COMMONWEALTH OF MASSACHUSETTS
ENERGY FACILITIES SITING BOARD

In the Matter of the Petition of Cape Wind Associates, LLC and NSTAR Electric Company, Project Change	)	EFSB 02-2B/EFSB 07-8A

FINAL DECISION

M. Kathryn Sedor
Presiding Officer
November 17, 2014

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The Energy Facilities Siting Board hereby APPROVES, subject to the conditions set forth below, changes to the Cape Wind Associates, LLC and NSTAR Electric Company Project as further described below.

I. INTRODUCTION

A. Summary of the Previously Approved Project

On May 11, 2005, the Energy Facilities Siting Board ("Siting Board") approved the construction by Cape Wind Associates, LLC ("Cape Wind") and NSTAR Electric Company ("NSTAR") (together, the "Companies") of two new 115 kV electric transmission lines running beneath Nantucket Sound and Lewis Bay and then underground in the Towns of Yarmouth and Barnstable on Cape Cod where they would interconnect with the electric grid at the existing NSTAR Barnstable Switching Station ("Project").[1] The purpose of the Project is to interconnect Cape Wind's planned offshore wind-powered electric generating facility in Nantucket Sound ("Wind Farm") with the regional electric grid.

The Transmission Line route is approximately 18.4 miles in length. The route would begin at the proposed Wind Farm on Horseshoe Shoal in Nantucket Sound, travel approximately 12.5 miles beneath Nantucket Sound and Lewis Bay, come ashore at the southern end of New Hampshire Avenue in Yarmouth, and then continue approximately 5.9 miles underground through Yarmouth and Barnstable to the Barnstable Switching Station ("Switching Station"). In an August 8, 2014 filing ("Project Change Filing") Cape Wind and NSTAR now propose to make various changes to the Barnstable Switching Station to accommodate the interconnection of the Transmission Lines ("Project Change").

B. Summary of the Proposed Barnstable Switching Station Changes

The Companies' proposed changes to the Barnstable Switching Station consist of the addition of new equipment to the site, and enlargement of the site to accommodate the new

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[1] Cape Wind Associates, LLC and Commonwealth Electric Company, d/b/a NSTAR Electric, 15 DOMSB 1, EFSB 02-2 (2005) ("Final Decision"). The Siting Board proceeding in which the Board approved the Project and issued the Final Decision is referred to in this decision as the "Original Proceeding."

equipment. The Companies state that the proposed changes reflect the interconnection specifications for the Project that are contained in the ISO-New England ("ISO-NE") System Impact Study for the Project, which ISO-NE had not completed at the time of the Original Proceeding (Exh. CW/NSTAR-1, at 2).

The Companies stated in the Original Proceeding that the new equipment to be added to the Switching Station site would include three new circuit breakers in a new bay and two shunt reactors, and that an extension of the existing ring bus on the site also would be required (Final Decision at 27-28, 126).[2] In the Project Change Filing, the Companies now state that the equipment to be added to the site would include eight bays of circuit breakers, four shunt reactors, two harmonic filters, and a control house; expansion of the existing static VAR compensator ("SVC") on the site also would occur (Exhs. CW/NSTAR-1, at 3). The Companies stated in the Original Proceeding that the only noise associated with the Project would be construction-related noise. Final Decision at 107. In the Project Change Filing, the Companies now state that the shunt reactors, the harmonic filters, and the expanded SVC all would emit noise (Exh. CW/NSTAR-1, at 5). The Companies stated in the Original Proceeding that all Switching Station construction would occur within the station's existing fence line, and thus would not require expansion of the site. Final Decision at 27-28, 31. The Companies now state that the Switching Station would need to be expanded by approximately 1.9 acres (Exh. EFSB-3).

C. Procedural History

1. Prior Proceedings

a. EFSB 02-2

The Siting Board first approved the Project in the 2005 Final Decision. The Siting Board found that the Project, using the Companies' primary route and interconnecting at the Barnstable Switching Station, was preferable to other alternatives with respect to providing a reliable energy supply for the Commonwealth, with a minimum impact on the environment at the lowest possible cost. Final Decision at 32, 132. The Final Decision required the Companies to provide notice to

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[2] The Companies indicated that additional shunt reactors might be necessary. Final Decision at 126.

the Siting Board of any proposed project changes other than minor variations. Final Decision at 135.

b. EFSB 07-8

In a proceeding in 2009 ("Certificate Proceeding"), the Siting Board granted a Certificate of Environmental Impact and Public Interest for the Project, containing nine state and local permits identified by Cape Wind as necessary for Project construction. Cape Wind Associates, LLC, EFSB 07-8 (2009) ("Certificate Decision"). The Certificate Decision stated that, in accordance with G.L. c. 164, § 69K, the Certificate "shall be in the form of a composite of all individual permits, approvals or authorizations which would otherwise be necessary for the construction and operation of the facility and it acts in the place of the nine permits referenced below." Certificate Decision, Exhibit A at 1. The Certificate Decision also stated "no agency shall require any approval, consent, permit, certificate or condition for the construction, operation, or maintenance of the project. No agency shall impose or enforce any law, ordinance, by-law, rule or regulation nor take any action nor fail to take any action which could delay or prevent construction, operation, or maintenance of the project." Certificate Decision, Exhibit A at 4; G.L. c. 164, § 69K.

The Siting Board found that the Project was needed; that granting a Certificate containing approvals for the Project was compatible with considerations of environmental protection, public health and safety;[3] that the Project might not conform with certain laws and regulations, but that it was reasonable to exempt the Project from these requirements; and, that issuing a Certificate would serve the public interest and convenience. Certificate Decision at 29-30. The Certificate Decision also required Cape Wind to provide notice to the Siting Board of any proposed Project changes other than minor variations. Certificate Decision, Att. A at 4.[4]

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[3] In the Certificate Decision, the Final Decision served as the foundation for the Siting Board's findings of need, of compatibility with environmental protection and public health and safety, and that the public convenience and necessity required the construction and operation of the Project. Certificate Decision at 13-14, 21-24, and 27-28.

[4] In 2008, the Siting Board approved other changes to the Project. Cape Wind Associates, LLC and Commonwealth Electric Company d/b/a/ NSTAR Electric, 16 DOMSB 194,

2. Current Proceeding

When the Companies submitted the Project Change Filing to the Siting Board on August 8, 2014, they also served the filing on all parties in the Original Proceeding and the Certificate Proceeding, who retain their previous Intervenor or Limited Participant status in accordance with the Siting Board precedent for processing project change requests.[5] See Brockton Power Co. v. EFSB, 469 Mass. 215, 217-220 (2014) ("Brockton Power"). On September 2, 2014, Siting Board staff issued a set of written Information Requests to the Companies and a procedural order. At the request of the Town of Barnstable, staff subsequently modified the procedural order to allow for evidentiary hearings, which were conducted on September 23 and 24, 2014. In addition to the Companies, the Town of Barnstable and the Barnstable Fire District, and Mr. Roberto Arista[6] participated in the hearing. The Companies presented four witnesses; the Town of Barnstable presented one witness; and the Barnstable Fire District presented one witness. Subsequent to the evidentiary hearing, Dakota Partners, Inc. ("Dakota") filed a motion to intervene in the proceeding; the Presiding Officer granted the motion. On October 8, 2014, the Companies and Dakota each filed a brief; the Town of Barnstable and the Barnstable Fire District filed a joint brief.[7] On

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EFSB 02-2A/D.T.E. 02-53 (2008) ("2008 Project Change Decision"). The 2008 Project Change Decision is not at issue in this proceeding.

5 The record in the Original Proceeding was incorporated by reference into the record in the Certificate Proceeding. The Presiding Officer noted that the records in the Original Proceeding and the Certificate Proceeding were incorporated by reference into the record of this proceeding. EFSB 02-2B/07-8A, Procedural Order (August 20, 2014).

6 Mr. Arista is not a party to the proceeding and was not on any party's pre-hearing witness list. He appeared pro se at the evidentiary hearing, and the Presiding Officer allowed him to be sworn in and present testimony, and allowed the Town of Barnstable to sponsor aerial photographs that he identified and described. Mr. Arista testified regarding the planned Village Green housing development that would abut the Switching Station ROW, as discussed in Section II.B.1, below. Mr. Arista identified himself as the general partner in the Village Green project. In its post-hearing intervention motion, Dakota Partners, Inc. stated that it owns the parcel of land on which the Village Green project would be located, and identified Mr. Arista as a principal in Dakota Partners, Inc.

7 The parties also filed numerous evidentiary and procedural motions before, during, and after the evidentiary hearing. The motions, the responses to the motions, and the Presiding

October 29, 2014, the Companies and Dakota notified the Siting Board that they had entered into a settlement agreement, and Dakota filed a notice of withdrawal as a party to the proceeding (Exh. CW/NSTAR/Dakota-1; Notice of Withdrawal by Dakota Partners, Inc. (October, 29, 2014)).

II. ANALYSIS OF THE PROJECT CHANGE FILING

A. Standard of Review

As noted above, in both the Final Decision and the Certificate Decision, the Siting Board required Cape Wind and NSTAR to notify the Board of any changes other than minor variations to the proposal as presented to the Siting Board, so that the Board might decide whether to inquire further into such issues. Final Decision at 135, Certificate Decision, Att. A, at 4. The standard of review to determine whether further inquiry is warranted was first articulated by the Siting Board in Berkshire Power Development, Inc., 7 DOMSB 423, EFSB 95-1, at 10 (1997) ("Berkshire Compliance Decision"). In the Berkshire Compliance Decision, the Siting Board declined to make further inquiry regarding certain project changes if the change did not alter in any substantive way either the assumptions or conclusions reached in its analysis of the project's environmental impacts in the underlying proceeding (Id. at 437-439; see also 2008 Project Change Decision at 4; GenOn Kendall LLC, EFSB 99-4C (January 9, 2012).

B. Proposed Changes to the Barnstable Switching Station

As stated above, the final design of the Project's interconnection at the Barnstable Switching Station was unknown at the time of the Original Proceeding as ISO-NE had not yet issued the System Impact Study for the Project. However, the Companies stated at that time, and the Final Decision so indicated, that any upgrades or construction related to the Switching Station would occur inside the then-existing fence line, and that the only noise associated with the Project would be construction noise – not operational noise. In contrast to the earlier record, the Project Change would include additional electrical equipment located beyond the existing fence line at the Switching Station, and this equipment would also generate operational noise.

Officer's rulings on the motions are in the record of this proceeding, and can be identified in the Docket for the proceeding.

The Siting Board finds that the location and operation of the additional equipment that the Companies propose to install at the Barnstable Switching Station may have land use, visual, noise, and other impacts. Therefore, the Project Change may alter in a substantive way assumptions or conclusions by the Siting Board in its analysis of the environmental impacts of the Project in the Original Proceeding. Accordingly, the Siting Board finds that further inquiry regarding the Project Change is warranted. The Siting Board undertakes this further inquiry below.

1. Land Use and Visual

The existing Barnstable Switching Station is situated in an approximately 3.83-acre fenced area, located within a 10.99-acre NSTAR-owned parcel (Exh. EFSB-3).[8] The proposed site expansion for the new equipment would be approximately 1.9 acres, of which 0.8 acres includes pre-existing driveways and access roads (id.).[9] All of the new equipment would be located to the west and south of the existing transmission equipment (Exhs. CW/NSTAR-1, at 3; EFSB-1(3) Public). The shunt reactors, harmonic capacitors, control house, and breaker bays would be located to the west, and the expansion of NSTAR's existing SVC would be located to the southeast (Exh. EFSB-1(3) Public).

The Companies stated that the new equipment would be consistent in kind and dimension with the existing equipment, as well as below the heights of the existing towers and masts at the Switching Station (Exh. EFSB-6). The majority of the existing Switching Station equipment, consisting of buses, transformers,[10] and a shunt reactor is approximately 15-25 feet high, while towers, masts and overhead lines are approximately 55 to 60 feet high (id.). The dimensions of the

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8 NSTAR has owned and operated the Barnstable Switching Station at the current location for over 40 years (Exh. CW/NSTAR-1, at 3).

9 The distances from the NSTAR parcel property boundary to the nearest uses are: (1) Trinity Christian Academy (southeast), 450 feet for the athletic fields and 550 feet to the nearest structure; (2) Brazilian Assembly of God Church (southeast), 650 feet; and (3) nearest residences, north of Route 6, 1,250 feet and 1,600 feet respectively. The Cape Cod Times is located 250 feet south of the property line (Exh. CW/NSTAR-1, Att. D at 5-4; EFSB-14).

10 The transformers function as part of the SVC unit (Tr. 1, at 66, 197).

new equipment are as follows: (1) the four shunt reactors each consist of three cylinders, approximately 30 feet high with a radius of approximately ten feet, ten inches; (2) the two harmonic filters each consist of three cylinders, approximately 19 feet high with a radius of four feet, eleven inches, and their connection to other equipment is approximately 23 feet, three inches high; (3) the SVC expansion would be approximately 40 feet long by 78 feet wide and 26 feet, three inches high (id.). The control house would be approximately 50 feet long by 24 feet wide and eleven feet high (Exh. CW/NSTAR-1, at 3).

The entire site, including the expansion area, is previously disturbed, cleared land in an industrially zoned district (Exhs. EFSB-4; EFSB-7; EFSB-1(3)Public). To the west of the expansion area are industrial and commercial uses (Exh. CW/NSTAR-1, at 5). Trees are located along the north and south property lines and these areas would not be affected by the installation of the new equipment (Exh. EFSB-7). The Companies stated that a small area of pine trees in the southwest of the site would be removed but would not affect abutting properties, as the heavily wooded buffering outside the Switching Station would remain (id.).

An NSTAR ROW runs along the east fence line of the Switching Station (Exh. EFSB-3). Prior to the summer of 2014, there was a significant area of woody vegetation on the eastern side of the ROW (Exhs. EFSB-1(3)Public; TOB-2; Tr. 1, at 107, 112). Currently, the buffered area on the majority of the ROW has been removed to facilitate the ongoing construction of Village Green, a residential apartment development that would abut the ROW (Exh. TOB-2; Tr. 1, at 110-113).[11] The developer of Village Green stated that the removal of the woody buffer was entirely under the direction of Village Green, and that the Companies played no part in the removal (Tr. 1, at 119). The developer indicated that the new development would have some landscaped screening, but not to the extent of the previous treed buffer that was removed by the developer (id. at 111-112). The Companies indicated that views from the Village Green development of most of the new

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[11] The Village Green development would be constructed in two phases (Tr. 1, at 106). Phase I, currently under construction, would consist of two residential buildings, 30 units each and a community building (id. at 111, 112). Phase I is anticipated to be completed in the spring of 2015, with occupancy of the first building at the beginning of 2015 (id. at 113). Phase II would also consist of two 30-unit buildings, and construction is scheduled to begin in the fall of 2015 (id.).

equipment associated with the Project Change would be shielded by the existing equipment, with the exception of the expanded SVC located to the south of the existing equipment (Companies Brief at 26).

The Siting Board notes that the Barnstable Switching Station has been situated at its current location for over 40 years. There is significant forested buffer to the north and south of the site, as well as a buffer and industrial uses to the west. The majority of the new equipment would be situated to the west and south of the site. Currently, the closest residences are located approximately 1,250 feet and 1,600 feet to the north, well buffered from the Switching Station.

As noted above, the Village Green residential development would directly abut the Switching Station ROW to the east. Since the developer chose to remove a significant treed buffer on its own property, thus bringing the existing Switching Station into view, it is not reasonable to place the burden of mitigating visual impacts associated with the existing Switching Station on NSTAR. Were the Project Change to impose significant visual impacts on Village Green or others receptors in the area, then mitigation by the Companies could be warranted. However, the majority of the new equipment associated with the Project Change, located to the west of the Switching Station site, would be blocked from view at Village Green (east of the site) by the existing equipment, given both its location and height. Therefore, the new equipment associated with the Project Change would present a minor visual impact on Village Green, and does not require mitigation by the Companies. Accordingly the Siting Board finds that the potential land use and visual impacts of the Project along the primary route, with the Project Change, would be minimized.

2. Noise

a. Introduction

The Companies stated that they would install new equipment that is the quietest available and also replace the existing SVC air-core reactors with low-noise units (Exh. CW/NSTAR-1, Att. D at 5-2 ; Tr. 1, at 42-43). The Companies provided noise measurements and modeling at ten receptors to estimate the noise impacts in A-weighted decibels ("dBA") from the operation of the new equipment, as well as creation of pure tones as defined by the Massachusetts Department of

Environmental Protection ("MassDEP")[12] (Exhs. CW/NSTAR-1, Att. D; EFSB-11; EFSB-12; RR-EFSB-2).[13] The noise modeling was based on the assumption of all four shunt reactors operating, which the Companies stated was a very unlikely event (Exh. EFSB-16; Tr. 1, at 46). Specifically, the Companies explained that the only times all four shunt reactors would be operating is during commissioning, or when the temperature in Nantucket Sound is over 95 degrees Fahrenheit; once the wind farm is commissioned, it would be very unusual for more than two of the shunt reactors to be operating at any given time (Tr. 1, at 46). The Companies indicated that 90 percent of the time, two shunt reactors would be operating, and that ten percent of the time either no reactors or all four would be operating (id. at 50).

In looking at noise issues in past cases, the Siting Board has taken into account both the MassDEP policy of limiting A-weighted dBA increases to 10 dBA over background, and where appropriate, MassDEP's policy concerning pure tone conditions.[14] The Siting Board determines acceptable levels of noise increases on a case-by-case basis and is not required to allow noise increases to the extent allowed by MassDEP's policy. Frequently, the Siting Board has required more stringent noise requirements. In this proceeding, the Siting Board looks at both the dBA increase over ambient and pure tone conditions during operation of the Project that require additional study and mitigation, as described below.

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12 MassDEP states that a pure tone condition exists where any one octave band sound pressure level exceeds the two adjacent frequency bands by three dBA or more. Here, the octave band where pure tones are identified is in the 125 Hertz ("Hz") band (Exh. CW/NSTAR-1, Att. D at 5-2; Tr. 1, at 44).

13 The original noise analysis submitted by the Companies as an attachment to the Petition was based on six receptors. During the course of the proceeding, the Companies updated the noise analysis to include the four Village Green residential 30-unit buildings.

14 We note that historically, the vast majority of Siting Board (as well as Department) cases where noise has been at issue have involved increases in dBA noise levels compared to background and not pure tone conditions.

b. Intervenors

The Town and Dakota did not assert that any of the Companies' noise data was incorrect. Rather, in motions and in their briefs, they asserted that they did not have sufficient time to review some of the data, and moved to strike the data from the record (TOB/BFD Brief at 15; Dakota Motion/Brief at 1). The Town had filed a motion to strike on October 1, 2014, which was denied in a ruling issued on October 28, 2104. Dakota's motion to strike, which supported the Town's motion to strike, also was denied in the October 28, 2014 ruling. In its Motion/Brief, Dakota asserted that the Siting Board should impose adequate noise mitigation measures to protect the rights of Village Green residents to quiet enjoyment and healthful use of their homes (Dakota Motion/Brief at 3).[15]

c. Pure Tones

Based on the Companies' modeling, a potential pure tone condition would exist because sound in the 125 Hz octave band exceeds sound in the adjacent octave bands by more than the MassDEP three-decibel pure tone criterion. The model indicated a likely one or two decibel pure tone exceedance at the residences to the north, and a three-decibel exceedance at Village Green (RR-EFSB-2, Att. 2(2); Tr. 1, at 47). The Companies stated that information was not available from the manufacturer for the adjacent 63 Hz octave band for some of the pieces of equipment, and that the Companies' assumption of zero noise in the 63 Hz octave band is conservative with respect to evaluation of pure tones (Tr. 2, at 263; Exh. CW/NSTAR-1, Att. D at 5-2).[16] Therefore, the Companies asserted when the new equipment is operational there may, in fact, not be any pure tone (Tr. 1, at 44, 45). As modeled, the installation of sound barriers at various locations would eliminate any pure tone condition at any of the ten receptors (RR-EFSB-2).

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[15] As noted above, Dakota subsequently withdrew as a party to the proceeding, and has stated that it supports the relief requested by the Companies in this proceeding (Notice of Withdrawal by Dakota Partners, Inc. at 1 (October 29, 2014)).

[16] The Companies explained that when there is no data available on sound produced by a piece of equipment for a particular octave band, the model uses zero as the value, thereby increasing the likelihood of an assumed pure tone in the adjacent octave band (Tr. 2, at 401).

The Siting Board notes there are significant modeling uncertainties relating to potential pure tone conditions that might result from the Project Change and that attempting to mitigate these impacts now would be premature. The pure tone conditions, as modeled, are based on a one to three dBA increase over the MassDEP limit. The likelihood of such exceedances actually occurring is unclear, given the lack of detailed information about sound generation profiles for certain pieces of equipment involved in the Project Change from their manufacturers. In addition, the pure tone impacts are predominantly associated with the shunt reactors, which have been modeled based on the use of all four reactors being in operation, which is expected to be a very infrequent operating condition. Therefore, the Siting Board finds in this case that noise mitigation based on actual operational measurements, rather than on modeling, is both reasonable and necessary.

The Siting Board will determine the need for the installation of a sound barrier(s), as well as their location and dimension, based on the results of operational noise analyses to be performed by the Companies. Specifically, the Board directs the Companies to conduct operational noise measurements that evaluate potential pure tones under reasonable worst case conditions as soon as practicable after connection of the cables to the Barnstable Switching Station and commencement of operation of the Wind Farm. The Board requires that the following parameters be included in the measurements: (1) noise analysis based on the ambient measurements provided in Exh. CW/NSTAR-1, Attachment D, for all receptors; and, in addition, updated ambients should be measured to reflect the operational noise measurements for receptors R3, R4, R7, R8, R9A, and R10; (2) the noise analysis should include updates to Tables 1-6 of RR-EFSB-2, including nighttime measurements for all receptors; (3) the noise analysis should include an analysis of the mitigation provided by sound barriers or any other proposed mitigation, including a description of the proposed mitigation, locations and dimensions; and (4) the results of the updated noise analysis should be submitted to the Siting Board within 60 days after connection of the cables to the Barnstable Switching Station and commencement of operation of the Wind Farm or, with approval of the Board, such other time as may be necessary to conduct the assessment under reasonable worst case conditions.

d. A-Weighted Sound Levels

With regard to A-weighted sound levels at residential receptors, as shown in Table 1 below, the level at the nearest residence to the north would increase by six dBA; at the Village Green development, the increase at the residential building closest to the new equipment would be twelve dBA (RR-EFSB-2, Table 3).[17] The Companies indicated that the dominant source of noise at the Village Green development (Building A) would be the SVC expansion (RR-EFSB-2, at 2).[18] In order to reduce the noise impacts at Village Green associated with the SVC expansion, the Companies presented possible mitigation that includes several 20-foot high walls; each located approximately seven feet from each of the three SVC expansion sources (id.). This sound wall configuration was modeled to decrease the A-weighted noise impacts from twelve dBA to three dBA at the Village Green building closest to the new equipment (Building A) (id. at Table 5).

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[17] In conducting the noise analysis for the Village Green development after the evidentiary hearings, the Companies created Figure 1 of RR-EFSB-2, which laid out the locations of the four residential buildings and the associated receptor designations. The Companies labeled Buildings C and D as Phase I (on the east side of the development), and Buildings A and B as Phase II (on the west side of the development) (RR-EFSB-2). However, in reviewing the transcript and the site plan for Village Green provided by the Town of Barnstable, dated June 2008, the phasing (not placement) of the four buildings is not conclusive (Exh. TOB-4; Tr. 1, at 110-113).

[18] The Village Green development consists of four 30-unit residential buildings. The southwest building (designated Building A in RR-EFSB-2) is 115 feet from the NSTAR property line and is the closest building to the new SVC equipment; the northwest building (designated Building B in RR-EFSB-2) is 75 feet from the NSTAR property line (see RR-EFSB-2).

Table 1: Predicted Noise Levels

Receptor[19]	Measured Ambient (dBA)	Project Only (dBA)	Project and Ambient (dBA)	Increase (dBA)	Increase with Mitigation (dBA)
Children's Cove Advocacy Center (R1)	41 day/29 night	36	42 day/37 night	1 day/8 night	1 day
Cape Cod Times (R2)	51 day/50 night	44	52 day/51 night	1 day/1 night	1 day
Trinity Christian Academy School (R3)	46 day/39 night	34	46 day/44 night	2 day/5 night	0 day
Brazilian Assembly of God Church (R4)	46 day/39 night	41	47 day/43 night	1 day/4 night	1 day
Northeast Residence (R5)	29 night	27	31 night	2 night	2 night
Northwest Residence (R6)	29 night	33	35 night	6 night	5 night
Village Green – Building A (R10)	39 night	51	51 night	12 night	3 night

Sources: RR-EFSB-2, Table 1, Table 3, and Table 5; Exh. EFSB-11

With regard to the A-weighted noise impacts at the existing receptors (not Village Green), the increase at residential receptors range from two to six dBA, and at the other receptors ranges from one to eight dBA (all measurements at night). At Village Green, the increase at the building closest to the new equipment is twelve dBA, which both exceeds the MassDEP policy and the levels accepted by the Siting Board in past cases. This location is east of the Barnstable Switching Station and is closest to the SVC expansion. Further, the dominant sounds at this location are not associated with the shunt reactors, which have been modeled with all four operating, but from the SVC expansion, which has been modeled under proposed operating conditions. Therefore, prior to commencement of operation of the Wind Farm, the Siting Board directs the Companies to install sound walls, as described above, around each of the SVC expansion sources.

[19] Given that the updated noise analysis conducted by the Companies incorporated the potential shielding of some of the Village Green buildings, as well the possible differing identification of the buildings for Phase I and II, the Siting Board focuses only on Receptor 10 (Building A), the closest residence to the new equipment, as representative of the Village Green development.

e. Conclusion

The Siting Board finds that with the implementation of the condition pertaining to pure tone impacts and the condition pertaining to A-weighted impacts, the noise impacts of the Project along the primary route, with the Project Change, would be minimized.

3. Oil-Filled Equipment

The four shunt reactors would be air-cooled with no oil stored or used as an insulating medium (Exh. EFSB-21; Tr. 1, at 23). The harmonic filter capacitors would require non-PCB dielectric fluid and the SVC would require non-PCB synthetic fluid as an insulating medium (Exh. EFSB-21).[20, 21] For both the harmonic filter capacitors and the SVC, the fluid would be filled and sealed in individual canisters by the manufacturer (id.). The two harmonic filters are each made up of three free-standing capacitor banks; the harmonic filter capacitors consist of 216 individually sealed canisters (108 for each of the harmonic filters), each containing 4.5 gallons of dielectric fluid (id.). The SVC is arranged in two capacitor banks; the capacitors consist of 72 individually sealed canisters, each containing 7.8 gallons of fluid (id.). The Companies stated that the harmonic filters and the SVC would be equipped with alarm systems, and that if any one of the 288 canisters experienced a failure and a release of dielectric fluid, the alarm system would be activated and the appropriate Company's operations center would be automatically notified (Tr. 1, at 33-34).[22, 23]

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20 The Companies explained that under the Massachusetts Contingency Plan ("MCP"), the fluids are rated or categorized as non-hazardous, non-PCB fluids (Tr. 1, at 28). Under the MCP plan, the reportable quantities for these fluids are 25 gallons or more (id. at 55).

21 The Companies stated that aside from the dielectric fluid amounts described above, there would be no additional hazardous material or hazardous waste generated, used or stored on site when the Project is in operation (Exh. EFSB-21).

22 The installation of the proposed new equipment would increase the amount of insulating oil in use at the Switching Station site by approximately 1,534 gallons (Exh. EFSB-21).

23 The Companies stated that the alarms detect imbalance within the capacitor bank (Tr. 1, at 33). If one canister were to fail, it would trigger an alarm (id.). If a second canister were to fail, it typically would trip the capacitor bank, de-energizing the capacitor bank (id.). The

The Companies assert that the physical failure of any individual canister is a very infrequent event and given the design of the system the simultaneous failure of more than one canister is rarer still (RR-EFSB-1; Companies Brief at 13). The Companies stated that the canisters are highly reliable from a physical integrity standpoint and have very low leakage rates (Tr. 1, at 28). Further, the probability of a single event causing the failure of multiple canisters is even more remote; thus, the probability of a release of a significant quantity of dielectric fluid involving multiple canisters is also extremely small (RR-EFSB-1; RR-BFD-1).[24]

The Switching Station is located in a groundwater protection overlay district and a well protection overlay district, approximately 2,500 feet north of two municipal water supply wells, one owned by the Barnstable Fire District and one by the Hyannis Water Department (Exh. TOB-1, at 1).[25] The groundwater level is 50 to 75 feet below the surface (id.; Tr. 1, at 72). The Companies explained, that in their opinion, a release of five to eight gallons of insulating fluid (one canister) would reach a depth of only four feet (significantly less than the 50-70 foot depth of the groundwater) before it would be cleaned up by their hazardous material contractor (RR-BFD-1; Tr. 2, at 241). Specifically, the Companies indicated that, in general, the amount of time between the receipt of a call precipitated by the alarm and an on-site response would be four hours, and the restoration of the site to its preexisting condition would be completed within 24 hours (RR-BFD-1; Tr. 1, at 69, 74). Therefore, the Companies asserted that the spill would not reach or even approach the groundwater; there would be no impact on the groundwater table, and no impact to the water supply wells (Tr. 1, at 74; Companies Brief at 17).

Companies noted that not every electrical failure in a capacitor bank results in a release of dielectric fluid (id.).

[24] On October 16, 2014 the USEPA issued a letter to the U.S. Department of Energy, Loan Programs Office, stating that "Provided that the Barnstable switching station meets all applicable federal, state, and local environmental protection standards (including, but not limited to the SPCC rule, 40 CFR 112), EPA does not believe that the proposed additions will pose a significant threat of ground water contamination which could pose a health hazard" (Exh. EFSB-21 (Supp)).

[25] The Barnstable Switching Station, including the expansion area, is located in the Town of Barnstable wellhead protection overlay district (Exh. EFSB-4; Tr. 1, at 20). However, the new equipment is not located in the groundwater protection overlay district (Tr. 1, at 20).

The Barnstable Switching Station currently has a Spill Prevention, Control and Countermeasure plan ("SPCC") in place, and NSTAR would be updating that plan; Cape Wind, in consultation with NSTAR, would also develop its own SPCC (Tr. 1, at 32, 35). The Companies indicated that, as required under the Massachusetts Contingency Plan, they would notify the Chief Municipal Officer and the Board of Health in the Town of Barnstable in the event of a reportable release of oil and/or hazardous materials (RR-TOB-5).

Based on the determination by the Companies, as discussed above, that the installation of the new equipment would not have a negative impact on the Town of Barnstable groundwater or wells, the Companies stated that a concrete contamination system beneath each capacitor was not warranted (RR-BFD-1; Companies Brief at 16-17). The Companies indicated that the placement of a concrete apron or moat under the capacitor racks would hinder the ability to clean up any spill due to the tight configuration of the capacitor racks (Tr. 1, at 31, 180-182). The Companies originally proposed to use crushed rock, also known as trap rock, as containment around the new equipment (id. at 29).[26] The Companies testified that use of trap rock is the industry standard (id. at 188-190). During the course of the proceeding the Companies proposed a revised containment method consisting of a semi-permeable geo-textile membrane placed above a layer of fine grain compacted material and shaped to form a bowl beneath each capacitor bank (RR-EFSB-1). The bowl area would be filled with a thick layer of well compacted processed gravel topped with a layer of trap rock (id.). The cost of the geo-textile liner system is estimated at $30,000 per capacitor rack for a total of $240,000; the cost of a concrete apron is estimated to be $75,000 per capacitor rack for a total of $600,000 (RR-BFD-1).

The Town and Barnstable Fire District assert that the oil contained in the new equipment to be installed at the Switching Station site would pose a threat to groundwater and, therefore, that the equipment should not be located on the site (TOB/BFD Brief at 1). The Town and Fire District assert in the alternative that, if the new equipment is to be located on the Switching Station site, the Siting Board should require the Companies to provide impervious, concrete containment for the

[26] NSTAR testified that it, as well as its affiliated companies, does not provide containment other than trap rock under capacitors (Tr. 1, at 30).

equipment, rather than the trap-rock and geo-textile membrane containment system that the Companies have proposed (id.).

The Town and Barnstable Fire District assert that, in contrast to the Town's witness, the Companies' witnesses lack the training and experience in geology, hydrology and soil testing to conclude that the new equipment on the site would not pose a significant threat to groundwater (TOB/BFD Brief at 3, 12). The Town and Fire District assert that the Companies' conclusion is not based on groundwater testing or modeling, and was reached without necessary underlying data regarding the properties of the oil contained in the equipment, such as viscosity and solubility, or necessary data regarding the site, such as soil types and the depth to groundwater (id. at 6). For the same reasons, the Town and Fire District take issue with the Companies' position that the enhanced containment system would adequately protect groundwater (id. at 13). The Town and Fire District assert that the Companies should install the same type of concrete containment system that NSTAR installed at its Hyannis Junction Substation in D.P.U. 13-64 (Exh. TOB-1; Tr. 1, at 133; TOB/BFD Brief at 1).[27]

The Siting Board notes that, while the total quantity of non-PCB dielectric oils stored in the proposed new equipment is 1,534 gallons, the oil would be stored in factory-sealed individual containers, ranging between 4.5 and 7.8 gallons each. The record indicates that the probability of leakage of even a single canister is quite low; therefore the simultaneous leakage of multiple canisters is remote. Moreover, the Project Change includes design features intended to mitigate the extent of any environmental impacts should a leak occur. First, the oil-filled equipment is monitored continuously and has alarms that activate in the event of a spill, triggering an immediate response. Second, the Companies initially proposed the use of trap rock, the industry standard. In response to concerns of the Town and the Fire District, the Companies now propose to install a semi-permeable geo-textile membrane beneath each capacitor bank, with fine grain compacted material below and well compacted processed gravel above, which in combination would slow migration of any spilled oil through the soil. Third, the record also demonstrates that, with the

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[27] The Hyannis Junction Substation includes three transformers with 10,000 gallons each of dielectric fluid (30,000 gallons total); and the Substation is located 450 feet from a public well (Companies Brief at 15).

assistance of its remediation and spill response contractors, any potential leak that could occur would be cleaned up within 24 hours. In view of the above factors, the presence of insulating oil in the new equipment is not anticipated to have any significant adverse impacts on the groundwater or wells.[28] The Siting Board therefore directs the Companies to install a geo-textile liner system, as described above, under the six harmonic filter capacitor banks and the two SVC capacitor banks. The Siting Board also directs the Companies to notify the Town of Barnstable and the Barnstable Fire District immediately in the event of a release of fluid with respect to any of the equipment that is the subject of the Project Change.

The Siting Board finds that with the implementation of this condition, the potential water resource impacts of the Project along the primary route, with the Project Change, would be minimized.

4. Air

The Companies explained that upgrades performed as part of the Project would result in ten new circuit breakers with a total sulfur hexafluoride ("SF_6") quantity of 1,138 pounds (Exh. EFSB-20).[29] The equipment would have a guaranteed SF_6 emissions leakage rate of no more than 0.1 percent per year (Exh. EFSB-20; Tr. 1, at 172). The SF_6 equipment would have alarms that would be activated in the event of a leak (Exh. EFSB-20; Tr. 1, at 168). The Companies indicated it would not store any SF_6 on site in conjunction with the Project (Exh. EFSB-20).

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28 The Companies' witnesses were more credible than the Town's witness regarding whether the new Switching Station equipment would have adverse impacts on groundwater. Specifically, the testimony of the Companies' witnesses reflected significant experience with oil-filled electrical equipment, substation design, oil containment systems and spill response.

29 The Massachusetts Clean Energy and Climate Plan for 2020 identifies SF_6 as a non-toxic but highly potent greenhouse gas ("GHG") and estimates one pound to have the same global warming impact as eleven tons of CO_2. See G.L. c. 21N and Massachusetts Clean Energy and Climate Plan for 2020, at 77-78. Reducing SF_6 emissions is an important policy goal of the Clean Energy and Climate Plan. Id. The Siting Board's mandate requires it to ensure the consistency of new energy facilities with the Commonwealth's current health, environmental protection, and resource and development policies. In accordance with this mandate, the Siting Board reviews the Companies' proposed use of SF_6 to ensure reduction of SF_6 emissions to the maximum extent possible.

In terms of SF_6 air impacts, the Companies have proposed installing circuit breakers at the Barnstable Switching Station with a guaranteed SF_6 emissions rate of no more than 0.1 percent per year, along with alarms.[30] The Companies would also comply with USEPA SF_6 reporting requirements (Exh. EFSB-20). In addition, the Siting Board directs the Companies to inform the Board if it adds SF_6 to any of the ten new circuit breakers at the Barnstable Switching Station or replaces any of the ten new circuit breakers at the Switching Station due to SF_6 loss within five years of the completion and initial operation of the Project, after which time the Companies will consult with the Siting Board to determine whether the Siting Board will require continuing reporting. The Siting Board also directs the Companies to submit a copy to the Board of their annual SF_6 report(s) to MassDEP.

With or without the Project Change, diesel construction equipment emits particulate pollution. In cases filed since the Original Proceeding, the Siting Board has typically required retrofitting certain older diesel equipment to reduce particulate emissions. The Siting Board directs the Companies to ensure that all diesel-powered non-road construction equipment with engine horsepower ratings of 50 and above to be used for 30 or more days over the course of the Project Change construction has U.S. Environmental Protection Agency-verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies (to the extent that they are commercially available) installed on the exhaust system side of the diesel combustion engines. Prior to the commencement of construction at the Barnstable Switching Station, the Companies shall submit to the Siting Board certification of compliance with this condition.

The Siting Board finds that with the implementation of these conditions, the air impacts of the Project along the primary route, with the Project Change, would be minimized.

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30 In April 2014, MassDEP promulgated final regulations that require companies to purchase new gas-insulated switchgear with a manufacturer's guaranteed SF_6 emission rate of one percent or less. The new regulations also include requirements for maintenance and handling of SF_6, and require NSTAR to comply with a declining SF_6 emission rate standard by 2020 (see 310 CMR 7.72).

5. Conclusions

a. EFSB 02-2B

Consistent with the Siting Board's directive to the Companies in the Final Decision to inform the Siting Board of any changes to the Project, other than minor variations, the Companies have informed the Siting Board of proposed changes to the Barnstable Switching Station, reflecting interconnection specifications contained in the recently-issued ISO-NE System Impact Study for the Project.

Based on the Companies' initial Project Change Filing, the Siting Board determined that further inquiry regarding the Project Change was warranted, to evaluate the potential land use, visual, noise, water resource, and air impacts that might result from these changes. In Sections 1 through 4 above, the Siting Board has evaluated the proposed changes, and has found that, with implementation of the conditions set forth in these sections, the land use, visual, noise, water resource, and air impacts of the Project along the primary route, with the Project Change, would be minimized.

Accordingly, the Siting Board finds that the Project Change, with implementation of the conditions set forth above, would not alter in any substantive way either the assumptions or conclusions reached in the Siting Board's analysis of the Project's environmental impacts in the Original Proceeding. The Siting Board also finds that the proposed changes would not alter in any substantive way the Board's finding in the Original Proceeding that interconnection of the Project at the Barnstable Switching Station using the primary route is preferable to other interconnection approaches with respect to providing a reliable energy supply for the Commonwealth, with a minimum impact on the environment at the lowest possible cost.

b. EFSB 07-8A

In addition to seeking approval of the proposed changes to the Barnstable Switching Station, the Companies in their Project Change Filing seek "confirmation" from the Siting Board that the changes "fall squarely within" the Certificate for the Project that was issued by the Siting Board in the Certificate Decision.

The Project Change was not part of the Project when the Certificate for the Project was issued; as a result of this Decision, however, the changes are now part of the Project. Based on our

examination of the Project Change and its potential impacts, above, the Siting Board finds that the Project Change would not alter in any substantive way the Board's findings or conclusions in the Certificate Decision. The existing Certificate, and the nine state and local permits granted by the Certificate, therefore apply to the Project as modified in this proceeding.

III. DECISION

The Energy Facilities Siting Board approves the Companies' proposed changes to the Project, consisting of the proposed modifications to the Barnstable Switching Station as presented in the Companies' August 8, 2014 Project Change Filing and in the record of this proceeding. The approval is conditioned on the Companies' compliance, as applicable, with Conditions A through J in the Final Decision; Condition K in the 2008 Project Change Decision; Conditions C.1 through C.7 in the Certificate Decision; and Conditions L through Q, below:

L. The Board directs the Companies to conduct operational noise measurements that evaluate potential pure tones under reasonable worst case conditions as soon as practicable after connection of the cables to the Barnstable Switching Station and commencement of operation of the Wind Farm. The Board requires that the following parameters be included in the measurements: (1) noise analysis based on the ambient measurements provided in Exh. CW/NSTAR-1, Attachment D, for all receptors; and, in addition, updated ambients should be measured to reflect the operational noise measurements for receptors R3, R4, R7, R8, R9A, and R10; (2) the noise analysis should include updates to Tables 1-6 of RR-EFSB-2, including nighttime measurements for all receptors; (3) the noise analysis should include an analysis of the mitigation provided by sound barriers or any other proposed mitigation, including a description of the proposed mitigation, locations and dimensions; and (4) the results of the updated noise analysis should be submitted to the Siting Board within 60 days after connection of the cables to the Barnstable Switching Station and commencement of operation of the Wind Farm or, with approval of the Board, such other time as may be necessary to conduct the assessment under reasonable worst case conditions. The Siting Board will determine the need for installation of a sound barrier(s), as well as their location and dimensions, based on the results of the Companies' noise analysis.

M. The Siting Board directs the Companies prior to commencement of operation of the Wind Farm, to install sound walls, as described above, around each of the SVC expansion sources.

N. The Siting Board directs the Companies to install a geo-textile liner system, as described above, under the six harmonic filter capacitor banks and the two SVC capacitor banks.

O. The Siting Board directs the Companies to notify the Town of Barnstable and the Barnstable Fire District immediately in the event of a release of fluid with respect to any of the equipment that is the subject of the Project Change.

P. The Siting Board directs the Companies to inform the Board if it adds SF_6 to the ten new circuit breakers at its Barnstable Switching Station or replaces any of the ten new circuit breakers at the Switching Station due to SF_6 loss within five years of the completion and initial operation of the Project, after which time the Companies will consult with the Siting Board to determine whether the Siting Board will require continuing reporting. The Siting Board also directs the Companies to submit to the Board a copy of their annual SF_6 report(s) to MassDEP.

Q. The Siting Board directs the Companies to ensure that all diesel-powered non-road construction equipment with engine horsepower ratings of 50 and above to be used for 30 or more days over the course of the Project Change construction has U.S. Environmental Protection Agency-verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies (to the extent that they are commercially available) installed on the exhaust system side of the diesel combustion engines. Prior to the commencement of construction at the Barnstable Switching Station, the Companies shall submit to the Siting Board certification of compliance with this condition.

The Siting Board notes that the findings in this decision are based upon the record in this case. A project proponent has an absolute obligation to construct and operate its facility in conformance with all aspects of its proposal as presented to the Siting Board. Therefore, the Siting Board requires the Companies or their successors in interest, to notify the Siting Board of any changes other than minor variations to the Project as modified in this Decision so that the Siting Board may decide whether to inquire further into a particular issue. The Companies or their successors in interest are obligated to provide the Siting Board with sufficient information on changes to the Project to enable the Siting Board to make these determinations.

M. Kathryn Sedor

M. Kathryn Sedor
Presiding Officer

Dated this November 17, 2014

APPROVED by the Energy Facilities Siting Board at its meeting of November 13, 2014, by the members and designees present and voting. Voting for approval of the Tentative Decision (as amended): Mark Sylvia, Acting Chair, Designee of the Secretary of the Executive Office of Energy and Environmental Affairs; Meg Lusardi, Acting Commissioner, Department of Energy Resources; Ann. G. Berwick, Chair, Department of Public Utilities; Jolette A. Westbrook, Commissioner, Department of Public Utilities; Laurel MacKay, Designee for Commissioner, Department of Environmental Protection; George Durante, Designee for Secretary, Housing and Economic Development; Kevin Galligan, Public Member; Penn Loh, Public Member.

Mark Sylvia, Acting Chair
Energy Facilities Siting Board

Dated this November 17, 2014

Appeal as to matters of law from any final decision, order or ruling of the Siting Board may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the order of the Siting Board be modified or set aside in whole or in part. Such petition for appeal shall be filed with the Siting Board within twenty days after the date of service of the decision, order or ruling of the Siting Board, or within such further time as the Siting Board may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. (Massachusetts General Laws, Chapter 25, Sec. 5; Chapter 164, Sec. 69P).