

Chapoquoit Beach Restoration - Feasibility Study



June 28, 2016

Chapoquoit Beach Project

Key Project Components

- *beach nourishment*
- *Cape Cod Canal sand source*
- *nearshore rehandling site*
- *cooperation with USACE*
- *public and private interests*

Feasibility Assessment

- *engineering*
- *environmental*
- *financial*
- *public/private partnership*



Funded By CZM Coastal Resilience Grant

Updates Since Last Meeting

Offshore Investigations

- *benthic habitat and sediment sampling*
- *ID site for nearshore rehandling*

Nearshore Investigations

- *shellfish survey*
- *wave modeling*
- *sediment transport modeling*
- *impacts on W. Falmouth Harbor*

Refined Design and Cost

- *minimize impacts to resources*
- *refined cost sharing model*
- *ID costs for permitting*

Formalized Next Steps



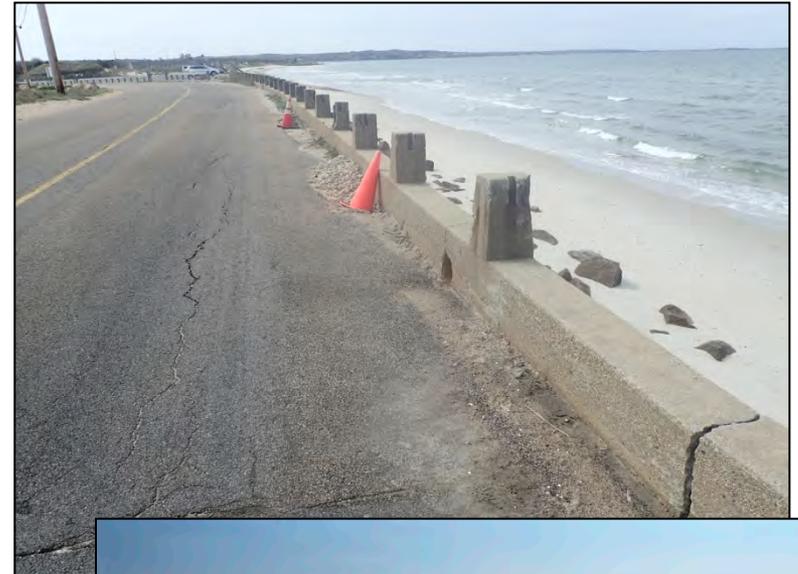
Project History

Permitted Nourishment Project in 2002

- *CA, Town of Falmouth, Bowerman's*
- *Cape Cod Canal sand source*
- *Direct pump to the beach*
- *~100,000 cy over 3,200 ft*
- *Project not constructed*

Current Beach Conditions

- *still eroding (1.5 to 2.0 ft/yr)*
- *loss of recreational resource*
- *loss of storm damage protection*
- *damage to seawall/causeway*



Future Change at Chapoquoit

If No Action

- *current erosion 1.5 to 2.0 ft/yr*
- *sea level rise will increase shoreline retreat*
- *loss of beach/dune resource*
- *loss of recreational resource*
- *loss of storm damage protection*
- *damage to seawall/causeway*
- *damage to infrastructure*



Nearshore Investigations

Wetland Resources

- *coastal beach*
- *coastal dune*
- *rocky intertidal shore*
- *land under the ocean - eelgrass*
- *land containing shellfish*



Nearshore Investigations

Waves

- *locally generated in Bay*
- *swell from Atlantic Ocean*
- *10 & 50 yr storms*
- *waves drive sediment transport*

KEY

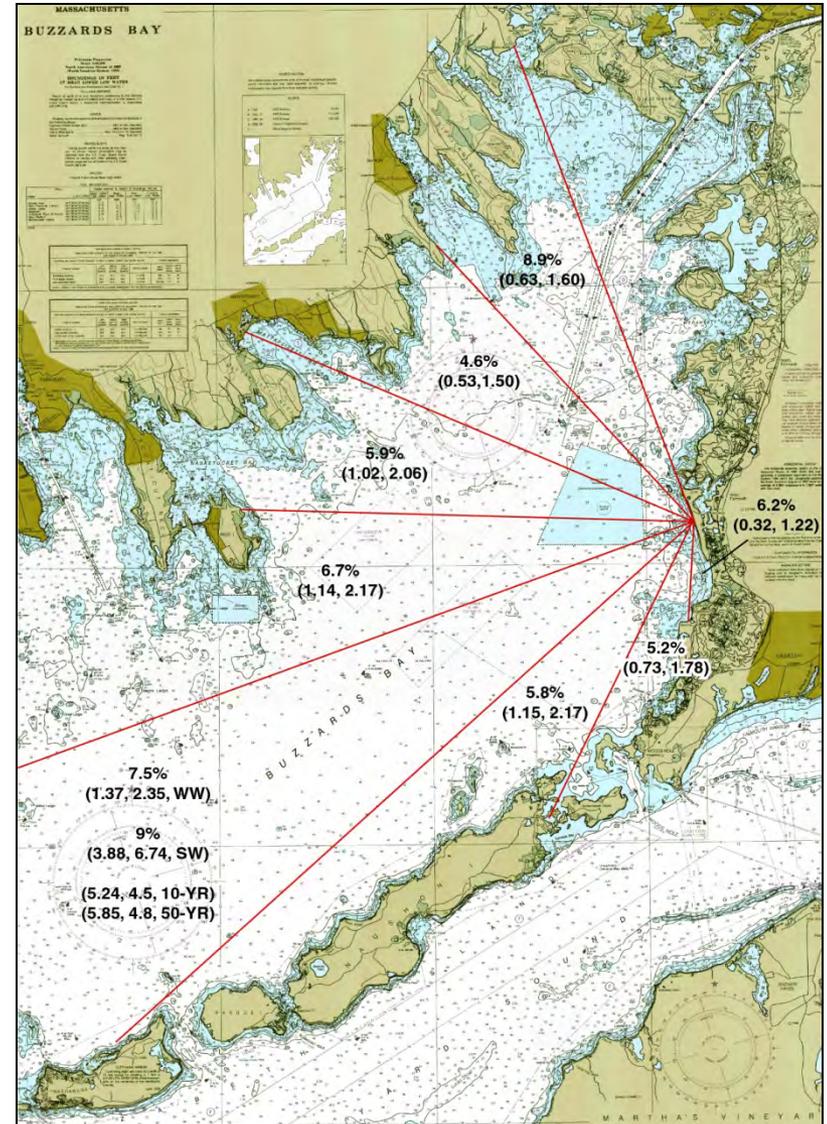
4.6% - Annual percent of occurrence for waves from each directional bin

(0.53,1.50) – Average wave height (ft) and wave period (sec) for locally generated waves

WW – locally generated waves

SW – swell waves

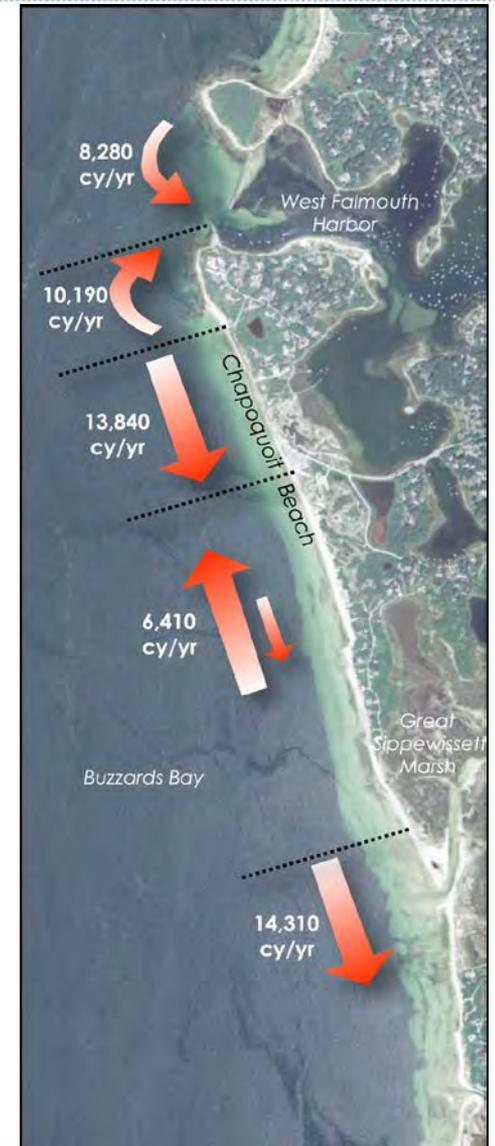
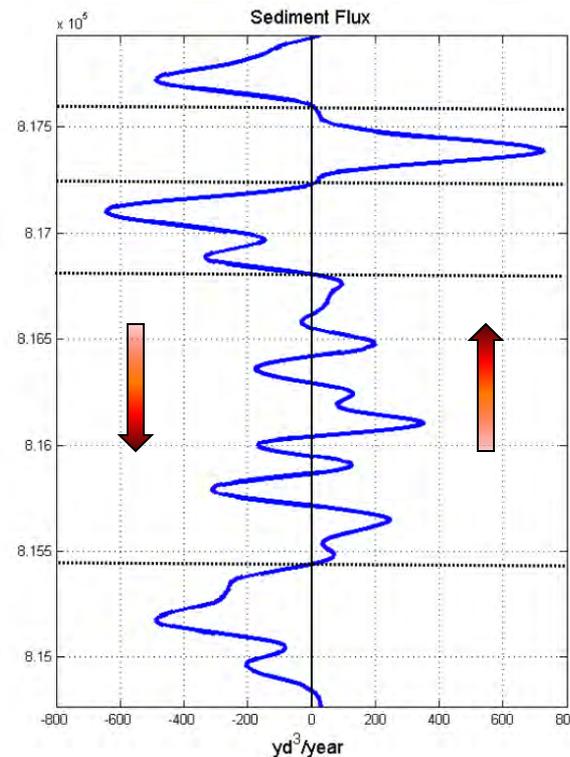
10-YR & 50-YR – Storm wave conditions for 10-yr and 50-yr events



Nearshore Investigations

Sediment Transport

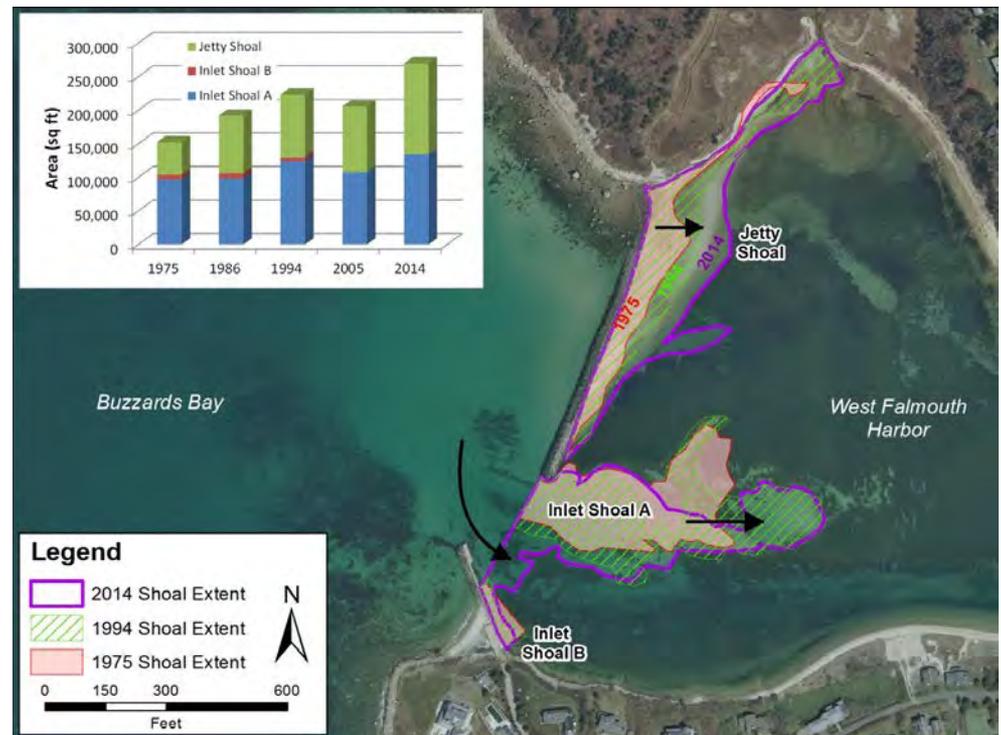
- modeled avg. annual + 10-yr storm event
- direction & rate varies along beach
- zones of convergence & divergence
- net southerly transport in area of nourishment
- potential rates that assume infinite supply of sediment



Nearshore Investigations

Sediment Transport at West Falmouth Harbor

- *shoal areas have increased*
- *~ 40,000 to 50,000 cy in shoals*
- *main source from north*
- *~8,900 cy to harbor entrance in first 2 yrs*
- *entrance in first 2 yrs*
- *~5,000 cy in following 5-10 yrs*
- *conservative estimates*
- *don't account for offshore losses, shoreline trapping, etc.*



Offshore Investigations

Benthic Habitat & Sediments

- sediment samples
- video trawls



Hard Bottom



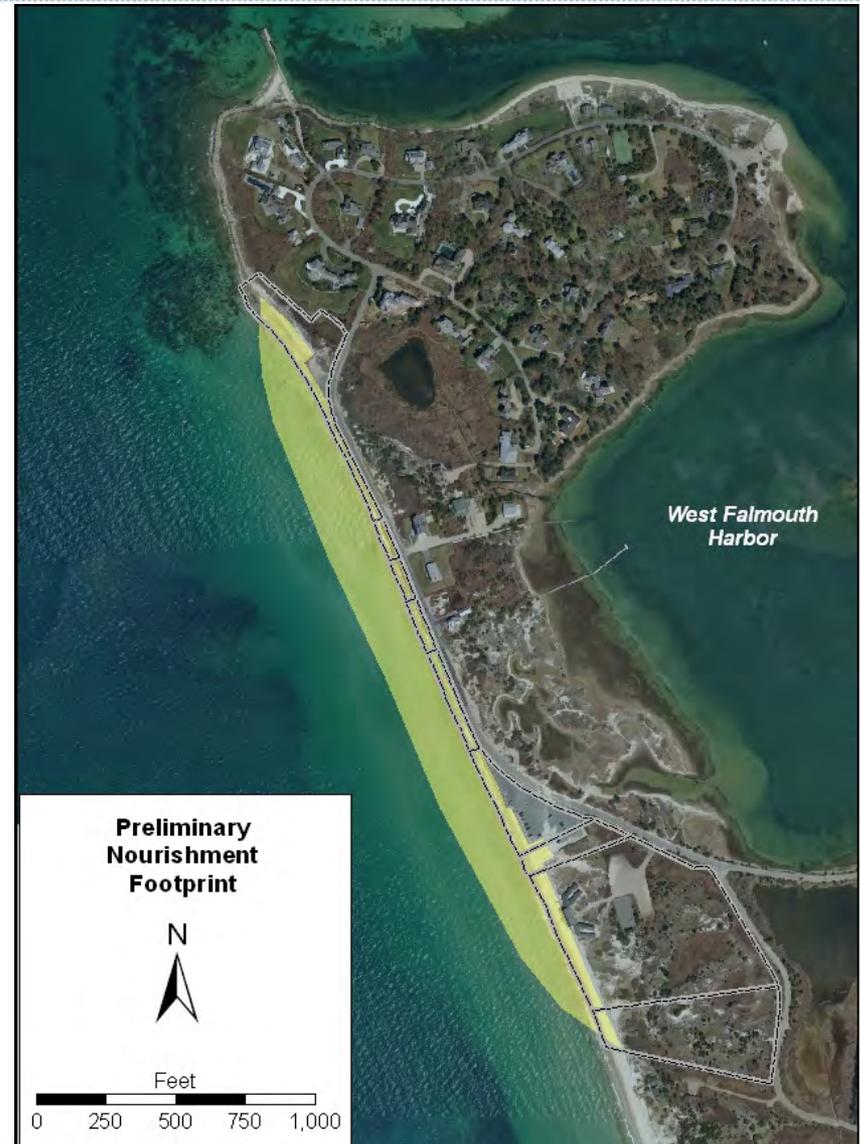
Soft Bottom



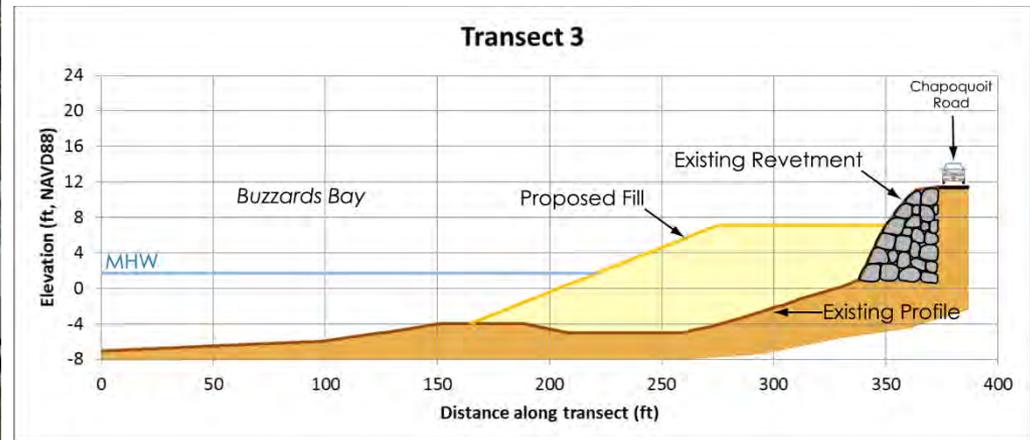
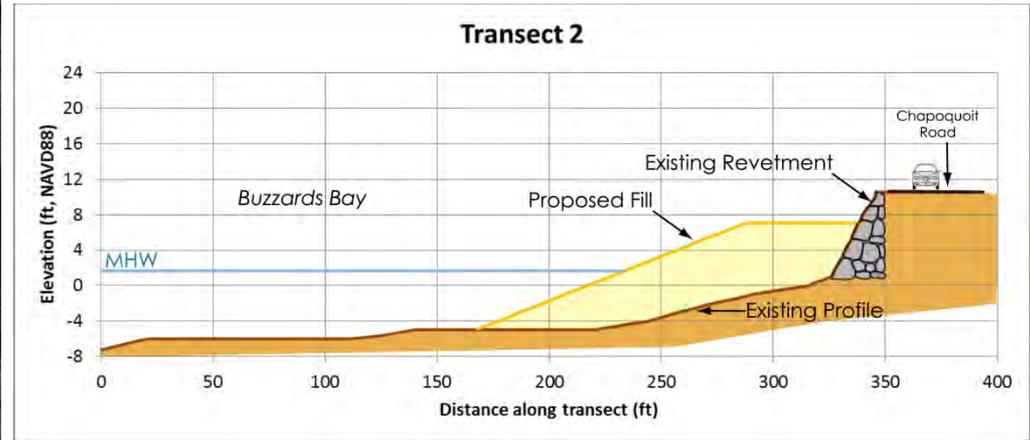
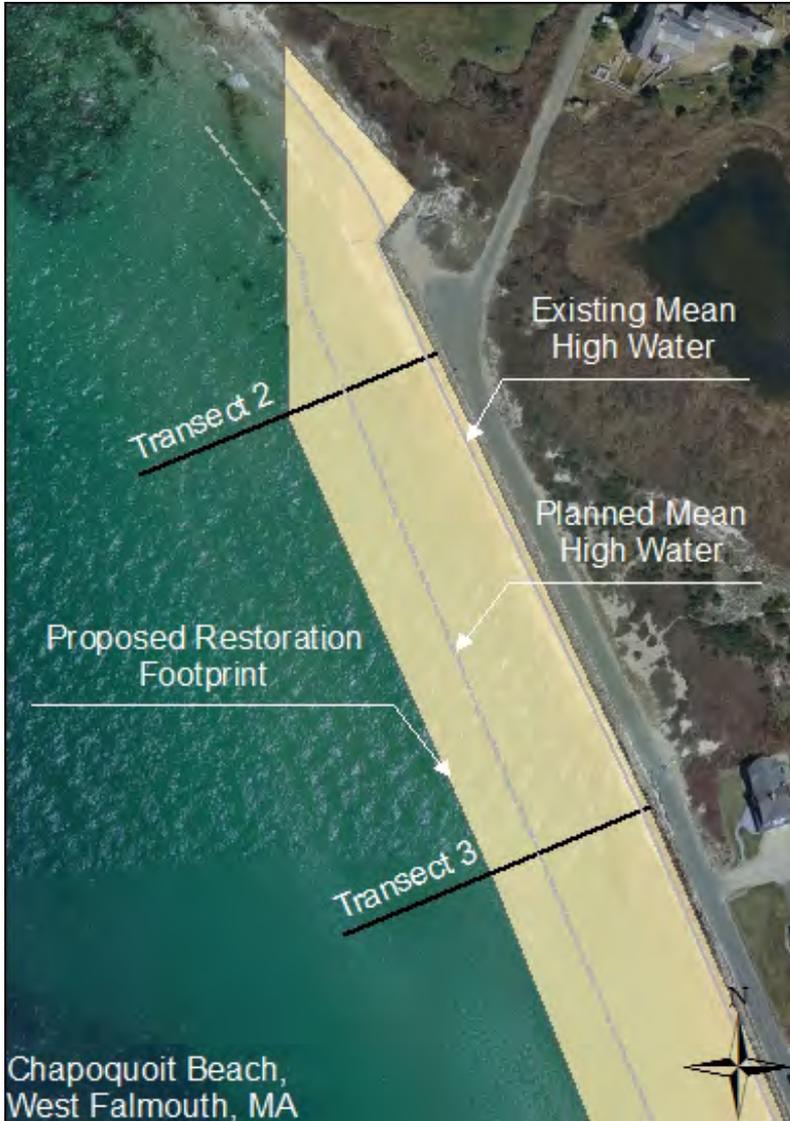
Engineering Design

Beach Nourishment

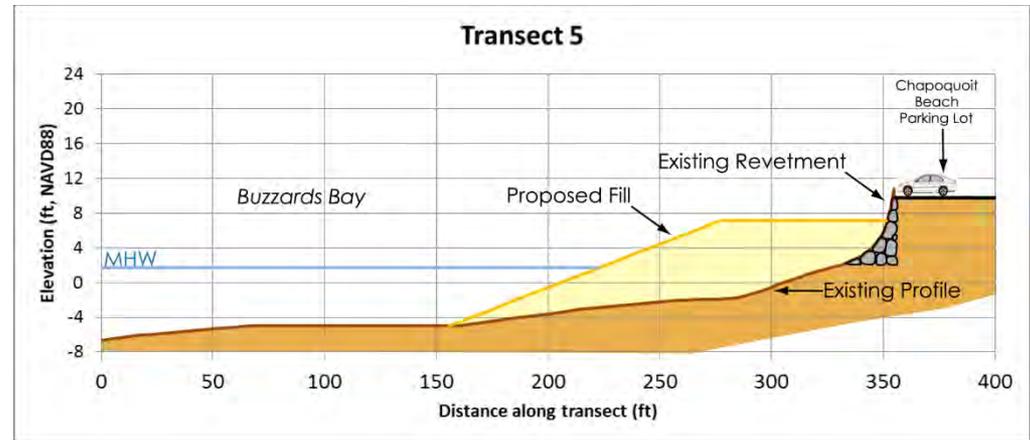
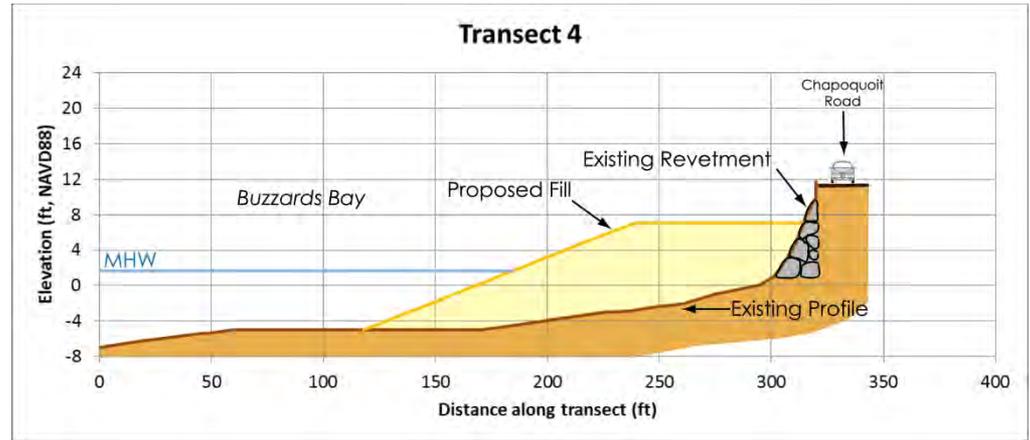
- footprint ~11.5 acres
- ~2,960 linear ft
- ~100,000 cy
- 9 parcels (public & private)
 - 2 Chapoquoit Assoc.
 - 2 Town of Falmouth
 - 1 Bowerman's Beach Club
 - 4 private



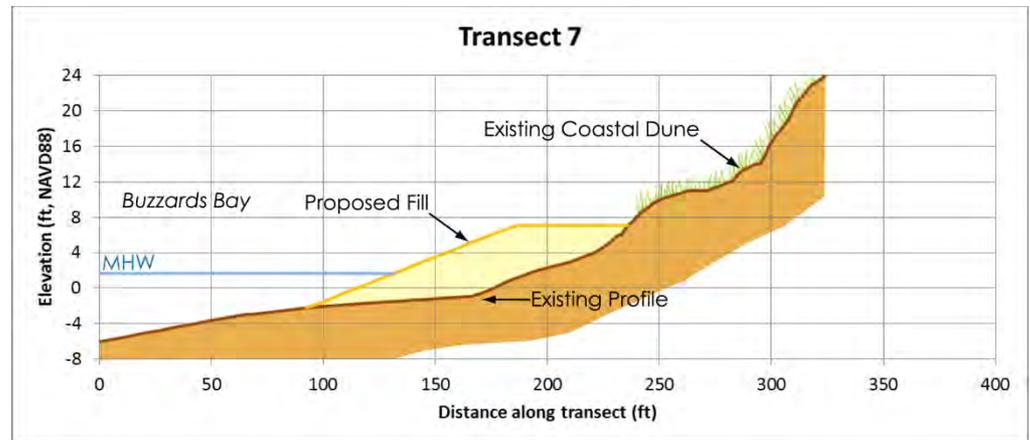
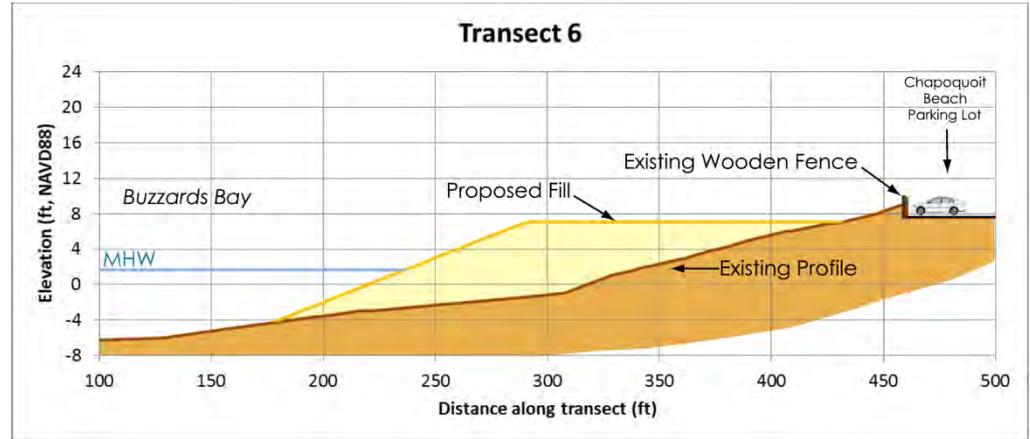
Engineering Design



Engineering Design



Engineering Design



Design Visualization



Existing Conditions



Post Restoration

Design Visualization



Existing Conditions

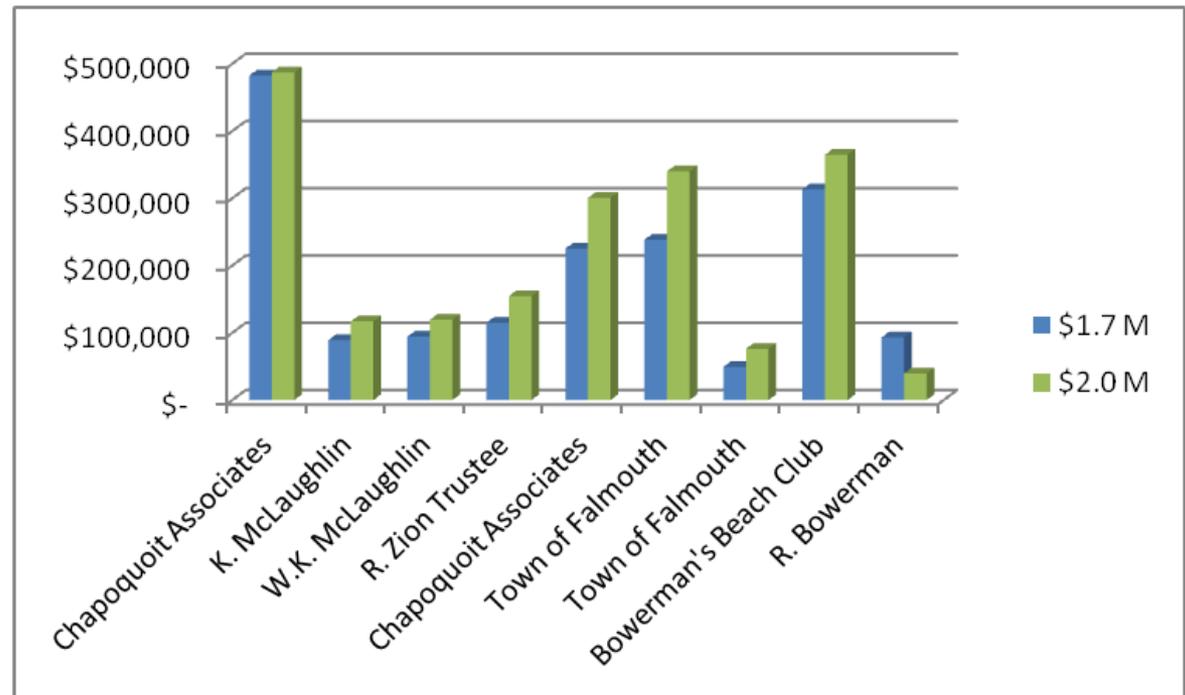


Post Restoration

Construction Costs

Construction Cost Estimate

- *\$1.7 to \$2.0 million*
- *~ \$.8 to 1.1 mil for Phase I plus \$900,000 for Phase 2*
- *\$574 to \$676/linear ft of beach*
- *Environmental permitting costs ~ \$100,000*
- *Easements not required if private owners pay for their share of sand*



Next Steps

July public meeting

- *investigate feasibility of dredging W. Falmouth Harbor*

Local stakeholder meetings (Summer 2016)

- *fact sheet to be provided with key discussion points*
- *determine/vote support for project by stakeholder groups*
- *report decision back to Town*

If full support

- *execute MOU between Town and stakeholder groups*
- *Town seeks funds for permitting at 2016 Fall Town Mtg.*
- *stakeholder groups begin fund raising*
- *permitting ~1.5 yrs (complete by summer 2018)*
- *execute MOU between Town and USACE*

USACE announces availability of sand

- *Town seeks funds for construction at Town Mtg.*

Questions



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