The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 14-08 April 2, 2015

Petition of NSTAR Electric Company Pursuant to G.L. c. 164, § 72 for Approval to Construct and Operate a New 115-kV Overhead Transmission Line in Barnstable, Yarmouth, and Dennis on an Existing Right-of-Way Between Barnstable Switching Station and Harwich Tap

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APPEARANCE: Catherine Keuthen, Esq.
Cheryl Blaine, Esq.
Keegan Werlin LLP
265 Franklin Street
Boston, MA 02110
FOR: NSTAR Electric Company
Petitioner

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I. INTRODUCTION

A. Description of the Proposed Project

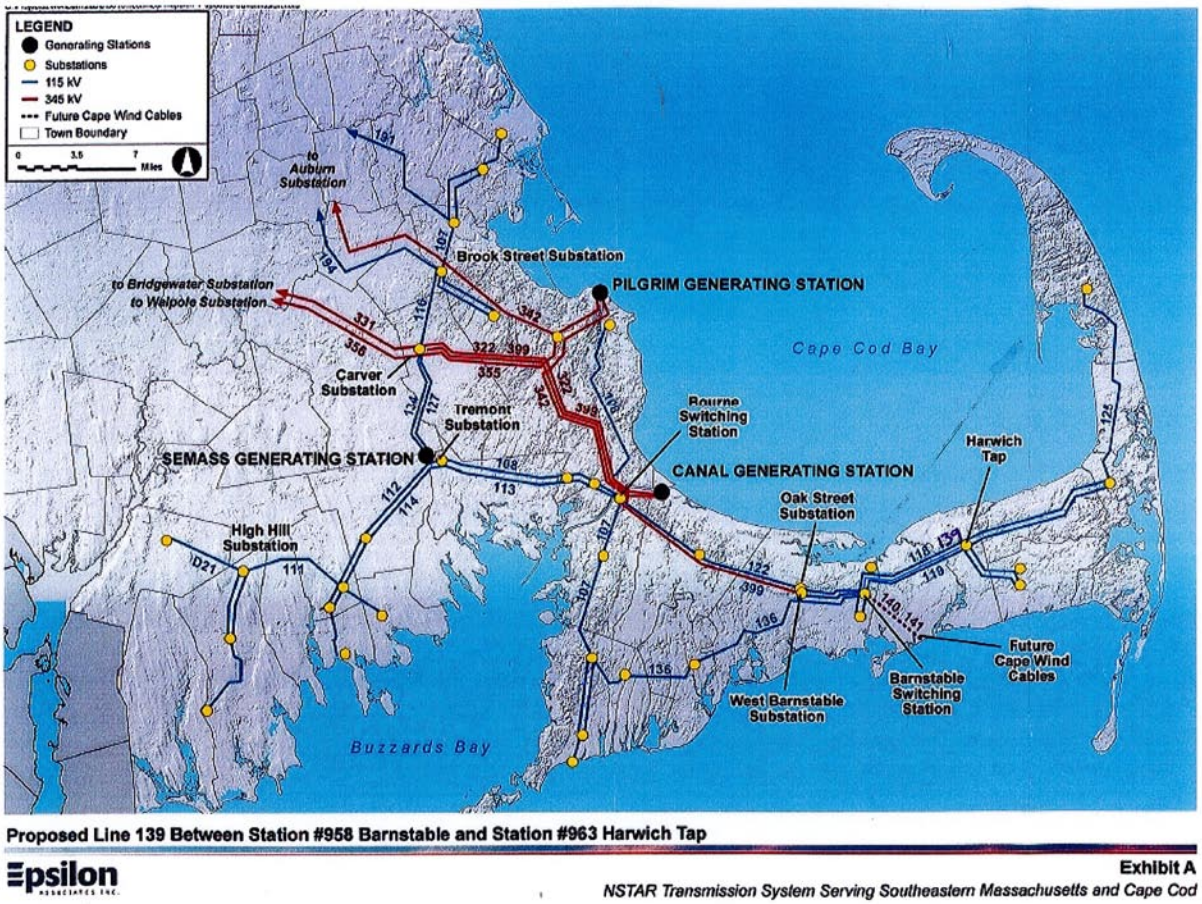
On February 4, 2014, NSTAR Electric Company ("NSTAR" or "Company") filed a petition ("Petition") with the Department of Public Utilities ("Department") pursuant to G.L. c. 164, § 72 seeking approval to construct a new 7.8-mile 115 kV overhead transmission line along an existing NSTAR right-of-way ("ROW") between the Barnstable Switching Station and the Harwich Tap (the "Project"). The Department docketed the filing as D.P.U. 14-08.

The primary transmission system on Cape Cod operates at 115 kV and runs west to east, from the Bourne Substation to the West Barnstable Substation to the Barnstable Switching Station to the Harwich Tap, and then continues eastward to the Orleans and Wellfleet Substations (Exh. NSTAR-1, ¶ 4 and Exhibit A). As shown in Figure 1 below, there are presently two radial 115 kV lines (Lines 118 and 119), each approximately 17.2 miles in length, that originate at the Barnstable Switching Station and terminate at the Orleans Substation (Exh. NSTAR-1, at 2).[1] Lines 118 and 119 are located on separate transmission structures along a one-half mile span from the Barnstable Switching Station to the east; from that point eastward to the Harwich Tap, both lines are supported on the same double circuit

[1] East of the Barnstable Switching Station, Lines 118 and 119 serve a "radial" purpose of supplying power to the Mid/Lower Cape meaning that the transmission system there has no connection to any other supply as compared with the system west of the Barnstable Switching Station where there are multiple connections to other points of supply (Exh. NSTAR-1, at 3; Tr. at 161).

towers ("DCT") (Exh. NSTAR-1, at 2). From the Harwich Tap to the Orleans Substation (a further 9.6 miles), Lines 118 and 119 are again supported on separate structures.

Figure 1: Proposed Line Between Barnstable Station and Harwich Tap



Source: Exh. NSTAR-1, at Exh. A; with additional notation by DPU staff.

The Project involves the construction of a new segment of 115 kV transmission line (to be known as Line 139) that will be supported on approximately 62 new steel monopoles installed over approximately 7.8 miles of the existing ROW in Barnstable, Yarmouth and Dennis (Exh. NSTAR-1, at 5). The Company proposes to leave the existing Lines 118 and

119 in service, which would result in three 115 kV lines supplying power to the area of Cape Cod from Yarmouth to Provincetown, including the Towns of Yarmouth, Dennis, Brewster, Harwich, Chatham, Orleans, Eastham, Wellfleet, Truro, Provincetown and Nantucket (collectively, the "Mid/Lower Cape"). The proposed new Line 139 will connect to the existing section of Line 119 at the Harwich Tap forming Line 139 from the Barnstable Switching Station to the Orleans Substation with a tap to the Harwich Bulk Substation (Exh. NSTAR-1, at 5 and at Exh. C, Line Drawing). Line 119 will only serve Harwich and will no longer serve Orleans, while Line 118 will only serve Orleans.

The Company maintains that the Project is needed in order to address transmission reliability concerns for customer loads east of Barnstable. The Company's conceptual grade cost estimate (-25%/+50%) for the Project is $19.5 million (Exh. NSTAR-1, at 6).[2] The construction is anticipated to take six to nine months, beginning in the first quarter of 2015 (id. at 9).[3]

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[2] The Department encourages NSTAR and other companies in the future to submit cost estimates that incorporate a narrower range than -25 percent to +50 percent. An accurate estimate with a narrower range would provide greater certainty about the true cost of a project.

[3] As part of a geographically related project that will use a 1.9 mile segment of the same NSTAR ROW as the proposed Project, two new 115 kV electric transmission lines associated with the Cape Wind project would run beneath Nantucket Sound and Lewis Bay, and then proceed in a single underground duct bank in Yarmouth and Barnstable to interconnect with the electric grid at the existing Barnstable Switching Station (Exh. DPU-G-17). The 1.9-mile segment of the underground transmission line begins at the Barnstable Switching Station and ends at the intersection of the NSTAR ROW and Willow Avenue in Yarmouth (id.). NSTAR reports that it is currently performing preliminary design and engineering for this separate Cape Wind-related construction, and that the Company does not have an estimate for the timing or duration of this project (id.; Tr. at 144-145).

B. Procedural History

NSTAR filed its Petition with the Department on February 4, 2014. On April 17, 2014 the Department conducted a site visit followed by a duly noticed public hearing at Dennis-Yarmouth Regional High School. No person or entity filed a petition requesting to be a party or a limited participant in the proceeding. The Company sponsored the following witnesses: (1) Kristen Trudell, project manager; (2) Kevin McCune, licensing and permitting project manager; (3) Souren Tourian, senior planning engineer; and (4) Peter A. Valberg, Ph.D., a principal at Gradient.

The Department conducted an evidentiary hearing at its offices in Boston on July 9, 2014. The evidentiary record of the proceeding, in addition to the Company's Petition and accompanying exhibits, includes the Company's responses to 68 information requests and twelve record requests. The Company filed a brief on August 7, 2014.

II. REQUEST FOR AUTHORITY TO CONSTRUCT AND USE TRANSMISSION LINE PURSUANT TO G.L. c. 164, § 72

A. Standard of Review

General Laws c. 164, § 72, requires, in relevant part, that an electric company seeking approval to construct a transmission line must file with the Department a petition for:

> authority to construct and use ... a line for the transmission of electricity for distribution in some definite area or for supplying electricity to itself or to another electric Company or to a municipal lighting plant for distribution and sale ... and shall represent that such line will or does serve the public convenience and is consistent with the public interest .... The [D]epartment, after notice and a public hearing in one or more of the towns affected, may

> determine that said line is necessary for the purpose alleged, and will serve the public convenience and is consistent with the public interest.[4]

The Department, in making a determination under G.L. c. 164, § 72, considers all aspects of the public interest. Boston Edison Company v. Town of Sudbury, 356 Mass. 406, 419 (1969). Among other things, Section 72 permits the Department to prescribe reasonable conditions for the protection of the public safety. Id. at 419-420.

In evaluating petitions filed under G.L. c. 164, § 72, the Department examines: (1) the need for, or public benefits of, the present or proposed use; (2) the environmental impacts or any other impacts of the present or proposed use; and (3) the present or proposed use and any alternatives identified. New England Power Company d/b/a National Grid, D.P.U. 12-02, at 37-38 (2012) ("Westborough"); NSTAR Electric Company/New England Power Company d/b/a National Grid, D.P.U. 11-51, at 6 (2012); Boston Edison Company, D.T.E. 99-57, at 3-4 (1999). The Department then balances the interests of the general public against the local interests and determines whether the line is necessary for the purpose alleged and will serve the public convenience and is consistent with the public interest.

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[4] Pursuant to G.L. c. 164, § 72, the electric company must file with its petition a general description of the transmission line, a map or plan showing its general location, an estimate showing in reasonable detail the cost of the line, and such additional maps and information as the Department requires.

B. Public Convenience and Welfare

1. Need for or Public Benefit of Use

a. Existing Facilities

As discussed above, the primary transmission system on Cape Cod is a 115 kV system that runs west to east, with the system located east of the Barnstable Switching Station categorized as a radial transmission system (Exh. NSTAR-1, at 4). Two radial lines, Lines 118 and 119 originate at the Barnstable Switching Station and terminate at the Orleans Substation and generally supply all load east of Barnstable (id. at 2, 3). Lines 118 and 119 serving the Mid/Lower Cape largely share DCTs, so that a single incident could cause a loss of electric service to the Mid/Lower Cape customers (id. at 11). Lines 118 and 119 also extend from the Harwich Tap in Dennis to the Harwich Bulk Substation, and supply the Harwich Bulk and the Lothrop Avenue Substations, both located in Harwich (id. at 2-3).

b. Load

NSTAR determined the total load supplied by Lines 118 and 119 serving the Mid/Lower Cape by adding the peak loads at the Harwich Bulk, Orleans, and Wellfleet Substations, plus the entire load on Nantucket Island (Exh. NSTAR-1, at 11).[5] Although Nantucket is served by National Grid, NSTAR is required to provide 50 percent of Nantucket's load from Lines 118 and 119 on a firm basis, and possibly the entire load in the event of a

[5] The Nantucket load forecast was provided to NSTAR by National Grid (Exh. NSTAR-1, at 17).

contingency (id. at 14).[6] The average annual load of the Mid/Lower Cape is projected to grow 1.3 percent, net of reductions from forecasted energy efficiency (Exh. DPU-N-3). Lines 118 and 119 serve approximately 84,500 customers, if Nantucket is included (Exh. DPU-N-2; Tr. at 160). Given that the Mid/Lower Cape is a radial system, the Company explained that the number of customers whose service could be interrupted by the simultaneous loss of Lines 118 and 119 is not a function of current or anticipated load levels (Exh. DPU-N-2).

NSTAR stated that the simultaneous loss of Lines 118 and 119, which is considered a single (N-1) contingency,[7] would cause the entire Mid/Lower Cape to be out of service, as well as the Nantucket load served by the Lothrop Avenue Substation (Exh. NSTAR-1, at 16).[8]

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[6] Nantucket is normally supplied by National Grid's Merchant Way Substation in Barnstable and the Lothrop Avenue Substation in Harwich (Exh. DPU-N-4). The Lothrop Avenue Substation is supplied by Line 118, with Line 119 as the alternative supply (id.; Exh. NSTAR-1, at 3). The Merchant's Way Substation is supplied by Line 131 from the Barnstable Switching Station (Exh. NSTAR-1, at 3). In the past two years (with the exception of the Nemo storm in February 2013), Lines 118 and 119 have fully supplied Nantucket twice, once for nine minutes and once for 2.5 hours (id.).

[7] An N-1 contingency is a circumstance in which there is a single unexpected fault or loss of an electrical system element. Along the 7.3 miles where Lines 118 and 119 share DCT structures, a single contingency could cause the simultaneous outage of both lines (Exh. NSTAR-1, at 20).

[8] The Company provided information on the source and duration of six outages on Lines 118 and 119 between the years 2006 to 2013 (Exh. NSTAR-1, at 19; RR-DPU-2). Depending on the type of contingency, the circuit outage duration lasted from momentary to approximately 30 hours (Exh. NSTAR-1, at 19; RR-DPU-2). The customer outage duration ranged from momentary to 31 minutes (RR-DPU-2). The majority of the outages either were directly related to lightning strikes (three), or failure of equipment related to preventing lightning strikes (two) (id.; Tr. at 54-55). Of the six outages, one was associated with the DCT segment of Lines 118/119 and five were associated with either the Line 118 or Line 119 (RR-DPU-2; Tr. at 41-42).

According to the Company, the North American Electric Reliability Corporation ("NERC"), the Northeast Power Coordination Council ("NPCC") and ISO-New England each have transmission planning standards that require a transmission system be studied based on the assumption that losing two circuits located on a single tower (i.e., a double-circuit tower or "DCT")would be a single contingency (id. at 12). However, NERC and NPCC standards and criteria generally exclude the radial parts of the transmission system, and Lines 118 and 119 between Barnstable Substation and Harwich Tap are radial circuits (id[9] The Company has developed its own transmission planning standards, which are described in its planning documents known as SYSPLAN-001 (Transmission System Planning Procedure) and SYSPLAN-010 (Bulk Distribution Substation Assessment Procedure) (id.). According to these Company planning standards, NSTAR has elected to apply the NERC and NPCC transmission planning standards to its radial lines (Exh. NSTAR-1, at 11).

The Company concluded that the construction of the proposed Line 139 would increase reliability and address the loss-of-load impacts associated with the simultaneous loss of Lines 118 and 119, which could affect 84,500 customers and over 200 megawatts ("MW") of related peak load (Exhs. NSTAR-1, at 21; DPU-N-2).[10]

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[9] The Federal Energy Regulatory Commission ("FERC")-approved NERC standard, entitled Transmission System Planning Performance Requirements ("TPL-001-4"), is applicable to the Bulk Electric System ("BES") (RR-DPU-6). The FERC definition of BES provides for the exclusion of radial transmission facilities that only serve load and do not include generation with an aggregate capacity greater than 75 megavolt amperes. (id.). This exclusion applies to Lines 118 and 119 (id.).

[10] NSTAR listed the following benefits of constructing a third 115 kV line between Barnstable Switching Station and Harwich Tap: (1) reduced transmission losses in the lower Cape area; (2) reduced momentary load loss following an outage of Lines 118,

c. Analysis and Findings

The Department notes that Lines 118 and 119 are radial lines and, therefore, are treated as non-BES, non-Bulk Power System ("BPS"), and non-Pool Transmission Facilities ("PTF") not be subject to NERC, NPCC, and ISO-NE standards. NSTAR notes that it does not make a planning distinction between BES/non-BES, BPS/non-BPS, and PTF/non-PTF lines, and therefore, its SYSPLAN applies to both radial and non-radial lines equally.

The Department concurs with the Company, that in this instance, where approximately 84,000 customers might lose service in a single contingency, NSTAR appropriately applied the NERC, NPCC and ISO-NE reliability standards to this radial line.[11] Based on the NSTAR reliability requirements detailed in its SYSPLAN for an N-1 contingency, the configuration of the system as radial, combined with the geographic isolation of the Cape Cod transmission system and the potential for the loss of service for approximately 84,000 customers, the proposed Project would increase reliability of the Mid-Cape system. Accordingly, the

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119 or 139; and (3) an improved voltage profile from Barnstable to Wellfleet due to the load reductions on Lines 118 and 119 (Exh. DPU-A-3; Tr. At 57). In addition, by leaving the two existing lines in service, the Company would avoid a cost of $200,000 to remove one of the existing lines and would also reduce ongoing maintenance costs (id.; Exh. NSTAR-1, at 21).

[11] The Company's SYSPLAN states that "NSTAR does not apply a hard pass/fail criteria (such as the number of customers or MW of load that is not served) to determine the need for new transmission/substation facilities" (RR-DPU-5(1) at 19). The SYSPLAN identifies a number of relevant considerations, such as the length of time needed to restore service permanently or with temporary resources, the amount of load at risk, and the number of customers served in the area. Id. Where a radial line serves a limited number of customers or limited amount of load, use of the NERC/NPCC/ISO-NE reliability planning standards may not necessarily be justified. The Company should make such determinations on a case-by-case basis.

Department finds that there is a need for the Project, and that by meeting this need and providing other electrical system benefits, the construction and operation of the Project would result in public benefits.

2. Alternatives Explored

a. Description

In addition to the proposed Project, NSTAR evaluated the potential to meet the need for additional resources using the following alternatives: (1) utility scale generation; (2) underground installation on the existing ROW; (3) underground installation on other ROWs; (4) overhead transmission route alternatives; and (5) distributed generation ("DG"), energy efficiency ("EE"), and demand response ("DR") (Exh. NSTAR-1, at 25-36).[12]

The Company considered the alternative of a 250 to 300 MW generation facility that could be interconnected at either the 23 kV or 115 kV level at the Harwich Tap area (Exh. NSTAR-1, at 29-30). In order to interconnect such a generator at the 115 kV level, a new 115 kV switching station would need to be built between the Harwich Tap and the Orleans Substation (id. at 30); if interconnecting at the 23 kV level, 23 kV substation buses would need to be expanded at the Harwich Bulk and Orleans Substations, and possibly the Wellfleet Substation (id. at 31). With either interconnection, islanding and frequency deviation, as well as possible trips could occur due to the simultaneous loss of Lines 118 and 119 (id. at 30-31).

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[12] With regard to the option of separating Line 118 and Line 119 without constructing Line 139, the Company stated: (1) that such a project would provide two, rather than three, usable circuits between Barnstable Switching Station and Harwich Tap, providing a lower level of reliability improvement; and (2) that there is no advantage given that construction is essentially the same and the costs are very similar (Exh. DPU-A-3; Tr. at 60-64).

The Company concluded that utility-scale generation is not practical or viable to meet the project need (Company Brief at 18). In addition, the cost of a generation alternative would likely be significantly more than that of the proposed Project (Exh. NSTAR-1, at 31).

The overhead transmission line route alternative would involve construction of a new transmission line along a new corridor between the Barnstable Switching Station and the Harwich Tap (Exh. NSTAR-1, at 35). Construction along a greenfield corridor, versus an existing ROW, would require significant acquisition of land, as well as wetland, habitat, water resource, and land use impacts (id. at 35-36). The Company determined that the overhead transmission alternative was impractical based on land use and environmental factors (id. at 36).

In order to interconnect an underground line alternative, a cable riser would be required at the Harwich Tap, as well as shunt reactors at the Barnstable Switching Station (Exh. NSTAR at 31).[13] The Company stated that excavation for the 7.8 mile 115 kV cable duct bank could affect wetlands, ponds, and areas of protected state-listed rare plants, as well as areas containing archeological resources, which would be avoided by a conventional overhead 115 kV line (id. at 32-33). The Company noted that, in comparison with an overhead line, an underground line can generally withstand very serious storms without damage; however, if there is a fault, repairs typically take longer and are more costly (id. at 33). The cost of an underground line along the ROW would be approximately $40,740,000 (Exh. DPU-A-1).

[13] To facilitate the Cape Wind interconnection at the Barnstable Switching Station, NSTAR and Cape Wind would be constructing four shunt reactors at the Barnstable Switching Station (see Cape Wind Associates, LLC and Commonwealth Electric Company, d/b/a NSTAR Electric, EFSB 02-2B/EFSB 07-8A at 2 (2014)).

The Company also considered constructing the line underground in or along existing public ROWs such as streets or railroad corridors (Exh. NSTAR-1, at 33). Roadway and railroad alternatives included routes that were located either predominantly along local streets or would be located along Route 6, or would travel on a combination of railroad ROW and local streets (id. at 33-34). The Company estimated that the cost of an underground line in a public way would be approximately $58,000,000 (id. at 35). The Company indicated that although further study on a particular route would need to be done to identify specifics, in general, construction would be much more expensive and/or challenging due to traffic impacts and the location of existing utilities than for the proposed Project (id. at 34-35).

The Company acknowledged that the peak load on the Mid/Lower Cape can be reduced by aggressive EE and DG programs (Exh. DPU-N-2). However, the Company explained that since the need being addressed by the proposed Project is the loss of all transmission service to the Mid/Lower Cape Area, DG would not mitigate customer impacts to any meaningful degree (Exh. NSTAR-1, at 27). Specifically, the majority of DG resources in the Mid/Lower Cape area cannot operate during a transmission and distribution outage, as would occur with the loss of the DCT lines (id. at 26). The Company also contended that DG would not avoid the need for the Project because photovoltaic facilities, the most prevalent DG resources on the NSTAR system, are intermittent and non-dispatchable and thus an unreliable means of serving load at a specific time (summer peak load periods, for example) (id. at 27).

The Company explained that EE and DR programs are intended to address system reliability by reducing system load; however, the coincident loss of Lines 118 and 119 would

reduce available capacity to near zero (Exh. NSTAR-1, at 29). The Company concluded that reducing customer loads in the Mid/Lower Cape to near zero with EE or DR, and thereby avoiding the need for the Project, is not possible (id. at 29).

b. Analysis

The evidence described above shows that the utility generation alternative would not provide greater reliability benefits compared to the Project, but would involve construction and the attendant impacts associated with a new generation facility and associated facilities and would be significantly more costly than the Project. Similarly, depending on whether they were constructed overhead or underground, the ROW alternatives would increase environmental impacts, and in the case of underground lines, would cost over twice as much as the proposed Project. However, with regard to reliability, the underground line may be subject to less damage and fewer outages due to storms and lightning, although repair times for faults to underground lines would be longer and more costly. The evidence described above also shows that EE, DR, and DG would not adequately address the need because they cannot remedy the coincident loss of Line 118 and Line 119. Nonetheless, NSTAR should strongly encourage its customers, both existing and new, to take full advantage of its energy efficiency programs.

Accordingly, the Department finds that the Company's decision to pursue the Project rather than the alternatives is reasonable.

3. Impacts of the Proposed Use

a. Land Use Impacts

The Project would be located within an existing ROW containing two 115 kV

transmission lines and two 23 kV distribution lines (Exh. NSTAR-1, at 37). The ROW is located within existing easements and the width varies from a minimum of 150 feet to a maximum of 210 feet (Exh. NSTAR-1, at 6, 37). The Project would not require the expansion of the ROW and would result in minimal impacts on the existing pattern of land use in the Project area (Exh. NSTAR-1, at 35, 37). NSTAR reported the number of residences and businesses within 100 feet of the ROW, provided in Table 1.

Table 1: Residences and Businesses Within 100 Feet of ROW Edge

	Western/Northern Edge[14]			**Eastern/Southern Edge**			**Harwich Tap**	**Total**	
Distance from ROW Edge	Homes	Other	Total	Homes	Other	Total	Homes	Homes	Other
0 – 25 feet	62	1	63	33	0	33	0	95	1
25-50 feet	18	0	18	24	0	24	0	42	0
50-100 feet	33	0	33	46	2	50	1	80	2
Total	**113**	**1**	**114**	**103**	**2**	**107**	**1**	**217**	**3**

Source: Exh. DPU-LU-1

The ROW already has been cleared of trees from edge to edge, and the Project would not significantly impact the existing grasslands and low-growing woody vegetation (Exh. DPU-LU-6). The Project would require minor grading, leveling, and clearing of small shrubs at each structure and conductor pulling location (Exhs. NSTAR-1, at 7; DPU-LU-4).

The Project would not be located within an Area of Critical Environmental Concern ("ACEC"), but would be within Natural Heritage and Endangered Species Program

[14] The western and eastern edges of the ROW refer to the first 0.5 miles of the ROW directly north of Barnstable Switching Station. For the remaining 7.3 miles, the Project travels easterly towards Harwich Tap, and the ROW edges are referred to as the northern and southern edges.

("NHESP")-mapped Priority Habitat (Exh. NSTAR-1, at 45, 48). NSTAR indicated that limited work is proposed in the mapped Priority Habitat and that the Project would avoid state-listed plant and animal species by using best management practices ("BMPs") such as turtle sweeps and contractor training (Exh. NSTAR-1, at 48). On December 17, 2014, NHESP determined that the Project, as proposed, would not result in a "take" of state-listed species (RR-DPU-12 (Supp.)). NHESP ordered qualified staff from the Company to perform turtle sweeps during Project construction occurring between April 15 and October 31, and to submit an NHESP Rare Species Observation Form for observations of state-listed turtles (RR-SPU-12(Supp.)).

The Project would be located near several historic resources found on the State and National Registers and the Inventory of Historic and Archaeological Assets of the Commonwealth (Exh. NSTAR-1, at 46). The Massachusetts Historical Commission ("MHC") approved an "Archaeological Avoidance Plan and Construction Methodology" for the Project on April 15, 2014 (Exh. DPU-LU-13). To minimize impacts to historic resources the plan includes strategies such as site avoidance, fencing, erosion controls, and use of a full-time environmental inspector and project archeologist (Exh. DPU-LU-13).

In response to comments made by abutters at the Department's public hearing, the Company initiated a clean-up of old materials (e.g., old poles, fencing, and trash) from the Project ROW (Exh. DPU-G-4; Tr. at 83).

b. Visual Impacts

As described above, the Project would be located within an existing transmission and distribution line ROW that is cleared to its full width (Exh. NSTAR-1, at 42). The existing

transmission lines (Lines 118 and 119) are located on separate towers for the first 0.5 miles north of the Barnstable Switching Station (Exh. NSTAR-1, at 2). In this first section, the proposed Line 139 would be situated along the easterly edge of the ROW (Exh. NSTAR-1, at 6). For the remaining 7.3 miles to Harwich Tap, Lines 118 and 119 are supported on a DCT on the northern edge of the ROW, the distribution lines are located on the southern edge of the ROW, and Line 139 would be slightly off center between these existing structures (Exh. NSTAR-1, at 2, 6, 20). Line 139 would be placed on 65 to 115-foot tall steel monopoles for the entire length of the Project (Exhs. NSTAR-1, at 5;DPU-V-1).

Twelve of the 61 Project structures would be taller than the adjacent Line 118/119 DCTs (Exh. DPU-V-1). There are five structures proposed with a less than five-foot difference, five with a six-to-eleven foot difference, and two with a 16-foot difference (Exh. DPU-V-1). The difference in adjacent structure height is attributed to vertical clearance requirements, structure configurations, terrain, and span between structures (Exh. DPU-V-1(1)).

The Line 139 structures would be located approximately adjacent to the Line 118/119 DCTs to keep span lengths similar and to minimize the need for additional access (Exhs. DPU-V-2; DPU-V-3). NSTAR stated that there would be no significant change to the views of nearby residents as the new structures would run parallel to the existing transmission lines (Exh. NSTAR-1, at 42).

c. Wetlands and Water Resources

The Project would result in impacts to wetlands in Yarmouth and Dennis associated with temporary access through wetland resources and permanent conversion of forested

wetlands to scrub-shrub wetlands (Exhs. NSTAR-1, at 37-38; DPU-G-1(1), at 6). The Company stated that less than eight percent of the ROW contains wetlands and that only one structure would require temporary access through a Bordering Vegetated Wetland ("BVW") (Exh. NSTAR-1, at 37). The Company stated it would file Notices of Intent with the Conservation Commissions of Yarmouth and Dennis before conducting work in the wetland resource areas (Exh. DPU-G-1(1), at 6).

NSTAR stated that in Yarmouth, proposed Structure 33 would require temporary access through BVW and Structures 20, 24, 40, and 32 would require limited work in riverfront areas and in wetland buffer zones during construction, including site preparation and access, work pad activities, and staging (Exh. NSTAR-1, at 37, 38). On December 19, 2014, the Town of Yarmouth issued an Order of Conditions and ordered NSTAR to follow standard and special conditions, such as to remove all debris from wetland areas and implement and maintain appropriate and adequate erosion control measures (RR-DPU-11 (2nd Supp.)).

The Company stated that it would be converting approximately 0.5 acres of forested wetlands (red maple and birch) to scrub-shrub wetlands and cutting 0.22 acres of upland buffer zone (oak and white pine) near Flax Pond in Dennis (Exh. NSTAR-1, at 38). The Town of Dennis issued an Order of Conditions for tree removal in BVW on September 18, 2014 (RR-DPU-11(supp.)). In addition to standard conditions, the Town of Dennis ordered the Company to use chainsaws and chains to remove trees, prohibited mechanized equipment or swamp mats in BVW, and required all vegetative debris to be removed from any wetland resource areas (id.).

The Company would develop a Stormwater Pollution Prevention Plan to reduce the potential for erosion and sedimentation during work in wetland areas (Exh. DPU-G-1(1), at 1). NSTAR described BMPs that it would implement to minimize impacts to wetland resources including swamp mats (where permitted), trenched siltation fencing and/or straw wattles, and consultation with the U.S. Army Corps of Engineers for tree removal (Exh. NSTAR-1, at 8, 38).

There are no Certified Vernal Pools, significant stream crossings, Great Ponds, or tidally influenced water bodies located on the ROW (Exh. NSTAR-1, at 48, 39). The Project would cross three major water bodies: Muddy Pond and Little Greenough Pond in Yarmouth and Clay Pond in Dennis (Exh. NSTAR-1, at 39).

NSTAR mapped four community wellheads within 300 feet of the ROW (Exh. NSTAR-1, at 40; RR-DPU-9). The Company stated that two of the structures would require construction within the Massachusetts Department of Environmental Protection ("MassDEP") Zone I protective buffer[15] of community wells and the water departments of Barnstable, Yarmouth, and Dennis would be notified before the work was performed (Tr. at 129; RR-DPU-9). The Company stated it would minimize impacts to groundwater and water resources by prohibiting vehicle fueling and equipment maintenance within 100 feet of wetlands, streams, bogs, or ponds and 200 feet of wells (Exh. NSTAR-1, at 41; Tr. at 129; RR-DPU-9). NSTAR further stated that it would make available proper spill containment gear and absorption materials (Exh. NSTAR-1, at 41).

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[15] A Zone I protective radius, as defined by the MassDEP drinking water regulations (310 CMR 22.02), is within 400 feet of a public water supply.

NSTAR has a current Vegetation Management Plan and a Yearly Operational Plan approved by the Massachusetts Department of Agricultural Resources ("DAR") under DAR's ROW regulations, 333 CMR 11.04(4)(c)(2) (Exhs. DPU-LU-7; DPU-W-3). The intent of these regulations and plans is to prevent contamination of water resources and wetlands during vegetation maintenance activities (id.).

d. Traffic

NSTAR stated that there would be six workers required for site preparation, eleven workers for foundation drilling, and 30 workers for steel-pole setting and conductor installation (Exh. DPU-G-11). The personal vehicles of the workers would be located at an off-site yard, which would be selected by the contractor, and six to 15 crew trucks would transport workers to the job site daily (Exh. DPU-T-1). The Company stated that a traffic management plan would not be needed for crew travel (Exh. DPU-T-1).

The Company explained that traffic control may be needed during material delivery, movement of construction equipment, conductor and shield wire stringing, and for installation of structures located near roadways (Exh. DPU-T-1). If necessary, any road closures would be temporary and of a short duration (Exh. DPU-S-2). Traffic control measures, including possible police details, would be coordinated with each town's police department or the Massachusetts Department of Transportation ("MassDOT") (Exh. DPU-T-1). The Company would use public roads and gravel ROW access roads for material delivery and site access (Exhs. NSTAR-1, at 7; DPU-T-2; DPU-T-3).

The Company would provide abutters with door hanger notifications outlining project schedules, staging, equipment delivery, access plans, and NSTAR's contact information

(Exh. DPU-G-3). The notification of this general information would be distributed one to two months prior to construction (Exh. DPU-T-3). The Company would provide further details of construction access plans, communications, and overall schedules to town officials as the Project advances (Exh. DPU-G-5; Tr. 72, 84). The Company stated it would maintain communication with town officials and neighbors throughout the duration of the construction and post-construction phases (Exh. NSTAR-1, at 35, 36).

e. Noise Impacts

The Company stated that noise impacts from the Project would be temporary and construction related (Exh. NSTAR-1, at 42). Construction noise would be generated by worksite preparation, foundation installation, tower construction, wire pulling, and delivery of materials (Exhs. NSTAR-1, at 42; DPU-NO-2). The Company committed to use construction methods that reduce noise, use construction equipment of the latest design, and operate only the necessary equipment to minimize noise generated during the construction process (Exhs. NSTAR-1, at 42; DPU-NO-3).

Sound levels from construction equipment at a reference location of 50 feet could range between 80 A-weighted decibels ("dBA") for a concrete mixer or soil compactor to 98 dBA for a mower (Exh. DPU-NO-2). The Company estimated that the noise level at the nearest abutter to the structure work pad would be 85 dBA during construction (Exh. DPU-NO-2). NSTAR stated that construction noise impacts at any given receptor along the ROW would be limited due to the linear construction schedule (Exh. NSTAR-1, at 42). The Company indicated that helicopter installation might be used for conductor stringing (Exh. DPU-G-15,

Tr. at 91). The Company estimated that noise generated from helicopter use would be 96 dBA at a reference point of 150 feet (Exh. DPU-NO-4).

The Company proposed to perform construction during weekday daylight hours: Monday through Friday, from 7:00 a.m. to 6:00 p.m. (Exh. NSTAR-1, at 42). The Company stated that Saturday or nighttime construction may be necessary for foundation installation, shield wire and conductor pulling, and to meet scheduling demands (Exhs. DPU-NO-4; DPU-T-1; DPU-G-12). The Company explained that it would seek approval and coordinate the scheduling of this work with town officials and MassDOT (Exh. DPU-NO-4).

f. Air Impacts

The Company would mitigate construction air impacts by limiting vehicle idling in accordance with 310 CMR 7.11(1)(b) (Exh. NSTAR-1, at 43). Additionally, the Company would install US Environmental Protection Agency ("EPA")-verified (or equivalent) emission control devices on all diesel-powered non-road construction equipment rated 50 horsepower or above to be used for 30 days or more over the course of the Project (Exh. NSTAR-1, at 44). NSTAR would mitigate impacts of dust and particulate matter by spraying water over dust generated by earthwork and sweeping adjacent road surfaces during the construction period (Exh. NSTAR-1, at 44).

g. Magnetic Fields

The Company provided an assessment prepared by its contractor of potential magnetic field impacts of the Project in combination with existing transmission and distribution lines on the ROW (Exh. K-1 Revised). The Company calculated the average annual magnetic field values for the observed 2013 load (pre-Project) and forecasted 2019 load (post-Project)

conditions on the edges of the ROW and 50 feet beyond the ROW for seven cross sections (Exhs. K revised at 13; DPU-MF-2(1), at 1).

Table 2: Pre-Project and Post-Project Average Annual Magnetic Field Values Across Seven Typical Cross Sections (mG)

	Western/Northern Edge				Eastern/Southern Edge			
	Edge of ROW		50' from edge of ROW		Edge of ROW		50' from edge of ROW	
Segment	Pre-Project	Post-Project	Pre-Project	Post-Project	Pre-Project	Post-Project	Pre-Project	Post-Project
1	10.2	8.0	4.2	3.4	7.5	13.1	3.4	4.6
2	52.6	43.1	15.9	13.7	12.1	15.7	3.7	4.3
3	32.6	27.3	10.6	9.3	11.7	15.3	3.5	4.1
4	32.5	26.9	10.5	9.1	9.8	10.2	3.2	3.2
5	40.0	32.9	12.3	10.6	10.9	11.4	3.7	3.8
6	31.5	26.0	10.2	8.8	7.4	7.3	3.0	3.1
7	38.6	31.4	11.8	10.2	8.5	8.8	3.6	3.8

Source: Exh. K-1 Revised

The modeling provided by the Company showed a decrease in magnetic field levels across all sections on the northern ROW edges (Exh. K-1 revised, at 14). NSTAR stated that by redistributing the electric current from two lines (Lines 118 and 119) to three lines (Lines 118, 119, and 139), magnetic field values on the northern edges would be reduced due to the current being closer to the center of the ROW (Exhs. K-1 Revised, at 5; DPU-MF-4).[16] At

[16] The Company stated that construction of the Cape Wind project would likely not increase magnetic field values along the edge of the ROW since the Cape Wind line would be installed in separate ducts and consists of a shielded cable system (Tr. at 155-156). The dominant source of magnetic fields would be from the overhead transmission and distribution lines (id.).

the nearest residence to the ROW, the post-Project magnetic field level under average annual system load would decrease from 34.4 mG to 28.4 mG (Exh. DPU-MF-1(1)).

The modeling provided by the Company indicated that magnetic field values on the southern edge-of-ROW would increase by a maximum of 5.6 mG under average annual loads across all segments (Exh. K-1 revised, at 16). However, the Company explained that the modeled increases were in part attributable to assumptions regarding distribution rather than the construction of the Project (RR-DPU-1). [17]

h. Analysis and Findings

The land use impacts would be similar to the existing impacts along the ROW, as the Project would occur entirely within an existing transmission and distribution ROW. Tree clearing and leveling and grading of the ROW would follow established BMPs. Construction impacts near cultural and historical resources identified by MHC would be avoided by adhering to the "Archeological Avoidance Plan and Construction Methodology." On

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[17] The Company stated that the modeled increases in magnetic field values on the southern edge of the ROW at Segment 2 and 3 (between Mary Dunn Road and Willow Road) are due to an increased load on the distribution line on the southern edge, Line 92A (Exh. K-1 Revised, at 5; RR-DPU-1). The Company stated that the 2013 load value used for Line 92A in the modeling was lower than normal due to an off-schedule system condition, thus overstating the increase between pre-Project and post-Project conditions (RR-DPU-1). NSTAR further stated that the forecast peak load on Line 92A would be reduced with the installation of a third transformer at the Hyannis Junction Substation and a new distribution line under the Hyannis Airport to the South Yarmouth area in 2015, but that the impact of those projects was not reflected in the forecasted 2019 peak load modeled by the Company (RR-DPU-1; See NSTAR Electric Company, D.P.U. 13-64 (2014)). The Company stated that given these two factors, magnetic field increases presented in Table 2 would be reduced or eliminated (RR-DPU-1).

December 17, 2014, NHESP determined that the Project, as proposed, would not result in a "take" of state-listed species.

Following comments heard at the public hearing, the Company initiated a cleanup to remove old material and debris from the ROW. The Department directs the Company to provide, at the completion of construction, a report with certification that it has completed the clean-up of all debris (e.g., old poles, fencing, and trash) from the ROW (existing before and after Project construction). The report should describe whether the abutters' concerns have been fully addressed.

The visual impacts of the Project would be minimal. The Project would consist of transmission structures of similar height and horizontal span as the existing structures, resulting in only modest visual change for abutters.

The Project would result in alterations and impacts to jurisdictional wetland resources. The Company is obtaining necessary permits and orders for construction activity in those areas. The Company would minimize wetland and water resource impacts by creating a Stormwater Pollution Prevention Plan, establishing BMPs, and adhering to the NSTAR's Vegetation Management Plan and Yearly Operating Plan.

There would be little impact on traffic during the Project, as construction would be within an existing ROW and along existing access routes. If necessary, the Company would create traffic control plans or schedule police detail with town officials and/or MassDOT. The Company would directly notify abutters via door hangers regarding the construction schedule, the hours construction will occur, and contact information for an NSTAR representative.

The Company's plan to coordinate construction access, communications, Project scheduling, additional work hours, and traffic control with town officials would further mitigate construction-related impacts, including traffic and noise, of the Project. Nonetheless, in order to ensure that information about construction and operation of the Project is disseminated more widely within the community, the Department directs the Company, in consultation with the towns, to develop a community outreach plan for Project construction and operation. The outreach plan should, at a minimum, lay out procedures for providing prior notification to affected residents of: (1) the scheduled start, duration, and hours of construction; (2) any construction that must take place outside the hours or days indicated below; (3) any operation the Company intends to conduct that could result in unexpected community impacts due to unusual circumstances; and (4) complaint and response procedures including contact information.

Noise impacts would be temporary and occur only during construction; there would be no permanent increase in noise as a result of the Project. The noise impacts of the Project would be minimized by performing construction work during weekday business hours and implementing construction methods to reduce noise, using equipment of the latest design, working in a linear construction path, imposing idling restrictions, and operating equipment only as needed during construction. The Company has indicated that it may be necessary to work on Saturdays and employ extended work hours in certain instances. The Department notes that there are approximately 213 residences within 100 feet of the edge of the ROW. In contrast to projects where work occurs predominantly in streets, and Saturday construction is

needed to mitigate weekday traffic impacts, such is not the case here. Accordingly, the Department approves construction from 7:00 a.m. to 5:00 p.m. Monday through Friday, excepting public holidays. Should the Company need to extend construction work beyond those days or hours, the Company is directed to seek written permission from the relevant town authorities prior to the commencement of such work and to provide the Department with a copy of such permission. If the Company and town officials are not able to agree on whether such extended construction days or hours should occur, the Company may request prior authorization from the Department.

With respect to air quality impacts, the Company has stated its intention to use a number of measures to reduce both dust and motor vehicle emissions. In this regard, the Department directs the Company to ensure: (1) 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 construction will have US EPA-verified or equivalent emission control devices installed; and (2) that all vehicle idling will be limited, generally to five minutes, in accordance with the Massachusetts anti-idling law and regulations. See NSTAR Electric Company, D.P.U. 13-86, at 38 (2014); NSTAR Electric Company, D.P.U. 13-126/127, at 29 (2014); New England Power Company, D.P.U 10-77, at 37 (2011).

The predicted magnetic field values would decrease along the northern ROW edges and increase along the southern ROW edges. The maximum value on the southern edge of the ROW would increase from 12.1 to 15.7 mG under average system load levels. The maximum magnetic field value at an abutting residence, located six feet northwest from the ROW edge,

would decrease from 34.4 to 28.4 mG under average system load. The Department finds that the Company has minimized magnetic field impacts with construction and operation of the Project by redistributing the current along three lines, placing the Project in the center of the ROW, and completing other Company projects (e.g., a third transformer at Hyannis Junction Substation and a new distribution line in Yarmouth).

It is not clear from the record whether it would be possible to construct both the Project and the Cape Wind-related transmission line at or near the same time, or whether doing so would provide net benefits to the environment, abutters, and the Company. Accordingly, the Department requires the Company to provide a report within 45 days of the issuance of this Decision on the status of the Cape Wind Project. The report should include the Company's planned schedule for both the Project and the Cape Wind-related construction.

The Department concludes that with the Project's compliance with: (1) all applicable federal, state, and local laws and regulations; (2) the avoidance, minimization and mitigation measures that NSTAR has stated it will implement during Project construction; and (3) the Department's conditions as discussed above and set forth below, the impacts of the Project will be minimized.

C. Conclusion on Public Convenience and Public Interest

Based on the foregoing analysis of: (1) the need for or public benefit of the proposed use; (2) alternatives explored; and (3) impacts of the proposed use, the Department finds that that the Project is necessary for the purpose alleged, that the benefits of the Project to the general public exceed the local impacts, and that the Project will serve the public convenience and is consistent with the public interest.

III. SECTION 61 FINDINGS

MEPA provides that "[a]ny determination made by an agency of the Commonwealth shall include a finding describing the environmental impact, if any, of the project and a finding that all feasible measures have been taken to avoid or minimize said impact" ("Section 61 findings"). G.L. c. 30, § 61. Pursuant to 301 C.M.R. § 11.01(3), Section 61 findings are necessary when an EIR is submitted to the Secretary of Energy and Environmental Affairs, and should be based on such EIR. Where an EIR is not required, Section 61 findings are not necessary. 301 C.M.R. § 11.01(3). NSTAR submitted the affidavit of Kevin F. McCune in which he asserts that the Project does not require the filing of an Environmental Notification Form with the Secretary of the Executive Office of Energy and Environmental Affairs (Exh. NSTAR-1, at exh. I). Accordingly, Section 61 findings are not necessary in this case.[18]

IV. ORDER

Accordingly, after due notice, hearing, and consideration, it is hereby

ORDERED: That the petition of NSTAR, seeking approval to construct and operate a transmission line pursuant to G.L. c. 164, § 72, is granted; and it is

FURTHER ORDERED: That the Company provide a report within 45 days of the issuance of this Decision on the status of the Cape Wind Project. The report should include

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[18] The Department notes the requirements set forth in G.L. c. 30A, § 61, effective November 5, 2008, regarding findings related to climate change impacts. Since Section 61 findings are not required in this case, the Project is not subject to the Greenhouse Gas Emissions Policy and Protocol. The Department nonetheless notes that this Project would have low greenhouse gas emissions because it does not itself generate power. As such, the Project would have minimal direct emissions from a stationary source under normal operations and would have minimal indirect emissions from transportation sources limited to construction, occasional repair, or maintenance activities.

the Company's planned schedule for both the Project and the Cape Wind transmission line-related construction, and it is

FURTHER ORDERED: That the Company provide the Department with a copy of NHESP's determination on the impacts of the Project to protected species, when issued; and it is

FURTHER ORDERED: That the Company provide, at the completion of construction, a report with certification that it has completed the clean-up of all debris (e.g., old poles, fencing, and trash) from the ROW (existing before and after Project construction). The report should describe whether the abutters' concerns have been fully addressed; and it is

FURTHER ORDERED: That NSTAR shall limit Project construction to 7:00 a.m. to 5:00 p.m., Monday through Friday, excepting public holidays. Should the Company need to extend construction work beyond these hours or days, the Company is directed to seek written permission from the relevant town authorities prior to the commencement of such work and to provide the Department with a copy of such permission. If the Company and the town officials are not able to agree on whether such extended construction hours should occur, the Company may request prior authorization from the Department; and it is

FURTHER ORDERED: That the Department directs the Company, in consultation with the Towns of Barnstable, Yarmouth, and Dennis, to develop a community outreach plan for Project construction and operation. The outreach plan should, at a minimum, lay out procedures for providing prior notification to affected residents of: (1) the scheduled start, duration, and hours of construction; (2) any construction that must take place outside the hours

or days indicated above; (3) any operation the Company intends to conduct that could result in unexpected community impacts due to unusual circumstances; and (4) complaint and response procedures including contact information; and it is

FURTHER ORDERED: That the Company shall minimize construction noise by using best construction practices (e.g., use of equipment of the latest design); and it is

FURTHER ORDERED: That NSTAR shall ensure that: (1) 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 construction will have USEPA-verified or equivalent emission control devices installed; and (2) that all vehicle idling be limited, generally to five minutes, in accordance with the MassDEP regulations; and it is

FURTHER ORDERED: That NSTAR and its contractors and subcontractors comply with all applicable federal, state and local laws, regulations, and ordinances for which the Company has not received an exemption, including those pertaining to noise, emissions, herbicides, and hazardous materials; and it is

FURTHER ORDERED: That NSTAR obtain all other governmental approvals necessary for the Project; and it is

FURTHER ORDERED: That NSTAR and its successors in interest shall notify the Department of any significant changes in the planned timing, design, or environmental impacts of the Project so that the Department may decide whether to inquire further into a particular issue; and it is

FURTHER ORDERED: That within 90 days of Project completion, NSTAR shall submit a report to the Department documenting compliance with all conditions contained in this Order, noting any outstanding conditions yet to be satisfied and the expected date and status of such resolution; and it is

FURTHER ORDERED: That because the issues addressed in this Order relative to this Project are subject to change over time, construction of the Project must commence within three years of the date of this Order; and it is

FURTHER ORDERED: That the Secretary of the Department transmit a certified copy of this Order to the Towns of Barnstable, Yarmouth, and Dennis Town Clerks, and that NSTAR serve a copy of this Order on the Barnstable, Yarmouth and Dennis Boards of Selectmen; the Barnstable, Yarmouth, and Dennis Departments of Public Works; the Barnstable, Yarmouth, and Dennis Planning Boards; and the Barnstable, Yarmouth, and Dennis Zoning Board of Appeals within five business days of its issuance and certify to the Secretary of the Department within ten business days of its issuance that such service has been accomplished.

By Order of the Department:

Angela M. O'Connor, Chairman

Jolette A. Westbrook, Commissioner

Robert Hayden, Commissioner

An appeal as to matters of law from any final decision, order or ruling of the Commission 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 Commission be modified or set aside in whole or in part. Such petition for appeal shall be filed with the Secretary of the Commission within twenty days after the date of service of the decision, order or ruling of the Commission, or within such further time as the Commission 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. G.L. c. 25, § 5.