

Oak Island

CRC Beach Management Plan



THE TOWN OF OAK ISLAND, NORTH CAROLINA



AGENDA

- Project Purpose
- OKI Timeline and Plan Definitions
- Volumetric Triggers – Planning for Maintenance Events
- Calculation of Sand Needs for Maintenance Events
- Probabilities, Estimated Costs & Recommendation

Project Purpose

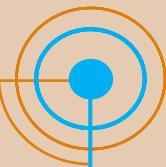
- Development of a comprehensive long-term beach maintenance program (Plan) that will set the Town up for success
- Provide increased protection for Life Safety & Infrastructure during storm events
- Increase overall Town Resilience against background erosion and storm events – Allows for quicker recovery for the Town by minimizing damage
 - Healthy(wide) Beach + Vegetation = Resilience
- Preserve \$682M of property value (first two rows ~ equal to Ocean Erodible Area) and infrastructure. (Potential loss of 20% of tax base)
 - Does not account tax losses for diminished home values by not having a healthy beach
- Preserve tourist economy estimated to be worth ~\$33M/year in direct impact and \$65M/year in total impact and 756 jobs (NCBIMP, 2016) based on 2014 numbers, likely much higher now

Oak Island Timeline – OIBMP – Where we are Today!

CRC Oak Island Beach Management Plan (OIBMP): Presented to CRC to document 30-yr maintenance plan which allows for reestablishment of a New Vegetation Line to be used for setback compliance

- The OIBMP, at its core, is the following:
 - An opportunity for the Town to put maintenance of the beach into a plan to set them up for long-term success of maintaining a healthy beach
 - By providing the CRC a long-term maintenance plan, it can help the Town to restore some of the benefits that property owners lost when the CRC eliminated the Development Line on August 1, 2022
- Currently (since August 1, 2022) the 1998 Pre-Project Line is used for development setback compliance
 - Based on the 1998 Pre-Project Line approximately 2/3 of oceanfront properties would be considered non-conforming
- If approved, a new line for setback compliance can be established at the first line of stable, natural vegetation at the time of permit application
- Will not allow development further seaward than adjacent properties
- Expires after 5 years at which time changes can be made and resubmitted for approval

2023



CRC

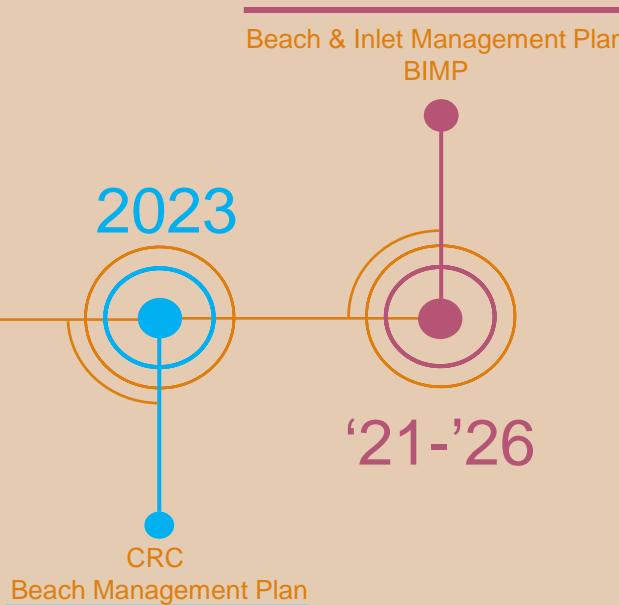
Beach Management Plan

Oak Island Timeline - OIBIMP

Oak Island Beach and Inlet Management Plan (OIBIMP):

Engineering and environmental studies to identify sand sources and acquire permits for implementation of Beach and Inlet Management projects to carry out the 30-year Plan

- OIBIMP is a decision support document that prepares the Town to proactively plan for and address future issues resulting from background and storm-related oceanfront erosion
- By having the sand needs quantified, the borrow sources identified and permitted it provides for quick response to storm related events. Can reduce the response time from 3 years to 1 year



Oak Island Timeline – Initial Project

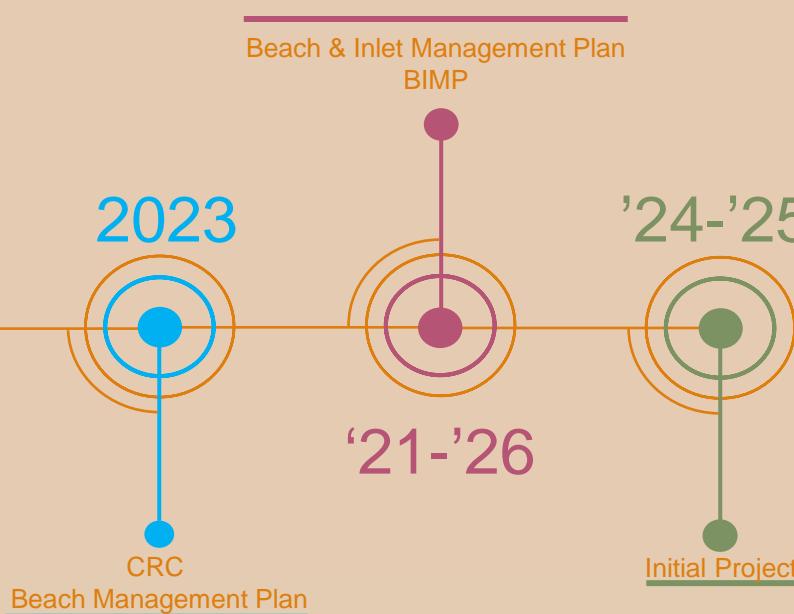
Currently planned Advance Fill project for 2024-2025. Advance Fill is the sacrificial berm placed in front of the dune feature to protect the Design LoP against background erosion

Session Law – 2021-180, Section 5.9.(a)(6)

- \$20 M Set Aside for Town of Oak Island – Direct Grant
- 1/1 Cost Local Share Is Required

Project Construction Date	Engineering Cost	Mob/Demob	Volume (cy)	Unit Rate (\$/cy)	Total Cost
Initial Project 2024/2025	\$2,500,000	\$6,500,000	1,650,000	\$18.75	\$39,937,500

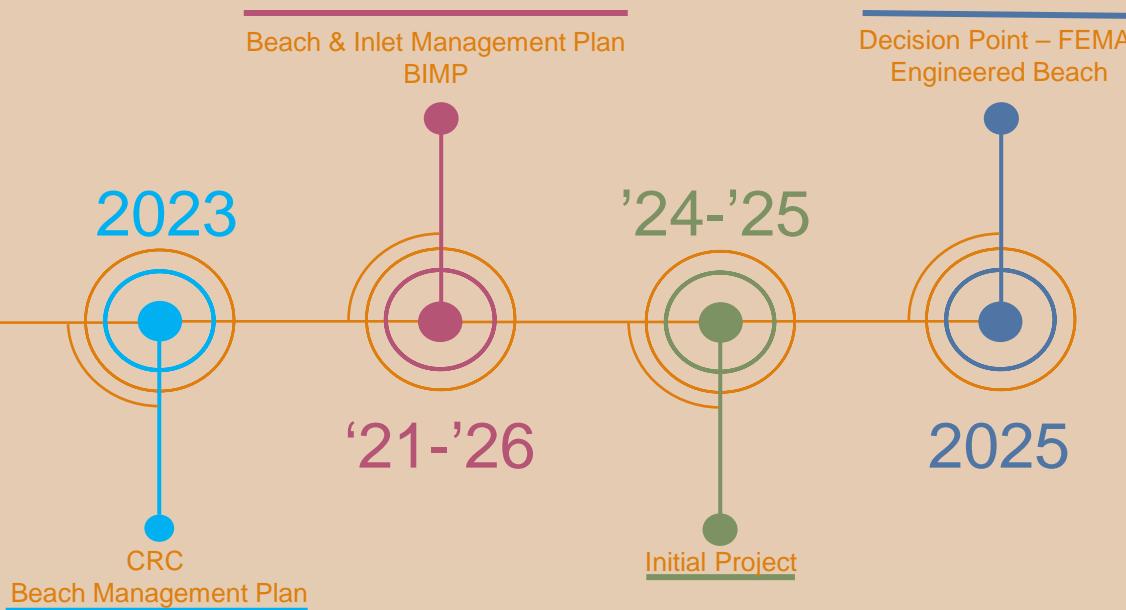
Initial Project will be completed with only State and Local Funds



Oak Island Timeline – FEMA Engineered Beach

Potential FEMA Reimbursement Projects

- Cat B – Emergency Berm: Reimbursements for only to 6 CY/ft Above 5-Yr Surge Level
- Cat G – Engineered Beach: Reimbursement for all material lost during a Presidentially Declared Disaster Event with Cat G approval – Must have completed Initial State/Locally Funded Engineered Project and adhere to a Maintenance Plan to preserve original design
- After completion of the Initial Project the would be at a decision point on whether to move forward with an Engineered Beach or not



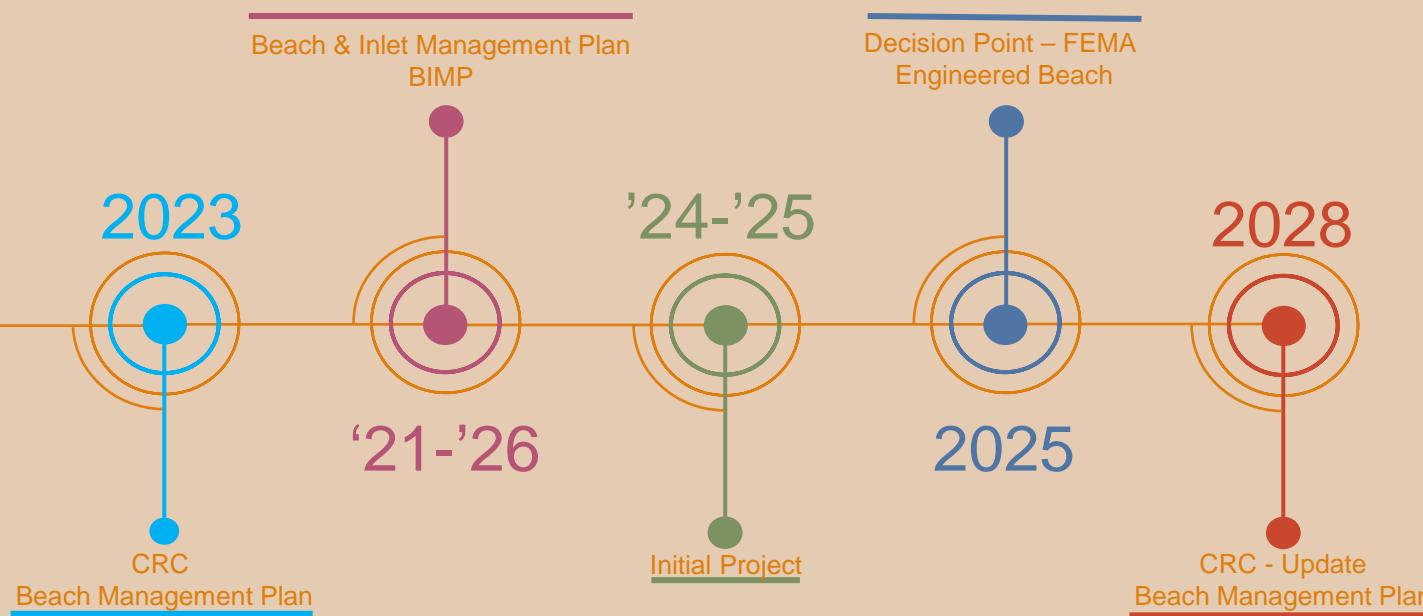
Oak Island Timeline – Update OIBMP

Update of OIBMP:

Every 5 years the Town must resubmit an updated BMP for approval by the CRC

- This allows the Town to modify the BMP to provide updates based on realized conditions such as:
 - New borrow sources identified
 - Changes in measured erosion rates
 - Changes in financial capability

The CRC realizes it is difficult to predict 30 years into the future and requires resubmission of the plan for approval to make any necessary changes and to review if the plan is being adhered to by the applicant

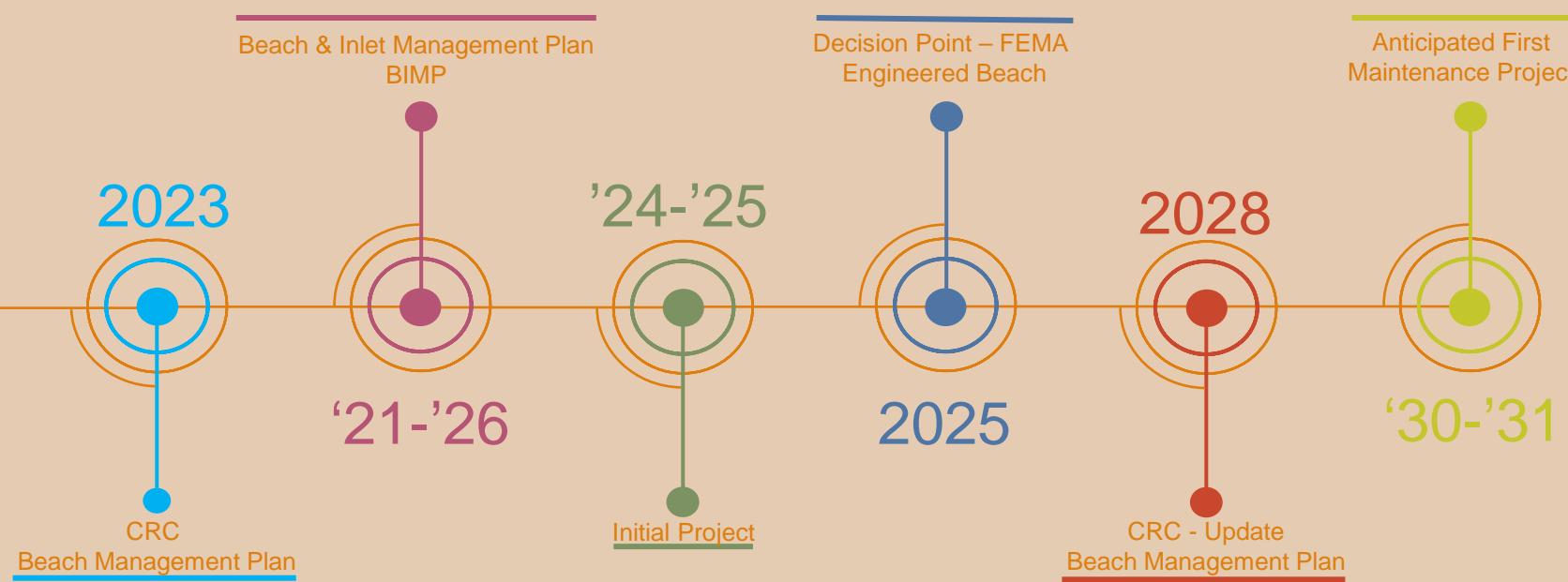


Oak Island Timeline – Anticipated First Maintenance Project

Maintenance Project:

It is anticipated the first maintenance event will be 6 years after the placement of the Advance Fill (Initial Project).

- M&N recommends planning for a maintenance event of 1.36M cubic yards every 6 years
- The exact timing of the maintenance projects will likely be mostly dependent on if the Town encounters any major storms.
- Decision Point – If the project is not needed at the 6 year mark (based on triggers) the Town can decide the action to take:
 - Delay the nourishment until the triggers are approaching
 - Place the Plan project (would increase the Advance Fill)



Oak Island Timeline – USACE Federal Project

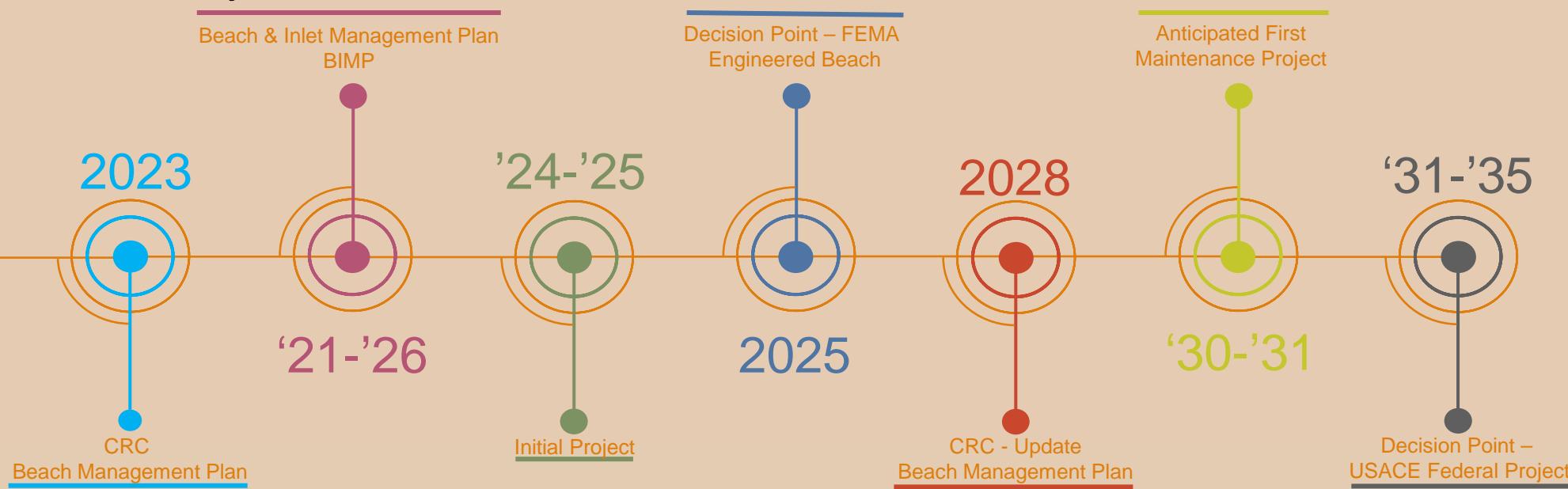
USACE Federal Project:

Town entered into agreement in 2023 for a 3-year feasibility study to investigate the prospect of the Town becoming a Federal Project.

Partnership with the USACE – Cost share can vary between 50/50 and 65/35 – USACE Controls the timing and size of the renourishment events and is subject to Congressional funding

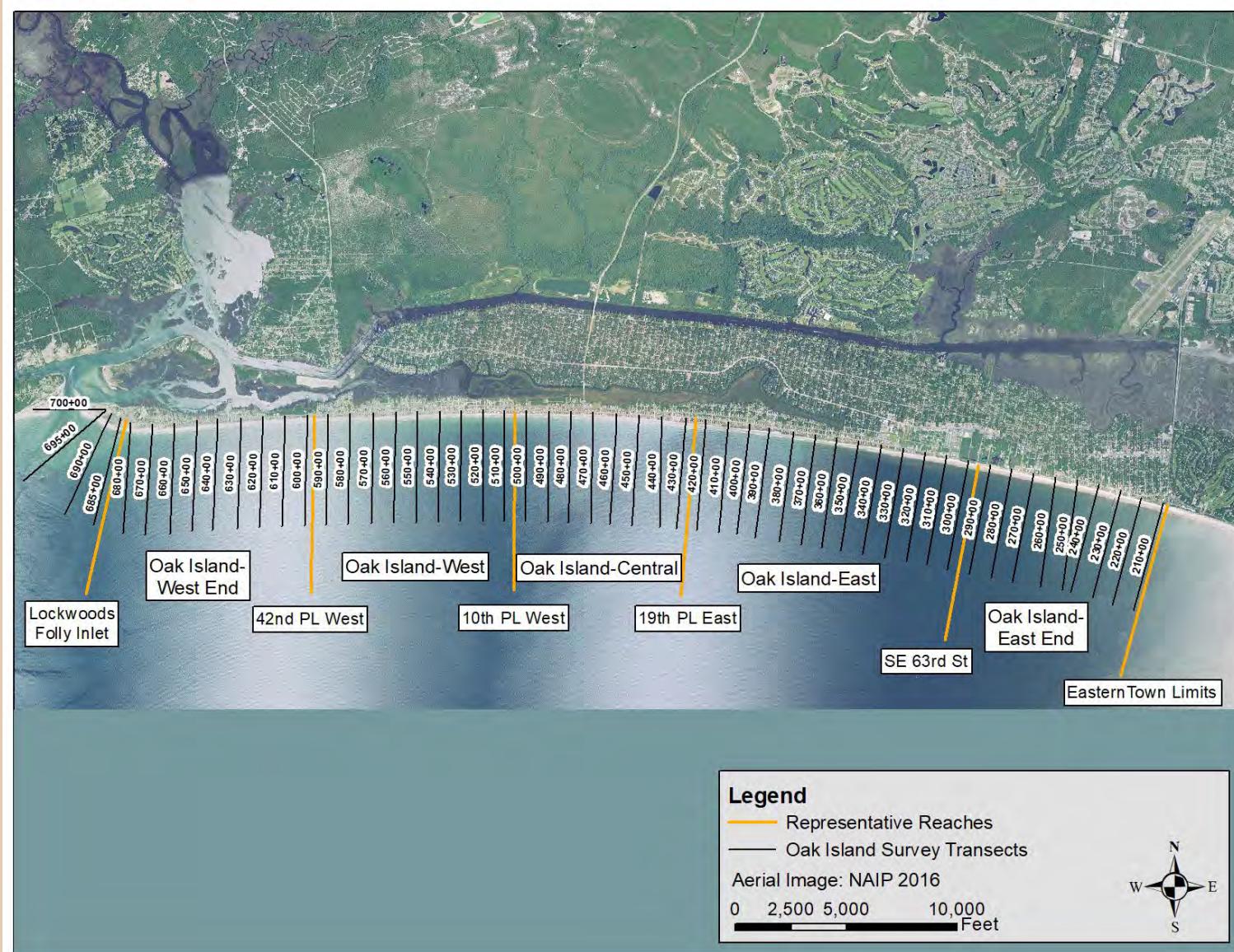
Likely at least a decade away if all goes well and Benefit/Cost Ratio is nationally competitive

If approved, Town will be at decision point to enter into a Partnership Agreement with the USACE for likely a 50-year Federal Project



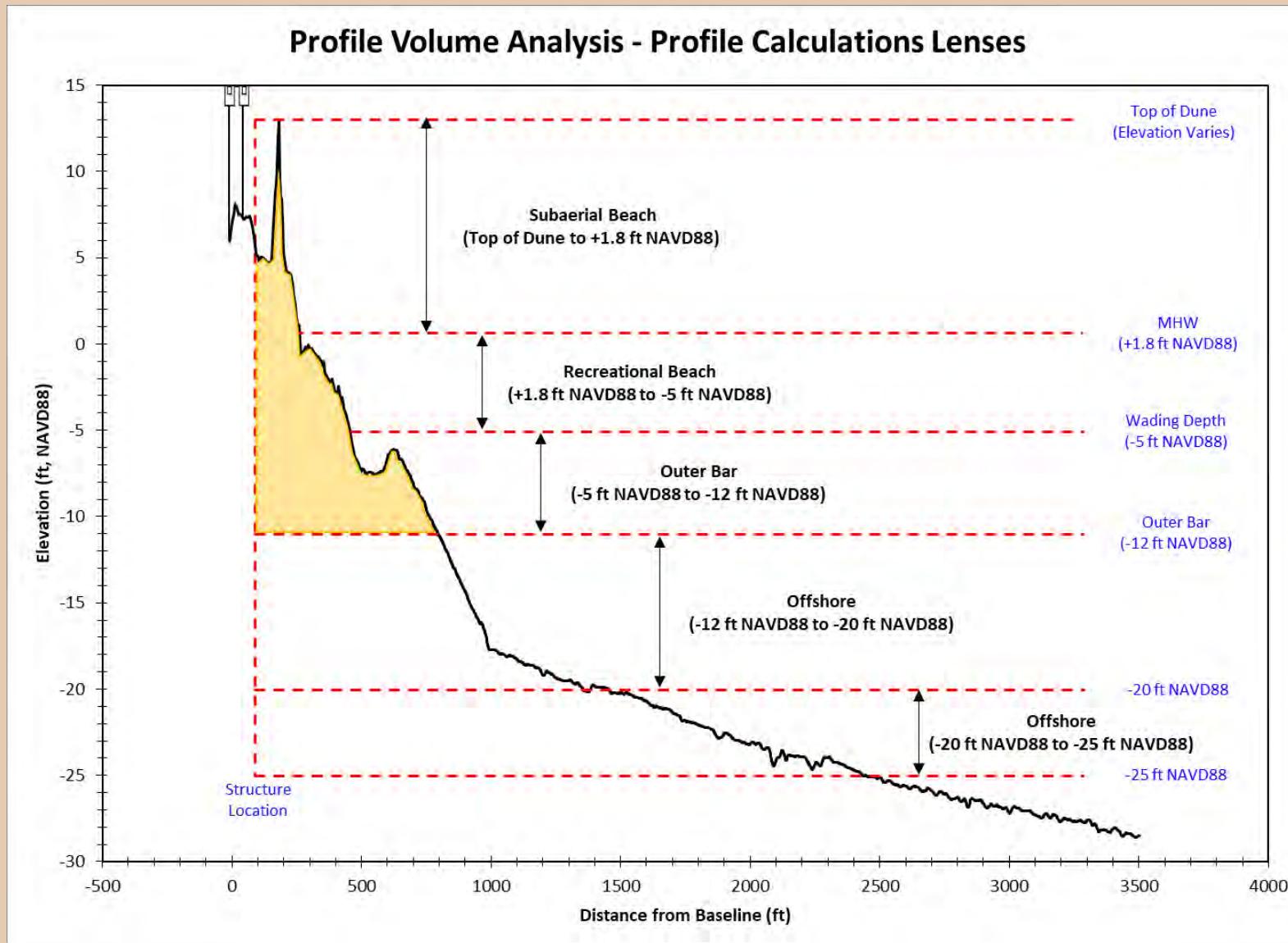
Project Background

- Island Wide Reaches



OKI Beach Management Plan Design

- Profile Volume Lenses (Level of Protection Determination)

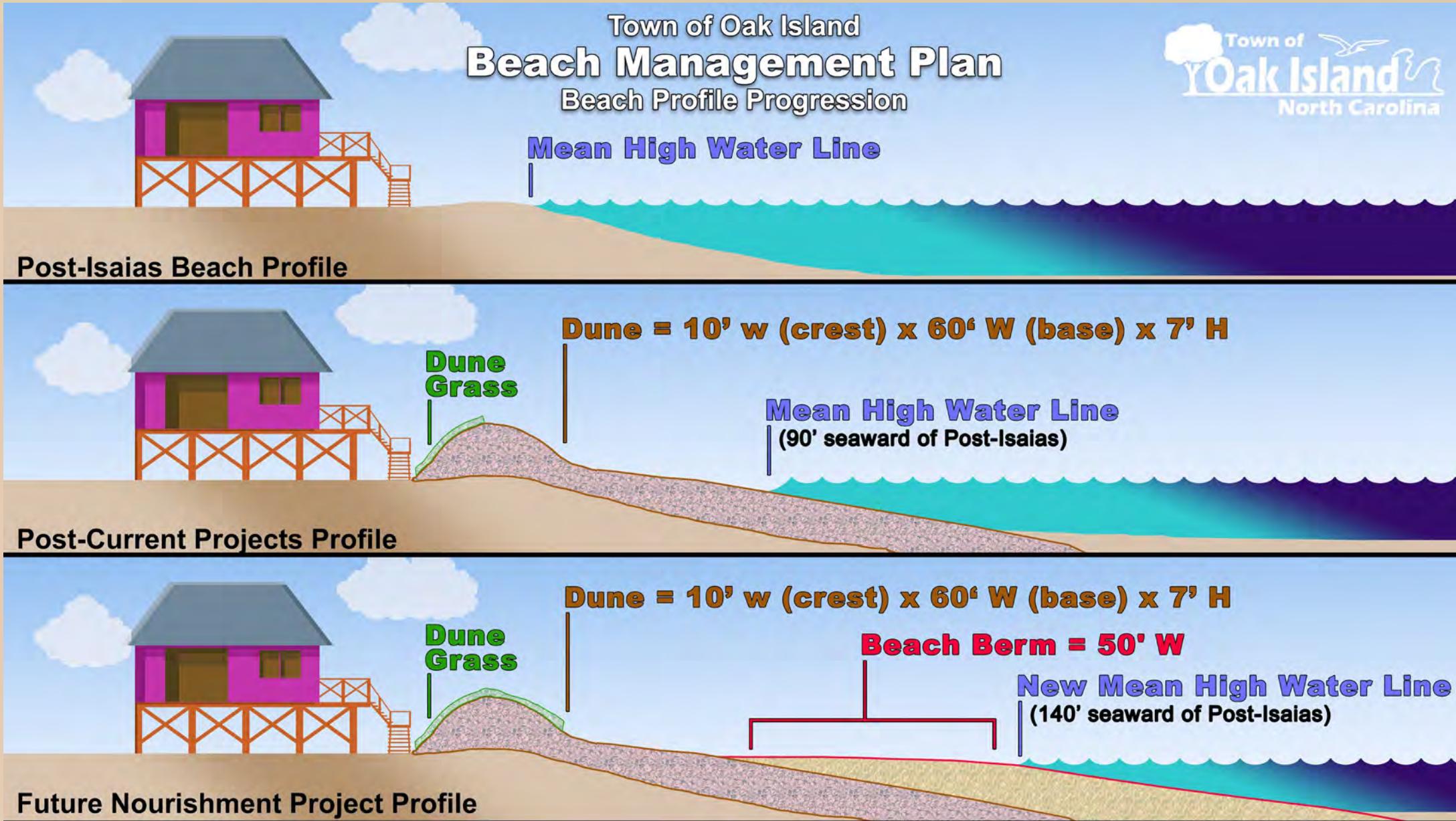


OKI Beach Management Plan Design

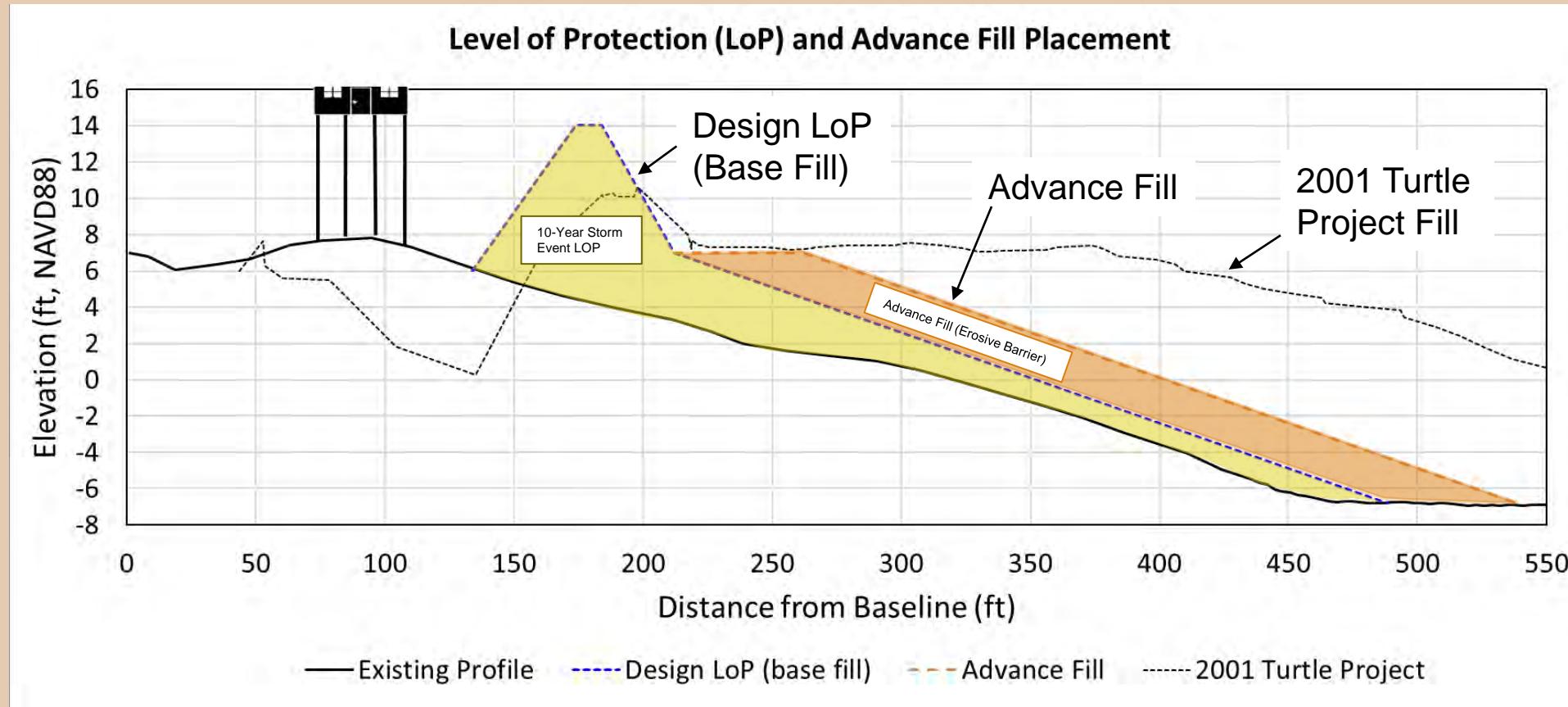
- Volumetric Triggers

Reach	10-year Level of Protection Trigger Volume (cy/ft)
Oak Island-East End 210+0 - 290+00 (Eastern Town Limits – SE 63 rd St)	307
Oak Island-East 300+0 - 420+00 (SE 63 rd St – 16 th PI East)	257
Oak Island-Central 430+0 - 500+00 (16 th PI East – 10 th PI West)	235
Oak Island-West 510+0 - 590+00 (10 th PI West – 42 nd PI West)	231
Oak Island-West End 600+0 - 680+00 (42 nd PI West – West End Parking Lot)	238

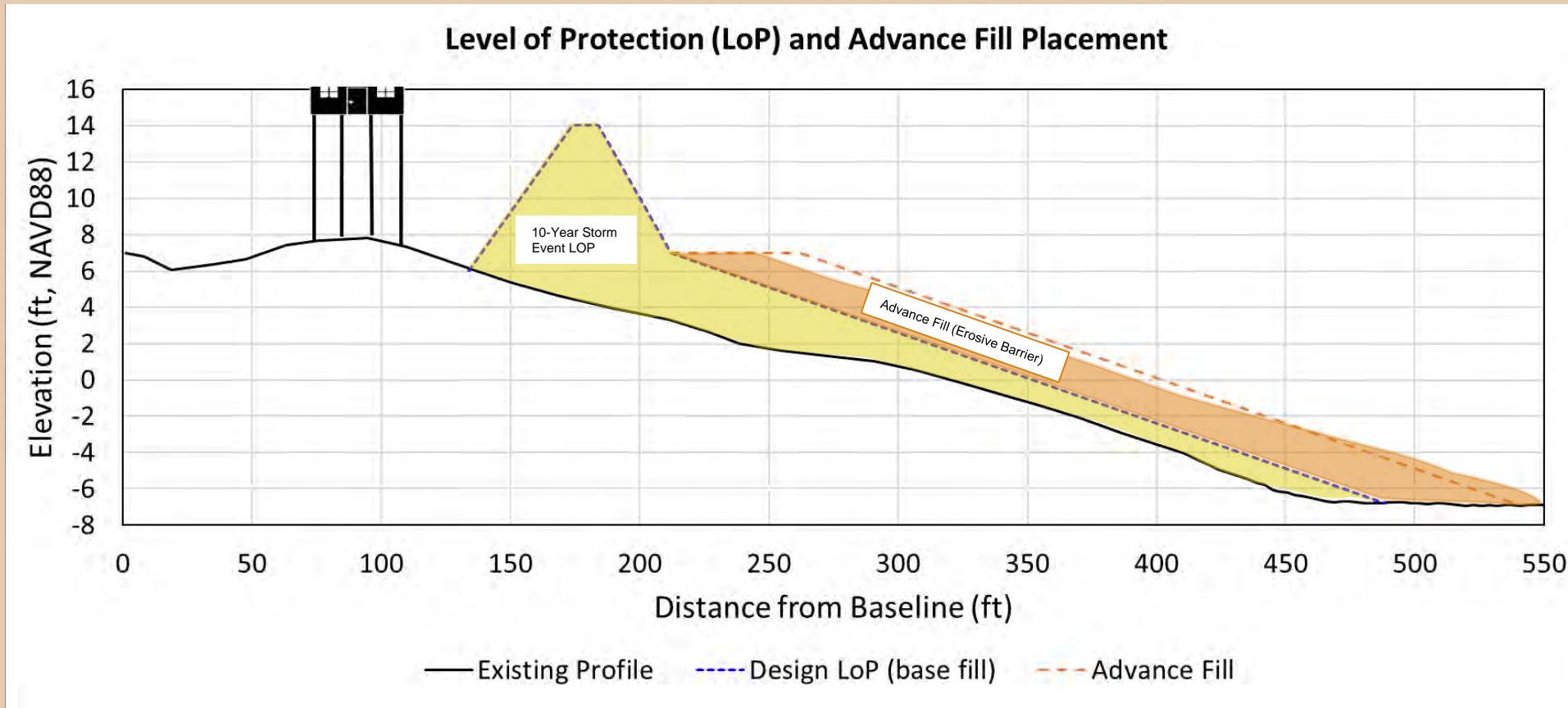
OKI Beach Management Plan Design



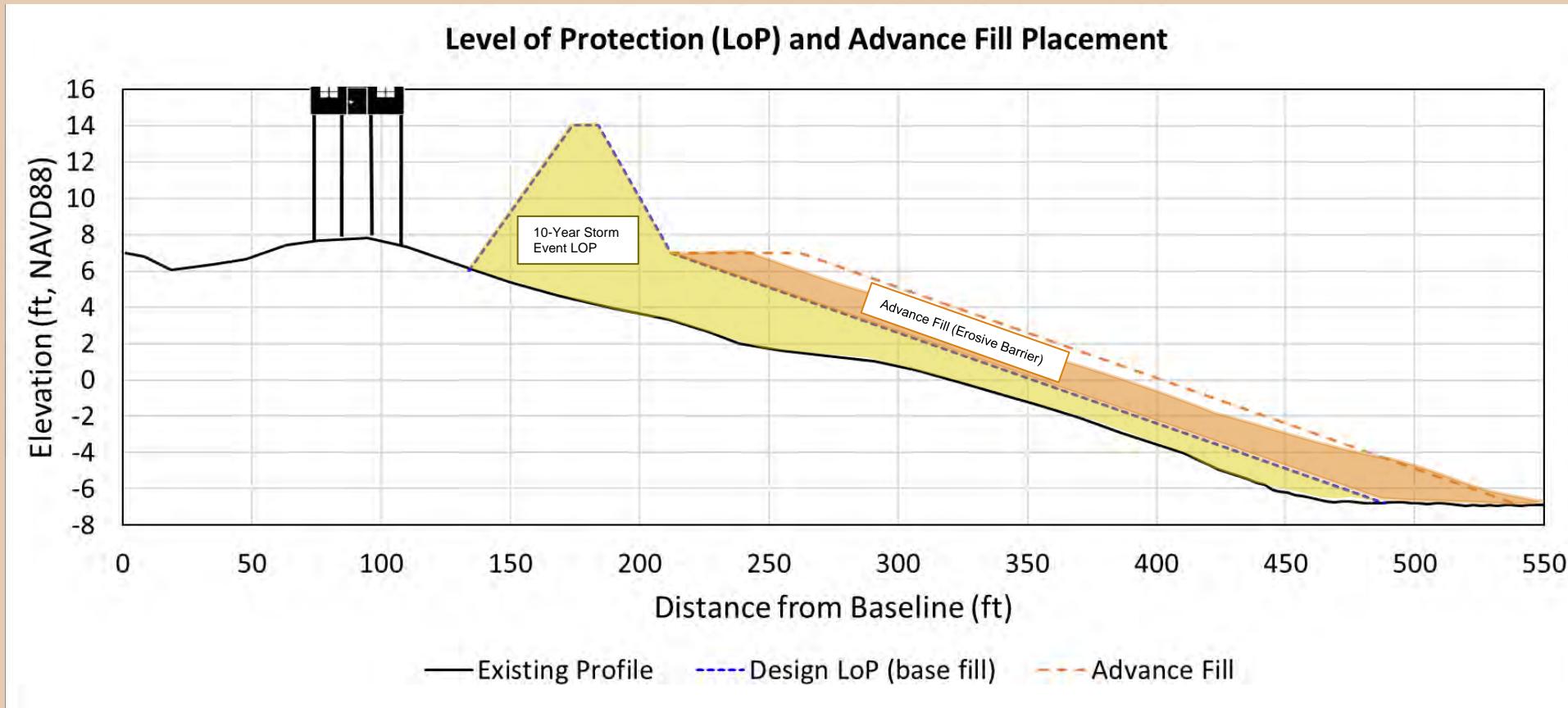
Beach Management Plan Design



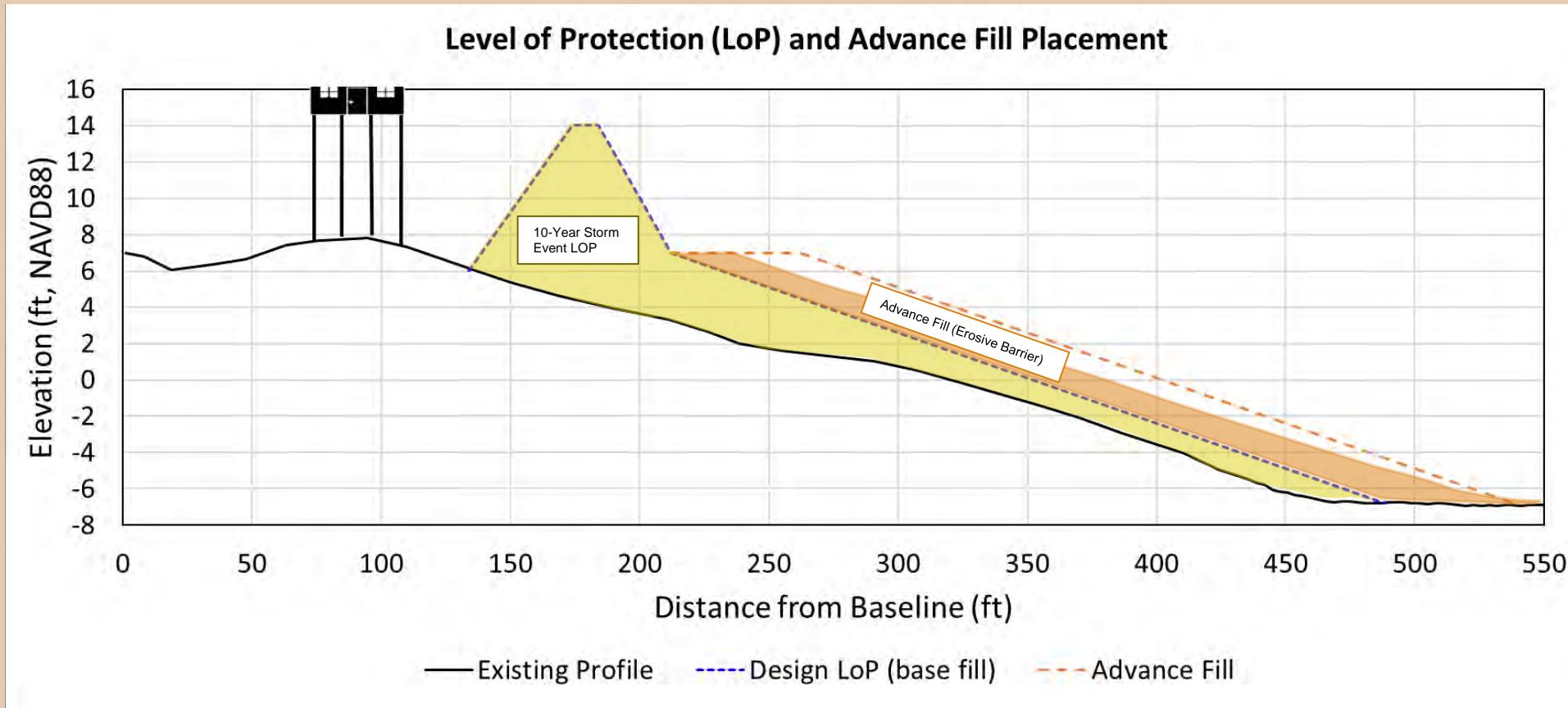
Equilibration and Erosion Over Time



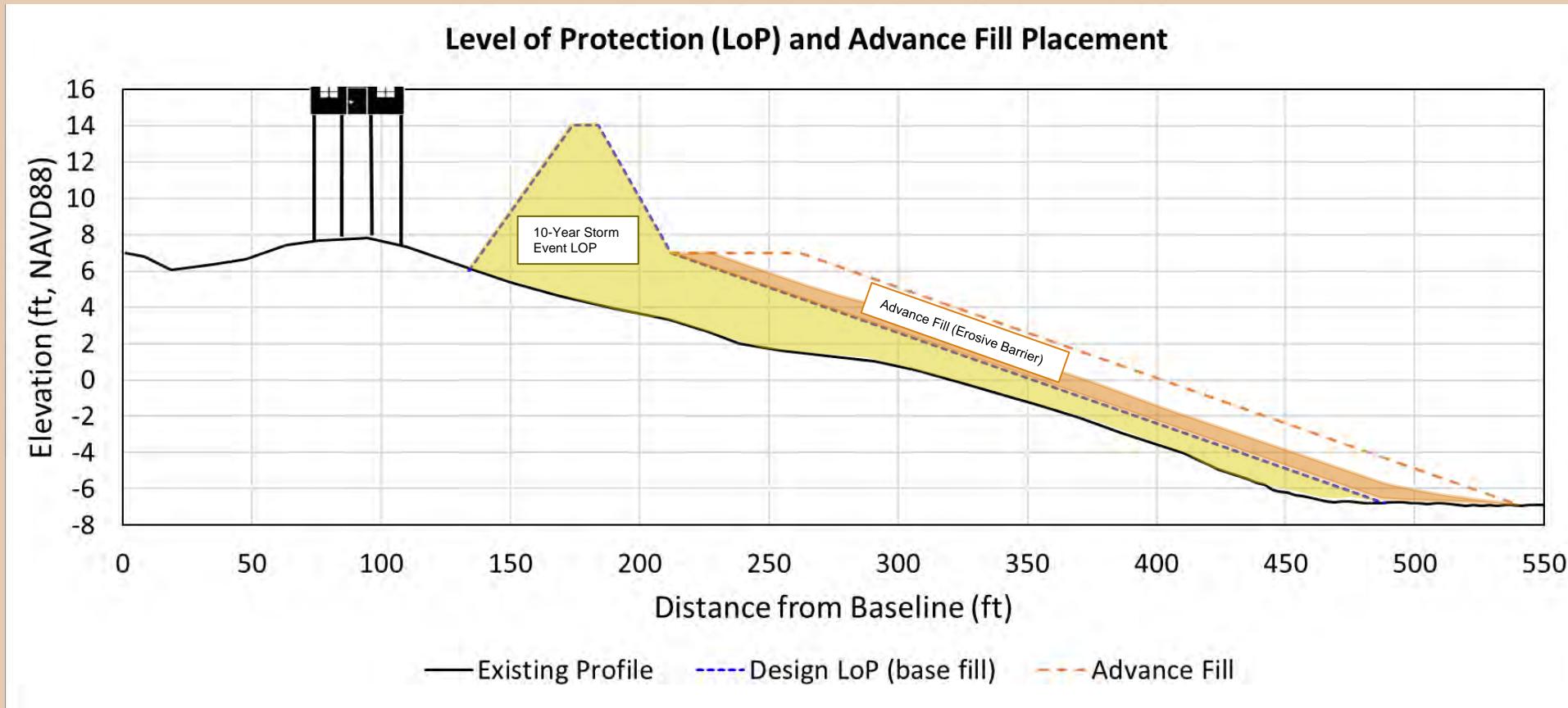
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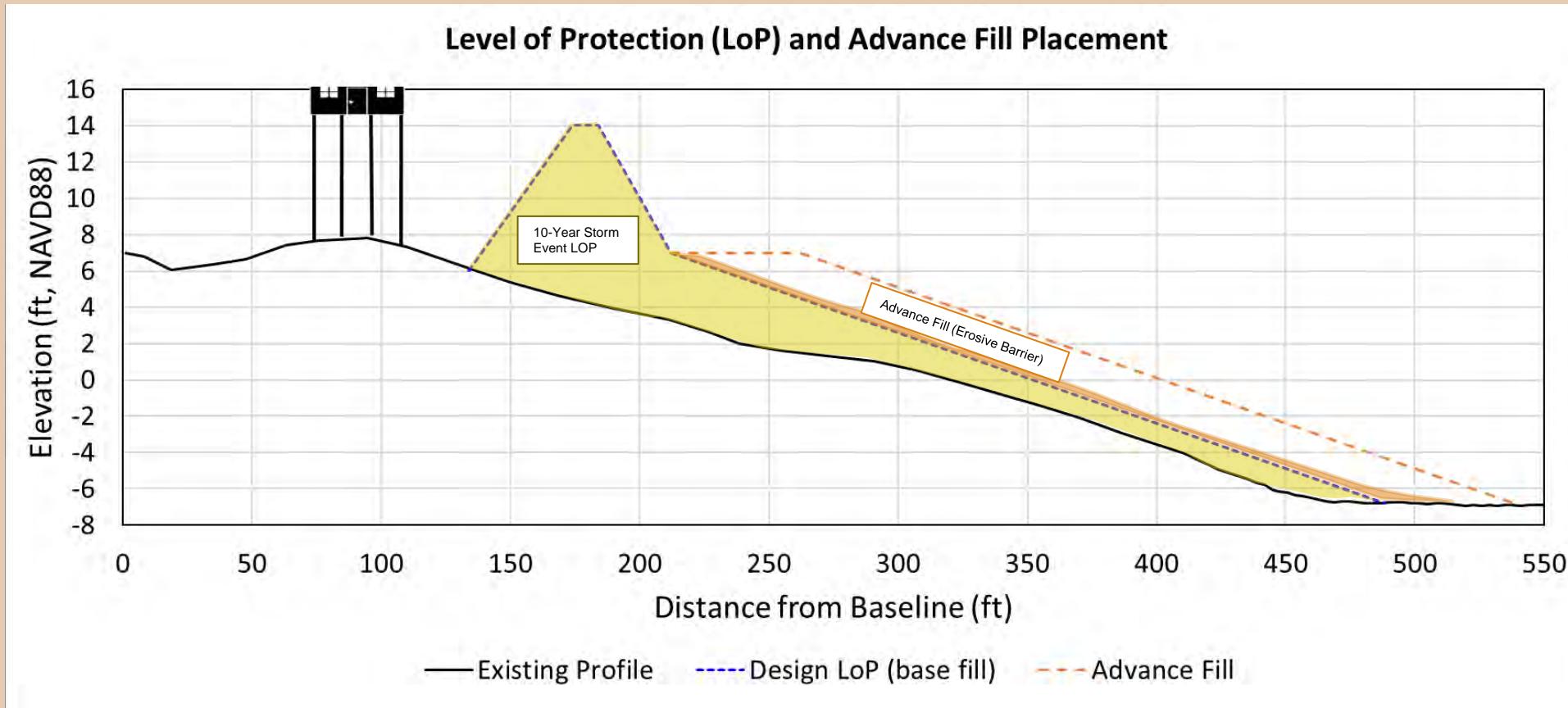
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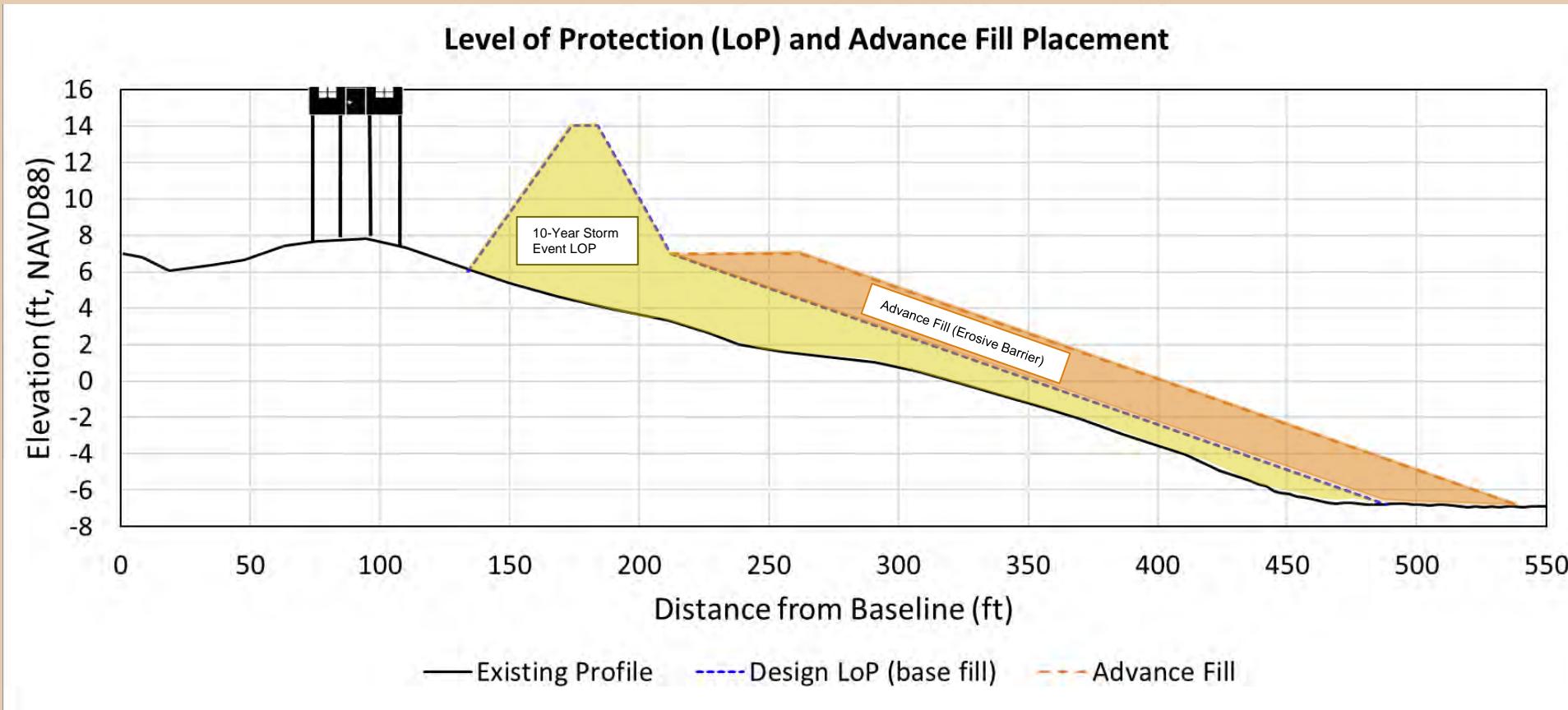
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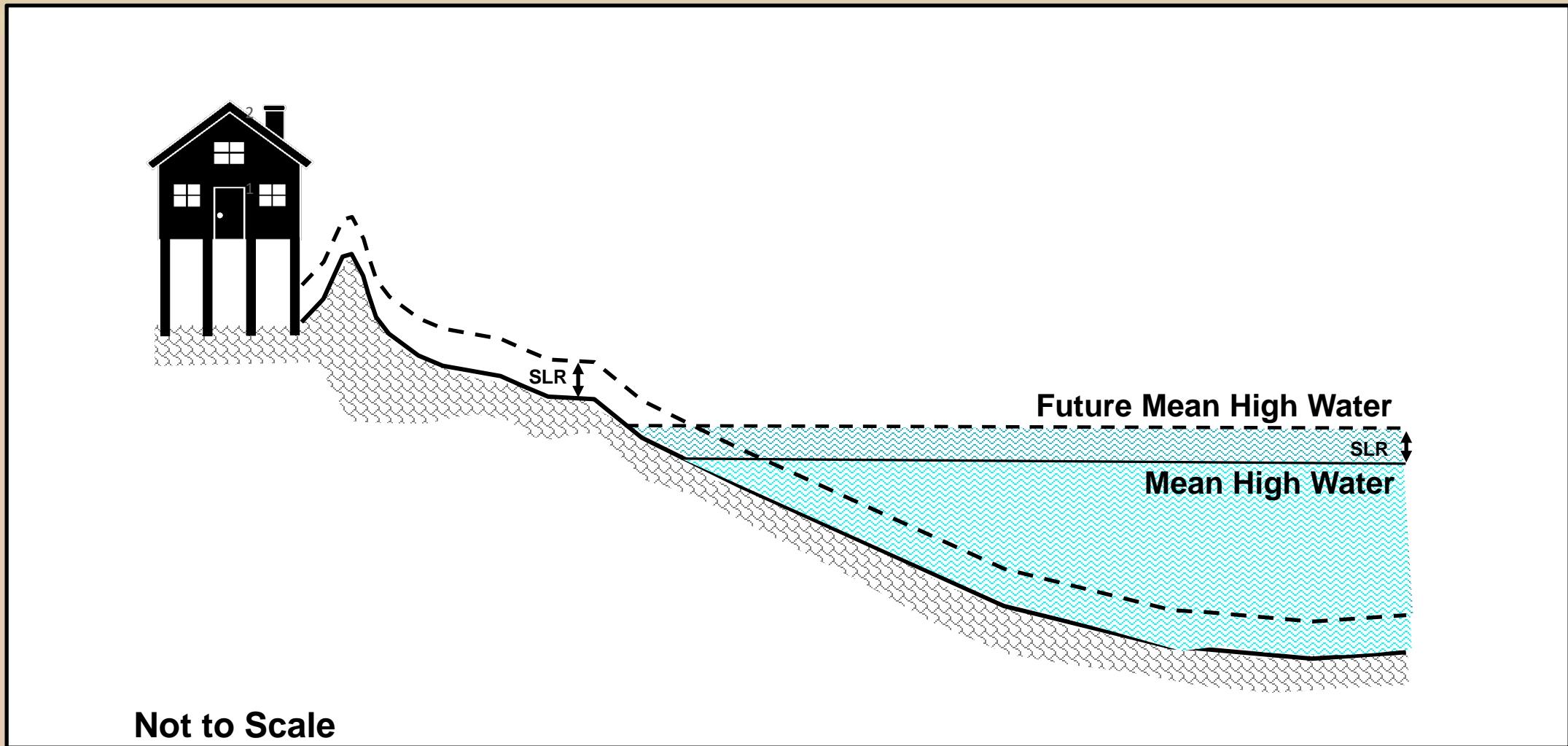
Equilibration and Erosion Over Time



Renourishment Project



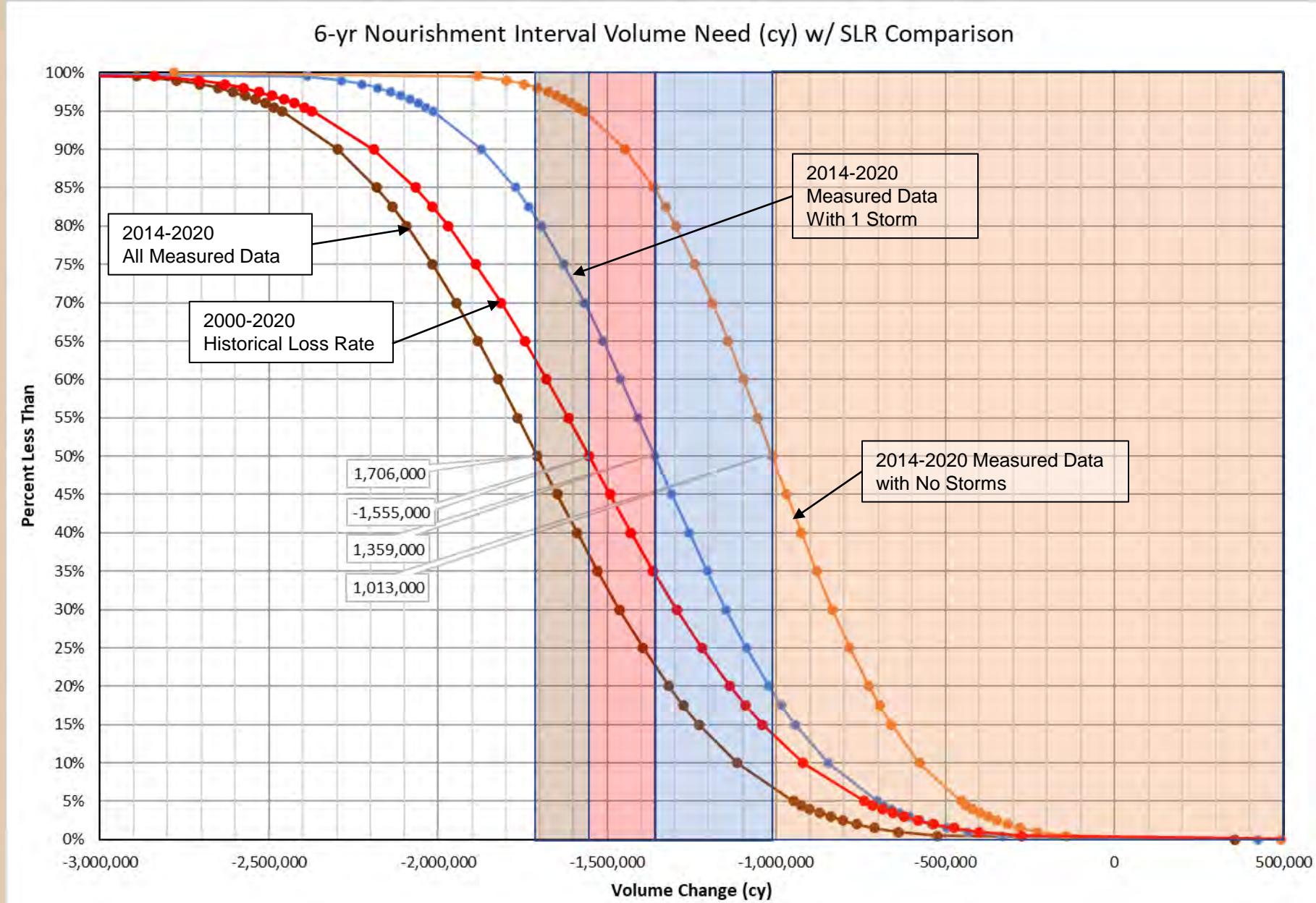
Sea Level Rise Volumetric Estimate Added



Estimated Sea Level Rise (SLR) from 2025 to 2055 is 0.58 feet (7 inches)

Additional volume needed to account for SLR over the life of the plan would be 400,000 cy
or 80,000 cy per 6-year cycle or 13,333 cy/year

6-Year Nourishment Crystal Ball Volume Estimate w/ SLR



Calculation of Sand Needs for Maintenance Events

Historical Beach Nourishment 2001 - 2020

Year	Placement Location	Borrow Area	Project Volume (cy)
2001	Oak Island - East End (Sta 210+00 to 294+00)	Wilmington Harbor Entrance Channel (Ocean Entrance/Baldhead Shoal thru Snows Marsh)	509,000
2001	Oak Island - Central, West, West End (Sta 415+00 to 665+50)	Wilmington Harbor Entrance Channel (Ocean Entrance/Baldhead Shoal thru Snows Marsh)	1,270,000
2001	Oak Island - East (Sta 294+00 to 415+00) & (Sta 309+63 to 399+33)	Yellow Banks	2,650,000
2009	Oak Island - East End (Sta 210+00 to 260+00)	Wilmington Harbor Entrance Channel (Ocean Entrance/Baldhead Shoal thru Snows Marsh)	336,000
2009	Oak Island - West End (57th Pl.)	Lockwoods Folly River Crossing	19,220
2015	Oak Island - West End (Sta 649+50 to 678+64)	Eastern Channel	227,315
2017	Oak Island - East (Sta 300+00 to 373+50)	Upland Borrow Site	37,228
2018	Oak Island- East/Central/West/West End (Sta 300+00 to 410+00, 430+00 to 490+00, 530+00 to 550+00, 570+00 to 600+00, 607+00 to 620+00)	Upland Borrow Site	106,418
2018	Oak Island - East End/East (Sta 210+00 to 310+00)	Wilmington Harbor Entrance Channel (Ocean Entrance/Baldhead Shoal thru Snows Marsh)	640,300
2019	Oak Island - West End (Sta 650+00 to 680+00)	Lockwoods Folly Inlet AIWW Crossing	121,300
		TOTAL MATERIAL PLACED ON OAK ISLAND	5,916,781

Condition of Beach in 2020 Compared to 2020 Based on Documented Shoreline Change **-1,000,000**

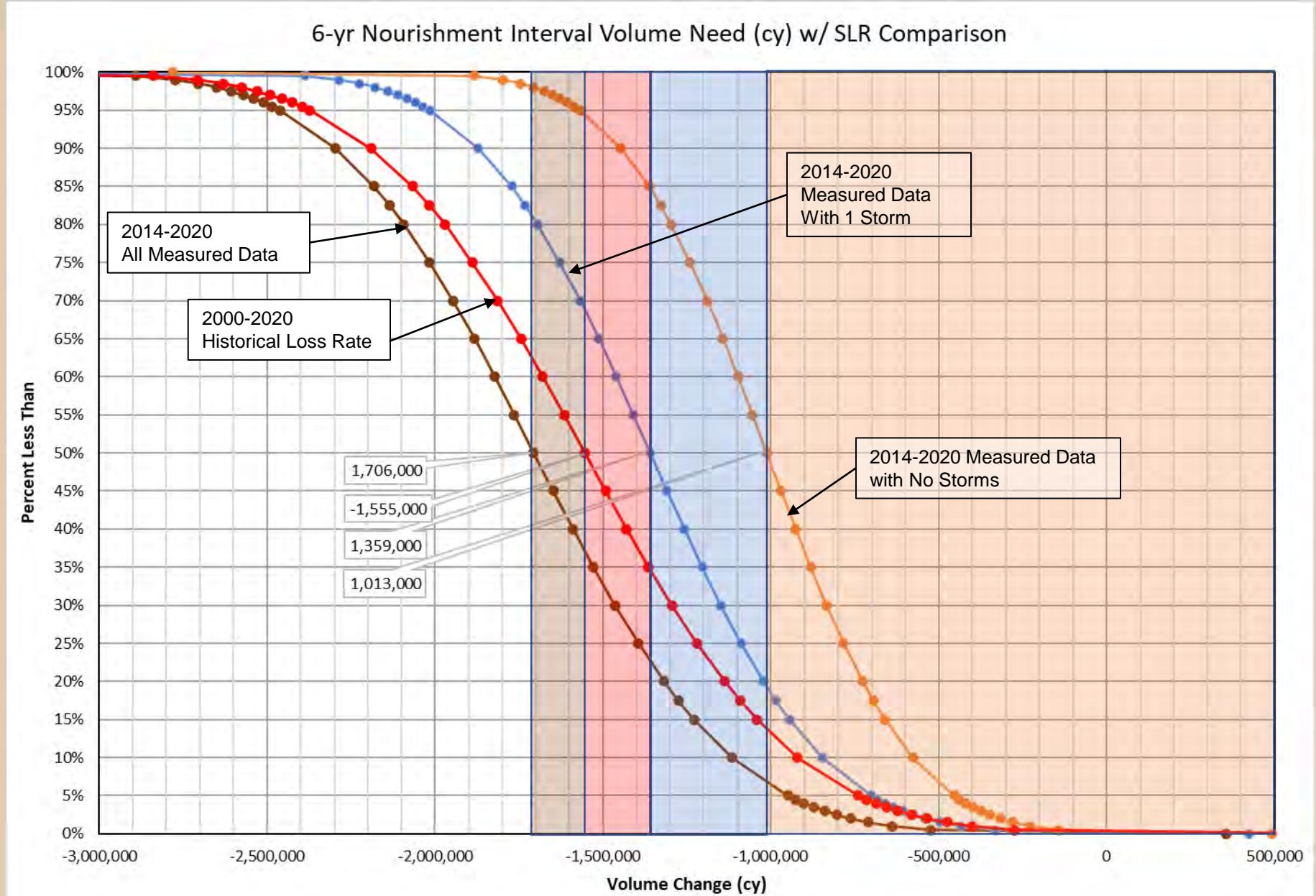
Total Losses Oak Island 2000-2020 **4,916,781**

Average Annual Losses **245,839**

Crystal Ball Annual Losses (w/SLR)

Basis of Annual Material Need for Maintenance Events	Annual Need (cy)	Annual Sea Level Rise (cy)	Total Annual Volume Needed (cy)	6-Year Project Requirement (cy)
2014 – 2020 All Measured Data (with 2 Storms)	271,077	13,333	284,410	1,706,000
2000-2020 Historical Loss Rate	245,839	13,333	259,172	1,555,000
2014 - 2020 Measured Data (with 1 Storm)	213,247	13,333	226,580	1,359,000
2014 – 2020 Measured Data (with No Storms)	155,417	13,333	168,750	1,013,000

6-Year Nourishment Crystal Ball Volume Estimate w/ SLR



6-Year Nourishment Crystal Ball – Probabilities, Costs & Reommendation

Initial Project Construction	Engineering Cost	Mob/Demob	Volume (cy)	Unit Rate (\$/cy)	Total Cost
2024/2025 Oak Island Renourishment Project	\$2,500,000	\$6,500,000	1,650,000	\$18.75	\$39,937,500

Basis of Material Need for Maintenance Events	Engineering Cost	Mob/Demob	Volume (cy)	Unit Rate (\$/cy)	Total Cost	Annual Fund Requirement	Range of Probability of Planning for Enough Sand
2014 – 2020 All Measured Data (with 2 Storms)	\$1,000,000	\$6,500,000	1,706,000	\$18.75	\$39,487,500	\$6,581,250	50% to 98%
2000-2020 Historical Loss Rate	\$1,000,000	\$6,500,000	1,555,000	\$18.75	\$36,656,250	\$6,109,375	37% to 94%
2014 - 2020 Measured Data (with 1 Storm)	\$1,000,000	\$6,500,000	1,359,000	\$18.75	\$32,981,250	\$5,496,875	23% to 85%
2014 – 2020 Measured Data (with No Storms)	\$1,000,000	\$6,500,000	1,013,000	\$18.75	\$26,493,750	\$4,415,625	7% to 50%

Discussion

Thank You!

