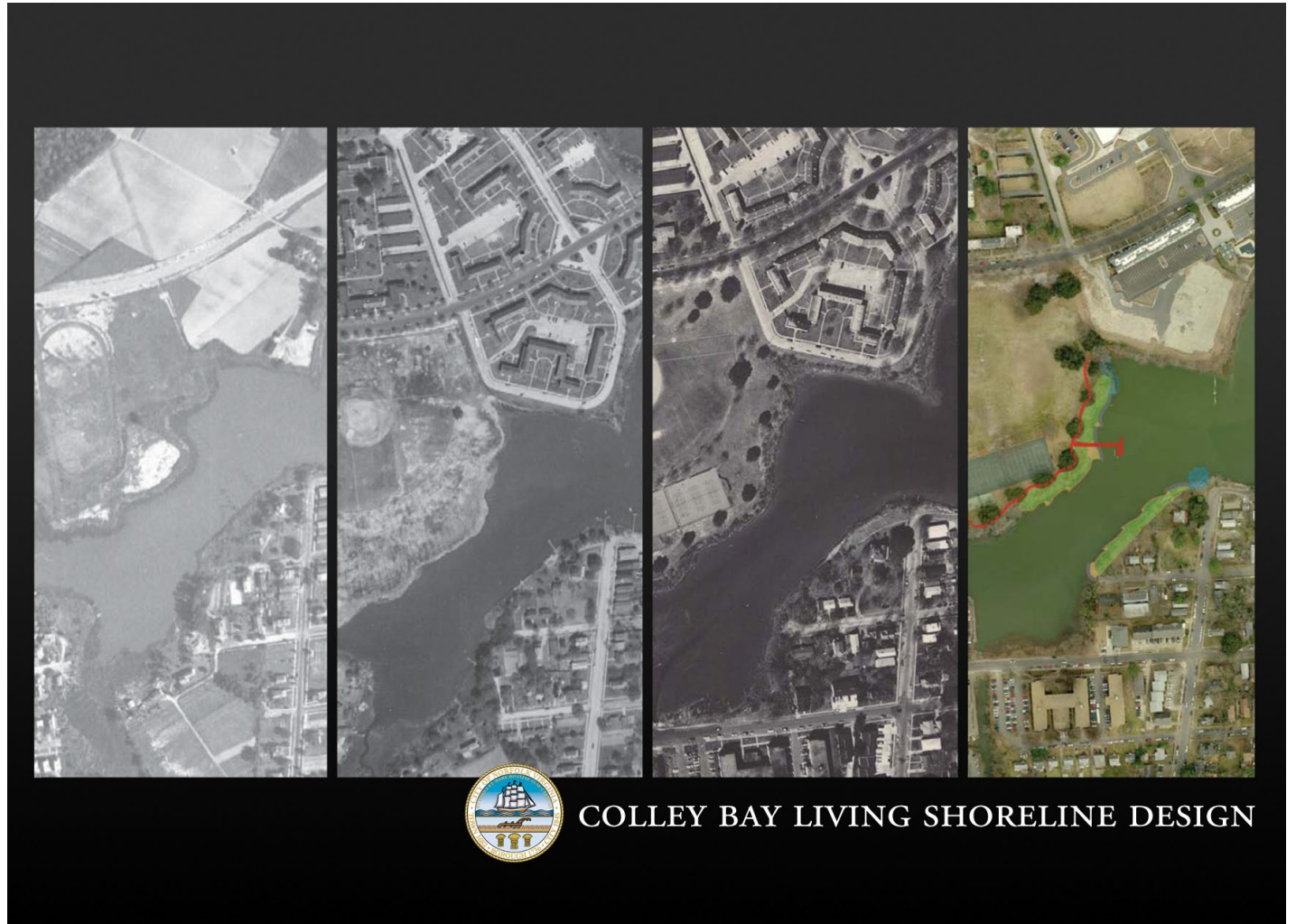
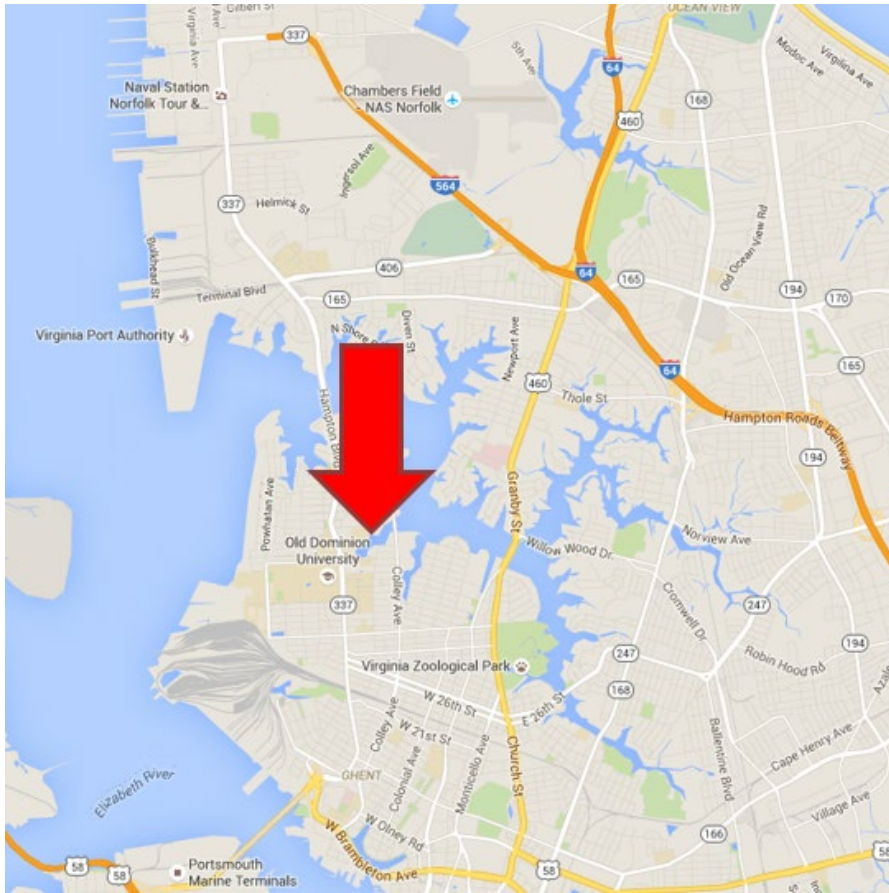
Centerville Turnpike Movable Bridge Chesapeake, Virginia





Colley Bay Living Shoreline

Norfolk, Virginia





Colley Bay Living Shoreline



Norfolk, Virginia

Benefits of Living Shorelines

- Flood Protection
- Shoreline Erosion Protection
- Water Quality
- Fish & Wildlife Habitat
- Aesthetics



Colley Bay Living Shoreline Norfolk, Virginia



COLLEY BAY LIVING SHORELINE
NORTH SHORE
SEGMENTED STONE SILL & FRINGE MARSH WITH BIOLOGS



Colley Bay Living Shoreline Norfolk, Virginia



COLLEY BAY LIVING SHORELINE
SOUTH SHORE

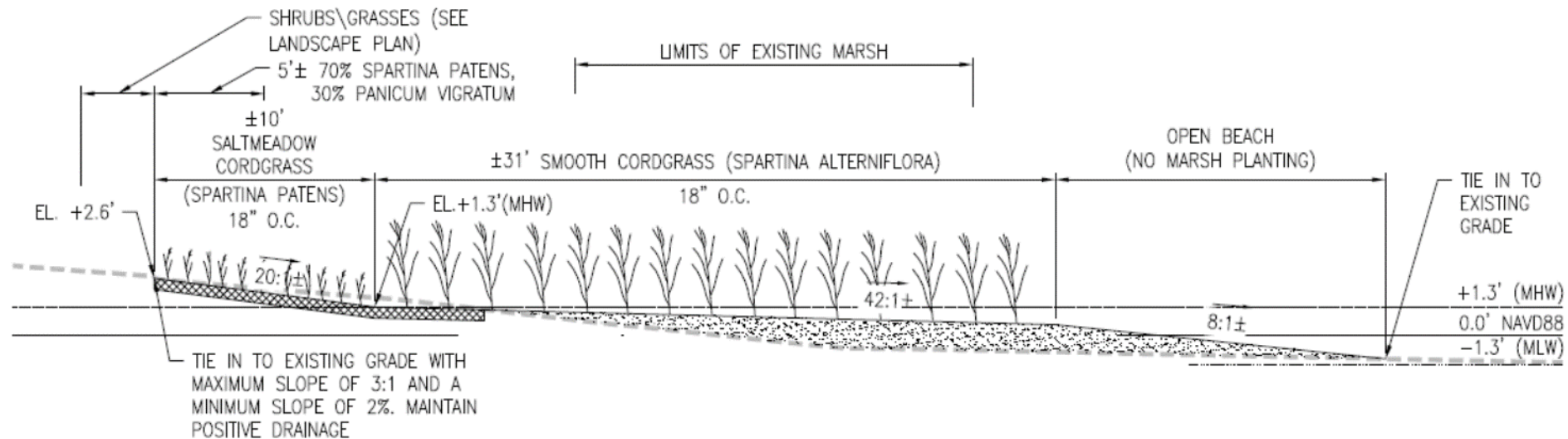
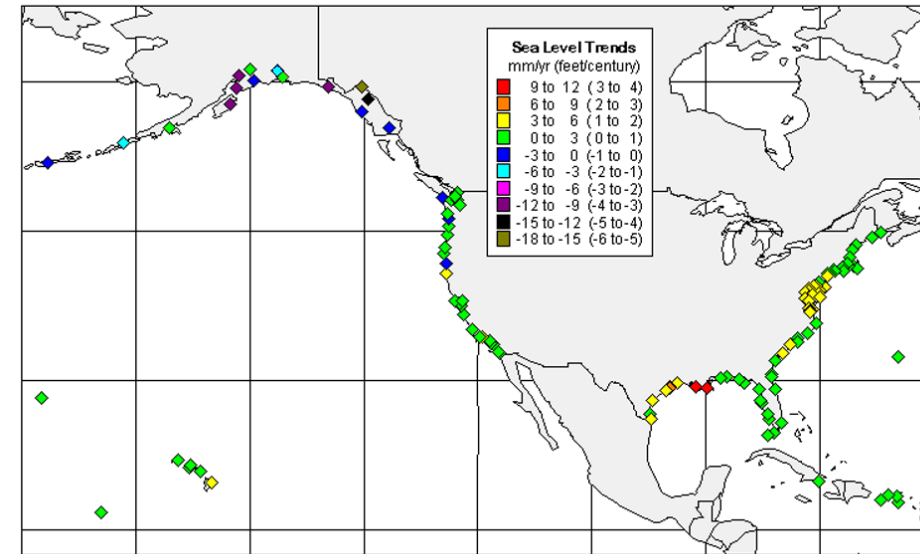


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Colley Bay Living Shoreline

Norfolk, Virginia

- Bulkheads can't move Living Shorelines can





Colley Bay Living Shoreline

Norfolk, Virginia





Colley Bay Living Shoreline

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Volunteers



Colley Bay Living Shoreline

Norfolk, Virginia

Volunteers





THANK YOU

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