The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 15-44/15-45 April 28, 2016

Petition of New England Power Company d/b/a National Grid for Approval to Construct and Operate a 345 kV Overhead Transmission Line on an Existing Right-of-Way in Tewksbury, Andover, and Dracut, Massachusetts, Pursuant to G.L. c. 164, § 72 and for Individual and Comprehensive Zoning Exemptions from the Towns of Tewksbury, Andover, and Dracut, Pursuant to G.L. c. 40A, § 3

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TABLE OF CONTENTS

I. INTRODUCTION

A. Description of Proposed Project

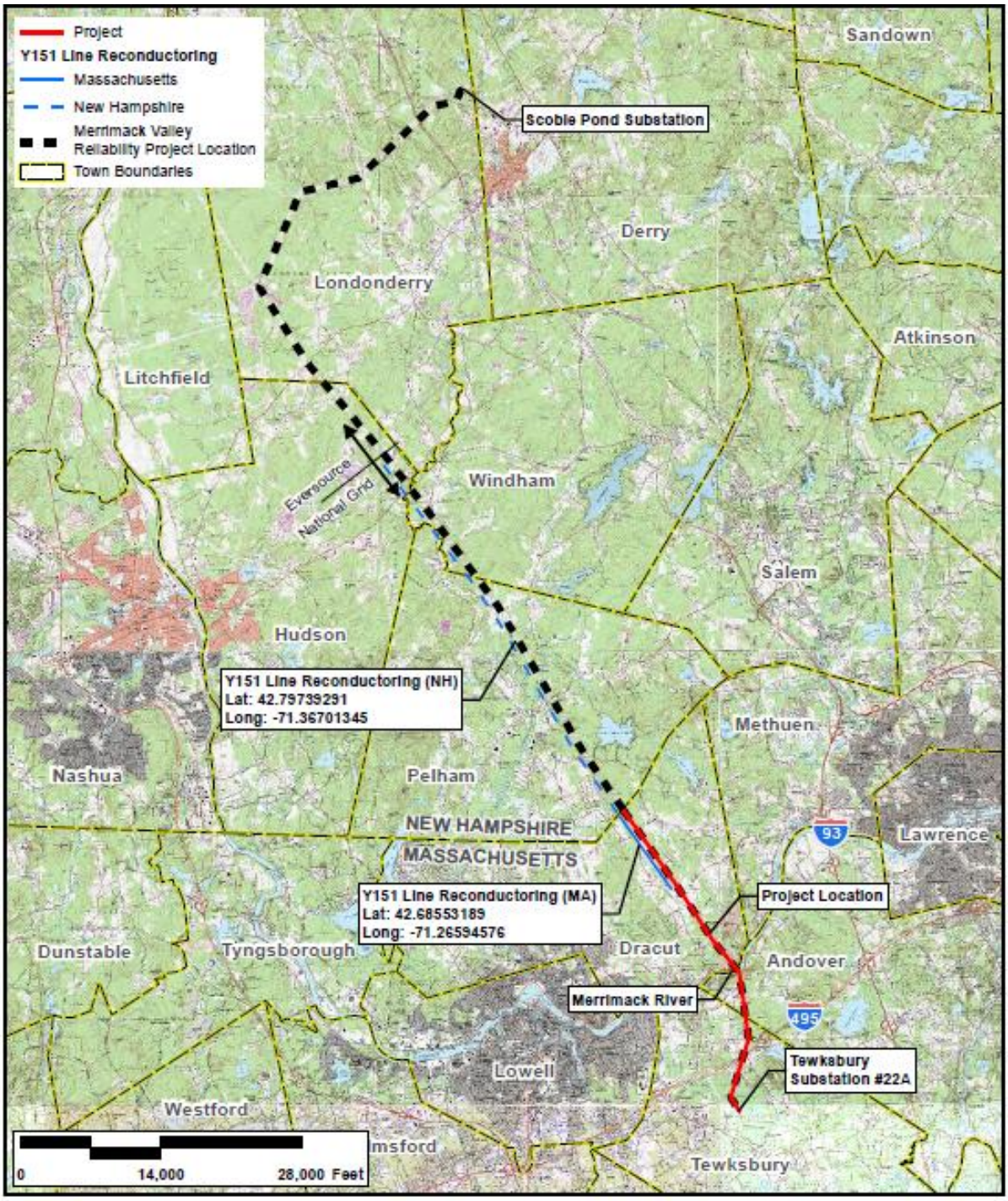
New England Power Company d/b/a National Grid ("National Grid" or the "Company") proposes to construct upgraded transmission facilities in northern Massachusetts and southern New Hampshire as part of the proposed Merrimack Valley Reliability Project ("MVRP") (Exh. NEP-1, at 1-1). National Grid stated that the regional independent system operator ISO New England ("ISO-NE") identified the MVRP as one of approximately 40 individual transmission projects necessary to bring the transmission system in the Greater Boston and surrounding areas into compliance with applicable national and regional reliability standards (id. at 1-10, 2-5). National Grid stated that the MVRP is designed to address reliability needs related to the 115 kilovolt ("kV") and 345 kV ties between Massachusetts and New Hampshire (id. at 1-10).

The Massachusetts transmission line components of the MVRP (the "Project") would include: (1) constructing and operating a new, approximately 6.5-mile long, 345 kV electric transmission line ("3124 Line") along an existing right-of-way ("ROW") from the Company's Tewksbury 22A Substation in Tewksbury to the Massachusetts/New Hampshire border; (2) reconfiguring a number of existing transmission lines within the ROW to accommodate the new 3124 Line; and (3) reconductoring the existing Y-151 115 kV transmission line ("Y-151 Line") with a larger capacity conductor for approximately 1.7 miles within the same ROW between a location just north of Wheeler Road in Dracut ("Dracut Junction") and the Massachusetts/New Hampshire border (Exhs. NEP-1, at 1-1; DPU-G-4).

From the Massachusetts/New Hampshire border, the 3124 Line would continue approximately 17.9 miles to the Scobie Pond Substation in Londonderry, New Hampshire, and the Y-151 Line reconductoring would continue approximately 7.6 miles to a point in Hudson, New Hampshire, where ownership of the transmission line transfers between National Grid and Public Service New Hampshire d/b/a Eversource Energy ("Eversource") (Exhs. NEP-1, at 1-1; DPU-G-4). A map of the MVRP, including both the Massachusetts and New Hampshire components, is provided in Figure 1 below.

The Company estimated that the Project would cost approximately $52.6 million, and that the total cost of the MVRP would be approximately $129.2 million (Exh. DPU-C-1(S1)). The estimated in-service date of the Project is December 2017, with construction expected to begin in the fall of 2016 (Exh. NEP-1, at 1-8 to 1-9).

Figure 1. Map of the Proposed MVRP



Source: Exh. DPU-G-3(1).

B. Procedural History

On April 14, 2015, National Grid submitted a petition for approval of a new 345 kV transmission line pursuant to G.L. c. 164, § 72 and individual and comprehensive zoning exemptions from Tewksbury, Andover and Dracut, pursuant to G.L. c. 40A, § 3 (together, the "Petition"). On June 25, 2015, Department staff conducted a Project site visit followed by a duly noticed public hearing at the Wynn Middle School in Tewksbury. The Department granted the petitions to intervene of ISO-NE and of Steven and Elena Dimitriou, as well as a petition for limited participant status by New Hampshire Transmission LLC. The Department held evidentiary hearings in December 2015, and the Company submitted the only brief in the case on December 23, 2015.

II. REQUEST FOR INDIVIDUAL ZONING EXEMPTIONS PURSUANT TO G.L. C. 40A, § 3

A. Standard of Review

G.L. c. 40A, § 3, provides, in relevant part, that:

> Land or structures used, or to be used by a public service corporation may be exempted in particular respects from the operation of a zoning ordinance or bylaw if, upon petition of the corporation, the [Department] shall, after notice given pursuant to section eleven and public hearing in the town or city, determine the exemptions required and find that the present or proposed use of the land or structure is reasonably necessary for the convenience or welfare of the public.

Thus, a petitioner seeking exemption from a local zoning bylaw under G.L. c. 40A, § 3, must meet three criteria. First, the petitioner must qualify as a public service corporation. NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15-02, at 3 (2015) ("NSTAR Hopkinton"). New England Power Company d/b/a

National Grid, D.P.U. 14-128/14-129, at 3 (2015) ("NEP Cabot Taps"); Save the Bay, Inc. v. Department of Public Utilities, 366 Mass. 667 (1975) ("Save the Bay"). Second, the petitioner must demonstrate that its present or proposed use of the land or structure is reasonably necessary for the convenience or welfare of the public. NSTAR Hopkinton at 3; NEP Cabot Taps at 3; Tennessee Gas Pipeline Company, D.T.E. 01-57, at 4 (2002). Finally, the petitioner must establish that it requires exemption from the zoning ordinance or bylaw. NSTAR Hopkinton at 4; NEP Cabot Taps at 3; Boston Gas Company, D.T.E. 00-24, at 3 (2001).

1. Public Service Corporation

In determining whether a petitioner qualifies as a "public service corporation" ("PSC") for the purposes of G.L. c. 40A, § 3, the Massachusetts Supreme Judicial Court has stated:

> among the pertinent considerations are whether the corporation is organized pursuant to an appropriate franchise from the State to provide for a necessity or convenience to the general public which could not be furnished through the ordinary channels of private business; whether the corporation is subject to the requisite degree of governmental control and regulation; and the nature of the public benefit to be derived from the service provided.

Save the Bay, 366 Mass. at 680. See also NSTAR Hopkinton, at 6-7; NEP Cabot Taps at 4; Berkshire Power Development, Inc., D.P.U. 96-104, at 26-36 (1997) ("Berkshire Power").

The Department interprets this list not as a test, but rather, as guidance to ensure that the intent of G.L. c. 40A, § 3, will be realized; i.e., that a present or proposed use of land or structure that is determined by the Department to be "reasonably necessary for the convenience or welfare of the public" not be foreclosed due to local opposition. Save the Bay 366 Mass. at 685-686; Town of Truro v. Department of Public Utilities, 365 Mass. 407, 410 (1974)

("Town of Truro"); NEP Cabot Taps at 4. The Department has interpreted the "pertinent considerations" as a "flexible set of criteria which allow the Department to respond to changes in the environment in which the industries it regulates operate and still provide for the public welfare." NSTAR Hopkinton at 4-5; NEP Cabot Taps at 4; see also Dispatch Communications of New England d/b/a Nextel Communications, Inc., D.P.U./D.T.E. 95-59-B/95-80/95-112/96-13, at 6 (1998). The Department has determined that it is not necessary for a petitioner to demonstrate the existence of "an appropriate franchise" in order to establish PSC status. NSTAR Hopkinton at 5; NEP Cabot Taps at 4; Berkshire Power at 31.

2. Public Convenience and Welfare

In determining whether the present or proposed use is reasonably necessary for the public convenience or welfare, the Department must balance the interests of the general public against the local interest. Save the Bay, 366 Mass. at 680; Town of Truro, 365 Mass. at 410; NEP Cabot Taps at 5. Specifically, the Department is empowered and required to undertake "a broad and balanced consideration of all aspects of the general public interest and welfare and not merely [make an] examination of the local and individual interests which might be affected." New York Central Railroad v. Department of Public Utilities, 347 Mass. 586, 592 (1964) ("New York Central Railroad"); NEP Cabot Taps at 5.

With respect to the particular site chosen by a petitioner, G.L. c. 40A, § 3, does not require the petitioner to demonstrate that its primary site is the best possible alternative, nor does the statute require the Department to consider and reject every possible alternative site presented. Rather, the availability of alternative sites, the efforts necessary to secure them,

and the relative advantages and disadvantages of those sites are matters of fact bearing solely upon the main issue of whether the primary site is reasonably necessary for the convenience or welfare of the public. Martarano v. Department of Public Utilities, 401 Mass. 257, 265 (1987); New York Central Railroad, 347 Mass. at 591; NEP Cabot Taps at 5.

Therefore, when making a determination as to whether a petitioner's present or proposed use is reasonably necessary for the public convenience or welfare, the Department examines: (1) the present or proposed use and any alternatives or alternative sites identified; (2) the need for, or public benefits of, the present or proposed use; and (3) the environmental impacts or any other impacts of the present or proposed use. The Department then balances the interests of the general public against the local interest, and determines whether the present or proposed use of the land or structures is reasonably necessary for the convenience or welfare of the public. NSTAR Hopkinton at 6; NEP Cabot Taps at 5-6; Tennessee Gas Company, D.T.E. 98-33, at 4-5 (1998).

3. Exemptions Required

In determining whether exemption from a particular provision of a zoning bylaw is "required" for purposes of G.L. c. 40A, § 3, the Department makes a determination whether the exemption is necessary to allow construction or operation of the petitioner's Project. NSTAR Hopkinton at 6; NEP Cabot Taps at 6; Tennessee Gas Company, D.P.U. 92-261, at 20-21 (1993). It is a petitioner's burden to identify the individual zoning provisions applicable to the Project and then to establish on the record that exemption from each of those provisions is required:

> The Company is both in a better position to identify its needs, and has the responsibility to fully plead its own case . . . The Department fully expects that, henceforth, all public service corporations seeking exemptions under c. 40A, § 3 will identify fully and in a timely manner all exemptions that are necessary for the corporation to proceed with its proposed activities, so that the Department is provided ample opportunity to investigate the need for the required exemptions.

New York Cellular Geographic Service Area, Inc., D.P.U. 94-44, at 18 (1995); NSTAR Hopkinton at 6; NEP Cabot Taps at 6.

B. Public Service Corporation Status

National Grid is an electric company as defined by G.L. c. 164, § 1, and, as such, is a public service corporation. NEP Cabot Taps at 6; NEP/Salem Cables, EFSB 13-2/D.P.U. 13-151/13-152, at 93; NEP/Hamden County Reliability Project, EFSB 12-1/D.P.U. 12-46/12-47, at 77 (2014). Accordingly, the Department finds that National Grid qualifies as a public service corporation for the purposes of G.L. c. 40A, § 3.

C. Public Convenience and Welfare

1. Need for or Public Benefit of Use

a. ISO-NE Greater Boston Area Transmission Needs Assessment

In 2008, ISO-NE established the Greater Boston Working Group ("Working Group"), which included members from ISO-NE and local electric utilities, to identify and address performance issues affecting the transmission system serving northern Massachusetts and southern New Hampshire (Exh. NEP-1, at 1-10, 2-1). The Working Group established a study area that included all of the Northeast Massachusetts ("NEMA") load zone, and portions of the New Hampshire, Southeastern Massachusetts ("SEMA") and Western Central Massachusetts ("WCMA") load zones (together, the "Greater Boston Area") (id. at 2-1).

National Grid stated that the Working Group completed its initial assessment of the reliability needs of the Greater Boston Area in July 2009, and that a number of subsequent updates to this assessment were required in order to reflect significant changes on the transmission system (Exh. NEP-1, at 2-1 to 2-2). The most recent needs assessment, the "Greater Boston Updated Transmission Needs Assessment," was issued in January 2015 ("2015 Needs Assessment") (id. at 2-3). According to the Company, this assessment evaluated the reliability performance of the transmission system serving the Greater Boston Area under 2018 and 2023 projected system conditions, and assessed the system for compliance with planning standards and criteria established by the North American Energy Reliability Corporation ("NERC"), the Northeast Power Coordinating Council ("NPCC"), and ISO-NE (id. at 2-5). National Grid stated that this study identified numerous reliability concerns throughout the Greater Boston Area, including a number of thermal and voltage violations following certain N-1 and N-1-1 contingencies (id. at 3-4 to 3-6).[1]

National Grid stated that the 2015 Needs Assessment relied on the summer peak 90/10 load forecast from the 2013 Capacity, Energy, Loads, and Transmission ("CELT") Report, generation and demand response ("DR") resources that had cleared Forward Capacity Auction 7 ("FCA 7"), and energy efficiency ("EE") resources, as forecast in the 2014 CELT Report (id. at 2-7 to 2-8).

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[1] An N-1 contingency is a circumstance in which there is an unexpected fault or loss of a single electric element (including the loss of a double-circuit transmission tower). If after the first contingency has occurred, a second non-related transmission or generation outage follows, the two contingencies together are referred to as an

According to the Company, for each of the two study years (2018 and 2023), the 2015 Needs Assessment evaluated 37 generation dispatch cases, which represented a wide range of possible generation dispatch and availability scenarios, under summer peak load conditions (Exhs. NEP-1, at 2-8; DPU-N-9; Tr. 2, at 194-195). The 37 generation dispatch cases were organized by surrounding interface transfer levels and included base case conditions with: (1) high north-to-south flows (power flowing from Northern New England into Southern New England) along with high Southeastern Massachusetts/Rhode Island ("SEMA/RI") flows (power flowing out of SEMA/RI to the rest of New England); (2) high north-to-south flows with low flows out of SEMA/RI; and (3) low north-to-south flows with high flows out of SEMA/RI (Exh. NEP-1, at 2-8; Tr. 2, at 187-189).[2] Six light load cases – five at minimum load and one at summer off-peak load – were also assessed (Exh. DPU-N-9). Together, these cases were categorized as "Design Cases," where one or two major generating units were assumed to be out of service, or "Retirement Sensitivity Cases," where the retirement of the 1975-vintage Mystic 7 unit, in addition to two major generating units (Mystic 8 and 9), was assumed to be out of service (Exh. NEP-1, at 2-9).

ISO-NE stated that a proposed solution must be developed to address any planning standard or criteria violations identified in the Design Cases, whereas the Retirement Sensitivity Cases were used to assess the robustness of a proposed solution in light of potential future generator retirements (id. at 2-9; Exh. NEP-14, at 31-32).

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[2] According to the Company, transfer levels on the Hydro-Québec Phase II Import interface also ranged across the base cases assessed, and included 0 MW (where no power is imported), 1,400 MW and 2,000 MW import cases (Exh. DPU-N-9).

b. ISO-NE Greater Boston Area Solutions Study

On August 12, 2015, ISO-NE issued the Final Solutions Study for the Greater Boston Area ("Solutions Study"), outlining the recommended transmission investments for addressing the reliability needs identified in the 2015 Need Assessment (Exh. NEP-14). According to the Company, two sets of transmission solutions were assessed by ISO-NE: (1) an "AC Plan," which is a package of alternating current ("AC") transmission projects; and (2) an "HVDC Plan," which is a package of transmission projects that included some but not all of the AC components in the AC Plan and a new high voltage direct current ("HVDC") underwater transmission line between Seabrook, New Hampshire, and Mystic Station in Everett (Exh. NEP-1, at 2-13 to 2-14).[3] ISO-NE's assessment of the AC and HVDC Plans included both cost and non-cost criteria (id. at 2-15 to 2-18).

With regard to the cost of the two plans, the Company stated that the total cost of the AC Plan would be significantly lower than the cost of the HVDC Plan (id. at 2-15). National Grid stated that based on the transmission owners' estimates, the total cost of the AC and HVDC Plans were $739.7 million and $1,025.4 million respectively – a cost differential of $285.7 million (id.).[4] New Hampshire Transmission ("NHT"), the proponent of the HVDC

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[3] The HVDC Plan would obviate the need for the new 3124 Line, as well as other AC Plan components currently before the Energy Facilities Siting Board, including a new transmission line between the Woburn and Mystic Substations (EFSB 15-3/ DPU15-64/15-65) and a new transmission line between the Woburn Substation and Wakefield Junction (EFSB 15-4 / DPU 15-140/15-141) (Exh. NEP-14, at 71-74).

[4] The transmission owners' cost estimates were provided in 2017 dollars, with an accuracy of -25 percent to +50 percent (Exh. NEP-1, at 2-15). ISO-NE engaged Electrical Consultants, Inc. ("ECI") to independently review these cost estimates

Plan, put forward a price-cap proposal that would limit cost recovery for certain components of the HVDC plan, protecting ratepayers from unanticipated cost overruns (id.).[5] According to the Company, ISO-NE concluded that even with the price-cap proposed by NHT, there was no scenario in which it would expect the HVDC Plan to be cost-competitive with the AC Plan (id.).

National Grid stated that, typically, ISO-NE would conclude its comparison of the AC and HVDC plans based on this cost differential alone (Exh. NEP-1, appx. 2-2, at 32; Tr. 2, at 217-218). However, following feedback from various stakeholders, ISO-NE further evaluated the merits of each plan, considering a number of non-cost criteria such as constructability, construction outages, and expected in-service date (Exh. NEP-1, at 2-16 to 2-18 and appx. 2-2, at 32). According to the Company, ISO-NE determined that, for ten of the non-cost criteria, the AC Plan would be superior or comparable to the HVDC Plan, and that for one criterion only (reliability following extreme contingencies), the HVDC Plan would be superior (id. at 2-19).[6] Table 1 below provides ISO-NE's summary of its assessment of

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(id. at 2-3). Based on ECI's estimates, the cost differential between the two plans was $245.2 million (Exh. NEP-1, at 2-15).

[5] NHT is the owner of the Seabrook switchyard and would build the HVDC transmission line proposed between Seabrook and the Mystic Substation in the HVDC Plan (Exh. NEP-1, at 2-2 to 2-3).

[6] Extreme contingencies would include events such as the loss of all of the transmission lines in a common ROW, or the loss of a substation (Exh. NEP-1, at 2-17). National Grid stated that while ISO-NE assessed alternative solutions for extreme contingencies to provide a fuller understanding of system impacts, mitigation is not required by NERC, NPCC, or ISO-NE for overloads modeled as resulting from extreme contingencies (id. at 2-19).

both the cost and non-cost criteria for the AC and HVDC Plans. Based on this assessment, ISO-NE selected the AC Plan package as its preferred solution for the Greater Boston Area (id.; Exh. NEP-14, at 12; Tr. 2, at 215-216).

Table 1. Comparison Matrix of the AC and HVDC Plans as Presented by ISO-NE

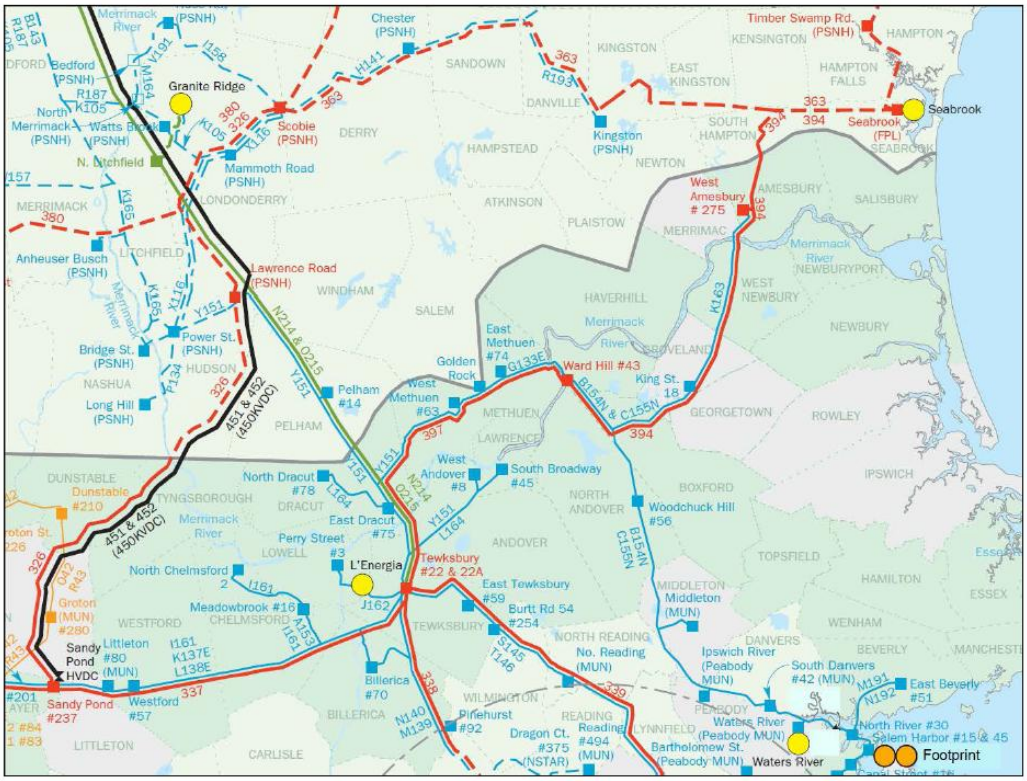
	AC Plan	HVDC Plan
Cost	✓	✗
Constructability	✓	✓
Construction outage / cost impacts	✓	✗
Expected in-service dates	✓	✓
Interface impacts	✓	✗
Losses	✓	✗
Extreme contingency analysis results	✗	✓
Expansion capabilities	✓	✗
Lifetime maintenance requirements	✓	✗
Incremental costs for potential retirements	✓	✗
Siting Issues	✓	✓
Storm Hardening	✓	✓
✓ Is applied to the plan which better achieves the objective		
✗ Is applied to the plan which does not achieve the objective as well as the other plan		

Source: Adapted from Exh. NEP-14, at 13-14.

c. Reliability Needs in the Northern NEMA/Boston and Southern New Hampshire Load Zones

Given the broad geographic area included in the 2015 Needs Assessment and its electrical complexity, the Working Group divided the Greater Boston Area into a number of sub-areas based on the reliability needs identified (Exh. NEP-1, at 2-6). According to the Company, the Working Group identified a number of reliability concerns in northeastern Massachusetts and southern New Hampshire ("Sub-Area A"), distinct from the reliability needs identified elsewhere in the Greater Boston Area (id. at 3-5 and appx. 2-1, at 48; Exh. DPU-N-20). The existing transmission system in Sub-Area A is depicted in Figure 2, below.

Figure 2. Map of the Existing Transmission System in Sub-Area A



Note: National Grid's 345 kV and 115 kV transmission lines are shown as solid red and blue lines, respectively, on this figure. Source: Exh. DPU-G-2.

According to the Company, five 345 kV transmission lines form an electrical loop that connects the NEMA/Boston and New Hampshire load zones, bringing power from northern New England down into the Boston area (Exh. NEP-1, at 3-2; Tr. 2, at 186). These 345 kV lines include:

- the 394 transmission line ("394 Line") between NHT's Seabrook Substation in Seabrook, New Hampshire, and National Grid's Ward Hill Substation in Haverhill, Massachusetts;
- the 397 transmission line between National Grid's Ward Hill Substation and its Tewksbury 22A Substation in Tewksbury, Massachusetts;
- the 337 transmission line between National Grid's Tewksbury 22A Substation and its Sandy Pond Substation in Ayer, Massachusetts;

- the 326 transmission line between National Grid's Sandy Pond Substation and Eversource's Scobie Pond Substation in Londonderry, New Hampshire; and
- the 363 transmission line ("363 Line") between Eversource's Scobie Pond Substation and NHT's Seabrook Substation (Exh. NEP-1, at 3-2).

National Grid identified three additional transmission lines that transfer power between the NEMA/Boston and New Hampshire load zones: (1) the Y-151 Line, which runs from Eversource's Power Street Substation in Hudson, New Hampshire to National Grid's Tewksbury No. 22 Substation in Tewksbury, Massachusetts;[7] (2) the 230 kV N-214 transmission line; and (3) the 230 kV O-215 transmission line (Exh. NEP-1, at 3-3). Both the N-214 and the O-215 transmission lines run from the North Litchfield Switchyard in Litchfield, New Hampshire, to the Tewksbury No. 22 Substation (id.).

As part of the 2015 Needs Assessment, the Working Group assessed the potential impact of N-1 and N-1-1 contingencies on the transmission lines serving Sub-Area A (id. at 3-3 to 3-6). National Grid stated that within Sub-Area A, post-contingency thermal violations were identified in association with the Y-151 Line under all 34 peak-load Design Cases for the year 2023, while post-contingency thermal violations were identified in association with other transmission facilities in Sub-Area A under all but two of the peak-load Design Cases for 2023 (Exhs. DPU-N-9; DPU-N-11). According to the Company, following certain N-1 contingencies, loading on the Y-151 Line would exceed 200 percent of its long-term emergency ("LTE") rating and loading on the 394 Line would exceed 110 percent of its short-term emergency ("STE") rating, both under 2018 and 2023 peak demand conditions

[7] Tewksbury No. 22 Substation and Tewksbury 22A Substation are two different substations located in close proximity to each other in Tewksbury.

(Exhs. NEP-1, at 3-4 and appx. 2-1, at 61; DPU-N-11; Tr. 2, at 205-206). Additional post-contingency thermal overloads were identified on the Sub-Area A 230 kV and 345 kV systems (Exhs. NEP-1, at 3-4; DPU-N-11). Finally, post-contingency high-voltage violations were also identified under five of the six light-load scenarios assessed, and post-contingency low-voltage violations were identified under two of the 2023 Retirement Sensitivity Cases (Exh. DPU-N-9). The Company stated that many of the thermal violations identified would occur at pre-2013 load levels and that, in summary, the existing transmission ties would not provide sufficient capacity to reliably serve northeastern Massachusetts and southern New Hampshire under forecasted 2018 and 2023 summer peak or minimum load conditions (Exhs. NEP-1, at 3-1, 3-5 and appx. 2-1, at 21; DPU-N-15; DPU-N-17). The Company stated that these reliability needs would not be addressed even with the development of other recommended transmission reinforcements elsewhere throughout the Greater Boston Area (Tr. 2, at 198).

d. National Grid's Recommended Solution

National Grid's recommended solution to the post-contingency thermal violations affecting Sub-Area A is construction of the MVRP, as described in Section 1.A above. According to the Company, the new 3214 Line would provide an additional path between southern New Hampshire and Greater Boston, and in combination with the higher capacity of the reconductored Y-151 Line, would relieve the identified thermal overloads in Sub-Area A, as well as post-contingency low-voltage violations identified in the Retirement Sensitivity Cases (Exhs. NEP-1, at 3-1; DPU-N-17; DPU-N-18). National Grid stated that, in contrast,

high voltage issues identified for Sub-Area A would be addressed with a separate project involving the installation of new 345 kV shunt reactors at the Company's Wakefield Junction Substation and Eversource's Woburn Substation, and not with the MVRP (Exh. DPU-N-11; Tr. 2, at 199).

National Grid stated that the MVRP is one of approximately 40 individual transmission projects included in the AC Plan recommended by ISO-NE to bring the transmission system in the Greater Boston Area into compliance with applicable national and regional reliability standards (Exh. NEP-1, at 1-10).

e. Analysis and Findings

In the 2015 Needs Assessment, the Working Group indentified numerous reliability needs within the Greater Boston Area, including deficiencies in Sub-Area A specifically. The MVRP is one element of the recommended solution for addressing these reliability needs. The Working Group's assessment of Sub-Area A demonstrated that the existing transmission system would be insufficient to provide a reliable supply of electricity to northeastern Massachusetts and southern New Hampshire under both existing and forecast summer peak load conditions following certain N-1 and N-1-1 contingencies. Furthermore, the Company presented evidence that, even if proposed transmission system reinforcements elsewhere in the Greater Boston Area were constructed absent the Project, the regional transmission system would still be vulnerable to thermal overloads. National Grid is required to eliminate the potential for these thermal overloads in order to comply with applicable national and regional

reliability standards and provide a reliable supply of electricity to customers in the Greater Boston Area.

On the basis of the immediate and future potential for thermal overloads in Sub-Area A following certain contingencies of concern, the Department finds that there is need for the Project and that, by meeting this need, the construction and operation of the Project would result in public benefits.

2. Alternatives Explored

In assessing alternative solutions to meet the identified need, National Grid considered three approaches: (1) non-transmission alternatives ("NTAs"); (2) overhead transmission alternatives; and (3) underground transmission alternatives (Exh. NEP-1, at 4-2 to 4-30).[8]

a. Non-Transmission Alternatives

National Grid and Eversource ("the Companies") engaged London Economics International ("LEI") to conduct an assessment of the cost and feasibility of using NTAs to address the identified need (Exh. NEP-1, at 4-23). National Grid stated that the Companies provided LEI with information on the most helpful locations for NTA resources, and the amount of NTA resources required to mitigate the potential for post-contingency thermal overloads in Sub-Area A in the event that construction of the new 3124 Line was deferred

[8] National Grid also explored a no-build approach. However, this approach did not address the identified reliability need of Sub-Area A (Exh. NEP-1, at 4-1 to 4-2).

(id. at 4-24 to 4-25).[9] According to the Company, NTA resources were modeled at three different maximum sizes ("P_{max}") per injection point, a P_{max} of 15 megawatts ("MW"), 250 MW, and 750 MW, in order to model different categories of resource types (id. at 4-24). Table 2 below provides a summary of the amount of NTA resources and the number of injection points the Companies identified as required under each of the P_{max} cases.

Table 2. Summary of the Total Amount of NTA Resources and Number of Injection Points Required to Address the Identified Need as Presented by the Company

P_{max} Level	15 MW		250 MW		750 MW	
Contingency Level	**N-1**	**N-1-1**	**N-1**	**N-1-1**	**N-1**	**N-1-1**
Total NTA Resource Needed (MW)	501.9	1,547.7	285.5	1,124.7	329.1	1,114.9
Total Number of Injection Points	34	71	2	12	1	12

Source: Exh. NEP-1, at 4-25.

According to the Company, LEI identified a broad range of potential NTA technologies for consideration including combined-cycle gas turbines, dual-fuel jet engines, utility-scale solar with storage, and EE (Exh. NEP-1, at 4-25). National Grid stated that LEI first considered the minimum and maximum size of each NTA technology to determine whether a particular NTA option could provide the size of injection needed at a specific location (id.). Next, LEI considered whether a specific NTA technology has the operating characteristics necessary to respond to contingency conditions (id. at 4-26).[10] Finally, LEI considered

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[9] National Grid stated that LEI's assessment assumed all other elements of the ISO-NE recommended solution for the Greater Boston Area were completed, including the Y-151 reconductoring (Exh. NEP-1, at 4-24).

[10] The Company stated that in order to respond to an N-1 or N-1-1 contingency, an NTA resource must be able to provide energy within five minutes or 30 minutes, respectively

whether sufficient peak load exists at each location to make load reductions from EE a feasible solution (id.; Exh. DPU-PA-24). The Company stated that LEI established a maximum peak demand reduction of 15 percent over and above EE reductions already embedded in the ISO-NE demand forecast (Exh. NEP-1, at 4-26 and appx. 4-1, at 19).[11]

After identifying technically feasible NTA technologies for each case and location, LEI developed a least-cost set of NTA solutions based on the gross and net levelized cost of entry ("LCOE") for each technology (id. at 4-26).[12] The Company stated that because future market revenues are uncertain, LEI calculated the net LCOE under four scenarios with varying assumptions for revenues from the capacity market and solar renewable energy certificates ("SREC") (id. at 4-27). Based on this assessment, LEI concluded that the direct cost to ratepayers for an NTA solution would range from $100.1 million annually (for a solution consisting of 1,218 MW of new combined-cycle generation, 734 MW of utility-scale solar with storage, and 168 MW of aeroderivative peaking generation) to $637.3 million annually (for a

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(Exh. NEP-1, at 4-26). For both N-1 and N-1-1 contingencies, National Grid stated that an NTA resource must be able to continue to operate for a minimum of twelve hours, which would provide sufficient time for the failed transmission system element to be repaired, or for load levels to drop sufficiently (id.; Exh. DPU-PA-10).

[11] The Companies stated that achieving peak load reductions from EE of 15 percent over and above levels achieved through state-mandated programs is an aggressive goal, which goes well beyond utility geo-targeting experiences to date (Exh. NEP-1, appx. 4-1, at 19).

[12] The Company stated that the gross LCOE is a dollars-per-kilowatt-year ($/kW-year) value that includes all investment and operating costs, and that net LCOE is derived by deducting any potential revenue streams (e.g., energy sales, capacity market revenues, etc.) from the gross LCOE (Exh. NEP-1, at 4-26).

solution consisting of 2,320 MW of aeroderivative peaking generation, 642 MW of dual-fuel jet engine, and 15 MW of EE) (id. at 4-28 to 4-29). LEI stated that the most likely NTA scenario would have a direct cost to ratepayers of $113 million per year (id., appx. 4-1, at 12-13).[13] Accordingly, the Company argued that an NTA solution would be much more costly than the MVRP, for which it estimated an annual cost to ratepayers of approximately $19 million (id. at 4-28 to 4-29).[14] The Company also noted significant barriers to the implementation of NTA solutions of this scale, stating that 13,664 MW of solar PV, for example, would require over 68,000 acres of flat, unencumbered land, which the Company stated was an impractical real-estate scenario in New England (id. at 4-29).[15]

b. Overhead Transmission Alternatives

The Company assessed two overhead transmission alternatives: the MVRP (as described above) and the Seabrook-Ward Hill Alternative. National Grid's evaluation of the

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[13] LEI stated that based on consideration of the likely market revenues achievable over the life of an asset and the practicality of bringing the required NTA technologies to commercial operation under each scenario, a scenario where generators would receive low SREC revenues and capacity payments for half the economic life of the NTA technology was the most likely (Exh. NEP-1, appx. 4-1, at 12).

[14] According to the Company, LEI's assessment did not explicitly model demand response (typically, reductions in demand at manufacturing or processing facilities) as a feasible NTA technology due to limitations on the availability of specific technical and locational information for these resources (Exh. DPU-PA-24; Tr. 2, at 238-240). Based on the technical and operating characteristics of demand response resources, the Company determined that demand response would not be a feasible alternative to the MVRP (Tr. 2, at 241).

[15] In comparison, the entire land area of the City of Boston is approximately 57,260 acres, or 84 percent of the area that would be required to accommodate solar PV development of this scale (Exh. DPU-PA-25).

two overhead transmission alternatives included a comparison of the cost, reliability, and potential for environmental impacts (Exh. NEP-1, at 4-2).

The Seabrook-Ward Hill Alternative would involve the construction of a new, approximately 24.8-mile long, 345 kV transmission line along an existing ROW between the Seabrook Substation in Seabrook, New Hampshire, and the Ward Hill Substation in Haverhill, Massachusetts (id.). Reconfiguration of the existing transmission lines within this ROW, and upgrades at the terminal stations to facilitate the connection of the new line would be required (id. at 4-6; Exhs. DPU-PA-3; DPU-PA-6). Additionally, National Grid stated that in order to fully address the identified reliability need, reconductoring the Y-151 Line with larger capacity conductor would also be necessary (Exh. NEP-1, at 4-2).[16] In total, the Company estimated the cost of the Seabrook-Ward Hill Alternative at approximately $171.9 million (excluding land acquisition costs and the cost of upgrades at the terminal substations), $50 million more than the base estimate cost of the MVRP (id. at 4-6; Exh. DPU-PA-5).[17,18] Accordingly, the

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[16] The Company considered an alternative to reconductoring the Y-151 Line where the transmission line would be opened at the Power Street Substation in Hudson, New Hampshire in order to create a radial connection, rather than a network path (Exh. DPU-PA-1). However, this alternative was found to provide insufficient capacity to meet growing demand in Pelham, New Hampshire, and was eliminated from further consideration (id.; Exh. DPU-G-2).

[17] The Seabrook-Ward Hill Alternative cost estimate was provided in 2017 dollars, with an accuracy of -50 percent to +200 percent, while more refined estimates with an accuracy of -25 percent to +25 percent were provided for the MVRP (Exhs. NEP-1, at 4-6; DPU-C-1(S1)). The Company stated that, notwithstanding the different degrees to which the alternatives had been engineered, the cost estimates for the two alternatives were developed using a consistent methodology in terms of assumptions and underlying unit costs for materials and labor, and thus reflect a fair

Company concluded that the MVRP was the preferred alternative from a cost perspective (Exh. NEP-1, at 4-6).

From a reliability perspective, the Company stated that both the MVRP and the Seabrook-Ward Hill Alternative would address the identified reliability need, but that the Seabrook-Ward Hill Alternative would be more complex to site and construct, and therefore more difficult to implement in a timely manner (id.). National Grid stated that construction of the Seabrook-Ward Hill Alternative would likely require widening of the existing ROW over a substantial distance, resulting in the need to acquire approximately 70 acres of additional ROW (id. at 4-5; Exh. DPU-PA-2; Tr. 2, at 256-257). Additionally, the Company stated that the Seabrook-Ward Hill Alternative would require a significant number and duration of equipment outages during construction, compared to the MVRP, and that temporary bypass structures and/or short underground segments might be required to facilitate ROW reconfigurations, particularly in areas where structures would be rebuilt within the footprint of existing structures, or where ROW expansion would not be possible due to development along the ROW (Exhs. NEP-1, at 4-7; DPU-PA-6; DPU-PA-7; Tr. 2, at 262-263). The cost of

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comparison of the cost of designing, permitting, and building the two alternatives (Exh. DPU-PA-5).

[18] The Company stated that while the Seabrook-Ward Hill Alternative would require construction of a new 345 kV transmission line of similar length to the MVRP, the costs associated with constructing the Seabrook-Ward Hill Alternative would be greater than the MVRP for three main reasons: (1) a greater number of circuit miles being constructed or reconstructed; (2) differences in the type of transmission structures required; and (3) the need for additional environmental protection measures, such as timber matting (Exh. DPU-PA-4; Tr. 2, at 260-262).

constructing a temporary bypass line would further increase the cost differential between the MVRP and the Seabrook-Ward Hill Alternative (Exh. NEP-1, at 4-7). Finally, the Company stated that it may be difficult to schedule the construction outages to the 394 and 363 Lines necessary to facilitate construction of the Seabrook-Ward Hill Alternative (id.). Accordingly, National Grid concluded that the MVRP was the preferred alternative from a reliability perspective (id. at 4-7 to 4-8).

Finally, the Company compared the potential environmental impacts of the MVRP and Seabrook-Ward Hill Alternative, assessing the land use and visual impacts of the two overhead transmission alternatives, as well as the linear footage of wildlife habitat, wetlands, open space and agricultural areas, and Outstanding Resource Waters along the alternative routes (id. at 4-8 to 4-11; Exh. DPU-PA-8). According to the Company, the Seabrook-Ward Hill Alternative would likely have greater land use and visual impacts compared to the MVRP due to the need for approximately 70 acres of additional ROW (Exh. NEP-1, at 4-8). Additionally, the Company stated that because the Seabrook-Ward Hill Alternative crosses a substantially higher number of environmental resource areas compared to the MVRP (e.g., over 27,000 linear feet of open space would be crossed by the Seabrook-Ward Hill Alternative, while less than 15,000 linear feet would be crossed by the MVRP), even if additional ROW was not required for the Seabrook-Ward Hill Alternative, the MVRP would still be superior from an environmental impacts perspective (Exh. DPU-PA-8; Tr. 2, at 258-260). Finally, the Company stated that because reconductoring work on the Y-151 Line would be required regardless of whether the MVRP or the Seabrook-Ward Hill Alternative were selected,

environmental impacts to the existing Scobie Pond to Tewksbury corridor would not be avoided by selecting the Seabrook-Ward Hill Alternative (Exh. NEP-1, at 4-11).

c. Underground Transmission Alternatives

The Company also considered the potential for an underground transmission alternative to meet the identified need. National Grid stated that it indentified an underground route primarily along state highways for the purposes of providing a meaningful comparison between an underground alternative and the MVRP (Exh. NEP-1, at 4-14). According to the Company, the underground transmission alternative would cost approximately $558 million to construct (more than four times the cost of the MVRP), and would face significant operational issues (id. at 4-19 to 4-20). National Grid stated that the underground alternative would be unable to meet the identified need because the underground line would draw in more of the regional power flows, creating post-contingency thermal violations on the new line (id. at 4-16).[19] The Company also identified the potential for longer outage and repair times, and voltage control issues in association with an underground transmission option (id. at 4-19, 4-23).

[19] The Company stated that the underground alternative could potentially address the identified need through the installation of additional transmission equipment, such as series reactors or phase-shifting transformers, as well as other as-yet-unidentified system reinforcements (Exh. NEP-1, at 4-16). However given the already substantial cost differential between the underground alternative and the MVRP, the Company did not conduct additional analysis to determine the cost and scope of these facilities or whether they would be sufficient to overcome the electrical performance issues identified (id.).

With regard to the potential environmental impacts of the underground alternative, the Company asserted that most of the impacts would be to the manmade environment along highways, and would include significant temporary impacts to traffic during conduit and cable installation (id. at 4-21). The Company concluded that environmental considerations are not a compelling advantage or disadvantage for either alternative (id. at 4-23). Overall, the Company stated that significantly lower costs and reliability advantages make the MVRP the superior alternative (id. at 4-23).

d. Analysis and Findings

The evidence described above shows that an NTA would be significantly more costly than the Project, and given the scale of the required resource additions, would likely encounter significant implementation obstacles. The Company showed that an alternative overhead transmission route between the Seabrook and Ward Hill Substations would likely result in greater environmental impacts and would cost at least $49 million more than the Project. Finally, the Company demonstrated that an underground transmission alternative would face significant operational issues and would be more than four times the cost of the MVRP.

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

3. Impacts of Proposed Use

a. Project Design and Construction Methods

The Company described eight unique transmission line configurations, or cross sections, proposed along the 6.5-mile long ROW (Exhs. NEP-1, at 5-2; DPU-V-1). The 3124

Line would be installed on new structures in cross sections 1, 2, and 8; and on existing 345 kV structures in cross sections 3, 4, 5, 6, and 7 (Exhs. NEP-1, at 5-17 to 5-21; DPU-V-1). The reconfiguration of existing transmission lines in the ROW would require a combination of the construction of new structures, relocation of existing circuits to existing structures, and removal of existing structures (Exhs. NEP-1, at 5-17 to 5-21; DPU-CM-3; DPU-CM-5, DPU-CM-7; DPU-V-1). The 3124 Line would be located generally in the center of the ROW in cross sections 3, 4, and 8; and slightly off-centered in cross sections 1, 2, 5, 6, and 7 (Exh. NEP-1, appx. 5-1).

National Grid outlined seven steps of the construction process that would be used for the Project (Exh. NEP-1, at 5-21 to 5-22). The sequential steps are: (1) removal of vegetation and ROW mowing; (2) installation of soil erosion and sediment controls; (3) access improvement and maintenance; (4) installation of foundations and structures; (5) installation of conductor and shield wire; (6) removal of existing transmission line components; and (7) restoration of the ROW (id. at 1-8, 5-21 to 5-22). The Company stated that the most efficient construction technique would be to proceed on a circuit-by-circuit basis rather than by segments (id. at 1-8, 5-22).

b. Land Use

The Project would be constructed within 6.5 miles of existing ROW in Tewksbury, Andover, and Dracut (Exh. NEP-1, at 1-1). Depending on location, the existing ROW consists of up to five existing transmission lines: one 345 kV line, two 230 kV lines, two

115 kV lines; and one distribution circuit ("Existing Lines") (id.).[20] The ROW varies in width between 225 and 520 feet (id. at 5-2).

National Grid characterized the ROW as containing upland and wetlands areas that are currently maintained in accordance with National Grid's Vegetation Management Plan ("VMP") (id.). The Company would not be using herbicides or pesticides during Project construction, but would continue to perform vegetation maintenance consisting of hand and mechanical cutting and selective application of herbicides in accordance with National Grid's VMP once the transmission line is operational (id. at 5-32; Exh. DPU-LU-15).

The land uses immediately adjacent (within 300 feet) of the ROW include forested land, non-forested wetlands, residential, commercial, industrial, transportation, open space, and agriculture (Exh. NEP-1, at 5-30 to 5-31). The Company identified five protected, recreational, or open space parcels and one trail that intersect the ROW (id. at 5-31 to 5-32; Exhs. DPU-LU-5; DPU-LU-12). The Andover Village Improvement Society and the Bay Circuit Alliance are two organizations that represent users of the Bay Circuit Trail, which crosses the existing ROW; these two organizations have requested detailed information regarding construction scheduling and trail closures as construction progresses (Exhs. DPU-G-10, at 4; DPU-LU-5; DPU-LU-13; Tr. 1, at 60-62).

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[20] There are three different distribution circuits along the ROW, but only one at any particular location (Exh. NEP-1, at 1-1, n.3).

National Grid reported that there are 33 residences and three businesses within 100 feet of the ROW (Exhs DPU-LU-1, DPU-LU-9). Table 3 contains the number of residences and businesses located within 100 feet of the ROW.

Table 3. Counts of Residences and Businesses Within 100 Feet of ROW Edges

Relation to the ROW	Type	Between 0- 25 feet	Between 25- 50 feet	Between 50- 100 feet
East	Residences	Tewksbury: 4	Tewksbury: 1 Dracut: 1	Andover: 3 Dracut: 2
	Businesses	Tewksbury: 1	0	0
West	Residences	Andover: 1 Dracut: 1	Tewksbury: 1 Andover: 3 Dracut: 1	Andover: 12 Dracut: 3
	Businesses	Tewksbury: 1	Tewksbury: 1	0
Total		8	8	20

Sources: Exhs. DPU-LU-1; DPU-LU-9.

The Project would not require the expansion of the ROW (Exh. NEP-1, at 5-32).[21] The Company stated that the ROW is cleared nearly to its full width; however, a total of 6.3 acres of tree removal in upland and wetlands areas would be required for the Project (Exhs. NEP-1, at 1-11; DPU-LU-4; DPU-W-4). National Grid stated that grading of the ROW may be required near structure locations to develop upland work pads, and that following construction, the work pad locations would be stabilized and revegetated

[21] The Company reported that it has had conversations with Kinder Morgan (an interstate natural gas transmission pipeline company) regarding Kinder Morgan's proposed Northeast Energy Direct ("NED") project, which indicate the proposed pipeline would be in the vicinity of the Project (Exh. DPU-G-9; Tr. 1, at 40; RR-DPU-9). The Company stated that it is waiting on sufficient updated information from Kinder Morgan regarding the placement of the proposed pipeline along the length of the ROW corridor associated with the Project (RR-DPU-9). The Company further stated it believed that the pipeline would be adjacent to the ROW, but also stated it could be within the bounds, crossing through, or travelling within the ROW (Tr. 1, at 41, 49). The Company noted that to the extent the NED project would require clearing, it could change the visibility of the ROW (id. at 54).

(Exh. NEP-1, at 5-24). The Company reported that excavation would be required to install the foundation of proposed structures and remove the foundations of existing structures (id. at 5-25, 5-27).

The Company provided the proposed locations and dimensions of on-site material and equipment storage (id., appx. 5-3; Exh. DPU-LU-8). National Grid noted that laydown areas would be adjacent to existing access ways and used for temporary storage of materials but not for refueling, parking for construction workers' vehicles, or as marshalling yards (Exh. DPU-LU-8; DPU-LU-16).[22] The Company stated that marshalling yards and employee parking would be located off the ROW (Exhs. DPU-T-3; DPU-LU-16).

The Company provided National Grid's "Access, Maintenance and Construction Best Management Practices" ("Environmental Guidance") that describes construction-related best management practices ("BMPs") for work on electric and natural gas transmission and distribution ROWs (Exh. NEP-1, at 5-23 and appx. 5-5, at 1). The Environmental Guidance contains BMPs to support construction activities, such as vegetation removal and installation of erosion and sedimentation controls, that would be protective of the environment and comply with all applicable environmental laws, regulations, and Company policies and procedures (id.). National Grid asserted it would comply with any Project-specific permit conditions that differed from the Company's Environmental Guidance (Exh. DPU-LU-3).

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[22] Marshalling yards would be located outside the ROW and would be utilized for parking for construction workers' vehicles, bulk delivery of materials, equipment parking and storage, and clerical space for field personnel (Exh. DPU-LU-16).

c. Rare and Endangered Species

The Company consulted with the Massachusetts Natural Heritage and Endangered Species Program ("NHESP") and United States Fish and Wildlife Service ("USFWS") to determine the locations of state and federally listed rare, threatened, or endangered species within the Project area (Exh. NEP-1, at 5-37). National Grid stated that NHESP identified two areas of Priority Habitat and Estimated Habitat along the Project ROW (id.; Exh. DPU-ES-1). One area contains protected habitat for bald eagles and a species of dragonfly and the second area contains protected turtle and salamander habitat (Exhs. NEP-1, at 5-37; DPU-ES-1).

According to National Grid, NHESP determined that the Project could be conditioned to avoid a "take" under the Massachusetts Endangered Species Act ("MESA") through the implementation of a turtle protection plan (Exhs. DPU-LU-4; DPU-LU-11; DPU-ES-2). The Company filed a MESA Project Review Checklist with NHESP on January 14, 2016 (RR-DPU-1). The Company received a determination from NHESP on February 18, 2016, concluding that the Project would not result in a "take" of state-listed species based on the turtle protection and vernal pool measures outlined in the Company's MESA Project Checklist (RR-DPU-1(S)(2)).

National Grid reported that the entire ROW is a potential habitat for the federally protected northern long-eared bat (Exh. DPU-ES-1). The USFWS review and consultation under section 7 of the Endangered Species Act would be coordinated with the United States Army Corps of Engineers ("USACE") concurrent with the section 404 permit under the Clean Water Act (Exhs. DPU-ES-2; DPU-G-7). The Company testified that USACE and USFWS

have concurred on a no-effect determination and that there would be no time-of-year restrictions related to the northern long-eared bat (Tr. 2, at 184).

d. Historic and Archaeological Resources

The Company conducted a review to identify known historic properties listed on Massachusetts Historical Commission's ("MHC") Inventory of the Historic and Archaeological Assets of the Commonwealth ("MHC Inventory") within a study area that extended one quarter-mile from either side of the ROW centerline (Exh. NEP-1, at 5-37). National Grid identified 21 properties on the MHC Inventory that are listed in the National Register of Historic Places (id.). Additionally, the Company indicated there are four pre-contact archaeological sites in the Project ROW (id. at 5-38).

The Company concluded that the Project would be unlikely to cause any new direct or indirect impacts on historic resources, since the ROW is already affected by the existing transmission line infrastructure (id.). National Grid coordinated with USACE and MHC to avoid adverse effects to eligible and potentially eligible historic and archaeological resources (id.; Exh. DPU-HR-1). MHC issued a letter on October 14, 2015 indicating that no further archaeological survey is required and that no historic properties will be affected by the Project (Tr. 1, at 21; RR-DPU-4, at 1-5).

e. Visual

The Company asserted that the Project would not substantially change the visual appearance of the ROW and that the overall visual character of the ROW would remain unaltered (Exh. NEP-1, at 5-38). The Existing Lines range in height from 35 feet to 95 feet

(Exhs. NEP-1, at 1-8; DPU-V-1). The new and reconstructed structures would range in height from 40 feet to 115 feet (Exhs. NEP-1, at 1-8; DPU-V-1). National Grid stated that design objectives of pole placement along the ROW included balancing visual impacts to abutters, blowout criteria, and engineering guidelines (Exh. DPU-G-5, at 2; Tr. 1, at 128-129).[23]

The Project would include approximately 180 new or reconstructed transmission structures (Exhs. NEP-1, at 1-8; DPU-CM-7). The type of new or reconstructed structures would vary between steel H-frame, davit-arm, three-pole, and single-pole structures (Exhs. NEP-1, at 1-8; DPU-V-1). National Grid stated that over 100 existing structures would be removed (Exh. DPU-CM-7, Company Brief at 2). The type of existing structures that would be removed are wood H-frame, steel lattice tower, and wooden delta-davit-arm structures (Exhs. NEP-1, at 5-17 to 5-21; DPU-V-1). The Company explained that the increase in structure height is due to changes in structure type and clearance requirements (Exh. DPU-V-4).

The Company would install approximately 34 temporary guard structures in advance of wire pulling activities (Exh. DPU-CM-6, at 2). The guard structures would be utilized to ensure public safety and uninterrupted operation of other utility equipment by keeping the wire off the traveled way and away from other utility wires (Exh. NEP-1, at 5-26). The guard structures would be 30 to 40 feet above grade and would be in place for two to four weeks (Exh. DPU-CM-6, at 2).

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[23] The Company stated that the design point at which one line would be closest to another would occur under conductor blowout conditions (A wind load of 6 pounds per square foot and no displacement of conductors on the adjacent circuit) (Exhs. DPU-G-5; DPU-G-15).

National Grid provided modeled views at eleven locations that best depicted the visual impacts of the Project (Exhs. NEP-1, at 5-39 and appx. 5-6; DPU-V-3; Tr. 1, at 121). To determine the eleven locations, the Company identified and photographed 87 visually sensitive and significant resources within a one-mile radius of the center line of the ROW in Massachusetts and twelve additional viewpoints that illustrated vegetation removal impacts, Project impacts in residential settings, views from Main Street in Tewskbury, and other easily recognizable locations (Exh. DPU-V-3).

The Company claimed there are no immediate abutters in the vicinity of the most significant area of tree clearing (Exh. NEP-1, at 5-39). However, there are locations along the ROW where vegetation removal may make facilities that are now partially obscured more apparent (id.). National Grid confirmed that the view of some residences may change due to relocation of structures closer to abutting residences (id.). Additionally, the Company determined that although the Project may increase the visible portion of the ROW for some abutters, the Project would not create a new view where one does not presently exist (id.; Exh. DPU-V-2). National Grid concluded that it would be able to minimize the visual impacts by siting the Project in an existing ROW and limiting the amount of clearing (Tr. 1, at 121).

National Grid indicated it would work with abutters on a case-by-case basis to mitigate visual impacts through techniques such as pole relocation, post-construction restoration, or landscape mitigation (Exhs. NEP-1, at 5-40; DPU-V-5). The Company listed communication records for abutters who have contacted National Grid with concerns associated with the impacts of the Project (Exhs. DPU-G-10; DPU-LU-17).

The Department received a comment letter from Michael and Lori Cahill on November 2, 2015, stating their concerns with respect to the placement of poles near their home and a list of their suggested solutions (Exh. DPU-1). National Grid had multiple meetings between Company officials and the Cahills concerning their property at 878 Broadway Street in Dracut, located 10.4 feet from the edge of the ROW and 117 feet from the nearest transmission line structure, to discuss issues such as pole placement, tree removal and trimming, encroachment on the Company's property, electromagnetic fields, and visual mitigation (Exhs. DPU-G-10, at 4; DPU-G-18; Tr. 1, at 26-38 and 62-63; RR-DPU-8).[24] The Company reported National Grid has changed the Y-151 pole structures and trimmed trees near the Cahill property (Exhs. DPU-LU-14; DPU-LU-17; Tr. 1, at 26-33). National Grid asserted that it would continue to work with the Cahills to develop a visual mitigation plan using techniques such as vegetative and non-vegetative screening or grading (Tr. 1, at 37-38; RR-DPU-12; Company Brief at 59).

f. Wetlands and Water Resources

i. Wetlands

The Project would result in unavoidable temporary and permanent impacts to vegetated wetland areas (Exh. NEP-1, at 5-33). The impacts to wetland resource areas would result in 2.3 acres of conversion of forested wetlands to scrub/shrub or emergent wetlands (tree clearing), 11.9 acres of temporary swamp matting, and 0.04 acres of permanent fill (Exh. DPU-W-4). The impacts to wetland areas have been reduced since the initial filing in

[24] The distances were calculating using the nearest face of the Cahill home (RR-DPU-8).

April 2015 through Project redesigns and reengineering (Exhs. DPU-G-6; DPU-W-4; Tr. 1, at 94).

The Company stated that it has minimized impacts to wetland resources by utilizing an existing ROW and avoiding the placement of structures or access ways in wetland resource areas (Exh. NEP-1, at 5-34). The BMPs contained in the Company's Environmental Guidance would be implemented during construction to minimize potential adverse effects to vegetated wetlands and waterbodies (id. at 5-34 and appx. 5-5). National Grid described BMPs for erosion/sedimentation control and tree clearing that included straw bales, siltation fencing, chip bales, allowing decomposition of felled trees, seeding, and planting of native shrub species (id. at 5-23; Exh. DPU-LU-4). The Company would use temporary swamp mats to provide access across wetlands and streams where needed and restore the impacted areas following removal (Exh. NEP-1, at 5-24). During construction of the Project, National Grid would not permit refueling, maintenance, or storage of mobile equipment within 100 feet of any wetland or waterbody (id. at 5-34).

The Company proposed mitigation to compensate for impacts to wetland resources (Exh. DPU-W-5; Tr. 1, at 92-93). National Grid would restore areas of temporary impacts from swamp mats through "in situ restoration," restoring the areas to pre-existing conditions (Exh. DPU-W-5). The Company stated it would provide wetland replication in Tewksbury and Dracut and an in-lieu payment to compensate for permanent wetland impacts (id., Tr. 1, at 92 to 93).

The Project would require permit applications to be filed with USACE, the Massachusetts Department of Environmental Protection ("MassDEP"), and the conservation commission of each town pursuant to regulations of the Clean Water Act and Massachusetts Wetland Protection Act (Exhs. NEP-1, at 5-33; DPU-G-7). The Company stated it has met with these agencies throughout the course of the Project and would continue to work with each agency to develop mitigation for wetland impacts (Exhs. NEP-1, at 5-34; DPU-G-7; Company Brief at 48).

ii. Water Resources

The Project ROW crosses a MassDEP Zone II Wellhead Protection Area in Tewksbury (Exh. NEP-1, at 5-34). The Company stated it would take a number of measures to avoid impacts to groundwater and drinking water supplies (id.). The Company committed that equipment used for the Project would be properly maintained and operated to reduce the chance of spill occurrences, equipment would contain spill containment and prevention devices, and contractors would adhere to BMPs regarding the storage and handling of oil (id. at 5-34 to 5-35; Tr. 1, at 86-87).

The Project would cross the Merrimack River, three perennial streams, and seven intermittent streams (Exh. NEP-1, at 5-35 to 5-36). MassDEP indicated to National Grid that the Merrimack River crossing could be processed as a request for minor modification rather than an amendment to an existing license granted pursuant to G.L. c. 91 (Massachusetts Public Waterfront Act) (Exh. DPU-W-8). National Grid filed a Minor Project Modification Request

with MassDEP on November 6, 2015, and MassDEP approved the Company's request on January 7, 2016 (id.; Exh. DPU-W-8-(1)(S); Tr. 1, at 19)

g. Traffic

The Company stated that intermittent construction-related traffic would occur over the entire construction period (Exh. NEP-1, at 5-40). The Project would result in traffic caused by construction activities on local streets and Interstate-495, and construction equipment entering the ROW (id. at 5-40 to 5-41). National Grid stated that marshalling yards for construction workers would be located off site and construction workers would travel to the ROW by crew trucks to minimize the total number of vehicles entering the ROW (Exh. DPU-T-3).

The Company would mitigate traffic impacts of the Project construction by coordinating with state and local transportation authorities; developing work zone traffic control plans, site-specific traffic plans, and traffic management plans; utilizing police details and flag persons; identifying construction work zones with signage; installing guard structures over roadways; and maintaining communication with municipalities and residents (Exh. NEP-1, at 5-40 to 5-41). National Grid would minimize traffic impacts of material deliveries by developing delivery routes following the shortest accessible roads and scheduling delivery of materials outside of commuting hours (id.; Tr. 1, at 136-137).

The Company stated that it would begin pre-construction communication six to eight weeks prior to construction start and would conduct outreach in the form of mailings and meetings (Exh. DPU-G-8). The purpose of this communication would be to make municipal officials and abutters aware of construction timelines and sequencing (id.).

h. Noise

i. Construction Noise

The Company stated that the Project would be constructed over an approximate 16-month period, beginning in fall of 2016 and finishing at the end of 2017 (Exh. NEP-1, at 1-9, 5-42). National Grid's proposed work schedule is 7:00 a.m. to 7:00 p.m. Monday through Friday and 7:00 a.m. to 5:00 p.m. on Saturdays. (id. at 5-28; Exh. DPU-NO-1). The Company stated that tasks such as concrete pours and construction line stringing must be completed once started, and may go beyond normal work hours (Exhs. NEP-1, at 5-28; DPU-NO-1). National Grid also reported that scheduled line outages dictated by ISO-NE and restrictions on work hours for transportation corridor crossings (e.g., Interstate-495) required by the Massachusetts Department of Transportation ("MassDOT") may require work outside of the proposed work hours (Exhs. NEP-1, at 5-28; DPU-NO-1; DPU-NO-2; Tr. 1, at 138). The Company asserted that it would work closely with each municipality to negotiate mutually agreeable work hours and to obtain any required waivers if Project construction must be conducted outside of the proposed work hours (Exhs. NEP-1, at 5-29; DPU-NO-1).

National Grid modeled maximum sound levels in A-weighted decibels ("dBA") at locations along the ROW for each stage of construction. Table 4 provides the maximum sound level from construction activities at the nearest residential lot line in each town and 50 feet from the construction activity.

Table 4. Maximum Sound Levels (dBA) from Construction Activities to the Nearest Residential Lot Lines and at 50 feet

Construction Activity	Andover	Dracut	Tewksbury	At 50 feet
Vegetation removal and ROW mowing	64	110	87	98
Erosion/sediment control installation; access way improvements and maintenance	76	78	113*	93
Removal and disposal of foundations and structures	77	82	79	93
Installation of foundations and structures	77	86	78	93
Conductor and shield wire installation	72	93	89	90
Restoration of the ROW	110*	102	110*	90

* Construction activity may occur on the lot line at some locations. For these locations, the maximum sound level at a distance of five feet from the lot line was calculated.
Sources: Exhs. DPU-NO-5; DPU-NO-8; DPU-NO-10; RR-DPU-10.

The Company stated that a community outreach representative would be assigned to provide information to abutting property owners and municipal officials about the Project as it progresses along the ROW (Exh. NEP-1, at 5-29). Further, National Grid's website would provide information about the progress of construction, construction work hours, and contact information for Company personnel responsible for noise complaints (id.).

ii. Town Noise Bylaws

(A) Andover

National Grid stated that the town of Andover does not have specific limits on construction work hours or a specific noise ordinance pertaining to construction noise, but determines work hours on a case-by-case basis (Exhs. NEP-1, at 5-28; DPU-NO-3).

(B) Tewksbury

The Company described three separate bylaws in Tewksbury that govern noise associated with the Project: chapter 11.04 of Tewksbury's General Bylaw ("Right-of-Way Bylaw"), chapter 8.12 of Tewksbury's General Bylaw ("Noise Bylaw"), and Section 5340 of Tewksbury's Environmental Performance Standards ("Section 5340") (Exhs. DPU-NO-4; DPU-NO-9; Company Brief at 63-64).

The Right-of-Way Bylaw defines public rights-of-way as a public way in which the Town has an interest in law or equity (Exh. DPU-NO-9, at 1). The Company asserted that the Right-of-Way Bylaw does not apply to transmission rights-of-way because they are not public rights-of-way, but would apply to public ways (i.e., streets) in Tewksbury that the Project would cross (Exh. DPU-NO-9, at 1; Tr. 2, at 295). The Right-of-Way Bylaw establishes that "noise of sufficient volume to disturb sleep" cannot occur between 4:30 p.m. and 7:30 a.m., but does not state specific noise levels (Exh. DPU-NO-9, at 1).

The Noise Bylaw sets exterior noise standards in two different land use categories (Exhs. DPU-NO-4, at 1; DPU-NO-9, at 2). The Company concluded the Project would be treated as being within "Land Use Area I" (Exhs. DPU-NO-4, at 1; DPU-NO-9, at 2; Tr. 2, at 297). The Noise Bylaw limits noise levels in Land Use Area 1 to 60 dBA from 7:00 a.m. to 10:00 p.m. and 50 dBA from 10:00 p.m. to 7:00 a.m. (Exhs. DPU-NO-4, at 1; DPU-NO-9, at 2). National Grid asserted that Section 8.12.060 of the Noise Bylaw exempts construction noise from noise restrictions between the hours of 7:00 a.m. and 7:00 p.m., and therefore the

daytime noise limitation of 60 dBA in the Noise Bylaw would not apply to construction of the Project (Exhs. DPU-NO-4, at 2; DPU-NO-9, at 2; Tr. 2, at 297-298).

National Grid noted that the noise standard contained in Section 5340 applies to construction equipment that may be fitted with mufflers or other sound-dampening equipment (Exhs. DPU-NO-4, at 2; DPU-NO-9, at 3; Company Brief at 66). The Company asserted that it would comply with Section 5340 by ensuring that there is no excessive noise and no unnecessary emissions by requiring: (1) well-maintained equipment with functioning mufflers; (2) strict compliance with MassDEP's Anti-Equipment Idling regulations; and (3) all its construction contractors to be trained in the Company's requirements with respect to well-maintained equipment, anti-idling, and other relevant policies (Exhs. DPU-NO-4, at 2; DPU-NO-9, at 3; Company Brief at 66).

The Company provided an official letter from Steven Sadwick, Director of Community Development, clarifying how Tewksbury's noise regulations would apply to the construction activities proposed in connection with the Project (Exh. DPU-NO-9(1)). Mr. Sadwick represented that the "daytime noise limitation of 60 dBA contained in the Noise Bylaw would not apply to the Project's daytime construction activities" (Exh. DPU-NO-9(1), at 2). Furthermore, Mr. Sadwick confirmed that the Company would be in compliance with the Rights-of-Way Bylaw because it would be "exempt or otherwise comply" with the Noise Bylaw and Section 5340, as Section 8.12.060 would supersede any other noise-related provisions in Tewksbury's Bylaw (id.; Tr. 2, at 297-298).

Mr. Sadwick requested that "the Company provide written notice to the Town Manager to the extent it will perform construction work outside of the hours of 7:00 a.m. and 7:00 p.m. weekdays and Saturdays or will otherwise be unable to comply with any of the foregoing noise regulations" (Exh. DPU-NO-9(1), at 3). The Company affirmed it would comply to the extent possible with the Tewksbury noise regulations, as interpreted and applied by Tewksbury (Company Brief at 66). Further, the Company stated it would work with Tewksbury to negotiate mutually agreeable work hours and obtain any required waivers from Tewksbury (Exh. NEP-1, at 5-29).

(C) Dracut

National Grid stated that noise regulations for the town of Dracut are contained in section 13 of the Town of Dracut Bylaws ("Section 13") (Exhs. DPU-NO-5; DPU-NO-11). Section 13 limits noise levels to 50 or 60 dBA at adjacent or nearby residential and /or institutional lot lines, depending on time and day; 65 dbA at the lot line of an adjacent business use; and 70 dBA at the lot line of an adjacent industrial use (Exhs. NEP-1, at 5-28; DPU-NO-5(1)). Section 13 exempts temporary construction activities occurring between 7:00 a.m. to 6:00 p.m. on weekdays from noise regulations, and therefore the Company concluded that the Project would not be subject to noise regulations between those hours (Exhs. NEP-1, at 5-28; DPU-NO-11). The Company confirmed that it would be subject to Section 13 noise regulations based on land use outside of those exempted hours (Exh. NEP-1, at 5-28).

National Grid asserted that it would endeavor to limit construction activities that potentially could generate excessive noise to weekdays between 7:00 a.m. and 6:00 p.m. (Exh. DPU-NO-11; Tr. 2, at 313-314). Furthermore, the Company explained that it would work with neighbors to inform them of the sequencing of construction activities and to accommodate reasonable alternative work hours, and work with the town of Dracut to determine the best way to complete the Project with a minimum disturbance to nearby residences (Exhs. DPU-NO-5, at 2; DPU-NO-11; Tr. 2, at 313-314). Additionally, the Company stated it would work with Dracut officials to negotiate mutually agreeable work hours and obtain any required waivers (Exh. NEP-1, at 5-29).

iii. Operational Noise

The Company stated that 345 kV transmission lines may generate audible noise under certain weather conditions (Exh. NEP-1, at 5-43). National Grid characterized the audible noise as a hissing, crackling sound that could be accompanied by a 120-hertz hum that is the result of a process called corona that releases a small amount of energy in the form of conductor vibration, light, audible noise, or radio noise (id. at 5-43 to 5-44). National Grid further asserted that this noise may be noticed a few hundred feet from the transmission line, but would be most pronounced directly underneath the wire, and that the noise generally increases with wet weather (id. at 5-44).

The Company modeled existing and proposed audible noise levels from corona (id. at 5-44 and appx. 5-7). The modeling results show a maximum post-Project noise level 4 dBA above pre-Project levels (id. at 5-44 and appx. 5-7, at 24, A6-A7). The Company concluded

that a change in noise levels under 3 dBA cannot normally be detected by the human ear and that the Project would therefore have minimal impact on noise levels along the Project ROW (id. at 5-44).

i. Air

National Grid requires the use of ultra-low sulfur diesel fuel in its diesel-powered non-road construction equipment and limits idling time to five minutes except when engine power is necessary for the delivery of materials or to operate accessories (Exh. NEP-1, at 5-30). Vehicle idling would further be minimized in accordance with Massachusetts' anti-idling law (id.). The Company committed to use United States Environmental Protection Agency ("USEPA") Tier 4 compliant or USEPA verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies, on 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 Project construction (id.). National Grid would suppress dust generation on access ways by wetting and stabilizing exposed soils (id. at 5-24).

j. Safety

The Company outlined numerous safety measures to ensure that safety of the general public would be maintained throughout the Project (Exhs. NEP-1, at 5-30; DPU-S-1). The measures would include: safety supervisors on construction sites; signage, barriers, and gates to restrict public access to the ROW and recreational trails that cross the ROW; installation of guard structures during wire pulling; coordination with municipal officials, local police, and

MassDOT for road crossings; and development of traffic control plans (Exhs. NEP-1, at 5-30; DPU-S-1).

National Grid stated the Project has been designed in accordance with the Massachusetts Code for the Installation and Maintenance of Electric Transmission Lines and the current edition of National Electrical Safety Code, and included an additional design buffer to ensure conformance with the governing codes (Exhs. DPU-G-5; DPU-G-15). National Grid stated it considered additional factors that influence project design such as structure type, voltages, blowout criteria, vegetation management, electromagnetic fields, worker clearances, outages, and constructability (Exhs. DPU-G-5; DPU-G-15; Tr. 1, at 138-143).

k. Magnetic Fields

Magnetic fields are created when current flows in a conductor (Exh. NEP-1, at 5-44). The Company modeled ground-level magnetic fields that would result from current flowing in overhead wires to be constructed for the Project, and compared total transmission-related magnetic fields before and after Project construction for the edge of the ROW for each of the nine different transmission line cross-sectional layouts. The current on each line varies based upon demand and so will vary throughout the course of the year, and even during different times of the day (id., appx. 5-7, at 19). The Company has suggested that the modeling scenarios of greatest interest are those that are likely to apply on any particular day of the year, and to that end presented magnetic field levels for average annual load levels ("AALs") for 2018 (id.). Modeled levels are shown in Table 5, below.

Table 5. 2018/2023 Calculated Magnetic Field Levels (milligauss) for Pre-Project and Post-Project

ROW Section	Modeled Conditions	100 Feet from the Western Edge of the ROW	Western Edge of the ROW	Eastern Edge of the ROW	100 Feet from the Eastern Edge of the ROW
Section 1	Pre-Project	3.6	10	36	7.3
	Post-Project	0.6	10	27	4.5
Section 2	Pre-Project	2.2	3.9	17	3.7
	Post-Project	0.8	1.9	16	2.9
Section 3	Pre-Project	4.5	13	1.7	1.5
	Post-Project	1.5	5.3	3.3	1.5
Section 4	Pre-Project	4.7	14	19	4.0
	Post-Project	1.7	5.7	16	3.2
Section 5	Pre-Project	3.0	6.5	13	4.8
	Post-Project	1.6	3.6	16	4.1
Section 6	Pre-Project	2.7	5.6	13	1.3
	Post-Project	1.5	3.3	15	3.9
Section 7	Pre-Project	7.9	50	13	4.6
	Post-Project	4.6	37	15	3.9
Section 8a	Pre-Project	1.5	6.2	5.4	1.3
	Post-Project	0.4	4.6	2.0	0.2
Section 8b	Pre-Project	1.4	6.2	5.5	1.3
	Post-Project	2.4	7.4	7.4	2.4

Sources: Exhs. NEP-1, at 5-46; DPU-EMF-2.

According to the Company, magnetic field levels would decline in most segments and any increase would be minimal with the Project, both for the average annual load levels shown in Table 5, above, such as the modeled reduction on the west side of the Segment 7 ROW from 50 milligauss ("mG") to 37 mG, as well as for projected maximum load levels, which it also calculated (Exh. NEP-1, at 5-45). The Company indicated that this decline would result from

a change of phasing on the existing Y-151 Line, which is not otherwise proposed to be changed in Segment 7 (id.; Exh. DPU-EMF-4).

As described in Section II.C.3.a, above, the new 345 kV line would be located away from both edges of a wide ROW for a majority of the length of the route in Massachusetts. The Company stated that magnetic-field levels would be further minimized by the Project's use of 345 kV, which requires less current to carry the same amount of power compared to a series of 115 kV lines, and by using magnetic field cancellation with other transmission lines on the shared ROW through phase-arrangement selection (Exh. NEP-1, at 5-49). According to the Company, phase optimization is one of the ways to minimize EMF levels consistent with 2007 recommendations from the World Health Organization to apply low cost measures that reduce magnetic fields (id., appx. 5-7, at 21).

The Company considered the use of additional towers to transpose phasing differently from one segment to the next, but concluded that such mitigation would not be readily achieved because of additional cost, additional line outages, and potential increases to magnetic fields elsewhere along the project (Exhs. DPU-EMF-4; DPU-EMF-5).

1. Analysis and Findings

Given that the Project would not expand the ROW, and would require only minimal tree clearing, the land use impacts of the Project would be similar to the existing conditions along the ROW. Further, there are only 33 residences within 100 feet of the ROW along its 6.5-mile length.

The ROW contains habitat for state and federal protected species. The Company continues to work with NHESP and USACE to avoid impacts to protected species in the ROW. The Company filed its MESA Project Checklist on January 14, 2016 with NHESP and received a determination from NHESP on February 18, 2016. NHESP concluded that the Project would not result in a "take" of state-listed species based on the measures outlined in the Company's MESA Project Checklist.

The general visual appearance of the ROW would not be altered as a result of the Project. The Project would be constructed entirely within an existing 225 to 520 foot-wide ROW. Tree clearing and pole relocation would alter the view for some abutters, but not create a new view of the ROW where one does not already exist. The height of new structures would increase slightly over the existing structures due to structure type and conductor clearance standards. The Company would continue to coordinate with abutters to minimize visual impacts.

In several recent transmission line cases the petitioners have been directed to implement an off-site screening program consisting of vegetative plantings and/or other screening. New England Power Company, EFSB 12-1/D.P.U. 12-46/12-47 (2014) ("IRP"); Western Massachusetts Electric Company, D.P.U. 09-24/09-25 (2010) ("WMECO/AWS"); Western Massachusetts Electric Company, EFSB 08-2/D.P.U. 08-105/08-106 (2010) ("GSRP").

The Company stated that it would work with landowners along the length of the ROW to address visual impacts of the Project on a case-by-case basis. National Grid acknowledged that the view of the ROW may change due to tree clearing or pole placement. Therefore, in

order to minimize visual impacts, and to be consistent with other approved projects, the Department directs National Grid, upon request of any person owning property located directly abutting or within the ROW, to provide additional off-site screening (such as, but not limited to shrubs, trees or window awnings) provided operating and maintenance requirements for all ROW facilities are met. Upon completion of construction, the Company shall notify in writing all owners of property located on or abutting the ROW, of the option to request that the Company provide off-site mitigation. The Company shall honor all reasonable and feasible requests for mitigation that are submitted by such property owners within six months of receipt of the Company's written notification.

The Project would result in some unavoidable temporary and permanent impacts to wetlands. However, the Company has minimized the extent of the impacts and would mitigate impacts by providing wetland replication in Tewksbury and Dracut. The Merrimack River crossing is jurisdictional under Chapter 91, and the Company filed a request for minor modification under the current Chapter 91 license on November 6, 2015. MassDEP approved the Company's request on January 7, 2016.

With respect to traffic impacts, the Company would coordinate closely with municipalities and MassDOT to minimize traffic impacts. National Grid would protect public safety through measures such as traffic management plans, signage and road blocks, and coordination with municipal officials.

Operational noise from the Project would be minimal. The Company proposed to use a construction schedule of 7:00 a.m. to 7:00 p.m. Monday through Friday and 7:00 a.m. to

5:00 p.m. Saturdays. The Company committed to working with abutters and municipalities to coordinate the timing of construction activities and accommodate alternative work hours.

For construction in Andover and Tewksbury, the Department approves a construction schedule of Monday through Friday from 7:00 a.m. to 6:00 p.m., and Saturdays from 9:00 a.m. to 5:00 p.m. with the exception of areas with nearby residential abutters. In areas of Andover and Tewksbury with residential abutters within 100 feet of construction work areas or activities, the Department directs the Company to work Monday through Friday only from 7:00 a.m. to 6:00 p.m.

For construction in Dracut, the Company would exceed maximum sound levels permitted in Section 13 for all construction after 6:00 p.m. or on weekends, based on the modeled maximum noise levels provided in Table 4. For construction in Dracut, the Department approves a construction schedule of Monday through Friday only from 7:00 a.m. to 6:00 p.m.

Should the Company need to extend construction work beyond those hours and days (with the exception of emergency circumstances on a given day that necessitate work beyond such times), 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 hours should occur, the Company may request prior authorization from the Department and shall provide the town with a copy of any such request.

The Company shall inform the Department and the relevant town authorities in writing within 72 hours of any work that continues beyond the hours allowed by the Department, or, if granted extended work hours in writing by the town, work that continues past the hours allowed by the town. The Company shall also send a copy to the Department, within 72 hours of receipt, of any authorization for an extension of work hours issued by the towns. Furthermore, the Company shall keep a record of the dates, times, locations, and durations of all instances in which work continues beyond the hours allowed by the Department, or, if granted extended work hours in writing by the town, work that continues past the hours allowed by the town, and must submit such record to the Department within 90 days of Project completion.

The Company's plan to coordinate construction timing and scheduling, work hours, communication, and traffic control with municipals 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 communities, 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.

National Grid is subject to idling restrictions imposed by MassDEP, and the Company committed that all diesel-powered non-road equipment rated 50 horsepower or above to be used for 30 or more days over the course of the Project would be retrofitted to reduce emissions.

The predicted magnetic field values would decrease along most of the edge of the ROW to be occupied by the Project. In general, magnetic field levels are expected to decrease because the new line is generally located away from the edges of the ROW and because the Company would be able to reverse-phase adjacent circuits along the ROW.

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

D. Exemptions Required

1. Individual Exemptions

National Grid is seeking seven individual exemptions from specific sections of the Tewksbury Zoning Bylaw, three individual exemptions from the Andover Zoning Bylaw, and six individual zoning exemptions from the Dracut Zoning Bylaw (collectively, the "Zoning Bylaws") (Exh. NEP-1, at 19-36). In addition, National Grid is also seeking comprehensive

zoning exemptions from the zoning bylaws of Tewksbury, Andover, and Dracut. National Grid asserts that both specific and comprehensive relief are required because the Project is needed in the immediate time frame to provide reliable electric service to the electric system (id. at 19).

2. National Grid's Position

In addition to the general reasons cited above, Table 6, below, summarizes the provisions of the Zoning Bylaws from which National Grid seeks exemptions, the relief available from each Town, and the Company's argument as to why the Project cannot comply with the identified zoning provisions.

Table 6. Requested Individual Exemptions from the Tewksbury Zoning Bylaw: Summary of Company's Position

Section of the Zoning Bylaw	Available Relief	Why Exemption is Required: Company's Position
Table of Use Regulations section 3130 appendix A	**None Available**	Essential services are prohibited in the R40 district (Exh. NEP-1, at 26). Use variances are not authorized under the bylaw; therefore an exemption is per se required (id.).
Table of Use Regulations section 3130 appendix A	**Special Permit**	A special permit would be required for Essential Services in the HI and OR districts. According to the Company, the subjective nature of the special permit criteria creates legal uncertainty for obtaining it and the risk of long and costly appeals.
Use Regulations Non-Conforming Uses section 3620	**Special Permit**	To the extent that the Project is considered a change or substantial extension of a pre-existing non-conforming use, the Project would require a special permit subject to site plan review. The Company seeks an exemption from the special permit requirement because of the subjective nature of the criteria and the risk of lengthy and costly appeals.
Groundwater Protection District section 8300	**None Available**	Essential services are prohibited in the overlay Groundwater Protection District in an R40 District. Because use variances are not authorized under the bylaw, an exemption is per se required.
Dimensional Requirements section 4100 appendix B	**Height Variance**	The relevant maximum height restriction is 35 feet, compared to the proposed height of the reconfigured and new lines of 45 to 115 feet. A variance would be required for noncompliance with the applicable maximum height requirements. Variances are a legally disfavored form of relief and, even if granted, are susceptible to appeal, which creates additional risk for the project.
Site Plan Special Permit section 9400	**Special Permit**	A site plan special permit would be required for institutional use with an expanded ground area. According to the Company, the subjective nature of the special permit criteria creates legal uncertainty for obtaining it and the risk of long and costly appeals.
Use Special Permit section 9510	**Special Permit**	Any non-residential development proposed for construction that consists of 10,000 square feet or more shall be required to first obtain a special permit. However, the Company seeks an exemption because of the subjective nature of the special permit, the legal uncertainty for obtaining it and the risk of long and costly appeals.

Sources: Exhs. NEP-Petition at 26-27; DPU-Z-10.

Table 7. Requested Individual Exemptions from the Andover Zoning Bylaw: Summary of Company's Position

Section of the Zoning Bylaw	Available Relief	Why Exemption is Required: Company's Position
Table of Use Regulations section 3.1.3 appendix A	Special Permit or Use Variance	A special permit for essential services may be required. The subjective nature of the special permit criteria creates legal uncertainty for obtaining it, and causes additional potential risk of lengthy and costly appeals. Alternatively, a use variance would be required, which are a legally disfavoved form of relief, and highly susceptible to reversal on appeal.
Table of Dimensional Requirements section 4.1.2 appendix A, table 2	Height Variance	The maximum height restriction is 35 feet, compared to the proposed height of the reconfigured lines and the new line of 45 to 115 feet (Exh. NEP-1, at 29). A variance from the maximum height requirement would be required. According to the Company, the subjective nature of the variance criteria create legal uncertainty and the potential risk of lengthy and costly appeals.
Earth Movement section 6.3.3 section 6.3.5	Special Permit or Earth Moving Permit	To construct the Project, an earth moving permit by the building inspector or a special permit by the Board of Appeals may be required for earth movement. The subjective nature of the special permit criteria creates legal uncertainty for obtaining it, and causes additional potential risk of lengthy and costly appeals.

Sources: Exhs. NEP-Petition at 31; DPU Z-6.

Table 8. Requested Individual Exemptions from the Dracut Zoning Bylaw: Summary of Company's Position

Section of the Zoning Bylaw	Available Relief	Why Exemption is Required: Company's Position
Table of Permitted Uses section 2.11.30	Special Permit	Public or private utilities facilities use is allowed by the issuance of a special permit and site plan review for the I-1 District (Exh. NEP-1, at 33). According to the Company, the subjective nature of the special permit criteria creates legal uncertainty for obtaining it and the potential risk of lengthy and costly appeals.
Table of Permitted Uses section 2.11.30	Not Available	For the portion of the Project in the R-1 and R-3 Districts, the granting of use variances is prohibited, and therefore the Company has no local relief available to it.
Site Plan Special Permits section 1.16.21	Site Plan Special Permit	The Company would have to obtain a site plan special permit because the Project constitutes initial development of land, expansion of ground area by 1,200 square feet or more and a use specified in the Table of Permitted Uses as requiring a site plan special permit (Exh. NEP-1, at 34). The Company seeks an exemption from the requirement for a site plan special permit because of the legal uncertainty and the potential for adverse interpretations, delay, burden and undue expense associated with the permitting process.

Section of the Zoning Bylaw	Available Relief	Why Exemption is Required: Company's Position
Non-Conforming Uses and Structures section 2.16.22	Special Permit	To the extent that the structures on the existing lines are "reconstructed, extended, altered, changed or structurally changed" a special permit would be required. The special permit would be granted only if the change or extension of use, etc. shall not be more detrimental than the existing nonconforming use or structure to the neighborhood. The Company seeks an exemption because of the legal uncertainty, potential for adverse interpretations, delay, burden and undue expense associated with the permitting process and potential appeals.
Table of Standard Dimensional Requirements section 2.12.50	Variance	The proposed Line 3124 and the reconfigured existing lines will be 45 to 115 feet high, and therefore, will exceed the maximum height requirements in R-1, I-1, and B-3 Districts, which are 36 feet, 65 feet, and 40 feet, respectively (Exh. NEP-Petition at 34). The Company seeks an exemption from the requirement to obtain a variance because the subjective nature of the variance criteria creates legal uncertainty for obtaining it, and the risk of lengthy and costly appeals.
Compliance Certification section 1.11.20	Certification	Certification by the Building Inspector is required under this provision. According to the Company, the certification requirement has the potential to create conflicts between various local permitting bodies in the event that the Dracut Building Inspector have a different interpretation of any applicable federal, state or local law.

Source: Exh. NEP-Petition at 35-36.

3. Analysis and Findings

a. Use Variances

The Project's construction would require the Company to obtain use variances from Tewksbury Zoning Bylaw, section 3130, appendix A (table of use regulations) and section 8300 (groundwater protection district). However, the Company correctly states that section 9222 (use variances) of the Tewksbury Zoning Bylaw explicitly prohibits the issuance of use variances (Exhs. NEP-Petition at 21; DPU-Z-14). As a result, there is no local zoning relief available to the Company from the operation of the Tewksbury Zoning Bylaw use provisions. The Department agrees with the Company's analysis, and finds, accordingly, that exemptions from the identified provisions of the Zoning Bylaw that would require a use

variance to construct and operate the Project are required within the meaning of G.L. c. 40A, § 3.

The Project would also require the Company to obtain use variances from the Dracut Zoning Bylaw, section 2.11.30 for R-1 and R-3 districts (table of permitted uses). Section 1.13.21 (use variances) explicitly prohibits the issuance of use variances (Exh. NEP-2). As a result, there is no local zoning relief available to the Company from the operation of the Dracut Zoning Bylaw use provisions. The Department agrees with the Company's analysis, and finds, accordingly, that exemption from section 2.11.30 of the Dracut Zoning Bylaw that would require a use variance to construct and operate the Project is required within the meaning of G.L. c. 40A, § 3.

b. Non-Use Variances

The Project's construction would require that the Company obtain variances from Tewksbury, Andover, and Dracut. The Department concurs with the Company's argument that the criteria for obtaining a variance are difficult to fulfill. See G.L. c. 40A, § 10; see also, 28 Mass.Prac.Series, Real Estate Law, § 23.24 (4th ed.) ("[e]stablishing each one of the three requirements [for obtaining a variance] is a very difficult task"). Additionally, the Department notes that the grant of a variance may be appealed. See G.L. c. 40A, § 17, see also, 28 Mass.Prac.Series, Real Estate Law, § 23.24 (4th ed.) ("it is not surprising that few variances stand up when challenged in court"). Consequently, requiring the Company to obtain variances could, at a minimum, result in significant Project delay.

Accordingly, the Department finds that exemptions from the identified provisions of the Tewksbury, Andover, and Dracut Zoning Bylaw that would require the Company to obtain a variance to construct and operate the Project are required within the meaning of G.L. c. 40A, § 3. Specifically, exemptions are granted from the following provisions of the Tewksbury Zoning Bylaw: section 4100, appendix B, (table of dimensional regulations); section 3130 appendix A (table of use regulations); section 4.1.2, appendix A, table 2 (table of dimensional requirements) of the Andover Zoning Bylaw; and section 2.12.50 (table of standard dimensional requirements) of the Dracut Zoning Bylaw.

c. Special Permits and Site Plan Review

Construction of the Project would require the Company to obtain a total of nine separate special permits, four from Tewksbury, two from Andover, and three from Dracut. Because the Project would be constructed in three different municipalities, the Company would encounter a number of different bylaws, each with its own set of criteria, if it attempted to obtain all of the special permits necessary for construction. This complexity alone could cause delay. In addition, the Department concurs with the Company's argument that the special permit criteria are, at least to some extent, subjective in nature, and this introduces uncertainty into the permitting process. Further, the Department notes that the grant of a special permit is appealable. See G.L. c. 40A, § 17. Consequently, requiring the Company to obtain the special permits necessary for construction of the Project could result in significant Project delay and uncertainty.

Accordingly, the Department finds that the exemptions from the special permit requirements are required within the meaning of G.L. c. 40A, § 3. Specifically, the Department grants exemptions from the following provisions of the Tewksbury Zoning Bylaw: section 3130, appendix A (table of use regulations); section 3620 (nonconforming uses); section 9400 (site plan special permit); and section 9510 (use special permit). The Department grants exemptions from the following provisions of the Andover Zoning Bylaw: section 3.1.3 (appendix A) (table of use regulations); and section 6.3.3 and 6.3.5 (earth movement). In addition, the Department grants exemptions from the following provisions of the Dracut Zoning Bylaw: section 2.11.30 (table of permitted uses); section 1.16.21 (site plan special permit); and section 2.16.22 (nonconforming structures).

d. Building Inspector Certification

Section 1.11.20 of the Dracut Zoning Bylaw provides that buildings, structures or signs may not be

> erected, substantially altered, moved or changed in use and land may not be changed in principal use without certification by the Building Inspector that such action is in compliance with then applicable zoning, or without review by him regarding whether all necessary permits have been received from those governmental agencies from which approval is required by federal, state, or local law (Exhs. NEP-Petition at 35; DPU-Z-9).

According to the Company, such a requirement has the potential to create conflicts between the various permitting bodies should the Dracut inspector of buildings have a different interpretation of any applicable federal, state or local law (Company Brief at 93). The Department agrees with the Company's argument and grants the requested exemption from section 1.11.20 of the Dracut Zoning Bylaw. It should be noted that, notwithstanding this

exemption from section 1.11.20, National Grid and its contractors and subcontractors must comply with all applicable federal, state, and local laws, regulations, and ordinances from which the Company has not received an exemption.

4. Consultation with Municipalities

a. Introduction

Prior to seeking zoning relief from the Department, the Company conducted outreach to both local residents and local officials. The Company stated that in February 2015, abutters within 300 feet of the ROW were sent introductory letters and fact sheets describing the Project need, location, and anticipated permitting schedule (Exh. DPU-G-5). Community meetings open to the public to discuss the Project were held in Andover on February 11, 2015, Tewksbury on February 12, 2015, and in Dracut on February 26, 2015 (Exh. NEP-Petition at 17).

The Company has also met with town officials in Tewksbury, Andover, and Dracut to introduce the Project, its schedule, and permit requirements (Exhs. NEP-Petition at 17; DPU-G-9). The Company also made two separate presentations to each of the three affected communities in November 2014 and February 2015, and met separately in February 2015 with zoning officials from each of the towns concerning the process for seeking zoning exemptions from the Department, and the applicability of each town's zoning bylaw to the Project (Exhs. NEP-Petition at 17; DPU-G-9; DPU-G-9(1), DPU-G-9(2); DPU-G-10; DPU-Z-1; DPU-Z-5; DPU-Z-6; DPU-Z-9). According to the Company, town officials from Tewksbury,

Andover, and Dracut did not object to the Company's decision to seek individual (and comprehensive) zoning exemptions from the Department (Exhs. NEP-5; DPU-Z-7; DPU-Z-8).

b. Analysis and Findings

The Department continues to favor the resolution of local issues on a local level whenever possible to reduce concern regarding any intrusion on home rule. NSTAR Hopkinton at 41; NEP Cabot Taps at 45; Russell Biomass LLC/Western Massachusetts Electric Company, 17 DOMSB 1, EFSB 07-4/D.P.U. 07-35/ 07-36, at 60-65 ("Russell Biomass"). The Department believes that the most effective approach for doing so is for applicants to consult with local officials regarding their projects before seeking zoning exemptions pursuant to G.L. c. 40A, § 3.

The record shows that the Company consulted with multiple local officials. Furthermore, all of these meetings took place before the Company filed its zoning exemption petition with the Department. In addition, the Company also reached out to Tewksbury, Andover, and Dracut residents during this time. As noted by the Company, none of these town officials objected to the Company's petition in this case. Accordingly, the Department finds that the Company made a good faith effort to consult with municipal authorities, and that the Company's communications have been consistent with the spirit and intent of Russell Biomass and the other cases cited above.

5. Conclusion on Request for Individual Zoning Exemptions

As described above, the Department finds that: (1) National Grid is a public service corporation; (2) the proposed use is reasonably necessary for the public convenience and

welfare; and (3) the specifically identified zoning exemptions are required for purposes of G.L. c. 40A, § 3. Additionally, the Department finds that the Company engaged in good faith consultations with the towns of Tewksbury, Andover, and Dracut. Accordingly, the Department grants the Company's request for the individual zoning exemptions listed above in Tables 6-8, subject to any conditions set forth in this Order.

III. REQUEST FOR COMPREHENSIVE EXEMPTIONS

A. Standard of Review

The Department considers requests for comprehensive zoning exemptions on a case-by-case basis; NSTAR Hopkinton at 44; NEP Cabot Taps at 42; NSTAR Electric Company, D.P.U. 07-60/07-61, at 50-51 (2008) ("NSTAR Carver"), citing Princeton Municipal Light Department, D.T.E./D.P.U. 06-11, at 37 (2007). The Department will not consider the number of exemptions required as a sole basis for granting a comprehensive exemption. Rather, the Department will consider a request for comprehensive zoning relief only when issuance of a comprehensive exemption would avoid substantial public harm. NSTAR Hopkinton at 43; NEP Cabot Taps at 43; NSTAR Carver at 51-52.

B. The Company's Position

In addition to the individual exemptions discussed above, the Company has also requested a comprehensive exemption from the Tewksbury, Andover, and Dracut Zoning Bylaws. The Company states that there are four factors, in addition to the avoidance of substantial public harm, that the Department has articulated relevant to deciding whether to grant a comprehensive exemption. They are whether: (1) the project is needed for reliability;

(2) the project is time sensitive; (3) there are multiple municipalities involved that could have conflicting zoning provisions that might hinder the uniform development of a large project spanning these communities; and (4) the communities affected by the project do not oppose the issuance of a comprehensive zoning exemption (id. at 98 (citations omitted)).

Addressing the first two factors, the Company argues that the Project is needed in order to improve system reliability and that this need is time-sensitive because the Project is needed to address current load levels (id. at 98). Furthermore, the Company maintains that there could be inconsistencies between the requirements and conditions imposed by the multiple towns on the Project (id. at 99). The Company stated that it received "letters of support" for the Project from each town's zoning official (Exhs. NEP-5 (Tewksbury); NEP-10 (Dracut); NEP-11 (Andover); DPU-Z-7; DPU-Z-8).

C. Analysis and Findings

The grant of a comprehensive exemption is based on the specifics of each case. Compared to the grant of individual zoning exemptions, which are tailored to meet the construction requirements of a particular project, the grant of a comprehensive exemption serves to nullify a municipality's zoning code in its entirety with respect to the project under review. Thus, compared to the grant of individual zoning exemptions, a comprehensive zoning exemption constitutes a broader incursion upon municipal home rule authority. In the absence of a showing that substantial public harm may be avoided by granting a comprehensive exemption, the granting of such extraordinary relief is not justified. NSTAR Electric Company, D.P.U. 13-126/13-127, at 34-35 (2014) ("Electric Avenue") at 37; New England

Power Company d/b/a National Grid/Westborough, D.P.U. 12-02, at 35-37 (2012); NSTAR Electric Company Waltham, D.P.U. 08-1, at 35-37 (2009).

Department and Siting Board cases that have considered and granted comprehensive exemptions have often involved projects that were time sensitive and that dealt with the zoning ordinances of multiple municipalities, where conflicting interpretations could arise. NEP Cabot Taps at 45; New England Power Company d/b/a National Grid, D.P.U. 13-187/188, at 58 (2015); New England Power Company d/b/a National Grid, EFSB 12-1/ D.P.U. 12-46/12-47 (2014).

Even when a comprehensive zoning exemption is granted, however, one class of zoning ordinances or bylaws is often excluded: zoning restrictions relating to environmental aspects of the ongoing operation of the proposed project. NSTAR Hopkinton at 45; NEP Cabot Taps at 45-46. Boston Edison Company, 14 DOMSB 233 (2005); EFSB 04-1/D.T.E. 04-5/04-7, at 153-154 (2005) ("NSTAR Boston/Stoughton"). In this case, section 5300 through 5360 (environmental performance standards) of the Tewksbury Zoning Bylaw set forth environmental performance standards, which prohibit uses that would be "offensive because of injurious or obnoxious noises, vibrations, smoke, gas, fumes, odors, dust, debris, or other objectionable features..." Similar provisions are included in section 3.15.0 (environmental protection standards) of the Dracut Zoning Bylaw.

Consequently, were the Department to include Tewksbury Zoning Bylaw sections 5300 through 5360 and Dracut Zoning Bylaw section 3.15.0 in the grant of a comprehensive exemption, the towns could not exercise control over the on-going operations of the proposed

Project with respect to these important environmental impacts. NSTAR Hopkinton at 45; NEP Cabot Taps at 46. Although the Department grants requests for zoning exemptions to facilitate construction and avoid unnecessary delay or adverse zoning outcomes, the Department also believes that once such facilities are operational they should comply with local zoning requirements relating to environmental aspects of the ongoing operation of the proposed Project, such as those found in Tewksbury Zoning Bylaw section 5300 through 5360 and Dracut Zoning Bylaw section 3.15.0.

In this case, the Department finds that the construction of the Project is necessary immediately for system reliability, and is accordingly time sensitive. Moreover, the Company has consulted extensively with officials from Tewksbury, Andover, and Dracut, which have each expressed their lack of opposition to individual and comprehensive zoning exemptions. The Department concludes that the grant of a comprehensive zoning exemption from the Zoning Bylaws of Tewksbury, Andover, and Dracut, with the exception of Tewksbury Zoning Bylaw section 5300 through 5360 and Dracut Zoning Bylaw section 3.15.0, is necessary in order to avoid substantial public harm arising out of non-compliance with existing system reliability requirements.

IV. REQUEST FOR AUTHORITY TO CONSTRUCT AND USE TRANSMISSION LINE(S) 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.[25]

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. NEP Cabot Taps at 47-48; Northfield/Erving at 59- 60; NSTAR Electric Company/New England Power Company d/b/a National Grid, D.P.U. 11-51, at 6 (2012). 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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[25] 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. Analysis and Findings

In evaluating petitions filed pursuant to G.L. c. 164, § 72, the Department relies on the standard of review established for G.L. c. 40A, § 3, for determining whether the Project is reasonably necessary for the convenience or welfare of the public. Based on the record in this proceeding and the analysis provided in Section II.C.1.e above, compliance with the directives and mitigation discussed in Section II.C.3.l and compliance with all applicable federal, state, and local laws and regulations, the Department finds pursuant to G.L. c. 164, § 72, that the proposed transmission line is necessary for the purpose alleged, will serve the public convenience, and is consistent with the public interest.

V. SECTION 61 FINDINGS

The Massachusetts Environmental Policy Act ("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 Environmental Impact Report ("EIR") is submitted to the Secretary of Energy and Environmental Affairs ("Secretary"), 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(4). On November 17, 2014, the Company submitted an Environmental Notification Form ("ENF") to the Secretary (Exh. NEP-1, at 1-13). The record indicates that on December 24, 2014, the Secretary issued a Certificate on the Company's ENF requiring the Company to file an EIR (Exh. NEP-1, at 1-13). The

Company submitted its Final EIR on January 15, 2016 (RR-DPU-3(S)). The Secretary issued the Certificate on the FEIR on February 26, 2016, determining that the FEIR adequately and properly complies with MEPA and its implementing regulations (RR-DPU-4(S)(1)).

The Department recognizes the Commonwealth's policies relating to GHG emissions, including G.L. c. 30, § 61 and the Executive Office of Energy and Environmental Affairs Greenhouse Gas Emission Policy and Protocol. The Department notes that the Project would have minimal GHG emissions as it is an overhead transmission line.[26] As such, the Project would not have direct emissions from a stationary source or indirect emissions from energy consumption. In Section II.C.3.l above, the Department conducted a comprehensive analysis of the environmental impacts of the proposed transmission line. Based upon the record in this case, implementation of the required mitigation measures, and compliance with all applicable federal, state, and local laws and regulations, the Department finds that the Company has taken all feasible measures to avoid or minimize the environmental impacts of the Project.

VI. ORDER

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

ORDERED: That the petition of National Grid seeking the specific exemptions set forth in Tables 6-8 from the operation of the Tewksbury, Andover, and Dracut Zoning Bylaws, pursuant to G.L. c. 40A, § 3, is granted; and it is

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[26] The Secretary's Certificate on the ENF states: "The [P]roject is subject to MEPA Greenhouse Gas Policy and Protocol (GHG Policy) because it exceeds thresholds for mandatory EIR. Given the nature of the [P]roject, I have concluded that this project fall under the de minimis exemption" (RR-DPU-2).

FURTHER ORDERED: That the petition of National Grid seeking a comprehensive exemption from the operation of the Tewksbury, Andover, and Dracut Zoning Bylaws, pursuant to G.L. c. 40A, § 3, is granted with the exception of Tewksbury Zoning Bylaw sections 5300 through 5360 and Dracut Zoning Bylaw section 3.15.0; and it is

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

FURTHER ORDERED: That to help mitigate visual impacts National Grid shall, upon request of any person owning property located directly abutting or within the ROW, provide additional off-site screening (such as, but not limited to shrubs, trees or window awnings) provided operating and maintenance requirements for all ROW facilities are met. Upon completion of construction, the Company shall notify in writing all owners of property located on or abutting the ROW, of the option to request that the Company provide off-site mitigation. The Company shall honor all reasonable and feasible requests for mitigation that are submitted by such property owners within six months of receipt of the Company's written notification; and it is

FURTHER ORDERED: That National Grid limit Project construction in Andover and Tewksbury to Monday through Friday from 7:00 a.m. to 6:00 p.m., and Saturdays from 9:00 a.m. to 5:00 p.m. with the exception of areas with nearby residential abutters. In areas of Andover and Tewksbury with residential abutters within 100 feet of construction work areas or activities, the Department directs the Company to work Monday through Friday only from

7:00 a.m. to 6:00 p.m. For construction in Dracut, the Department approves a construction schedule of Monday through Friday only from 7:00 a.m. to 6:00 p.m.

Should the Company need to extend construction work beyond those hours and days (with the exception of emergency circumstances on a given day that necessitate work beyond such times), 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 hours should occur, the Company may request prior authorization from the Department and provide the town with a copy of such request; and it is

FURTHER ORDERED: The Company shall inform the Department and the relevant town authorities in writing within 72 hours of any work that continues beyond the hours allowed by the Department, or, if granted extended work hours in writing by the town, work that continues past the hours allowed by the town. The Company shall also send a copy to the Department, within 72 hours of receipt, of any authorization for an extension of work hours issued by the town. Furthermore, the Company shall keep a record of the dates, times, locations, and durations of all instances in which work continues beyond the hours allowed by the Department, or, if granted extended work hours in writing by the town, work that continues past the hours allowed by the town, and must submit such record to the Department within 90 days of Project completion; and it is

FURTHER ORDERED: That National Grid, in consultation with Tewksbury, Andover, and Dracut, develop community outreach plans for Project construction and

operation. The outreach plan should, at a minimum, lay out procedures for providing prior notification to affected residents of: (a) the scheduled start, duration, and hours of construction; (b) any construction that must take place outside the hours or days indicated above; (c) any operation the Company intends to conduct that could result in unexpected community impacts due to unusual circumstances; and (d) complaint and response procedures including contact information; and it is

FURTHER ORDERED: That National Grid and its contractors and subcontractors comply with all applicable federal, state, and local laws, regulations, and ordinances from which the Company has not received an exemption; and it is

FURTHER ORDERED: That National Grid obtain all other government approvals necessary for the Project; and it is

FURTHER ORDERED: That National Grid and its successors in interest notify the Department of any changes other than minor variations to the Project so that the Department may decide whether to inquire further into a particular issue; 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 commence within three years of the date of this Order; and it is

FURTHER ORDERED: That within 90 days of Project completion, the Company must submit a report to the Department documenting compliance with all conditions 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 the Secretary of the Department transmit a certified copy of this Order and the Section 61 findings herein to the Executive Office of Energy and Environmental Affairs. The Company shall serve a certified copy of this Order on the town counsel, the planning board, and the board of appeals for the towns of Tewksbury, Andover, and Dracut within five business days of its issuance, and that the Company certify to the Secretary of the Department within ten business days of its issuance that such service has been accomplished; and that said certification be served upon the Hearing Officer to this proceeding.

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.