

MEMORANDUM

TO: Kara Buzanoski, Director of Public Works, Town of Nantucket

FROM: Nicolle Burnham, Milone & MacBroom, Inc.

DATE: September 24, 2013

RE: Design Basis Document
Baxter Road Temporary Stabilization
Nantucket, Massachusetts
MMI #2967-11

Per your request, Milone & MacBroom, Inc. (MMI) has initiated study of certain sections of Baxter Road to evaluate the feasibility of options for stabilizing the roadway temporarily. The roadway is parallel to the steep bluff that overlooks that Atlantic Ocean and is receding due to wave attack. This area has been the subject of lengthy discussion between the town, the Sconset Beach Preservation Fund (SBPF) and consultants for the SBPF. The intent of this memorandum is to define MMI's understanding of the project goals, project limits, and design criteria. The information presented herein will be used as the basis for MMI's alternative evaluation.

Project Goals

The goal of the project is to maintain vehicular access and utility service to the residential properties on Baxter Road from Bayberry Lane north to the Sankaty Head Lighthouse.

Project Limits

MMI's evaluation is limited to those areas where Baxter Road appears in imminent danger of failure from bank failure. Specifically, our project area extends from 85 to 91 Baxter Road and from 99 to 107.

Design Criteria

For the purposes of MMI's work, measures installed will be considered temporary and intended to provide some level of protection for the short term, while long term solutions are considered by the SBPF and the town. The town has requested that the measures implemented under MMI's work consider a three year design life. Given the varied erosion rates from year to year it is not possible to guarantee a specific design life of stabilization measures here. After considering the project site and having discussions with Haley & Aldrich, who has performed geotechnical evaluations on behalf of SBPF, we believe there are two potential failures categories that may occur within the project area – global failure and local failure.

Global failure would be a catastrophic bank failure caused by undermining at the toe by wave action. This type of failure may occur during coastal storm events with high onshore wind and wave action. The possibility for this type of failure is heightened by the fact that geotechnical investigations of the area revealed a sand lens at approximately the beach elevation. This lens is particularly vulnerable to wave attack – more so than the glacial till deposits that extend up the bank to the road elevation. Accurately predicting the design life of any stabilization measure is difficult at best since the erosion rate is influenced by the magnitude, frequency and duration of coastal storm events.

Local failure would result along smaller sections and is more likely to be caused by runoff discharging from the top of the bank and running down the exposed face. This is a daily threat that may occur from

rainfall, excess irrigation water applied to lawns or groundwater seepage and the result is small, localized slides or sloughs that appear to be occurring along the bank length. While these are minor in nature we believe they should be prevented to the extent practicable.

Through our current alternatives analysis MMI will seek to address the potential for failure and provide emergency access in the event of catastrophic global failure. To facilitate this we intend to pursue means of accomplishing the following:

1. Preventing or minimizing "run-on" to the slope.
2. Methods of holding Baxter Road in its current location from 85 to 91 and from 99 to 107. This may include sheeting, geotubes, and the like.
3. Utility relocations and disconnections.
4. Monitoring the bank for signs of pending global failure.
5. Alternative Baxter Road location as recommended by town staff in their alternatives analysis.
6. Preparation of an emergency response plan to be followed by the town in the event that failure of the road does occur.

MMI will proceed with this evaluation throughout this week and will discuss the preliminary results with the town at a conference call on September 27, 2013. If the methods laid out here are not consistent with the town's expectations please let us know as soon as possible.