

Presentation to
City of Milford

**Great Creek Outlet Improvements
Silver Sands State Park**

November 14, 2013



Presentation Outline

- Site Setting
- Project Background
- Coastal Processes Evaluation Summary
- Outlet Structure Alternatives Assessment
- Recommended Alternative
- Next Steps

Site Setting

Site Setting



Site Setting



Site Setting



Great Creek and Tide Gate Structure Inlet

Site Setting



Tide Gate Structure (behind tree screen)

Site Setting



Tide Gates

Site Setting



Great Creek Outlet Structure (looking east)

Site Setting



Box Culvert Discharge Point

Site Setting



Great Creek Outlet Structure (looking northwest)

Project Background

Project Background

- Damage occurred to outlet structure



Project Background

- DEEP temporarily repaired training wall
 - Tiebacks installed to new sheet pile deadman



Project Background

- Sinkholes continue to form after temporary repairs
 - Additional repairs made by DEEP



Project Background

- Tide gate structure inspected
 - Tide gates functioning properly
 - Minor repairs recommended
- Borings performed adjacent to the training walls
 - Dense sand and silt layer identified approx. 15' deep
 - Makes driving conventional wooden piles difficult
- Coastal Engineering study performed

Coastal Processes Evaluation Summary

Coastal Processes Evaluation Summary



- Evaluate site-specific coastal processes
- Improve structural stability of updrift structure
- Improve sediment bypassing
- Reduce downdrift beach impacts
- Minimize potential for flanking of downdrift structure
- Maintain inlet stability and maintenance
- Minimize safety concerns

Coastal Processes Evaluation Summary

1. Data Collection

- Sediment samples
- Beach profiles
- Tidal currents and flux
- Tide data
- Existing wind and wave data

2. Coastal Processes Analysis and Modeling

- Wave Transformation Modeling
- Sediment Transport Modeling
- Inlet Stability Analysis

3. Alternatives Analysis

- Alternatives Considered
- Sediment Distribution
- Beach Nourishment Performance

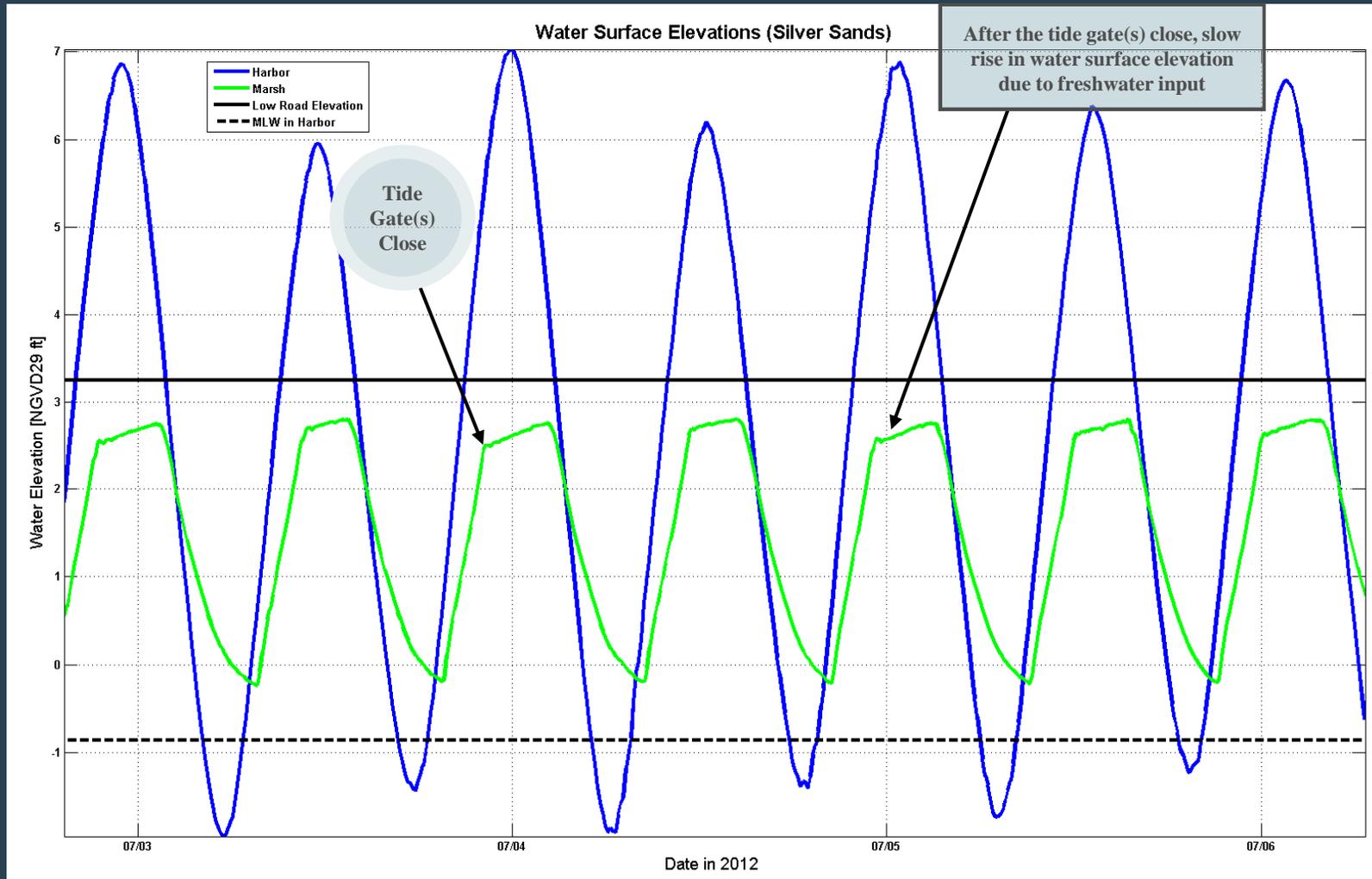
Understanding the existing conditions

Developing the appropriate solution

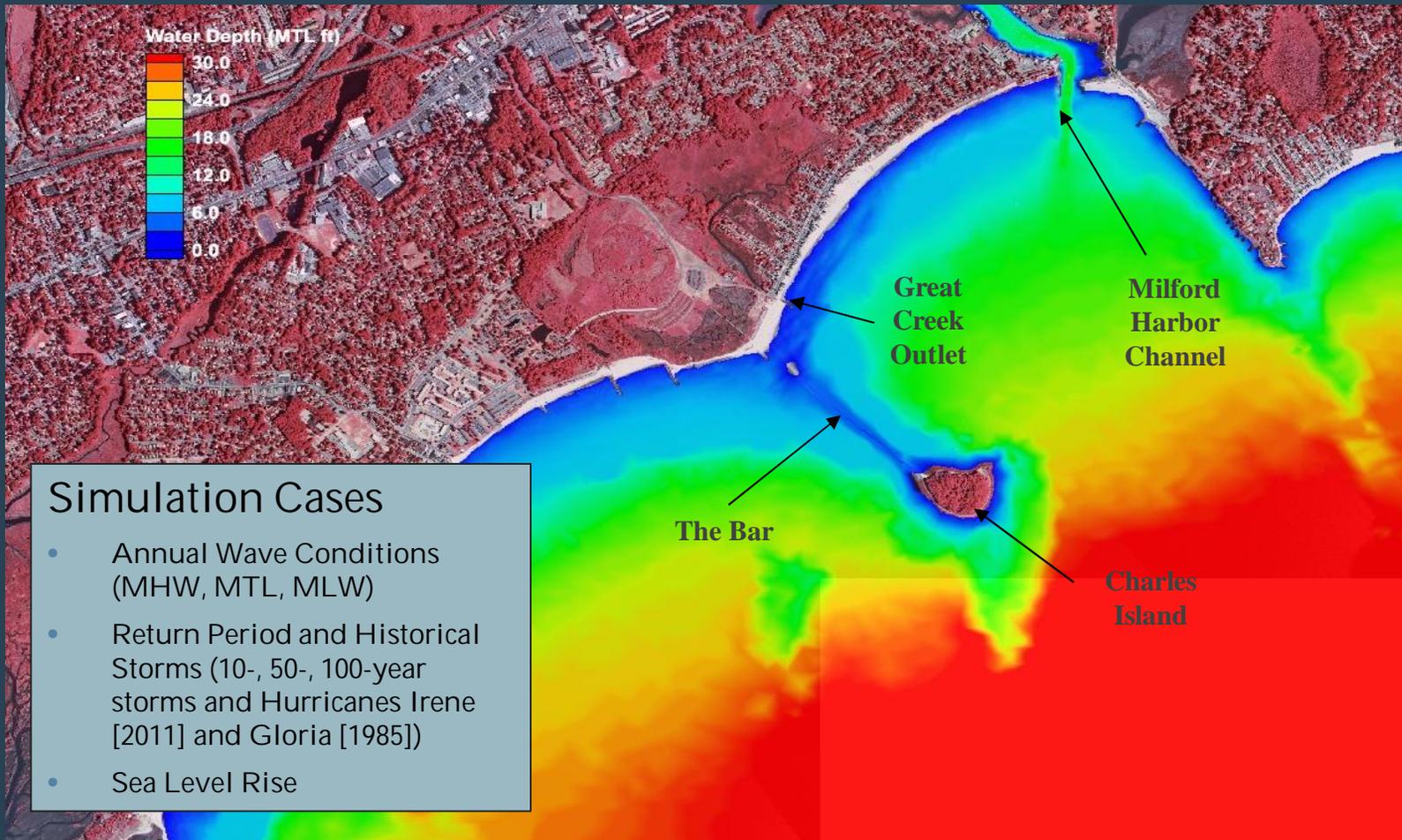
Coastal Processes Evaluation Summary



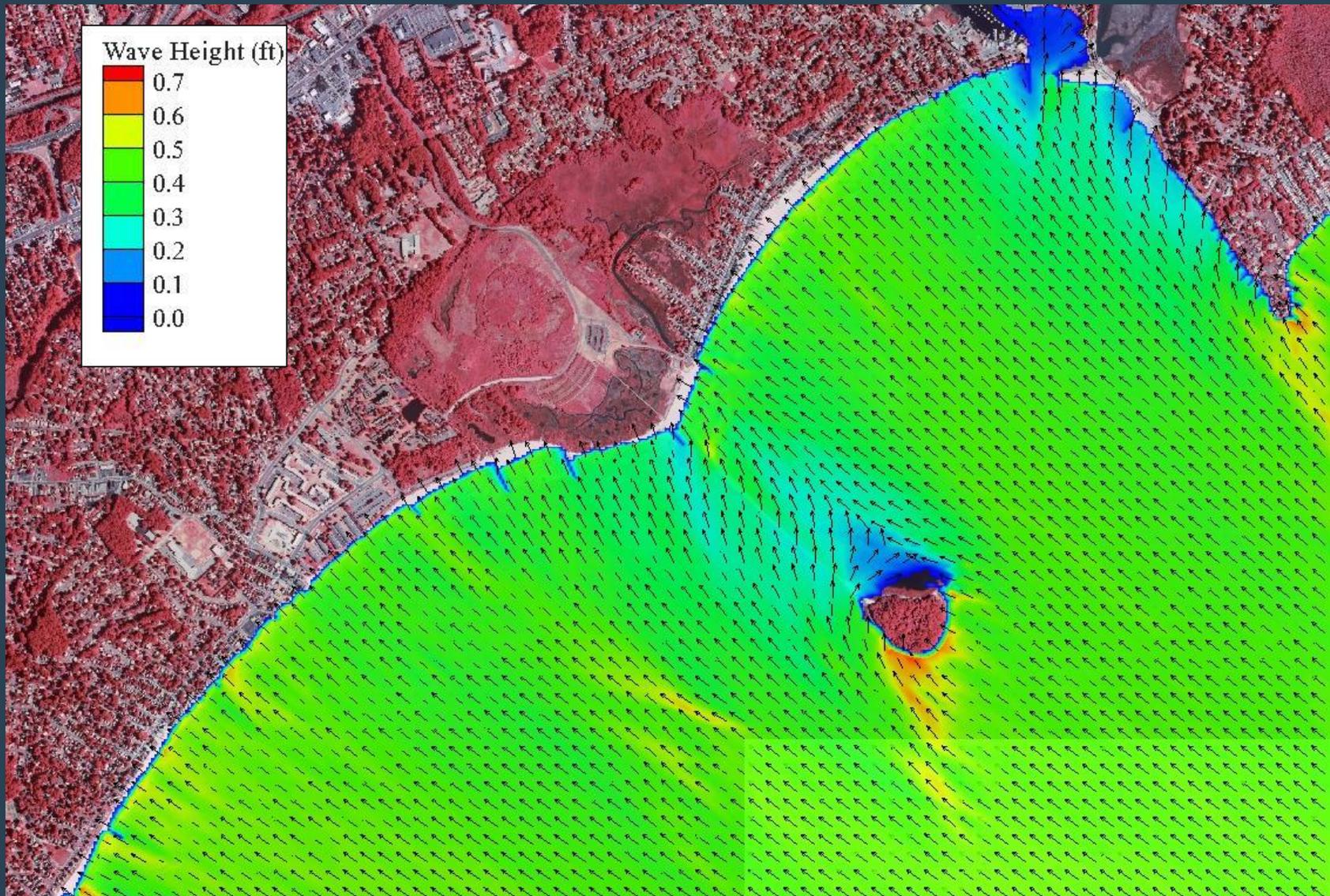
Coastal Processes Evaluation Summary



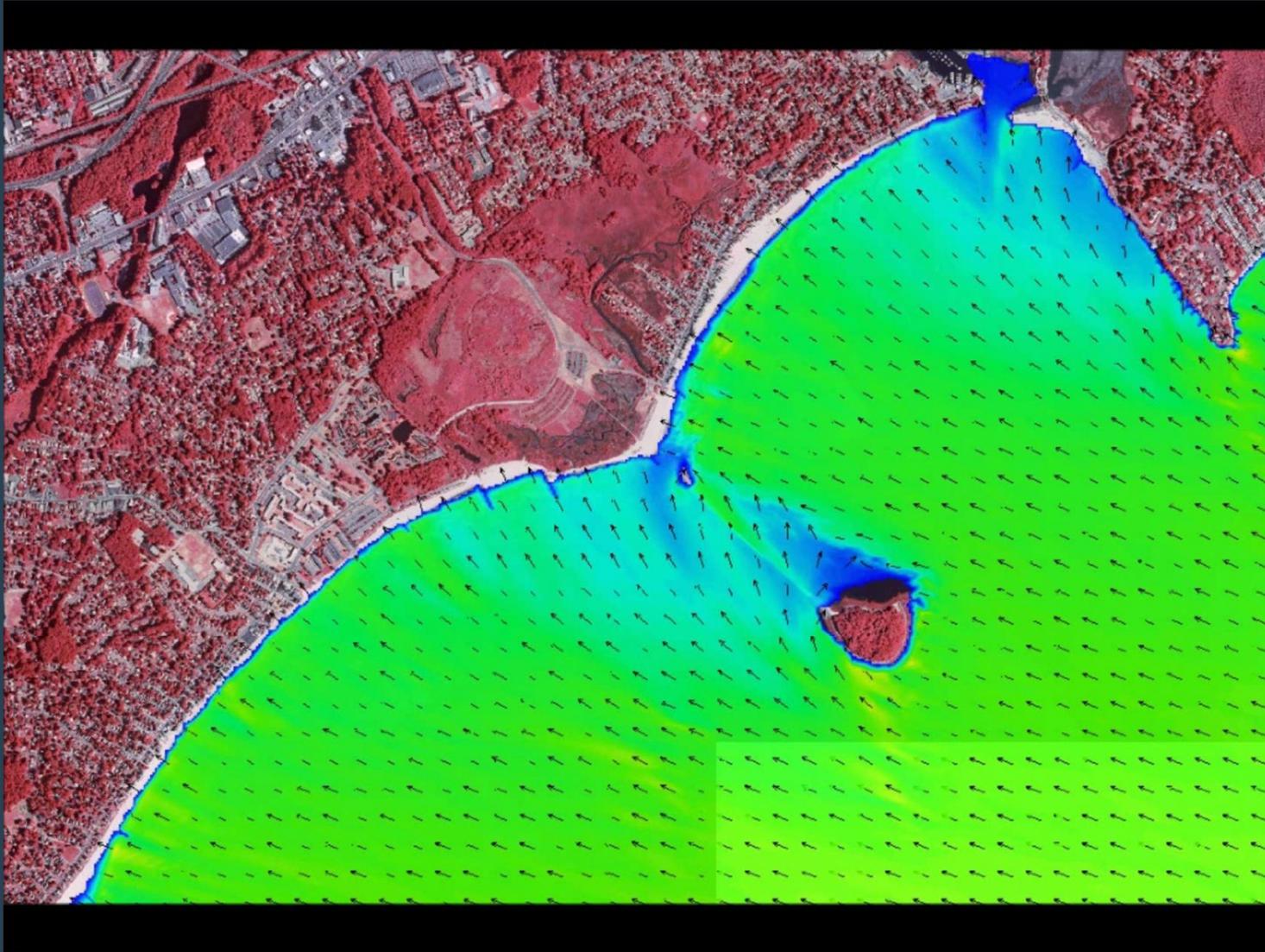
Coastal Processes Evaluation Summary



Coastal Processes Evaluation Summary



Coastal Processes Evaluation Summary



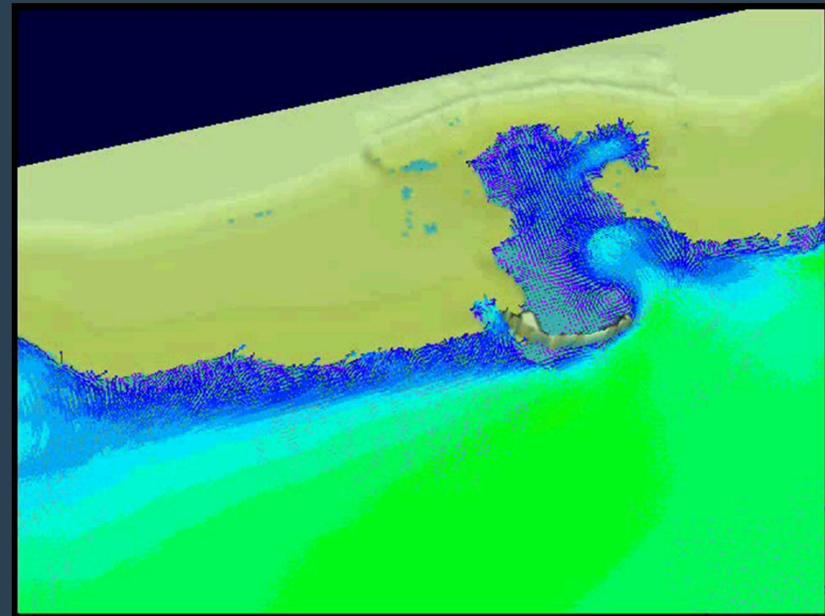
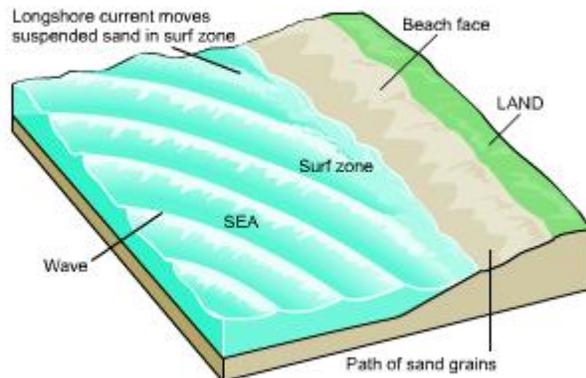
Coastal Processes Evaluation Summary

Nearshore Circulation

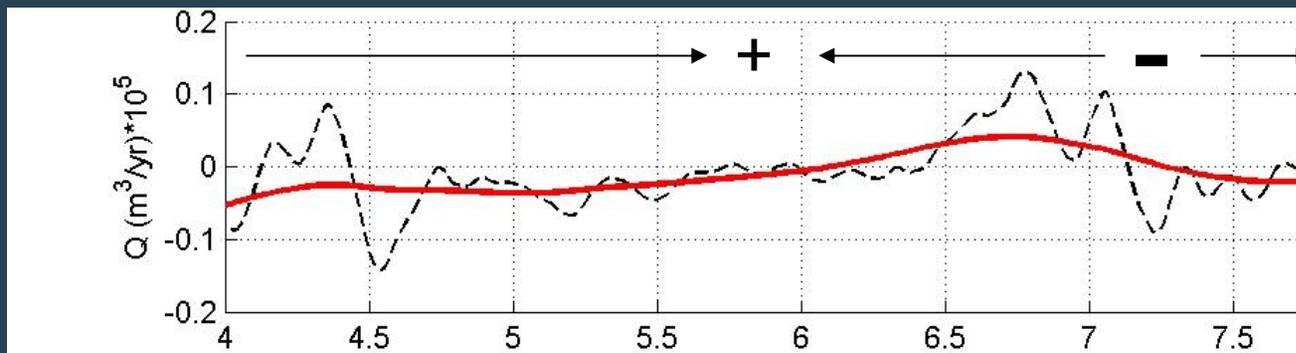
- Physically-based representation
- Driven by breaking waves in the surf zone
- Based on Depth-averaged mass and momentum
- Provides stream function and vorticity



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Coastal Processes Evaluation Summary



Average annual rate = 14,600 cy/yr to the east (near the outlet)

*as long as sand is available

Alternatives Assessment

Alternatives Assessment

- No action
- Replacement in kind
- Removal of training walls
- Shortening of training walls
- Tapering the elevation of training walls
- Culvert extension
- Culvert extension with training wall shortening
- New outlet structure

Alternatives Assessment

- Balance of inlet stability and sediment bypassing

Alternative	Inlet Stability and Maintenance			Percent Sediment Bypassed				
	Unstable	Potentially Unstable	Stable	0%	25%	50%	75%	100%
Existing Conditions			█		█			
Remove Training Walls	█							█
Shorten Training Walls		←	█		→			
Taper Training Walls		←	█		→			
Culvert Extension			█		█			
Culvert Ext./Shorten Walls		←	█		→			

- Criteria Evaluated
 - Inlet stability
 - Downdrift beach
 - Cost
 - Service Life
 - Maintenance requirements
 - Safety
 - Modular design

Training Wall Adjustments

Evaluated a range of reductions

Reduce length by 30 feet and/or taper slope over 100 feet

Allows an additional 1,500-1,800 yd³/yr to naturally bypass

Maintains stability of outlet

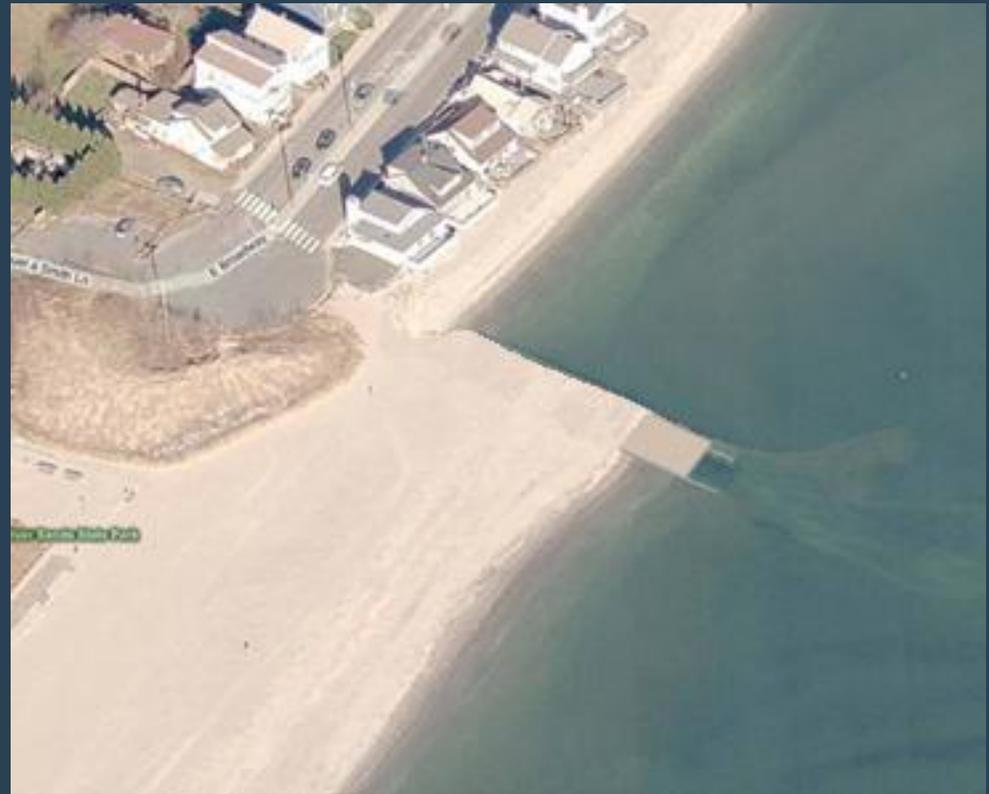


Culvert Extension

Extend culvert and reduce training walls

Allows an additional 3,800 yd³/yr to naturally bypass

Maintains stability of outlet



Recommended Alternative

Recommended Alternative

- Configuration based on Coastal Study
 - Shorten training walls by 30 feet
 - Extend box culvert to increase sediment transport
- Various training wall options explored
 1. Timber piles and lagging – Piles difficult to drive through confining layer
 2. Steel sheet piling – Least aesthetically pleasing and difficult to modify after installation
 3. Precast concrete piles and panels – Most expensive option and difficult to modify after installation
 4. Steel piles with timber lagging – Deemed best compromise on pile drivability, flexibility, aesthetics, and cost

Recommended Alternative



Existing Great Creek Outlet Structure

Recommended Alternative



Proposed Great Creek Outlet Structure

Next Steps

Next Steps

- Obtain State permits from the DEEP Office of the Long Island Sound Programs (OLISP)
 - Project requires a Certificate of Permission (COP)
- Prepare Construction Documents
- Solicit bids for proposed work
- Hire a contractor
- Begin construction
 - May be restricted from working during certain times of year

Questions
