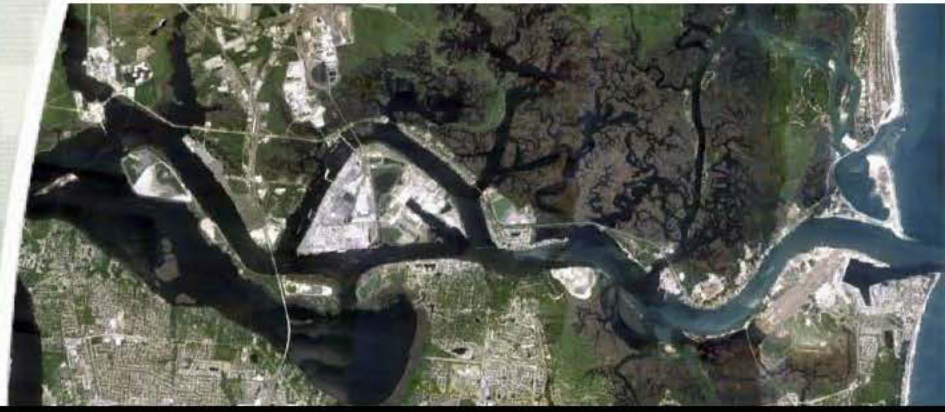
Building an Improved Weir Decanting System:

Economical, Safer, Longer Life-Cycle and with Environmental Provisions



Engineering Division
Jacksonville District

Presentation for
Designing Navigation Infrastructure: Toward Greater Environmental Sustainability

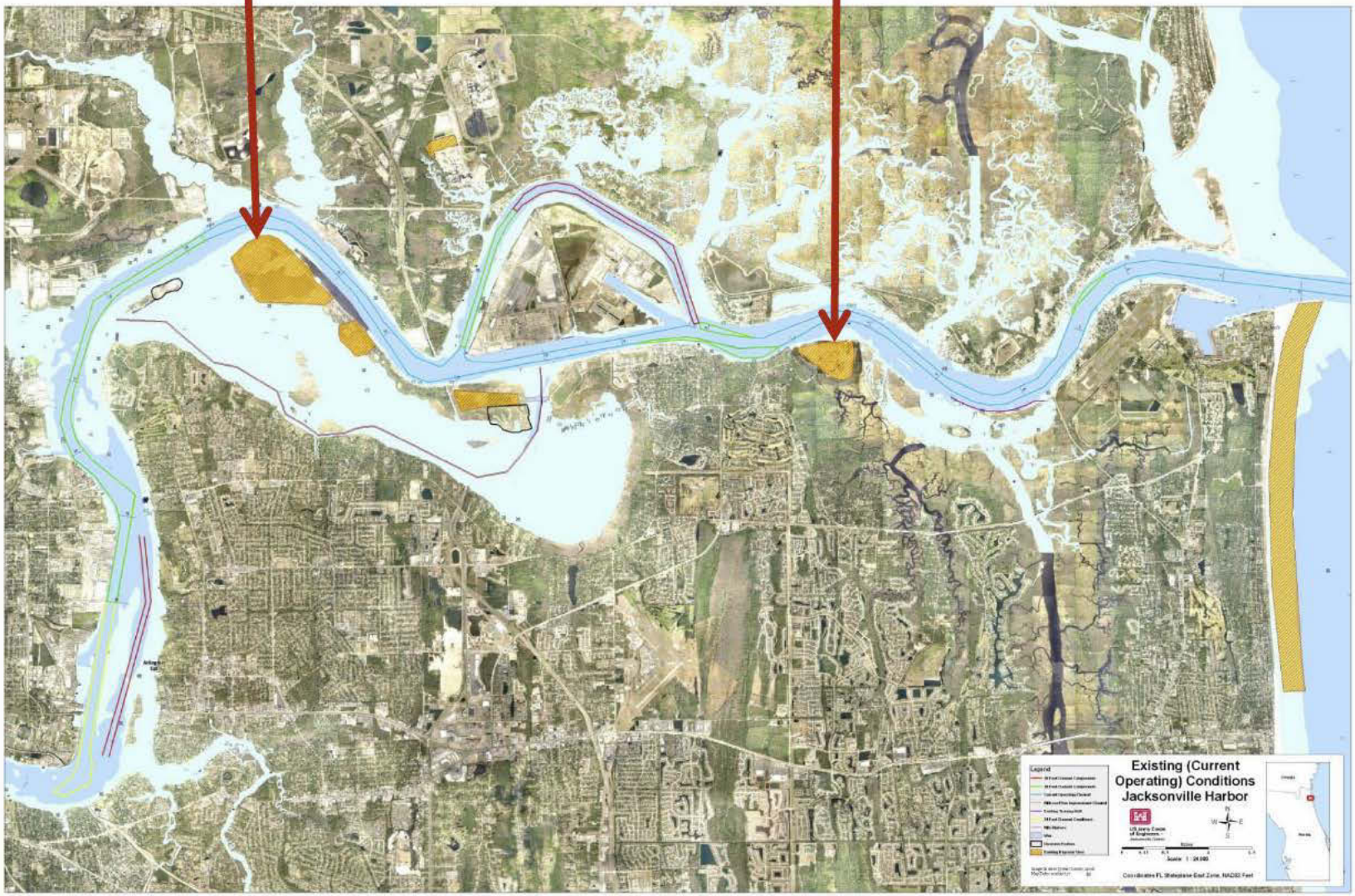
7-8 September 2011

By: Coraggio Maglio, P.E.
(Engineering Technical Lead)
Justin Grover, E.I.T.
(Structural Engineer)
Fred McAuley, E.I.T.
(Value Engineer)

OUTLINE

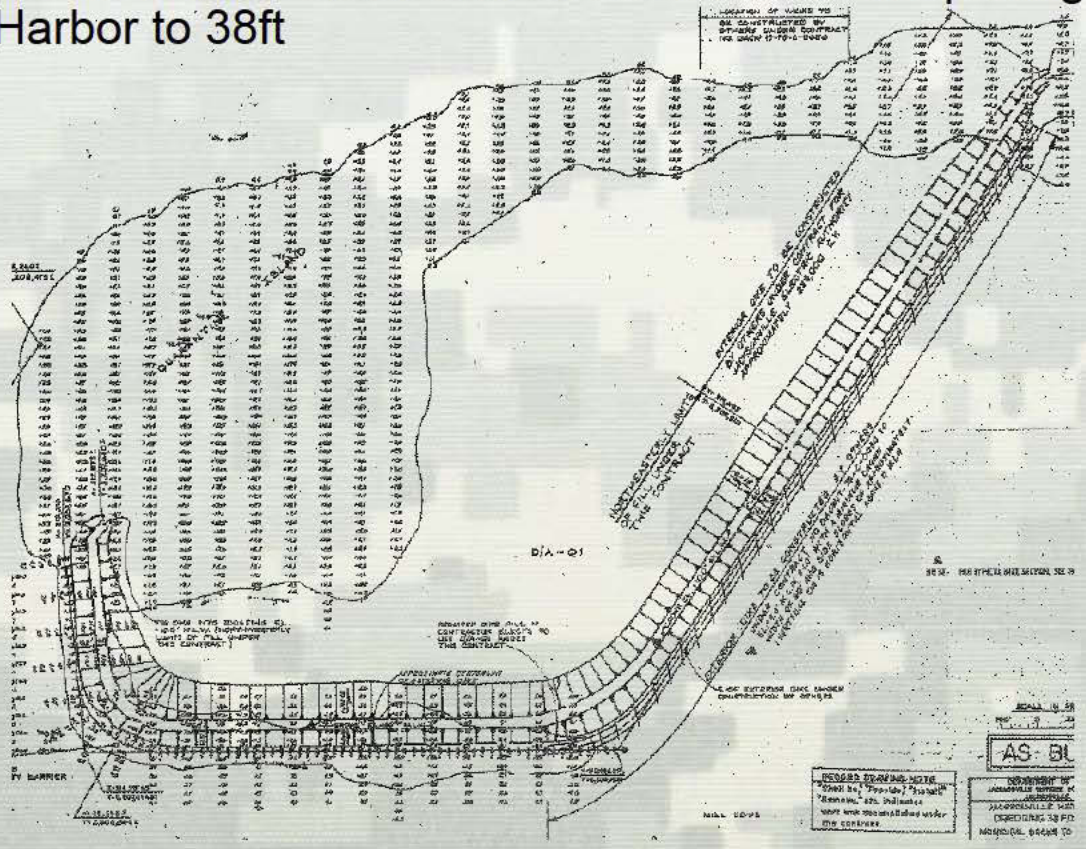
- **Background**
- **Example Projects - Design Features**
  - Resource Avoidance
  - Shoreline Plantings
  - Wavebreak
  - Drainage Blanket
- **Environmental Safety Measures**
  - Improved Weir System Design
    - Box Riser
    - Composite Weir Boards
    - Floating Docks Access
    - Emergency Shutoff Flap Gates
    - HDPE Outfall Pipes
- **Less Expensive and Safer**
  - Life-cycle
  - Cost
  - Safety

BARTRAM and BUCK Islands



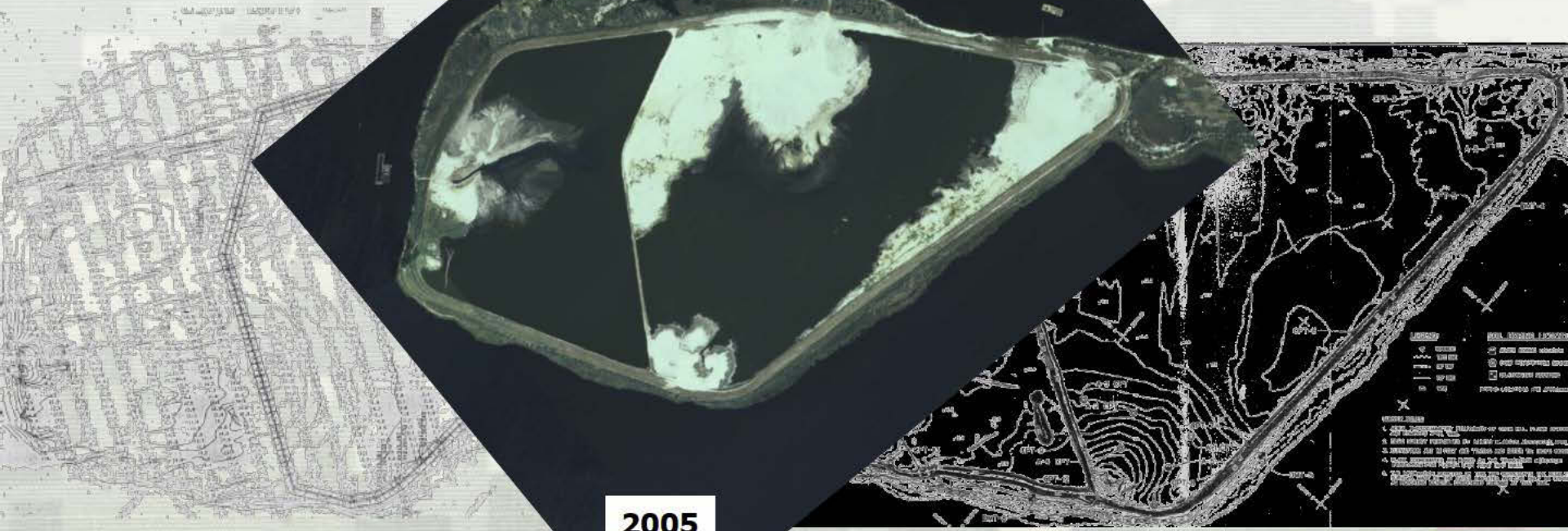
BARTRAM ISLAND

- **1895**
  - Bartram (Quarantine) Island appears on survey maps as dredge spoils area
- **1974**
  - Dikes of Cell A and B were created to el. 8.5 ft for the deepening of Jacksonville Harbor to 38ft



BARTRAM ISLAND

- **1995**
  - Cell A Bartram dikes raised t[illegible]29 by USACE
- **1999**
  - Cell A raised to 28.5 f[illegible] Authority; Cell B created to 28.5 ft



1995

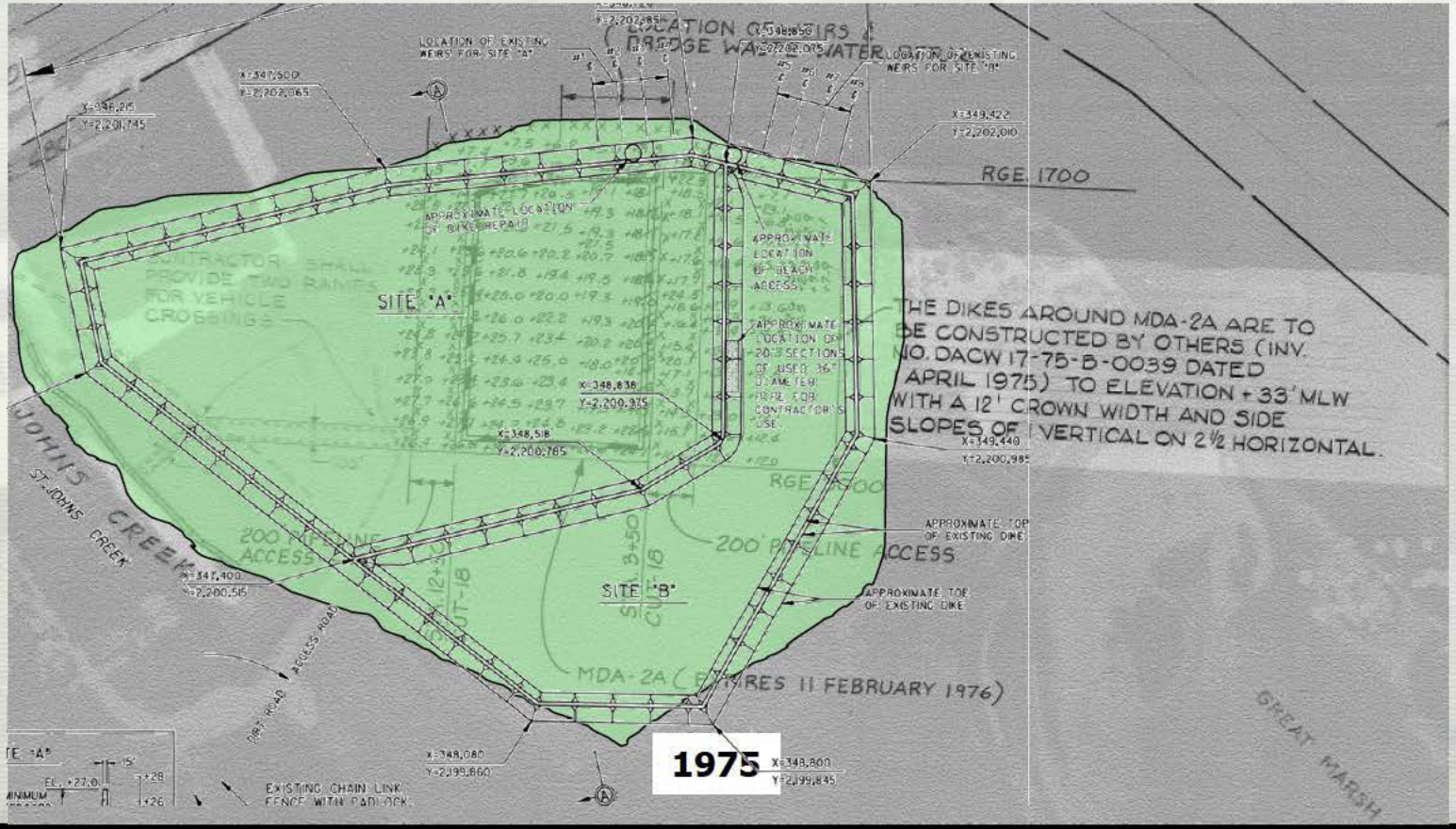
2005

1999

BARTRAM ISLAND

BUCK ISLAND

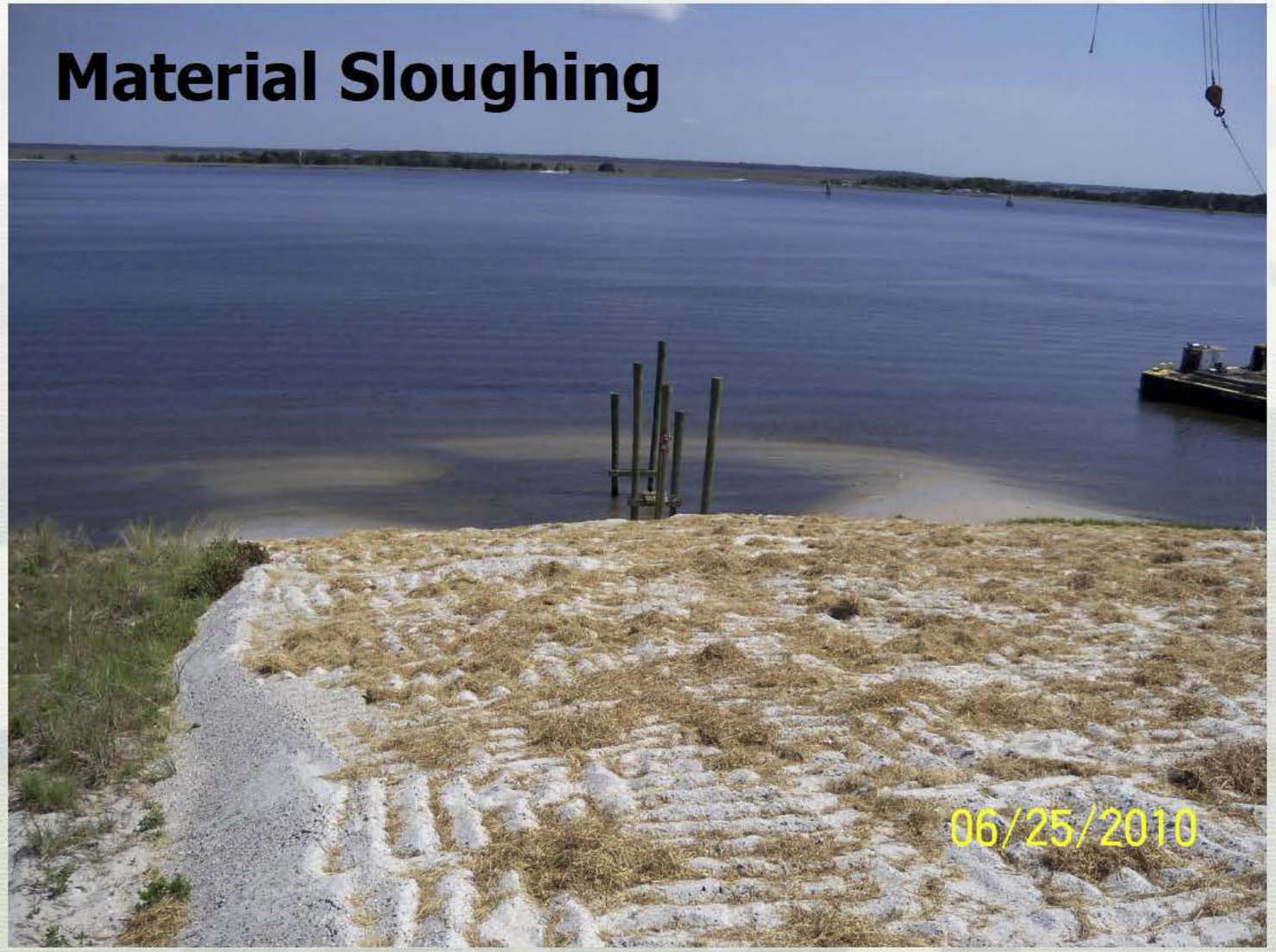
- **1975** - Confined disposal facility created by local Sponsor
- **1985** - Existing DMMA footprint created
- **1997** - Dikes raised to el. 37 ft by Port



BUCK ISLAND

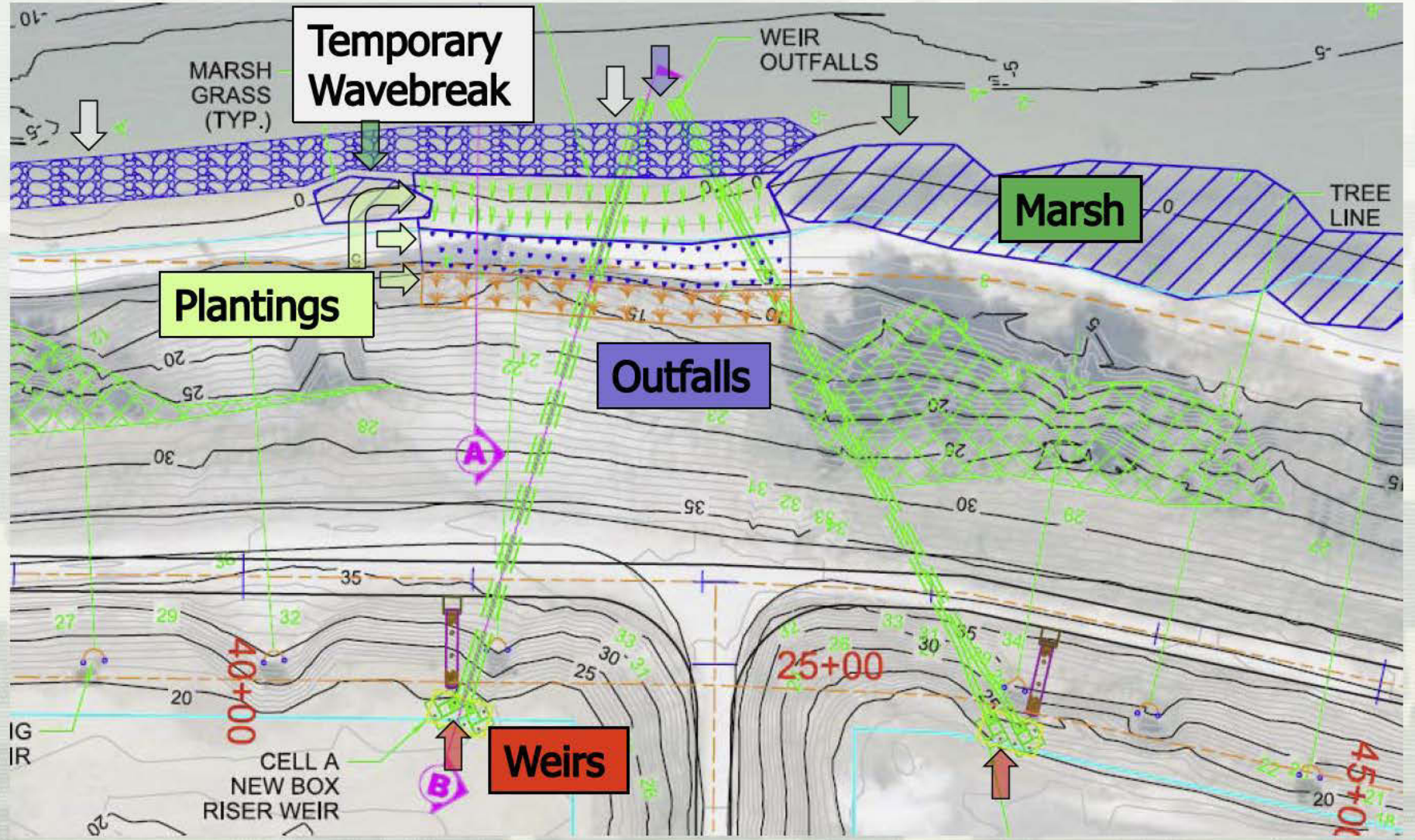
BUCK ISLAND

BUCK ISLAND



BUCK ISLAND

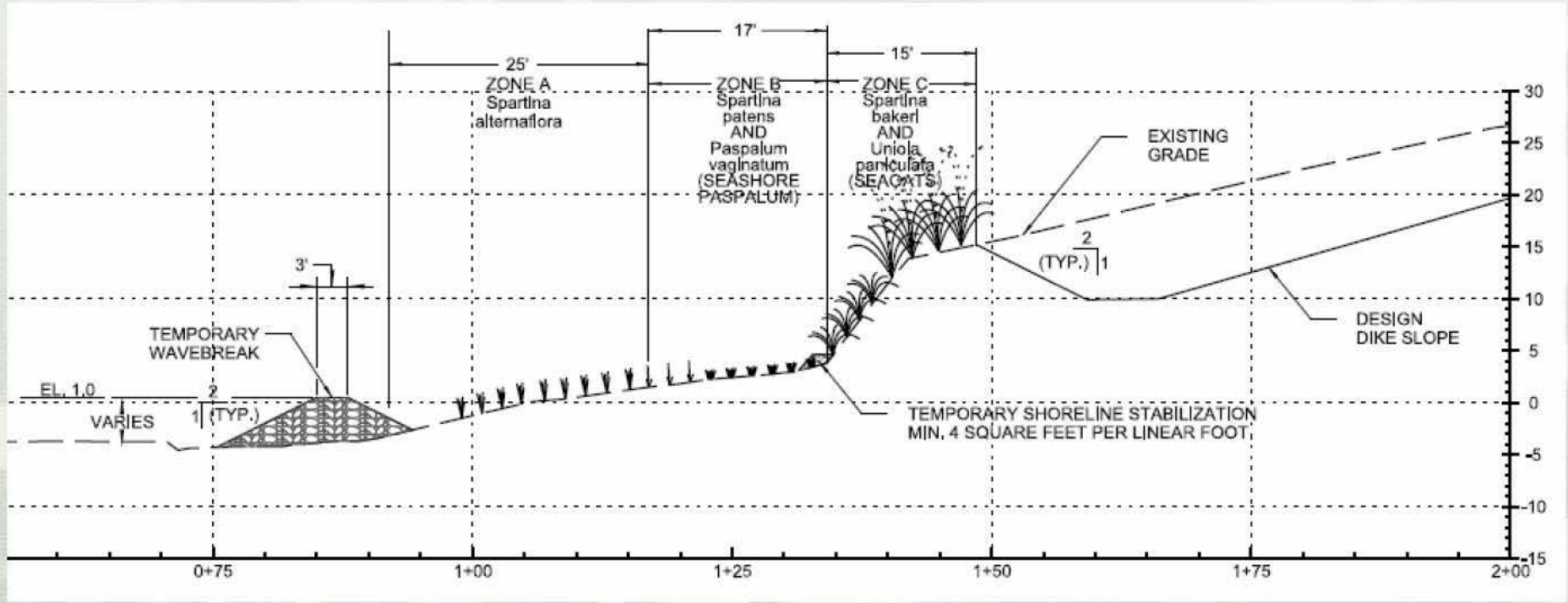
BUCK ISLAND



- **Shoreline Planting** for Stabilization and Enhancement

BUCK ISLAND

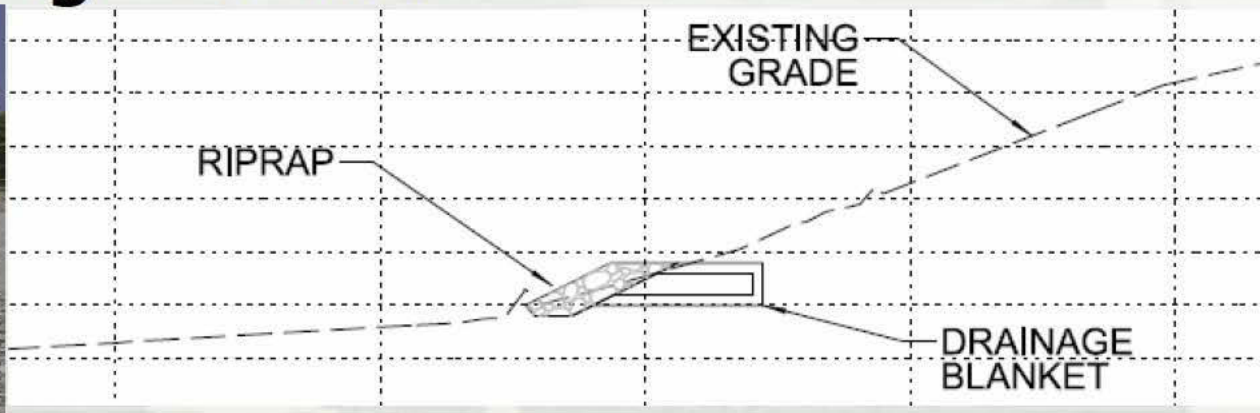
Shoreline Restoration

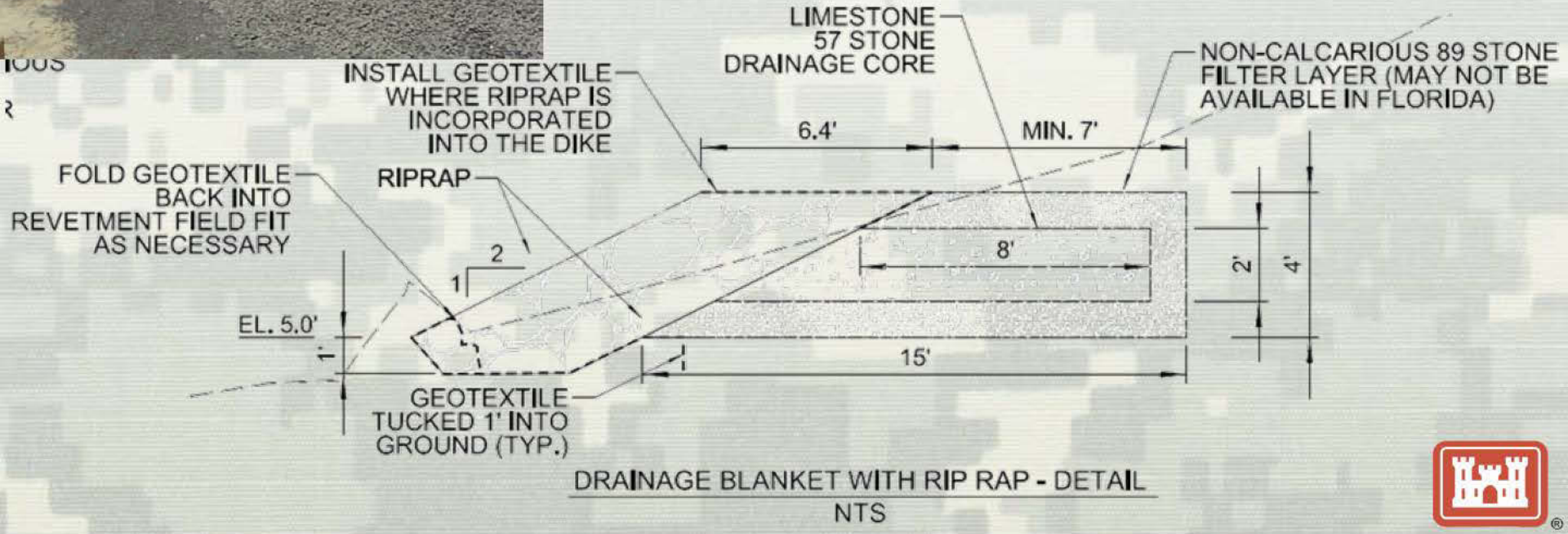


BUCK ISLAND

BUCK ISLAND

Shoreline Drainage Blanket

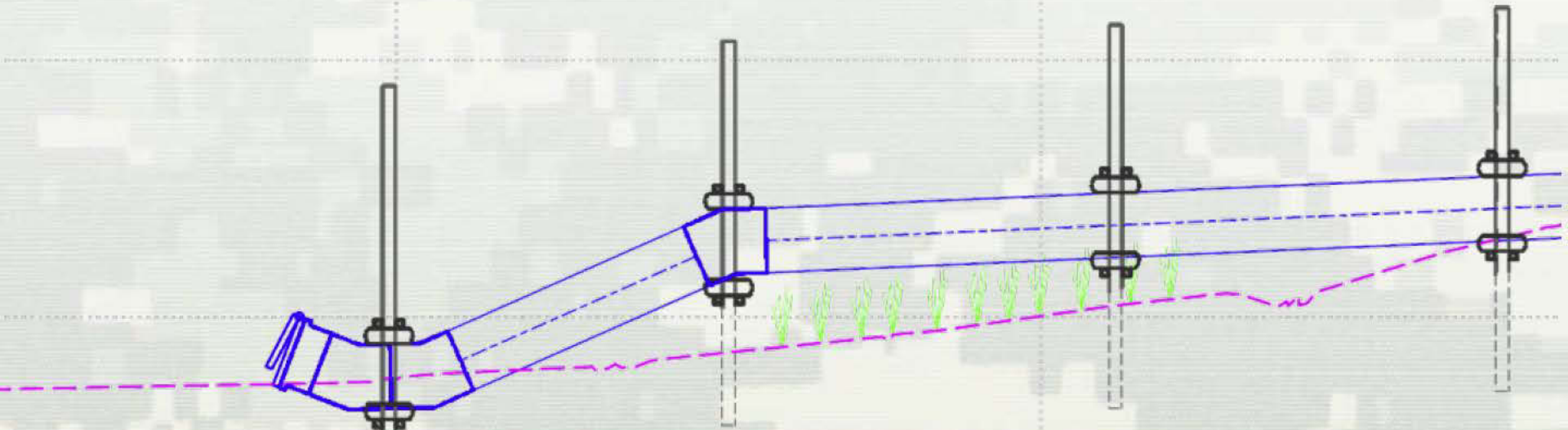




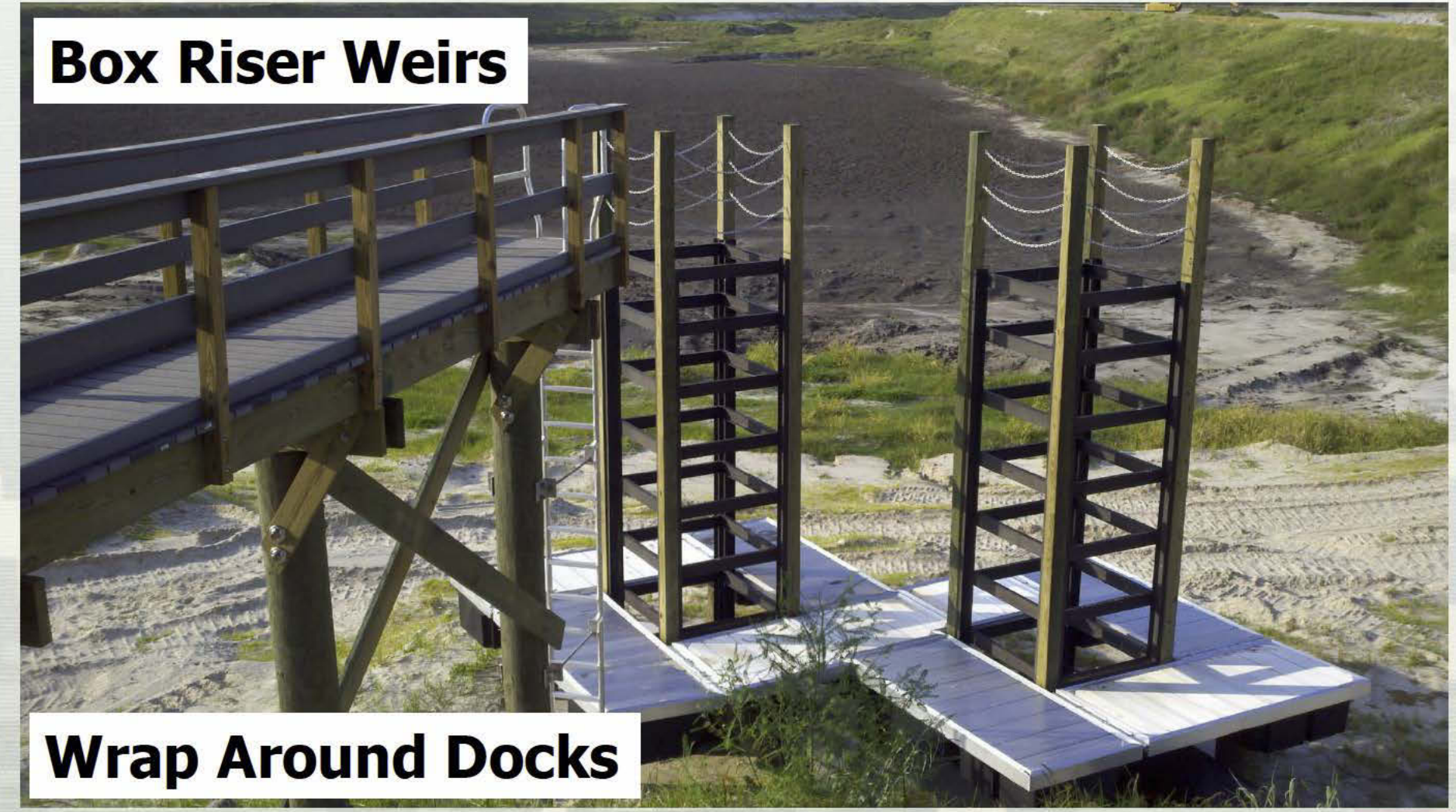
DRAINAGE BLANKET WITH RIP RAP - DETAIL
NTS

BARTRAM ISLAND

Elevated pipeline to avoid resources



BUCK ISLAND



BUCK ISLAND

Emergency Flap Gates

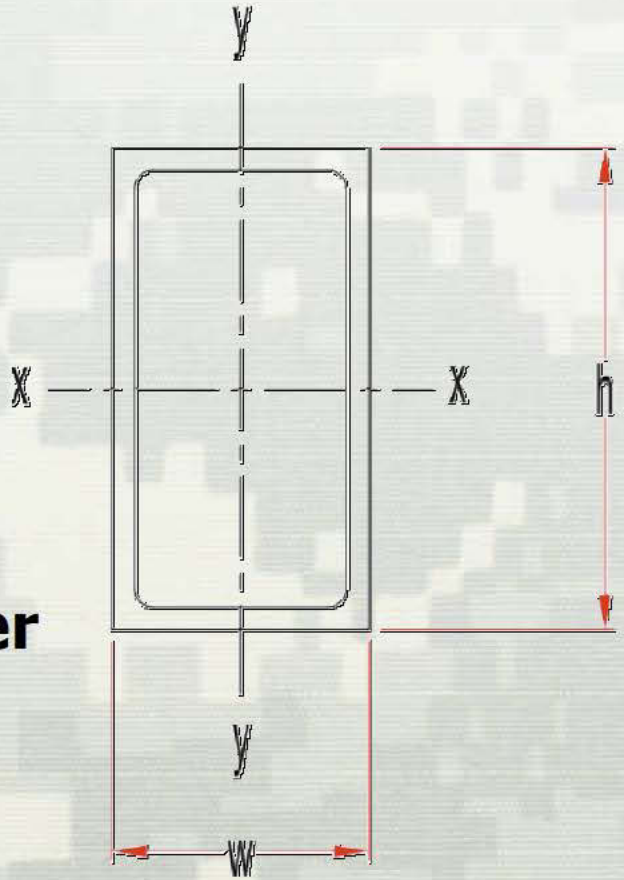
BUCK ISLAND

HDPE
Outfall Pipes

SITE TO REMAIM NAMELESS

COMPOSITE WEIR BOARDS

- Stronger
- Hollow Core
- Lighter = Safer
- Better fit = less turbidity
- 1.8 times denser than water



VALUE ENGINEERING STUDY

- **Assumptions**
  - 2 Half-Pipe Riser Projects – Corrugated Steel
    - 10 yr life
    - ~ $715,000
  - 3 Box Riser Projects – Coal Tar Epoxy Steel
    - 25 yr life
    - ~ $514,000
  - Overall Life Cycle of 50 years
  - Includes $100K Misc. Design Cost
  - Federal Discount Rate 4.125%

LIFE CYCLE COST COMPARISON

- **Costs**
  - Initial Cost Savings
    - ~$201,000
  - Life cycle Savings
    - ~$1,216,000
  - **Total Initial and Life Cycle Savings**
    - **~$1,417,000**

LIFE CYCLE COST STAINLESS STEEL

- **Assuming**
  - Stainless Steel Box Riser Weir System
  - Overall Life Cycle of 50 years
- **Costs**
  - Initial Cost
    - ~$593,000
  - Life cycle Savings
    - ~$1,362,000
  - **Total Initial and Life Cycle Savings**
    - **~$1,484,000**

SUMMARY

- **Example Projects**
  - Resource Avoidance
  - Shoreline Plantings
  - Wavebreak
  - Drainage Blanket
- **Improved Weir System Design**
  - Box Riser
  - Composite Weir Boards
  - Floating Docks Access
  - Emergency Shutoff Flap Gates
  - HDPE Outfall Pipes
- **Value Engineered**
  - Life-cycle
  - Cost
  - Safety

Questions