

BROOKHAVEN VILLAGE MARINA

EROSION AND RESILIENCY PROJECT





1947



1962



1978

SHORELINE STABILIZATION TECHNIQUES

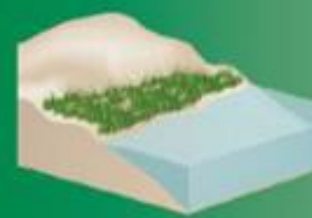
GREEN VS GRAY SOLUTIONS

HOW GREEN OR GRAY SHOULD YOUR SHORELINE SOLUTION BE?

GREEN - SOFTER TECHNIQUES

GRAY - HARDER TECHNIQUES

Living Shorelines



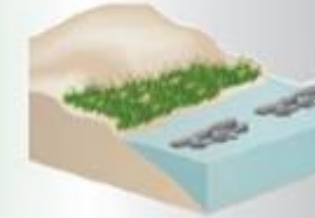
VEGETATION ONLY - Provides a buffer to upland areas and breaks small waves. Suitable only for low wave energy environments.



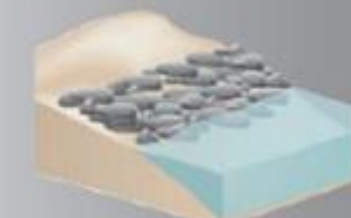
EDGING - Added structure holds the toe of existing or vegetated slope in place.



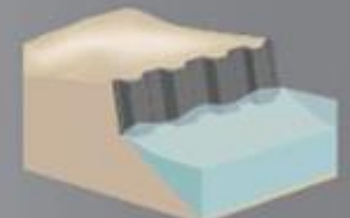
SILLS - Parallel to existing or vegetated shoreline, reduces wave energy, and prevents erosion. Suitable for most areas except high wave energy environments.



BREAKWATER (vegetation optional) - Offshore structures intended to break waves, reducing the force of wave action, and encourage sediment accretion. Suitable for most areas.



REVETMENT - Lays over the slope of the shoreline and protects it from erosion and waves. Suitable for sites with pre-existing hardened shoreline structures.



BULKHEAD - Vertical wall parallel to the shoreline intended to hold soil in place. Suitable for areas highly vulnerable to storm surge and wave forces.

Coastal Structures

A continuum of green (soft) to gray (hard) shoreline stabilization techniques.
(Adapted from SAGE 2015 Natural and Structural Measures for Shoreline Stabilization brochure).

SHORELINE STABILIZATION OPTIONS

- LOW SILL BULKHEAD
 - NO NEW FULL-SIZED BULKHEADS
- ROCK SILL
- COIR LOGS

FULL SIZED (TRADITIONAL) BULKHEADS

- OUTDATED SOLUTION FOR SHORELINE STABILIZATION
- NEW BULKHEADS ARE GENERALLY NOT APPROVED
- PROTECT UPLAND, BUT TO THE DETRIMENT OF WETLANDS
 - WAVE ACTION IS REFLECTED INTO NATURAL SHORELINES CREATING A LOSS OF WETLANDS OVER TIME
- INCREASED EROSION WHERE THE BULKHEAD ENDS
- CREATES A BATHTUB EFFECT, PASSING THE BUCK DOWN THE LINE
- CAN FAIL 'ALL AT ONCE'

LOW SILL BULKHEAD

- BULKHEAD TOPPED EVERY TIDE CYCLE
- STABILIZES TOE OF SLOPE TO PREVENT EROSION
- WETLANDS CREATED LANDWARD OF BULKHEAD
 - SALTWATER FEED PLANTS EVERY TIDE CYCLE
 - PLANTS HOLD ON TO LAND, HELPING PREVENT EROSION
- WELL SUITED FOR:
 - RELATIVELY STRAIGHT SHORELINES
 - PROPERTIES IN BETWEEN FULL SIZED BULKHEADS



LOW SILL BULKHEAD

BEFORE
DURING
AFTER



**LOW SILL
BULKHEAD**

CUTCHOQUE

FEB 2020



LOW SILL BULKHEAD

CUTCHOQUE

JULY 2020



**LOW SILL
BULKHEAD**

CUTCHOQUE

SEPT 2023



LOW SILL BULKHEAD

CUTCHOGUE

JUNE 2020

ROCK SILL

- TOPPED WITH EVERY TIDE CYCLE
- STABILIZES TOE OF SLOPE TO PREVENT EROSION
- WETLANDS CREATED LANDWARD OF ROCK SILL
 - SALTWATER FEED PLANTS EVERY TIDE CYCLE
 - PLANTS HOLD ON TO LAND, HELPING PREVENT EROSION
- CAN FOLLOW CURVATURE OF NATURAL SHORELINE

ROCK SILL



COIR LOGS

- MOST 'GREEN' OPTION
- WETLANDS CREATED LANDWARD OF COIR LOGS
 - SALTWATER FEED PLANTS EVERY TIDE CYCLE
 - PLANTS HOLD ON TO LAND, HELPING PREVENT EROSION
- MADE WITH NATURAL MATERIALS WHICH BREAK DOWN OVER TIME LEAVING A VEGETATED SHORELINE
- MOST EFFECTIVE IN NON-TIDAL ENVIRONMENTS

COIR LOGS



STORMWATER CONTROL

- RAINS ARE HEAVIER THAN THE PAST AND THEY ARE EXPECTED TO BECOME HEAVIER IN THE FUTURE
- SHORELINE ERODES AS STORMWATER RUNS OFF
 - AMOUNT AND SPEED OF WATER ADD TO EROSION
- CAPTURE STORMWATER UPLAND TO PREVENT EROSION
 - RAIN GARDENS AND SWALES



OTHER OPTIONS FOR RESILIENCY

- RAISE THE ROAD 6-8 INCHES, SLOPE AWAY FROM SHORELINE INTO PLANTED AREAS
- STABILIZE TOE AND INSTALL RETAINING WALL LANDWARD
- RAISE THE HEIGHT OF THE FINGER PIERS

FUTURE PROJECTIONS

(FROM 2017)

Long Island Region -The marine coast of Nassau and Suffolk counties.

Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	2 inches	4 inches	6 inches	8 inches	10 inches
2050s	8 inches	11 inches	16 inches	21 inches	30 inches
2080s	13 inches	18 inches	29 inches	39 inches	58 inches
2100	15 inches	21 inches	34 inches	47 inches	72 inches

CURRENT ESTIMATES FOR SEA LEVEL RISE BY 2040

APPROX 6-8 INCH RISE IN
AVERAGE HIGH TIDE BY 2040



PROJECT PLANNING

- ARMY CORP OF ENGINEERS
- DEPT OF STATE
- DEC
 - TIDAL WETLANDS
 - WILD, SCENIC & RECREATIONAL RIVERS (CARMEN'S RIVER)
- TOWN OF BROOKHAVEN WETLANDS
- TOWN OF BROOKHAVEN BUILDING DEPT

PROJECT PLANNING

- TYPICAL RESIDENTIAL PROJECTS GENERALLY RANGE FROM 9-18 MONTHS
 - INCREASED SCOPE COMES INCREASED REVIEW
- SOME PIECES OF THE PROJECT HAVE ALREADY BEEN COMPLETED
- NOT URGENT – MORE MEDIUM TO LONG TERM PLANNING

PROJECT PLANNING

- WORK CAN BE COMPLETED OVER TIME
 - DEC PERMIT VALID FOR 5 YEARS
 - CAN BE RENEWED FOR ANOTHER 5 YEARS FOR TOTAL OF 10 YRS
 - TOWN WETLAND PERMITS VALID FOR ABOUT 2 YEARS AND CAN BE RENEWED
 - IF BUILDING PERMIT REQUIRED, WETLANDS PERMIT STAYS VALID AS LONG AS BUILDING PERMIT IS ACTIVE

RESOURCES



- [DEC LIVING SHORELINE DOCUMENT](#)
- [NOAA SEA LEVEL RISE MAPPER](#)

QUESTIONS?



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