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EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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THE OFFICE OF APPEALS AND DISPUTE RESOLUTION

August 3, 2011

In the Matter of
Miltiades and Phyllis Tzitzenikos

OADR Docket No. WET-2010-033
Newbury, MA

RECOMMENDED FINAL DECISION

INTRODUCTION

Miltiades and Phyllis Tzitzenikos ("Applicants") challenge a Superseding Order of Conditions ("SOC") that Massachusetts Department of Environmental Protection's Northeast Regional Office ("MassDEP" or "Department") issued denying the Applicants' proposed project at their property on 30 Annapolis Way, Newbury, MA ("the Property" or "site"). The proposed project included a single family house, driveway, and walkway. The SOC was issued pursuant to the Massachusetts Wetlands Protection Act, G.L. c. 131, § 40 ("Act"), and the Wetlands Regulations, 310 CMR 10.00 et seq. ("the Wetlands Regulations").

MassDEP denied the Applicants' proposed project because it found the project did not meet the performance standards for Coastal Dune and Barrier Beach, under 310 CMR 10.28 and 10.29. After the Applicants appealed the SOC denial, I conducted an adjudicatory hearing. Based upon the entire record and applicable law, I find that a preponderance of the evidence shows the project will not comply with the applicable performance standards. In sum, a preponderance of the evidence demonstrates that the project will adversely affect the ability of

the Coastal Dune and Barrier Beach to aid in storm damage prevention and flood control, and therefore must be denied. As a consequence, I recommend that the Commissioner issue a Final Decision denying the project and affirming the SOC.

BACKGROUND

The Applicants seek to construct a house, driveway, and walkway on the west and landward side of Annapolis Way, a paved public roadway, on Plum Island, Newbury. Plum Island is a barrier beach protected by the Act and the Wetlands Regulations. Inglin PFT[1], p. 7; Matter of Carol Henderson, Docket No. 2009-059, Recommended Final Decision (April 12, 2010) ("the entirety of Plum Island is a barrier beach"), adopted by Final Decision (April 27, 2010); 310 CMR 10.29. For many years, Plum Island, including Newbury, has been impacted by severe beach and dune erosion. For example, the United States Army Corps of Engineers issued a Beach Erosion Control Report for Plum Island in 1952, and recommendations for implementation in subsequent years. Inglin PFT, Ex. T, p. 6.

The beachfront in Newbury has eroded, or retreated, at an average rate of 13 feet per year between 2000 and 2007, with a range of 5 to 21 feet per year. Inglin PFT, p. 7 and Ex. T, pp. 14-15. Going back to 1928, the Official Shoreline Change data show ongoing periods of erosion and accretion for this area. The two most recently measured periods, 1952 to 1978 and 1978 to 1994 show erosion, or loss, of 2.9 and 2.7 feet per year. Inglin PFT, p. 10. The net long term change in shoreline position from 1928 to 1994 was a loss of approximately 91 feet at a rate of 1.51 feet per year. Inglin PFT, p. 10. The serious and escalating erosion within the last decade prompted the Town of Newbury to declare a local state of emergency and undertake restoration efforts. Restoration efforts have included a beach replenishment project with the assistance of

[1] "PFT" refers to pre-filed written testimony.

the United States Army Corps of Engineers and a Dune Stabilization Project.[2] Inglin PFT, pp. 6-8.

The project proposed in this case would include a gravel driveway and walkway, a 728 square foot house, and a 382 square foot deck; the house and deck would be elevated eight feet on 9 pilings that are each 18 inches in diameter. Rosen PFT, p. 2; Abell PFT, p. 7. The house would be serviced by municipal sewer and water lines underlying Annapolis Way. Rosen PFT, p. 2; Rosen Rebuttal PFT, p. 15. A 5 by 10 foot utility shaft[3] would also be constructed to convey the utility connection from the ground to the house. Abell PFT, p. 8. The site is approximately 170 feet from the coastal beach, separated from the beach by the roadway and a row of houses. Rosen PFT, p. 6. The site is presently vacant. It is in a relatively densely populated suburban setting, abutted on the north, south and west by lots with residential structures. Tzitzenikos PFT, p. 3. To the east is the roadway, which is abutted to the east and seaward side by a row of houses, which are just landward of the coastal beach. Rosen PFT, p. 2.

Since 1967, the Applicants have owned a home at 29 Annapolis Way, directly across from the site on the seaward side of the roadway. Tzitzenikos PFT, p. 1. They purchased the site in 1973. At that time, the elevation of the site was below the road, forming a depression that was approximately 20 feet deep at its lowest point. In 1973, sediment from the nearby Parker River construction project was deposited at the site, upon Mr. Tzitzenikos' request. Tzitzenikos PFT, p. 2. This formed a mound level with the roadway, having relatively steep slopes on the west and northern sides and a less severe slope on the south side. Id.; Rosen PFT, p. 2. The general topography of the lot has not changed since that time. Id. The depth of the deposited fill

[2] See generally http://www.townofnewbury.org/pages/NETCO%20PDF%20v1bR.pdf and http://www.townofnewbury.org/pages/PI%20Beach%20Erosion

[3] The utility shaft is an impermeable corridor that is constructed from within the ground to the house to contain the utility lines for water and sewer.

is estimated to be approximately 10 feet. Rosen PFT, p. 3. Underlying the fill is "dunal material" that comprises the original barrier beach. Id.

Almost all of the site is densely vegetated with American Beachgrass (*Ammophila breviligulata* Fernald). Inglin PFT, p. 7, Ex. H, J. A portion of the site adjacent to the roadway, approximately 10 to 15% of the entire site, has been used as parking for the neighborhood, inhibiting vegetation and leaving bare sand areas on the east side of the lot. Rosen PFT, p. 3; Tzitzenikos PFT, p. 2; Inglin PFT, p. 7, Ex. H, J.

I held an adjudicatory hearing, prior to which the issues for adjudication were framed as follows:

1. Whether the project will be located on a Coastal Dune under 310 CMR 10.28?

    a. If the project will not be located on a Coastal Dune, does it otherwise satisfy the regulatory criteria under 310 CMR 10.21, et seq.?

2. Whether the project will meet the performance standards for Coastal Dune under 310 CMR 10.28?

3. Whether the project will meet the performance standards for Barrier Beach under 310 CMR 10.29?

Pre-Screening Conference Report and Order, p.4.

After the parties submitted pre-filed direct and rebuttal testimony in writing, the Applicants called the following witnesses at the hearing:

1. Peter S. Rosen. Dr. Rosen is a coastal geologist with "more than 35 years experience with the Massachusetts coastline including Plum Island and surrounding areas." He holds M.S. and B.A. degrees in Geology, and a Ph.D. in Marine Science. He is employed as a professor of earth and environmental sciences at Northeastern University. Rosen PFT, pp. 1-2.

2. Miltiades Tzitzenikos. Mr. Tzitzenikos is one of the applicants. He testified as a fact witness.

The Department called two witnesses:

1. Rebecca Haney Inglin. Ms. Inglin is a coastal geologist who has been employed by the Massachusetts Office of Coastal Zone Management ("CZM") since 1993. Prior to that employment she worked as a research assistant with the University of South Florida, Coastal Research Laboratory from 1990 to 1993. Ms. Inglin holds an M.S. degree in coastal geology and a B.A. degree in geology, with a minor in marine science.

2. Michael Abell. Mr. Abell has been employed with the Department since 2001, and is presently serving as an Environmental Analyst. He has a M.S. degree in natural resource science. He previously worked as the Conservation Administrator for the Town of Topsfield. His duties include review of requests for Superseding Order of Conditions, Superseding Determinations of Applicability, 401 Water Quality Certificates, and drafting SOCs, SDAs and 401s.

STATUTORY AND REGULATORY FRAMEWORK

The purpose of the Act and the Wetlands Regulations is to protect wetlands and to regulate activities affecting wetlands areas in a manner that promotes the following:

(1) protection of public and private water supply;

(2) protection of ground water supply;

(3) flood control;

(4) storm damage prevention;

(5) prevention of pollution;

(6) protection of land containing shellfish;

(7) protection of fisheries; and

(8) protection of wildlife habitat.

G.L. c. 131, § 40; 310 CMR 10.01(2). As discussed below, coastal dunes, barrier beaches, and Land Subject to Coastal Storm Flowage ("LSCSF") are wetlands resource areas protected by the

Act and the Wetlands Regulations. 310 CMR 10.02; 310 CMR 10.04; 310 CMR 10.28; 310 CMR 10.29; 310 CMR 10.57.

Coastal Dune. The Wetlands Regulations at 310 CMR 10.28(2) define a coastal dune as:

> any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control.

310 CMR 10.28(2) (emphasis added). Under the Wetlands Regulations:

> All coastal dunes are likely to be significant to storm damage prevention and flood control, and all coastal dunes on barrier beaches and the coastal dune closest to the coastal beach in any area are per se significant to storm damage prevention and flood control. Coastal dunes are also often significant to the protection of wildlife habitat.

310 CMR 10.28(1) (emphasis added).

"Coastal dunes aid in storm damage prevention and flood control by supplying sand to coastal beaches." Id. "Coastal dunes protect inland coastal areas from storm damage and flooding by storm waves and storm elevated sea levels because such dunes are higher than the coastal beaches which they border. In order to protect this function, coastal dune volume must be maintained while allowing the coastal dune shape to conform to natural wind and water flow patterns." Id.

"On retreating shorelines, the ability of the coastal dunes bordering the coastal beach to move landward at the rate of shoreline retreat allows these dunes to maintain their form and volume, which in turn promotes their function of protecting against storm damage or flooding." Id.

"Vegetation cover contributes to the growth and stability of coastal dunes by providing conditions favorable to sand deposition. Id.

"When a proposed project involves the dredging, filling, removal or alteration[4] of a coastal dune, the issuing authority shall presume that the area is significant to the interests of storm damage prevention, flood control and the protection of wildlife habitat." Id. "This presumption may be overcome only upon a clear showing that a coastal dune does not play a role in storm damage prevention, flood control or the protection of wildlife habitat, and if the issuing authority makes a written determination to that effect." Id.

To protect inland areas from storm damage and flooding, the shape and volume of dunes will respond to natural processes as the dunes erode, supplying sand to the beach, and grow as sand from the beach is deposited by wind or waves to the dunes. Vegetation is a primary contributor to dune stability and growth by trapping sand, resulting in the vertical accumulation that constitutes the dune itself. 310 CMR 10.28(1), 310 CMR 10.29(1).

Barrier Beach. The Wetlands Regulations at 310 CMR 10.29(2) define a barrier beach as:

> a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends.

Under the Wetlands Regulations:

> [b]arrier beaches are significant to storm damage prevention and flood control and . . . protect landward areas because they provide

[4] The Wetlands Regulations define "alter" as a "change [to] the condition" of any wetlands area subject to protection under the Act and the Wetlands Regulations. 310 CMR 10.04. The regulations provide the following examples of alterations:
(a) the changing of pre-existing drainage characteristics, flushing characteristics, salinity distribution, sedimentation patterns, flow patterns and flood retention areas;
(b) the lowering of the water level or water table;
(c) the destruction of vegetation;
(d) the changing of water temperature, biochemical oxygen demand ("BOD"), and other physical, biological or chemical characteristics of the receiving water."

> a buffer to storm waves and to sea levels elevated by storms. Barrier beaches protect from wave action such highly productive wetlands as salt marshes, estuaries, lagoons, salt ponds and fresh water marshes and ponds, which are in turn important to marine fisheries and protection of wildlife habitat. Barrier beaches and the dunes thereon are also important to the protection of wildlife habitat in the ways described in 310 CMR 10.27(1) (coastal beaches) and 10.28(1) (coastal dunes).

310 CMR 10.29(1).

Barrier beaches are significant to storm damage prevention and flood control and are likely to be significant to the protection of marine fisheries, wildlife habitat, and shellfish. The performance standards for coastal beach and coastal dune apply to all coastal beaches and to all coastal dunes that make up a barrier beach. 310 CMR 10.29(3).

"Barrier beaches are maintained by the alongshore movement of beach sediment caused by wave action." 310 CMR 10.29(1). "The coastal dunes and tidal flats on a barrier beach consist of sediment supplied by wind action, storm wave overwash and tidal inlet deposition. Barrier beaches in Massachusetts undergo a landward migration caused by the landward movement of sediment by wind, storm wave overwash and tidal current processes. The continuation of these processes maintains the volume of the landform which is necessary to carry out the storm and flood buffer function." Id.

"When a proposed project involves removal, filling, dredging or altering of a barrier beach, the issuing authority shall presume that the barrier beach, including all of its coastal dunes, is significant to the interest(s) specified above." Id. "This presumption may be overcome only upon a clear showing that a barrier beach, including all of its coastal dunes, does not play a role in storm damage prevention, flood control, or the protection of marine fisheries, wildlife habitat, or land containing shellfish, and if the issuing authority makes a written determination to such effect." Id.

Land Subject to Coastal Storm Flowage. The Wetlands Regulations at 310 CMR 10.04 define Land Subject to Coastal Storm Flowage ("LSCSF") as "land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater." Under the Wetlands Regulations, LSCSF is "likely to be significant to flood control and storm damage prevention." Matter of Edward Longo, Docket No. 91-001, Decision on Motion for Reconsideration, citing, 310 CMR 10.57(1)(a). This wetlands resource area, "by its very nature, serves to dissipate the force of coastal storms, [and thus,] serves the [Act's] interests of flood control and storm damage prevention . . . ." Longo, supra. The Department may only authorize activities in land subject to coastal storm flowage if the Department determines that the proposed activities will not interfere with the Act's interests of flood control and storm damage prevention. Longo, supra.

THE BURDEN OF PROOF IN AN APPEAL CHALLENGING AN SOC

As the party challenging the Department's issuance of a permit, the Applicants had the burden of going forward by producing credible evidence from a competent source in support of their position. 310 CMR 10.03(2); see Matter of Town of Freetown, Docket No. 91-103, Recommended Final Decision (February 14, 2001), adopted by Final Decision (February 26, 2001) ("the Department has consistently placed the burden of going forward in permit appeals on the parties opposing the Department's position."). Specifically, the Applicants were required to present "credible evidence from a competent source in support of each claim of factual error, including any relevant expert report(s), plan(s), or photograph(s)." 310 CMR 10.05(7)(j)3.c. So long as the initial burden of production or going forward is met, the ultimate resolution of factual disputes depends on where the preponderance of the evidence lies. Matter of Town of Hamilton, Docket Nos. 2003-065 and 068, Recommended Final Decision (January 19, 2006), adopted by

Final Decision (March 27, 2006); compare 310 CMR 10.05(7)(j)3.b ("The Petitioner has the burden of going forward pursuant to 310 CMR 10.03(2), and proving its direct case by a preponderance of the evidence."); 301 CMR 10.03(1)(a) ("Any person who files a Notice of Intent to perform work . . . has the burden of demonstrating to the issuing authority . . . ."); Matter of Princeton Development, Inc., Docket No. 2006-157, Final Decision (February 5, 2009) ("applicant always bears the ultimate burden of proof in a wetlands permit matter that its proposed project, as conditioned, will comply with the requirements and performance standards of the Wetlands Regulations"); Matter of Hoosac Wind Project, EnXco, Inc., Docket No. 2004-174, Final Decision, n. 2 (June 20, 2007) (the "burden of proof rests squarely upon the applicant in a wetlands case, 310 CMR 10.03(1).")

"A party in a civil case having the burden of proving a particular fact [by a preponderance of the evidence] does not have to establish the existence of that fact as an absolute certainty. . . . [I]t is sufficient if the party having the burden of proving a particular fact establishes the existence of that fact as the greater likelihood, the greater probability." Massachusetts Jury Instructions, Civil, 1.14(d).

The relevancy, admissibility, and weight of evidence that the parties sought to introduce in the Hearing were governed by G.L. c. 30A, § 11(2) and 310 CMR 1.01(13)(h)(1). Under G.L. c. 30A, § 11(2):

> [u]nless otherwise provided by any law, agencies need not observe the rules of evidence observed by courts, but shall observe the rules of privilege recognized by law. Evidence may be admitted and given probative effect only if it is the kind of evidence on which reasonable persons are accustomed to rely in the conduct of serious affairs. Agencies may exclude unduly repetitious evidence, whether offered on direct examination or cross-examination of witnesses.

Under 310 CMR 1.01(13)(h), "[t]he weight to be attached to any evidence in the record will rest within the sound discretion of the Presiding Officer. . . ."

DISCUSSION

I. The Project Will Be Located On A Primary Coastal Dune And Barrier Beach

The Applicants have conceded that the project will be located on a coastal dune. Applicants' Closing Brief, p. 2. There is also no dispute that the project will occur on a barrier beach. 310 CMR 10.29. The parties, however, disagree strenuously over what type of coastal dune is at issue. The Applicants claim it is not a primary dune. Instead, they characterize it as a stable "back dune," or secondary dune, which remains "static, consistent with a nonfunctioning dune . . . ." Applicants' Closing Brief, p. 4. Therefore, they conclude that the performance standards should not be applied as stringently as they are for a primary dune, as in Matter of Peabody, Docket No. 2002-053, Final Decision (January 25, 2006).[5]

Peabody has similarities to this case. There, the applicant also proposed to construct a house on pilings in Newbury, Plum Island. It was found that all potential impacts were entirely within the dune closest to the coastal beach, which Peabody stated was the primary coastal dune. Matter of Peabody, supra. Peabody recognized that the regulation "clearly draws a distinction as to the heightened significance of flood control and storm damage prevention for dunes on barrier beaches and primary dunes." Matter of Peabody, supra. (citing 310 CMR 10.28(1)). The regulation distinguishes coastal dunes closest to the coastal beach and coastal dunes on barrier beaches as "per se significant to storm damage prevention and flood control." 310 CMR 10.28(1). In contrast, all other coastal dunes are "likely to be significant to storm damage

[5] On appeal under G.L. c. 30A, § 10A, the Superior Court affirmed the Final Decision in Peabody. See Peabody v. Department of Environmental Protection, Essex Superior Court, C.A. No. 2006-0299, Memorandum of Decision and Order on Plaintiffs' Motion for Judgment on the Pleadings (Fahey, J.), June 21, 2007. The appeal of that decision is pending in the Massachusetts Court of Appeals.

prevention and flood control [and not per se significant]." Id. "This regulatory language distinguishes dunes on barrier beaches and the 'primary' dune – as opposed to secondary dunes that may have developed landward of the primary dune – and the heightened significance derived from [the primary dune's] presence at a site warrants greater scrutiny." Matter of Peabody, supra. "[T]he concept of primary dune as the dune closest to the beach is a concept within the state regulations independent of any definitional evolution of 'primary frontal dunes' at [the Federal Emergency Management Agency ('FEMA')]."[6] Matter of Peabody, supra. Even though the term primary dune is derived from the Wetlands Regulations independent of FEMA and its regulations, for purposes of this case—delineating the landward edge of the primary dune—there is no material difference between the terms primary dune and primary frontal dune, as Ms. Inglin testified and as discussed below. It is therefore appropriate, as elaborated upon below, to rely upon the analysis, information, and data that were generated in delineating the primary frontal dune by CZM on behalf of FEMA.

[6] Peabody elaborated on the heightened significance of primary dunes, stating: "The regulatory standard for work in any coastal dune is quite stringent, appropriate to their protective function and dynamic nature. Because dunes on barrier beaches and the coastal dune adjacent to the beach are singled out as intrinsically important to storm damage prevention and flood control, the performance standards should be applied most strictly in those areas." Matter of Peabody, supra. (footnotes omitted). "While the requirements for coastal dunes that are not primary or on barrier beaches are also quite stringent, there may be situations such as work in remnant or backdune areas where the potential for adverse effect or the significance to the interests of the Act are more limited. There may even be situations where a portion of barrier beach within an urbanized area has already been so highly developed that redevelopment will not have an adverse effect." For example, "In a highly developed area of seawalls, roadways, and parking lots such as Revere Beach, dunes may remain only as vestigial forms where additional alteration will have no adverse effect because their beneficial capacity has already been obliterated." Peabody, supra. at n. 18. "Although still a highly protected resource area, secondary dunes, particularly stable back dunes where there is no longer exchange of sediment between the dune and the beach, can sustain a relatively greater degree of alteration before it will be adversely affected so that its value is diminished." Matter of Peabody, at n. 12. The preceding statements regarding secondary or back dunes are consistent with Mr. Abell's testimony at the hearing in which he discussed applying somewhat different levels of scrutiny for projects on secondary dunes. See Abell Cross Examination; Inglin Cross Examination.

In this appeal, the Applicants contend that the site is not located on a primary dune because, they claim, the landward edge of the primary dune is just east of the site at the eastern edge of the roadway. MassDEP disagrees, contending that the entire site is part of a primary dune, the landward edge of which lies west of the site. I find that a preponderance of the evidence shows the landward edge of the primary dune is west of the site, and thus the entire site is part of a primary dune.

Ms. Inglin testified in detail regarding how she reached her determination that the site was part of a primary dune. Inglin PFT, pp. 8-12. Ms. Inglin has been extensively involved since 1993 in the delineation of dunes, particularly those involving fill, and providing technical assistance for over 1500 projects in several coastal areas, including Plum Island. Inglin PFT, pp. 1-2, 4-6. She has significant knowledge of Plum Island, and in fact has provided technical assistance to the Town of Newbury, where the site is located. Inglin PFT, pp. 1-8, Ex. I. She visited Plum Island on numerous occasions to conduct mapping for primary dunes and to provide advice regarding projects, delineation of dunes, and functional analysis of dunes. Inglin PFT, p. 7. She also participated in the process leading to revisions for changes in the state building code for floodplains and coastal dunes. Inglin PFT, pp. 4-5.

Ms. Inglin relied partially upon data and information generated during her work for CZM in delineating the primary frontal dune on behalf of FEMA for Plum Island. Ms. Inglin testified that it was appropriate to rely upon that data and information because the terms primary dune and primary frontal dune are "synonymous." Inglin PFT, p. 2. "Primary Frontal Dune" is a "continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the

primary frontal dune occurs at a point where there is a distinct change from a relatively steep slope to a relatively mild slope." Inglin PFT, Ex. D, p. 2 (quoting 33 CFR 59.1). The methodology that Ms. Inglin employed for CZM on behalf of FEMA delineated the landward limit of the primary frontal dune by identifying where the landward toe, or distinct break in slope, existed. Inglin PFT, Ex. D, p. 8. This coincides with the landward limit of the primary dune under the Wetlands Regulations. Indeed, Dr. Rosen, the Applicants' expert witness, testified that the landward edge of the primary dune is the point at which there is a distinct break in slope, like the landward edge for the primary frontal dune.[7] Rosen Rebuttal PFT, p. 21, 30. I find that there is no material difference between the landward limits of primary dunes or primary frontal dunes, and thus it is appropriate to rely in this case upon the research, data, and analyses utilized in determining the landward limit of the primary frontal dune for CZM on behalf of FEMA. To be clear, the conclusions reached by FEMA for the landward limit of the primary frontal dune have not yet become final[8] and are not binding here. Instead, I consider the analysis

[7] Although Dr. Rosen testified that he had a general working knowledge of Plum Island and its dunes and beaches, a review of his resume and this testimony reveals almost no research or other professional experience with the island, particularly in comparison to Ms. Inglin's extensive experience with Plum Island. See Rosen PFT, pp. 1-2 (and resume attached to PFT). Dr. Rosen testified only that he has been "familiar with this vicinity of Plum Island for several decades." He also testified that he acquired experience with Plum Island in 1971-72 when he was working on his masters degree. Rosen PFT, p. 4. The factual foundation of Dr. Rosen's testimony is very general in nature, and lacking in specific, particularly recent, data and information regarding Plum Island. The most specific data he provides is related to accretion east of the site, but his factual basis is limited to only the period between 1928 and 1962. He also refers to hearsay "discussions" with "other scientists" as the basis of his testimony. He makes general conclusory statements without a foundation of data, specific facts, or research. In light of the nature of Dr. Rosen's testimony and the sparse factual foundation regarding Plum Island, especially in comparison to Ms. Inglin's testimony and background, throughout this decision I have attached greater weight to Ms. Inglin's testimony regarding coastal processes on the island.

[8] There was testimony that the Flood Insurance Rate Maps ("FIRM") are not final because there is a pending appeal challenging an aspect of the FIRM with regard to the Merrimack River, which is not pertinent to this case. There was also some inconclusive testimony from both parties, both in pre-filed testimony and at the hearing, regarding the potential pendency of another appeal that may affect the site in this case. It is not necessary to make findings regarding whether that appeal is pending or how it impacts this appeal because the analysis and underlying information and data testified to by Ms. Inglin are

and underlying information and data as pieces of evidence in this case, taking into consideration any countervailing evidence. Relying upon such information is no different than any other case in which an opinion or conclusion is derived from underlying scientific data. Ms. Inglin testified that the underlying data represents the "best available information." Inglin PFT, p. 3. She relied upon that and her own independent review of the site in this case, in addition to other corroborating evidence. The Applicants and their expert in this case, just as in any other case, may challenge the validity and reliability of the information and data in order to undermine the resulting testimony.[9]

Ms. Inglin discussed in great detail her involvement and that of CZM in updating the primary frontal dune delineation for FEMA and the Flood Insurance Rate Maps. Inglin PFT, pp. 2-3. She testified to the robust scientific review process that led to FEMA's adoption of CZM's updated maps showing the newly delineated primary frontal dune. Inglin PFT, pp. 2-3 and Exhibit D. FEMA later updated the FIRMs again for the subject region to move the landward

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considered as pieces of evidence in this case, not as binding decisions, taking into consideration any persuasive countervailing evidence that the Applicants have presented. Moreover, Ms. Inglin conducted an independent review of the site, instead of merely relying upon the analysis and conclusions previously issued by FEMA.

[9] Dr. Rosen has offered no persuasive reason to discredit Ms. Inglin's testimony that the terms primary dune and primary frontal dune are synonymous. The gist of his argument is only that they fall under different regulatory regimes, and thus primary frontal dune regulations are not "not relevant." Rosen Rebuttal PFT, pp. 10, 19-22. While they do fall under different regulations, that does not provide a persuasive reason to ignore information and data from the primary frontal dune analysis and analogous regulatory provisions. Indeed, as in Peabody, I look to the federal regulatory scheme as an authoritative and informative source for this decision, to the extent it is analogous, but it is not binding. See Matter of Peabody, supra. at n. 14 ("FEMA concluded that 'the primary frontal dune would, in most cases, be completely eroded during the 100-year storm event.'"). It was therefore also appropriate for witnesses to use the federal regulatory scheme as an authoritative source. Indeed, as stated in Peabody, the "inclusion by FEMA of all primary frontal dunes in the velocity zone as a means to reduce potential for damage in these areas and to increase protection to inland areas is consistent with and supportive of the Department's protection of primary dunes under its regulations." See Matter of Peabody, supra. at n. 14.

extent of the Velocity Zone[10] to the west to include the primary frontal dune. FEMA issued and distributed the updated FIRMs in 2009. Inglin PFT, pp. 3.

In delineating the primary dune in this particular case, Ms. Inglin relied generally upon three sources of corroborating evidence: (1) field work specific to this particular site, (2) topographic Geographic Information Systems ("GIS") technology utilizing Light Detection and Ranging ("LIDAR") data generated during her delineation of the Primary Frontal Dune for Plum Island on behalf of CZM and FEMA, and (3) a cross sectional analysis of the site. Inglin PFT, pp. 8-9, 19, Ex. D.

The topographic LIDAR data that Ms. Inglin used is highly accurate and dense and meets the National Map Accuracy Standards. Inglin PFT, pp. 9. Ms. Inglin testified that the use of this data "reduces the arbitrary on-the-ground decision-making thereby producing a primary frontal dune line that is both repeatable and defensible." Inglin PFT, Ex. D, pp. 1-2. From this information, Ms. Inglin concluded that the landward limit of the primary dune, or landward toe, for this site is consistent with the primary frontal dune delineation she performed in 2004, which was adopted in draft by FEMA. Inglin PFT, pp. 8-9. The landward limit of the dune is approximately 32 feet[11] west of the site. Inglin PFT, pp. 9, Exs. F and Q. At that point there is a distinct break in slope, representing the landward edge of the primary dune. Ms. Inglin confirmed this conclusion with a site visit and a cross sectional analysis of the dune. The cross section exhibited a typical mound-shaped, undulating dune formation. Inglin PFT, pp. 8-9, Exs. D, F, H, Q, U, Z; Inglin Cross Examination (testifying that the landward limit is at 123 meters on

[10] Velocity Zone is an "area of special flood hazard extending from offshore to the inland limit of the primary frontal dune along an open coast and any other area subject to high velocity wave actions from storms or seismic sources." Inglin PFT, Ex. D, p. 2 (quoting 33 CFR 59.1).

[11] Much of the data provided in exhibits is in metrics. This decision includes accurate conversions to feet.

Exhibit U). The best and most recent available data show that the site is also within LSCSF, meaning that it is subject to inundation caused by coastal storms up to and including that caused by the 100-year storm. Inglin PFT, pp. 10-11; Inglin Cross Examination; Abell Cross Examination; 310 CMR 10.04. Based upon all of the above information, Ms. Inglin concluded that the site is entirely within the primary dune, or the dune closest to the beach. See 310 CMR 10.28(1). Mr. Abell reached a similar conclusion based upon comparable evidence. Abell PFT, pp. 6-7, 9, 19-20.

Dr. Rosen opined that that the site was not part of a primary dune. He describes the primary dune as "the active, or functional, dune interacting with the beach according to the regulations . . . ." Rosen Rebuttal PFT, p. 16; Rosen PFT, p. 5. He testified that because "coastal dunes are defined based on functionality, a determination of the functional dune closest to the beach reflects the protection of these interests." Rosen PFT, p. 5. Like Ms. Inglin, Dr. Rosen described the landward edge of the coastal dune as being where there is a distinct break in slope. Rosen Rebuttal PFT, pp. 21, 30. Ms. Inglin agreed with Dr. Rosen's assessment that the row of houses across the road and seaward of the site are directly adjacent to the "crest of the primary dune." Rosen PFT, p. 5; Inglin PFT, p. 19. Dr. Rosen, however, testified that the landward limit of the primary dune lies roughly along the eastern edge of the roadway, and thus east of the site. Rosen PFT, p. Ex. 5. He testified that this landward limit has partially resulted from the row of houses to the east of the road obstructing the wind. Small dunes, otherwise known as "lotline dunes," have formed between each house from vegetation and windblown sand. He found that these "lotline dunes" have a landward distinct break in slope, at approximately the road's easterly edge. "These lotline dunes have vibrant, natural dune vegetation and are the relicts of a preexisting active, continuous dune line prior to development."

Rosen PFT, p. 5; Rosen Rebuttal PFT, p. 16. Dr. Rosen therefore concluded that the primary dune is east of the site. Rosen PFT, p. 6. He claims that the "primary dune in the vicinity of the Site is the mound seaward of Annapolis Way which is directly connected with the beach and has vegetative characteristics indicative of active sand transfers . . . ." Rosen Rebuttal PFT, p. 11.

I am not persuaded by Dr. Rosen's testimony and I attach greater weight to Ms. Inglin's and Mr. Abell's testimony for several reasons.[12] First, Dr. Rosen's analysis focuses on the topographical features of only part of the dune, to the exclusion of the underlying dune structure, which Ms. Inglin depicted with her cross sectional analysis. Although Dr. Rosen observed a break in slope, that break was only part of the dune landscape proximate to and just landward of the crest of the dune. Dr. Rosen's analysis did not capture the entire dune structure, in contrast to Ms. Inglin's and Mr. Abell's analysis. Inglin PFT, p. 19. The break in slope observed by Dr. Rosen is a ridge-line on top of the dune and proximate to the dune's crest. Inglin PFT; Abell PFT.

Dr. Rosen also premised his opinion upon a map that was published in 1992 based upon data and information from 1978 to 1986. It does not include the most up to date information, and it underestimates the extent of the flood zones in coastal dunes.[13] Inglin PFT, pp. 13-14. The most recent data and information indicates that the dune crest would be overtopped in a 100 year storm, or a storm that has a 1% chance of occurring in a given year. Inglin PFT, pp. 21; Inglin Cross Examination.

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[12] This allocation of evidentiary weight is also based upon the relative backgrounds of Dr. Rosen and Ms. Inglin and sparse factual foundation for Dr. Rosen's testimony, as discussed previously. See supra. at n. 7.

[13] The FIRMs and regulatory areas, such as Velocity Zones, are federally based regulatory programs. They are not binding in this appeal. Instead, they are relied upon as evidence related to the issues at hand under the state Wetlands Regulations, 310 CMR 10.00.

I also find that the scope of Dr. Rosen's functionality test for delineating the primary dune is too narrow. Indeed, a different outcome is not compelled because a portion of the dune on the site is presently stable and is comprised of sediment deposited by artificial means that has not naturally undergone significant transformation in the last "40 (+/-) years."[14] See Rosen Rebuttal PFT, p. 12 (discussing results of coring samples showing evidence of two organic layers). The Wetlands Regulations specifically provide that coastal dune includes sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control, which is the case here. 310 CMR 10.02. Although the portion of the primary dune at the site is presently stable, Ms. Inglin testified that the dune's seaward side is eroding, "which is the normal process or pattern of change for primary dunes. Most change in primary dunes occurs in coastal storm events." Inglin PFT, p. 16, 18. Such erosion will diminish the height of the dune, leading to overtopping during coastal storms. Inglin PFT, p. 16-17, Ex. Z; Inglin Cross Examination. This erosion is a chronic issue, exacerbated by episodic erosion, primarily as a direct result of coastal storm events. Inglin PFT, p. 6. This process of dune removal and retreat is depicted in Exhibit Z to Ms. Inglin's PFT. The crest of the primary dune will eventually lower and erode back to the site. Id. As it erodes landward and the height diminishes "there will be more frequent overwash and more dramatic change at the site, as has happened on other portions of Plum Island where the primary dunes with the higher elevations . . . have eroded." Inglin PFT, p. 17, 18. More wave activity and erosion will continue to reach the site. Id.; Inglin Cross Examination.

[14] It is noteworthy that in Matter of Kline, Docket No. 1999-21-26, Final Decision (October 16, 2000), the administrative law judge and the parties acknowledged that a dune "particularly if it is as heavily vegetated as is this landform, can be stable for a significant period of time. The question then becomes, does the landform have the ability to move, even if it is not moving much now?"

As Ms. Inglin testified, this process has already been occurring seaward of the site for at least the last 80 years, recently resulting in the elimination of the well vegetated dune that previously existed in front of the Applicants' property across the road. Inglin PFT, pp. 6-10, 17, 18 and supra. at pp. 2-3. The regulations themselves state that barrier beaches in Massachusetts tend to migrate landward due to the landward movement of sediment by the wind, waves, and tidal current. 310 CMR 10.29(1). A residence just to the north of the Applicants' existing house was condemned and removed because it was significantly undermined by the ocean's erosive forces on the primary dune. Abell PFT, p. 18. To slow down this erosion, beach scraping recently occurred directly in front of the Applicants' current residence—a process that involves bulldozing sand from the seaward portion of the beach landward towards the house to raise the level of the dune.[15] Inglin PFT, p. 18.

There is no persuasive evidence showing that the fill material deposited on this site would function significantly different from the surrounding beach and dune sediments on Plum Island. Inglin PFT, pp. 14, 15, 21. Indeed, when overtopped by storm surge and waves, this site would function no differently from similarly situated dunes. Inglin PFT, p. 14, 15. It will "move and shift in response to water when the primary dune is overtopped, the vegetation will trap sand, and it will move landward when subject to overwash, which carries sediment and deposits it landward of the primary dune, by which the primary dune would migrate landward." Inglin PFT, p. 21.

Dr. Rosen also challenged Ms. Inglin's use of LIDAR data because it is based upon remotely collected data and allegedly may not reflect the reality on the ground. Rosen Rebuttal PFT, p. 20. He claims that the data misrepresents the landward extent of the primary dune,

[15] Mr. Abell generally reached the same conclusions. Abell PFT, p. 17-18.

which he confirmed with a field inspection. Rosen Rebuttal PFT, p. 21, 30. I am not persuaded by this argument, for several reasons. First, Ms. Inglin and Mr. Abel corroborated the data with their field inspections and the cross sectional analysis. Second, Dr. Rosen has not offered any information or factual foundation regarding how he used his field observations to reach a different conclusion. Third, and just as important, Dr. Rosen has not offered any information regarding the alleged margin of error. That is of great significance here because Ms. Inglin's delineation puts the landward extent of the primary dune approximately 32 feet west of the site. Thus, even if there's some error in Ms. Inglin's analysis the margin of error would have to be quite substantial to exclude the site from the primary dune.

Because the site is located on a primary dune, it is per se significant to the interests of storm damage prevention, flood control and the protection of wildlife habitat. I also find that the coastal dune at the site is significant to the interests of storm damage prevention, flood control and the protection of wildlife habitat because the dune is located on a Barrier Beach (rendering it per se significant) and the project will involve alteration of the dune without a "clear showing" that a coastal dune does not play a role in storm damage prevention, flood control or the protection of wildlife habitat. See 310 CMR 10.28(1).

II. The Project Does Not Comply With The Applicable Performance Standards For Coastal Dunes and Coastal Beaches

Under 310 CMR 10.28(1), when a coastal dune is significant to storm damage prevention, flood control or the protection of wildlife habitat, the following characteristics are critical to the protection of those interest(s):

> (a) the ability of the dune to erode in response to coastal beach conditions;
>
> (b) dune volume;

(c) dune form, which must be allowed to be changed by wind and natural water flow;

(d) vegetative cover;

(e) the ability of the dune to move landward or laterally; or

(f) the ability of the dune to continue serving as bird nesting habitat.

The coastal dune performance standards are found at 310 CMR 10.28(3)-(6). Matter of Stanley, Docket No. 99-033, Recommended Final Decision (March 15, 2001), adopted by Final Decision (March 27, 2001). The parties do not dispute that when, as here, the dune at issue lies on a barrier beach that is significant to storm damage prevention or flood control, the barrier beach performance standards are derived from 310 CMR 10.28(3)-(5). See 310 CMR 10.29(3). The regulations at 310 CMR 10.28(3) provide:

WHEN A COASTAL DUNE IS DETERMINED TO BE SIGNIFICANT TO STORM DAMAGE PREVENTION, FLOOD CONTROL OR THE PROTECTION OF WILDLIFE HABITAT, 310 10.28(3) through (6) SHALL APPLY:

(3) Any alteration of, or structure on, a coastal dune or within 100 feet of a coastal dune shall not have an adverse effect on the coastal dune by:

(a) affecting the ability of waves to remove sand from the dune;

(b) disturbing the vegetative cover so as to destabilize the dune;

(c) causing any modification of the dune form that would increase the potential for storm or flood damage;

(d) interfering with the landward or lateral movement of the dune;

(e) causing removal of sand from the dune artificially; or

(f) interfering with mapped or otherwise identified bird nesting habitat.

Adverse effect is defined in 310 CMR 10.23 as:

Adverse effect means a greater than negligible change in the resource area or one of its characteristics or factors that diminishes

> the value of the resource area to one or more of the specific interests of M.G.L. c. 131, § 40, as determined by the issuing authority. "Negligible" means small enough to be disregarded.

The coastal wetlands regulations performance standards "shall be interpreted to protect those characteristics and resources to the maximum extent practicable." 310 CMR 10.21. Because this case involves development on an undeveloped portion of a primary dune, I look to Peabody, supra., for guidance in resolving this case. In Peabody, the Commissioner stated:

> In this case where new work is proposed on a currently undeveloped primary dune on a barrier beach, strict application of the regulatory standards is certainly appropriate. I recognize that the performance standards do not prohibit any work, they prohibit any adverse effect on the coastal dune and barrier beach. The regulations indicate the quite limited types of activity that may be permitted, largely designed to benefit the dune, and allow some flexibility for existing development. 310 CMR 10.28(4) and (5). The wetlands regulations generally establish performance standards that are specifically tailored to protect each type of resource area for the public interests it provides. The level of protection is established, in part, to take into account the cumulative effects of many similar projects that might otherwise be permitted if the impacts of a single project were considered in isolation. The stringency of the regulations for work on a primary dune on a barrier beach reflect a scientifically and policy based determination that limiting development of these areas serves the public interest by reducing public safety concerns and the economic consequences of storm damage and flooding.

Matter of Peabody, supra.[16]

Here, after considering and applying the above performance standards, I find that the project would not comply with the performance standards because it would adversely impact: (1) the ability of the waves to remove sand from the dune, (2) the landward or lateral movement of the dune, (3) the vegetative cover, destabilizing the dune, and (4) the site's ability to further the interests of preventing storm or flood damage. See 310 CMR 10.28(3)(a) - (d).

[16] The reference to "existing development" in Peabody explains why at times Mr. Abell's analysis at the hearing varied depending upon whether he was talking about new construction versus existing development.

In Peabody the proposed structure was very similar to the structure here. The applicant proposed a 1080 square foot house with a 576 square foot deck on pilings, a parking area of gravel located underneath, and a 300 square foot driveway. The applicant proposed mitigation of 5,490 square feet of dune vegetation plantings and permit conditions that would require removal of the house and septic system if it appeared they were to be impacted in storms. The site in this case is 20 feet closer to the seaward edge of the primary dune than the proposed house in the Peabody case. Inglin PFT, pp. 14, 15. This site has vegetation similar to the property in Peabody. Inglin PFT, p. 14.

In Peabody, the project was found to adversely impact the movement of sand, the movement of the dune, and the vegetation, resulting in destabilization. The Commissioner stated: "The regulations accommodate the inherent variability of coastal dunes, particularly of primary dunes and dunes on barrier beaches, by requiring that sediment and dune movement be largely unimpeded by manmade alterations." Matter of Peabody, supra. The Commissioner added:

> While the impacts of a single pile-supported house seem dwarfed by the impacts of a major coastal storm, the integrity of the primary dune under and around structures may be compromised, diminishing the ability of the dune to serve as the first line of defense against storm damage. By placing limitations on new development, particularly on oceanfront lots with primary dunes, the regulations adopted in 1978 reflect a considered public policy of providing a high level of protection to dunes to preserve their natural functions for the public interests they serve. By restraining overall development along the coast and minimizing associated cumulative adverse effects, the coastal dune regulations avoid increased demands for public services to hazard-prone areas and promote public safety for both coastal and more inland property.

Matter of Peabody, supra.

In Peabody, the applicant, like the applicants in this case, also proposed to plant substantial vegetation on the dune, in order to compensate for losses from components of the project, such as the house and driveway. The Commissioner rejected this on the grounds that it would undermine the natural movement of sand when the site was impacted by the ocean. The Commissioner also found that the addition of the house and deck would not be mitigated by the planting of additional grass. It was found that the occupation of the pile supported structure and the structure itself would alter the dune such that the surfaces would not function in the same way as dune vegetation would were it allowed to colonize naturally. The dune would be destabilized: "While the entire dune would not necessarily suffer from interference with the natural vegetation at this site, there is the potential for local effects such as weakening, slumping, or blow out which would allow water to reach property further inland." Peabody, supra. Lastly, such re-vegetation would require long term monitoring which is not appropriate for a dynamic system.

In this appeal, as in Peabody, the primary dune on which the project will be built is subject to ongoing and chronic erosion and deposition processes. Ms. Inglin testified in detail how the shoreline is receding and how the crest of the primary dune will be topped by waves, resulting in westward migration of the primary dune's crest and more frequent events that directly impact the site. Based upon the data showing long term erosion trends of the seaward side of the primary dune Ms. Inglin concluded that the site is located on an eroding primary dune.[17] Inglin PFT, pp. 6-10, 16-18. Indeed, seaward of the site, there has been significant erosion of the beach and seaward side of the coastal dune. Inglin PFT, pp. 6-, Exs. J, K. From

[17] Because the site is located within the Primary Frontal Dune it is also, by definition, located in the Velocity Zone and a Coastal high hazard area, which means: "an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources." Inglin PFT, p. 10.

approximately 2007 to 2008 alone the ocean eroded the entire vegetated dune that used to lie in front of the Applicants' house on the seaward side of Annapolis Way, to the point where it eroded underneath the deck. Inglin PFT, pp. 6, 18, Exs. K, R, W. Based upon the above, Ms. Inglin testified that there has been a "pattern of ongoing erosion on Plum Island that shows no indication that it will subside." Inglin PFT, pp. 17-18. She believes that it will persist but continue shifting from one part of the island to another in a cyclical fashion. Inglin PFT, p. 18.

Given the site's significance to storm damage prevention and flood control, Ms. Inglin testified that the project will have an adverse effect by: (1) inclusion of a utility shaft and pilings that will interfere with sediment transport and thus the ability of the dune to move, shift, and migrate, (2) removal of large amounts of vegetation that will destabilize the dune, and (3) the execution of construction activities and the installation of pilings that will destabilize the dune, particularly because of the steep grades. Inglin PFT, p. 12-13, 15, 21-22; Inglin Cross Examinaton. Ms. Inglin's testimony is consistent with the Commissioner's findings in Peabody, where he concluded that an analogous project would have similar adverse impacts.

Here, the parties disputed whether the plans actually would require a net gain in vegetation, assuming all new plantings were to grow. Regardless, Ms. Inglin and Mr. Abell persuasively testified that the Applicants' projections were overly optimistic and not reflective of the future of the site were the project to proceed. As similarly found in Peabody, Ms. Inglin testified that the proposed planting of new vegetation would be inadequate because it would not be able to thrive like the current vegetation due to shading both under and around the project. She also testified that it will take many years to establish densely with deep roots. Inglin PFT, p. 12-13, 15, 21-22. Ms. Inglin testified that the project would result in the permanent loss of vegetation under the structures and in the footprint of the driveway and walkway. Inglin PFT, p.

22. "Unlike the regulations for bordering vegetated wetlands which explicitly allow the replacement of inland vegetation to compensate for altered areas, 310 CMR 10.55(4)(b), the regulations governing work on coastal dunes do not establish or even suggest a standard based on replication of vegetation to compensate for adverse impacts from a project." Matter of Peabody, supra.

Mr. Abell testified that based upon his experience with other pile supported structures on Plum Island and Salisbury, "only none to sparse vegetation manages to re-grow beneath pile-supported dwellings even those structures elevated as much as 6 feet." Abell PFT, p. 7, 12. The root mass will be lost and the remaining plants will not grow as vigorously because of shading from the structure. Abell PFT, p. 7. Although Dr. Rosen testified that dune grass is able to grow under partial sun conditions, I am persuaded by Mr. Abell and Ms. Inglin and the evidence that they relied upon that it will not grow nearly as vigorously as the grass presently at the site and the grass that does grow will take several years to establish itself with deep roots. Both Mr. Abell and Ms. Ingrim elaborated upon this subject area under cross examination, which persuasively supported their direct testimony and undermined Dr. Rosen's testimony. See also Ingrim PFT, Ex. O.

Ms. Inglin also explained that the combination of the structural components, impacts from the construction process, and increased shading will destabilize the dune.[18] Inglin PFT, p. 12. The dune destabilization will adversely impact the storm damage and flood protection to landward areas, "increasing the potential for storm and flood damage to homes landward of the

[18] Page 13 of Ms. Inglin's testimony, in addition to other pages, includes an annotation by me reflecting her testimony at the hearing in which she corrected some typographical errors. The annotations include my initials: "TMJ."

Site." Inglin PFT, p. 22. Mr. Abell reached similar conclusions as Ms. Inglin.[19] Abell PFT, pp. 6-8, 12, 13.

The Applicants disagree with Ms. Inglin's and Mr. Able's assessment, primarily because they believe the site is stable, and not subject to ongoing erosive forces. The Applicants state there has been no significant erosion or accretion at the site in recent years, and thus there will be no adverse impact. Rosen PFT, pp. 3, 5, 8; Rosen Rebuttal PFT, pp. 22-23, 28; Tzitzenikos PFT, p. 2. They contend that the shape of the lot has not changed in 38 years, since the fill was placed there. Rosen PFT, p. 3. The Applicants and their expert have not seen sand blowing across the lot, despite seeing it blowing landward across the beach. Rosen PFT, p. 3.

I find Ms. Inglin's testimony regarding erosion and accretion in the vicinity of the site to be more reliable and worthy of greater weight. Her testimony regarding long term retreat of the shoreline and future impacts, is based upon specific data, including that from the Historic Shoreline Change data and the 2009 U.S. Army Corps Report. Inglin PFT, p. 17. In contrast, Dr. Rosen's testimony is internally inconsistent, not grounded on specific factual information and data, and contradicted by information and data provided by Ms. Inglin. Dr. Rosen's testimony instead appears to be based upon Dr. Rosen's optimistic conjectural expectations for the site. It is undermined by the detailed long-term data that Ms. Inglin provided showing the gradual retreat of the shoreline on Plum Island. Dr. Rosen's testimony is also based upon his conclusion that the site is stable and not part of the primary dune[20], a position which I found was not persuasive.

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[19] Mr. Abell testified on cross examination that utility shafts smaller than the one at issue in this case had been allowed in reconstruction of existing dwellings or on back dunes. He also testified that although reducing the utility shaft size would reduce impacts in this case, it would still be in noncompliance with the performance standards. Abell Cross Examination; see also Inglin Cross Examination.

[20] Rosen Rebuttal PFT, pp. 5-6, 9, 10.

Indeed, the Applicants' expert conceded that the seaward side of the primary dune had undergone recent significant changes. He testified that there have been cycles of erosion and accretion seaward in the vicinity of the site. Rosen PFT, p. 4. This is similar to other trends, just north and south of the site. Rosen PFT, p. 4. Dr. Rosen stated that the beaches of northern Plum Island have been in a period of retreat the past few years, following "a relatively stable period." Rosen PFT, p. 5. Dr. Rosen added, without a specific factual basis, that even though this recent retreat has shifted to the section of Plum Island where the applicants' existing house is located, "this critical erosion situation has now abated and the foredune remains stable throughout this time in 2011." Rosen Rebuttal PFT, p. 29. Dr. Rosen believes, without a specific factual basis, that the "recent cycle of accelerated retreat will subside shortly." Rosen PFT, p. 5. Moreover, despite Dr. Rosen's testimony regarding "recent" "accelerated retreat" and evidence regarding long-term trends, he testified that Plum Island "does not have the gradually retreating shoreline often envisioned with barrier beaches because of the periodic pulses of sand input to the beach system, and the interaction of these sand bodies with incoming waves. The sources of sand are an offshore submerged delta deposit (the Merrimack River Paleodelta) and the sands flowing out of the mouth of the adjacent Merrimack River."[21] Rosen PFT, p. 5.

In Peabody, the Commissioner rejected a view similar to Dr. Rosen's. There, the applicant advocated a similar position, arguing that notwithstanding overall long term erosion, the site itself was stable. In fact, in that case, the site had undergone short term accretion. The

[21] Mr. Tzitzenikos has never seen wind blow sand blowing across the site, but frequently sees windblown sand moving across the beach and toward the dune on his lot at 29 Annapolis Way. Tzitzenikos PFT, p. 3. Ms. Inglin testified that the site does not appear to be affected by the wind because of the dense vegetation and obstruction caused by the houses seaward of the site. Inglin PFT, p. 14, 16. In contrast, wind blown sand is observed on the coastal beach because it is unvegegated. Inglin PFT, p. 16.

Commissioner, however, declined to accept the applicant's position, finding that the long-term trends demonstrated the site was not stable.

Contrary to the Applicants' arguments, the decision in Matter of Kline, Docket No. 1999-21-26, Final Decision (October 16, 2000), does not compel a decision in the Applicants' favor. There, the primary issue was whether the landform was a coastal dune or a coastal bank. Thus, there was much testimony regarding whether it possessed the characteristics of a dune or a bank. The parties and the administrative law judge acknowledged that a dune "particularly if it is as heavily vegetated as is this landform, can be stable for a significant period of time. The question then becomes, does the landform have the ability to move, even if it is not moving much now?" Here, in contrast, it is undisputed that the landform at issue is a coastal dune. What is disputed is whether it is a primary dune and whether the project will comply with the performance standards. Further, the fill brought to the site in Kline raised the elevation several feet above the 100 year floodplain; in contrast, in this case the crest of the primary dune remained unchanged, and the dune in this case is actively eroding. Inglin PFT, pp. 20-21. Indeed, here the dune crest would be overtopped in a 100 year storm, or a storm that has a 1% chance of occurring in a given year. Inglin PFT, pp. 21.

For all the foregoing reasons, I find that the project would not comply with the performance standards for coastal dune and barrier beach.

CONCLUSION

For all the above reasons, I find that a preponderance of the evidence shows the project will be located on a primary dune and that it will not comply with the applicable performance standards. In sum, a preponderance of the evidence demonstrates that the project will adversely affect the ability of the Coastal Dune and Barrier Beach to aid in storm damage prevention and

flood control, and therefore must be denied. As a consequence, I recommend that the Commissioner issue a Final Decision denying the project and affirming the SOC.

NOTICE-RECOMMENDED FINAL DECISION

This decision is a Recommended Final Decision of the Presiding Officer. It has been transmitted to the Commissioner for his Final Decision in this matter. This decision is therefore not a Final Decision subject to reconsideration under 310 CMR 1.01(14)(d), and may not be appealed to Superior Court pursuant to M.G.L. c. 30A. The Commissioner's Final Decision is subject to rights of reconsideration and court appeal and will contain notice to that effect. Once the Final Decision is issued "a party may file a motion for reconsideration setting forth specifically the grounds relied on to sustain the motion" if "a finding of fact or ruling of law on which a final decision is based is clearly erroneous." 310 CMR 1.01(14)(d). "Where the motion repeats matters adequately considered in the final decision, renews claims or arguments that were previously raised, considered and denied, or where it attempts to raise new claims or arguments, it may be summarily denied. . . . The filing of a motion for reconsideration is not required to exhaust administrative remedies." Id.

Because this matter has now been transmitted to the Commissioner, no party shall file a motion to renew or reargue this Recommended Final Decision or any part of it, and no party shall communicate with the Commissioner's office regarding this decision unless the Commissioner, in his sole discretion, directs otherwise.

_____

Timothy M. Jones
Presiding Officer

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