

2020 BEACH ASSESSMENT UPDATE: TOWN OF SOUTHERN SHORES, NC

KEN WILLSON, SENIOR PROGRAM MANAGER

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JANUARY 21, 2021



COASTAL
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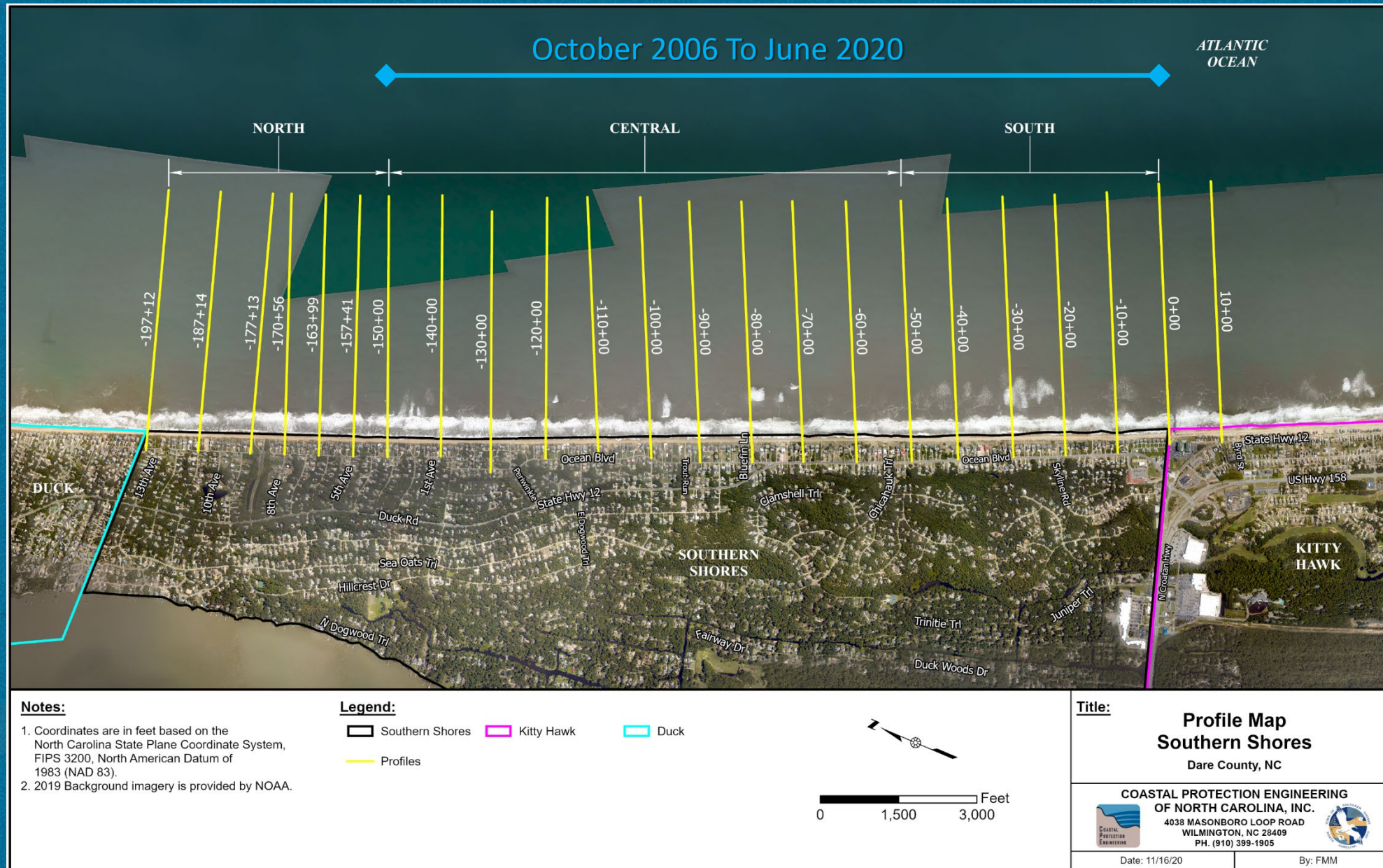
Background:

- December 2017 – Initial Town-wide beach profile survey conducted
- March 2018 – Initial Beach Assessment provided
- December 2018 – Vulnerability Analysis and Beach Management Plan provided
- May 2019 – Second Town-wide beach profile survey conducted
- September 2019 – Updated volumes and recommendations from the 2018 Plan (2019 Beach Assessment)

Background (continued):

- Dec. 2019 – Jan. 2020: Town requested update of project goals and development of additional alternatives to include entire Town
- Project Goals:
 1. Provides a reasonable level of storm damage reduction to public and private development
 2. Mitigates long-term erosion that could threaten public and private development, recreational opportunities, and biological resources
 3. Maintains a healthy beach that **provides sufficient useable beach** and supports valuable shorebird and sea turtle nesting habitat
- June 2020 – Third Town-wide beach profile survey conducted
- July 2020 – Town Authorized CPE to conduct permitting and design of the proposed beach nourishment project

Project Area:



Project Area:

September 2013 To June 2020



Notes:

- Coordinates are in feet based on the North Carolina State Plane Coordinate System, FIPS 3200, North American Datum of 1983 (NAD 83).
- 2019 Background imagery is provided by NOAA.

Legend:

- Southern Shores
- Kitty Hawk
- Duck
- Profiles



0 1,500 3,000 Feet

Title:

Profile Map Southern Shores

Dare County, NC



**COASTAL PROTECTION ENGINEERING
OF NORTH CAROLINA, INC.**
4038 MASONBORO LOOP ROAD
WILMINGTON, NC 28409
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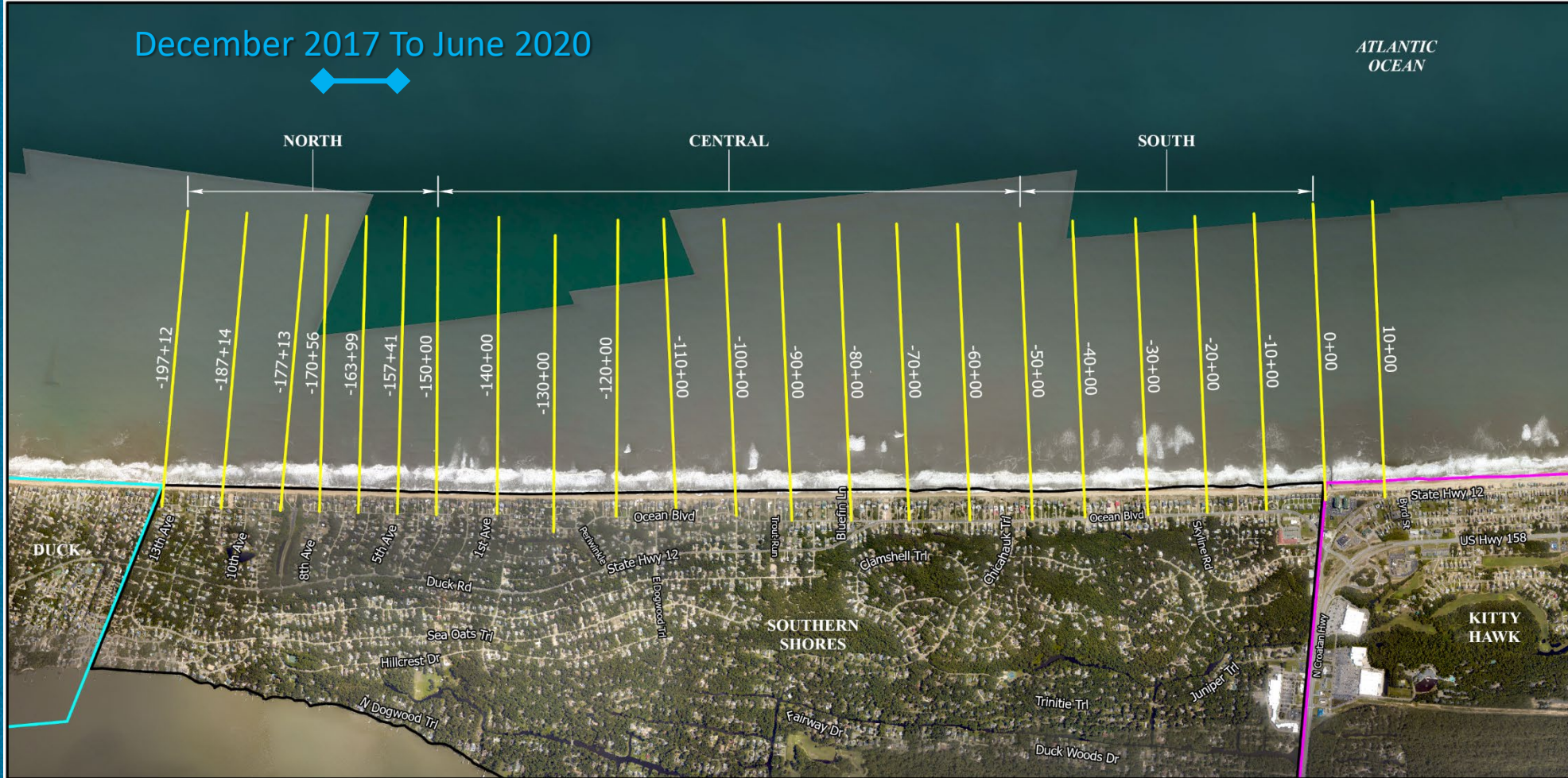
Date: 11/16/20

By: FMM



Project Area:

December 2017 To June 2020

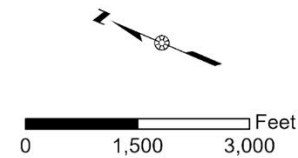


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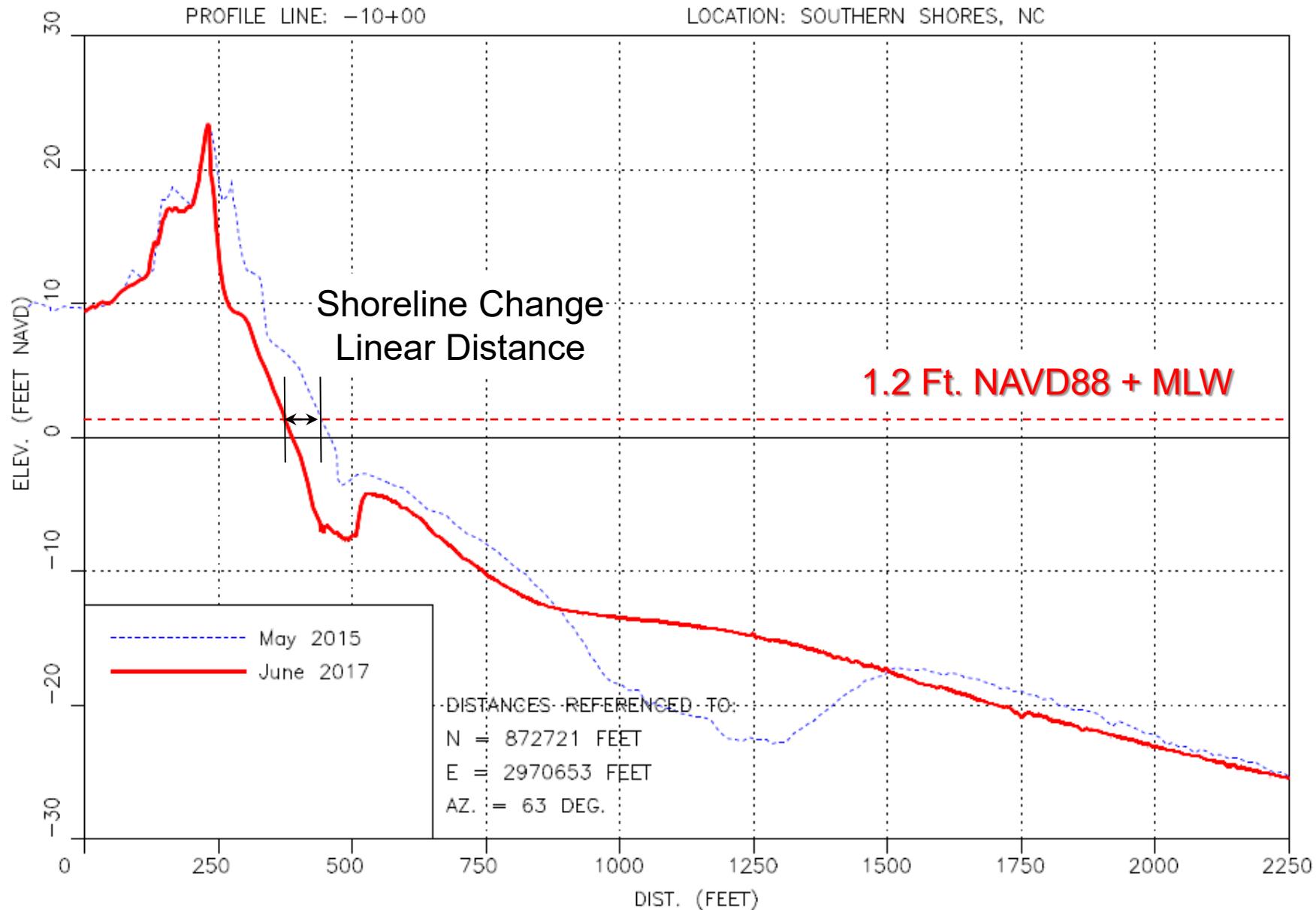


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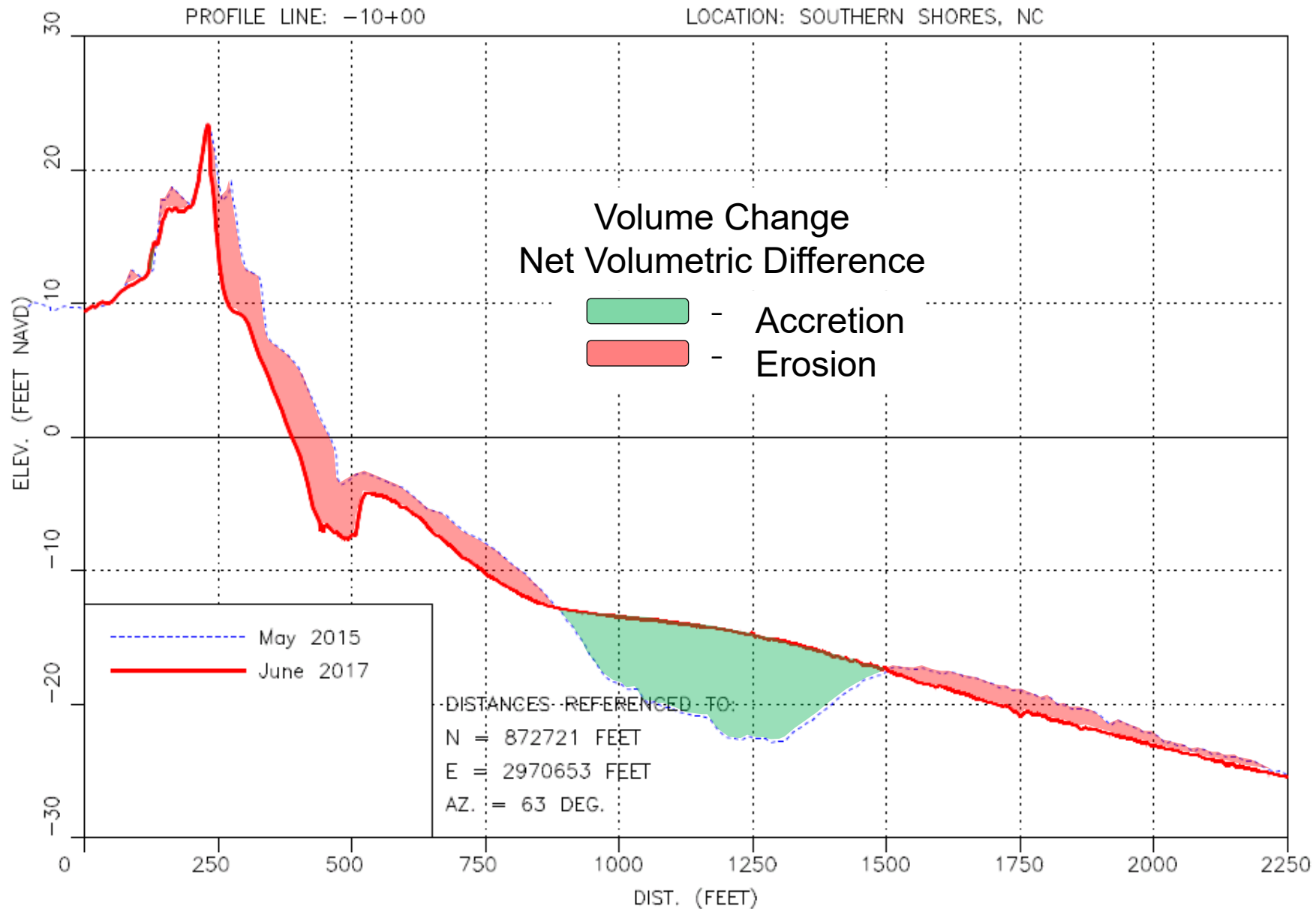
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Shoreline Change:



Volume Change:



Shoreline / Volume Change:

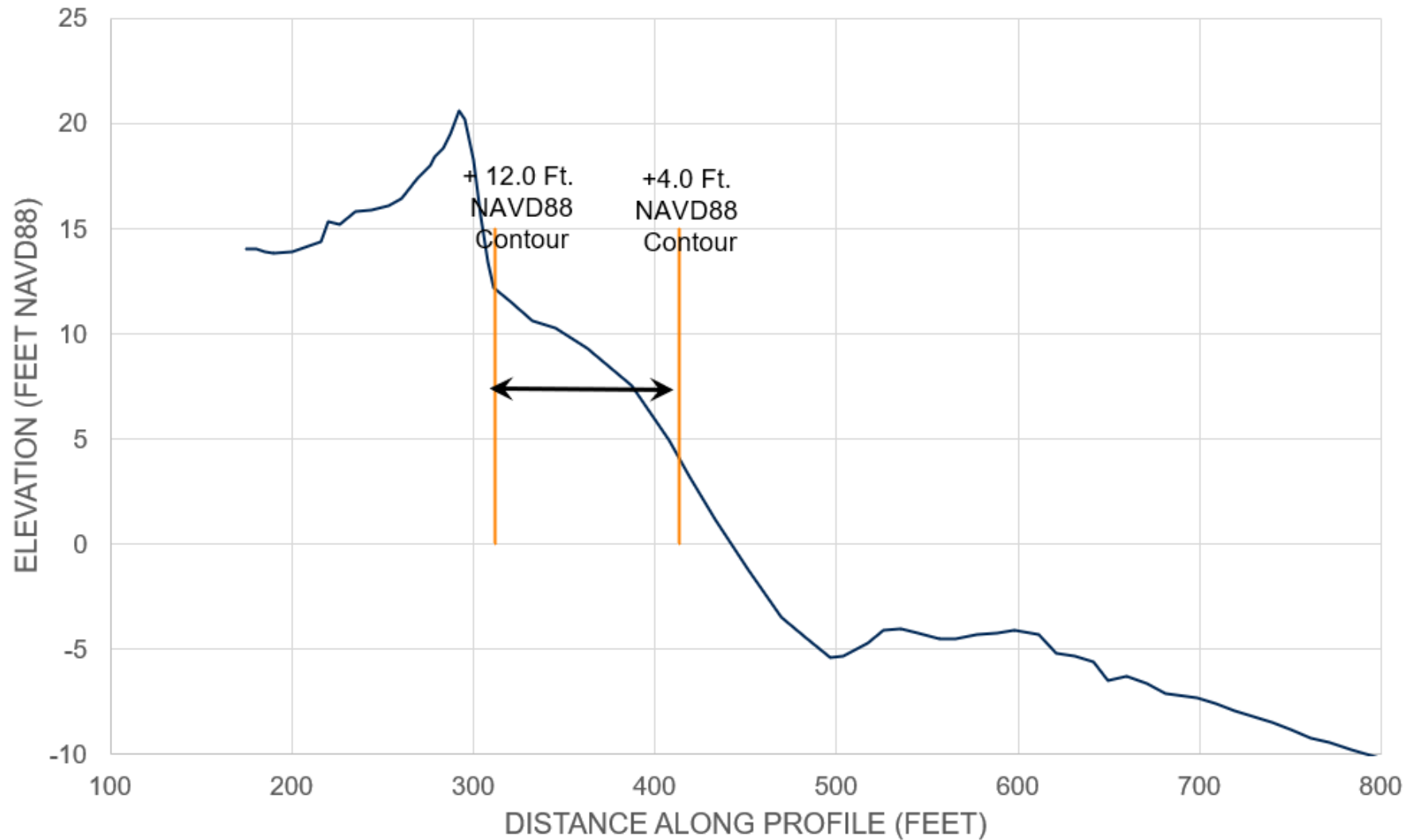
- Three (3) Sections Referenced:
 - North Section – North Town boundary to 3rd Ave.
 - Central Section – 3rd Ave. to approx. 400 ft. south of Chicahawk Trl.
 - South Section – Approx. 400 ft. south of Chicahawk Trl. to southern Town boundary
- Town Wide – Changes between Dec. 2017 and June 2020
- Central and South Sections – Changes between Oct. 2006 to June 2020
- From 9th Ave. to Northern Town Boundary – Changes between Sept. 2013 and June 2020

Shoreline Change (Update):

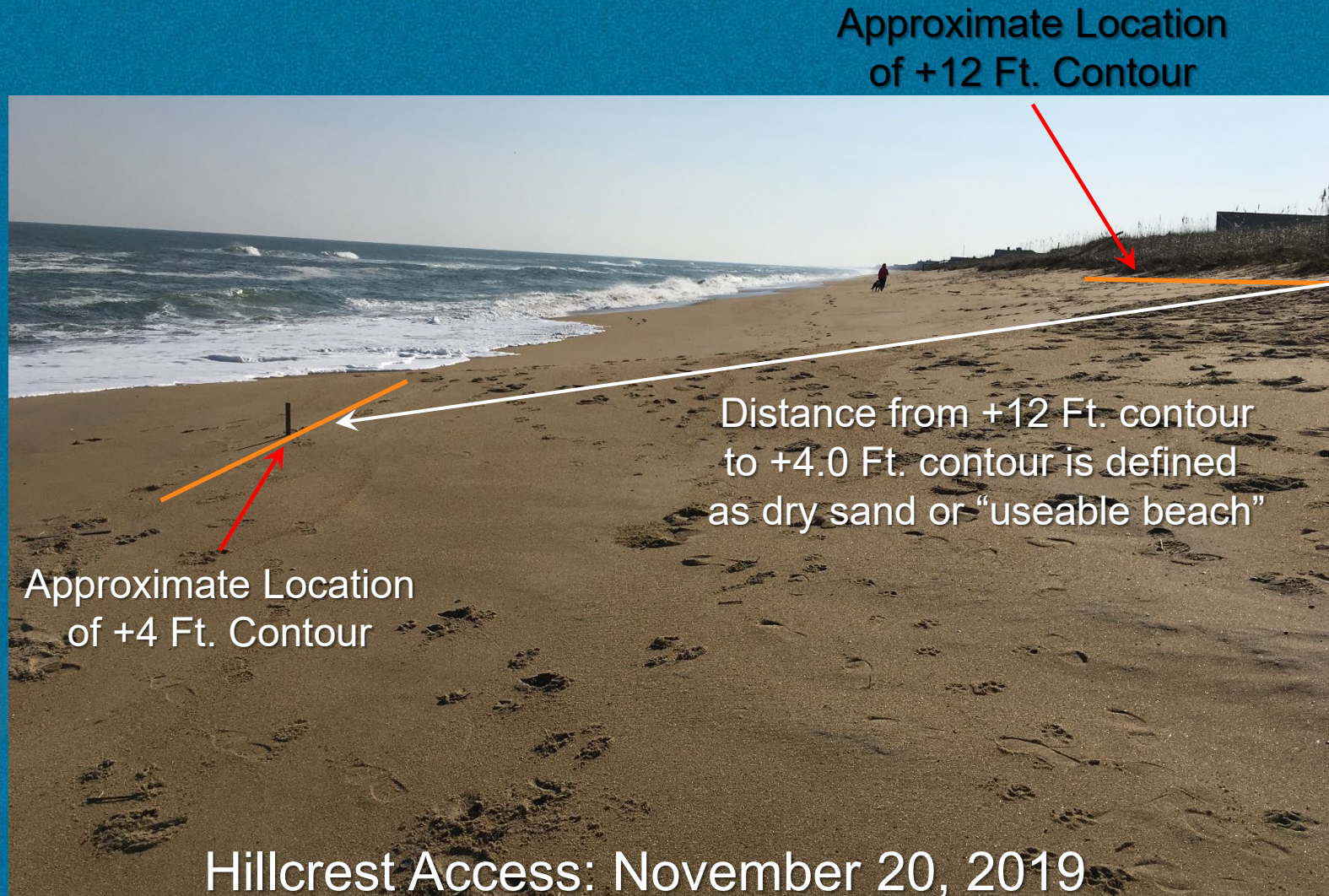
- North Section:
 - *Average shoreline change rate of -2.3 ft./yr. between Dec. 2017 and June 2020*
 - *Average shoreline change rate of -1.3 ft./yr. between Sept. 2013 and June 2020 (6.75 years) along the northern 2,000 feet of Town (Area north of 9th Ave.)*
- Central Section – Average shoreline change rate of -2.3 ft./yr (Dec. 2017 to June 2020) and -1.3 ft./yr (Oct. 2006 to June 2020)
- South Sections – Average shoreline change rate of -10.8 ft./yr (Dec. 2017 to June 2020) and -1.1 ft./yr (Oct. 2006 to June 2020) Note: Includes beach nourishment

Useable Beach Width:

May 2019 Condition:
Station -100+00 - Dolphin Run



Useable Beach Width:



Useable Beach Width:

Table from Beach Management Plan Addendum A

Beach Section	Profile Stations	Average Useable Beach Width
Town of Southern Shores from 3rd Avenue South to Southern Town Limit	-150+00 to 0+00	84
2017 Sand Placement Area (Skyline Road to Asheville Street)	-20+00 to 320+05	103
Northern Section of Southern Shores from 5th Avenue North to Northern Town Limit	-197+12 to -157+41	57

Useable Beach Width:

Updated numbers based on June 2020 Data

Beach Section	Profile Stations	Average Useable Beach Width
Town of Southern Shores from 3rd Avenue South to Southern Town Limit	-150+00 to 0+00	69
Northern Section of Southern Shores from 5th Avenue North to Northern Town Limit	-197+12 to -157+41	69

Volume Change (Update):

- North Section:
 - *Average volume change rate of +6.1 cy/ft./yr. between Dec. 2017 and June 2020*
 - *Average volume change rate of -0.2 cy/ft./yr. between Sept. 2013 and June 2020 (6.75 years) along northern 2,000 feet of Town (Area north of 9th Ave.)*
- Central Section – Average volume change rate of -0.3 cy/ft./yr (Dec. 2017 to June 2020) and +2.7 cy/ft./yr (Oct. 2006 to June 2020)
- South Sections – Average volume change rate of -15.3 cy/ft./yr (Dec. 2017 to June 2020) and +0.3 cy/ft./yr (Oct. 2006 to June 2020) Note: Includes beach nourishment
- Overall Average along Central and South Section was -5.2 cy/ft./yr, an increase from -3 cy/ft./yr reported in 2019.

Project Volumes:

Beach Management Addendum A

Table 2. Comparison of volumes calculated for each of the beach fill options

Design	Design Volume ⁽¹⁾	Diffusion Loss Volume ⁽²⁾	Advanced Fill Volume ⁽³⁾	Taper Volume ⁽⁴⁾	Total Volume	Avg. Fill Density ⁽⁵⁾
Option 1 ⁽⁶⁾	540,000	54,400	225,000	9,000	828,400	36
Option 2	N/A - Design Volumes and Transition Area Volumes are the Same as Option 1.					
Option 3 ⁽⁶⁾	720,000	68,800	225,000	12,000	1,025,800	48
Option 4	591,400	54,400	225,000	7,500	878,300	30
Option 5	681,400	54,400	225,000	7,500	968,300	35

⁽¹⁾ Volume (CY) necessary to achieve the design goal of each option. This number excludes diffusion loss, advanced fill, and tapers.

⁽²⁾ Volume (CY) included to account for diffusion losses and background erosion (APTIM, 2018).

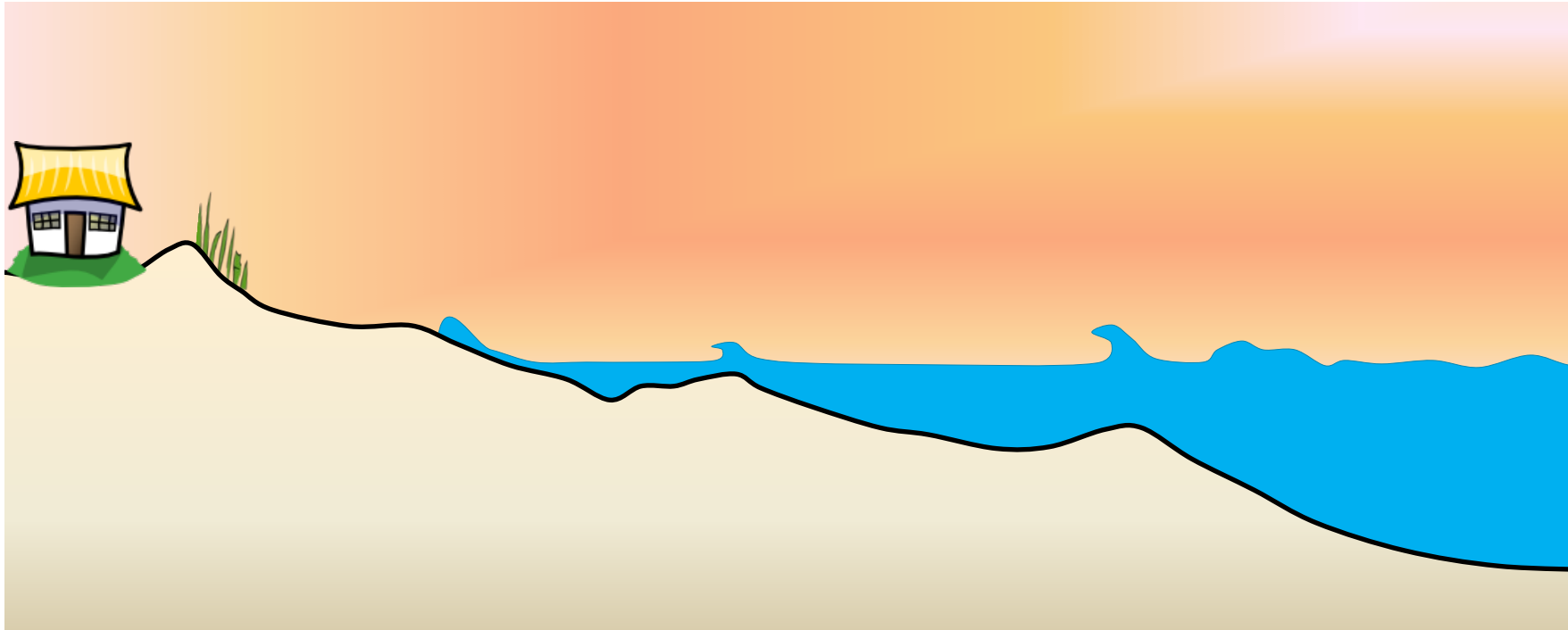
⁽³⁾ Volume (CY) included to account for background erosion expected to occur throughout the nourishment interval. Re-nourishment interval assumed to be 5 years.

⁽⁴⁾ Volume (CY) to construct a 500-foot taper on the northern end of the beach fill. Taper is dependent on the fill density at the northern extent of the project.

⁽⁵⁾ Total Volume included in the Design Volume divided by the length of the beach fill (CY/FT).

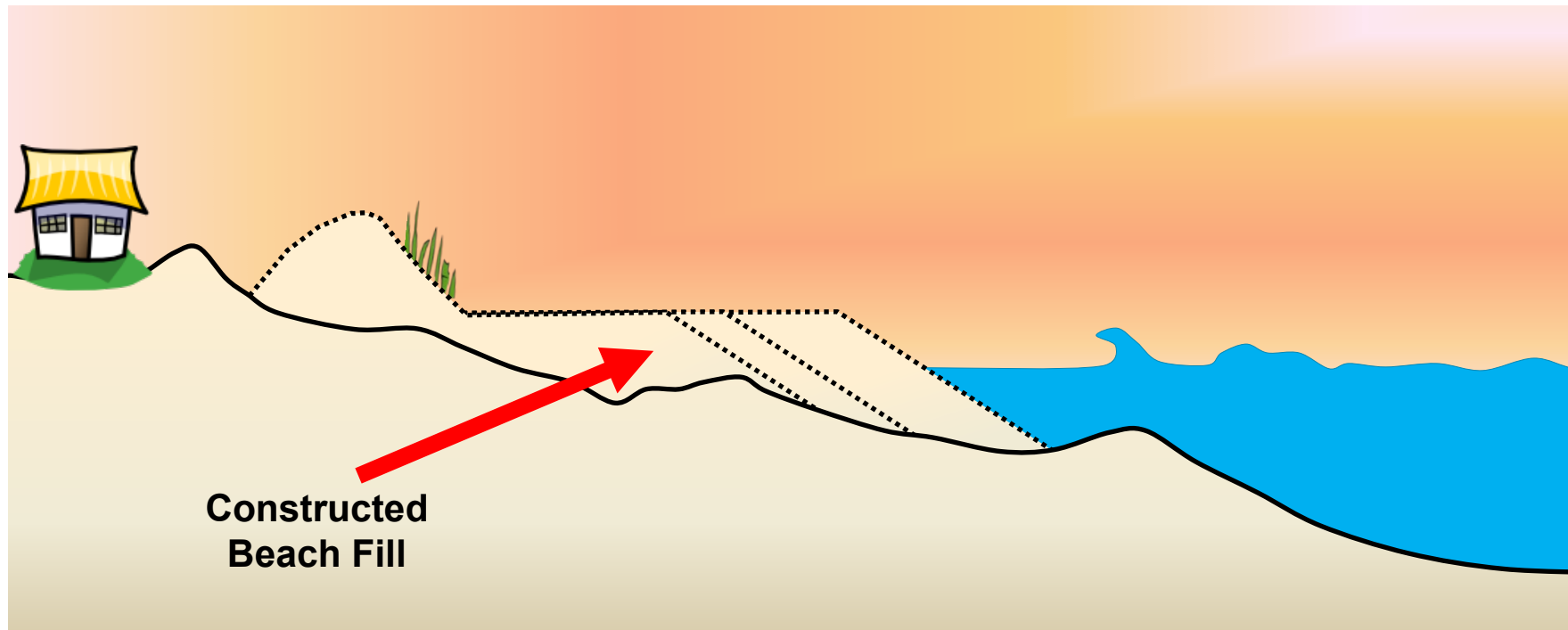
⁽⁶⁾ Options that only include placement of beach fill south of 3rd Avenue.

Storm Damage Reduction Project



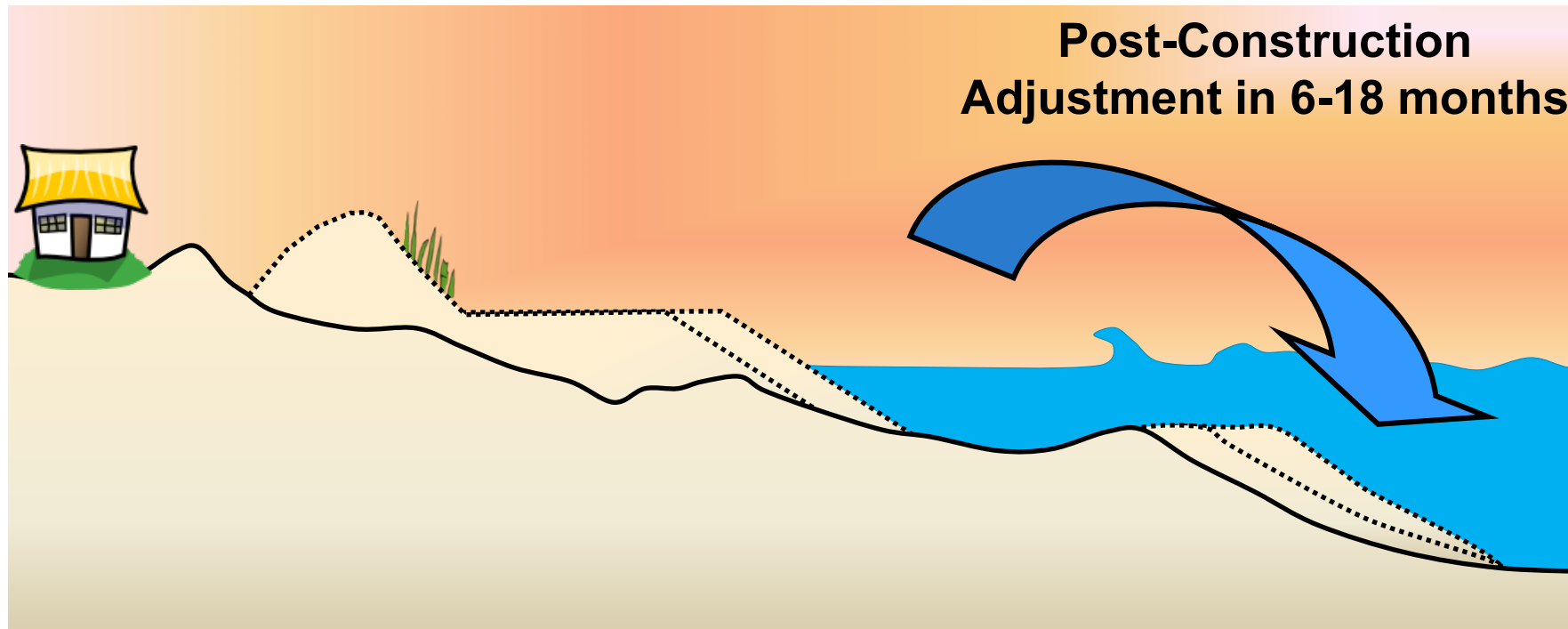
Pre-Project Conditions

Storm Damage Reduction Project



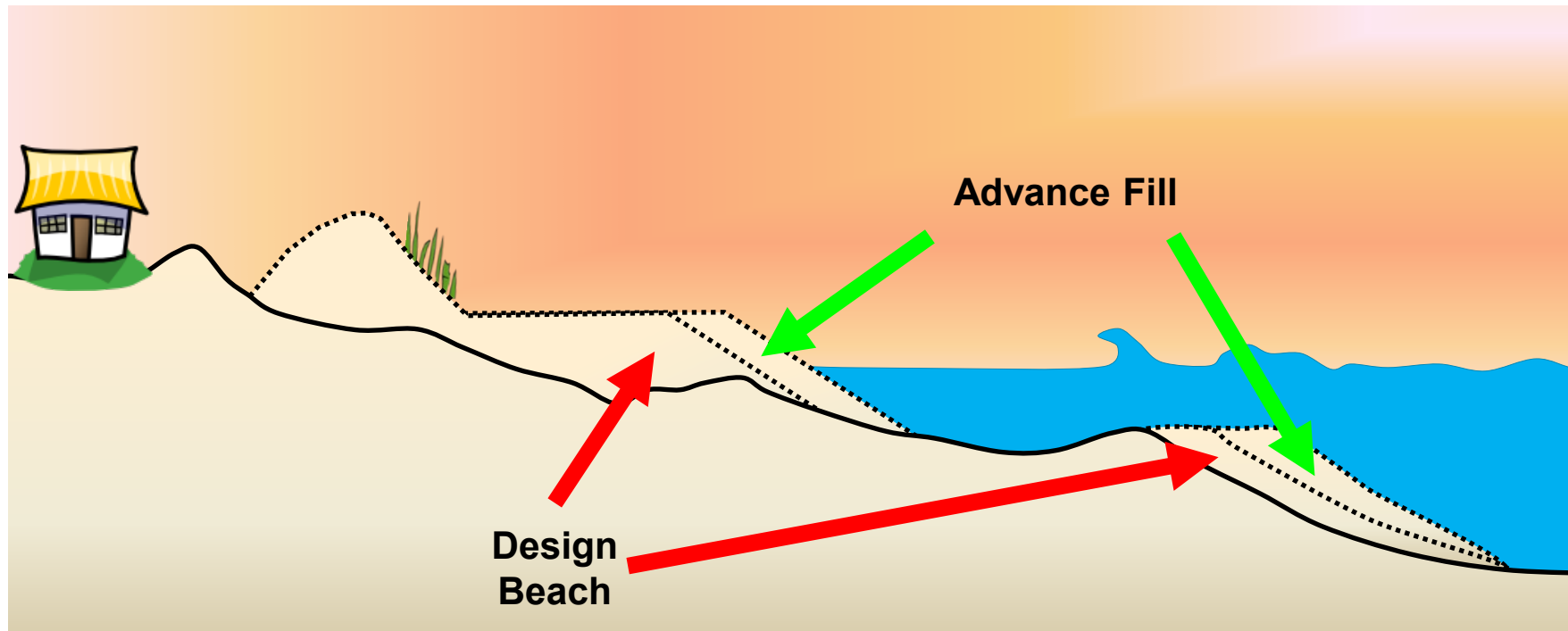
Initial Construction

Storm Damage Reduction Project



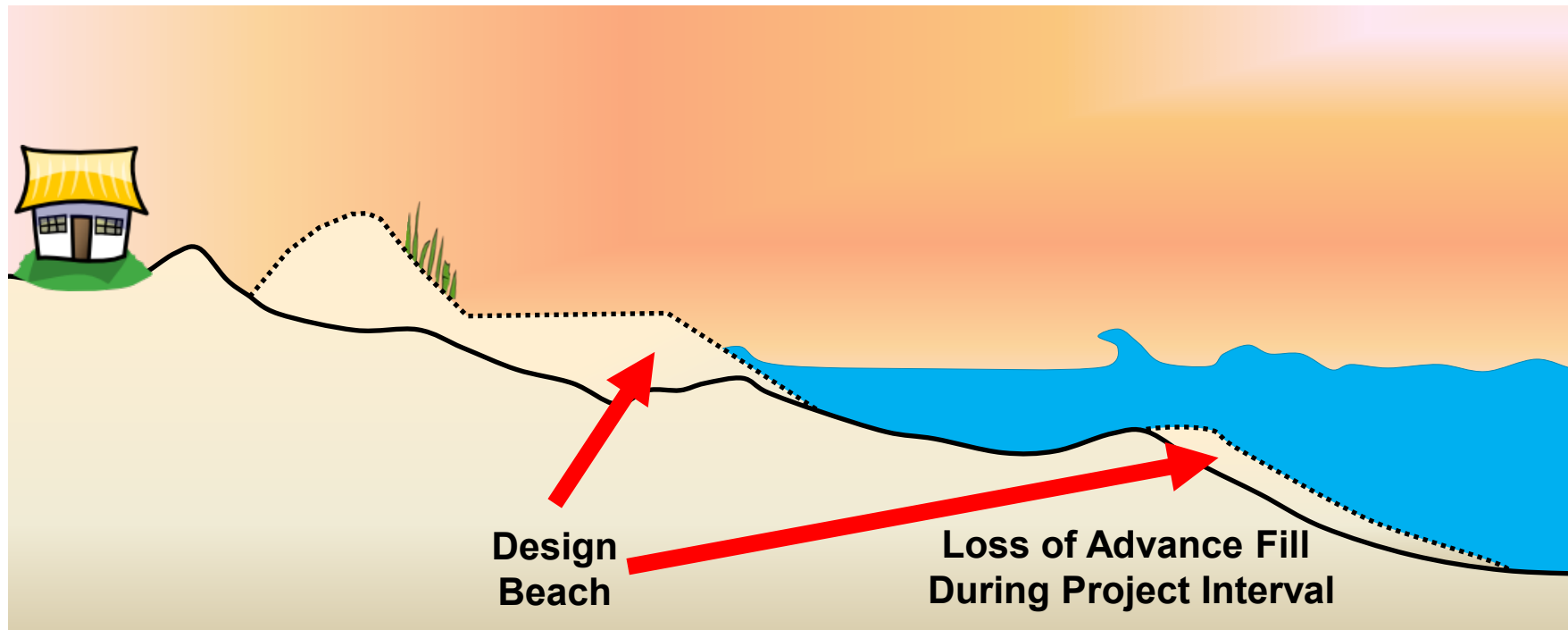
Equilibration of Beach Fill

Storm Damage Reduction Project



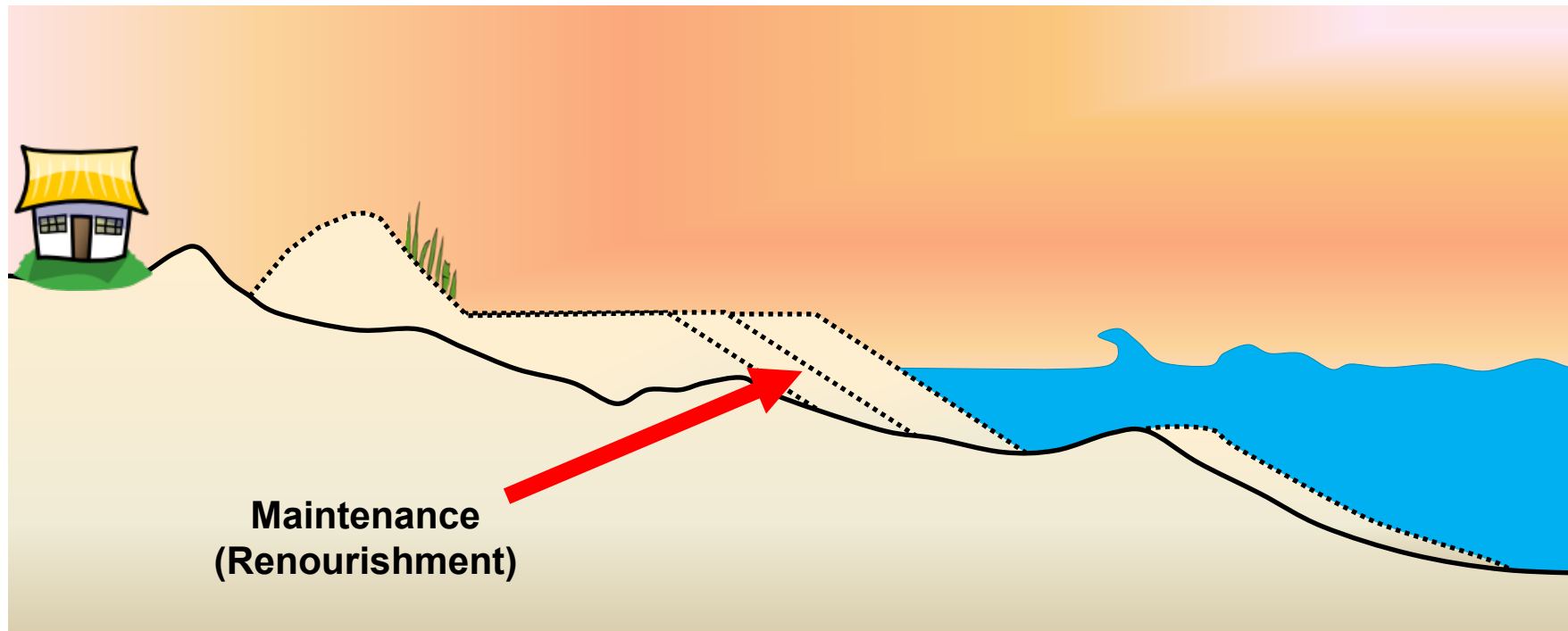
Nourishment Interval

Storm Damage Reduction Project



Nourishment Interval

Storm Damage Reduction Project



Maintenance = Beach Renourishment

Project Costs:

Beach Management Addendum A

Table 3. Project Option Cost Estimates

Option	Permitting/ Design Soft Cost ⁽¹⁾	Volume (cy) ⁽²⁾	Construction Cost ⁽³⁾	Construction Soft Cost ⁽⁴⁾	Construction Env. Monitoring Costs ⁽⁵⁾	Contingency Cost (10%)	TOTAL COST
1	\$435,000	828,400	\$11,758,000	\$235,500 ⁽⁶⁾	\$275,300	\$1,270,400	\$13,974,200
3	\$435,000	1,025,800	\$14,146,000	\$255,500	\$332,400	\$1,516,900	\$16,685,800
4	\$435,000	878,300	\$12,505,000	\$241,500	\$232,700	\$1,341,400	\$14,755,600
5	\$435,000	968,300	\$13,783,000	\$249,500	\$256,600	\$1,472,400	\$16,196,500

⁽¹⁾ Professional services costs associated with the permitting and design of the beach fill project. These costs include design surveys of the beach and offshore sand investigations.

⁽²⁾ Total volume (CY) estimated for the Option including design volume, diffusion losses, advanced fill, and tapers.

⁽³⁾ Costs associated with mobilization/demobilization, sand placement, and other costs paid directly to the dredge contractor.

⁽⁴⁾ Costs associated with development of construction bid package, bidding assistance, and construction administration.

⁽⁵⁾ Costs anticipated for estimated environmental monitoring that may be required by permit condition.

⁽⁶⁾ Updated Construction Soft Costs from those included in the September 2019 update. The updating of these cost estimates resulted in a slight decrease in the Total Cost estimate.

Schedule:

Milestone	Start Date	Completion Date	Number of Months
Project Initiation / Interagency Meeting	April 2020	April 2020	1
Borrow Area Development	May 2020	January 2021	9
Engineering Design	June 2020	April 2021	11
Federal Permitting	April 2020	June 2021	15
State Permitting	February 2021	July 2021	6
Development of Construction Plans & Specifications	March 2021	June 2021	4
Solicitation of Bids	June 2021	July 2021	1.5
Award Construction Contract	July 2021	August 2021	1.5
Construction	May 2022	October 2022	5

THANK YOU!

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