



Stabilizing the Coastal Bank: Protecting Baxter Road and the North Bluff in 'Sconset

A Project Proposal from Siasconset Beach Preservation Fund

Since 1992, Siasconset Beach Preservation Fund (SBPF) has worked to preserve the remarkable natural landscape of the 'Sconset North Bluff and to protect Baxter Road, and the historic homes and bluff walk along its border. Despite those efforts, the eroding bluff has continued to lose an average of three to four feet annually from north of Sankaty Lighthouse to midway down Baxter Road. The lighthouse and seven homes have been relocated, and seven other residences have been moved out of harm's way to the edge of Baxter Road, on their existing properties.

SBPF is proposing a system to ensure bluff stabilization and revegetation, and beach preservation and protection of residences and Town infrastructure, in a way that will be environmentally unobtrusive and effective.

Protecting Nantucket's assets

It is now evident that cherished parts of the Island, including historic 'Sconset Village, will eventually disappear if the erosion trends of the last 60 years continue. Predictions of a rising sea level and the unabated incidence of hurricanes and Nor'easter storms underscore this peril. Baxter Road, the only access to Nantucket's recently preserved Sankaty Head Lighthouse and to many homes in that area, will likely be endangered, at significant cost to the landowners and to the Town of Nantucket and its taxpayers.

This project simply protects—in accordance with state and local regulations—access to Sankaty Head Lighthouse, the north end of Baxter Road and the existing community of homes, many of which are historically important.

Our proposed approach for ending the adverse effects of erosion and damage to these properties is designed for implementation without harming nearby beaches. This project is similar to remedies that have successfully forestalled erosion on Nantucket and elsewhere. It has been designed to function effectively and safely for many years to come, even as the sea level continues to rise. It should demonstrate an easily maintained, environmentally sensitive erosion control solution that will protect adjacent upland properties and Town infrastructure.

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The project

This proposal involves placing strong but flexible *geogrid-mesh* containers called *marine mattresses* and *gabions* on the ‘Sconset coastal bank, where temporary sand bag terraces have already been permitted. Made of tough, high-tensile-strength polymeric material, these water-filtering containers will be covered with beach-compatible sand. The upper section of the system will be planted over with native vegetation to blend into the landscape and to re-establish wildlife habitat lost to erosion.

The *marine mattresses* portion of the system consist of “mattress-shaped” containers measuring 18-inches thick and filled with angular stones up to a half-foot in diameter. These will be laid on the face of the coastal bank.

The *gabion baskets* are made of the same material formed into rectangular, box-like shapes, each four-feet in height and filled with angular stones measuring approximately one-two feet in diameter. These will be buried at the toe of the coastal bank to help prevent sand from being scoured away from below where the marine mattresses are installed (*see illustration*).

The beach-compatible sand covering the mattresses or gabions will regularly wash away during large winter storms. This is a likely and desired development that replicates the natural supply of sand being transferred by bank erosion to adjacent beaches. When this happens, SBPF will replace the sand annually in late spring to once again cover the mattresses and gabions. This will preserve the natural appearance of the bluff and beach. Additional “sacrificial sand” will be deposited at the ends of the protected areas to mitigate against additional scouring that might occur in those locations.

How it works

These stone-filled containers will be positioned on the face of the bank slope, so that waves running up the bank will gradually dissipate during coastal storms. The installation will follow the contours of the existing bank and provide a sand cover planted with native vegetation on the higher bank face. This protected area will remain visually pleasing and consistent with the appearance of adjacent natural coastal bank areas that have not yet eroded.

In large storms, when waves might otherwise wash up and undermine the sand at the toe of the coastal bank, the gabions will absorb the impact of waves. Since these cages filled with stones are porous, seawater will drain through them and flow back to the ocean. The mattresses will extend up the bank approximately 18 feet above the beach, to stabilize and protect the bank from erosion caused by strong storms of a “once-in-a-hundred-years” magnitude.

The weight and size of the angular stones enclosed within the geogrid containers, along with a rigorous anchoring system, will prevent them from moving, so that they cannot be washed out to sea or swept along the coast, even during the strongest storms.

Sand that moves along the beach due to wave action, the process known as *littoral drift*, will continue doing so without interruption from the installation. Through the littoral drift process, new sand placed over and at the ends of the gabions will nourish adjacent

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beaches as it washes away and is later replaced, thus continuing the natural beach regeneration process.

A benefit of this particular mattress and gabion design is that it can be fabricated off-site, brought to the site by truck, and then placed accurately using Nantucket-based equipment and labor. The installation will be readily maintained using local labor and machinery.

Proposed project location

This proposed installation will be located within the 2,500-foot section of the coastal bank from 99 Baxter Road to 55 Baxter Road, running along roughly 10 properties north and 10 properties south of the intersection of Baxter Road with Bayberry Lane. Five or more individual homeowners within the pilot area will install mattresses and gabions in front of their properties, protecting some 500 – 1,000 feet of eroding bank.

A similar marine mattress system was installed on the north shore of Nantucket at Hinckley Lane in 2005 (*see photos*). Already tested by several strong coastal storms, the system has performed well in that location. Another was installed in 2007 on Martha's Vineyard, under the direction of the Oak Bluffs Selectmen, to protect a threatened road. That has also performed as promised and has provided the desired protection. In both locations, no debris has been created and no further erosion or harm to neighboring beaches has occurred.

The most extensive marine mattress protection of this kind in the Northeast U.S. was installed at Cape May, New Jersey in 1996. Before being incorporated eight years later into a much longer beach-fill effort, this installation served as the sole protection in its location for commercial buildings, homes and critical infrastructure. During that initial period, this approximately 500-foot long system successfully weathered several extreme storms with no reported damage or loss of functionality, including after the particularly energetic 1997-1998 storm season that resulted in a Presidential Disaster Declaration. Many conservationists and engineers consider systems like this to be among the most environmentally friendly of effective erosion control methods when coupled with the regular replacement of washed away sand. The systems on Hinckley Lane, at Oak Bluffs and in Cape May have required only minimal or no repairs to their geogrid mattress and gabion structures.

This newly proposed project will be more secure and easier to sustain than other systems. It clearly offers the potential of a long-term solution that preserves the bluff, protects Baxter Road and the properties there, and naturally replenishes sand along the beach. Again, the end result will be the long-term protection and preservation of 'Sconset itself.

Paying for the project

Each abutting homeowner will decide whether to participate in the pilot project and will pay the costs of its installation and maintenance through SBPF. An escrow fund, covering the costs of possible removal if required, will be established and will be accessible by the Town in the event that any property owner does not comply with maintenance agreements or fails to replenish the sand as required.

The project has been conceived and designed to have no negative impacts on neighboring beaches, the environment in general and the Island at large. Nonetheless, if the overall project or an element of it fails or causes adverse effects, the stone-filled mattresses and gabions can be readily removed, using similar local equipment and labor to what was used in their installation.

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An island-wide challenge

SBPF has been in contact with other Nantucket shoreline homeowners who are experiencing similar erosion problems. We're reaching out to owners of property in Madaket, Sheep's Pond, Eel Point, Surfside, Dionis and elsewhere. We support other Island-wide efforts to stop or delay the destructive effects of erosion.

Public input

SBPF consulted with a wide range of the Island's leaders, to get their input and questions about this proposed project, so that we could address them before the proposal was formally submitted to the required permitting agencies.

We continue to invite public questions and feedback and will soon launch a revised version of our website and a Facebook page to facilitate that interaction. On our website, www.sconsetbeach.org, we make available technical details and public filings related to our proposal, including our formal Notice of Intent (NOI) that was filed in June with Nantucket Conservation Commission (after the Nantucket Board of Selectmen reviewed our proposal and had no objections to us going forward with the application for ConCom).

We also include sections devoted to the history of the 'Sconset Bluff and its importance to Nantucket, articles about the wider issue of erosion on Nantucket and elsewhere, the impact of erosion on Nantucket's tax base, and recent articles about our project and other local erosion issues. Additionally, we answer frequently asked questions about our proposal (FAQs) and invite further inquiries.

SBPF will continue to confer with those who were active in the talks about the previous erosion management efforts and with other concerned citizens. Because we've tried to answer concerns that people expressed with our previous proposal, we hope that our current plan will meet with approval from some of our former opponents and local regulatory agencies.

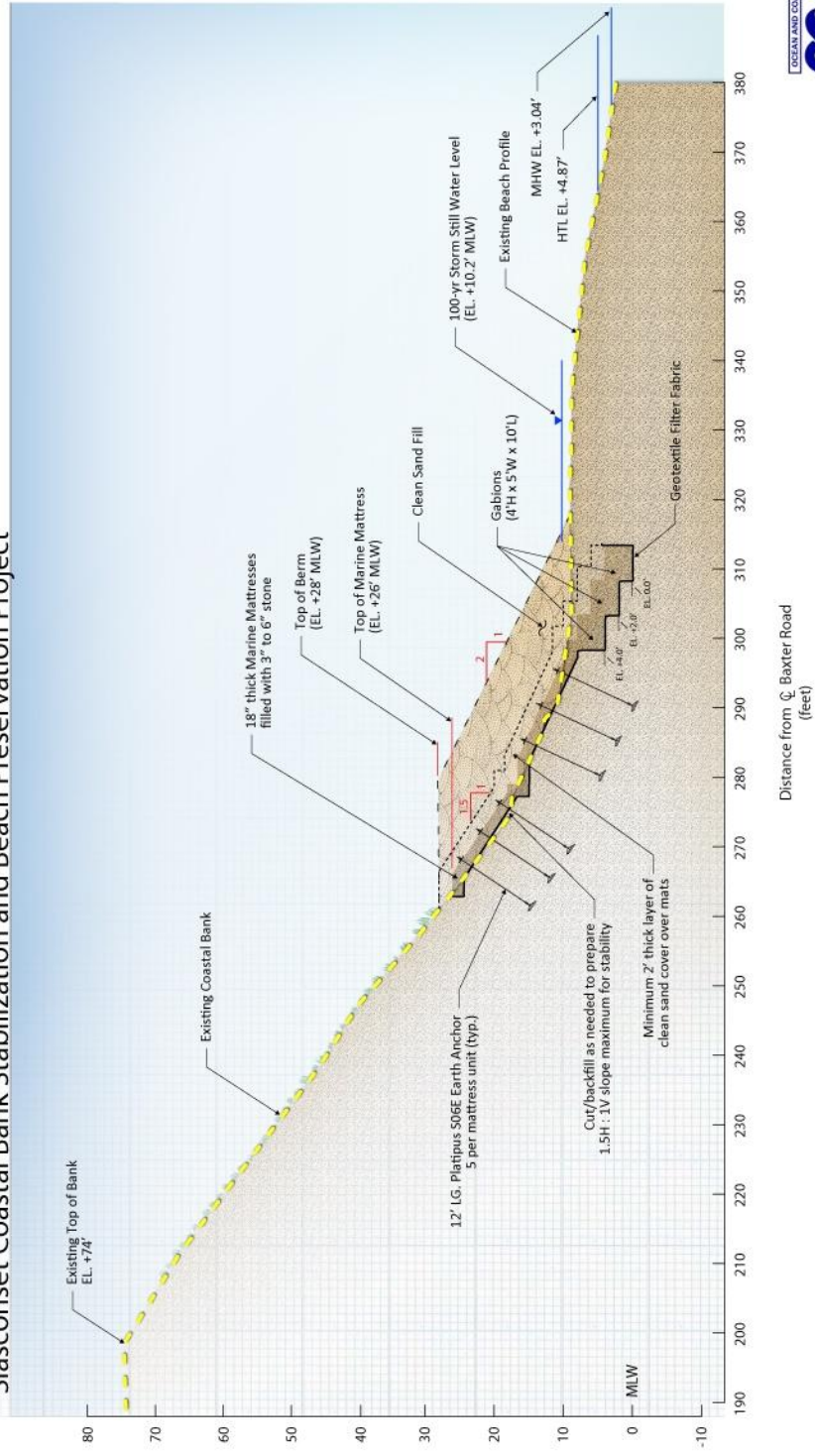
Attached is an easy-to-read diagram that illustrates the basic installation aspects of our proposal and photos of an existing similar Nantucket installation. A sample of a *marine mattress* to be used in the installation is located at Holdgate Partners Construction on Barnard Valley Road, a left-hand turn off Milestone Road approximately two miles from The Rotary. (We are developing a custom-color for the mesh-grid that's used to contain the gabions and mattresses, to blend completely into the local landscape.)

For more detailed information or to comment on this proposal, please call Jenny Garneau at 508-325-0048. We welcome your inquiries through her or via emails to our Facebook page "Siasconset Beach Preservation Fund."

* See included letter updating the most recent developments about our proposal and our application process.

Typical Section

Siasconset Coastal Bank Stabilization and Beach Preservation Project





Marine mattress system installed on Hinckley Lane, Nantucket