



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER RESOURCES
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WETLANDS & SUBAQUEOUS
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Technical Response Memorandum

To: Robert Haynes, Hearing Officer

Through: Kathy Bunting-Howarth *KBH 11/4/09*
Laura Herr *LH 11/4/09*

From: Jim Chaconas *JC 11/10/09*

Date: November 4, 2009

Subject: Prime Hook Beach Organization, Inc. Subaqueous Lands Permit Application to rebuild the existing dune line using approximately 20,500 cubic yards of sand scraped from just above the mean low water line to the existing protective dune line at Prime Hook Beach on the Delaware Bay in Sussex County, Delaware

Introduction

This Technical Response Memorandum (TRM) presents the Wetlands and Subaqueous Lands Section's (WSLS) findings regarding the above-referenced permit application. The TRM also addresses comments presented at the public hearing held on June 3, 2009. The applicant, Prime Hook Beach Organization, Inc., proposes to rebuild 7,400 linear feet of artificial dune along the Delaware Bay at Prime Hook Beach, a residential beachside community. The dune will be rebuilt using 20,500 cubic yards of sand mechanically scraped from the beach in front of the dunes, including the foreshore. For purposes of this TRM the foreshore is considered to be the intertidal zone between the mean low water and mean high water lines. Scraping is proposed to be conducted by bulldozing sand from approximately 20 feet landward of the mean low water line up to the existing dune line, encompassing an area of approximately 25 acres. The maximum scraping depth will be 24 inches at the observed high tide line. In addition to rebuilding the dune line, an additional 10 feet of width will be added to the dunes. The dune line will serve to protect the adjoining residential community of Prime Hook Beach. The entire beach at this location was scraped approximately 11 years ago, at which time the dune line was rebuilt. According to the applicant, most of the damage to the dune line prompting the submittal of this permit application occurred during two storm events, Hurricane Ernesto in 2006 and the Mother's Day storm (a relatively severe northeaster) of 2008.

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The public hearing was held in response to comments received, some requesting a hearing, during the initial 20 day public notice advertising the application. The comments included concerns about property ownership, specifically if the beach and foreshore are privately owned by the residents of the beach community; and issues associated with longshore transport of sand and the effect that removing sand from the intertidal zone might have on the beaches of a neighboring beach community – Broadkill Beach. Comments in favor and opposed to the project were received in advance of, and during the hearing. The majority of the favorable comments came from the residents of Prime Hook Beach.

Additionally, the Department's Division of Fish and Wildlife, Natural Heritage Program expressed concerns that the project could negatively impact horseshoe crabs using the beach for spawning, and migratory shorebirds using the beach for feeding and roosting. Because the horseshoe crab and migratory shorebird use of the beach is seasonal, they recommended a seasonal restriction prohibiting any work from April 15 through August 30.

In addition to addressing the aforementioned public comments, the following review evaluates the proposed project with respect to the requirements of the Subaqueous Lands Act (7 Del. C., Chapter 72 (Chapter 72) and the Regulations Governing the Use of Subaqueous Lands (Regulations)). Chapter 72 requires a person to obtain a permit, lease or letter of approval for the removal or extraction of materials in private or public subaqueous lands in Delaware. Chapter 72 also outlines the procedures for applying and processing applications for permits, leases or letters of approval, including the public hearing procedures used to conduct the hearing for this project. Additionally, the Regulations provide the criteria the Department must use for evaluating the proposed project. The comments received for this project and/or expressed at the hearing, as well as the Department's regulatory evaluation, are addressed according to the pertinent sections of the Regulations.

Public Hearing Comments

A comment was received questioning the ownership of the property proposed to be scraped. The comment asserted that the beach area at Prime Hook Beach was never transferred to the individual owners or the Prime Hook Beach Organization, Inc. Jennifer Wheatley of the Division of Soil and Water Conservation, Shoreline and Waterway Management Section examined each of the deeds submitted by the 104 property owners adjacent to the area to be scraped and found that not all of the deeds state that the property owner owns to the mean low water line of the Delaware Bay. 53 of the deeds stated that the property boundary went to the mean high water line. Other deeds reference just the Bay, the original water line, the dune or the beach as the eastern property boundary. Only two deeds reference the mean low water line as the eastern boundary. 18 deeds do not reference the Delaware Bay at all. The hearing comments made it clear that there exists a significant amount of disparity between the various property

descriptions, resulting in uncertainty about clear title to the area that is proposed for sand removal.

The applicant has submitted a copy of a Delaware land use case, *Buckson, Attorney General v. The Pennsylvania Railroad Company* which was heard both in the Superior Court and Supreme Court of Delaware. The case was submitted as evidence that all of the 104 property owners named in the application own to the mean low water line of the Delaware Bay. Two of the findings of the court case are as follows:

1. *“Foreshore is distinct class of property right in tidal waters and is capable of independent ownership”.*
2. *“Where basic patents in railroad’s title chain did not run boundary of property to low watermark and did not thus specifically include foreshore of navigable river but they ran the boundary to and along the river, the land was thus riparian and railroad as riparian owner fronting on river held to low watermark and title included the foreshore”.*

The first finding above indicates that the foreshore area can be privately owned by someone other than the owner whose property borders the mean high water line. The second stated finding indicates that a person owning property which is described in their deed as bordering a tidal waterway can assume ownership to the mean low water line.

Neither of these concepts, however, provides the necessary evidence of ownership to the mean low waterline for a significant number of the 104 property owners and leaves us uncertain whether the applicant has appropriate ownership and control of the area they are proposing to scrape. The Regulations require that applicants provide proof of ownership or the written permission of the owner, if other than the applicant. That has not occurred here.

Other comments were voiced or received from several residents of Broadkill Beach concerning the impact of the project on the longshore transport of sand. Longshore transport is the movement of sand along a beach caused by currents generated by breaking waves. According to Evelyn Maurmeyer’s dissertation entitled “Geomorphology and Evolution of Transgressive Estuarine Washover Barriers along the Western Shore of Delaware Bay” dated June, 1978, the primary source of sand for most of the beaches along the western shore of the Delaware Bay is by longshore transport. The report found that the net movement of sand moved by longshore transport is to the south in the direction of Broadkill Beach and the amount of sand transported in that direction each year from Prime Hook Beach is 7,200 cubic meters. Consequently, removal of sand along the beach at Prime Hook could interrupt the longshore transport of sand in the direction of Broadkill Beach, thus, depriving Broadkill Beach of the sand needed to replace the sand lost there to longshore transport, resulting in exacerbated beach erosion. The residents of Broadkill Beach have a valid concern that the proposed Prime Hook beach scraping project has a likelihood of causing damage to their own beach.

A large number of comments supporting the project were also received, the majority coming from the waterside property owners at Prime Hook Beach. The comments centered primarily on the protection that the dune construction would provide to the community during storm events. Favorable comments also noted that the project would protect the nearby fresh water impoundment at Prime Hook National Wildlife Refuge. Many of the comments noted that the last beach scraping project has lasted 10 years. However, this may be misleading because most shore erosion occurs during storm events. And as noted above, there have only been two significant storm events during the 10 year period since the last scraping, Hurricane Ernesto and the Mother's Day storm, both of which occurred recently. The longevity of this type of beach protection measure ultimately depends on the frequency of severe storms occurring following its construction.

Moreover, there is evidence that beach scraping using bulldozers can exacerbate beach erosion. A study of a beach scraping project using bulldozers to scrape the foreshore along the beach at Ocean City, Maryland (Kerhin & Halka, 1981), found that removing material from the foreshore and moving it to the backshore of the beach resulted in significantly more erosion from subsequent storm events at that beach than at a nearby non-bulldozed beach. Bulldozing the beach artificially changed the natural beach profile, and consequently destabilized the foreshore of the beach. Following these changes to the profile, the beach at Ocean City underwent a period of readjustment, during which natural processes worked to replenish lost sand and re-establish a stable beach profile. Unfortunately, during this period of readjustment, beaches are more vulnerable, so when a coastal storm struck, it resulted in aggravated beach erosion made worse by the beach scraping project. Consequently, the degree of beach protection expected from this project was not realized and in the long run, it likely cost more to repair the damage (to replace the lost sand) caused by the increased erosion rate.

Regarding the statements that the project will protect the freshwater impoundment at the Prime Hook National Wildlife Refuge, the project will likely afford the impoundment a level of protection. Currently, the primary protection mechanism for the impoundment is an artificial sand dune system constructed north of the Prime Hook community. That system was repaired after the Mother's Day storm by bulldozing the sand which had been washed inland just beyond the dune, back into the dune system from the landward side. That type of repair is significantly different from the Applicant's proposal to utilize sand from an intertidal area washed by the waters of the Delaware Bay.

Regulatory Review

Section 3 of the Regulations requires that the application be evaluated based both on its public use impacts as well as its potential for adverse impacts to environmental resources. Under section 3.01.A, the Department must consider, among other things, the extent to which the public would benefit or the extent to which the public would suffer detriment from the project.

Additionally, the Department must consider the extent to which the applicant's primary purpose would be realized by alternatives that reduce adverse impacts.

As discussed above, the project could adversely affect the beach and adjacent private properties at Broadkill Beach by interrupting the longshore transport of materials in the direction of that beach. Potentially, the beach scraping at Prime Hook Beach could exacerbate erosion at Broadkill Beach by depriving that beach of the sand removed from the longshore transport system for the dune construction. This is judged to be a significant potential public detriment associated with the project as proposed.

The WSLs supports the concept of rebuilding and maintaining dunes to protect properties along the Delaware Bay, such as Prime Hook Beach. However, there are alternatives which would avoid the adverse public use impacts associated with proposed project. An often used and viable alternative to scraping sand from the intertidal zone for dune restoration is to truck sand in from upland sources. This would avoid the problem of depleting the sediment supply associated with longshore transport. It would allow the dune system to be rebuilt and would maintain and enhance the sand budget for the longshore transport of materials along the beach. Additionally, it would avoid other negative environmental impacts discussed below.

Section 3.01.B of the Regulations requires the Department to assess a myriad of environmental impacts, including those to water quality, flora and fauna including benthic organisms, and the cumulative effects on the aquatic ecosystem. Most of the impacts to the local fauna (e.g. shorebirds, horseshoe crabs) have been addressed by the Department's Heritage Program as described above. However, an important benthic organism that is present in the intertidal zone of Prime Hook Beach is *Sabellaria vulgaris*. *Sabellaria vulgaris* is a unique marine worm that lives in colonies or reefs. Over time, *Sabellaria* construct a series of cemented tubes creating living reefs. These reefs provide very stable and ecologically diverse near-shore habitat, as well as a valuable food source for local fisheries and shorebirds. The reefs have also been shown to withstand storm events and act to protect shorelines. There is currently a colony covering an area of 134 square meters at Prime Hook Beach (Brown, J. 2009). This colony would be destroyed by the beach scraping project. Additionally, intertidal zones such as exist at Prime Hook Beach are usually rich in other benthic organisms that provide a valuable food source for fish and shorebirds. At a minimum, the project would negatively impact the local intertidal benthic community and adversely affect the habitat value of the beach for an indeterminate amount of time.

The WSLs has never issued a permit for beach scraping as is proposed by this permit application. The project would reshape the profile of 7,400 linear feet of beach. By issuing a permit to scrape sand from the beach's intertidal zone, the WSLs would set a precedent that may encourage other beach side communities to pursue the same course of action to protect their beaches and property. Given the potential negative environmental and public use impacts associated with the practice, and given that this method of obtaining sand for dune restoration is

not considered a standard or proven method for shoreline erosion control (due to the many variables associated with beach dynamics), the WSLS is concerned about authorizing the project.

In making this finding, the WSLS has placed a premium on protecting the beaches and coastline of Delaware, and the rights of the private property owners and the public who use neighboring (downdrift) beaches.

Recommendations

The applicant has applied to the WSLS to rebuild the artificial dune line at Prime Hook Beach. Following a review of the project, and based on the evaluation detailed above, the WSLS makes the following recommendations:

1. There are questions concerning the ownership of the intertidal zone and beach area associated with a significant number of the properties included in the application. A permit cannot be issued unless the ownership issues are resolved.
2. The project would interrupt the sediment supply to the longshore transport system which could result in downdrift erosion at neighboring beaches, especially at Broadkill Beach.
3. The project would disrupt and/or destroy intertidal zone habitat, including a unique reef-building marine worm colony of *Sabellaria vulgaris*.
4. Past experience at other locations indicates that beach scraping alters the beach profile in such a way as to exacerbate beach erosion which, in the long term, costs more to repair.
5. Issuing a permit for the project would set a precedent for other beach communities to pursue this course of action for managing beach erosion.
6. The WSLS supports the concept of rebuilding and maintaining dunes to protect property from erosion. However, an alternative approach which utilizes sand trucked in from outside sources, followed by planting with American Beach Grass to maintain the dune line stability, is preferred. This would eliminate the removal of sand from the sediment supply associated with longshore transport. Trucking in sand would also likely increase the lifespan of the project because new sand would be added to the system rather than removed from it.

For the above stated reasons, the WSLS recommends that a permit for reconstructing the artificial dune line at Prime Hook Beach by scraping sand from the intertidal zone be denied.

References

Kerhin, R.T. and H.P. Halka, 1981. "Beach Changes Associated with Bulldozing the Lower Foreshore," Ocean City, Maryland. Maryland Geological Survey, Open File Report 7, 28p.

Brown, J. 2009. Author's notes from Jill Brown's defence of her dissertation entitled "Recruitment, Post-Settlement, and Reef Distribution of *Saballaria vulgaris* in Delaware Bay," April.

c. Jennifer Wheatley, DSWC



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TECHNICAL RESPONSE MEMORANDUM

TO: Robert P. Haynes, Esq., Senior Hearing Officer, OTS

THRU: Tony Pratt, DSWC- SWMS *TP*

FROM: Jennifer Wheatley, DSWC-SWMS *JW*

RE: Prime Hook Beach Organization, Inc. Application to DSWC – Coastal Construction permit. Request for Technical Response Memorandum and Assistance on Public Hearing

DATE: 8/18/2009

As part of the permit application process for the Coastal Construction Permit to mechanically scrape the beach from below the high water mark in Prime Hook Beach, comments were received from the public. Some of the comments regarding the proposed project raised issues that were deemed worthy to investigate by the Shoreline and Waterway Management Section. The following issues were examined:

- A question was raised regarding the ownership of the area in which the project is to be located. Prime Hook Beach residents are asking permission to scrape sand from below the high waterline to place it in the dunes on their property. It was brought to our attention that the property owners may not own all the way below the mean high waterline. A review of the deeds had found that 53 of the deeds reference the high water mark, 27 reference the Delaware Bay, 2 reference the low water mark, 2 reference the dune, 1 references the beach and 1 references an "original water line." Since Delaware is a low water state, the 27 deeds that reference the Delaware Bay probably grant ownership to the low water mark, which would have them own the land that they intend to scrape. However, the 53 deeds that use the high water mark as the seaward boundary, as well as the two deeds that reference the dune and the one deed that references the beach, do not give clear sight of ownership of the land that is proposed to be scraped. Then the question is: who owns the land seaward of these properties and is permission given by such property owner to the resident of Prime Hook Beach to scrape sand from the land and push it onto their dunes? Without consent from the property owner, DNREC should not be permitting activities to be conducted on such lands.

It's good being first.

- The issue of littoral drift was also raised. Littoral drift is defined as the movement of sand along a shoreline by waves and currents. Sand scraped from below the mean high water line is being removed from the littoral transport zone. Residents of communities adjacent to Prime Hook Beach expressed concern that scraping sand from the intertidal zone would remove such sand from the natural process of longshore sand transport thereby capturing sand onto Prime Hook Beach that might naturally replenish beaches to the north and/or south. According to Evelyn Maurmeyer's dissertation "Geomorphology and Evolution of Transgressive Estuarine Washover Barriers Along the Western Shore of the Delaware Bay" the net transport of sand all along the Delaware Bay Beaches is to the south. More recent wave models indicate that sand transport has the potential to run in a southerly direction at Prime Hook Beach. Currently, a beach management study of the western Delaware Bay beaches is being conducted by the engineering firm PBS & J. All preliminary recommendations from the study for management of sediments along Prime Hook Beach include the addition of sand to the beach. None of the recommendations include scraping the sand that already exists. The residents who raised this issue are from Broadkill Beach, which is located south of Prime Hook, do have a legitimate concern.
- It has been commented by individuals of the public who are in favor of the project that when Prime Hook Beach was scraped without a permit from the intertidal zone in 1998, that the scraping was a success and no additional repairs needed to be made to the dune until 9-10 years later. A review of the coastal storms that have occurred in the last ten years has found that since February of 1998 a northeaster of such magnitude did not occur in Prime Hook Beach until May of 2008. This could also be a reason that the last scraping from the intertidal zone appeared to be a success. If a storm of such magnitude had occurred months or even weeks after the 1998 scraping, it is possible that the dunes could have been decimated again and the scraping may not have been deemed such a success.
- Some comments received in favor of the project stated that by allowing the scraping, the Prime Hook National Wildlife Refuge, that exists landward of the project area, would be better protected. It has been the observation of the Department that saltwater intrusion not only occurs at the Prime Hook Beach community, but also on lands north of the community where a large breach in the dunes has occurred as well. The breach to the north seems to be a more of a source of saltwater intrusion than does the breach at Prime Hook. The Refuge's Wildlife Biologist clarified that building the dunes in Prime Hook Beach would not be a detriment to the freshwater impoundment that is west of the community, but would not solely protect the marsh from saltwater intrusion because there is a series of culverts that are also causing saltwater intrusion. She stated that if the culverts were not a problem then building the dunes in Prime Hook Beach and to the dunes from there north to Fowlers Beach Road would indeed protect the freshwater impoundment from saltwater intrusion. Although her comments support the construction of the dune, it does not mean that scraping the sand is the only way to do so. Dunes can also be built by bringing in sand from an outside source or by planting native dune vegetation such as Cape American Beach Grass that will trap windblown sand in the dunes.

The Division has allowed scraping of sand from the high water line landward to help build dunes in not only Prime Hook Beach, but in other communities as well. By keeping the scraping above the high water mark, the sand that is in the littoral zone is left to drift to adjacent beaches or for cross-

shore transport where it can then replenish the depleted areas on the beach that have been scraped. When the last Permit for scraping was issued to the residents of Prime Hook Beach, it was issued with specific conditions. If the current Permit application is approved, the following conditions should be included:

1. Notice must be given to the Division at least three (3) working days before scraping is intended to occur, so that a meeting on-site can be scheduled with a representative of the Division in order to comply with Condition #3.
2. Prior to any beach scraping it shall be determined by the Division that there is adequate sand above the low water line to be used for dune restoration.
3. A Division representative shall be on-site at the start of the beach scraping to make sure that it is conducted in accordance with Division standards. Initiation of scraping without an on-site meeting and approval by a Division representative will be considered a violation of this permit and the Regulations.
4. All new dunes or repaired dunes shall be aligned, to the greatest extent possible, with existing adjacent dunes and shall be of the same configuration as adjacent dunes.
5. Addition of sand to existing dunes shall be accomplished in such a manner that the damage to existing vegetation is minimized. The filled areas should be replanted with Cape American Beach Grass at the appropriate time of year, so that the dune will grow and continue to be functional.
6. The beach scraping permitted herein shall be confined only to those areas approved by the Division. These areas are indicated by forms, completed and signed by each property owner along the bayfront in Prime Hook Beach, that when asked "Do you want lots replenished with sand by a bulldozer after the next storm?" they checked "yes."
7. No scraping activities shall occur on Lot 1 (Parcel 23), Lot 2 (Parcel 22), Lot 3 (Parcel 21), Lot 101 (Parcel 34), Lot 103 (Parcel 33), Lot 104 (Parcel 32) and Lot 105 (Parcel 31) unless the property owners of these lots have stated in writing each and every time scraping is to occur that they are willing to participate.

More conditions could be added to the Permit based on the outcome of the hearing officer's report.

DNREC's preferred method of combating chronic erosion is addition of sand to the system. Communities may be best served by following this example. The residents on the north end did this in 2007 and although the sand was washed away by storm, the amount of storm damage that could have occurred may have been worse had they not brought in any sand.

Cc: Collin P. O'Mara, Secretary
David S. Small, Deputy Secretary
Robert S. Baldwin, Director, DSWC