10.0 RESPONSE TO DEIR COMMENTS

This section details the responses of the Proponent to comments received on the DEIR. The Project received a total of 56 comment letters; 10 letters were received from agencies and the remainder originated from organizations and private individuals. The Project received 41 letters of support, including letters from numerous State Senators and Representatives.

Each letter has been assigned an abbreviation as listed below. Specific comments within each letter have been noted in the margin of the letter with this abbreviation and sequential numbering. Each comment has been restated below (paraphrased where the comment is extensive) and is followed by a response. Where appropriate, a section reference to the FEIR is provided to direct the reader to information that elaborates on the response. Clean, numbered copies of each letter are provided in Attachment H. Letters of support are not responded to individually.

	Commenter	Abbreviation
Agencies/Regulatory Authorities		
1	Executive Office of Environmental Affairs	EOEA
2	Coastal Zone Management	CZM
3	Massachusetts Board of Underwater Archaeological Resources	MBUAR
4	Massachusetts Department of Environmental Protection	DEP
5	Massachusetts Division of Fisheries & Wildlife (Natural Heritage and Endangered Species Program)	NHESP
6	Massachusetts Division of Marine Fisheries	DMF
7	Massachusetts Historical Commission	MHC
8	National Marine Fisheries Service	NMFS
9	U.S. Environmental Protection Agency	EPA
10	Nantucket Conservation Commission	NCC
Organizations/ Interest Groups		
1	Cape Cod Commercial Hook Fishermen's Association, Inc.	CCCHFA
2	Massachusetts Audubon Society	MAS
3	Nantucket Land Council	NLC
Individuals		
1	DeCosta, Robert R. (Albacore Charters)	DeCosta
2	Till, Derek	Till
LETTERS OF SUPPORT*		
Agencies/Regulatory Authorities		
1	Nantucket Board of Selectmen	
Legislators		
1	Atsalis, Demetrius J.	
2	Baddour, Steven A.	
3	Bradley, Garrett J.	
4	Gomes, Shirley	
5	Hynes, Frank M.	
6	Murray, Therese	
7	O'Brien, Thomas J.	

8	O'Leary, Robert A.
9	Patrick, Matthew C.
10	Perry, Jeffrey Davis
11	Travaglini, Robert E.
12	Turkington, Eric T.
13	Verga, Anthony J.
14	Senator Hedlund
15	Senator Brewer
Organizations/ Interest Groups	
1	Nantucket Association of Real Estate Brokers
2	Nantucket Beach Foundation
3	The 'Sconset Trust
4	Sankaty Head Golf and Beach Club
Individuals	
1	Canaiy, Kathleen M.
2	Felch, Robert Dean
3	Furrow, Sam
4	Greenhill, Robert F. and Gayle G.
5	Joung, Chansoo
6	Keller, Dennis and Connie
7	Latshaw, Kyle L. and Yoder, Loretta
8	Osborn, John
9	Paine, W. Dexter III and Susan
10	Petty, Robert D.
11	Pollock, Larry
12	Posner, Joshua
13	Roosevelt, Kermit and Priscilla R.
14	Saul, Andrew
15	Simmons, Brian P. and Julie D.
16	Singer, Frederick
17	Soros, Jeffrey
18	Soros, Jeffrey and Catharine
19	Soros, Peter
20	Walker, James E. III
21	Weymar, F. Helmut and Caroline S.

* No abbreviation is assigned to letters of support.

10.1 Executive Office of Environmental Affairs (EOEA) – DEIR Certificate

EOEA 1. Federal, state and local agencies, through their comments and consultation, have identified significant concerns that will require further information in three main areas of the project:

1. Quantitative assessment of physical processes: including nourishment design; need for/design of groins and groin placement; and impacts of borrow sites.
2. Screening of sediments and actual site selection: including identification of a preferred alternative site demonstrated to have least impacts/best material balance and information on long-term/permanent impacts.
3. Fisheries/Habitat: including continued surveys and Time-of-Year restrictions for both the dredging and nourishment activities.

In order for the Final EIR (FEIR) to be found adequate, I remind that the FEIR include information requested during the DEIR stage as well as information requested during the ENF phase that was not addressed in this submittal.

The FEIR provides information requested during the DEIR and ENF stages of the Project; the section included herein directly responds to all comments submitted on the DEIR.

EOEA 2. The project will require a 401 Water Quality Certificate and a Chapter 91 License from the Department of Environmental Protection (DEP); and an Order of Conditions from the Nantucket Conservation Commissions (and hence Superseding Order from DEP if the Order is appealed). In addition, the Massachusetts Coastal Zone Management Office (CZM) will conduct Federal Consistency Review of the project, including the portions of the project located in federal waters. The project will require a Section 10/404 permit from the United States Army Corps of Engineers and a potential review and leasing of the borrow site in Federal water by the Minerals Management Service.

The Proponent acknowledges these requirements and will be submitting applications for the permits and approvals identified in Table 2-1 (see Section 2). Minerals Management Service review is not necessary, as the preferred borrow sites are located entirely in state waters.

EOEA 3. Because the proponent is not seeking financial assistance from the Commonwealth for the project, MEPA jurisdiction extends to those aspects of the project that are within the subject matter of required or potentially required state permits and that have the potential to cause significant Damage to the Environment. In this case, given the broad scope of the Chapter 91 permit, MEPA jurisdiction effectively extends to all aspects of the project that are within Massachusetts.

The Proponent acknowledges MEPA's jurisdiction over the Project.

EOEA 4. CZM has broad jurisdiction because federal law (pursuant to the Coastal Zone Management Act) specifically delegates review authority over projects in federal waters to the Coastal Zone Management Office of the adjacent coastal state, provided that the state has a federally approved Coastal Zone Management Plan.

The Proponent acknowledges CZM's jurisdiction and will submit a CZM Consistency Certification to the agency.

EOEA 5. The Final EIR (FEIR) should include a detailed description of the project and should briefly describe each state agency action required for the project as well as its consistency with any applicable performance standards. The FEIR should contain sufficient information to allow the permitting agencies to understand the environmental consequences of their official actions related to the project.

A detailed Project description is provided in Section 1 of the FEIR; this description has been significantly advanced since the DEIR. Permits and approvals are listed in Table 2-1, and the Project's consistency with applicable regulations and performance standards is addressed in Section 2.

EOEA 6. The FEIR must respond fully to the substantive comments received. The FEIR must present additional technical analysis and/or narrative as necessary to respond to the concerns raised. The proponent should circulate the EIR to those who submitted written comments on the ENF, and to any state agencies from which the proponent will seek permits or approvals. The FEIR should contain a copy of this Certificate and of each comment received.

This section of the FEIR identifies comments submitted regarding the DEIR and directly responds to them. A copy of the Secretary's Certificate on the DEIR is provided in the front of the FEIR as is the circulation list. All commenters on the DEIR and ENF will receive a copy of the FEIR, as well as each of the agencies from which permits or approvals are being sought.

EOEA 7. As noted above, CZM jurisdiction extends over all aspects of the project. The FEIR should address the concerns of CZM as outlined in their detailed comment letter, and provide sufficient information to facilitate the Federal Consistency Review. Many of CZM's comments on the ENF requesting further analysis or documentation were not addressed in the DEIR.

CZM's comments on the DEIR have been addressed later in this section and consistency with CZM policies are reviewed in Section 2. In addition, a CZM Consistency Certification will be submitted to CZM in conjunction with USACE permitting.

EOEA 8. A complete understanding of the nature of the sediment transport system and wave climate is critical to the design of an effective beach nourishment program and the evaluation of potential impacts associated with the proposed geotubes.

Groins and geotextile tubes have been removed from the Project design.

Since the DEIR, the Proponent has given consideration to results from completed sediment transport models, a finalized sediment budget for the Project area, projected wave and current dynamics, and an updated forecast for performance of the nourishment material related to the possible appearance of erosion hotspots. Also, the Proponent has had extensive discussions with public agencies, the Nantucket community and other DEIR commenters and their feedback has had a great influence on the decision to eliminate these structures from the Project.

The sediment budget is discussed in the context of the sediment transport system and wave climate in Section 5. The level of understanding of these physical processes has been significantly advanced since the DEIR and has directly contributed to the final proposed Project design.

EOEA 9. As noted in the DEIR, 310 CMR 10.30(3) allows the placement of coastal engineering structures when required to prevent storm damage to buildings constructed prior to August 10, 1978. The FEIR should address compliance with this performance standard and should evaluate, on a case-by-case basis, instances where this standard cannot be met and the rationale behind why a Geotube is necessary.

As discussed in the response to EOEA 8 above, geotextile tubes have been eliminated from the Project.

EOEA 10. The FEIR must address concerns relative to potential wave interactions, including scour as a result of wave reflection, with the proposed Geotube.

As discussed in the response to EOEA 8 above, geotextile tubes have been eliminated from the Project.

EOEA 11. The FEIR must address the likely consequences if re-nourishment is not implemented in a timely manner and, as a result, the Geotube is subjected to wave interaction and scour; the proponent must identify under what conditions the Geotube would be removed or abandoned.

As discussed in the response to EOEA 8 above, geotextile tubes have been eliminated from the Project.

EOEA 12. As described in the DEIR, the current proposal includes beach nourishment almost to the cut at Sesachacha Pond including a small section (roughly 200' wide) of beach owned by Mass Audubon. Installation of a geotube is also proposed on a portion of

Mass Audubon-owned beach. This section of beach can be seen on Figure 3-4 sheet 1 and is between monuments 96.7and 96.9. Mass Audubon was not consulted regarding this work. This work cannot proceed without Mass Audubon's explicit permission, which has not been granted at this time. The FEIR should contain information specifically detailing the permission.

A team from SBPF met with Mass Audubon (MAS) representatives on October 23, 2006 on Nantucket. Based on discussions at this meeting, SBPF and MAS are working on negotiating an easement across MAS property for project construction. SBPF is confident based on these initial discussions that an easement can be worked out. Also, as discussed in the response to EOEA 8 above, geotextile tubes have been eliminated from the Project.

If the Project activities are not extended across the seaward end of the Audubon property, some relief for adjacent properties can be provided by placing a greater volume of advanced nourishment to either side of the gap in the beach fill. The additional fill may not mitigate for the entire impact of the gap, but will be somewhat helpful. Over time, wave activity will rework the fill and straighten the beach; fill will be lost from adjacent areas to fill the Mass Audubon segment naturally. Hence, the life of the advanced nourishment could be reduced in that immediate Project area. Beach nourishment projects do not generally exhibit uniform erosion across their span. Renourishment cycles are typically driven by areas of accelerated beach loss, commonly referred to as "hot spots." It is possible that the segment of beach in proximity to the Audubon property could become such an area which would dictate the timing of renourishment events. It is conceivable that, depending on storm cycles, a 5-year renourishment period could be reduced to 3-4 years. During the construction period, if the Mass Audubon property is to be avoided the construction activities will occur within two discrete segments. The fill discharge pipe would not be placed across the Mass Audubon property; therefore, two separate pipeline landings would be achieved, one on either side of the Audubon parcel. The likely scenario by which this would occur is that the landing pipeline would be refloated and moved from one side to the other. Beach equipment (bulldozers, trailers, etc.) would not move across the Mass Audubon property but instead would need to be transported around this area, likely adding to the cost of construction. In any event SBPF is involved in discussions with MA Audubon to obtain an easement.

EOEA 13. The proposed project will require the repeated need for sand mining. Therefore, the monitoring program detailed in the FEIR should be designed to inform the selection of future borrow sites. The FEIR should analyze the effects of dredging material from an area that is undergoing recovery, or that has been shown to have recovered, in response to a previous mining effort. DEP has advised that the continuous mining of the same area would result in a permanent, rather than temporary, impact, since the area would either not have time to recover or be mined again upon recovery. The FEIR should assess this, given habitat and hydrogeological regime at all the potential sites.

Section 5 of the FEIR discusses the monitoring efforts proposed at the offshore borrow site. Post-construction monitoring of this site is proposed to extend for 5 years; since it is anticipated that renourishment will occur at approximately 5-year intervals, the monitoring would encapsulate any renourishment activities in the vicinity. The preferred overall borrow site has approximately 6 million cubic yards of sediment available; it has been sub-divided into two smaller excavation areas. These areas will provide sediment for both the initial nourishment project and at least one subsequent renourishment event. The actual dredging footprints for these two efforts are unlikely to overlap; rather, dredging for a renourishment event would likely occur in an area distinct from the initial dredging footprint proposed. If the initial dredging does not cover the extent of the boundaries identified for the initial Project, the dredging contractor may return to that same area during the renourishment dredging in order to collect the remaining nourishment material. In general, contractors will exhaust the sand resources in one area before moving to another. Therefore, potential impacts are appropriately characterized as temporary rather than permanent.

EOEA 14. In light of the repeated mining needs, the FEIR should consider whether future mining should take place at different borrow sites identified in the alternatives analysis, and consider the effects of an ongoing mining program on the broader offshore area subject to the mining effort.

Sand mining at the preferred borrow site is proposed to satisfy nourishment requirements for the initial Project construction and the first renourishment event (as detailed in EOEA 13 above). After the initial Project and first renourishment event, a new borrow site will likely be required. A geotechnical investigation similar to the initial study will be conducted to locate a new sand source. Studies conducted as a result of the excavation of the original borrow site will be used to refine future geotechnical investigations to locate sand. At that time, THE PROPONENT anticipates re-filing with MEPA and permit agencies for future renourishment events.

EOEA 15. The FEIR should present an annual plan for monitoring and protecting Piping Plovers and terns that establish breeding territories within the project area in future years. These activities should be carried out every year for the life of the project, not just in years when construction, maintenance, or re-nourishment activities occur. The plan should include provisions to protect nests and nesting habitat from human disturbance using warning signs and symbolic fencing, and should describe seasonal restrictions on driving by recreational off-road vehicles. It should specify who will carry out this monitoring and protection work, and how it will be funded over the life of the project. I encourage the proponent to work closely with Mass Audubon and NHESP to develop more suitable monitoring of plovers and terns.

The Shorebird Management Plan is included in Section 7.2. This Plan includes provisions to protect nests and nesting habitat, including symbolic fencing and seasonal vehicular

restrictions. The content of the Shorebird Management Plan has been modified to incorporate discussions and comments received by Mass Audubon and NHESP on the draft Plan presented in the DEIR.

EOEA 16. The proponents do attempt to identify the range of physical and biological parameters that need to be considered in assessing the potential offshore sediment sources. However, the DEIR does not identify the borrow site screening processes used, nor has this been presented to the state agencies for review and comment. The FEIR should describe in detail the proposed sand mining process. The Highway Methodology model described in detail in CZM's comment could be very helpful. All of the information developed and analyses conducted need to be provided in the FEIR to facilitate a complete review of the proposed project.

Building on the Highway Methodology alternatives analyses for shore protection alternatives at Sconset that the Proponent previously prepared and submitted to the USACE, the Proponent prepared Alternatives Analyses for Upland Sediment Sources and Marine Sediment Sources and submitted these to the USACE and resource agencies (CZM, NMFS, EPA, DMF, US Fish & Wildlife Service and DEP). These documents were reviewed at a meeting of these agencies on November 1, 2006. These analyses were revised in response to feedback at that meeting and subsequent discussions with agency staff and are included as Sections 3 and 4.

EOEA 17. Based on the information presented in the DEIR, it appears that the proponent's identification and focus on the Bass Rip Shoal sediment source is premature. I recommend that the proponents work closely with the permitting agencies regarding the screening of sediment source alternatives before further effort is focused on the one preferred site. The FEIR must address the detailed comments provided by many of the state agencies and Mass Audubon requesting more information and analysis on this topic.

See responses under EOEA 16 and Sections 3 and 4.

EOEA 18. The DEIR provides preliminary geophysical surveys in the preferred offshore sediment source site that detected sand waves approximately 15 feet in height, and states that relatively coarse-grained material appears to be moving along the landward portions of Bass Rip (the preferred borrow site) in large quantities. Based on this information, the DEIR concludes that sand mined from this area would be replaced by natural processes over time. However, no data or analyses were provided to support these conclusions. This information should be provided in the FEIR to facilitate review of the potential adverse impacts.

Based on wave modeling, there will be no adverse coastal effects due to excavation of the borrow site. Sand will eventually replace the excavated material based on modeling of the large storm events over a 48 hour period. A modest amount of infilling occurs, for

example, with a 50 year event of 48 hour duration. The Delft3D model report for the borrow site wave impact provides a graphic (see Attachment A, Engineering Report).

EOEA 19. The FEIR should describe any necessary turbidity controls at the dredge head. In the event a hopper dredge is proposed to be used, the FEIR should analyze any water quality or sedimentation impacts associated with any dewatering or screening that will take place on the dredge vessel.

Additional details on dredging methodology are provided in FEIR Section 1 and in the Engineering Report Attachment. No technology exists to provide turbidity control at the dredge head itself; rather, turbidity is controlled through selection of a proper borrow site where the silt/clay fraction comprises 5% or less of the borrow material. This proportion is the standard used in identifying borrow sites for beach nourishment projects in Florida (Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems requirement. It is based on water quality monitoring of beach nourishment projects. The Corps of Engineers has a 10% threshold of silt/clay for navigation projects as an example of the conservativeness of the 5% standard). The sediment at the Borrow Site has a silt/clay fraction of only 1%. As for turbidity created near the dredge head, the dredge draws in material, so the majority of sediment is piped to the beach rather than agitated into suspension at the borrow site. The Proponent fully anticipates that turbidity monitoring will be required throughout the dredging and nourishment placement activities. If turbidity exceeds 29 NTUs above background, the contractor will be required to cease operation and take action to reduce the turbidity. Increased turbidity may occur if the dredge encounters a pocket of sediment where silt/clay content is anomalously high; in such an event, the contractor will relocate the dredge head away from the pocket of unacceptable material and continue dredging. This type of occurrence is quite rare, and is more likely to occur where wave energy is low, allowing fine materials to accumulate, and where there are large volumetric inputs of muddy sediment; such a setting is present, for example, on the Louisiana coast where the Mississippi River empties into the Gulf of Mexico.

EOEA 20. The information provided in the DEIR regarding potential upland source alternatives is very limited, although it acknowledges that investigations into how the cost of a direct-barging operation might be reduced are on-going. CZM recommends in its comment letter that the proponents utilize the detailed analysis conducted for the DCR Winthrop project as a model for the level of information that should be provided regarding this sediment source alternative. The FEIR should provide this detailed analysis as requested by CZM.

the Proponent has conducted a detailed analysis of potential upland sediment sources which was presented to USACE and resources agencies as part of the project's Highway Methodology process (see Sections 3 and 4). This analysis concluded that it would be infeasible to construct the beach nourishment project using upland sand sources due to costs which would be 2.5 to 4 times the cost of the proposed Project, due to excessive

timeframe required to deliver the sand from upland sources (2 to 13 years), and due to other environmental impacts that would be associated with various upland delivery options including excessive truck traffic.

EOEA 21. As stated, significant fisheries habitat exists at the borrow site and in the nourishment area. I direct the proponent to consult with DMF, DEP and CZM jointly to identify additional data needs and to develop, if needed, additional appropriate research to ensure a comprehensive assessment that accurately characterizes fisheries habitat, resources, and potential impacts associated with the project and its alternatives. I strongly encourage the proponent to include National Marine Fisheries Service (NMFS) in these consultations. This information should be included in the FEIR.

The Fisheries Sampling Plan was discussed in DEIR Section 4.4 and is further discussed in FEIR Section 6. Extensive agency consultations informed the development of this plan and all agencies noted in the certificate were involved in those discussions. Extensive consultations with agencies were undertaken prior to sampling to ensure that comments were incorporated early in the planning process to avoid late modifications which could interrupt the consistency of the sampling period during the proposed construction season. The sampling plan is quite comprehensive in relation to plans prepared for other nourishment projects in Massachusetts (i.e., Winthrop), New Jersey, and Florida. Input from DMF technical staff was incorporated during implementation of the sampling program. DMF staff members were consulted regarding the status of the commercial striped bass fishery during July and August, 2006; shellfish biologists were also consulted regarding appropriate protocol for assessing surfclam populations at the borrow site. A meeting was held with agency personnel on November 1, 2006 to review data generated during the field program and to discuss the data's relevance to impact assessments. In summary numerous individual consultations and joint meetings were held with DEP, CZM, DMF and federal resource agencies to review sampling plans and obtain input, including meetings attended by the NMFS. This input allowed the development of a comprehensive sampling plan that the team of MRI/Normandeau, CP&E, BlueWave and Epsilon has been implementing to build on the substantial body of directly relevant existing marine data for the preferred borrow site and nourishment site.

EOEA 22. The DEIR proposes a work period between May and October because of the generally favorable weather conditions during this period. The proponent should consult with DMF and the NMFS to develop Time-of-Year restrictions for both the dredging and nourishment activities to minimize fisheries impacts; the FEIR should discuss the outcome of these discussions.

As detailed in FEIR Section 9.1, the proposed construction schedule will avoid any work within the winter flounder time-of-year restriction between February and May. The Proponent has met with DMF, NMFS, and other resource agencies, most recently on November 1, 2006, to discuss TOY restrictions, and restrictions commonly applied to other

projects have been incorporated into the proposed construction schedule. The Proponent has also had extensive discussions with commercial and recreational fishing industry representatives. Where TOY restrictions or other restrictions based on fishing concerns would force construction into the hazardous winter season, alternative mitigation has been proposed. Section 9 includes a description of the proposed mitigation package. As evidenced by difficulties associated with the Nantucket Cable Project during winter 2005-2006, when the cable was damaged during installation as a result of a winter storm, winter construction in exposed locations nearshore and offshore from Nantucket involves significant safety hazards that must be avoided.

EOEA 23. This proposed project occurs within Priority Habitat of Rare Species, and hence requires a formal MESA filing pursuant to 321 CMR 10.18.

The Proponent acknowledges this requirement and will submit a formal MESA filing concurrent with the Project's Notice of Intent filing.

EOEA 24. Since the Massachusetts Natural Heritage and Endangered Species Program (NHESP) has mapped a significant portion of the coastal beach and dune within the project area as habitat for rare and endangered species, the proponent should coordinate with the NHESP relative to the timing of beach construction, the location of the proposed de-watering site as well as the placement of snow fencing and/or planting of vegetation within existing and potential shorebird habitat. The FEIR should contain results of these discussions.

The Proponent has coordinated with NHESP and the US Fish & Wildlife Service in preparing revisions to the Shorebird Management Plan (see Section 7.2), which has been modified to incorporate all comments provided by the NHESP on the draft plan contained in the DEIR. See Section 7.1 for information on the timing of beach construction and a description of the revised beach nourishment template. As detailed in this section, no beach nourishment will occur within historic nesting areas during the nesting season. No additional snow fencing is proposed within the beach nourishment template. Further, areas of vegetated dune nourishment have been greatly reduced from the DEIR.

EOEA 25. The DEIR identifies areas of nearshore cobble habitat that may be impacted by the nourishment; the FEIR should consider nourishment alternative designs that would eliminate or reduce the impacts to these habitat areas.

A delineation of nearshore cobble bottom is provided in Section 6.3.2 of the FEIR, and Project impacts to this habitat are discussed in Section 6.6.4. As identified in the text, construction of the design beach profile will permanently cover approximately 10 acres of nearshore cobble bottom habitat; approximately three acres is comprised of hard bottom and seven acres of sand. However, cobble bottom habitat identified by sidescan sonar surveys extends across approximately 2,082 acres seaward of the project area. Alternative Project beach designs were considered, including those with groins, that would increase the

slope of the fill to minimize cobble burial; however, the corresponding reduction in impacts would be minimal and potential downdrift impacts from groins would be unacceptable.

EOEA 26. The proposed dune construction in Piping Plover and Least Tern nesting habitat south of Codfish Park may have both short- and long-term adverse effects on that habitat by creating an unbroken "dune" that will significantly impede natural processes of erosion and accretion that are necessary to create and maintain flat, unvegetated or sparsely vegetated nesting habitat. Dune construction in this area is proposed to occur without the benefit of concomitant widening of the beach through nourishment, as is proposed for other parts of the project area.

Since filing of the DEIR, the previously-proposed dune nourishment activities south of Codfish Park have been greatly curtailed. To safeguard portions of Codfish Park that currently do not have sufficient elevation to protect against a large storm event, a reduced area of dune nourishment is proposed (from profile 85 to 200-feet south of profile 84.3), for a length of approximately 1100-feet. This is a significant reduction from the DEIR, where 0.7 miles (3,500 feet) of dune nourishment was proposed. Additionally, a small dune in front of the Town Sewer Beds is included to protect this vital public infrastructure against a low-frequency storm event. The dunes in these areas will not impede the natural processes of erosion or accretion, but rather will provide an enhanced volume of sand for the littoral system. If a storm strikes the Project area, the dune will erode naturally, contributing sand to help maintain the beach. This additional sand will especially benefit the Low Beach area (where the Sewer Bed dune is proposed), as shorebirds did not nest in this area in 2006 because it was heavily eroded and frequently overwashed by storms. The dune may also be scarped where sand washes out, leaving small step-like landforms in the dune face. These small scarp features occur on natural dunes just as they may form along the dune proposed to be nourished by this Project; thus, the Project's dune is not expected to have any adverse impacts on habitat that in any event would be absent under natural conditions.

EOEA 27. The FEIR must include analysis on the construction of groins between Codfish Park and Hoick's Hollow, which may reduce the suitability of the nourished beach as nesting, feeding, or chick-rearing habitat for plovers and terns. I strongly encourage the proponent to explore options for nourishing the beach in this area without the use of groins.

Groins have been removed from the Project (See EOEA 8 response).

EOEA 28. NHESP has stated in their comment letter that the DEIR does not adequately assess the potential impacts of proposed offshore dredging east of Nantucket (at the offshore borrow site) on foraging habitats of wintering sea ducks and loons. The proponent should work closely with NHESP, and the FEIR should include the specific data necessary to address this issue. The FEIR should address whether the overall capacity of marine habitats near Nantucket to support wintering populations of Long-tailed Ducks, Common eiders, or scoters, will be diminished by an amount equal to the footprint of the area that is dredged, as a result of removal of mollusks and crustaceans, and lowering of the sea floor elevation.

The FEIR should also provide a substantive assessment of the potential adverse effects of the dredging to Common Loon foraging habitat as a result of reduced fish prey and temporary increases in turbidity.

These potential impacts to birds at the offshore borrow site are fully addressed in Section 7.3.

EOEA 29. The DEIR provides an overview of the wave modeling conducted to assess the potential impacts of mining on the nearshore wave climate. None of the results were quantified; the analysis did not indicate the projected difference in wave heights at the shoreline for the scenarios modeled. Finally, it does not appear that the model was run for the full range of potential wave conditions at the site, or for the range of storm events, as requested in our comments on the ENF. Therefore, the FEIR should contain this information.

Waves, currents, sediment transport and morphology changes of the offshore zone in vicinity of the borrow site were modeled using the Delft3D model to evaluate potential impacts resulting from excavation of 3.5 million cubic yards of material from the borrow site, which is greater than the maximum excavation for the initial beach nourishment project. It is recommended that follow up modeling be conducted of the borrow site for the renourishment project after an updated bathymetric survey is conducted of the modified condition. Eight wave cases were evaluated, including two extreme storm events. A 20-year and a 50-year storm event were modeled for duration period of 48 hours, in addition to modeling average wave conditions for a one year period. Changes to wave heights and wave angle changes induced by the excavated borrow site did not come any closer then one and one-half miles from shore. Additionally, the wave changes at the extreme were only in the order of 6 inches, insignificant in terms of the normal wave climate east of Nantucket Island. A reason for the muted wave changes is that the borrow site is located west of Bass Rip Shoal. The shoal acts to "trip" waves, as do shoals located farther offshore. Also, the borrow site is sufficient distance from the shoreline (three miles) to allow waves to dampen to normal height after passing over the borrow site (See modeling results in Section 5 for additional detail).

EOEA 30. The impact of sand movement from sand ridges into the borrow pit on wave patterns must be addressed in the FEIR. Further analysis is needed regarding whether such movement may lower the ridge height significantly at least in some areas. More explanation is needed regarding the degree to which sand movement patterns on the shoals are understood, justifying whether there is sufficient information to make accurate predictions.

Wave effect modeling has been performed based on the worst-case scenario regarding excavation (i.e., total excavation of 3.5 million cubic yards from the borrow site which is greater than the actual 2.6 million cubic yards to be excavated). This worst-case scenario evaluates the areas of deepest cuts or holes under a situation where the entirety of the

borrow site has been excavated. Modeling results have indicated that there will be no coastal effects from this worst-case scenario. The accuracy of data inputs involved in wave modeling has been maximized; these inputs are from a recent bathymetric survey, known wave conditions from past events, and the projected dimensions of the borrow site (including excavation depth).

The Delft3D model was employed to evaluate sediment movements in vicinity of the borrow site, again assuming removal of 3.5 million cubic yards of material for the initial beach nourishment project. Two extreme storm events were modeled, including a 1 in 20-year, and a 1 in-50 year storm event for a duration of 48 hours. Flow simulations were conducted using Delft3D flow, forced by the storm waves, wind and tides to simulate extreme conditions. Average conditions were also evaluated. Changes in sediment transport induced by borrow site excavation were found to be limited to the nearby vicinity of the borrow site, with no coastal effects noted. For the 20-year event, sediment transport into the borrow site was found to be on the order of about 0.1 to 0.3 cubic yards per foot. For the 50-year storm event, infilling generally increased to about 0.5 cubic yards per foot with the exception of the extreme eastern edge which had an infilling rate of 0.9 cubic yards per foot. The greatest changes were found along the crest of the shoals which were modified by the high wave activity, not excavation of the borrow site. Excavation of the borrow site will not effect the shoals or shoal crests. The borrow site is located inshore of the Bass Rip Shoal, not on the shoal. For the 50-year event, a relatively large area of 1.1 cubic yards per foot was found south of the borrow site (see Section 5 and Engineering Report Attachment for additional detail). None of these changes in bathymetry resulted in significant changes in wave height in the area of the borrow site or had any impact on wave height at the shoreline.

EOEA 31. The FEIR should contain information on sand movement patterns on the impacted and neighboring beaches and also on the amount of sand contributed to the system by the project area.

Analysis of the sediment budget along the Project shoreline has indicated that an annual total of approximately 200,000 cubic yards of sediment leaves the Project area for adjacent beaches (see Section 5). Modeling has indicated that the proposed nourishment will increase the volume of sediment transported to these adjacent areas by ~50% (see Section 5). Proposed monitoring is extensively discussed in Section 5, and will be performed to assess the longshore transport of sand to adjacent beaches. The amount of accretion (or erosion) will be determined by profiling (i.e., surveying) the shoreline on either side of the Project area. Beach and hydrographic surveys will be conducted over the entire Project area, extending approximately one mile on both sides to quantify fill transport. Project engineers have designed a monitoring program with profile lines spaced no farther then 1,000-foot intervals along the Project profile itself and extending 5,000 feet laterally on each side of the Project. The Project, by placing a large volume of sand on the Project shoreline in the design profile and advanced nourishment profile, will be adding a

significant volume of sand to the littoral system without impinging upon sediment transport to adjacent shores. It is anticipated that the advanced nourishment fill will be in place until four to six years after Project construction; after loss of the advanced nourishment fill, the Proponent will perform renourishment. Surveys will begin after initial Project construction and will be performed annually for at least five years to yield data needed to assess fill transport and Project performance.

EOEA 32. The Wetland Regulations at 310 CMR 10.27(4) require that any structure perpendicular to the shore which will interfere with littoral drift be the minimum length and height to maintain beach form and volume. Thus, the FEIR should demonstrate that the proposed groin design meets this performance standard.

Groins have been eliminated from the Project (see EOEA 8 response).

EOEA 33. The DEIR states in Section 3.4.2 that the preferred construction sequence would be to install the proposed groins following completion of the nourishment template; DEP has advised, and I concur, that this proposed sequence is the proper sequence. Construction of the proposed groins prior to beach nourishment would likely result in adverse impacts to the downdrift shoreline by decreasing the beach form and volume.

Groins have been eliminated from the Project (see EOEA 8 response).

EOEA 34. CZM's comments on the ENF requested that the DEIR quantify the direction and magnitude of cross-shore and longshore sediment transport in the project area in part to facilitate our review of groins and their potential effects on the sediment transport system. However, no analysis or documentation of the sediment transport directions and volumes were provided in the DEIR. The FEIR must include this information as requested during the ENF stage as well as the information requested on this topic during the review of the DEIR.

Groins have been eliminated from the Project (see EOEA 8 response).

Presently, the project area is eroding at a rate of 208,900 cubic yards per year, net loss due to longshore transport. Approximately 53,300 cubic yards is transported to the south, and 155,600 cubic yards to the north. In the absence of the project, longshore losses would be 1,044,500 cubic yards out of the project area over a five-year period. If the project is constructed, diffusion losses will add an additional 400,800 cubic yards to the longshore movement out of the project area in the same period of time. Cross-shore movement will be limited to the depth of closure at -26 feet (MLW). Material within that depth will be subject to strong lateral tides (longshore currents) which will move the material in the longshore transport system. Thus, cross-shore volumes are contained within the longshore volumes.

EOEA 35. DEP is concerned that the proposed groins do not appear to be designed to be readily adjustable, particularly the rubble head component. The DEIR states at 3.2.2 and

5.2.2.4 that if the groins are causing adverse impacts that they can be "modified accordingly". Experience has shown that it was impossible to adjust groins constructed on Sylvia State Beach in Oak Bluffs in the 1990's. Since the Siasconset shoreline has a much more dynamic wave climate than the north side of Oak Bluffs, it is likely to be much more difficult to adjust the groins. If the proponents believe this design is feasible for this site, further information should be provided regarding the number and use of this type of groin in similar wave environments, including details regarding the actual feasibility of adjustment. In addition, alternatives to this proposal should be discussed in the FEIR.

Groins have been eliminated from the Project (see EOEA 8 response).

EOEA 36. The FEIR must provide more information about each of the borrow sites identified in the DEIR such that the level of data collection for the alternative sites is comparable to that being prepared for the preferred site. The additional data will allow for an analysis of alternatives sites in order to select a borrow site that will minimize benthic habitat and fisheries impacts. In addition to allowing for a comparison of alternative sites, a more detailed description of the alternative sites may reveal secondary borrow sites that could provide material to supplement the material mined at the primary site.

As described in Section 2.0 of the DEIR, the Proponent conducted an extensive analysis of potential borrow sites before identifying the preferred borrow site as the proposed sediment source. An expanded Alternatives Analysis is provided in FEIR Sections 3 and 4. While all potential borrow sites were initially considered, many were quickly eliminated through a detailed process so efforts and resources could be focused on sites meeting preliminary requirements. These criteria include grain size, distance from nourishment area, local fishermen considerations and adequate sand volume. Performing detailed surveys and data collection efforts at all alternative borrow sites would not be an efficient use of resources, since some areas are unacceptable based on incompatibility with required criteria.

EOEA 37. The FEIR should evaluate whether obtaining the necessary material from more than one site could allow for the avoidance of impacts to the most significant habitat areas within each borrow site.

Impacts to habitat at the borrow site are expected to be minor and relatively short-term; the excavated area should recover very substantially within 1 year and essentially completely within three years of dredging based on experiences as other monitored borrow sites (see Section 6). To minimize impacts to habitat and marine resources, the Proponent has selected two closely-spaced excavation areas at the borrow site where dredging will not dramatically change bathymetry nor result in permanent physical alterations to the substrate or habitat conversion. Similar to the concept of forest fragmentation, the Project team believes it is better to limit impacts to a single constrained site than to distribute them among multiple distinct sites. Undisturbed areas will be maintained within the borrow site to protect indigenous benthic organisms and encourage recolonization of disturbed areas.

Widely-spaced multiple borrow sites are typically avoided for a number of logistical reasons. Moving dredging equipment between distinct borrow sites reduces efficiency and can slow Project progression. These effects may result in a drawn out construction schedule, resulting in the dredge and related equipment remaining in the Project area for a longer period of time. Furthermore, if widely-spaced multiple borrow sites are utilized, underwater pipelines will need to be relocated, causing further delay and extending the duration of impacts, a situation the Proponent is trying to avoid.

In addition, when a project must identify and potentially utilize multiple borrow sites, costs can significantly increase. When multiple borrow sites are considered in an alternatives analysis, one site can usually be identified as superior for a number of reasons. Unless the preferred site lacks the fill volume required for a project or would cause unacceptable environmental impacts, the best solution is to completely utilize the best fill source to achieve maximum project performance. In the absence of a site-specific condition at the selected borrow site, there are environmental disadvantages rather than advantages to dredging multiple areas.

EOEA 38. An alternatives analysis that fully evaluates several sites may also identify potential borrow areas for future nourishment needs. As a component of the borrow site post-construction monitoring program, the data collection for the alternative sites should continue on an ongoing basis so that the selection of a future borrow site can benefit from long-term data collected from each of the alternative borrow sites.

An expanded analysis of various offshore sediment sources is provided in FEIR Section 4. Preliminary borrow sites were surveyed, assessed, and excluded based on various criteria employing a format consistent with the USACE Highway Methodology. While the preferred borrow site will provide sufficient volume for the initial Project nourishment plus at least one subsequent renourishment event, the Proponent is willing to join others to undertake similar survey efforts to identify additional sources of renourishment material. This will be an ongoing effort during which the Proponent anticipates working collaboratively with the Commonwealth as well as Plymouth, Dukes, and Barnstable counties.

EOEA 39. The DEIR indicates that the Lighthouse South-South and Codfish Park dewatering systems retain the essential infrastructure to function. However the DEIR did not indicate if the project would include any changes to these systems, or how their effects on the sediment transport system would be monitored. This information should be included in the FEIR.

The required changes to the existing dewatering systems at Lighthouse South-South and Codfish Park are described in Section 1. Monitoring proposed for the Project will evaluate shoreline change and sediment transport across the comprehensive Project area; any effects of the dewatering systems will be captured within this overall survey. The beach monitoring plan is described in Section 5 of the FEIR.

EOEA 40. The southernmost portion of the project includes only dune nourishment, which will create a 125 foot wide dune approximately 6 feet high. The dune is designed to be placed as far landward as possible to ensure that it is as stable as possible. The DEIR states that this will result in some burial of existing vegetation; however, no information was provided regarding any proposed replanting. This should be addressed in the FEIR.

The proposed dune nourishment along the southern portion of the project (seaward of the Sconset sewer beds and at Codfish Park) will be placed on top of the existing low lying coastal dune to enhance the stability of the existing dune and to provide maximum protection for the Sconset sewer beds. The existing dune is moderately to well vegetated with American beach grass. Upon completion of construction the nourished dune will be replanted with American beach grass. Replanting will be carried out during the first available beach grass planting window (either early spring or fall) following construction of the nourished dune. Beach grass will be planted in staggered rows with an offset of approximately 12-18 inches. Individual plants will be spaced at approximately 12-18 inches on center.

EOEA 41. The FEIR should address the comments of the Massachusetts Board of Underwater Archaeological Resources regarding the archaeological resources. I strongly recommend that the proponent consult with the Massachusetts Historical Commission and the Massachusetts Board of Underwater Archaeological Resources to address their comments.

See Section 8.

EOEA 42. While the DEIR does state some public benefits to the project, the majority of benefits will be for private interests, with significant impacts to public resources. Nantucket's east shore beaches in general are not heavily used by the general public. The DEIR states that public access will be allowed on the beach upon completion of the nourishment. Therefore, the proposed groins should be designed to accommodate pedestrian access over or around the groins to adjacent beach areas. The FEIR should also include details on other benefits to the general public and what the access easements will be.

As detailed in Section 1 of the DEIR and reiterated in Section 1 of the FEIR, significant public benefits will be provided by the Project, not least of which will be an expanded beach area available for enhanced recreation. The proponent is in discussion with the Sconset Trust regarding a possible new beach access stairway to be constructed for public use near the current location of Sankaty Lighthouse.

The Proponent has also been discussing public access with the Nantucket Board of Selectmen who have been involved in a "One Big Beach" initiative. Other community input is being sought on ways to optimize public access to the newly widened Sconset Beach. The Project will effectively protect one of Nantucket's historic neighborhoods and

at the same time will prevent the destruction of existing public infrastructure including roads, electrical and water utilities and sewer beds. Relocating these sewer beds alone would cost taxpayers millions of dollars. Widening of the beach will also create some 50 acres of threatened shorebird habitat (piping plover and terns) covering most of the project length (see Section 7).

Public access to the beach will be maintained throughout construction except in areas where such access must be temporarily restricted to maintain safety. Section 2 describes the Project's compatibility with Chapter 91 regulations, which require public access to tidelands; the Proponent will be submitting a Chapter 91 Permit Application to the Massachusetts DEP.

Upon finalization of engineering surveys and associated design plans, the Proponent has elected to remove groins from the final Project; objectives will be satisfied without this element. Thus, groins will not impede public access to the beach, and any concerns related to construction or post-construction impacts from these structures are negated.

EOEA 43. The FEIR should include detailed information regarding Section 61 Findings. The proponent should continue to consult with the appropriate regulatory and resource agencies regarding sampling, impact assessment, post-construction monitoring of habitat and fisheries recovery, and mitigation for impacts.

Detailed information regarding Section 61 Findings is provided in Section 9. The Proponent has continued consultations with applicable regulatory and resource agencies during formulation of final Project design parameters.

Executive Office of Environmental Affairs (EOEA) – Draft Record of Decision

EOEA 44. The proponent must submit an EIR addressing the impacts of Phase I and the overall comprehensive project, and propose appropriate mitigation.

The DEIR submitted on June 15, 2006 addressed both the Phase I components and the comprehensive Project; following approval of the Phase I Waiver request, the Proponent has been discussing the project with representatives of the Nantucket Conservation Commission. The Commission has expressed concerns with some aspects of the terrace design so the Proponent is in the process of revising the design and will be refiling with the Con Com in the near future. Impacts from the overall project are addressed throughout this FEIR and appropriate mitigation is addressed in Section 9.

EOEA 45. The DEIR includes a description of the proposed terraces, but it does not indicate the source of sediment that will be used for the terracing and filling the coconut

fiber bags. The sediment needed for this portion of the project should be brought in from an offsite source. I advise the proponent to consult with CZM on this topic.

The source of sediment for terrace construction and fabric bag filling has been from upland sources. Grain size analysis is conducted on the upland source to confirm that it is beach compatible. These results are supplied to the Nantucket Conservation Commission for their review and approval.

10.2 Coastal Zone Management (CZM)

CZM 1. A more thorough alternatives analysis of borrow sites utilizing exclusionary and discretionary criteria would identify a continuum of sites from least to most appropriate that would ensure that the proponents receive appropriate input on site selection.

As described in Section 2.0 of the DEIR, the Proponent conducted an extensive analysis of potential borrow sites before identifying the preferred borrow site as the proposed sand source. An expanded Alternatives Analysis is provided in FEIR Sections 3 and 4. While all potential borrow sites were initially considered, many were quickly eliminated through a detailed pre-field-survey process so efforts and resources could be focused on sites meeting preliminary requirements. Performing detailed surveys and data collection efforts at all alternative borrow sites would not be an efficient use of resources, since some areas can be eliminated based on incompatibility with required criteria (such as grain size, distance from nourishment area, adequate sand volume, impacts to the fishing industry, etc.).

CZM 2. It is recommended that the proponent expand its alternatives analysis of upland sediment sources by using the detailed analysis conducted for the DCR Winthrop project as an example of the level of information that should be provided.

The requested detailed description of possible upland sand sources and delivery methodologies is provided in Section 3 of the FEIR. This alternatives analysis was presented as part of the Highway Methodology review of alternatives through USACE and was submitted to CZM for review. Review and discussions were conducted on November 1, 2006 about an earlier draft of this section with CZM, USACE and other resource agencies. Upland sand sources were determined to be infeasible due to the extremely long unacceptable timeframe to deliver the sediment from upland sources (2.5 to 13 years). Utilizing an off-island upland sediment source would unrealistically require around-the-clock operations, ideal weather conditions, the procurement of large numbers of relatively scarce tugs and barges. Truck delivery options would generate unacceptable impacts at the ferry off-loading facility in Nantucket Harbor, and on Nantucket's streets including downtown and Sconset Village locations. In addition, costs associated with utilizing an upland sediment source are prohibitively high, exceeding the costs of using an offshore borrow site by a factor 2.5 to 4.

CZM 3. Since the DEIR does not explicitly identify the screening processes of physical and biological parameters used during selection of the proposed borrow site, it is premature for the proponent to focus on one preferred site. An expanded alternatives analysis following the USACE Highway Methodology would be helpful in this regard.

The USACE New England District developed the Highway Methodology to incorporate wetland impacts into the design of highway projects such that they comply with Section 404 of the Clean Water Act. This methodology is intended to involve the USACE and other federal agencies in the early stages of highway projects to systematically expedite review of alternatives. The objective is to select the alternative which is least environmentally damaging while still satisfying a project's "purpose and need" as defined during the NEPA review process. Since establishment of the Highway Methodology in 1987, the USACE has utilized it for non-highway projects as well. While some specific aspects of the methodology are not directly applicable to all non-highway projects, the basic process of incorporating agency reviews into the early stages of a project's design is beneficial for planning projects consistent with NEPA and the Clean Water Act to avoid, minimize, and mitigate wetland impacts.

The purpose of this Project, as presented in Section 1, is to protect approximately three miles of eroding shoreline, prevent damage to existing public infrastructure and protect historic structures. Beach-compatible sand is required to achieve this purpose, and therefore appropriate grain size and sufficient sediment volume are critical criterion for borrow site assessment. To be economical, feasible borrow sites must necessarily be relatively close to Nantucket Island; thus, the basic biological characteristics of potential borrow sites for the Project are similar. Input from local fishermen is also an important screening factor. Screening information has been included in the Expanded Alternatives Analysis (see Section 4).

CZM 4. DEIR Section 1.2.2 and Figure 1-3 identify four potential borrow sites, but Section 2.6.2.1 discusses only three of these areas (Bass Rip Shoal and Trough, southeastern Great Point Shoal, and the eastern edge of Great Point Shoal).

DEIR Section 2.6.2.1 provided descriptions of the potential borrow sites initially considered for the Project; areas 1-3 as identified on Figure 1-3 were discussed in this section. Area 4, shown on DEIR Figure 1-3 within Nantucket Sound, was not discussed in detail in this section. FEIR Section 4 provides a detailed description of the potential offshore borrow sites that were evaluated.

CZM 5. The DEIR states that all data, analyses and modeling relating to the borrow site suggest the level of environmental impact will be low and manageable; while this conclusion is helpful, the supporting analyses must be presented for review.

Section 4 discusses the screening process that was used to select the preferred borrow site, including environmental considerations. Related to the expected physical changes at the

borrow site, assuming excavation of 3.5 million cubic yards of material, comprehensive modeling was conducted using the state of the art model, the Delft3D numerical model. Delft3D includes several modules for the simulation of physical processes including wave transformations, sediment transport, morphology, erosion and sediment deposition. The model was applied to a variety of scenarios including a 1 in 20 frequency storm event and a 1 in 50-year storm event for a 48-hour duration. Modeling was conducted in two phases, including the calibration phase and the modeling phase where different potential conditions occurring after borrow site excavation were evaluated. Results indicated no significant wave changes, sediment deposition changes and/or elevation changes will occur as a result of the excavation.

CZM 6. The proponent should present more detailed information about the proposed sand mining's impacts on wave climate, sediment transport, and adjacent shorelines. While the DEIR states that mining's impacts will be less than natural changes that occur as a result of tidal currents and waves, previous studies by the proponent cite shifting offshore shoals as the primary cause for increased erosion along the shoreline. Interactions between the shoal system and shoreline dynamics must be more thoroughly understood and presented for review.

Wave effect modeling has been performed based on the worst-case scenario regarding excavation (i.e., total excavation of the borrow site). This worst-case scenario evaluates the areas of deepest cuts or holes under a situation where the entirety of the borrow site has been excavated. Modeling results have indicated that there will be no coastal effects from the worst-case scenario of total borrow site excavation. The accuracy of data inputs involved in wave modeling has been maximized; these inputs are from a recent bathymetric survey, known wave conditions from past events, and the projected dimensions of the borrow site (including excavation depth).

Also, please see responses to EOEA 29 and 30.

CZM 7. The FEIR should contain data and analyses regarding infilling of the borrow site including identification of potential impacts to sediment transport and wave climate, an estimate of the time required for infilling, and an analysis of where the material will be transported from to fill in the excavated area. The DEIR states that dynamic sand transport landward of Bass Rip will fill in the borrow site, but additional detail is necessary.

Wave effect modeling has been performed based on the worst-case scenario regarding excavation (i.e., total excavation of the 3.5 million cubic borrow site for the initial beach nourishment project). This worst-case scenario evaluates the areas of deepest cuts or holes under a situation where the entirety of the two excavation areas at the borrow site have been removed. Modeling results have indicated that there will be no coastal effects from the worst-case scenario of total borrow site excavation. The accuracy of data inputs involved in wave modeling has been maximized; these inputs are from a recent bathymetric

survey, known wave conditions from past events, and the projected dimensions of the borrow site including excavation depth.

Also, please see responses to EOEA 29 and 30.

CZM 8. Wave climate modeling data should be presented in entirety to ensure that borrow site excavation will not produce unintended impacts along the shoreline. Changes in the wave climate should be analyzed at the shoreline itself, and the projected differences in wave heights for various modeled scenarios should be provided. These models should be conducted for the full range of potential wave conditions at the site.

Modeling results indicate that there are no expected wave effects or impacts expected as a result of excavating 3.5 million cubic yards of material from the borrow site's two excavation areas. Section 5 details modeling results which indicate wave changes will come no closer then 1 ½ miles to shore, and that the wave changes are in terms of inches, not feet.

CZM 9. The proponent should identify borrow sites capable of providing material for projected renourishment events, not solely the initial volume needed for nourishment.

It is the Proponent's intent to utilize the borrow site as the sediment source for the initial Project nourishment as well as the first renourishment event; the identified borrow site contains approximately 6 million cubic yards of material. Initial nourishment will be obtained from two excavation areas within the borrow site. Since renourishment will occur after the advanced nourishment volume has eroded away but prior to loss of the design beach, this event will involve less than 2 million cubic yards of material. The selected borrow site contains more than adequate volume for initial nourishment and the first renourishment, and there is great potential to locate offshore deposits of beach-compatible sand east of Nantucket. An investigatory process similar to the one used to locate the borrow site proposed for this Project will be required to refine the sand search and ultimately select specific borrow sites for future renourishment. As presented in Section 4, multiple factors are involved in borrow site investigations.

CZM 10. An adequate review of groins and their potential effects on the sediment transport system cannot be conducted without a thorough quantification of the direction and magnitude of cross-shore and longshore sediment transport in the project area.

Groins have been eliminated from the Project (see EOEA 8 response).

CZM 11. While the proponent states that a groin field of up to 40 structures may better retain the nourishment sand, it must be reiterated that the Wetlands Protection Act regulations require groins be kept to the minimum length, height and size and that they be filled to entrapment to minimize potential adverse effects.

Groins have been eliminated from the Project (see EOEA 8 response).

CZM 12. The proponent should provide case studies illustrating how similar groins have been adjusted in areas subject to similarly dynamic waves and currents. Experience has shown that it can be extremely difficult if not impossible to adjust groins (as learned on Sylvia State Beach in Oak Bluffs in the 1990s).

Groins have been eliminated from the Project (see EOEA 8 response).

CZM 13. The proponent should present a more detailed monitoring and maintenance plan relating to groins; this plan should identify more specific renourishment triggers and methods for monitoring impacts on adjacent beaches than were provided in the DEIR.

Groins have been eliminated from the Project (see EOEA 8 response).

CZM 14. Although the nourishment will provide a significant volume of sediment for the littoral system, exposure of the groins may impede longshore transport to the point where detrimental effects are apparent on downdrift beaches. The FEIR should articulate how the height and length of proposed groins have been designed to minimize impacts to the existing sediment transport system, how any changes will be detected by beach profile monitoring, and how groins will be re-filled to entrapment relatively quickly if such action is deemed necessary.

Groins have been eliminated from the Project (see EOEA 8 response).

CZM 15. The FEIR should more specifically define the construction methodology and schedule relating to groins. Groins installation prior to placement of nourishment fill would likely interrupt longshore sediment transport and result in downdrift impacts.

Groins have been eliminated from the Project (see EOEA 8 response).

CZM 16. Provide more detail regarding construction methodology for the groins; specifically, will cofferdams, dewatering pumps or other mechanisms be used to install panels between the pilings?

Groins have been eliminated from the Project (see EOEA 8 response).

CZM 17. The Proponent should confirm with DEP that groins in front of vacant lots or properties with post-1978 buildings are permittable.

Groins have been eliminated from the Project (see EOEA 8 response).

CZM 18. Since the geotextile tubes, if exposed, will prevent the coastal bank from providing sediment to the longshore transport system, the proponent should identify specific strategies in the project's monitoring and maintenance plan to ensure that sufficient

nourishment is maintained seaward of the geotextile tubes to provide sediment to the system.

Geotextile tubes have been eliminated from the project (see EOEA 8).

CZM 19. If a polyurea coating is still being considered for the geotextile tubes, additional information should be provided including a discussion of any potential environmental impacts.

Geotextile tubes have been eliminated from the project (see EOEA 8).

CZM 20. The FEIR should specifically identify any alterations to the Lighthouse South-South and Codfish Park dewatering systems and should describe how their effects on the sediment transport system will be monitored.

The required changes to the existing dewatering systems at Lighthouse South-South and Codfish Park are described in Section 1. Monitoring proposed for the Project will evaluate shoreline change and sediment transport across the comprehensive Project area; any effects of the dewatering systems will be captured within this overall survey. The beach monitoring plan is described in Section 5 of the FEIR.

CZM 21. The FEIR should identify any proposed replanting of vegetation on the proposed dunes to mitigate for the burial of existing vegetation.

See EOEA 40 response.

CZM 22. In the area where only dune nourishment/renovation is proposed, the proponent should consider dewatering nourishment material on the beach directly fronting the proposed dune area to minimize impacts from compaction associated with transporting material to the dune site from the beach nourishment zone.

Rather then use dewatering systems to relieve sediment compaction, the contractor can be directed to till the beach. This technique is used to "soften" beaches where sea turtle nesting occurs. Tilling involves dragging a rake with long tines behind a piece of equipment to loosen compaction. Compaction testing can be conducted through the use of a penetrometer to determine if compaction is a concern.

CZM 23. The proponent should identify the source of sediment that will be used for terracing; should the Phase One Waiver be granted, the sediment should be brought in from an offsite source.

See EOEA 45 response.

CZM 24. The project is subject to CZM federal consistency review.

The Proponent acknowledges this, and will be coordinating with CZM to submit an application for CZM Consistency Certification review. Consistency with CZM policies are reviewed in Section 2. All permits and approvals required for the Project were identified in Table 1-1 of the DEIR.

10.3 Massachusetts Board of Underwater Archaeological Resources (MBUAR)

MBUAR 1. The Board supports the Proponent's intent to conduct a marine archaeological reconnaissance survey for the borrow site in its entirety. This survey should be performed in all areas likely to experience direct or indirect subsurface impacts and should include use of a sidescan sonar, marine magnetometer, sub-bottom profiler, DGPS, and recording fathometer. Vibracores should be collected if remote sensing suggests the presence of potential paleo landscapes and survey parameters should be developed through consultation with the Board and the State Historic Preservation Officer.

The proposed marine archaeological reconnaissance survey of the borrow site will be conducted by a qualified marine archaeologist in Fall 2006. It will include each of the remote sensing components identified above. See Section 8 for details.

MBUAR 2. The Board concurs with the DEIR's determination that any anomalies identified through the reconnaissance survey as potential archaeological resources will be avoided.

The Proponent reiterates its intent to avoid any such resources. As explained in Section 8 of the FEIR, the Proponent will submit an avoidance plan to the MBUAR, Massachusetts Historical Commission, and U.S. Army Corps of Engineers in compliance with Section 106 of the National Historic Preservation Act prior to any borrow site excavation.

10.4 Massachusetts Department of Environmental Protection (DEP)

DEP 1. The Department has no objection to the Proponent's Phase One Waiver request to allow bank terracing and vegetation planting to proceed before the MEPA process has been completed for the entire project.

See EOEA 44 response.

DEP 2. In accordance with the Wetland Regulations at 310 CMR 10.27(4), the Proponent should demonstrate that the proposed groins are of minimum length and height to maintain beach form and volume.

Groins have been eliminated from the Project (see EOEA 8 response).

DEP 3. The proposed groins do not appear to be readily adjustable (particularly the rubble-mound head); the FEIR should clarify how the groins will be adjusted if adverse impacts are identified.

Groins have been eliminated from the Project (see EOEA 8 response).

DEP 4. The Department concurs with the DEIR's proposal of constructing the groins following completion of the nourishment template; installing these structures prior to nourishment would likely result in adverse downdrift impacts.

Groins have been eliminated from the Project (see EOEA 8 response).

DEP 5. Since 310 CMR 10.30(3) allows coastal engineering structures when required to prevent storm damage to buildings constructed pre-1978, the FEIR should analyze on a case-by-case basis the rationale behind proposing geotextile tubes seaward of any properties containing only post-1978 buildings.

Geotextile tubes have been eliminated from the Project (see EOEA 8 response).

DEP 6. The Proponent should assess the implications of potential wave interactions with geotextile tubes (including scour as a result of wave reflection) should the structures become exposed.

Geotextile tubes have been eliminated from the Project (see EOEA 8 response).

DEP 7. Identify the points at which geotextile tubes will be re-covered, removed or abandoned following exposure to wave action.

Geotextile tubes have been eliminated from the Project (see EOEA 8 response).

DEP 8. The proponents should coordinate with the NHESP relative to the timing of beach construction, the location of proposed dewatering areas as well as placement of snow fencing and/or planting of vegetation within existing and potential shorebird habitat.

See response to EOEA 24 and Section 7 of this FEIR.

DEP 9. Alternative designs should be considered to eliminate or reduce impacts to nearshore cobble bottom habitat.

A delineation of nearshore cobble bottom, and Project impacts to this habitat are discussed in Section 6. In summary, construction of the design beach profile will permanently cover approximately 10 acres of nearshore cobble bottom habitat; approximately three acres is comprised of hard bottom and seven acres of sand. However, cobble bottom habitat identified by sidescan sonar surveys extends across approximately 2,082 acres seaward of the project area. Alternative Project beach designs were considered that would increase the slope of the fill to minimize cobble burial; however, the corresponding reduction in impacts would be minimal. Mitigation of cobble impacts is discussed in Section 9.

DEP 10. The proponent should consult with the fisheries agencies to develop time-of-year restrictions for both the dredging and nourishment activities.

As detailed in DEIR Section 5.1, the proposed construction schedule will avoid any work within the winter flounder time-of-year restriction between February and May. The Proponent has met with DMF, NMFS, and other resource agencies, most recently on November 1, 2006, to discuss TOY restrictions, and restrictions commonly applied to other projects have been incorporated into the proposed construction schedule.

DEP 11. Fully describe the proposed sand mining process, including any turbidity controls at the dredge head and any water quality or sedimentation impacts associated with dewatering or screening that may take place in the event a hopper dredge is utilized.

See response to EOEA 19.

DEP 12. The Department would prefer that the proponent conduct more in-depth analyses and surveys not only of the preferred Northern Borrow Site but also of each of the potential borrow sites identified in the DEIR. Such detailed information would allow for more thorough comparisons between potential borrow sites and could identify areas that would supplement sand mined from a primary site.

As described in Section 2.0 of the DEIR, the Proponent conducted an extensive analysis of potential borrow sites before identifying the preferred borrow site as the proposed sand source. An expanded Alternatives Analysis is provided in FEIR Section 4. While all potential borrow sites were initially considered, many were quickly eliminated through a detailed process so efforts and resources could be focused on sites meeting preliminary requirements (such as grain size, distance from nourishment area, adequate sand volume, etc.). Performing detailed surveys and data collection efforts at *all* alternative borrow sites would not be an efficient use of resources, since some areas can be eliminated based on incompatibility with required criteria.

DEP 13. The FEIR should evaluate whether obtaining nourishment sand from more than one borrow site could avoid impacts to the most significant habitat areas within each borrow site.

See EOEA 37 response.

DEP 14. Data collection at alternative borrow sites should continue as a component of the borrow site post-construction monitoring program so that selection of borrow sites for renourishment events can benefit from long-term survey data.

An expanded analysis of various offshore sand sources is provided in FEIR Section 3. Preliminary borrow sites were surveyed, assessed, and excluded based on various criteria employing a format consistent with the USACE Highway Methodology. While the preferred

borrow site will provide sufficient volume for the initial Project nourishment plus at least one subsequent renourishment event, the Proponent will undertake similar survey efforts to identify additional sources of renourishment material. This will be an ongoing effort during which the Proponent anticipates working collaboratively with the state as well as Plymouth, Dukes, and Barnstable counties.

DEP 15. DEP recommends that the proponent continue to consult with the appropriate agencies to ensure the proper approach to sampling, impact assessment, post-construction monitoring of habitat and fisheries recovery, and impact mitigation is taken.

The Proponent is continuing its interactions and negotiations with various regulatory and resource agencies regarding these issues.

DEP 16. Post-construction and post-renourishment monitoring of the borrow site should analyze the effects of dredging an area undergoing recovery due to previous disturbance. Such an analysis would be useful during the selection of future borrow sites. In the Department's view, repeated mining of the same area would result in permanent rather than temporary impacts.

See EOEA 13 response.

DEP 17. The proposed groins should be designed to accommodate pedestrian access over and around the groins to adjacent beach areas.

Groins have been eliminated from the Project (see EOEA 8 response).

10.5 Massachusetts Division of Fisheries and Wildlife – Natural Heritage and Endangered Species Program (NHESP)

NHESP 1. This project occurs within Priority Habitat of Rare Species (Piping Plover and Least Tern) and requires a formal MESA filing pursuant to 321 CMR 10.18.

The Proponent acknowledges this requirement and has been consulting with the NHESP on the Shorebird Management Plan which will be filed as part of the formal MESA submission.

NHESP 2. The proponent should assess the potential impacts of offshore dredging on foraging habitats of wintering sea ducks and loons by conducting multiple low-altitude surveys of the borrow site from early November through April at various times of day. The proponent should acknowledge that the overall habitat area supporting such wintering populations will be diminished by the removal of mollusks and crustaceans and a lowering of the seafloor elevation.

Potential impacts of offshore dredging on foraging habitats are discussed in Section 7.3.3. Additional surveys of the borrow site are discussed in Section 7.3.2.

NHESP 3. The FEIR should provide a more substantive assessment of the potential adverse effects of dredging to foraging habitat of the Common Loon as a result of reduced fish prey and temporary increases in turbidity.

Potential impacts to Common Loon are addressed in Section 7.3.3.2.

NHESP 4. The unbroken dune will significantly impede natural processes of erosion and accretion that are necessary to create and maintain flat, unvegetated or sparsely vegetated nesting habitat, particularly where the dune is not coupled with beach widening.

See EOEA 26 response.

NHESP 5. The proponent should explore alternatives to using groins in the suitable nesting areas near Low Beach and Sesachacha Pond.

Groins have been eliminated from the Project (see EOEA 8 and 27 response).

NHESP 6. The plan for monitoring plovers and terns during construction in areas outside historic nesting locations should be twice weekly between March 15 and July 15 and weekly from July 16 through August 31.

This recommendation has been incorporated in the Shorebird Management Plan presented in Section 7.2.1.

NHESP 7. The FEIR should present an annual plan for monitoring and protecting plovers and terns that establish breeding territories in the entirety of the Project area under post-construction conditions. Nests should be protected using measures such as warning signs, symbolic fencing, and seasonal vehicular restrictions. This monitoring should be conducted each year, regardless of whether Project maintenance or renourishment is occurring, and the Proponent should identify the logistical details and funding of the monitoring efforts.

See response to EOEA 15 and the Post-Construction Shorebird Management Plan presented in Section 7.2.2.

10.6 Massachusetts Division of Marine Fisheries

DMF 1. The most durable shoreline protection techniques should be employed for the project; beach nourishment is by design only a temporary solution and is highly susceptible to loss in the event of a major storm.

The Project proposes a multi-faceted approach consisting of beach nourishment and accompanying bank stabilization components to achieve Project objectives while at the same time avoiding impacts to adjacent areas and acknowledging the community's varied interests. Federal, state and local environmental regulations firmly support soft solutions

such as beach nourishment over traditionally-utilized hard structures (i.e., seawalls, groins, breakwaters, etc.) because they do not inhibit natural sediment transport. Hard structures that alter natural coastal processes result in habitat conversion. While beach nourishment is a shoreline management strategy that requires regular monitoring and maintenance, mainly in the form of renourishment events, in this case the strategy allows for an appropriate balance between Project performance, natural resource protection and enhancement, and support for public access and recreation. As part of the USACE Highway Methodology review, the Proponent submitted an Alternatives Analysis to USACE on January 20, 2006. This document reviewed various shore protection alternatives considered by the Proponent, and explained the process by which beach nourishment was selected as the preferred alternative. Initial identification of appropriate alternatives to include in the analysis was the subject of meetings with the USACE, DMF, and other federal and state agencies held at the USACE office in Concord, MA on February 1, 2006 and November 1, 2006; alternatives presented in the DEIR and expanded upon in this FEIR were those deemed appropriate by agencies attending these meetings. The Secretary's Certificate on the DEIR requested that the Proponent provide additional information on the source of sediment for the Project's nourishment. The alternatives analysis for upland sediment sources is provided in Section 3 and for marine sediment sources in Section 4.

DMF 2. Submerged techniques used in other parts of the country should be further evaluated as alternatives to the project.

Submerged techniques such as artificial reefs are inappropriate since the level of protection provided by submerged structures decreases during storm surge, when the water surface is higher and the clearance above the structure is greater. This condition allows more energy to pass over the structures to the shoreline. Also, this alternative is a structural shore protection technique which would interfere with longshore sediment transport. As such it would not meet the state Wetlands Protection Act performance standards, since down-beach erosion impacts would be created.

DMF 3. The use of beach fill in other parts of the country is touted as the reason why it will work for this project; the Proponent should discuss how differing coastal processes, ocean exposure, and sand characteristics may enhance the success of nourishment projects in certain locations while inhibiting their success in others.

All areas subject to erosion have some similar characteristics. These include exposed shoreline, the presence of wave energy, and erosion-sensitive soil or sediment. While many different techniques have been developed to mitigate for erosion, government policy consistently supports beach nourishment because it is a strategy compatible with natural coastal processes. Hard structures, in contrast, degrade natural habitat reliant upon sediment transport and, consequently, negatively impact associated organisms. State of the art engineering physical models, in conjunction with extensive experience with beach nourishment projects was used to develop a project specific to the Sconset shoreline. The

full array of principles and parameters were applied to the site specific conditions including the local sediment budget, erosion rates, present shoreline condition, average and storm wave conditions, native sediment characteristics, borrow site sediment characteristics, longshore currents, profile slope, bluff slope and position related to the shoreline, sediment cobble and gravel content both at the beach and borrow site, wave angles, physical changes due to borrow site excavation, and project related sediment budget modifications among others. These same principles and parameters have been applied at various locations both nationally and on an international basis for development of successful beach nourishment projects.

Beach nourishment is the favored alternative for shore protection and coastal hazard mitigation for developed shorelines. Structures, such as groins, breakwaters (artificial reefs) and seawalls, can introduce side effects that are not acceptable. Groins can retain littorally-transported sand, accelerating downdrift erosion. Breakwaters, similar to groins, interrupt downdrift sediment movements resulting in accelerated erosion on the downdrift side of the structure. Barrier structures such as seawalls retain material, but do not contribute sediment to the deficient littoral transport system. The introduction of sediment into the system through beach nourishment addresses erosion in the project areas, and increases the amount of sediment transported by waves and currents to adjacent beaches. Beach nourishment expands the beach, greatly increasing habitat for threatened shorebirds (piping plovers and least terns).

DMF 4. Six (6) alternatives should be carried forward to the FEIR: offshore/nearshore reefs, beach fill, beach with groins, beach fill with groins and geotextile tubes, seawall/revetment, and seawall/revetment with beach fill. Each alternative should be evaluated on its ability to provide lasting protection while reducing impacts. The chosen alternative should be one that minimizes the volume of beach fill needed while maximizing its functionality.

Meetings with the USACE, DMF, and other federal and state agencies were held at the USACE office in Concord, MA on February 1, 2006 and November 1, 2006 to discuss which alternatives would be appropriate to include in an analysis to assess their potential to satisfy Project objectives. Alternatives presented in the DEIR and expanded upon in this FEIR were those deemed appropriate by agencies attending these meetings. Alternatives that were obviously incompatible with the dynamic coastal environment, impractical from a permitting perspective, or inadequate with regard to Project objectives were eliminated from consideration; this process of elimination is critical to allow resources to be appropriately focused on feasible alternatives.

Upon consideration of results from completed sediment transport models, a finalized sediment budget for the Project area, projected wave and current dynamics, and an updated forecast for performance of the nourishment material, the Proponent has elected to eliminate groins and geotextile tubes from the final Project design. The final engineered design will satisfy Project objectives without the use of these structures.

DMF 5. The sand waves and ridges that form on Nantucket Shoals provide refuge and shelter for many species of finfish and invertebrates; alteration or loss of these habitats as a result of sand mining may affect fish development, behavior, and foraging success. These changes may impact abundance levels as far as the Mid-Atlantic states due to historic migratory patterns.

The Project area constitutes a tiny fraction of the Nantucket shoal ecosystem, which extends for more than 25 miles off the southeast coast of Nantucket and covers an area in excess of one million acres. Migratory fish that occur seasonally on the shoals are not specifically dependent upon the Project area. Summer habitat is a vast region of the Northwest Atlantic and is primarily distinguished by proximity to the coast; oceanic species occur offshore while coastal species occur inshore. These fish are constantly mobile, pursuing prey and utilizing the Project area as one portion of a much larger habitat range. Because the Project area represents a tiny fraction of the habitat area utilized by species in the Northwest Atlantic, and because the habitat that will be impacted is not exclusive to any particular species (i.e. there are abundant comparable areas available nearby), fish populations that utilize the shoals are not expected to be impacted by the Project.

DMF 6. Alteration and removal of the shoals proposed for sand mining may significantly impact the commercial and recreational harvests of fish and invertebrates from these shoals; of particular concern are surf clams and recreational species such as striped bass.

A significant impact is one that could produce a measurable change in population. Based on an analysis of potential impacts and available habitat, the Proponent believes the Project will not result in a measurable impact. The area temporarily utilized for sand mining represents just 0.034% of the Nantucket Shoals (344 acres out of a total of 1.09 million acres), 0.93% of Bass Rip (23 acres of a total 2,439 acres), and 2.7% of subtidal flats interior to Bass Rip (321 acres of a total 11,740 acres). Species utilizing the borrow site for some portion of their life requirements will have ample alternatives for spawning, feeding, and shelter; therefore, a reasoned analysis concludes there will be no significant impact.

The Project impact to striped bass is not expected to exceed more than a fraction of a percent of the impact associated with commercial fishing. DMF established a 2006 quota of 1,140,807 pounds for commercial fishermen in Massachusetts to maintain a sustainable population of striped bass. Despite the fact that fishing in federal waters for striped bass is prohibited, the quota was filled within a 5 week period with all permitted fishermen constrained by a daily catch limit suggesting that legal sized fish are relatively abundant. Organisms temporarily displaced by the Project will return as benthic habitat recovers, which is anticipated to occur over a one to three year period. Impacts to these species were thoroughly discussed in DEIR Section 4.5.2.

DMF 7. Nearshore cobble bottom where attached vegetation is present is clearly stable and likely provides habitat for juvenile finfish and invertebrates; burial of this habitat is likely during fill placement or beach equilibration.

Section 6 provides a thorough discussion of cobble bottom habitat delineation and the likely Project impacts to this habitat. Approximately 10 acres of nearshore cobble will be permanently covered by nourishment fill in the design beach (three acres is hard bottom and approximately seven acres exhibit sand). Approximately 105 acres of nearshore cobble will be temporarily covered by the sacrificial beach, which will erode due to natural littoral transport. Unavoidable impacts will result from the permanent burial of ten acres of cobble and will require mitigation. Some areas are presently subject to burial and uncovering due to natural sediment transport; this cycle restricts growth and colonization by marine organisms that support higher-functioning habitats. The areas impacted by the sacrificial beach will assume these habitat characteristics.

When a beach is nourished, sand is placed into a profile that is steeper and contains a wider beach berm than would naturally occur given a particular wave climate, grain size, etc. Wave action then naturally reworks the fill, carrying some material offshore and creating a more gradual profile; beach equilibration through this process occurs over 1-2 years. At the time a beach has reached equilibrium, the toe of fill is at its most seaward location; after equilibration, the advanced nourishment profile begins to retreat and the toe of fill recedes back towards land. During this process, bottom habitat (such as nearshore cobble bottom) that was buried at the maximum coverage phase begins to re-emerge. Nearshore habitat is generally colonized by organisms conditioned to survive in the dynamic, active wave zone. This zone is particularly active with regard to sediment transport, which naturally and periodically buries and uncovers lower-relief rocks. As a result, organisms in the nearshore tend to be rapid colonizers. Composition of this habitat, which is subject to regular disturbance, is different from cobble habitat farther offshore; the offshore areas are not subject to regular burial and uncovering, and are characterized by a more mature ecosystem. As cobble bottom re-emerges following burial under Project fill, benthic organisms will colonize rocks and fish will soon follow. This process will be repeated after each renourishment event. Therefore, each renourishment event will enlarge the area of beach habitat while burying an area of nearshore cobble bottom; however, equilibration and natural shoreline processes will continue to alter the nearshore environment. In addition, the nourishment sediment source contains a coarser-grained component that in itself will provide a substrate that provides some of the functions and values that will be impacted by filling.

DMF 8. Partly due to a paucity in data, the DEIR provides little information regarding the impacts to finfish and macroinvertebrates observed from other beach nourishment projects around the country.

DEIR Section 5 provided a list of other nourishment projects performed around the country and contained accompanying descriptions of their impacts or associated issues. General consensus is that sand mining activities result in short-term impacts with complete recovery within approximately one to three years of the disturbance. A detailed study by the USACE in New Jersey assessed finfish populations before, during, and after implementation of a

large beach nourishment project and concluded that no long-term impacts to the marine environment occurred at the borrow site or at the beach (USACE, 2001).

DMF 9. The proponent's Fisheries Sampling Plan is only "comprehensive" in comparison to other projects which have performed minimal fisheries studies. MarineFisheries and NMFS have expressed their concerns that the proposed plan cannot provide data to accurately describe fisheries habitat functions and values at the proposed sand mining site nor can the plan fully evaluate the scope and magnitude of potential impacts.

The Proponent disagrees with this assessment. Marine Research, Inc./Normandeau, a highly-respected research company, has performed more than 30 days of field surveys to characterize sportfish, groundfish, shellfish, and early developmental stages of marine life and benthic habitat since November 2005; more than 15,000 fish were caught during the survey efforts. Data collected support statistically-based conclusions regarding fish occurrence and evaluation of potential impacts. Combined with the large volume of data on benthic recovery from other beach nourishment projects, the scientific analyses performed for this Project demonstrate that activities, with mitigation for nearshore burial, will not significantly impact the marine environment.

DMF 10. The Fisheries Sampling Plan should be performed for a duration greater than one year to allow separation of lasting construction impacts from natural variability.

Experts in the field of beach nourishment impact assessment agree that measuring changes in benthic communities as a result of construction is the best way to gauge habitat impacts and recovery for beach nourishment projects (Saloman, Naughton and Taylor, 1982; Johnson and Nelson, 1985). Benthic habitats are typically relatively stable environments that are not characterized by dramatic annual variability. A sampling plan, including the one proposed for this Project, is designed to assess seasonal variability; due to a lack of variability from year to year, a single year of sampling is commonly accepted as providing a reasonable baseline of data to be followed by multiple years of sampling to assess recovery. Much of the sampling being proposed and performed by the Proponent is not generally required of other projects and is meant to supplement information gathered on benthic recovery.

DMF 11. Otter trawls and mid-water trawls may not representatively sample certain fish species, including fast-moving pelagic fish. MarineFisheries did request that the proponent evaluate the use of a gill net, but such an evaluation was not included in the DEIR.

DMF reviewed several versions of the Fisheries Sampling Plan during a six-month review period, and their comments were incorporated into the plan's final design. Otter trawls are used by research programs, including those performed annually by DMF, to assess bottom fish populations throughout the world. The agency never questioned the use of otter trawls. In a meeting on April 3, 2006, DMF raised concerns about the effectiveness of the mid-water trawl; however, the agency admitted it was not prepared to recommend the

Proponent use gill nets due to the fish kills associated with the technique. The mid-water trawl has been used by state and federal government agencies such as USGS and California Fish and Game in long-term population assessment programs to study pelagic fish. The Project's marine experts are confident that the mid-water trawl is the most effective, least obtrusive sampling method for pelagic fish, and have provided DMF with related documentation. This method is being supplemented with a rod-and-reel sampling program, a shrimp trawl, and surveys of charter and commercial fishermen to obtain a comprehensive assessment of pelagic species.

DMF 12. Biological sampling should be performed at all potential sand mining sites rather than only within the preferred borrow site such that the severity of potential impacts can be compared for various alternatives.

It is common for projects to utilize existing information from maps, research, previous surveys, and known environmental conditions to assess potential borrow sites prior to collecting more detailed data from the most promising alternatives and the preferred site. It is unrealistic, unreasonable, and indeed unprecedented, to expect any project to collect detailed information from every potentially-feasible alternative site. Borrow sites must satisfy certain criteria required to achieve Project objectives, and if a particular site does not satisfy these "exclusionary criteria," it is valid and appropriate to eliminate it from further consideration (see Section 4). For illustrative purposes, one such exclusionary criterion is grain size, which must be compatible (i.e. comparable or coarser-grained) with the native beach. The Proponent collected sediment cores at all potential borrow sites to identify areas containing beach-compatible sand; sites lacking compatible sand were excluded from further consideration. Fisheries landings, DMF trawl results, bathymetric data, and other geologic information relating to the ecology of each remaining potential borrow site all suggest the sites are quite similar; therefore, site-specific studies are not appropriate. In addition, the Proponent discussed the various potential borrow sites with fishermen and utilized their input as part of the exclusionary analysis.

DMF 13. It is not appropriate to extrapolate MarineFisheries' Resource Assessment Trawl Survey data to describe year-round attributes for all collected species.

The DMF Resource Assessment Trawl Survey is limited in its spatial and temporal scope. Although it is used for making fisheries management decisions, the Proponent agrees that the DMF Trawl Survey is insufficient for characterizing marine resources at the Project site. Therefore, the Proponent has implemented its own comprehensive Fisheries Sampling Plan.

DMF 14. While beach fill and sand mining will cause direct and spatially-broad impacts to many species and habitats, techniques such as geotextile tubes and/or seawalls would have far fewer effects on marine resources.

Geotextile tubes and/or seawalls have minimal effects on marine resources if they are installed behind a nourished beach sufficiently wide to limit their wave contact to extreme

storm events (e.g. 50-year storms). Otherwise, use of hard structures can transform nearshore habitat and affect species that rely on unique erosion and sediment transport conditions. This is precisely why other environmental agencies employing an ecosystem management approach are proponents of soft techniques such as beach nourishment. Geotextile tubes are typically only used in conjunction with beach nourishment projects as the last line of defense. When they are used without a beach nourishment project in front of them, they are typically prone to failure during coastal storm wave attack. Seawall use in Massachusetts has rarely been permitted on beaches without existing structures due to Wetlands Protection Act and Local Wetland Bylaw performance standards that limit their use to more developed shorelines.

DMF 15. It is inaccurate to hypothesize that the functional loss of areas such as nearshore cobble would have minimal impact based on the purported abundance of such substrate; this level of data resolution is simply not supported by existing sources or studies.

Dive surveys conducted during summer 2006 supplemented the information presented in the DEIR regarding cobble bottom characteristics within the proposed nourishment footprint (See Section 6). Construction of the design beach profile will permanently cover approximately 10 acres of nearshore cobble bottom, which is comprised of roughly three acres of hard-bottom surface and seven acres of sand; this permanent impact will be mitigated in-kind. Adjacent cobble bottom habitat located seaward totaling 2,082 acres has been identified by sidescan sonar surveys. Since surveys were limited in their offshore extent, the area of actual cobble bottom coverage can reasonably be expected to be substantially greater. Impacts to cobble habitat will be mitigated as described in Section 9.

DMF 16. Because of the lack of adequate data, it is difficult to properly identify appropriate time-of-year (TOY) restrictions other than to say that the proposed summer work period is exactly the wrong time to be excavating sand from the shoals due to use of these areas by fish and fishermen. Furthermore, no rationale has been provided for the proposed winter flounder TOY restriction.

TOY restrictions are implemented to avoid impacting the reproductive success of species whose populations have been influenced by overharvesting (e.g., winter flounder, cod) or degradation of spawning habitat (anadromous fish species). Data generated during field studies from November 2005-October 2006, including the documentation of over 15,000 individual fish, provide a significant body of information useful to assess the presence of marine resources, including distinguished sensitive species, in the Project area. These data has proven to be critical to assessing the appropriateness of various TOY restrictions recommended by the Proponent. The proposed restrictions are consistent with those required for similar projects. TOY restrictions were most recently discussed with agency personnel at a meeting with fisheries agencies at the USACE, Concord, MA offices on November 1, 2006.

In general, the waters off Sconset between the nourishment site and the borrow site is heavily utilized by commercial and recreational fishermen in summer due to the seasonal occurrence of migratory species from the south. The construction activities will exclude fishermen from a very small area around construction operations. The majority of the Sconset shoreline will be unaffected as will popular fishing areas to the north (Great Point) and south (Old Man Shoals).

DMF 17. Regarding potential mitigation, the cited artificial reef deployments should be evaluated based on their success and associated monitoring and permitting. Application of artificial reefs will not have uniform results in all areas, but we do encourage the proponent to explore this technique as a form of shore protection.

The DEIR presented an initial explanation for why sunken breakwaters (essentially artificial reefs) are not an ideal element for inclusion in the Project design (see DEIR Section 2). Artificial reefs are generally unacceptable to environmental agencies seeking to protect unique habitat characteristics associated with particular patterns of erosion and sediment transport, although they have been employed for projects around the world to successfully create habitat. Artificial reefs employed as erosion control structures are referred to as "breakwaters" in the engineering field. These structures, if they function as intended, block wave activity resulting in a wave shadow landward of the structure. Sediment transported by littoral forces then deposit material behind the breakwater resulting in beach deposition. The problem occurs when breakwaters function in a situation of significant longshore transport, such as the project area. The breakwaters then operate essentially as littoral barriers, blocking sand movement and retaining the sand. The downdrift beaches become "sand starved" resulting in erosion, or if erosion already existed, in accelerated erosion. The breakwaters then function to shift the erosion problem behind the structure to the adjacent (downdrift) beach, potentially causing significant beach loss and damage. Longshore transport is significant at Sconset beach. Use of breakwaters, depending on their deployment and effect, could result in significant beach damage. Unlike groins which can be positioned to function only when the beach reached a certain level of beach loss, breakwaters would impact the entire beach profile.

DMF 18. The pace of this project raises concerns that data collection and analysis will be unduly accelerated, thereby preventing thoughtful evaluation of potential impacts to public trust resources. The proponent should continue to coordinate with State and Federal resource agencies to comprehensively analyze shore protection alternatives and potential impacts.

The Proponent has participated in extensive consultations with resource agencies to design a Project that comprehensively considers coastal processes, biological resources, public benefits, and Project objectives. While the Proponent acknowledges that due to imminent threats to landward resources the timeliness of the Project is essential, significant resources have been invested to collect and analyze data to inform the final Project design in an effort

to avoid and minimize impacts. Moreover, substantial bodies of data exist as a result of beach nourishment projects that have been installed under similar circumstances in other locations.

10.7 Massachusetts Historical Commission (MHC)

MHC 1. Additional information is needed by the MHC to comment on the proposed relocation of the Sankaty Head Lighthouse; scaled project plans with elevations illustrating proposed conditions should be provided along with photographs of the lighthouse and adjacent properties from multiple vantage points.

The SBPF is not undertaking relocation of the lighthouse as a component of this Project; rather, this is being accomplished by a different project being undertaken by the Sconset Trust in cooperation with the US Coast Guard.

MHC 2. MHC previously requested that the underwater borrow pits be subjected to a marine archaeological survey in conjunction and under permit with the Massachusetts Board of Underwater Archaeological Resources. The purpose of this survey is to locate and identify any significant marine archaeological resources (including shipwrecks and submerged ancient Native American sites) that may be affected by the proposed borrow operations.

The Marine Archaeologist for the Proponent has been in contact with MHC and MBUAR and a marine archaeological survey will be conducted this Fall.

10.8 National Marine Fisheries Service (NMFS)

NMFS 1. Additional data should be collected to assess impacts to fishery resources, habitats and fishing activities.

Since filing the DEIR, the Proponent has implemented a comprehensive Fisheries Sampling Plan which has produced a voluminous amount of data useful in assessing potential impacts and formulating strategies to avoid, minimize, and mitigate for those impacts (see Section 6.) This plan was reviewed with agency personnel over a six-month period before it was initiated in April 2006.

NMFS 2. Within the federal review process, NMFS anticipates that the lead federal agency (the USACE) will require the development of an Environmental Assessment (EA) pursuant to the National Environmental Policy Act; based on its findings, an Environmental Impact Statement may be required.

Based on previous meetings with the USACE, it appears likely the agency will prepare an EA pursuant to NEPA requirements. The EA will be prepared using the significant volume of data generated by the Proponent during the MEPA process. Karen Kirk Adams of USACE has stated in interagency meetings with the Proponent that it is unlikely an EIS will be

required. However, the Proponent recognizes that this process must run its course before the NEPA determination is issued.

NMFS 3. Loss of sand waves, ridges, and biogenic depressions present on Nantucket Shoals could affect the variety of marine resources utilizing the area as habitat.

From the earliest stages of the Project, the Proponent has been aware of concerns regarding potential biological impacts and has focused design efforts on maximizing Project effectiveness while minimizing adverse effects on marine resources. DEIR Section 4.3 presented analyses of existing habitat and biological resources in the Project area; FEIR Section 6 supplements the DEIR with more detailed data. Section 4.5 of the DEIR discussed potential impacts the Project may have on biological resources and their habitat, and this discussion is likewise supplemented by the FEIR. The area of impact is extremely small (195 acres at the borrow site) compared with the size of the overall Nantucket Shoals complex, which extends southeast from Nantucket for over 25 miles and spans 1.09 million acres.

NMFS 4. A full delineation of the surfclam resource within and adjacent to the borrow site should be performed; the DEIR generally discusses this resource, but a survey has not been completed to date. Such a survey will allow for an analysis of the scale of impacts resulting from the proposed mining and will identify the proportion of the local population that may be affected.

Surfclam surveys were performed in August of 2006. These surveys followed protocol recommended by DMF shellfish biologists knowledgeable in surfclam biology. To field sample the area, the proposed borrow site was divided into grid system of 300 meter blocks; and 100 to 571 meter tow transects were conducted in duplicate at each grid. On August 29, 2006, 17 transects were conducted using a commercial clam dredge vessel. Surfclams were collected, measured, and returned to the sea. Due to the high seas, it was not safe for a diver to conduct an assessment of dredge efficiency. A total of 359 surfclams was collected and used to provide a measure of the surfclam populations. The size of shell length with the highest frequency was 170 mm. As anticipated, the data show that surfclam habitat is most suitable along the edge toward Bass Rip, while the proposed dredging area to the west has limited surfclam resources. Results are presented in Section 6.2.2.4 and additional details can be found in Appendix D.

NMFS 5. A comprehensive cost analysis of the offshore alternative should include permanent and temporary habitat impacts at the borrow site and nourishment area, costs to fishing industries, costs associated with using Commonwealth tidelands, and the costs associated with multi-year monitoring and mitigation.

A comprehensive cost analysis, more detailed than the analysis presented in the DEIR, is provided in Section 6.6.5. Though difficult, the Proponent has sought to estimate the costs of potential Project impacts as accurately as possible to prevent externalities from being

omitted from the analysis. In an effort to quantify the Project's potential economic impacts, commercial fishermen on Nantucket have been consulted regarding their activities and financial experiences. Data from biological surveys, discussions with fishermen, various potential mitigation scenarios, long-term monitoring efforts, and potential impacts from the Project design have all been incorporated in the cost analysis

NMFS 6. The alternative of using multiple borrow sites (including upland sources and dredging projects) to achieve the necessary sand volumes should be explored.

Upland sediment sources were ruled out due to much greater cost (total and unit costs), unacceptable timeframes for sediment delivery and other environmental and safety factors (see Section 3.0 for details). Other marine sediment sources were ruled out for unacceptable grain size, sediment volume and fishing industry input (see Section 4.0). Also, the use of multiple borrow sites or sediment sources is normally avoided unless there are extenuating circumstances. Multiple sources generally increase projects costs versus use of the best low cost sediment source, and may introduce environmental concerns. Land sources are not feasible because of the cost of construction, the impact to the island infrastructure, and slow rate of project construction which adversely impacts project performance. It is likely that barging of sediment to Nantucket Island would be required, with trucking of the sediment to the beach site. In terms of locating a borrow site for the beach nourishment project, site selection is based on an extensive analysis of potential borrow sites to focus in on the best candidate locations. Initially, all available information is reviewed to eliminate potential borrow site sites from consideration. Issues related to wave effects, site specific environmental concerns, fisheries issues, sediment source issues, economics of the sediment source, issues related to dredging, proximity to the project area, for example, influence the selection of candidate sites usually to a few sites.

NMFS 7. Impacts and recovery associated with physical habitats (i.e., sand waves and biogenic depressions) should be further explored and presented by the proponents.

From the earliest stages of the Project, the Proponent has been aware of concerns regarding potential biological impacts and has focused design efforts on maximizing Project effectiveness while minimizing adverse effects on marine resources. DEIR Section 4.3 presented analyses of existing habitat and biological resources in the Project area; FEIR Section 6 supplements the DEIR with more detailed data. Section 4.5 of the DEIR discussed potential impacts the Project may have on biological resources and their habitat, and this discussion is likewise supplemented by the FEIR Section 6. The area of impact is extremely small (195 acres at the borrow site (less than 0.1%) compared with the size of the overall Nantucket Shoals complex), which extends southeast from Nantucket for over 25 miles and spans 1.09 million acres.

NMFS 8. Additional information regarding dredge cut thickness and substrate composition should be provided to confirm that borrow site excavation will not result in a conversion of habitat type.

The final design details for the proposed dredging activity are provided in Section 1. Borrow site excavation will be limited to less than 20 feet and often much less (average dredge cuts are 10-12-feet); coupled with bathymetric, seismic and vibracore data, this verifies that sand excavation of the preferred Borrow Site will not result in a conversion of habitat type.

NMFS 9. NMFS maintains that placement of fill in nearshore cobble areas will constitute a permanent loss of habitat; this should be reflected in a comprehensive accounting of project costs.

The Proponent agrees that the placement of fill in nearshore cobble areas will constitute a permanent loss of habitat and proposes to mitigate for the impacts associated with the construction footprint by creating an artificial reef.

As described in the response to NMFS 5, a comprehensive cost analysis is provided in Section 6.6.5.

NMFS 10. The use of Sconset Beach by recreational fishermen as well as anticipated impacts on fishery resources should be fully characterized.

Potential impacts to fishery resources were discussed in DEIR Section 4.5, and the discussion is supplemented by FEIR Section 6. Throughout summer 2006 and continuing into the fall, the Proponent has engaged in extensive discussions with both commercial and recreational fishermen to determine their level of activity and dependence on the Project area and how we can mitigate for any impacts that can not be avoided. Due to its remote location, very few shore fishermen utilize Sconset Beach. During construction, fishermen who do normally use the nearshore area in proximity to the Project will need to fish at alternative, perhaps adjacent, locations; there are numerous such options.

NMFS 11. The proposed timeframe, scope, frequency, and volume of renourishment events should be discussed in greater detail.

The DEIR discussion of renourishment is supplemented by FEIR Section 1 and the Engineering Report Attachment.

NMFS 12. Repeated disturbance of the borrow site should be factored into the analysis of benthic and habitat recovery times and should be reflected in a cumulative effects analysis.

A cumulative effects analysis is provided in Section 6.6.6. Renourishment activities will not involve excavation from within the dredging footprint from the initial Project sand borrowing. Therefore, each excavated area impacted by the Project will recover over one to three years.

NMFS 13. A cumulative effects analysis should describe effects from the project in light of any past, present, and reasonably foreseeable future actions which may impact the

ecosystem; loss of fishery resources and habitat should be analyzed in combination with existing commercial fishing closures.

A cumulative effects analysis is provided in Section 6.6.6. Due to its remote location, the Project area has not been subjected to many previous impacts; previous and current activities that have impacted the ecosystem are primarily limited to commercial and recreational fishing. There are no readily-foreseeable future activities that are expected to cause additional ecosystem impacts.

Impacts from commercial fisheries have been severe, and many commercially-important species occurring in the Project area have been depleted due to overharvesting which is largely responsible for impositions of time-of-year restrictions on nearshore, in-water construction activities. These restrictions protect spawning of commercially-important species such as winter flounder.

10.9 Environmental Protection Agency (EPA)

EPA 1. A comprehensive, site-specific assessment of all marine organisms that utilize the borrow site is critical to defining the site's habitat functions and values as well as for projecting and monitoring the rate of recovery.

The Proponent agrees with this statement, as demonstrated by the preparation and implementation of the Fisheries Sampling Plan. This plan utilizes fisheries sampling techniques commonly used by government and private entities to assess fisheries and other marine resources. Baseline data collected during the pre-construction phase will be used to monitor recovery rates.

EPA 2. The project could bury approximately 50 acres of nearshore cobble bottom, which provides structure and complexity not found in more homogeneous sandy environments. Although active sediment transport may carry nourishment material away from some of these areas, the habitat value may be permanently lost or compromised due to periodic burial associated with renourishment events. EPA recommends all possible options to reduce cobble bottom coverage be considered; only after impacts have been minimized should compensatory mitigation be considered.

See EOEA 25 response.

EPA 3. While fish and organisms inhabiting the nearshore area would be unlikely to experience detrimental effects from short-term increases in turbidity, it is unclear how they will be impacted by a prolonged period of elevated turbidity such as that associated with this project. The nourishment material proposed for use in this project should settle out fairly rapidly, but nearshore turbidity levels should be closely monitored.

No prolonged periods of elevated turbidity are expected to occur as a result of this Project , especially given the very low 1% silt content of the borrow site sediment (see Section 5). Nourishment sand will be discharged through pipeline directly onto the beach and landward of a dike, and the vast majority of suspended material will settle out before any backflow returns to nearshore waters. Any elevated turbidity values in the nearshore will be of short duration and are not expected to exceed suspended sediment levels that would naturally occur during storms. Nonetheless, monitoring efforts will be in place to record nearshore turbidity during Project activities.

EPA 4. Given that the extraction and discharge of sediments will occur within state waters, the Massachusetts DEP will need to certify the activities and turbidity limits to ensure protection of State Water Quality Standards. A mixing zone will need to be defined and appropriate monitoring and reporting requirements established.

The Proponent acknowledges that Massachusetts DEP's review and subsequent approval of the Project are required. Accordingly, an application for Water Quality Certification from the department will be submitted in the last quarter of the calendar year 2006; the resulting certificate will define mixing zones and establish monitoring and reporting requirements. The Proponent will conduct activities consistent with State Water Quality Standards.

EPA 5. The FEIR should discuss any published studies examining the effects from long-term exposure to suspended sediments on fish health and behavior and should clarify plans for turbidity monitoring and reporting in the nourishment area.

Monitoring efforts are detailed in Section 9.5, and potential biological impacts from suspended sediment were discussed in DEIR Section 4.5.2. Impacts of suspended sediment will be very limited. First, the sediment placed on the beach is coarse-grained and will not be suspended very long. Second, the very small percentage of silt that could remain in suspension will be constantly moving with the tidal currents and therefore no area will be subjected to sustained exposure. And third, the fish species that occur in the project area during the construction season are active and will sense the elevated turbidity and will move away from the sediment plume. While EPA measures toxicity of fish to various pollutants on with exposure tests of 48 to 96 hour periods, the above cited conditions will limit exposure to an hour at the most.

EPA 6. A comprehensive accounting of project costs should include long-term environmental monitoring and mitigation efforts as well as any impacts to habitat and loss of commercial fishery resources.

A comprehensive cost analysis, more detailed than the analysis presented in the DEIR, is provided in Section 6.6.5. Though difficult, the Proponent has sought to estimate the costs of potential Project impacts as accurately as possible to prevent externalities from being omitted from the analysis. In an effort to quantify the Project's potential economic impacts, commercial fishermen on Nantucket have been consulted regarding their activities and

financial experiences. Data from biological surveys, discussions with fishermen, various potential mitigation scenarios, long-term monitoring efforts, and potential impacts from the Project design have all been incorporated in the cost analysis.

EPA 7. A more thorough assessment of land-based sediment sources (both on-island and elsewhere) should be conducted.

See EOEA 20 response and FEIR Sections 2 and 3.

10.10 Nantucket Conservation Commission (NCC)

NCC 1. The Commission is strongly opposed to the Secretary granting a Waiver request for the proponent to construct additional bank terracing as described. The proponent has requested this waiver inappropriately as part of EOEA #13468 given that prior Certifications for this type of work, in this geographic location, by this proponent have been issued as EOEA #11719 and #13050 (reference Commission letter to Deerin Babb-Brott, Director of MEPA dated 10/24/2005). In addition, the proponent has not yet filed a Notice of Intent for the proposed work with the Commission as required by MGLc131s40. Ongoing discussions with the proponent's representatives indicate that no work will be proposed in the Hoick's Hollow area and that the immediate scope of work for mid-Baxter Road has been reduced by half. Based on this information, the Commission would request that the Secretary either postpone action on the NPC/Phase One Waiver request or, in the alternative, require the proponent to request the NPC to provide the proper project with current information.

See the Secretary's Certificate on the DEIR.

NCC 2. The proponent has opined that the initial and ongoing mining of sand from the back side of portions of the offshore bar system will not adversely impact the bar system itself or the nearshore and beach environments. Their conclusion is based on modeling only; the proponent did not provide technical data to support the borrow site selection, nor did the proponent provide reference to historical offshore shoal migration patterns and their relationship to onshore erosion as evidenced from historic photographs, maps, ongoing survey efforts, etc. The proponent did not provide actual survey data/monitoring protocols. Given the scope of the proposed mining for the initial and unspecified future work, the Commission believes it is critically important to expand the "site selection criteria analysis and impact analysis" to include historic data, current data, shoreline change analysis, and sediment and biologic monitoring criteria and protocols. The modeling information provided to date is not sufficient and does not include the best available data.

See Section 4 for a description of the Alternatives Analysis for Marine Sediment Sources.

NCC 3. The proponent has not provided an evaluation of existing coastal processes influencing the nearshore, coastal beach, coastal dune and coastal bank environments

within the project area. This information is critical in agency review and evaluation of the proposed groin and geotube structures. The proponent has been responsible for conducting site surveys and profiling the area for many years and therefore has direct access to data for this evaluation.

Groins and geotextile tubes have been removed from the Project. (See EOEA 8 response).

NCC 4. The proponent's description of the number and placement of groins, analysis of "hot spot" design elements and geotubes is not concise, is not supported by longshore sediment transport data or "demonstration" information that these structures have been successfully used in other similar locations, and does not provide an analysis of potential impact to down drift areas such as Codfish Park and the Sewer Beds.

Groins and geotubes have been eliminated from the Project (see EOEA 8 Response).

NCC 5. The proponent has not provided the technical basis for the design length or width of the beach nourishment areas. The Commission has worked with the proponent for many years to evaluate and understand the dynamics of the immediate and adjacent shoreline. Every change in project design has resulted in a response. The Commission, given the scope of the proposed project, believes it is critical that the proponent be required to provide the information necessary to support the nourishment area proposed/approved and the accompanying structural elements. A less strict standard for a project of this scope could jeopardize existing habitat areas, existing sediment transport patterns, existing public and private structures and public infrastructures. The Commission urges the Secretary to require additional information relative to coastal processes, design, and impact analyses for the beach nourishment component.

See the Engineering Report (Attachment A).

NCC 6. The project proposed is not consistent with the length of coastline monitoring or the basis for determining the length of coastline monitoring. The Commission would urge the Secretary to require this proponent to provide coastline monitoring protocols with necessary response actions based on a specific project scope supported by technical data generated on coastal processes along this shoreline of Nantucket.

The project length is not based on the length of coastline monitoring but rather is based on providing storm protection to the upland areas such as the bluffs and dunes. The monitoring results were used to determine which areas required treatment, and the extent of the required treatment in the form of beach nourishment and dune creation or dune enhancement.

NCC 7. The proponent has not provided any documentation as to long-term legal and fiscal responsibilities for the project and/or project consequences. This is the single most critical omission from the DEIR. Many "models" are available as examples for establishing

long-term legal and fiscal responsibilities; one such example has been developed by the Massachusetts DEP in dealing with privately-owned wastewater treatment facilities. The public interests at risk relative to this project require that private responsibility for protecting the natural resources be iron clad. The Commission urges the Secretary to require the proponent to address this ongoing responsibility.

The Proponent has previously posted bonds for other project elements (i.e. dewatering systems). With the elimination of structural elements (groins and geotextile tubes) the need for such long term financial legal instrument appears to have been removed.

NCC 8. The Commission, based on the comments above, strongly urges the Secretary to require the proponent to submit a supplemental DEIR to develop and provide critical data, processes analyses and legal documentation for ongoing project responsibility. Although some of these issues can be addressed in an FEIR, some relate to the generation and analysis of scientific data that are more property reviewed as DEIR information.

This FEIR responds to the required data presentation and analyses comments by NCC. See NCC 7 response above regarding legal documentation.

10.11 Cape Cod Commercial Hook Fishermen's Association, Inc. (CCCHFA)

CCCHFA 1. Modifications should be considered to constrain dredging only to the months of September through May; the proposed dredging in June through August would occur during the most productive months for striped bass, black sea bass and cod (among other fish). The dredging schedule, if unchanged, will have negative economic impacts on commercial and charter boat industries, negative social impacts to recreational fishing, and will not minimize ecological impacts.

Project construction during the summer months will result in a short-term impact to commercial fishing in specific areas, notably within the 195-acre borrow site, adjacent to the construction activity on the beach, and along a narrow corridor between the two where a connecting pipeline will rest on the seabed. While there are ample alternative fishing locations along eastern Nantucket, the Proponent recognizes that the Project will create a degree of temporary exclusion for commercial fishing operations; thus, the Proponent will work cooperatively with fishermen to ensure they are adequately compensated for any losses they may incur.

Irrespective of these potential impacts to the commercial fishing industry, construction during the summer months is the only viable option for the Project from ecological, human safety, economic and overall feasibility perspectives. In an ecological context, impacts to fish during early life stages should be avoided to maintain reproductive success; by avoiding construction activities during the winter and early spring, the Project will not impact spawning activities of cod, winter flounder, and other commercially-valuable bottom fish. Striped bass do not spawn in the waters of southern New England, and therefore this

species' reproductive success will not be affected by the Project. While black sea bass do spawn in the area, they do not spawn exclusively at the Project site but rather utilize pelagic waters throughout the region.

Performing construction during the summer months will also allow work to proceed much more efficiently and thereby limiting the duration of Project activities. As evidenced by difficulties experienced by the Nantucket Cable Project in the winter of 2005-2006 when winter storm conditions severely hampered the project and damaged the cable, winter construction in exposed locations around Nantucket presents significant safety hazards which must be avoided. Project scientists and engineers experienced these difficulties firsthand during the design and permitting phase as sampling and testing has been regularly delayed in non-summer months due to poor weather and high seas conditions.

The mitigation program will construct three areas of artificial reef which will provide for new opportunities for recreational fishing.

CCCHFA 2. Shoals off of Nantucket contain EFH for cod, striped bass, and other economically-important fish species, and in some areas contain hard bottom boulder and cobble habitat. The potential for dredging activities at the borrow site to contribute to sanding-over of these areas should be evaluated before the project is approved.

Project activities will not occur within any EFH designated for cod or striped bass. The borrow site does contain EFH designated for winter flounder, and the Proponent will adhere to time-of-year restrictions between February and May for this species. A delineation of nearshore cobble bottom is provided in Section 6.3.2 of the FEIR, and Project impacts to this habitat are discussed in Section 6.6.4. As identified in the text, beach nourishment will permanently cover approximately 10 acres of nearshore cobble bottom habitat, of which roughly three acres is hard bottom and seven acres sandy bottom. The permanent impact to this habitat will be mitigated in-kind through construction of similar hard bottom habitat in a nearby location. An adjacent 2,082-acre area of cobble bottom habitat has been identified by sidescan sonar surveys seaward of the project area.

10.12 Mass Audubon (MAS)

MAS 1. The project as currently proposed includes beach nourishment and installation of a geotextile tube along a 200-foot-wide parcel owned by Mass Audubon; Mass Audubon has not been consulted nor has granted permission for this work.

See response to EOEA responses 8 and 12.

MAS 2. The proposed terraces should not be permitted before the Nantucket Conservation Commission can assess the performance of existing toe terraces installed in the project area. Pieces of COIR fiber from these terraces are commonly found on Nantucket beaches and do not degrade quickly.

The Proponent is reviewing options for terrace construction to provide temporary non-structural protection of homes and other assets while permitting is concluded and the beach nourishment project is constructed.

MAS 3. Approximately 44% of the bank area proposed for terrace protection contains no dwellings or properties with only post-1978 buildings; these properties do not qualify for such protection.

The proposed terraces are not a solid fill coastal engineering structure. These terraces are a form of soft temporary non-structural coastal bank protection that effectively provide time released sand nourishment to the coastal beach and nearshore system. The DEIR shows terraces along portions of Baxter Road (Mid-Baxter Terraces) and north of the Sankaty Lighthouse (Hoick's Hollow Terraces). Several of the Hoick's Hollow properties were constructed post 1978 and portions of the properties do not have structures immediately landward of the top of the coastal bank. In order for the terraces to offer effective protection for a section of coastal bank the terraces must provide a unified front. If there are gaps along the line of toe protection, erosion will occur landward of these gaps. Over time, this will result in the formation of notches along the coastal bank. Notched areas will continue to erode at a higher rate than protected areas and will eventually encroach upon protected areas undermining the overall effectiveness of the terraces.

MAS 4. Additional models should be utilized to assess the borrow site excavation's potential impacts on wave patterns. Error estimates should be provided for the model already used, and additional models should be employed to provide comparisons. Model runs should include 50- and 100-year storm events. Additional excavations anticipated for renourishment events should be included in these modeling efforts.

Please see response to EOEA 30.

MAS 5. Assess whether infilling of the borrow site could lower the ridge height significantly, resulting in impacts to wave patterns. Explain the degree to which sand transport patterns on the shoals are understood.

See EOEA 30 response.

MAS 6. The proponent must demonstrate the capability to provide financial backing for project maintenance and removal if necessary; this financial backing should be guaranteed prior to project initiation.

See NCC 7 response.

MAS 7. Project benefits will primarily be reaped by private interests, and public resources will be significantly impacted.

See EOEA 42 response.

MAS 8. Identify the monitoring measures that will be used to identify and assess the causes of changes on adjacent beaches. Existing sediment transport along adjacent shorelines should be thoroughly assessed and the amount of sand contributed to the system by the project area should be identified. Groins' impacts need to be thoroughly assessed and quantitative measures for how the project will assume responsibility for negative impacts on adjacent beaches should be identified.

Groins and geotextile tubes have been removed from the project. See EOEA 8 response.

MAS 9. Geotextile tubes are hard coastal engineering structures that should not be allowed on previously structure-free beaches.

Geotextile tubes have been eliminated from the project.

MAS 10. If the design beach is 100 feet long and the proposed groins are 270 feet long, up to 170 feet of groins could be exposed prior to renourishment; assess the possible impacts to fish and marine mammals. Groins should be kept to a minimum number and should be only partially constructed to assess impacts before the full number are built.

Groins have been eliminated from the project.

MAS 11. Impacted areas will not quickly recover since beach equilibration will take 1-2 years and renourishment will likely be required after 5 years.

Section 5 of the FEIR discusses beach equilibration; benthic habitat recovery is discussed in Section 6. In the years following initial Project nourishment, as well as after renourishment events, the nearshore beach will develop habitat characteristics similar to those of a meadow in an early-succession stage. During the first 1-2 years, sand will drift seaward and cover some existing cobble habitat and associated macroalgae with a thin veneer of sand; the amount of coverage will vary depending, in part, on the level of relief exhibited by the cobble (e.g., larger boulders will not be fully covered while flatter cobble may be). During years 3-5, the thin veneer of sand will be transported both offshore and downdrift through natural coastal processes.

Benthic habitats in the nearshore are colonized by early-successional organisms, which are characteristically those which are best adapted to disturbance. These organisms will recolonize within the first year following nourishment, and will be followed by organisms less tolerant of disturbance. If managed systematically through predictable renourishment events, cobble areas will retain early-successional benthic communities due to the estimated 5-year cycle of renourishment.

MAS 12. Post-construction physical and biological monitoring efforts should be specifically defined.

Post-construction physical monitoring is included in the Section 5; post-construction Fisheries biological monitoring is included in Sections 6 and 9; and post-construction avian monitoring is included in Section 7.

MAS 13. Avian resources at the borrow site should be monitored year-round for at least 2-3 years prior to project construction.

Ongoing avian surveys of the borrow site are detailed in Section 7.3.2. The existing and proposed dataset of birds at the borrow site includes information gathered over a multi-year period: seven years of Christmas Bird Count Data (1998 to 2005), an aerial survey by R. Veit during the winter of 1997-1998, an SBPF-commissioned survey in December 2005, and seven additional SBPF-commissioned surveys to be conducted in the winter of 2006-2007. This characterization of birds is further enhanced by a knowledge of habitat conditions at the borrow site, as the Proponent has conducted studies of water depths and fisheries and benthic resources at the borrow site. Taken as a whole, existing data, ongoing surveys, and a knowledge of habitat characteristics provide a sufficient characterization of birds at the borrow site to allow potential impacts to be assessed. Further, holding to the Project timeline (construction in 2007) is critical to protecting endangered resources and providing timely benefits to protected shorebirds at the beach nourishment site.

MAS 14. Following completion of the project, the nourished area should be closed to vehicles from March-August to encourage shorebird nesting.

See Section 7.2.2 for the Post-Construction Shorebird Management Plan, which includes provisions for vehicular restrictions on suitable habitat of the nourished beach.

MAS 15. SBPF should fund ongoing post-construction shorebird monitoring in the project area.

Post-construction shorebird monitoring is discussed in Section 7.2.2. As is the case with the existing beach, the majority of the nourished beach will be owned by the Town of Nantucket. The SBPF has had a preliminary meeting with the Town of Nantucket Beach Manager and will continue to coordinate with the Town on long-term management of the nourished beach. Based on the meeting with MAS, SBPF anticipates working cooperatively with MAS and their Coastal Waterbird program staff to implement the Shorebird Management Plan described in Section 7 of the FEIR.

MAS 16. Due to the occurrence of storms, conducting shorebird monitoring at 2-week intervals after June 1 may be insufficient because birds will re-nest, possibly in new locations. In addition, least terns add new nests well into July.

The Shorebird Management Plan during construction periods in Section 7.2 has been updated to include twice-weekly monitoring from March 15-July 15 and weekly monitoring from July 16-August 31, as suggested by NHESP.

10.13 Nantucket Land Council (NLC)

NLC 1. Following installation of the original beach dewatering system in 1994, the SBPF has modified and/or expanded the project through the use of higher volume dewatering pumps, numerous installations of DuneGuard sand fencing, drilled drainage wells in the coastal bank, terracing and vegetating the coastal bank, and replenishing portions of the eroded bank with new material. Due to the magnitude of local coastal erosion during the past decade, these efforts have done little to maintain the beach or the coastal bank fronting the affected properties.

The proposed Project is being implemented to provide the necessary shore protection for the Sconset shoreline. Beach nourishment is more expensive than the methods that have been used in the past, but it was determined through the Highway Methodology review that beach nourishment is the least environmental damaging practicable alternative (LEDPA).

NLC 2. The use of "soft" shore protection methods (i.e., beach and dune nourishment, bank planting, etc.) should be encouraged, if they are designed properly, to minimize both short- and long-term environmental impacts. The incorporation of "hard" coastal engineering structures (i.e., geotextile tubes and groins) will likely cause downdrift impacts. The FEIR needs to include a complete quantitative evaluation of potential impacts associated with the various project elements. At a minimum, this analysis should include an evaluation of the project with and without structural elements.

Groins and geotextile tubes have been removed from the Project. (See EOEA 8 response).

NLC 3. The alternatives analyses presented in both the February 2005 ENF and the June 2006 DEIR do not provide sufficient information to justify either the proposed magnitude of the project or the incorporation of structural measures to enhance nourishment design life. Specifically, since no formal analyses of coastal processes were performed (e.g. determination of sediment transport rates and an evaluation of the regional geomorphology that appears to control coastal erosion in this area), the information needed to define an effective shore protection program remains unavailable. The limited information presented in the DEIR regarding coastal processes (e.g. short-term current and wave monitoring, limited shoreline change analyses, and limited wave modeling) does not appear to be linked to the overall project design.

Analysis of the sediment budget along the Project shoreline and modeling indicate that an annual total of approximately 200,000 cubic yards of sediment leaves the Project area for adjacent beaches and the proposed nourishment will increase the volume of sediment transported to these adjacent areas by about 50% to 300,000 cubic yards (see Section 5).

Groins have been eliminated from the final Project design, and therefore any lingering concerns regarding impacts on sediment transport from these structures are no longer applicable.

Proposed monitoring is extensively discussed in Section 5, and will be performed to assess the longshore transport of sand to adjacent beaches. Surveys will begin after initial Project construction and will be performed annually for at least five years to yield data needed to assess fill transport and Project performance. The amount of accretion (or erosion) will be determined by profiling (i.e., surveying) the shoreline on either side of the Project area. Beach and hydrographic surveys will be conducted over the entire Project area, extending approximately one mile on both sides to quantify fill transport. Project engineers have designed a monitoring program with profile lines spaced at 1,000-foot intervals along the Project profile itself and extending 5,000 feet laterally on each side of the Project.

The Project, by placing a large volume of sand on the Project shoreline in the design profile and advanced nourishment profile, will be adding a significant volume of sand to the littoral system without impinging upon sediment transport to adjacent shores. It is anticipated that the advanced nourishment fill will be in place until four to six years after Project construction; after loss of the advanced nourishment fill, the Proponent will perform renourishment.

NLC 4. It is unclear why the proponent has attempted to develop a major shore protection design without providing even a general understanding of sediment transport processes (e.g. which direction is the sediment moving alongshore within the project region). In addition to design guidance for shore protection, a coastal processes analysis can be used to assess potential impacts associated with potential shore protection measures as well as potential impacts associated with borrow site excavations.

See EOEA 31 response and the Engineering Report (Attachment A). The Engineering Report details the sediment transport processes in the project area and provides a basis for the size of the project. The engineering report also provides details on modeling performed to investigate the potential impact of borrow site dredging (no impacts were found).

NLC 5. According to Weishar, et al., 1991, Tiffney, et al, 1991, and Tiffney, 1977, the borrow site selected by the applicant is located in the shoals that govern the incident wave climate and storm-induced erosion. It is inappropriate to surmise that "mining of material from the lee side of the sand ridge will not significantly impact ridge morphology and will therefore have little to no impact on local water circulation patterns or wave climate." The proponent should be required to quantify potential changes to the shoal system including evaluation of tidal currents, wave dynamics, sediment transport patterns, and long-term morphological changes.

Wave effect modeling has been performed based on the worst-case scenario regarding excavation (i.e., total excavation of the borrow site (two excavation areas) for the initial beach nourishment project). This worst-case scenario evaluates the areas of deepest cuts or holes under a situation where the entirety of the 3.5 million cubic yard borrow site has been excavated. Modeling results have indicated that there will be no coastal effects from the worst-case scenario of total borrow site excavation. The accuracy of data inputs

involved in wave modeling has been maximized; these inputs are from a recent bathymetric survey, known wave conditions from past events, and the projected dimensions of the borrow site (including excavation depth). Response to EOEA 29 and EOEA 30 address wave effects and infilling in greater detail. The wave modeling report is provided as an appendix of the Engineering Report.

NLC 6. Property owners along the entire stretch of potentially impacted shoreline (stretching from Great Point to Tom Nevers) should be considered abutters for the purpose of regulatory notification.

Abutters will be notified in accordance with the requirements of the various permitting agencies. Also, it is important to note that the Proponent has engaged in an aggressive community-wide information campaign to solicit involvement from all interested and concerned citizens and not just a limited number of possible abutters.

NLC 7. The DEIR lacks quantitative information regarding the basis for the design as well as anticipated impacts associated with the dredging, placement, and eventual erosion of the beach nourishment and exposure of the planned coastal engineering structures. The DEIR also lacks a consistent and concise outline of the decision process utilized to arrive at the preferred alternative. Furthermore, the design decisions reached in the DEIR are not supported by an appropriate understanding of coastal processes; therefore, the validity of the design remains in question.

Engineering structures have been eliminated from the Project. Details on design are included in the Engineering Report (Attachment A). The engineering report provides a quantitative basis for the beach nourishment design, as well as the potential impacts associated with the dredging, placement and eventual erosion of the beach nourishment. No impacts are expected from dredging of the borrow site. As the groins have been removed from the project design, no downdrift impacts are expected due to project construction.

NLC 8. Due to the volume of material required to restore the Siasconset shoreline, it is likely that an offshore sediment source is the only viable option both from a construction logistics standpoint and overall construction cost. A formal borrow site screening process consistent with the USACE Highway Methodology should have been presented in the DEIR including both exclusionary and discretionary criteria.

See EOEA 16 and 20 responses and FEIR Sections 2 and 3.

NLC 9. For the eastern shore of Nantucket, significant concerns exist regarding changes to shoal morphology and the long-term impact to the shoreline; therefore, it would be appropriate to include a discretionary criterion that favors borrow sites that will not influence shoal morphology in this region.

Extensive modeling has been performed on wave changes as a result of the proposed excavation at the borrow site. Almost 98 % of this borrow site is located in waters in excess of 30 feet deep. Modeling results demonstrate that changes to the wave height will be very localized to the immediate area around the borrow site and will not result in changes to waves along the Nantucket shoreline (see Section 5).

NLC 10. The borrow sites presented in the Introduction (Figure 1-3) are not evaluated within the text of the DEIR. Since two of these borrow sites (Area 3 and 4) would not influence shoal morphology, these sites deserve further consideration.

Section 4, Alternatives Analysis for Marine Sediment Sources, presents the evaluation of potential borrow sites.

NLC 11. It is not clear whether an exhaustive analysis of available sediment information (e.g. USGS sediment database, U.S. Army Corps of Engineers data, Woods Hole Oceanographic Institution data, and Cape Wind information for nearby Horseshoe Shoal) was used to determine potential borrow sites.

Section 4, Alternatives Analysis for Marine Sediment Sources, presents the extensive data analysis that was used to evaluate potential borrow sites.

NLC 12. The borrow site screening analysis should incorporate biological resource considerations; the limited screening analysis presented in the DEIR only considered anecdotal commercial and recreational fishing information to assess the relative merits of various offshore borrow sites. No comparative analysis of biological resources at the various potential borrow sites was performed as part of the DEIR. Specifically, differences in bottom types relative to fisheries habitat were not described for the various borrow sites. In addition, it is anticipated that biological resources would differ between the more protected sites within Nantucket Sound and those exposed to open ocean wave conditions along the eastern side of Nantucket. The FEIR should include an analysis of both exclusionary and discretionary criteria associated with biological resources.

Section 4, Alternatives Analysis for Marine Sediment Sources, describes the biological resources considerations that were used to evaluate potential borrow sites.

NLC 13. Prior to the development of the shore protection design, an evaluation of coastal processes governing beach, dune, and bank erosion should be performed. Without this analysis, the project cannot be designed to minimize impacts to coastal and/or nearshore resources. At a minimum, quantitative analyses of coastal processes should include local sediment transport patterns and the forces governing these patterns. Appropriate numerical modeling of waves, tidal currents, and sediment transport rates should be performed to evaluate likely sediment transport pathways. In addition, coastal processes evaluations should include potential changes associated with borrow site dredging, as well as anticipated in-filling rates.

The Engineering Report (Attachment A) details the evaluation of historic erosion in this area and how the project design was developed. Modeling of waves and currents was performed using the state-of-the-art model Delft3D. Measured waves and tidal currents in the project area were incorporated in this modeling effort. Cross-shore modeling was performed using SBEACH to determine the minimum design template required to meet the project goals. Modeling of the borrow site (pre and post construction) was also performed, including in-filling rates, and this work is detailed in the engineering report.

NLC 14. Based on the limited SWAN model results provided, the potential impact from borrow site excavation on the nearshore wave climate and sediment transport regime is unclear; furthermore, the DEIR made no attempt to quantify this impact. Use of an offshore reference line (Grid Line #50 on Figure 2-10) to assess changes to wave climate is meaningless, especially when re-direction of waves isn't even considered. Also, use of only two wave conditions is of limited value. Based on a cursory review of the pictorial model results (Figures 2-11 thru 2-16), it appears there are significant problems with model accuracy since the results indicate larger waves at the southern edge of the grid during 'typical' conditions than during 'storm conditions'. This likely is a problem with boundary conditions and improper parameterization of the model grid. We recommend that SBPF use more contemporary methods for evaluating potential changes in nearshore sediment transport patterns associated with borrow site excavations (e.g. Kelley et al., 2004).

The modeling results presented in the DEIR were preliminary results. Since submittal of the DEIR a comprehensive modeling effort has been undertaken that has investigated at least 20 different wave cases, including the 20- and 50-year storm events. The graphics presented in the DEIR did exhibit boundary condition problems. The model grid was extended north and south to avoid this in the additional wave cases and the wave cases presented in the DEIR were modeled again. The wave and current modeling presented in the Engineering Report used the state-of-the-art Delft3D model which demonstrated that no impacts are expected due to borrow site dredging.

NLC 15. Since tidal currents play a significant role in regional sediment transport, it would be appropriate to incorporate models with wave-current interaction (e.g. STWAVE-M2D) to evaluate the nearshore wave climate. Since wave and current data were collected within the project region (Section 4), the models can be calibrated to ensure accurate simulation of waves across the shoals. The complete wave, current, and sediment transport modeling should be included within the FEIR. This modeling analysis should incorporate a complete discussion of model calibration for waves and longshore sediment transport, as well as results of the model associated with borrow site impacts.

The Delft3D model combines tidal currents and wave currents in performing regional sediment transport modeling. Wave and current data collected close to the project site was used in the modeling effort. The Engineering Report provides complete details of the calibration, verification and application of the Delft3D model to the project area.

NLC 16. The alternatives analysis presented in the DEIR is not based upon a quantitative analysis of coastal processes; therefore, the conclusions presented should be considered preliminary because further analysis may cause substantial changes to the design. Once coastal processes have been adequately evaluated, a more complete alternatives analysis should be performed that includes analyses of beach nourishment performance for several designs as well as a more in-depth analysis of other methods. To facilitate the regulatory process, we recommend that the applicant follow the USACE Highway Methodology to systematically review and evaluate alternatives.

The Engineering Report presents a quantitative analysis of the coastal processes within the project area. A project design was developed, based on standard coastal engineering principles that meet the client's goals. Structural options were also investigated though these were later discarded. The USACE Highway Methodology was used to systematically review upland and marine sediment sources (see Sections 3 and 4). Earlier drafts of Sections 3 and 4 were submitted to USACE and resources agencies and a meeting was held at USACE offices on November 1, 2006 to review these documents with USACE and resource agencies.

NLC 17. Section 2 attempts to justify why summertime dredging is required because of adverse wintertime wave conditions at the borrow site, primarily based upon data from a NOAA wave buoy 55 miles east of Nantucket. However, Section 4 indicates that the shoals east of Nantucket significantly attenuate waves approaching the Siasconset shoreline. Therefore, there appears to be limited or no justification for the summertime dredging requirement.

The Engineering Report details wave modeling that was used to transform the offshore wave climate from a WIS station to the borrow site. (The WIS station is located 15 miles offshore and 11.5 miles from the borrow site.) Once the wave climate at the borrow site was determined the downtime due to high waves could be determined. Dredges are not capable of dredging when the wave height exceeds approximately 5 feet and must return to safe harbor when the wave height approaches 7 to 8 feet. The analysis showed that dredging outside of the summer months resulted in the dredge being down 33% to 43% of the time while during the summer months weather only caused the dredge to be down 10% to 13% of the time. The winter weather delays presented here do not include additional downtime due to activities like de-icing or the potential for icing within the harbor preventing the crew boat from shuttling personnel and supplies to the dredge. Contractors have also indicated that they are unlikely to bid on winter time beach nourishment projects when they are located in the northwest Atlantic Ocean.

NLC 18. The DEIR indicates that the proposed nourishment will provide a 25-year supply of littoral sediments; however, the design life of the project is only five (5) years. No justification is provided for this assessment, but it is clear that downdrift areas will not benefit from the increase in littoral sediments if groins are constructed to prevent longshore

movement of this material. Once a more complete alternatives analysis is performed, we recommend that the FEIR present a specific project with engineering plans, rather than the conceptual plans and analyses presented in the DEIR.

Groins and geotextile tubes have been removed from the Project. (See EOEA 8 response).

NLC 19. Coastal engineering structures may be prohibited along much of the project area by existing Wetlands Regulations (310 CMR 10.00); only pre-1978 buildings should be fronted by coastal engineering structures, and even these would require sand nourishment in perpetuity to mitigate for removing the bank as a sediment source. Placement of a major beach nourishment project does not alter this requirement; therefore, the SBPF will be required to maintain the sediment supply in perpetuity.

Groin and geotextile tubes have been eliminated from the proposed Project.

NLC 20. To justify use of the composite (wood and stone) groins, the proponent should demonstrate other similar locations (open ocean wave environment with a rapidly eroding beach) where these structures have be used successfully to enhance beach nourishment design life without adversely affecting downdrift regions. No justification for the proposed groin design has been provided; adverse impacts to downdrift shorelines are a primary concern.

Groins have been eliminated from the proposed Project.

NLC 21. The DEIR indicates that the borrow site will be designed to minimize potential impacts to the shoreline; however, the complexity of the offshore shoal system may make this evaluation difficult. Although numerical wave, circulation, and sediment transport models have improved significantly over the past 20 years, development of a model to accurately simulate the complex oceanographic conditions east of Nantucket may be time- and cost-prohibitive; the complex interaction of waves and tidal currents caused by the offshore shoals will require an extensive understanding of the temporal and spatial variability of tidal currents and waves to accurately parameterize any numerical modeling effort. This accurate modeling effort would be required to ensure that dredging of the shoal system would not have adverse impacts to the Nantucket shoreline. Instead of focusing offshore borrow site alternatives within the areas east of Nantucket; it may be less problematic to evaluate sites that would not potentially impact nearshore sediment transport patterns.

The state-of-the-art model Delft3D was used to investigate any potential impacts of dredging the borrow site on the wave climate. This model is capable of incorporating waves and currents over a complex shoal system, such as exists offshore of the project site. The wave modeling, detailed in the engineering report, shows that the effect of dredging the borrow site on wave height and wave direction does not reach the shoreline. The wave modeling suggests that the changes in wave height and wave direction do not approach within a mile

of the shoreline even during a 50-year storm event. While it is acknowledged that the shoal system located offshore of the project area is complex, the borrow site are located at least 3 miles offshore and in water depths ranging from 30 to 50 feet. Many borrow sites have been located closer to shore and in shallower water without a negative impact to the adjacent shorelines.

NLC 22. To minimize impacts to nearshore resources, the beach nourishment design procedure should incorporate accepted analysis techniques developed by the USACE (or other appropriately vetted techniques developed by engineering experts). The specific analysis approach for design was not presented in the DEIR. The existing SBPF data set will prove invaluable to the design process for shore protection along this shoreline, but this data alone is insufficient to design an appropriate project. As mentioned above, numerical models of local coastal processes will be required to assess potential impacts, as well as to optimize the design to minimize impacts (e.g., area covered by the project).

The Engineering Report details the development of the beach nourishment design. In summary, the National Research Council recommended method of separating a beach nourishment design into a design fill component and advanced fill section was applied. The design fill is the volume of sand required to meet the project goals at the end of the project life, while the advanced fill is the volume of fill expected to erode from the project area over the project life (the sacrificial portion). Cross-shore modeling using SBEACH was applied to determine the design fill while a sediment budget was developed to determine the advanced fill losses expected over the life of the project. Delft3D and GENESIS models were used to optimize the fill layout and predict planform performance of the project. The Coastal Engineering Manual method for determining cross-shore equilibrium was used to determine the point of intercept of fill over the project life and minimize impacts to offshore cobble.

NLC 23. Justification for the design berm width (including the advanced replenishment), the berm height, and the equilibrium beach slope needs to be presented in the FEIR. Since moderate northeast storms and even typical waves during spring tide conditions directly impact the coastal bank, indications that the V-Zone extends only to the base of the coastal bluff are erroneous. Efforts should be made by the applicant to resolve noted elevation discrepancies between observed water levels and tidal datums used for project design.

The Engineering Report details the cross-shore modeling that was performed with SBEACH to determine the design dune width and dune height. An initial estimate of the dune height was developed based an analysis of the existing beach profile.

Elevation discrepancies between the observed water levels and tidal datums were examined. It was found that the tidal range measured at the NOAA tide station within Nantucket Harbor was similar to the tidal range measured by the ADCP's.

NLC 24. To minimize the nourishment "footprint", the applicant should consider incorporating a dune along the landward edge of the project to reduce the volume of advanced replenishment required. In addition, the volume of nourishment for the various areas needs to be justified.

A dune was incorporated along the landward edge of the project to reduce the offshore footprint of the beach nourishment project and also to achieve the project goals of providing protection to the coastal bank during several storm events. The elevation of the dune was based on previous successful projects constructed along Fire Island, NY and cross-shore modeling using SBEACH. Constructability of the dune was also considered in the design process. Justification for the nourishment volumes was based on the minimum volume required to meet the project goals (design fill) plus the advanced fill volume required for the design fill to be in place at the end of the project life. The advanced fill volume was based on a sediment budget that was developed for the project area.

NLC 25. Based on the ENF, the Codfish Park dewatering system caused a "net accretion of approximately 120 feet of beach." If this is the case, there appears to be no justification for nourishing this region of shoreline. Design information in the FEIR should address issues related to this dewatering system and explain why additional shore protection in this region (as well as other regions that appear to be stable or accreting) is necessary.

The footprint has been reduced in the Codfish Park area.

NLC 26. It will likely be appropriate to survey the beach several times during the first few years following nourishment. In addition, more closely spaced monitoring transects should be required in the vicinity of any proposed coastal engineering structures. Biological monitoring will be critical for determining the recovery of benthos within the areas impacted by the project. Monitoring of impacted areas should continue for the period needed for full recovery (perhaps not to exceed 10 years).

The profiles that have historically been collected within the project area are sufficiently spaced to accurately determine volumetric changes within the project area and provide information for future projects. As no structures are being proposed, no additional profile lines are recommended.

NLC 27. Strict conditions will be required to ensure appropriate mitigation actions take place in a timely and appropriate manner to ensure protection of resources. Use of an "adaptive management" approach may be warranted; however, even this type of approach anticipates possible project impacts/outcomes and plans appropriate mitigation efforts a priori. In the FEIR, the applicant should develop an exhaustive list of potential project impacts, as well as planned monitoring and mitigation for each of these potential impacts. The fisheries mitigation suggested in the DEIR is a good first step; however, the general proposal for artificial reef creation is too vague to provide comments at this time. The FEIR should include an in-depth discussion of the location and size of proposed mitigation

activities, as well as an analysis of how these efforts mitigate for impacts to similar biological resources in nearby waters.

See Mitigation Section 9.

NLC 28. Due to the potential for large scale long-term downdrift impacts associated with this project, regulatory agencies should consider appropriate conditions to prevent possible future environmental impacts. These safeguards should ensure that sufficient funds are available for mitigation (if necessary) and that an independent third-party (e.g. the Nantucket Conservation Commission) has control of these funds. Funding should be available to remove any component (e.g. geotextile tubes, groins, or the beach dewatering system) that has failed. Therefore, the FEIR should present draft criteria for determining whether a specific project component has failed. Similar trigger criteria also should be developed for mitigation requirements for impacts to downdrift beaches.

Since groins and geotextile tubes are not included in the proposed Project, the need for mitigation of downdrift impacts is no longer necessary.

NLC 29. The resource delineation presented in the DEIR was based on aerial photographs from the Town's GIS system. A more accurate delineation of resource areas should be provided based upon site investigations.

The delineation of coastal wetland resource areas was shown on 2004 orthophotos of the project area, which were updated based on on-the-ground observations by qualified coastal scientists.

NLC 30. The limited information provided in the DEIR regarding potential triggers for renourishment, as well as potential impacts associated with the groins, limit the efficacy of statements made regarding their, evaluation relative to performance standards (Section 6).

Groins have been removed from the Project design (see EOEA 8 and 27 response). Renourishment triggers are discussed in Section 5.

NLC 31. Placement of the geotubes before construction of the beach fill is problematic, since these structures could be damaged by the dynamic wave environment. Although the DEIR indicates that these structures will remain covered, their eventual exposure (even for a relatively short period) could be devastating to downdrift and fronting beaches. The FEIR should include detailed plans for mitigation should the structures become exposed, as well as the location and demonstrated need for the geotubes. Proposed mitigation plans should clearly present trigger conditions and nourishment volumes.

Geotextile tubes have been eliminated from the proposed Project.

NLC 32. The FEIR should include detailed plans for mitigation if the groins become exposed, as well as the demonstrated need for these structures. Proposed mitigation plans should clearly present trigger conditions and nourishment volumes.

Groins are no longer included in the project design.

NLC 33. Predictions made in the DEIR regarding future shoreline conditions are inconsistent with observed trends. For example, Section 4.1.3.3 (Erosion Forecast) indicates erosion rates within the dune areas (Figures 4-27, 4-28, and 4-29) are similar everywhere; however, the shoreline change data indicates that the Codfish Park area has accreted significantly since 1994. Therefore, it is inappropriate to indicate that erosion rate forecast presented in the DEIR. Instead, erosion rate forecasts should be based on the best long-term data (1994 thru present) presented in the Beach Dewatering Quarterly Monitoring Reports.

The project design was based upon shoreline change data between 1995 and 2005. The shoreline recession rate measured in this 10-year period had the highest average shoreline recession rate of any other time period analyzed. The second highest average shoreline recession rate occurred between 1978 and 1994. The 1995 to 2005 time period also had the highest shoreline recession rates on a line by line basis than any other time period. Shoreline advance in the Codfish Park area is reflected in the shoreline changes and has been incorporated into the design.

10.14 Robert R. DeCosta

DeCosta 1. Dredging should be prohibited between June 1 and September 1 to limit project activities in the nearshore area near Sankaty Head, as this area is frequently used by fishermen and is a favored fishing location due to its sheltered position.

Project construction during the summer months will result in a short-term impact to commercial fishing in specific areas, notably within the 195-acre borrow site, at the beach site where sand is being pumped, and along a narrow corridor between the two where a pipeline will rest on the seabed. While there are ample alternative fishing locations along eastern Nantucket, the Proponent recognizes that the Project will create a degree of temporary exclusion for commercial fishing operations; thus, the Proponent will work cooperatively wish fishermen to ensure they are adequately compensated for any losses they may incur.

Irrespective of these potential impacts to the commercial fishing industry, the Proponent believes that construction during the summer months is the only viable option for the Project from ecological and human safety perspectives. In an ecological context, impacts to fish during early life stages should be avoided to maintain reproductive success; by avoiding construction activities during the winter and early spring, the Project will not impact spawning activities of cod, winter flounder, and other commercially-valuable bottom

fish. Striped bass do not spawn in the waters of southern New England, and therefore this species' reproductive success will not be affected by the Project. While black sea bass do spawn in the area, they do not spawn exclusively at the Project site but rather utilize pelagic waters throughout the region.

Performing construction during the summer months will also provide a modicum of meteorological predictability and favorable conditions, allowing work to proceed more efficiently and thereby limiting the duration of Project activities. As evidenced by difficulties experienced by the Nantucket Cable Project in the winter of 2005-2006 when winter storm conditions severely hampered the project and damaged the cable, winter construction in exposed locations around Nantucket presents significant safety hazards which must be avoided.

DeCosta 2. Sand deposited on the beach may be carried onto rocky bottom and grassy areas which provide important, varied habitat for marine organisms.

A delineation of nearshore cobble bottom is provided in Section 6.3.2 of the FEIR, and Project impacts to this habitat are discussed in Section 6.6.4. As identified in the text, construction of the design beach profile will permanently cover approximately 10 acres of nearshore cobble bottom habitat, of which approximately three acres consists of hard bottom and seven acres contains sand. This area of cobble habitat will be mitigated for in-kind at a nearby location. An adjacent 2,082-acre area of cobble habitat has been identified seaward of the coverage area by sidescan sonar surveys.

DeCosta 3. Commercial striped bass fishing is limited to within state waters during July and August. Dredging during these months could drive these fish outside the 3-mile state limit, essentially eliminating any potential fishing season.

Dredging at the borrow site will be conducted within the 3-mile state boundary. Any avoidance of the borrow site by striped bass will likely bring them closer to shore, which is where they prefer to feed. Impacts from nourishment will be limited to suspended sediment along the immediate edge of the shoreline; areas between the shore and the borrow site will be free of impact and available for fishing.

DeCosta 4. During the summer months, the project area is covered with fog approximately 50% of the time; a large commercial dredge operating during this time could be a safety hazard to the numerous smaller boats in the area.

The dredge will either be stationary or operating at a slow rate of speed at the borrow site, which is located near the 3-mile state boundary. It will be equipped with U.S. Coast Guard-required markings to ensure that other vessels transiting the area are made aware of its presence. In accordance with Coast Guard rules and regulations, the barge will also issue a Notice to Mariners to ensure that fishermen know where it is located. Fishing vessels will not be near any other structures associated with the dredging operation, since

the pipeline will be located on the seabed; fishing vessels will not be located in proximity to construction equipment on the beach, since all such equipment will consist of land-based vehicles.

DeCosta 5. The project area contains important spawning grounds for black sea bass and bluefish; summer dredging could adversely affect spawning activities.

The Project area is identified as Essential Fish Habitat (EFH) for black sea bass eggs but is not EFH for bluefish eggs; this is because black sea bass spawn in the area while bluefish do not. EFH source documents describe black sea bass EFH for eggs as the water column from Southern New England to North Carolina. While some black sea bass eggs may be negatively-affected by temporary turbidity in the water column, the area of impact is very small when compared to the amount of available spawning habitat along the east coast.

Bluefish EFH for eggs is described as the Continental Shelf from Montauk New York to Cape Hatteras North Carolina. Any spawning activity by bluefish occurs well offshore and further south than Nantucket. Sampling in the Project area during the summer and fall of 2006 confirmed this information. On 16 different field days when ichthyoplankton sampling was conducted, no black sea bass eggs were collected; larvae were collected in late June through early August, suggesting that spawning activity likely occurs nearby. No bluefish eggs or larvae were collected between March and September.

10.15 Derek Till

Till 1. The DEIR deals inadequately with the possible effect on adjacent beaches where stability is derived from a dynamic equilibrium produced by the downdrift transport of sand, such as in Quidnet, Squam and Wauwinet. A systematic and long-term monitoring plan is needed.

Groins and geotextile tubes have been removed from the Project. (See EOEA 8 response). Analysis of the sediment budget along the Project shoreline and modeling indicate that an annual total of approximately 200,000 cubic yards of sediment leaves the Project area for adjacent beaches and the proposed nourishment will increase the volume of sediment transported to these adjacent areas by about 50% to 300,000 cubic yards (see Section 5).

Proposed monitoring is extensively discussed in Section 5, and will be performed to assess the longshore transport of sand to adjacent beaches. Surveys will begin after initial Project construction and will be performed annually for at least five years to yield data needed to assess fill transport and Project performance. The amount of accretion (or erosion) will be determined by profiling (i.e., surveying) the shoreline on either side of the Project area. Beach and hydrographic surveys will be conducted over the entire Project area, extending approximately one mile on both sides to quantify fill transport. Project engineers have designed a monitoring program with profile lines spaced at 1,000-foot intervals along the Project profile itself and extending 5,000 feet laterally on each side of the Project.

The Project, by placing a large volume of sand on the Project shoreline in the design profile and advanced nourishment profile, will be adding a significant volume of sand to the littoral system without impinging upon sediment transport to adjacent shores. It is anticipated that the advanced nourishment fill will be in place until four to six years after Project construction; after loss of the advanced nourishment fill, the Proponent will perform renourishment.

Till 2. The DEIR assumes that the project will maintain or even increase the drift of sand to the north. The impacts from groins, the four most northerly of which are north of the Lighthouse, and the discontinuity between the build-out of the nourished beach and the natural shoreline that occurs at Sesachacha Pond must be dealt with.

Groins and geotextile tubes have been removed from the Project. (See EOEA 8 response).

Till 3. Project benefits to the public have been overstated; while I understand the public has some rights to beach use in front of the Baxter Road homes, from a practical standpoint the only access points are at Sconset Village at one end and close to the pond at the other.

Project benefits derive from public access and protection of valuable public assets, such as infrastructure, Sankaty Head Lighthouse and the Town Sewer Beds. In addition to the public access that you mention the Proponent is in discussion with the Sconset Trust regarding the possible installation of stairs down to the beach near the current location of Sankaty Lighthouse.

Till 4. References to monitoring north of the project appear confusing: Section 5.2.2.1 states 2,500 feet annually, whereas the response to MA 20 (page 7-44) says a minimum of 5000 feet. The response to NLC4 (page 7-46) says "Baseline sampling year-round". Section 5.2.2.1 also says that "observations may be made after major storm events". Since offshore shoals are responsible for the amelioration of storm waves, and the contours may be affected by sand removal at the Borrow Site, why "may"? The DEIR recognizes the importance of the shoals in mitigating the effect of easterly storms on the adjacent beaches, so monitoring after storms would seem to be particularly important.

A detailed description of physical monitoring is provided in Section 5- Physical Characteristics.

Till 5. It would appear that benchmarks established by SBPF north of the project area at Quidnet (about 2000 ft), Squam (about 5000 ft) and Wauwinet (about 7,500 ft) would be suitable monitoring sites, since quarterly observations have been made from them since 1994.

See proposed beach monitoring described in Section 5 – Physical Characteristics. Future beach monitoring anticipates the continued use of existing monitoring sites.