

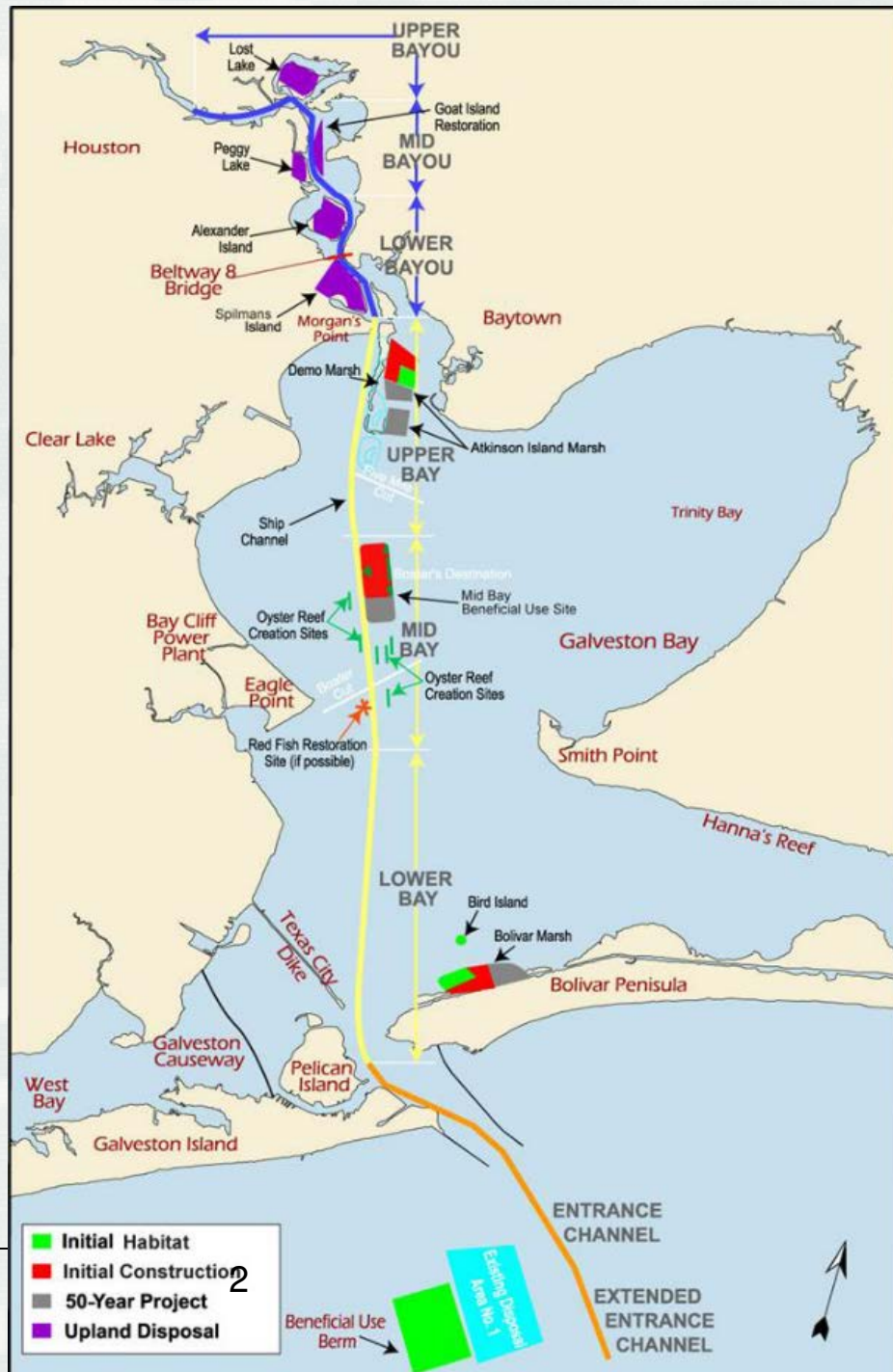
Galveston Bay: Environmental Restoration Opportunities

1. Build containment dikes with clay (Tom White)
2. Use a variety of vegetation to stabilize dikes (Tosin Sekoni)
3. Try many combinations of substrates and oyster castles (Tim Clarkin)
4. Measure extent of “environmental deserts” created by mining oysters (Crawford/White/Maglio/ERDC)
5. Collect project methods used to fill deep bay holes from Jacksonville, Mobile, and Philadelphia Districts (White/Maglio)
6. How and where to stockpile sediment for later use (Coast of Texas)



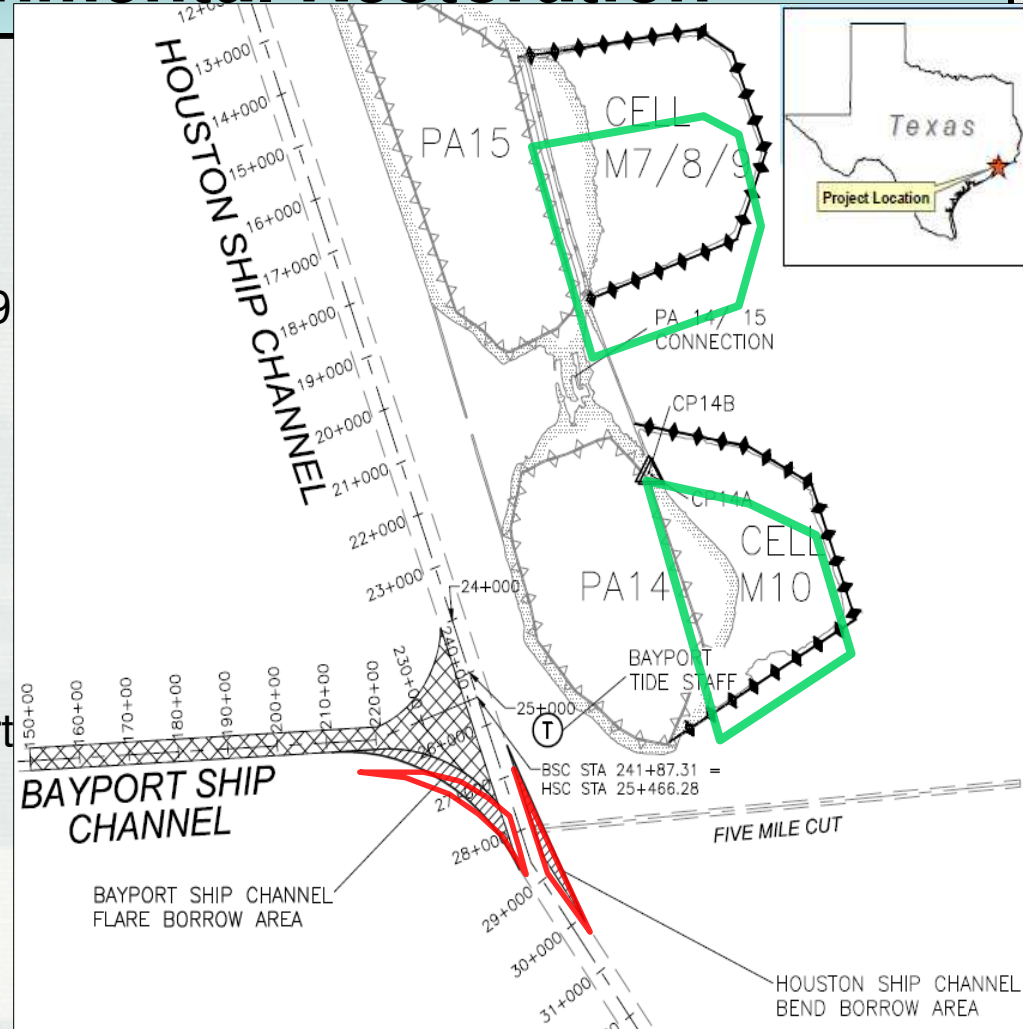
BUILDING STRONG®

Galveston Bay Placement Areas



Houston Ship Channel Deferred Environmental Restoration

- New-work material adjacent to Bayport Ship Channel (BSC) Flare and Houston Ship Channel (HSC) will be used to repair containment dikes at Atkinson Island beneficial use marsh cells M7/8/9 and M10
- Meets authorized project commitments to create marsh in Galveston Bay
- Provides additional placement capacity for HSC maintenance dredged material
- Provides necessary O&M of the Bayport Ship Channel and Flare
- Contract was awarded 27 Sep 2016



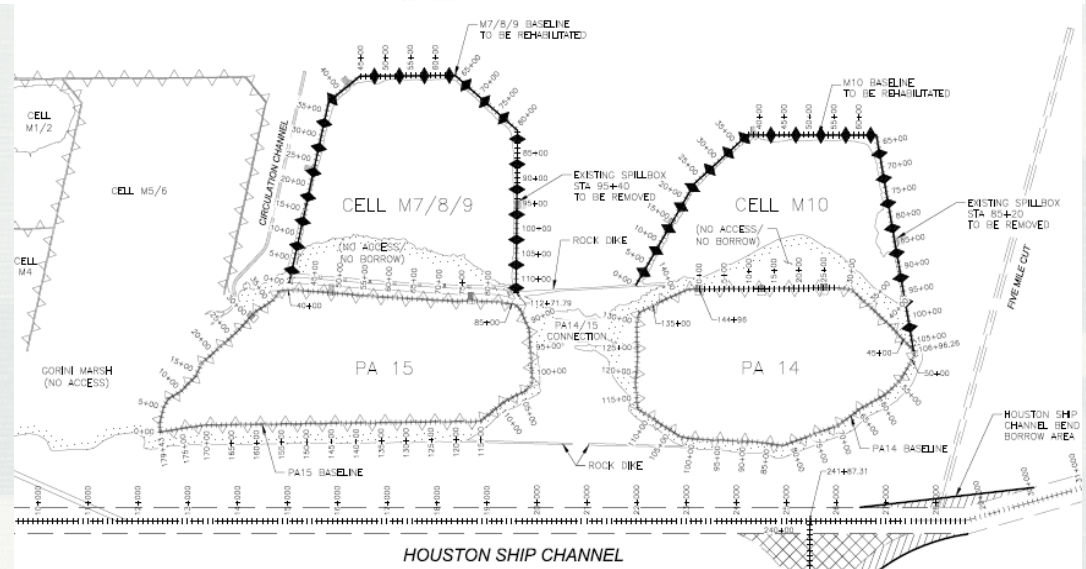
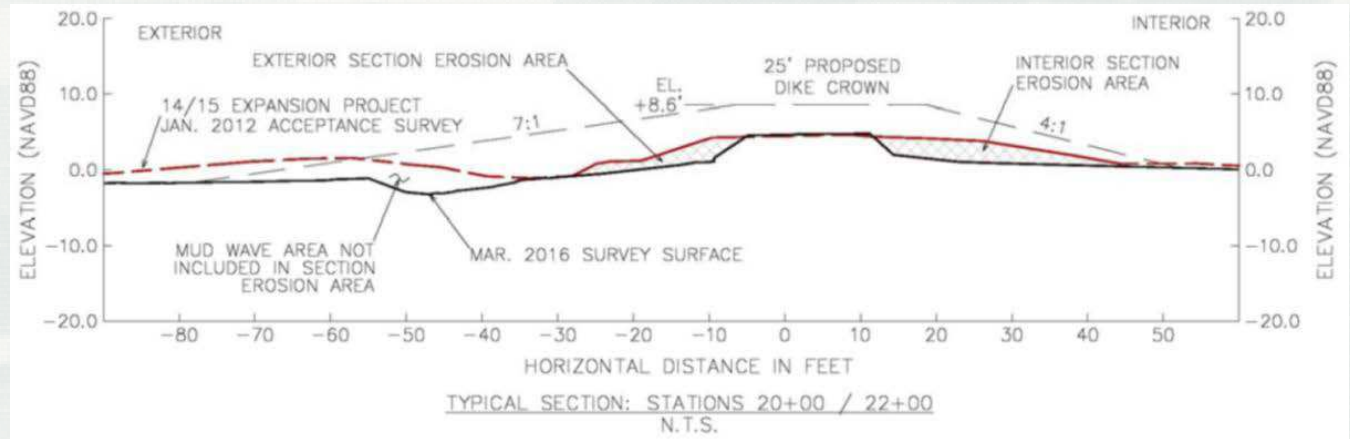
Mud dikes

Construction:

Build a dike to protect a disposal area & make a new marsh

Research Questions:

1. Under what conditions does the dike erode?
2. How does a sandy beach form (erosion? winnowing?)
3. Are there critical thresholds (tipping points) of the forcing functions? (storm duration, wave height)
4. What is the impact of storm surge? (duration & height)



R&D Opportunities

(thesis and dissertation topics)

Field

1. Monitor mud winnowing during beach nourishment (tides, waves, currents, grain size, elevation)

Field

2. Monitor mud dike erosion (elevations, quantities, grain size, settlement, waves, currents, storm surge)

Field

3. Monitor water displacement from a large ship (mud-wave formation, vertical mixing, side-slope erosion)

Computer

4. Model salinity changes in a large shallow bay



R&D Opportunities

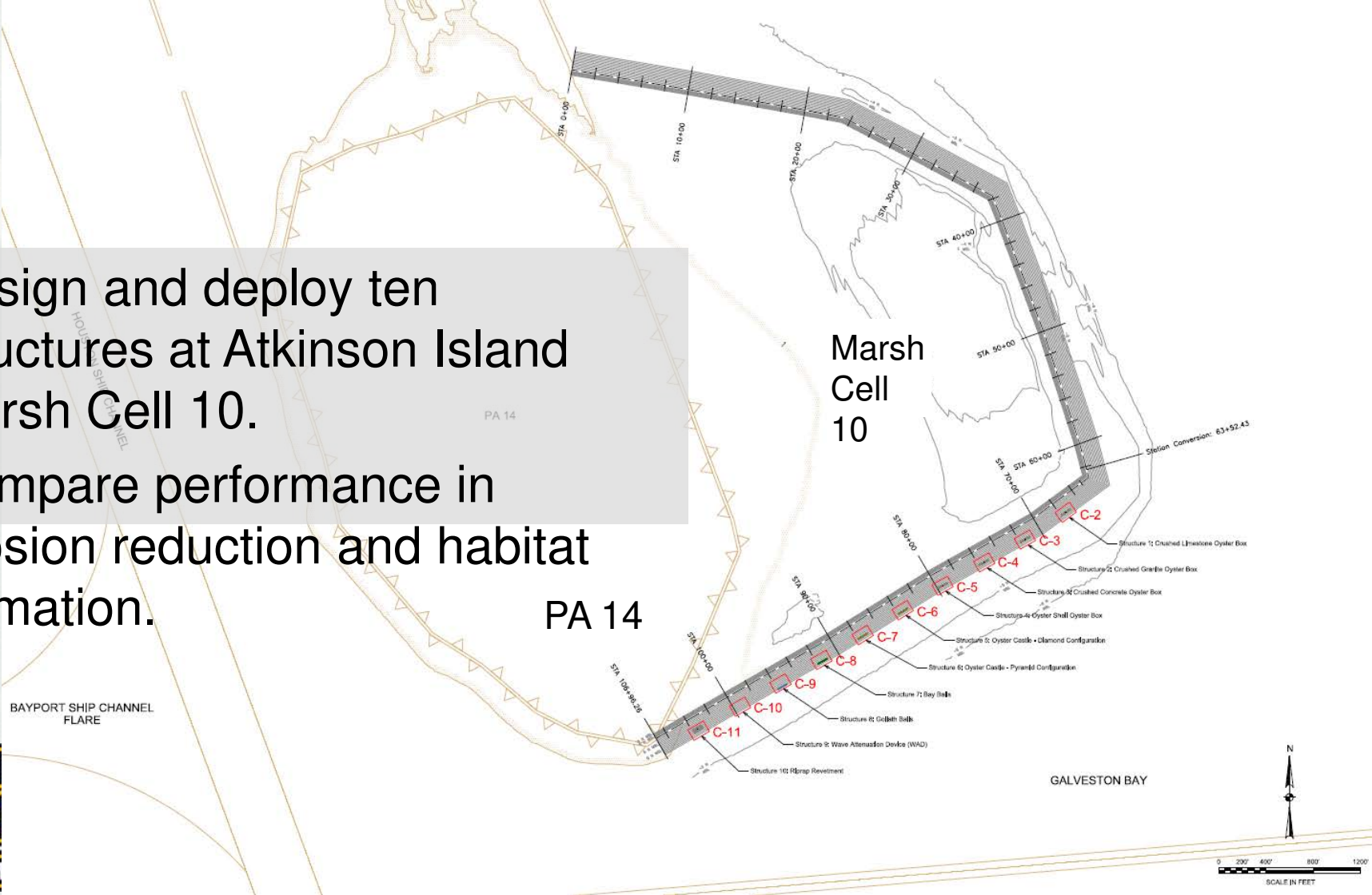
(thesis and dissertation topics)

- Lab & Field 5.** Measure marsh grass (Spartina) rates of sediment accumulation as a function of tide, waves, grain size, subsidence, sea level
- Lab & Field 6.** Compare different methods of measuring sediment erodibility
- Lab & Field 7.** Try out recipes and methods for flocculating mud “fluff” in bay holes

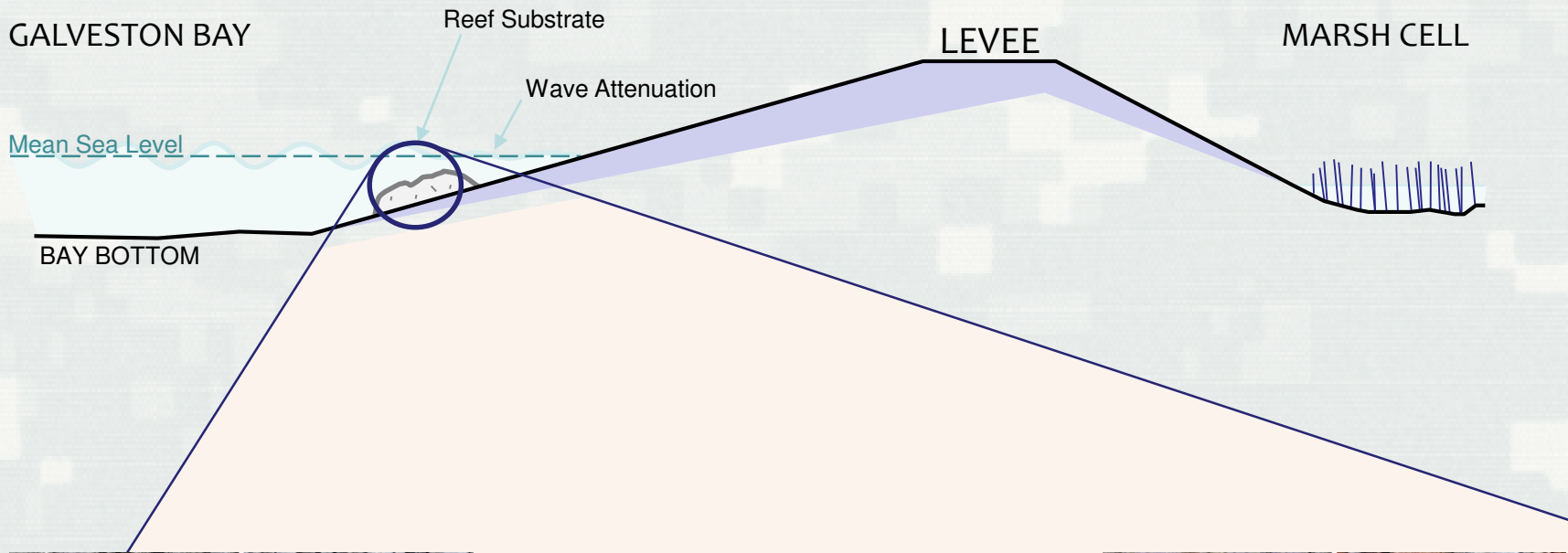


Proposed Oyster Demonstration Project

Design and deploy ten structures at Atkinson Island Marsh Cell 10. Compare performance in erosion reduction and habitat formation.



Typical Reef Materials



Limestone

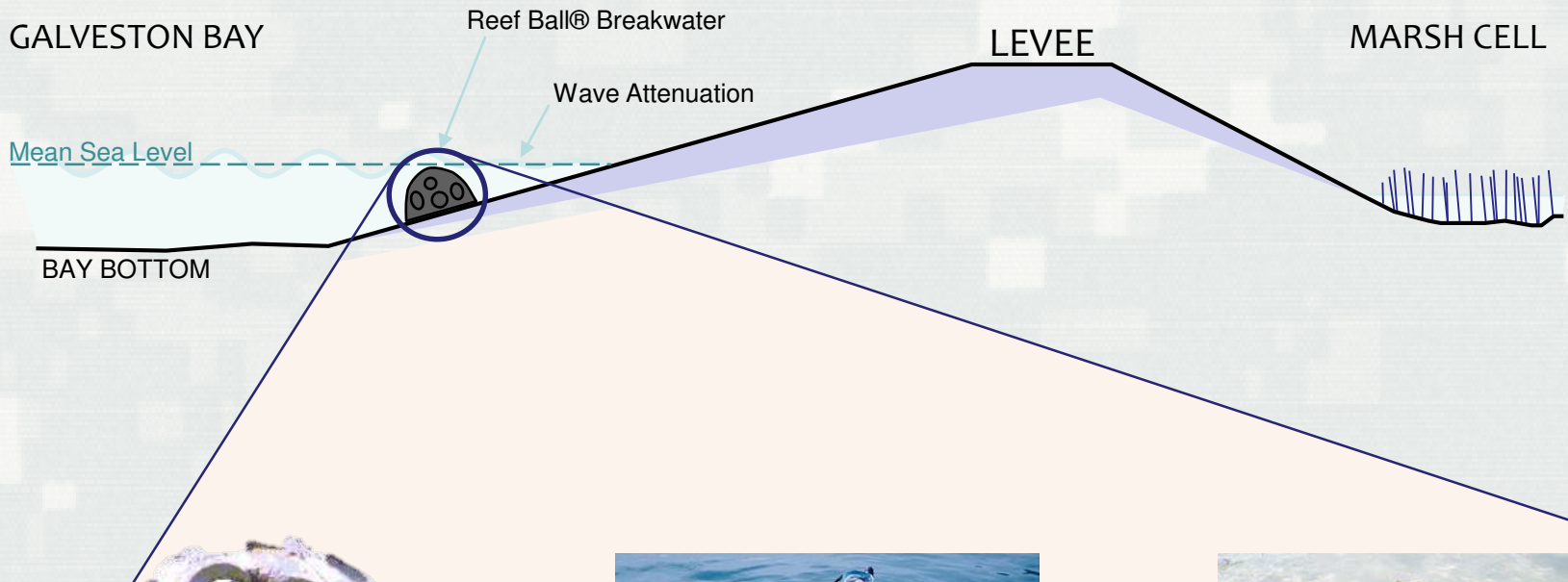


Crushed Concrete



Crushed Stone

Reef Balls®



Reef Ball®

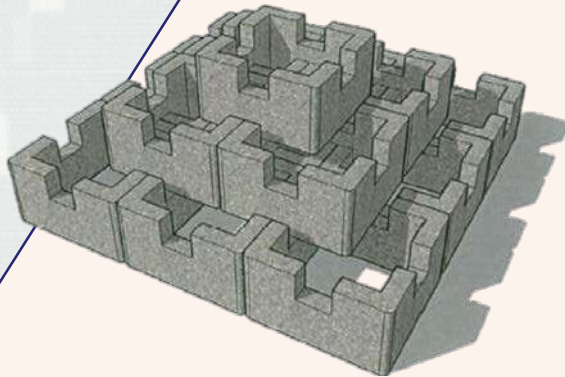
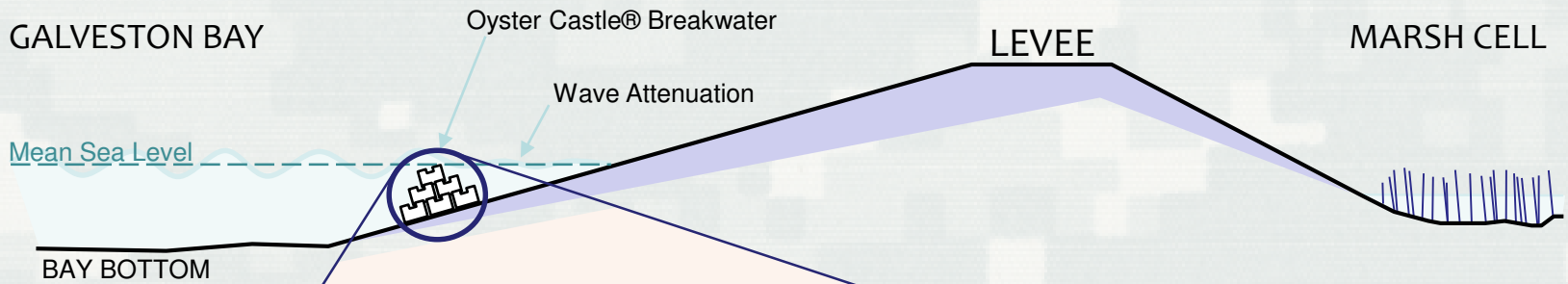


Manual Assembly



Oyster Habitat

Oyster Castles®



Oyster Castle® Blocks

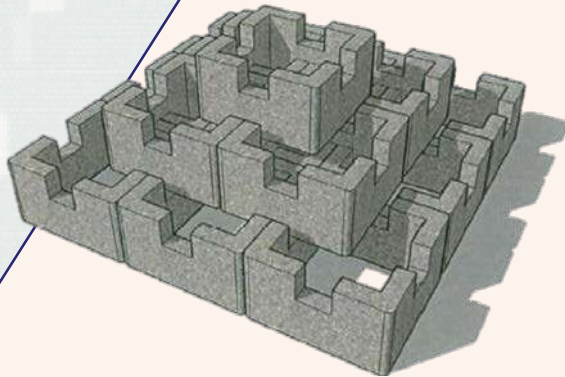
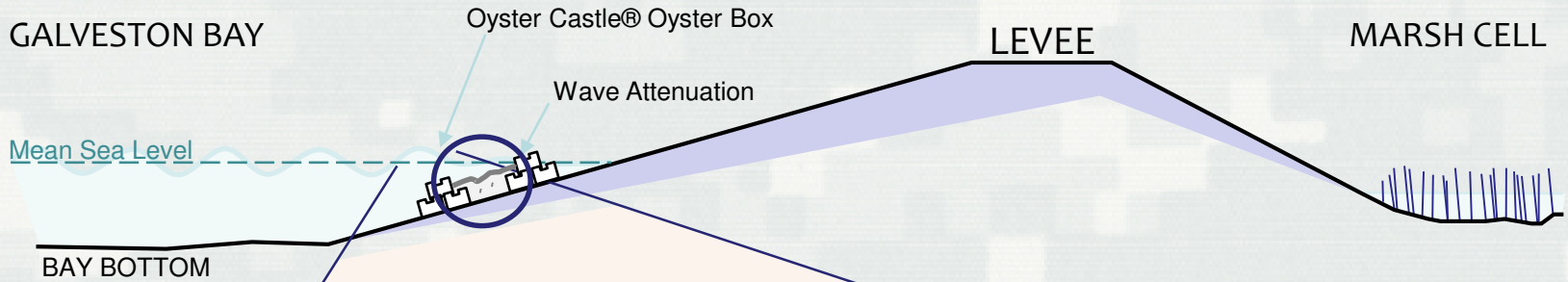


Manual Assembly



Oyster Habitat

Oyster Boxes



Build Oyster Boxes with Oyster Castles®



Fill Oyster Boxes with Substrate Material



Oyster Habitat