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July 19, 2013

Dr. Ernie Steinauer, Chair
Nantucket Conservation Commission

4 Bathing Beach Road
Nantucket, MA 02554

Re: NOI, Baxter Road and Sconset Bluff Storm Damage Prevention Project

Dear Commissioners,

The Nantucket Land Council, Inc. is a non-profit, environmental organization, which is supported by more than 1800 members. We have reviewed the Notice of Intent materials for Siasconset Beach Preservation Fund's Baxter Road and Sconset Bluff Storm Damage Prevention Project. We are providing comments and questions from our technical consultants, Applied Coastal Research and Engineering, Inc.

Thank you for your time,

Emily MacKinnon
Resource Ecologist

Honorary Director

Suzanne Mueller

Enclosure

Staff

Cormac Collier
Executive Director

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Applied Coastal Research and Engineering, Inc.
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MEMORANDUM

Date: July 19, 2013
To: Emily MacKinnon and Cormac Collier, Nantucket Land Council
From: John Ramsey, P.E. and Trey Ruthven
Subject: Baxter Road and Sconset Bluff Storm Damage Prevention Project

We have completed a review of the Bluff Storm Damage Prevention Project Notice of Intent (NOI) submitted by the Siasconset Beach Preservation Fund (SBPF) on July 2, 2013. The latest proposal includes an armor stone revetment that extends along 4,253 feet (0.81 miles) to be constructed in two phases. The project represents a substantial coastal armoring project of the Sconset Bluff, which is the primary sediment source to the beach system along the eastern shoreline of Nantucket. Although the impacts of this project would cause a complete loss of the sediment supply along the armored section, no *proactive* beach nourishment volume has been proposed. Furthermore, the NOI further indicates that future mitigation will not be based upon observed bluff/beach erosion rates that are well-documented, but rather on a much more complicated and non-specific analysis of shoreline movement and beach volume changes. Overall, the proposed project represents a substantial enlargement of coastal armoring in comparison to the stone mattress project denied by the Commission last year; however, the mitigation offered for this large-scale project is minimal. While sand mitigation is a critical issue for ensuring that a coastal armoring project does not impact adjacent areas, other concerns include the following:

1. The Applicant provided numerous examples of armor stone revetments along the coast of Massachusetts; however it is unclear (a) whether any of these (or other) revetments are in an area with bluff erosion rates in excess of 5 feet per year and (b) what the long-term impact on downdrift beaches has been as a result of revetment construction. The NOI also indicates that numerous properties experienced bluff erosion rates of more than 20 feet (with a maximum of 43 feet for Lot #87) during the 2012-2013 storm season. These excessive erosion rates will be problematic for both the stability of the revetment and the stability of the beach fronting the revetment. The applicant should provide examples of where revetments have been successful on coastal banks/bluffs with erosion rates similar to the Sconset Bluff, where the structure has provided long-term bank stability and downdrift impacts have been negligible and/or mitigated with nourishment.
2. As part of the previous submittal for coastal armoring, SBPF provided a calculation of mitigation sand needed to offset the construction of coastal armoring of the Sconset Bluff. Applied Coastal indicated that the volume calculated was approximately 13% less than the total provided by the coastal bank to the littoral system. Based on updated calculations by Applied Coastal, the appropriate volume of nourishment that should be supplied to the

beach on an annual basis has been provided below. This volume represents the minimum annual nourishment necessary to mitigate for the proposed project and indicates that approximately 90,164 cubic yards would be required for a 4,253 ft length of beach each year. Additional material can be added to ensure the project end effects are mitigated. This volume is based on erosion rates provided as part of the 2012 SBPF coastal armoring NOI and likely should be updated with the erosion information from the 2012-2013 storm season.

Based on the information provided in the NOI (Table 1), it appears that the mitigation volumes calculated in 2012 may underestimate the appropriate annual mitigation volume for this NOI.

Total volumes of nourishment required for mitigation with fines included (based on sand pit data provided by SBPF for their previous coastal armoring proposal in 2012):

Ries: $19.1 + 1.7 = 20.8$ cy/yr/lf

Holdgate: $20.5 + 1.7 = 22.2$ cy/yr/lf

Composite: $19.5 + 1.7 = 21.2$ cy/yr/lf

3. The purpose of mitigation nourishment is to maintain the sediment supply that naturally erodes from the coastal bank. Once the rock revetment prevents erosion of the coastal bank, coastal bank materials are no longer available to supply downdrift beaches. Therefore, the minimum annual mitigation should be based on the historic bank erosion rate (see #2, above) rather than monitoring results. Monitoring should only be utilized to indicate where placement of mitigation material is critical. The placement of beach nourishment mitigation should not be limited to the area of the project. Due to the large volume of annual mitigation that would be required for this large-scale project, it is likely that the beach fronting the revetment will not be able to hold the volume of annual nourishment required; therefore, the applicant should consider placement of nourishment both north and south of the proposed project.
4. The volume of material need to offset the annual impacts of the proposed revetment is substantial and likely will require additional regulatory review (i.e. Chapter 91 and U.S. Army Corps of Engineers). In addition, the NOI should include considerations for delivering these large volumes of material to the Sconset shoreline. Due to the large volume of mitigation required, it is likely that the source of this material would be off-island.
5. The Shoreline Monitoring Plan should include additional transects on regular intervals (50-100 foot intervals) immediately updrift and downdrift of the proposed project to monitor the project for end effects and increased erosion along the adjacent shoreline and coastal bank. The monitoring survey should be conducted pre- and post- nourishments to allow for quantification of shoreline variations and movements This near-field monitoring is critical to ensure that the structures are not having adverse impacts on properties immediately adjacent to the project.
6. The survey provided in the plans dates back to 2010. Due to the significant erosion that has occurred over the past 3 years, the NOI plans should be revised to show present conditions. Since the coastal bank has shifted landward and is over-steepened in many areas, the NOI should demonstrate that the stabilized coastal bank is not steeper than the angle of repose for the sand-dominated substrate (i.e. with a slope no steeper than approximately 2:1 (horizontal:vertical)).

Reviewing the data and calculations presented within the NOI for the 2012 Sconset Bluff armoring project demonstrate that the coastal bank erodes approximately five feet per year on an annual basis. At a minimum the mitigation should compensate for the material that will no longer be supplied by the coastal bank to the littoral system. Failure to adequately mitigate for the project will shift and magnify erosion onto the Town owned beach and neighboring properties along the coastal bank. The analysis indicates that the minimum annual mitigation nourishment should be on the order of 20.8 to 22.2 cy/lf or approximately 90,000 cy per year. That mitigation volume would provide for one-to-one mitigation of the material that is currently being provided from the coastal bank to the littoral system. It is important to note that the one-to-one mitigation does not account for any additional erosion which is likely to occur due to end effects, wave reflection, and disturbance of the coastal bank and beach during construction. The goal of mitigation is not to prevent erosion in front of the proposed structure, but to prevent the acceleration of erosion on adjacent shorelines. For this reason, monitoring beach elevation and/or sand cover in the vicinity of the project is meaningless relative to mitigation needs.