COMMONWEALTH OF MASSACHUSETTS
ENERGY FACILITIES SITING BOARD

Petition of Colonial Gas Company d/b/a National Grid for Approval to Construct a New Gas Pipeline in the City of Lowell and the Towns of Tewksbury and Chelmsford, Massachusetts, Pursuant to G.L. c. 164, § 69J	EFSB 18-01
Petition of Colonial Gas Company d/b/a National Grid for Individual and a Comprehensive Exemption from the Zoning Bylaw of the Town of Tewksbury, Massachusetts, Pursuant to G.L. c. 40A, § 3	D.P.U. 18-30

FINAL DECISION

Robert J. Shea,
Presiding Officer
September 26, 2019

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ABBREVIATIONS

Berkshire Gas (2006)	The Berkshire Gas Company, 15 DOMSB 208; EFSB 05-1 (2006)
Berkshire Power	Berkshire Power Development, Inc., D.P.U. 96-104 (1997)
BLSF	bordering lands subject to flooding
BMP	best management practices
BVW	bordering vegetated wetlands
CGP	Construction General Permit [under USEPA's NPDES]
CMR	Code of Massachusetts Regulations
Colonial	Colonial Gas Company d/b/a National Grid
Colonial Gas (2006)	Colonial Gas Company d/b/a KeySpan Energy Delivery New England, 15 DOMSB 269, EFSB 05-2 (2006)
Colonial Gas (2016)	Colonial Gas Company d/b/a National Grid, EFSB 16-01 (2016)
Company	Colonial Gas Company d/b/a National Grid
CWA	Clean Water Act
D.P.U.	Massachusetts Department of Public Utilities
d/b/a	doing business as
dBA	A-weighted decibels
Department	Massachusetts Department of Public Utilities
Doane GRS	Doane Gas Regulator Station
DOMSB	Decisions and Orders of Massachusetts Energy Facilities Siting Board
dth/hr	decatherms per hour
ECDA	external corrosion direct assessment
EEA	Massachusetts Executive Office of Energy and Environmental Affairs
EFSB	Massachusetts Energy Facilities Siting Board

ABBREVIATIONS

EIR	Environmental Impact Report
ENF	Environmental Notification Form
Eversource-Hopkinton	NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15-02 (2015)
Fed. Reg.	Federal Register
FEIR	Final Environmental Impact Report
G.L. c.	Massachusetts General Laws chapter
GHG	greenhouse gas
GWSA	Massachusetts Global Warming Solutions Act, Acts of 2008, Chapter 298
Hampden County	New England Power Company d/b/a National Grid, 18 DOMSB 323, EFSB 10-1/D.P.U. 10-107/ 10-108 (2012)
HDD	horizontal directional drilling
Highway Crossing	Tewksbury Mainline crossing beneath Riverneck Road and the I-495/Lowell Connector interchange
HTP	Hydrostatic Test Plan
I-495	Interstate Route 495
ILI	in-line inspection [equipment]
IRP	New England Power Company d/b/a National Grid, 20 DOMSB 1, EFSB 12-1/D.P.U. 12-46/ 12-47 (2014)
LNG	liquefied natural gas
LSP	Licensed Site Professional
LUWW	land under waterbodies and waterways
Lowell Distribution System	Lowell area low-pressure distribution system
MAOP	maximum allowable operating pressure
MassDEP	Massachusetts Department of Environmental Protection

ABBREVIATIONS

MassDOT	Massachusetts Department of Transportation
MCP	Massachusetts Contingency Plan
MDT	million decatherms
MEPA	Massachusetts Environmental Policy Act
MHC	Massachusetts Historical Commission
Mystic-Woburn	NSTAR Electric Company d/b/a Eversource Energy, EFSB 15-03/D.P.U. 15-64/15-65 (2017)
Needham-West Roxbury	NSTAR Electric Company d/b/a Eversource Energy, EFSB 16-02/D.P.U. 16 77 (2018)
NEP	New England Power Company
Notice	Notice of Adjudication and Public Comment Hearing
NPDES	National Pollutant Discharge Elimination System
NY Central Railroad	New York Central Railroad v. Department of Public Utilities, 347 Mass. 586 (1964)
Petitions	Siting Board Petition and Zoning Petition
PHMSA	Pipeline and Hazardous Materials Safety Administration
Pig	pipeline inspection gauge
Project	Lowell Area Gas Modernization Project
psig	pounds per square inch, gauge
R40	Residence 40 (zoning district)
Restructuring Act	St. 1997 c. 164
RFA	riverfront area
ROW	right-of-way
Russell Biomass/WMECo	Russell Biomass LLC-Western Massachusetts Electric Company, EFSB 07-4/D.P.U. 07-35/07-36 (2009)

ABBREVIATIONS

Salem Cables	New England Power Company d/b/a National Grid, 20 DOMSB 129, EFSB 13-2/D.P.U. 13-151/13-152 (2014)
SCADA	supervisory control and data acquisition
Siting Board	Massachusetts Energy Facilities Siting Board
Siting Board Petition	Petition in EFSB 18-01
SLRP	Colonial Gas Company d/b/a KeySpan Energy Delivery New England, EFSB 05-2 (2006) (Sagamore Line Reinforcement Project)
SMYS	specified minimum yield strength
Stoughton/Boston	Boston Edison Company d/b/a NSTAR Electric, 14 DOMSB 233, EFSB 04-1/ D.P.U. 04-5/04-6 (2005)
Street Restoration Standards	D.T.E. 98-22, att., §§ 1.0-12.0 (August 26, 1999)
SUE	subsurface utility engineering [survey]
SWPPP	Stormwater Pollution Prevention Plan
Tewksbury Line System	collectively, the Tewksbury Mainline, Wilbur Lateral, and Doane Lateral
TGP	Tennessee Gas Pipeline Company
TMP	Traffic Management Plan
ULSD	ultra-low-sulfur diesel fuel
URAM	utility-related abatement measure
USACE	U.S. Army Corps of Engineers
USEPA	U. S. Environmental Protection Agency
Vineyard Wind	Vineyard Wind LLC, EFSB 17-05/D.P.U. 18-18/18-19 (2019)
Walpole-Holbrook	NSTAR Electric Company d/b/a Eversource Energy, EFSB 14-2/D.P.U. 14-73/14-74 (2017)
Wilbur GRS	Wilbur Gas Regulator Station

ABBREVIATIONS

Woburn-Wakefield	NSTAR Electric Company d/b/a Eversource Energy, EFSB 15-04/D.P.U. 15-140/15-141 (2018)
Zoning Exemption Petition	Petition in D.P.U. 18-30

Pursuant to G.L. c. 164, § 69J, the Massachusetts Energy Facilities Siting Board ("Siting Board") hereby APPROVES, subject to the conditions set forth below, the Petition of Colonial Gas Company d/b/a National Grid ("Colonial" or the "Company") to construct 2.4 miles of replacement pipeline in Chelmsford and Lowell, Massachusetts, to install related equipment at individual locations in Tewksbury, Chelmsford, and Lowell, and to operate the replacement pipeline at pressures up to 610 pounds per square inch gauge ("psig"). Pursuant to G.L. c. 40A, § 3, the Siting Board hereby APPROVES, subject to the conditions set forth below, the Petition of Colonial for individual and comprehensive zoning exemptions from the Town of Tewksbury Zoning Bylaw.

I. INTRODUCTION

A. Summary of the Project

The Company is proposing the Lowell Area Gas Modernization Project (the "Project") to replace portions of an existing natural gas pipeline system serving the Lowell area with new, larger diameter pipeline (Exh. NG-2, at 1-1). Specifically, the Company is proposing to upgrade and replace portions of the existing pipeline between the Tewksbury Take Station in Tewksbury and the Wilbur Gas Regulator Station ("Wilbur GRS") in Lowell (id.). Colonial stated that the Project would facilitate the use of in-line inspection equipment ("ILI"), in accordance with Company policy, industry practice, and forthcoming federal regulatory requirements (id.). The Company stated that ILI would provide safety and operational improvements compared to current inspection methods (Exh. EFSB-S-2). The Project would also improve the Company's ability to maintain adequate delivery pressures during the peak winter season and address future capacity needs in the Lowell area (Exh. NG-2, at 1-1).

The Company operates a high-pressure pipeline system delivering gas from Tewksbury to the Lowell area ("Tewksbury Line System") (id.). The Tewksbury Line System consists of the Tewksbury Mainline, which begins at the Tewksbury Take Station in Tewksbury, and the Wilbur and Doane Laterals, which diverge from the Tewksbury Mainline to serve the Wilbur GRS and the Doane Gas Regulator Station ("Doane GRS") in Lowell (Exh. NG-2, at 1-2, 1-5). In turn, the

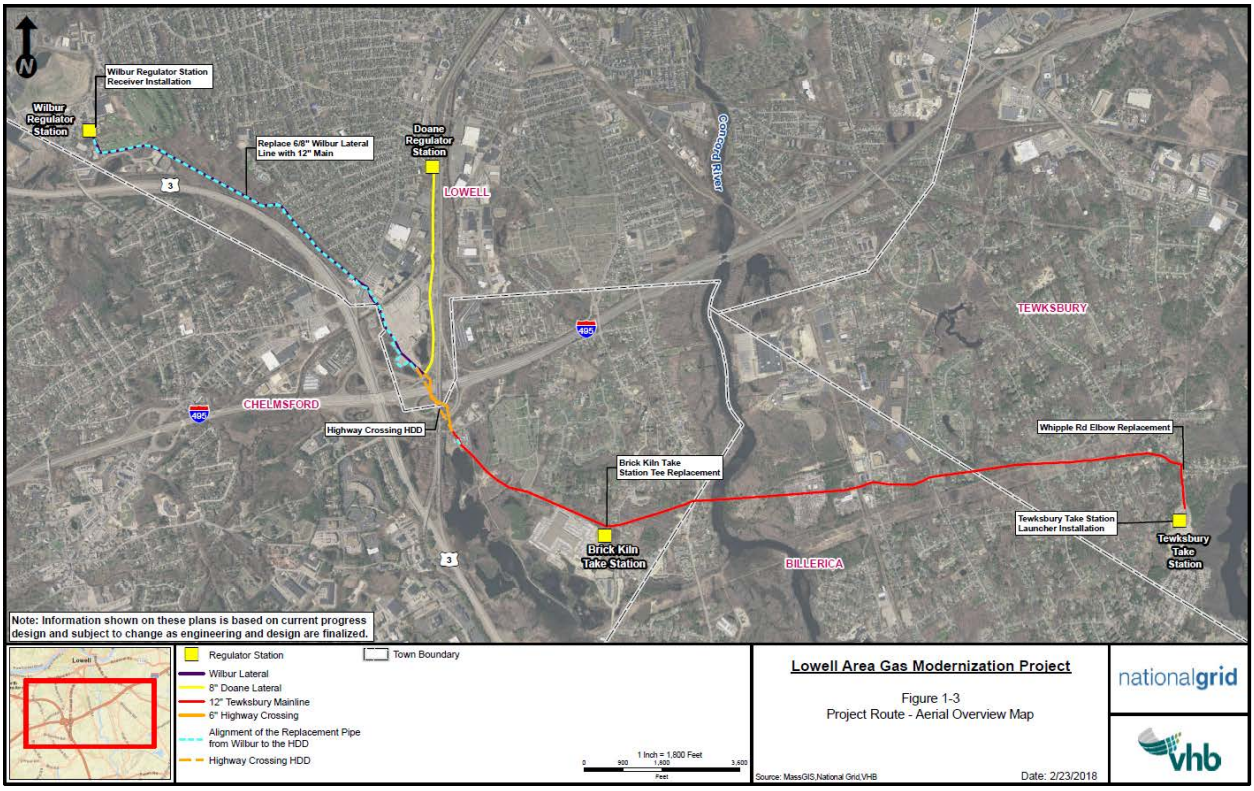
Wilbur GRS and the Doane GRS feed into the Lowell area low-pressure natural gas distribution system ("Lowell Distribution System") (id. at 1-1; Exh. EFSB-P-1).

The 3.9 mile long Tewksbury Mainline is composed of twelve-inch-diameter steel pipe, with the exception of a 1,915-linear-foot section of six- and eight-inch-diameter pipe that crosses beneath Riverneck Road in Chelmsford and the Interstate 495 ("I-495")/Lowell Connector interchange in Lowell ("Highway Crossing") (Exh. NG-2, at 2-2). The 2.0-mile-long Wilbur Lateral and 0.9-mile-long Doane Lateral are each variously composed of six- and eight-inch-diameter pipe (id.). The existing Tewksbury Line System has a maximum allowable operating pressure ("MAOP") of 610 psig (id. at 1-1).

The Project would replace the Highway Crossing portion of the Tewksbury Mainline and the entirety of the Wilbur Lateral with new twelve-inch coated-steel pipe (Exh. NG-2, at 1-5). The replacement would extend for 2.4 miles starting south of the intersection of I-495 and the Lowell Connector and extending northwest to the Wilbur GRS (id. at 1-1, 1-5, fig. 1-3). When completed, the Tewksbury Mainline and Wilbur Lateral would consist of uniform, twelve-inch-diameter pipeline between the Tewksbury Gate Station and the Wilbur GRS, enabling a total of 5.85 miles of pipeline to be inspected by a single, continuous ILI run (id. at 1-5).[1] Colonial would locate the majority of the replacement pipeline within the existing right-of-way ("ROW") adjacent to the existing Highway Crossing and Wilbur Lateral pipeline, which would then be abandoned in place (id. at 1-6, 5-10).

[1] The Company stated that the Project also includes the following elements that are required to fully enable the Tewksbury Mainline and Wilbur Lateral for ILI: (1) installation of a pig launcher at the Tewksbury Take Station; (2) replacement of fittings at the Tewksbury Take Station; (3) replacement of a pipe elbow near Whipple Road in Tewksbury; (4) replacement of a pipe "tee" at the Brick Kiln Road GRS in Chelmsford; and (5) installation of a pig receiver at the Wilbur GRS (Exh. NG-2, 3-6).

Figure 1. Proposed Project Overview



Source: Exh. NG-2, at fig. 1-3

The Company estimated the cost of the Project at approximately $32.8 million, with an expected accuracy of -25/+50 percent (Exh. NG-2, at 1-9). The Company stated that it expected to complete construction of the Project by November 2020 (id.).

B. Procedural History

On March 30, 2018, Colonial Gas Company filed three related documents: (1) a petition with the Siting Board, pursuant to G.L. c. 164, § 69J ("Siting Board Petition"), requesting approval to construct, operate, and maintain the Project, docketed as EFSB 18-01; (2) a petition with the Department of Public Utilities (the "Department"), pursuant to G.L. c. 40A, § 3, requesting a determination that individual and a comprehensive zoning exemption for upgrades at the Tewksbury Take Station are "reasonably necessary for the convenience or welfare of the public" ("Zoning Exemption Petition"), docketed as D.P.U. 18-30; and (3) a motion by the Company to refer the Zoning Exemption Petition to the Siting Board and consolidate it with the Siting Board

Petition for adjudication. The Chairman of the Department granted this motion, and the Siting Board conducted a single adjudicatory proceeding and developed a single evidentiary record for the consolidated petitions ("Petitions").

Colonial provided notice for a single route for the Project. The Project does not require enhanced participation or enhanced analysis of impacts under the Environmental Justice Policy of the Executive Office of Energy and Environmental Affairs. Consistent with the Commonwealth's and the Department's Language Access Policies, the Notice of Adjudication and Public Comment Hearing ("Notice") and the accompanying "Please Read" summary document ("Please Read Document") were translated into Spanish, Portuguese, and Khmer (Cambodian) (Affidavit of Kristin Reynolds, ¶ 4). The Company published the Notice in English (Lowell Sun), Spanish (El Mundo), and Portuguese (Brazilian Times and Portuguese Times) (id., ¶ 9). The Company sent by first class mail: (1) the Notice (in English); and (2) the "Please Read" summary document (in English, Spanish, Portuguese, and Khmer) to owners of property that abut the Project, and to abutters to abutters who own property located within 300 feet of the edge of the Project's ROW (id., ¶ 5).[2] The Company sent the Notice to the City or Town Clerk's office, the office of Mayor or Town Manager, and the principal public libraries for Tewksbury, Chelmsford, and Lowell, and placed copies of the Petitions and attachments for public review in the main public libraries of these three communities (id., ¶¶ 6-8). The Company also mailed the Notice to the planning boards of each affected municipality and each abutting city or town (id., ¶ 6).

The Siting Board staff conducted a public comment hearing regarding the Project on June 19, 2018, in Lowell.[3] Spanish, Portuguese, and Khmer interpreters were present. Karin Theodoros, a Lowell resident and property owner, moved to intervene. Cathy Kristofferson of

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[2] The Spanish, Portuguese, and Khmer translations of the Please Read Documents each contained a website address that could be used to access the Notice in each respective language.

[3] Comments at the public comment hearing included dissatisfaction that the hearing occurred on the east side of Lowell instead of the west side. A patron of the Mount Pleasant Golf Club asked if impacts to the course could be mitigated. Commenters expressed concerns about possible flooding caused by pipeline replacement, and that the use of the Stedman Street variation would block access to an industrial building on Stedman Street.

Ashby, Massachusetts, and Katie Irwin and Marisa Shea, both Lowell residents, moved to participate as limited participants. The Presiding Officer granted all four motions.

The Siting Board issued two sets of Information Requests to the Company, and Ms. Theodoros issued one set. The Siting Board staff conducted evidentiary hearings on September 25, September 27, and October 2, 2018. At these hearings, the Company presented a total of eleven witnesses for cross examination: Agnieszka Przybysz, P.E., Project Manager for Project Development at National Grid; Matthew Hayward, Project Manager at National Grid; Darrell Oakley, Environmental Specialist at National Grid; Kevin Conklin, P.E., Manager of Gas Transmission Engineering at National Grid; Jeffrey Smith, Senior Engineer in National Grid's Long-Term Planning and Operations Engineering Group; Grant Lella, Senior Project Engineer for Project Engineering and Design at National Grid; Michael Kern, Director of Transmission Engineering at National Grid; Sióna Patisteas, Senior Wetlands Scientist and Project Manager at Vanasse Hangen Brustlin; Dennis Doherty, Senior Consultant and National Practice Leader at Haley & Aldrich; Mark Brownstein, P.E., Geotechnical Engineer and Project Manager at Haley & Aldrich; and Robert O'Neal, Managing Principal at Epsilon. The evidentiary record consists of approximately 150 exhibits. The Company and Ms. Kristofferson each filed an initial brief on November 2, 2018; the Company filed a reply brief on November 9, 2018.

Siting Board staff prepared a Tentative Decision and distributed it to the Siting Board members and all parties for review and comment on September 16, 2019. The parties were given until September 23, 2019, to file written comments. The Siting Board received written comments from Cathy Kristofferson and the Company. The Board conducted a public meeting to consider the Tentative Decision on September 25, 2019, at which the parties were invited to present oral comments. Counsel for the Company, and Ms. Kristofferson presented oral comments. After deliberation, the Board directed staff to prepare a Final Decision approving the Company's Petitions, subject to conditions, set forth below.

C. Jurisdiction and Scope of Review under G.L. c. 164, § 69J

G.L. c. 164, § 69J provides that the Siting Board should approve a petition to construct if it determines that the petition meets certain requirements, including that the plans for the

construction of the applicant's facilities are necessary to provide a reliable energy supply for the Commonwealth, with a minimum impact on the environment, at the lowest possible cost, and are consistent with current health, environmental protection, and resource use and development policies as adopted by the Commonwealth. Pursuant to G.L. c. 164, § 69J, a project applicant must obtain Siting Board approval for the construction of proposed energy facilities before a construction permit may be issued by another state agency.

G.L. c. 164, § 69G, provides that a "facility" includes "a new pipeline for the transmission of gas having a normal operating pressure in excess of 100 psig, which is greater than one mile in length except restructuring, rebuilding, or relaying of existing pipelines of the same capacity." The Project is a facility with respect to Section 69G because: (1) it would have a normal operating pressure of at least 300 psig; (2) it exceeds one mile in length; and (3) the increase to the diameter of the pipeline proposed along the Highway Crossing and the Wilbur Lateral would result in increased capacity to transport gas compared to the existing Tewksbury Line System. Therefore, the Project is subject to Siting Board review under Section 69J.

The Siting Board requires that an applicant demonstrate that its proposal meets the following requirements: (1) that additional energy resources are needed (see Section II, below); (2) that, on balance, the proposed project is superior to alternative approaches in terms of reliability, cost, and environmental impact, and in its ability to address the identified need (see Section III, below); (3) that the applicant has considered a reasonable range of practical facility siting alternatives, while seeking to minimize costs and environmental impacts and ensuring a reliable energy supply (see Section IV, below); (4) that environmental impacts of the project are minimized and the project achieves an appropriate balance among conflicting environmental concerns as well as among environmental impacts, cost, and reliability (see Section V, below); and (5) that plans for construction of the proposed facilities are consistent with the current health, environmental protection, resource use, and development policies of the Commonwealth (see Section VI, below).

II. NEED FOR THE PROJECT

A. Standard of Review

In accordance with G.L. c. 164, § 69J, the Siting Board is charged with the responsibility for implementing energy policies that provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In carrying out this statutory mandate with respect to proposals to construct natural gas pipelines, the Siting Board evaluates whether there is a need for additional natural gas facilities in the Commonwealth to meet reliability, economic efficiency, or environmental objectives. See Colonial Gas Company, EFSB 16-01, at 5-6 (2016) ("Colonial Gas (2016)"); Colonial Gas Company, EFSB 05-2, at 5-6 (2006) ("Colonial Gas (2006)"; The Berkshire Gas Company, EFSB 05-1, at 3-4 (2006) ("Berkshire Gas (2006)").

In evaluating the need for new energy facilities to meet reliability objectives, the Siting Board may evaluate the ability of the existing system to accommodate changes in aggregate demand or supply, to serve major new loads, or to maintain reliable service. The Siting Board previously has approved proposals to construct gas facilities to accommodate load growth within a utility's service territory and to transport natural gas to generating facilities. See Colonial Gas (2006) at 13-15; Berkshire Gas (2006) at 9. In such cases, the proponent must demonstrate that additional energy resources are necessary to meet reliability objectives by establishing that its existing system is inadequate to serve the anticipated load with acceptable reliability. See Berkshire Gas (2006) at 3-4.

B. Description of the Existing System

The Tewksbury Line System begins at the Tewksbury Take Station, where gas is received from an interstate pipeline operated by Tennessee Gas Pipeline Company ("TGP") (Exh. NG-2, at 1-2). Colonial is able to supplement pressure and capacity on the Tewksbury Line System by dispatching re-gasified liquefied natural gas ("LNG") from its Tewksbury LNG station, which is located adjacent to the Tewksbury Take Station (id. at 2-10). The Tewksbury Line System is the main source of gas serving approximately 46,700 residential, commercial, and industrial customers in Chelmsford, Dracut, Dunstable, Lowell, Pepperell, Tyngsborough, and Westford, although the

area is partially supplied through other regulator stations as well (id. at 1-1 to 1-2; Exhs. EFSB-G-2; EFSB-G-5).

TGP Company built the Tewksbury Line System in 1954, with several segments having been replaced since the original construction (Exh. NG-2, at 1-2). The Company stated that various segments of the Wilbur Lateral were upgraded in 1953, 1963, 1967, and 1996; however, the Company's records are not clear as to which segments of the lateral were upgraded at which time (Exh. EFSB-N-1). The Lowell Gas Company took ownership of the system in 1981; later that year, Lowell Gas Company changed its name to Colonial Gas Company (Exh. NG-2, at 1-2). Colonial was acquired by National Grid in 2007 (id. at 2-2).

Pressure on the Tewksbury Line System is largely dependent on the operating pressure of the TGP, which is controlled by TGP Company (RR-EFSB-1; Tr. 1, at 16-17). The Company stated the Tewksbury Line System would not exceed its MAOP because the TGP is equipped with over-pressure protection equipment at its upstream sources and has the same MAOP of 610 psig (RR-EFSB-1). The Company also stated that it monitors the pressure of the Tewksbury Line System via supervisory control and data acquisition ("SCADA"), and that instances of over pressurization would initiate notifications to appropriate personnel to manage system pressure (id.). In addition, the Company explained that the Doane and Wilbur GRSs are equipped with pressure-regulation equipment and valves to ensure that gas is delivered into the Lowell Distribution System at the correct pressure (id.).

C. Description of Current Pipeline Inspection Program

The Company stated that, pursuant to the Pipeline Safety Improvement Act of 2002 (Pub. L. 107-355; 49 U.S.C. § 60109(c)(3)), the Pipeline and Hazardous Materials Safety Administration ("PHMSA") issued regulations requiring operators of gas transmission lines to conduct risk assessments and implement integrity management programs for covered pipeline segments (Exh. NG-2, at 2-4; Tr. 1, at 37-38).[4] The Company stated that, in compliance with

[4] The Company indicated that an integrity management program lays out how the Company will identify and address potential issues affecting the physical soundness of pipeline facilities before they become safety or performance issues (Exh. NG-8, at 26). Colonial explained that integrity management programs are required for pipeline segments

49 CFR Parts 191 and 192, it completed baseline assessments of the Tewksbury Line System in 2012 and 2014 (Exh. NG-2, at 2-4 to 2-5, table 2-1). Colonial noted that 49 CFR 192.939 requires covered segments to be reassessed "as frequently as needed to assure the integrity of each covered segment" and that the maximum reassessment period is seven years (id.; Exh. EFSB-N-4). The Company reported that no defects have been found on the Tewksbury Line System that would warrant a reassessment interval of less than seven years (Exh. EFSB-N-4). The most recent and next required assessment dates for the various segments of the Tewksbury Line System are shown in Table 1, below.

Table 1. Assessment Dates for the Tewksbury Line System

Pipeline Segment	**Last Assessment Date**	**Next Required Reassessment Date**
Tewksbury Mainline: Tewksbury Take Station to Brick Kiln Road	September 12, 2012	September 12, 2019
Tewksbury Mainline: Brick Kiln Road to Highway Crossing	October 30, 2014	October 30, 2021
Tewksbury Mainline: Highway Crossing	October 30, 2014	October 30, 2021
Wilbur Lateral	October 30, 2014	October 30, 2021
Doane Lateral	October 30, 2014	October 30, 2021

Adapted from: Exh. NG-2, table 2-1; RR-RFSB-5.

The Company stated that because the Project would not be completed before September 12, 2019, it would reassess the segment between Tewksbury Take Station and Brick Kiln Road under the current inspection protocol (Tr. 1, at 52). A reassessment of the entire Tewksbury Line System would be performed using ILI following completion of the Project (id.).

The Company stated that current PHMSA regulations allow operators to use three types of assessment: (1) ILI; (2) hydrostatic testing; and (3) direct assessment (Exh. NG-2, at 2-5). The Tewksbury Line System is currently inspected by a direct assessment process, including external corrosion direct assessment ("ECDA") (id. at 2-6). According to the Company, ECDA involves

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depending on the segments' classification according to the PHMSA definition of "transmission" (Tr. 1, at 37-38). The definition of a transmission line includes a pipeline that operates at a hoop stress of 20 percent or more of the specified minimum yield strength ("SMYS") of the pipe. 49 CFR 192.3 (definitions).

indirect aboveground surveys along the entire pipeline, excavating around the pipeline at targeted locations based on aboveground survey results, and visually inspecting the pipeline for external corrosion, defects, and third-party damage (id. at 2-4; Exh. EFSB-N-8). Under the ECDA approach, the Company acknowledged that it does not visually inspect the entire pipeline for external corrosion; rather, only limited sections of pipeline are directly inspected where aboveground survey results identify anomalies due to potential coating defects or third-party damage (Exh. EFSB-N-3). The Company stated that inspecting the Tewksbury Mainline by direct assessment typically requires two years, with surveying and analysis occurring in the first year, and excavation and examination occurring in the second year (Tr. 1, at 46). The Company estimated that the cost to perform a full inspection of the Tewksbury Mainline and the Wilbur Lateral by direct assessment methods, including aboveground surveys, excavation, and direct assessment (assuming the examination of up to four anomalies) is $270,000 (Exh. EFSB-PA-4).

The Company asserted that direct assessment yields limited information about the condition of the pipe because only limited segments of the pipeline are visually inspected (Exh. EFSB-Z-1). Furthermore, the Company stated that direct assessment methods are not suitable for identifying either long linear defects or internal defects (Exh. EFSB-S-2). The Company indicated that ECDA is limited in its ability to identify pipeline damage that requires maintenance and noted, for example, that there have been instances when ECDA did not detect a dented pipe because its coating was undamaged (id.).

D. Need for System Upgrade

Colonial stated that the primary need for the Project is to facilitate the use of state-of-the-art ILI (Exh. NG-2, at 1-1). The Company indicated that the Project would further improve system reliability by allowing the Tewksbury Line System to accommodate lower delivery pressures from TGP, and by providing additional capacity to meet growing demand for natural gas in the Lowell area over the longer term (id. at 2-10 to 2-11).

1. In-Line Inspection

The Company stated that proposed changes to federal pipeline inspection rules include prescriptive guidance regarding the selection of pipeline assessment methods (Exhs. NG-2, at 2-5; EFSB-N-7; EFSB-N-8).[5] The Company stated that the revised regulations are more explicit in specifying which pipeline inspection methods an operator can use, and that an operator would only be permitted to use direct assessment if "the pipeline is not capable of being inspected by internal inspection tools and [it] is not practical to assess using the [other approved assessment] methods" (Exhs. NG-2, at 2-6; EFSB-N-7).

While it may be able to achieve technical compliance with the pending PHMSA regulations using ECDA inspections of the Tewksbury Line System, the Company observed that it is required to select the most appropriate inspection methods for safely and reliably operating the pipeline (Exh. EFSB-Z-3; Tr. 1, at 67-68). Colonial determined that the caliber of information about a pipeline generated by ILI provides a significant safety advantage over direct assessment methods (Exh. EFSB-S-2). As such, the Company concluded that there is a regulatory need to upgrade the Tewksbury Line System to accommodate ILI (Exh. NG-2, at 2-12).[6]

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[5] The Company stated that relevant portions of the proposed regulations entitled "Pipeline Safety: Safety of Gas Transmission and Gathering Pipelines" (Docket No. PHMSA-2011-0023, 81 Fed. Reg. 20722) are scheduled for publication in two parts: the first part to be published on August 20, 2019 with an effective date of October 19, 2019; and the second part to be published on December 20, 2019 with an effective date of February 20, 2020 (EFSB-N-6(S1)). During the active evidentiary phase of this case, the regulations had not yet been codified; and the Company characterized these regulations as "proposed" (Exh. NG-2, at 2-5).

[6] Colonial also noted that the proposed federal regulations would eliminate a grandfather clause related to establishing an MAOP for pipelines constructed before 1970 (Exh. NG-5, at 9). Colonial anticipates it will be required to reconfirm the MAOP of certain pipelines lacking adequate records, including portions of the Tewksbury Line System (id. at 9-10; Tr. 1, at 74). The Company stated it will comply with MAOP reconfirmation requirements by completing an engineering critical assessment on the existing twelve-inch sections of the Tewksbury Mainline (which necessitates that the pipeline be ILI-enabled) and by replacing the Highway Crossing and the Wilbur Lateral (Tr. 1, at 75-76).

ILI involves the use of "smart pigs," which are a type of pipeline inspection gauge ("pig") equipped with a variety of data-recording equipment (Exh. NG-2, at 2-7). The Company described a variety of smart pig technologies, including free-swimming pigs, tethered pigs, and robotic pigs (id.). Free-swimming pigs are pushed through a pipeline by the pressure of the gas being transported; tethered pigs are pulled through the pipeline by a cable; and robotic pigs are battery powered and driven through the pipeline by an operator (id.; Exh. EFSB-N-2). Colonial stated that it prefers free-swimming pigs because that technology has proven to be reliable, does not require the pipeline to be taken out of service for inspection, and may be equipped with a wide variety of sensors (Exhs. NG-2, at 2-7; EFSB-N-2; Tr. 1, at 38-39). The Company explained that a free-swimming pig requires a pipeline with a consistent diameter and also launcher and receiver facilities at the beginning and end of the inspection run (Exhs. NG-2, at 2-7; EFSB-N-2). The Company indicated that a twelve-inch diameter pipeline is better for use of a smart pig than a six- or eight-inch diameter because the larger size pipe accommodates a shorter, wider pig, increasing maneuverability and battery capacity (Exh. NG-2, at 2-7).

Colonial compared ILI to the two other allowed testing approaches: ECDA and hydrostatic testing (id. at 2-6 to 2-7). The Company stated that when using ILI, smart pigs may be equipped with sensors capable of identifying, among other things, external and internal pipe corrosion, pipe wall thickness, lamination and manufacturing flaws, long-seam pipe defects, linear type defects, and stress corrosion cracking, while ECDA is only capable of identifying external corrosion and third party damage (id. at 2-7; Exh. EFSB-S-2). Colonial submitted that all information provided by ECDA is also collected by ILI (Exh. EFSB-S-2; Tr. 1, at 40-41). The Company estimated that inspecting the Tewksbury Mainline and Wilbur Lateral using ILI (expected to occur every seven years) would cost $540,000, but that this cost may be reduced with experience (Exh. EFSB-PA-4; Tr. 1, at 47, 98). The Company indicated that ILI is operationally more efficient than ECDA because ILI takes significantly less time and yields more information (Tr. 1, at 46-48). Because ILI provides information about the entire pipe, the Company explained that it would be able to better prioritize pipeline excavation and maintenance needs, create a plan for addressing future potential problems, and minimize the total number of excavations over time (Exh. NG-2, at 2-8 to 2-9). Finally, the Company noted that inspecting cased pipeline segments using ECDA requires

additional, specialized survey techniques, whereas cased segments may be readily inspected by ILI if a pig is equipped with magnetic flux leakage sensors (Exh. EFSB-N-2; Tr. 1, at 41-42).[7]

The Company described hydrostatic pressure testing as an inspection method that involves taking a pipeline out of service, filling it with water, and raising the water pressure to a specified level higher than the normal operating pressure of the pipeline (Exh. NG-2, at 2-6). The Company stated that the test water is typically pressurized for at least eight hours to identify leaks (id.). The Company also described a "spike test" where an existing pipeline pressure is increased to a level above the prescribed test pressure for a short period of time, typically 15 minutes (id.).[8]

The Company stated that although hydrostatic pressure testing will continue to be an approved assessment method for the routine seven-year integrity management program inspections, hydrostatically testing an existing pipeline poses engineering challenges that make it impractical to implement as a routine inspection method (Exh. NG-2, at 5-13; Tr. 1, at 83-86). For instance, Colonial stated that such an inspection would require segments of the existing Tewksbury Line System to be taken out of service for the duration of the test, which the Company argued is not feasible (Exhs. NG-2, at 2-6; EFSB-N-9).[9,10] Further, the Company pointed out that

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7 The Company explained that some pipeline crossings beneath highways and railroads are inserted into a casing for additional protection (Tr. 1, at 41-42). The Company stated that after completion of the Project, 380 feet of cased pipeline will remain on the Tewksbury Line System in segments between the Tewksbury Take Station and the Highway Crossing (RR-EFSB-4).

8 The Company explained that a hydrostatic pressure test is also required immediately after construction and before a pipeline is put into service and is also an approved assessment method for integrity management program inspections occurring every seven years or reconfirming the MAOP of a pipeline (Exhs. NG-2, at 2-6; EFSB-N-7; Tr. 1, at 83).

9 Other engineering challenges identified by the Company included the requirement to clean the pipe before testing, completely dry out the pipe after testing, and dispose of potentially contaminated test water following completion of the test (Exh. NG-2, at 5-13; Tr. 1, at 83-86).

10 The Company explained that, in theory, hydrostatic testing could be performed on the Wilbur Lateral in isolation by using the Doane Lateral to backfeed the distribution lines typically served by the Wilbur GRS (Exh. EFSB-N-9). However, the Company also stated that there is no practical way to maintain downstream gas service if either the Highway Crossing or the Tewksbury Mainline were taken out of service for hydrostatic testing (id.).

hydrostatic testing on an active pipeline typically involves an extra release of methane to the environment (Exh. EFSB-S-3). Finally, the Company contends that although hydrostatic testing would be nominally compliant with PHMSA inspection regulations, information about the condition of the pipeline garnered by hydrostatic testing would be less comprehensive than from ILI and, therefore, hydrostatic testing provides no advantages over ILI (Exh. EFSB-N-9).

Overall, the Company stated that ILI is its preferred assessment method because the superior information garnered through ILI allows it to maintain its pipeline while optimizing safety, reliably, and performance (Exh. NG-2, at 2-9). In keeping with its internal policy, the Company stated that it is actively increasing piggable pipeline mileage throughout its service territories, and currently operates approximately 109 miles of ILI-enabled natural gas transmission pipeline (id. at 2-8; EFSB-N-12). Furthermore, the Company maintains that there is a growing body of research and industry consensus that ILI is more effective than direct assessment in identifying defects related to stress corrosion cracking (Exh. NG-2, at 2-8).

2. Low Delivery Pressure

The Company stated that, to maintain sufficient pressure in its Lowell Distribution System, it needs to receive a sufficient delivery pressure from TGP; the required pressure varies, depending on customer gas demand (Exh. NG-2, at 2-10). The Company stated that it designed and maintains the Lowell area gas system based upon a delivery pressure from TGP at 475 psig; however, delivery pressure from TGP can, at times, drop substantially below this level (e.g., delivery pressure fell below 335 psig in nine days in 2012-2017) (id.; Exh. EFSB-N-16). During periods of peak demand, a minimum delivery pressure of 475 psig at the Tewksbury Take Station would be required to maintain adequate pressure on the Lowell Distribution System, without support from the Company's Tewksbury LNG station (Exh. NG-2, at 2-10).[11] The Company stated that although a period of peak customer demand has not coincided with low delivery pressure to date, such an event could result in customer interruptions (id.; Exh. EFSB-N-16). The Company reported that from 2012 to 2017 there were 178 days when pressures recorded at the

[11] The Company stated that its design day reflects an average temperature of zero degrees Fahrenheit (Exh. NG-2, at 2-10).

Tewksbury Take Station were below the minimum transmission delivery pressure required to maintain the design pressure on the Lowell Distribution System on a peak day (Exh. NG-2, at 2-10). According to the Company, these instances would have adversely impacted customers if they had occurred on a day of peak demand or if the Company were unable to utilize LNG from the Tewksbury LNG station to maintain pressure (id.; Exh. EFSB-N-16).

According to the Company, insufficient delivery pressure from TGP is primarily mitigated by dispatching re-gasified LNG from the Tewksbury LNG station into the Tewksbury Line System (Exh. NG-2, at 2-10). From 2012 to 2017, the Company reported that it dispatched LNG from its Tewksbury LNG Station for peak demand shaving on 189 days, with one instance occurring on a day of peak demand (Exh. EFSB-N-13). Although the Company has, to date, avoided customer impacts, it asserted that reliance on LNG to mitigate low pressure throughout the year is not an acceptable long-term solution (Exh. NG-2, at 2-10). Colonial stated that relying heavily on the Tewksbury LNG facility to mitigate low delivery pressures from TGP increases operational costs and complexity, while also reducing the availability of the LNG for use on days of extreme demand (id.).

The Company stated that replacing the various small diameter pipeline segments with a twelve-inch pipe along the Highway Crossing and Wilbur Lateral would enable the Lowell Distribution System to accommodate delivery pressure at Tewksbury Take Station down to approximately 335 psig during design day conditions (Exh. NG-2, at 2-10). The Company indicated that using a larger diameter pipe would reduce the need to rely periodically upon the Tewksbury LNG station, and therefore provide a secondary reliability benefit from the Project (id.; Tr. 1, at 79).

3. Future Capacity

Colonial recounted that the Project is specifically listed as a proposed pipeline resource in Massachusetts in the Company's most recently approved Long-Range Forecast and Supply Plan, docketed as D.P.U. 16-181, and approved by the Department on October 31, 2017 (Exh. NG-2,

at 2-11).[12] The Company concluded that, consequently, the proposed project is consistent with Colonial's most recently approved long-range forecast and supply plan (Exh. NG-2, at 2-11).

The Company indicated that it annually updates its long-range resource plans using a ten-year planning horizon and methodology approved by the Department in proceedings evaluating the Company's Long-Range Forecast and Supply Plans (Exh. EFSB-N-17). Colonial presented a summary of Lowell Division peak day sendout from the second quarter 2017 Analytics and Modeling Forecast, which is provided below in Table 2.

Table 2. 2017 Lowell Division Load Forecast (MDT/day)

Portion of Colonial System	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**
Lowell Division	153	154	154	155	156	156	158
Tewksbury System	116	117	117	118	118	118	120

Sources: Exhs. NG-2, at 2-11; EFSB-Z-16.

The Company interprets the table as showing a modest upward trend in natural gas demand over the next five years, anticipating continued growth from residential, commercial, and industrial customers over the long term (Exh. NG-2, at 2-11). The Company indicated that, based on its modeling, the Tewksbury Line System as currently configured is capable of providing approximately 125 MDT per day (Exhs. EFSB-N-18; EFSB-Z-6).

Although the existing Tewksbury Line System has sufficient capacity to serve its five-year planning horizon (fiscal year 2019 to fiscal year FY 2023), Colonial maintained that the system may be insufficient to serve peak day demand after 2032/33 (Exhs. NG-2, at 2-11; EFSB-Z-6). The Company estimated that the Project as proposed would be capable of delivering 184 MDT,

[12] In the Company's Long-Range Forecast and Supply Plan the Project is listed in Table G-21 "Proposed Pipeline in Massachusetts Over 1 Mile in Length and Over 100 PSI," with an expected in-service date of December 31, 2021 (Exh. NG-2, at 2-11; EFSB-N-21(1), at 206).

which it forecast would be sufficient to support system growth through 2040 (Exhs. EFSB-N-18; EFSB-Z-6). Therefore, the Company stated that construction of the Project would enhance long-term reliability by providing additional capacity (Exh. NG-2, at 2-12).

E. Positions of the Parties

Limited Participant Ms. Kristofferson submits that the Company has not sufficiently demonstrated that additional gas pipeline resources are needed (Kristofferson Brief at 3). Specifically, Ms. Kristofferson asserts that the Project is not warranted in terms of demand, and she cautions against an increased reliance on natural gas in light of recent gas safety issues (id., citing RR-EFSB-50).

The Company argues that the Project is needed because it will: (1) facilitate the use of ILI technology which will be more effective than visual inspections; (2) bring Company practice, in the use of ILI inspections, into accord with industry practice and forthcoming federal safety regulations; (3) reduce the need to use the LNG facility during low delivery pressure occasions and thereby increase the system's operational flexibility; and (4) provide additional capacity to meet long-term demand growth (Company Brief at 24-32).

F. Analysis and Findings on Need

Gas system reliability depends not only on having sufficient capacity, but also on ensuring that the design, construction, and operation of the system meet applicable safety requirements. Therefore, in evaluating need, the Siting Board also considers whether a project will help maintain or improve the safety of the gas system. See Colonial Gas (2016) at 46-47 ("[t]he Company filed its Petition to address . . . safety concerns"); see also, Berkshire Gas Company, EFSB 99-2/D.T.E. 99-17, at 8-10 (1999) (addressing safety implications of low pressure delivery as a component of need for an LNG storage project). In addition, enhancements to safety also reduce the potential for adverse impacts to people, property, and the environment within the scope of the Siting Board's environmental review.

The record shows that the Company intends to make proactive upgrades to enable ILI of the Tewksbury Line System, a task the Company cannot feasibly perform with pipes of varying

diameter. Although forthcoming PHMSA regulations do not explicitly require a pipeline operator to use ILI technology to inspect its pipeline, the record shows that ILI methods will provide the Company a comprehensive understanding of the structural integrity of its pipeline system, allowing defects to be addressed before they result in safety or performance issues. Replacing the Highway Crossing and the Wilbur Lateral will also facilitate compliance with a proposed obligation to reconfirm the MAOP of certain pipelines constructed before 1970. Although hydrostatic pressure testing will continue to be an approved pipeline assessment method and would also allow the Company to comply with proposed MAOP reconfirmation requirements, the record shows that it is not feasible to perform a hydrostatic test on the existing Tewksbury Line System while serving customers.

Although implementing ILI is the primary driver for the Project, the record shows that a larger-diameter pipe will allow the Tewksbury Line System to accommodate lower TGP delivery pressures, thereby both minimizing potential service interruptions and reserving LNG for extreme demand days. The pipeline in its current condition is capable of meeting modest demand growth in the near term; however, the Project will provide additional capacity to meet longer-term natural gas demand. Furthermore, the record shows that the Project is consistent with the most recently approved Long-Range Forecast and Supply Plan.

The Company has established that its existing Tewksbury Line System is not suitable for internal inspection methods, may not be able to maintain adequate service during instances of high demand and low delivery pressure, and is undersized for expected long-term demand. Importantly, the Company demonstrated that ILI offers a significant safety improvement compared to direct assessment inspection methods for the operation of a high-pressure gas transmission line. While both the capital cost and, apparently, the operational cost of inspecting the pipeline are higher for ILI than for ECDA, the Siting Board considers these costs as commensurate with the increased benefits associated with the enhanced monitoring capability.

Ms. Kristofferson contends that the Project is not needed because, in her view, there is no projection of an immediate increase in natural gas demand. However, the Company has shown that demand levels in the area served by the Tewksbury Line System are anticipated to grow over time, and that the increased capacity provided by the Project will be necessary as early as 2032. In

addition, and most importantly, the Company has also shown that the Project is needed for ensuring the reliability and safety of the Tewksbury Line System and downstream service to customers throughout the Lowell Distribution System and will help ensure the Company's compliance with forthcoming federal pipeline safety regulations.

As noted above, ILI will improve both the reliability and the safety of the System consistent with the Siting Board's statutory objectives, as articulated in G.L. c. 164, § 69H. The Project also would provide additional benefits, such as mitigating low delivery pressures from the interstate pipeline, and increasing local capacity. Therefore, in view of the above, the Siting Board finds that there is a need for construction of the Project in order to facilitate in line inspection, and that the improved inspection will enhance the reliability and safety of the system.

III. ALTERNATIVE APPROACHES TO MEETING THE IDENTIFIED NEED

A. Standard of Review

General Laws, c. 164, § 69J requires a project proponent to present alternatives to the proposed facility, which may include: (1) other methods of transmitting or storing energy; (2) other sources of electrical power or natural gas; and (3) a reduction of requirements through load management. Vineyard Wind LLC, EFSB 17-05/D.P.U. 18-18/18-19, at 16 (2019) ("Vineyard Wind"); NSTAR Electric Company d/b/a Eversource Energy, EFSB 16-02/D.P.U. 16-77, at 13-14 (2018) ("Needham-West Roxbury"); Colonial Gas (2016) at 11.[13] In implementing its statutory mandate, the Siting Board requires an applicant to show that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, and ability to meet the identified need. Vineyard Wind at 16; Needham-West Roxbury at 13-14; Colonial Gas (2016) at 11. In addition, the Siting Board requires a petitioner to consider reliability of supply as part of its showing that the proposed project is superior to alternative project approaches. Vineyard Wind at 13-14; Colonial Gas (2016) at 11; Berkshire Gas (2006) at 12-13.

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[13] G.L. c. 164, § 69J also requires an applicant to present "other site locations." This requirement is discussed in Section IV, below.

B. Identification of Alternative Approaches for Analysis

Colonial analyzed alternatives to meet the primary need of facilitating ILI on the Tewksbury Line System (Exh. NG-2, at 3-1). Each alternative was evaluated with respect to its ability to satisfy the identified need on the bases of reliability, environmental impact, and cost, as well as on any incremental reliability benefits (i.e., operational flexibility in addressing low delivery pressures from TGP and long-term capacity requirements) (id.). The Company identified and analyzed four pipeline replacement alternatives: (1) the Project; (2) replacement of the Highway Crossing with other upgrades to the Tewksbury Mainline; (3) replacement of the Doane and Wilbur Laterals with a single lateral serving both the Doane GRS and Wilbur GRS; and (4) a full Tewksbury Line System upgrade (id. at 3-2; Exh. EFSB-P-8).[14]

1. Lowell Area Gas Modernization Project

As discussed above, the Project would replace the Highway Crossing portion of the Tewksbury Mainline and Wilbur Lateral in its entirety to achieve 5.85 miles of consistent, twelve-inch diameter pipeline between the Tewksbury Take Station in Tewksbury and the Wilbur GRS in Lowell (Exh. NG-2, at 3-6). Colonial stated that it would locate the majority of the replacement pipeline within the existing ROW, adjacent to the existing pipeline, with minor deviations around the edges of commercial properties and a more direct Highway Crossing alignment (id.). The Project would enable the Company to conduct ILI activities using a single twelve-inch free-swimming pig along the Tewksbury Mainline and Wilbur Lateral (id.).

The Company stated that the Project also includes the following elements that are required to fully enable the Tewksbury Mainline and Wilbur Lateral for ILI: (1) installation of a pig launcher at the Tewksbury Take Station; (2) replacement of fittings at the Tewksbury Take Station; (3) replacement of a pipe elbow near Whipple Road in Tewksbury; (4) replacement of a

[14] In addition to the pipeline replacement alternatives, the Company provided information on "no build" and "enhanced energy efficiency" alternatives; however neither of these alternatives would address the primary project need of enabling the pipeline for ILI (Exh. NG-2, at 3-1 to 3-2). Nevertheless, Colonial stated that it remains committed to the success of its existing energy efficiency programs (id. at 3-1; Tr. 1, at 95-96).

pipe "tee" at the Brick Kiln Road GRS in Chelmsford; and (5) installation of a pig receiver at the Wilbur GRS (id.).

Under the proposed Project, the Doane Lateral would remain as an eight-inch diameter pipeline (id.at 2-7; Exh. EFSB-P-8). The Company indicated that, unlike the Tewksbury Mainline and Wilbur Lateral, the relatively short and straight reach of the Doane Lateral could accommodate a robotic pig (Exh. NG-2, at 2-7). Colonial indicated that, following completion of the Project, it intends to also modify the Doane Lateral to accommodate robotic pigging (id.). The Company estimated that the upgrades required to enable the Doane Lateral for robotic pigging would cost approximately $900,000 (-50/+50 percent) (RR-EFSB-7).

Environmental impacts of the Project are discussed in Section V, below. In general, there would be temporary construction impacts to land use and wetlands, and noise impacts associated with horizontal directional drill ("HDD") work at entry and exit points, and with the replacement of the Wilbur Lateral (Exh. NG-2, at 3-6). The Company stated that three waterbody crossings would be required, including: River Meadow Brook, Black Brook, and the Middlesex Canal (Exh. NG-8, at 49). The Company noted that no permanent aboveground equipment would be constructed outside of Colonial's existing facilities, and that the proposed Project would eliminate the need for ongoing excavations required by the current ECDA inspection program (Exh. NG-2, at 3-6).

With respect to reliability, the Company stated that the Project fully meets the identified need of internally inspecting the Tewksbury Mainline and Wilbur Lateral and has the operational advantage of completing ILI in a single run (id.). The Company stated that the Project provides an optimum diameter for ILI technology because twelve-inch pigs have a more compact design, greater battery capacity, more advanced instrumentation, and greater maneuverability (id. at 3-4). The Company also noted that constructing the pipeline within a ROW it controls has additional reliability benefits such as reducing the risk of third party damage and allowing the Company to readily perform necessary maintenance (RR-EFSB-49). Replacing smaller diameter pipeline segments with twelve-inch pipe would provide incremental reliability and capacity benefits by reducing the minimum design day delivery pressure from 475 psig to 335 psig and increasing pipeline capacity by 3,250 decatherms per hour ("dth/hr") (Exh. NG-2, at 3-6, 3-11). The

Company stated that a lower minimum TGP delivery pressure would minimize the Company's reliance on LNG to mitigate low delivery pressure and reduce the chance of service interruptions to customers on the 60 psig portions of the Lowell Distribution System (id. at 2-10). The cost for the Project as proposed is approximately $32.8 million (-25/+50 percent) (id. at 1-9).

2. Highway Crossing Replacement

The Company described an alternative that would extend the twelve-inch ILI capability of the Tewksbury Mainline under the Highway Crossing by replacing the existing six-inch and eight-inch pipeline segments with a single twelve-inch pipeline, and separately accommodating ILI of the six-inch Wilbur Lateral (Exh. NG-2, at 3-3). Under this Alternative, ILI runs would be completed separately for the Tewksbury Mainline and the Wilbur Lateral by free-swimming pigs designed for their respective pipeline diameters (id.). Components of this alternative include: (1) installation of a twelve-inch pig launcher at the Tewksbury Take Station; (2) replacement of the Tewksbury Mainline segments at Brick Kiln Road and Whipple Street; (3) replacement of the existing six-inch and eight-inch line segments under the Highway Crossing with a twelve-inch pipe, via HDD; (4) installation of both a twelve-inch pig receiver and a six-inch pig launcher in the vicinity of the juncture of the Tewksbury Mainline and Wilbur Lateral, installed on property that is currently private; (5) installation of a six-inch pig receiver at Wilbur GRS; and (6) replacement of 174 feet of eight-inch pipe with six-inch pipe to make the entire Wilbur Lateral a consistent pipe diameter (id. at 3-3, 3-5).

Although the Highway Crossing Replacement could somewhat reduce construction impacts compared to a full replacement of the Wilbur Lateral (e.g., trenching and waterbody crossings), Colonial stated that this alternative would still result in temporary construction impacts to land use and wetlands, and noise from HDD activities (Exh. NG-2, at 3-4). This alternative would also require the installation of a new aboveground facility containing a six-inch pig launcher and a twelve-inch pig receiver, which would not be required for the Project (id. at 3-3). Such a facility would be located near the junction of the Tewksbury Mainline and Wilbur Lateral, occupying approximately 3,700 square feet of third-party private property, and resulting in permanent land

use and visual impacts (Exh.EFSB-PA-7). According to the Company, the launcher and receiver facilities would likely be installed in or adjacent to wetlands (Exh. NG-2, at 3-5).

The Company stated that enabling the existing six-inch Wilbur Lateral for ILI would require additional engineering, testing, and physical modifications involving temporary construction impacts to land use and wetlands, and noise impacts to abutters (id. at 3-3 to 3-4). Specifically, Colonial maintained that it would need to excavate, inspect, and measure nearly every fitting on the existing Wilbur Lateral to determine if a six-inch diameter pig could pass through the pipeline (Tr. 1, at 95). The Company characterized this work as nearly as intrusive as replacing the Wilbur Lateral in full (id.). Although the Highway Crossing Replacement would avoid one perennial stream crossing (Black Brook), the Company noted that the portion of eight-inch main crossing River Meadow Brook would need to be replaced to provide a uniform six-inch pipeline diameter suitable for pigging (Exh. NG-2, at 3-5).

With respect to reliability, the Company stated that this alternative would meet the identified need of enabling internal inspection of the Tewksbury Mainline and the Wilbur Lateral (id.). However, the Company stated that using six-inch and twelve-inch pigs to complete separate ILI runs is operationally inferior and more expensive compared to the single twelve-inch ILI run enabled by the Project (id. at 3-3). The Company characterized six-inch pigs as being more elongated and less maneuverable, and therefore having a higher chance of becoming lodged within a pipe, as compared to a twelve-inch pig (id. at 3-4; Tr. 1, at 93-94). With respect to pipeline capacity, Colonial stated that replacing the Highway Crossing segment with twelve-inch pipeline would provide some incremental reliability and capacity benefits, reducing the minimum design day delivery pressure to 385 psig, and providing a modest capacity increase of 1,250 dth/hr (Exh. NG-2, at 3-4, 3-11). The Company estimated the Highway Crossing alternative would cost approximately $14.6 million (id. at 3-5).

3. Single Doane-Wilbur Lateral

The Company described an alternative that meets the identified need of making the Tewksbury Line System ILI-capable by replacing the Doane Lateral and Wilbur Lateral with a single, new twelve-inch lateral serving both the Doane GRS and Wilbur GRS (Exh. NG-2, at 3-7,

3-9). This alternative would also replace the existing Highway Crossing with a single twelve-inch pipeline, providing a consistent pipeline diameter between the Tewksbury Take Station and the Wilbur GRS (id. at 3-9). Under this alternative, the Company would complete ILI activities on the Tewksbury Mainline and a new lateral serving the Doane GRS and Wilbur GRS in a single run using a single twelve-inch free-swimming pig (id.). Completing this alternative would involve: (1) installing a twelve-inch pig launcher at the Tewksbury Take Station; (2) replacing segments of the Tewksbury Mainline at Brick Kiln Road and Whipple Street; (3) installing a new twelve-inch pipeline from the end of the Highway Crossing to the Doane and Wilbur GRSs; and (4) installing a twelve-inch pig receiver at Wilbur GRS (id.). The route for the combined Doane-Wilbur Lateral would use the existing Doane Lateral ROW, the streets of Lowell, and a portion of the existing Wilbur Lateral ROW (id.).[15]

The Company stated that the Single Doane-Wilbur Lateral would involve temporary construction impacts related to land use and wetlands, and noise associated with work at the HDD entry and exit points and the construction of the new Doane-Wilbur Lateral (Exh. NG-2, at 3-9 to 3-10). Constructing the Doane-Wilbur Lateral would involve open trenching within the existing Doane and Wilbur ROWs, and in-street construction through the City of Lowell (id. at 3-9). The Company noted that in-street construction along Doane Street and Jenness Street could also have impacts to sensitive receptors including schools and parks (id. at 3-9 to 3-10). In addition, the Single Doane-Wilbur Lateral would cross three water bodies, including the former Middlesex Canal (id. at 3-10).

With respect to reliability, this alternative would meet the primary need by allowing the Company to conduct ILI activities with a single free-swimming twelve-inch pig along the Tewksbury Mainline and a new lateral serving the Doane and Wilbur GRSs (Exh. NG-2, at 3-9). This alternative could accommodate TGP delivery pressures at the Tewksbury Take Station as low as 335 psig and provide an incremental capacity increase of 3,000 dth/hr (id. at 3-11). The Company stated that a drawback of the single Doane-Wilbur Lateral would be the elimination of redundancy between the Wilbur and Doane Laterals (id. at 3-9). Currently, the Wilbur and Doane

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[15] The Company stated that the new lateral would connect the Doane GRS to the Wilbur GRS via Doane Street, Jenness Street, and the existing Wilbur ROW (Exh. NG-2, at 3-10).

Laterals are in a "Y" configuration and have overlapping downstream distribution networks (Exh. EFSB-PA-9). The Company explained that this configuration allows a service interruption on the one lateral to be mitigated by gas supplied from the other lateral (id.). The Company estimated the cost for this alternative to be approximately $36.6 million (Exh. NG-2, at 3-10).

4. Full Tewksbury Line System Upgrade

The Company described an alternative that fully meets and possibly exceeds the identified need by replacing the Highway Crossing, the Wilbur Lateral, and the Doane Lateral with twelve-inch coated-steel pipeline (Exh. EFSB-P-8). The replacement pipeline segments would follow existing pipeline ROWs (id.). Colonial stated that although the alternative would provide a consistent pipeline diameter for the entire Tewksbury System, ILI activities on the Doane Lateral would need to be completed separately with a twelve-inch free-swimming pig that would require the installation of a pig launcher on private, commercial property near the HDD exit point, and the installation of a pig receiver at the Doane GRS (id.). Colonial reported that, like the Project, this alternative would require: (1) the installation of a launcher and replacement of fittings at the Tewksbury Take Station; (2) the replacement of an elbow near Whipple Road in Tewksbury; (3) the tee replacement at the Brick Kiln Road GRS in Chelmsford; and (4) the installation of a pig receiver at the Wilbur GRS (id.).

The Company stated that implementing this alternative would involve temporary construction impacts related to land use and wetlands, and noise associated with work at the HDD entry and exit points; pipeline replacements along the Wilbur ROW and Doane ROW; and construction of the various project elements described above (Exh. EFSB-P-8). This alternative would also entail permanent land use and visual impacts beyond the proposed Project, including the construction of a pig launcher on private property and the expansion of the Doane GRS to accommodate a pig receiver (id.). Replacing the Doane Lateral would require construction across Micky Ward Circle, potentially causing traffic impacts during construction and requiring significant utility relocations (id.). Furthermore, the Company stated that replacing the Doane Lateral would involve an additional crossing of River Meadow Brook (id.).

With respect to reliability, this alternative would meet the identified need by facilitating ILI activities on the Company's higher-pressure Tewksbury Line System (Exh. EFSB-P-8). The Company would be able to use a single twelve-inch free-swimming pig to inspect the Tewksbury Mainline and Wilbur Lateral between the Tewksbury Take Station and Wilbur GRS, and separately, use a twelve-inch free-swimming-pig to inspect the Doane Lateral from a launcher near the HDD exit point (id.). The Company stated that this alternative would provide an incremental capacity increase of 3,600 dth/hr and allow the Company to operate reliably during design day conditions when delivery pressures from TGP are as low as approximately 285 psig (id.).

The Full Tewksbury Line System Upgrade alternative was estimated to cost $43.4 million (Exh. EFSB-P-8). The Company noted that this cost estimate excludes the necessary acquisition of property rights: (1) for a pig launcher facility along the Doane ROW near the HDD exit point; (2) for a 75-foot-wide temporary construction work area; and (3) for expanding the Doane GRS footprint to accommodate a pig receiver (id.).

Because it is possible to complete ILI activities on the Doane Lateral using a robotic pig (ideal for relatively short, straight pipeline segments), the Company indicated that the additional cost and environmental impacts associated with this alternative, as compared to the proposed Project, are not warranted (id.). Furthermore, the Company indicated that it is not required to replace the Doane Lateral because, based on its history and characteristics, it is not obligated by the pending PHMSA regulations to reconfirm the MAOP of the Doane Lateral (Tr. 2, at 304-305).

5. Comparison of Project Alternatives

Comparing the above project alternatives, the Company provided the information shown on Table 3, for cost and reliability factors. Among the alternatives presented in Table 3, the Company indicated that the Highway Crossing Replacement alternative would have the least environmental impacts, while the Full Tewksbury Line System Upgrade alternative would have the greatest environmental impacts (Exhs. NG-2, at table 3-1; EFSB-P-8; RR-EFSB-51). With respect to the Single Doane-Wilbur Lateral and the Project, the Project has greater wetlands impacts but less community impacts from roadway work than the Single Doane-Wilbur Lateral alternative (Exhs. NG-2, at table 3-1; EFSB-P-8; RR-EFSB-51).

Table 3. Comparison of Project Alternatives

Option	Cost ($ million)	Minimum TGP Delivery Pressure Needed (psig)	Additional Capacity (dth/hr)
Highway Crossing Replacement	14.6	385	1,250
Lowell Area Gas Modernization Project (**the Project**)	32.8	335	3,250
Single Doane-Wilbur Lateral	36.6	335	3,000
Full Tewksbury Line System Upgrade	43.4	285	3,600

Sources: Exhs. NG-2, at table 3-1; EFSB-P-8

C. Positions of the Parties

Ms. Kristofferson argues that the Highway Crossing Replacement alternative would be superior to the Project given that it satisfies the stated project goal, has fewer environmental impacts, and is approximately half the cost of the proposed project (Kristofferson Brief at 3-4, citing Exh. NG-2, at 3-5). Ms. Kristofferson challenges the Company's testimony that six-inch diameter pigs are difficult to obtain by asserting that the forthcoming PHMSA regulations related to ILI could drive market demand and subsequent availability of smaller pig technology (Kristofferson Brief at 4, citing Tr. 1, at 36). Ms. Kristofferson also argues that the Company did not adequately develop an energy efficiency alternative to address potential increased customer demand (Kristofferson Brief at 3).

The Company contends that its analysis of alternatives demonstrates that the Project best meets the identified need, with a minimum impact on the environment at the lowest possible cost (Company Brief at 33). In response to Ms. Kristofferson, the Company notes that under the Highway Crossing Replacement, the Tewksbury Mainline would consist of twelve-inch diameter pipe, while the Wilbur Lateral would employ six-inch diameter pipe (id. at 35, citing Exhs. NG-2, at 3-3, NG-8, at 26; Company Reply Brief at 1). Consequently, the Company would need to use two different sets of ILI tools, and it would need to inspect the two parts of the pipeline system in separate ILI runs (Company Reply Brief at 1, citing Exh. KT-PR-1; Tr. 1, at 90-91). In order to do this, the Company states that it must install a six-inch launcher and a twelve-inch receiver above the ground on private property that is located close to the existing line and to the HDD exit point

of the Highway Crossing (Company Reply Brief at 1, citing Exh. KT-PR-1; Tr. 1, at 90-92). Consequently, the Company argues it would need to obtain property rights to install the launcher and receiver and to allow it access to those facilities in order to perform ILI (Company Reply Brief at 1, citing Exh. KT-PR-1). Because the area in question is already in intensive commercial use, the Company voices caution that it could obtain these rights (Company Reply Brief at 1-2, citing Exh. KT-PR-1). Accordingly, the Company concludes that the Highway Crossing Replacement alternative might not be feasible, and even if feasible, would result in increased visual impacts due to the construction of the additional pig launcher and receiver (Company Reply Brief at 1-2, citing Exh. KT-PR-1).

Second, the Company argues that using a six-inch-diameter pig for ILI is much more difficult than using a twelve-inch-diameter pig (Company Reply Brief at 2, citing Exhs. KT-PR-1; EFSB-PA-5; Tr. 1, at 90-93). The Company explains that a six-inch-diameter pig is longer and less maneuverable than the twelve-inch-diameter pig, especially when navigating a bend in the pipeline (Company Reply Brief at 2, citing Exh. EFSB-PA-5; Tr. 1, at 35-37). The Company concludes that use of a twelve-inch diameter pipeline, rather than a six-inch diameter pipeline, would allow the Company to best maintain its gas transmission system and to optimize safety, reliability, and performance (Company Reply Brief at 2).

Third, the Company asserts that it may have originally underestimated the actual costs and impacts of the Highway Crossing Replacement Alternative (Company Reply Brief at 2, citing Exhs. NG-2, table 3-1; KT-PR-1; Tr. 1, at 95). The Company had noted that the Wilbur Lateral was installed in the 1950s and it was not designed to accommodate ILI (Company Reply Brief at 2, citing Exh. KT-PR-1). The Company doubts that it would be possible for a six-inch pig to perform ILI of the Wilbur Lateral without significant modifications to the pipeline (Company Reply Brief at 2, citing Exh. NG-2, at 3-3; KT-PR-1; Tr. 1, at 93-95). These modifications would "be almost as intrusive as putting a new pipeline in" (Company Reply Brief at 2, citing Tr. 1, at 95; see also Exh. KT-PR-1). As such, the Company argues that using the Highway Crossing Replacement alternative is likely to involve significant drawbacks with little or no corresponding benefit (Company Brief at 37, citing Exh. NG-2, at 3-5).

D. Analysis and Findings on Alternative Approaches

As described above, the Company identified a number of potential alternative approaches to meeting the identified need. The record shows that "no build" and enhanced energy efficiency alternatives would not allow the Company to implement ILI and as such would not meet the identified need. The Project, Highway Crossing Replacement, Single Doane-Wilbur Lateral, and Full Tewksbury Line System Upgrade involve varying degrees of pipeline replacement and all enable the Tewksbury Line System for ILI. The pipeline replacement alternatives are considered further below.

With respect to reliability, the record shows that the Highway Crossing Replacement alternative is less reliable than the Project because it would use inferior pig technology that is operationally less efficient, and provides the least flexibility in accommodating lower TGP delivery pressure or providing added capacity to the Tewksbury Line System.[16] The Single Doane-Wilbur Lateral alternative would use a twelve-inch pig, lower the minimum TGP delivery pressure, and provide a capacity increase; however, it would eliminate the current "Y" configuration that provides redundancy for the Lowell Distribution System, which would be preserved under the Project. The Project and the Full Tewksbury Line System Upgrade both use a twelve-inch pig, reduce the required minimum TGP delivery pressure, and provide extra capacity to the system. The Siting Board concludes that the Full System Upgrade is slightly preferable to the Project with respect to reliability, and that, in turn, the Project would be preferable to the Highway Crossing and Single Doane-Wilbur Lateral alternatives.

With respect to cost, the record shows that the Highway Crossing Replacement alternative is estimated to have the lowest cost, that the Project and the Single Doane-Wilbur Lateral have similar costs, and that the Full Tewksbury Line System Upgrade is significantly more expensive than the other pipeline alternatives considered.

With respect to environmental impacts, the record shows that the Project and the Highway Crossing Replacement alternative would have similar environmental impacts. While the Highway Crossing Replacement alternative would avoid wetland impacts associated with the replacement of

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16 The Company also noted significant uncertainty as to whether or not this alternative was feasible to implement.

the Wilbur Lateral, these impacts would largely take place within a previously disturbed ROW. Furthermore, the Highway Crossing Replacement alternative would require incremental permanent facilities beyond those of the Project, with corresponding land use and visual impacts, and would entail impacts from the testing and retrofitting of pipeline welds that would be required to make the six-inch Wilbur Lateral piggable. The Single Doane-Wilbur Lateral would avoid some wetland impacts for the in-street portion of the replacement, but instead would traverse commercial and residential streets with sensitive receptors. The Full Tewksbury Line System Upgrade would entail similar wetland impacts as the Project, but requires incremental permanent facilities, and would cause greater traffic impacts. The record shows that all of the pipeline alternatives involve environmental impacts related to HDD installation of the Highway Crossing, and all involve at least one waterbody crossing. Accordingly, the Siting Board concludes that the Project and Single Doane-Wilbur Lateral alternatives would have comparable environmental impacts, and that the Project and the Single Doane-Wilbur Lateral are each preferable to the Highway Crossing alternative and Full Tewksbury Line System Upgrade.

Although the Project and the Full Tewksbury Line System Upgrade are roughly comparable with respect to reliability, the Full Tewksbury Line System Upgrade has greater environmental impact stemming from replacement of the Doane Lateral, which is not warranted at this time. In addition, the Full Tewksbury Line System Upgrade is estimated to be nearly fifty percent more expensive than the Project. The Single Doane-Wilbur Lateral alternative has comparable environmental impacts to the Project, however, it has reliability disadvantages and offers no cost savings. While the Highway Crossing Replacement is significantly less expensive than, and has comparable environmental impacts to the Project, it offers significantly lower reliability and operational benefits than the Project. In comparison to the Project, the Highway Crossing Replacement would yield a less robust Tewksbury Line System for meeting the long-term energy needs in the Lowell area. For these reasons the Siting Board rejects Ms. Kristofferson's argument in favor of the Highway Crossing Replacement alternative. Accordingly, the Siting Board finds, on balance, that the Project is superior to the other alternatives with respect to meeting the identified need and providing a reliable energy supply for the Commonwealth with minimum impact on the environment at the lowest possible cost.

IV. ROUTE SELECTION

A. Standard of Review

Section 69J requires the Siting Board to review alternatives to planned projects, including "other site locations." In implementing this statutory mandate, the Siting Board requires a petitioner to demonstrate that it has considered a reasonable range of practical siting alternatives, while seeking to minimize cost and environmental impacts and ensuring a reliable energy supply. Vineyard Wind at 19; Needham-West Roxbury at 21; Colonial Gas (2016) at 20; New England Power Company d/b/a National Grid, EFSB 13-2/D.P.U. 13-151/13-152, at 34-35 (2014) ("Salem Cables"). To do so, an applicant must satisfy a two-pronged test: (1) the applicant must first establish that it developed and applied a reasonable set of criteria for identifying and evaluating alternative routes in a manner that ensures that it has not overlooked or eliminated any routes that, on balance, are clearly superior to the proposed route; and (2) the applicant must establish that it identified at least two noticed sites or routes with some measure of geographic diversity. NSTAR Electric Company d/b/a Eversource Energy, EFSB 15-04/D.P.U. 15-140/15-141, at 34-35 (2018) (Woburn-Wakefield); Colonial Gas (2016) at 20-21; Salem Cables at 34-35. However, given that the designation of a noticed alternative route: (1) is not required by statute; (2) necessitates that a project proponent expend significant funds in both developing and supporting a noticed alternative route; and (3) has the potential to raise concern unnecessarily among potential abutters and other in the affected communities, the Siting Board has indicated that a noticed alternative route may not be warranted in all cases. Colonial Gas (2016) at 21; New England Power Company d/b/a National Grid, 20 DOMSB 1; EFSB 12-1/D.P.U. 12-46/12-47, at 46 (2014) ("IRP").

B. The Company's Route Selection Process

The Company stated that it conducted a two-pronged route analysis for distinct elements of the Project: (1) the Highway Crossing, and (2) the Wilbur Lateral replacement (Exh. NG-2, at 4-1). For the Highway Crossing, the Company assessed six potential HDD alignments on the bases of technical feasibility and cost (id.). For the Wilbur Lateral replacement, the Company's

routing analysis involved identifying a study area, selecting route alternatives, scoring and ranking the alternatives using a set of environmental, community, and engineering criteria, and evaluating the ranked alternatives based on cost and reliability (id.).[17] Routing analysis for the Wilbur Lateral replacement focused on alternatives that begin at the preferred Highway Crossing exit point, but also evaluated route segments that could be combined with the second-ranked Highway Crossing HDD exit point (id.). Colonial indicated that the route selection process considered a variety of distinct routing opportunities including the Wilbur and Doane ROWs, the U.S. Route 3 layout, an electrical utility right of way, and residential streets (id. at 4-8).

The Company did not provide public notice of any proposal to construct the Project on any route other than the Primary Route (Exh. NG-2, at 4-22). See Section IV.C, below. Colonial stated that the development of a noticed alternative route would require a significant expenditure of funds and would cause unnecessary concern to potential abutters along that alternative route (id. at 4-23).

1. Highway Crossing Alignments

Colonial assessed six potential alignments for the Highway Crossing HDD based on technical, logistical, and environmental considerations such as available work space, drill path length, subsurface conditions, potential hazard of HDD fluids escaping the borehole to the surface (known as inadvertent return), and noise (Exh. NG-2, app. 4-1, at i).[18] The Company stated that the cost estimate of each alignment includes design/engineering, pipe and trenchless installation,

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17 The Company noted that certain aspects of the Project are fixed, and therefore were not subject to routing analysis (Exh. NG-2, at 4-1 to 4-2). The pipeline replacement would begin at the end of existing twelve-inch diameter Tewksbury Main Line at Riverneck Road, south of I-495, and end at the Wilbur GRS (id. at 4-8; see Exh. NG-2, at fig. 4-2). According to the Company, the pig launcher and receiver facilities must be placed at the Tewksbury Take Station and Wilbur GRS, respectively (Exh. NG-2, at 4-1). The Whipple Road elbow replacement in Tewksbury and the Brick Kiln Road tee replacement in Chelmsford are also Project elements that are necessarily at fixed locations and Colonial stated that there are no feasible alternative locations for these Project elements (id. at 4-2).

18 Other factors considered by the Company included pipe assembly area, existing utilities and structures, property access, property impact, traffic impact, and sensitive areas (Exh. NG-2, app. 4-1, at i).

and construction monitoring costs (id., app. 4-1, at table 1). The assessment of technical factors was supported by land parcel research, Quality Level D Subsurface Utility Engineering survey ("SUE") of potential HDD entry and exit locations, and an environmental assessment based on publicly available records (Exh. NG-2, at 4-4).[19]

The Company stated that its HDD Alignment 1 had the highest (best) technical/logistical ranking and was estimated to have the lowest cost of the six alignments assessed; therefore, the Company proposed Alignment 1 as the Highway Crossing alignment for its Primary Route (Exh. NG-2, at 4-8). The Company explained that the other alignments had longer drill paths, which require longer drill times and therefore have a higher risk of borehole collapse (id., app. 4-1, at 8). The Company also noted that longer drill paths typically require higher drill-fluid pressures, which increase the risk of inadvertent return of drilling fluid to the ground surface (id.). The Company determined that Alignment 2 had the lowest technical/logistical ranking due in part to the highly restrictive exit point located behind a car dealership (id., app. 4-1, at 12, 14). The exit points of Alignments 3, 4, and 5 would likely entail traffic disruptions at the Micky Ward Circle and encounter a high density of existing utilities (id., app. 4-1, at table 1). Alignment 6 would have the longest drill path, the longest construction duration, and the highest cost (id.). The Company estimated Alignment 1 to have a construction and design cost of $3,556,000, which is approximately 27 percent less than the next least expensive HDD alignment (id.)

Alignment 1 begins at an entry point at 128/140 Riverneck Road and travels approximately 1,925 feet to an exit point located in a commercial parking lot located at 32 Reiss Avenue (Exh. NG-2, at 4-6). The Company stated that the entry and exit points provide unrestricted workspace and reasonable staging areas for pipe assembly and HDD pull back (id. at 4-8).

Colonial assessed the potential environmental risk of HDD Alignment 1. Although other HDD alignments had a lower risk of inadvertent return of drilling fluids to wetlands, Colonial stated that it would mitigate this risk by installing conductor sleeves at the entry and exit points

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[19] The Company stated that a Quality Level D SUE only provides a basic level of information for utility locations, is limited in terms of comprehensiveness and accuracy, and is primarily used for project planning (Exh. NG-2, at 4-4).

(Exhs. NG-2, app. 4-1, at 9).[20] Based on its review of available public records Colonial determined that there would be a low risk of encountering contaminated soil or groundwater along Alignment 1 (id., app. 4-1, at 4 to 5). The Company reported that there are: (1) no active disposal sites regulated by Massachusetts Department of Environmental Protection ("MassDEP") within HDD Alignment 1; (2) one active disposal site within a quarter mile; and (3) two additional active disposal sites within a half mile (id., app 4-1, at 5). The Company completed soil borings and environmental testing along Alignment 1 and reported that these tests confirmed there is a low risk of encountering contaminated soil or groundwater during the HDD process (Tr. 2, at 276-279).

After selecting Alignment 1, the Company conducted a Level A SUE of the HDD path to locate existing utilities (Tr. 1, at 141-142; Tr. 2, at 278; EFSB-RR-13). The Company explained that a Level A SUE provides the highest level of accuracy in locating and mapping existing utilities (EFSB-RR-13). The Company stated that Alignment 1 would have relatively limited traffic impacts, notwithstanding Canal Street in Chelmsford which would need to be closed for approximately two days during HDD pull back (Exh. NG-2, app. 4-1, at 12; Tr. 1, at 137). The Company explained that Canal Street only provides access to a facility operated by the East Chelmsford Water District, which would be provided temporarily through an adjacent cemetery (Tr. 1, at 137).

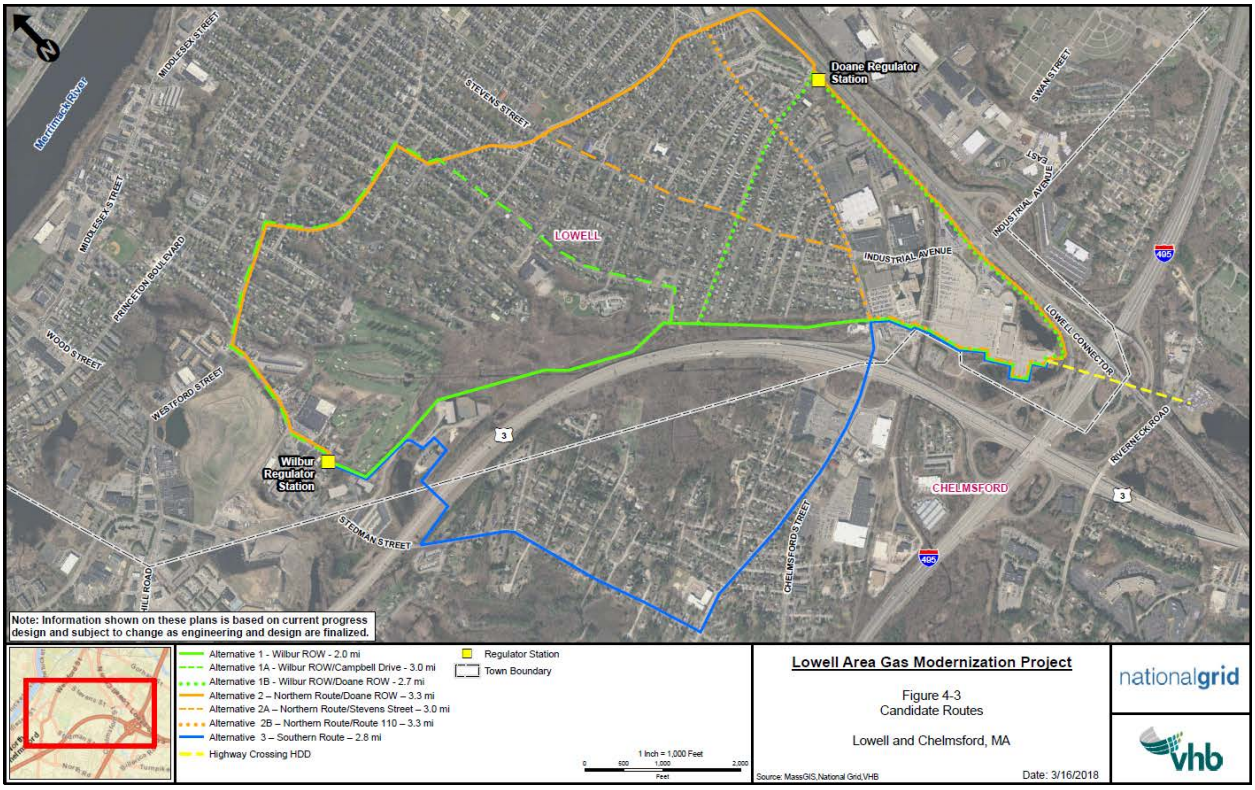
2. Wilbur Lateral Replacement Route Alternatives

As an initial step of the routing analysis for the Wilbur Lateral replacement, Colonial stated that it developed a study area that included routing opportunities that would provide a relatively direct connection between the HDD exit point and the Wilbur GRS (Exh. NG-2, at 4-8). The study area was bounded on the south by I-495, on the north by Westford Street (Route 3A), and on the east by the Lowell Connector, while it extended west into a residential neighborhood in Chelmsford, west of Route 3 (id. at 4-8 and fig. 4-2).

[20] A conductor sleeve is a steel casing that is driven into the ground at a specific angle at the entry and/or exit to facilitate drilling and reduce the risk of inadvertent fluid returns at the start and end of the drill (Exh. NG-2, app 4-1, at 9).

Colonial identified a total of seven routing alternatives; some route alternatives share common elements and are named accordingly (Exh. NG-2, at fig. 4-3). Alternative 1 – Wilbur ROW is the Primary Route and follows the existing ROW (id. at 4-15). Alternative 1A – Wilbur ROW/Campbell Drive and Alternative 1B – Wilbur ROW/Doane ROW use a combination of the existing ROW and public roadways (id. at 4-16). Alternative 2 – Northern Route/Doane ROW, Alternative 2A – Northern Route/Stevens Street, Alternative 2B – Northern Route/Route 110 predominately follow public roadways northeast of the existing ROW (id. at 4-16 to 4-17). Alternative 3 – Southern Route predominately follows public roadways south of Route 3 (id. at 4-17 to 4-18). Wilbur Lateral replacement route alternatives are shown below on Figure 2.

Figure 2. Wilbur Lateral Replacement Route Alternatives



Source: Exh. NG-2, at fig. 4-3.

After the route analysis, the Company evaluated several workarounds that alter the second half of the primary route between West Forest Street and the Wilbur GRS, described in more detail in the next section (Exh. NG-2, at 4-23 to 4-26; EFSB-RS-6). The Company also evaluated

additional in-street routes requested by the Massachusetts Environmental Policy Act ("MEPA") Office during the Company's Environmental Notification Form ("ENF") review (Exh. NG-8, at 50).

a. Company's Assessment of the Wilbur Lateral Replacement Route Alternatives

Colonial conducted a comparative analysis of the seven Wilbur Lateral replacement route alternatives by scoring and ranking each route alternative against 15 selection criteria grouped into three categories: built environment; natural environment; and constructability (Exh. NG-2, at 4-10 to 4-11). Built environment criteria included: (1) residential land uses; (2) commercial land uses; (3) recreational land uses; (4) sensitive receptors; (5) cultural resources; (6) potential for traffic congestion; (7) public transportation; and (8) potential to encounter subsurface contamination (id.). Natural environment criteria included: (1) tree clearing; (2) public shade trees; and (3) wetland resource areas (id.). Constructability criteria included: (1) route length; (2) waterway crossings; (3) highway crossings; and (4) existing utility density (id.).

The Company noted that there are no Areas of Critical Environmental Concern, Outstanding Resource Waters, or Article 97-protected lands within the Project Study Area; therefore, these considerations were not included as criteria in its evaluation (Exh. NG-2, at 4-11).

Colonial stated that to complete a comparative analysis of the seven route alternatives it developed a scoring technique that incorporated raw data for each criterion (id. at 4-18). The Company normalized raw criteria data relative to the route alternative with the greatest impact to arrive at a "ratio score" between "0" and "1" (id. at 4-18 to 4-19). The Company designated weights (1, 2, or 3) for each scoring criterion, intended to reflect the relative importance of the various criteria (id.). The Company assigned triple weight ("3") to residential land uses, sensitive receptors, potential for traffic congestion, and existing utility density; double weight ("2") to wetland resource areas, commercial land uses, recreational land uses, highway crossings; and the remainder of criteria were assigned a weight of "1" (id.). The Company multiplied ratio scores by the respective weight of each criterion, and then summed the weighted score of all criteria for each route alternative to yield a Total Environmental/Constructability Score (id.). The Company used the Total Environmental/Constructability Scores to rank the route alternatives (id. at 4-21).

The Company presented preliminary cost estimates for each routing alternative, which are based on construction cost per mile multiplied by the length of the route (Exh. NG-2, at 4-21). The Company noted that the cost estimates only reflect replacement of the Wilbur Lateral and do not include the Highway Crossing HDD or other project elements on the Tewksbury Mainline that are common to all route alternatives (id.). According to the Company, Alternative 1 would cost $14.9 million, which is $1.6 million less than the next lowest cost route alternative (id.). Table 4 provides a summary of the weighted ratio scores, weighted ratio score ranking, cost estimates, cost estimate ranking, and length of each of the Wilbur Lateral replacement route alternatives (id.).

Table 4. Weighted Scores and Costs of the Candidate Routes

Candidate Route	Description	Weighted Environmental Score	Environmental Score Ranking	Estimated Cost (millions)	Cost Ranking	Length (miles)
1	Wilbur ROW (Primary Route)	9.2	1	$14.94	1	2.0
1A	Wilbur ROW/ Campbell Drive	15.9	3	$20.96	3	3.0
1B	Wilbur ROW/ Doane Lateral	12.2	2	$15.59	2	2.7
2	Northern Route/ Doane Lateral	18.0	6	$23.20	4	3.3
2A	Northern Route/ Stevens Street	16.8	5	$24.50	6	3.0
2B	Northern Route/ Route 110	19.0	7	$26.85	7	3.4
3	Southern Route	16.2	4	$23.36	5	2.8

Adapted from: Exh. NG-2, at table 4-6 and table 4-7.

The Company asserted that the Project would be reliable using any of the seven routes described, but that minimizing the distance in public streets and the overall route length decreases the risk of third-party damage and confers a slight reliability advantage (Exh. NG-2, at 4-22; RR-EFSB-49). The Company reiterated that Alternative 1, which follows the existing Company-controlled ROW, is the shortest alternative, and has the least in-street construction (Exh. NG-2, at 4-22). The Company stated that utilizing a Company-controlled ROW allows the Company to expedite maintenance activities, given that there is not a need to avoid other utilities, or coordinate with a municipality for street opening permits and traffic management (RR-EFSB-49). Colonial

stated that based on its review of the cost, environmental impacts, and reliability of the seven routing alternatives the Company selected Alternative 1 as the Primary Route for the Wilbur Lateral replacement (Exh. NG-2, at 4-22).

Concerned that it might be unable secure necessary property rights and its desire for engineering flexibility for the Primary Route, Colonial identified two workarounds – the Stedman Street Workaround and the Route 3 Workaround – that would relocate a portion of the Wilbur Lateral outside the existing ROW near the northwestern end of the Primary Route (Exhs. NG-2, at 4-23; EFSB-CM-5; EFSB-CM-6). The Stedman Street Workaround would diverge from the Primary Route east of the former Middlesex Canal, continue west along the edge of the Route 3 highway layout, and turn north onto Old Canal Drive (Exh. NG-2, at 4-25). Once on Old Canal Drive, the Stedman Street Workaround would follow public roadways through a predominately commercial area and enter the Wilbur GRS via Wilbur Street (id.). The total length of the Stedman Street Workaround is 7,100 feet, which would increase the total length of the Preferred Route for the Wilbur Lateral replacement from approximately 10,500 feet to approximately 12,900 feet (id.). The Route 3 Workaround would follow the Stedman Street Workaround until part way down Old Canal Drive, where it would turn north, follow the perimeter of the Mount Pleasant Golf Club, then turn west and enter the Wilbur GRS (id.). The total length of the Route 3 Workaround is 5,000 feet, which would increase the total length of the Preferred Route for the Wilbur Lateral replacement to approximately 10,800 feet (id.).

Colonial requested approval of the Primary Route and the Primary Route with workarounds to avoid or minimize impacts to abutting property owners and wetland resource areas, and to provide flexibility to complete the Project as engineering details are finalized and land rights secured (Exh. NG-2, at 4-23; EFSB-CM-5; EFSB-CM-6). The Company stated that both workarounds would require the acquisition of additional property rights, increase the length of the Primary Route, and result in permanent wetland impacts adjacent to the Route 3 highway layout (Exh. NG-2, at 4-25, 4-26, 5-44). In general, the Company noted that longer routes and acquiring new property rights increases the cost of a route (Exh. EFSB-RS-6). The Company also noted that both workarounds involve using public streets as opposed to an available ROW, and therefore would have greater traffic impacts than the Primary Route (id.; Exh. NG-2, at 5-44).

At the request of Siting Board staff, the Company evaluated modifications to its proposed Primary Route and Route 3 Work-Around away from the Mount Pleasant Golf Club, which it called Reroute A and Reroute B, respectively; the modifications would use in-street construction for a portion of Olde Canal Drive that is parallel to the Mount Pleasant Golf Club and avoid some tree clearing and construction on the property of the Mount Pleasant Golf Club (Exh. EFSB-RS-6). The Company stated that Reroute A and B are generally feasible to construct and could reduce some impacts to the fourth hole of the Mount Pleasant Golf Club; however, according to the Company, either reroute would generate new tree and vegetation clearing on other properties, require additional property rights, and introduce pipeline bends that are difficult for a pig to follow (id.). As such, the Company submits that the Primary Route is favorable to Reroute A and Reroute B (id.).

At the request of the MEPA Office, the Company described additional route alternatives for the Wilbur Lateral replacement that would avoid impacts to wetlands by "constructing the pipeline within roadways closest to the northern edge of the ROW" (Exh. NG-8, at 50). The Company submitted three alternative routes, which it called Additional Route Alternatives A, B, and C, noting that options are limited because the majority of roads in that area are oriented east-west (id.). The Company stated that Additional Route Alternative A is identical to Route Alternative 2A, and that Additional Route Alternative B is largely a combination of Route Alternatives 1A and 2A, which are described above (EFSB-RR-47(S1)). Colonial stated that Additional Route Alternative C contains components of Route Alterative 2A and the Primary Route; where it does not follow previously assessed routes, Additional Route Alternative C traverses public roadways through residential areas (id.). Although full route scoring and analysis were not completed for Additional Route Alternatives B and C, the Company noted that these routes are essentially hybrids of previously analyzed routes, which scored worse than the Primary Route (id.). Accordingly, the Company contends its route selection process did not overlook any clearly superior routes (id.). The Company stated it did not evaluate the engineering feasibility of Additional Route Alternatives A, B, and C; using unit costs per foot, the Company estimated the construction costs at $23.4 million, $26.8 million, and $28.4 million, respectively (id.; Exh. EFSB-RR-48).

C. Analysis and Findings on Route Selection

The Siting Board requires that applicants consider a reasonable range of practical siting alternatives and that proposed facilities are in locations that minimize cost and environmental impacts. In past decisions, the Siting Board has found various criteria to be appropriate for identifying and evaluating route options for gas and electric transmission lines and related facilities, including criteria addressing natural resources, land use, community impact, constructability, cost, and reliability. Woburn-Wakefield at 140; Colonial Gas (2016) at 22, 23, 28; Berkshire Gas (2006) at 25. The record indicates that the Company developed numerous and reasonable screening criteria, which it used to evaluate the routing options. These criteria included environmental and community impacts as well as cost and reliability, and are consistent with the types of criteria that the Siting Board previously has found to be acceptable. The Siting Board has also found the specific design of scoring and weighting methods for chosen criteria to be an important part of an appropriate site selection process. Woburn-Wakefield at 35-47; Salem Cables at 38-39; Boston Edison Company, EFSC 89-12A, at 38-42 (1989). The Siting Board accepts the Company's scoring and weighting criteria.

The Siting Board notes that the Company did not provide a noticed alternative route. The Company maintained that a noticed alternative route is: (1) not required by statute; (2) would require a significant expenditure of funds; and (3) would potentially cause unnecessary concern among abutters to the alternative route. While the Siting Board has required past applicants to provide a noticed alternative route for their proposals, this practice is not mandated by Section 69J and, more recently, the Siting Board has accepted that a noticed alternative route may not be warranted in all cases. See Colonial Gas (2016) at 28. In this proceeding, where the proposed gas facilities would parallel and replace existing facilities for nearly the full length of the Primary Route, the Siting Board finds that the Company's decision to evaluate alternative routes, but not officially provide notice for an alternative route, to be reasonable. However, the Siting Board notes that this finding is based on the particular circumstances presented in this proceeding and that future proponents of jurisdictional facilities requiring Siting Board approval should continue

to follow the established practice of providing a noticed alternative route with their petitions unless unusual circumstances warrant otherwise.

Before assessing route alternatives for the Wilbur Lateral replacement, the Company considered several HDD alignments for the Highway Crossing. The Company's assessment of alignments considered technical feasibility, cost, and environmental impacts related to, among other things, noise, wetlands, subsurface contamination, and traffic. While Alignment 1 has a higher risk of inadvertent return of drilling fluids to wetlands, the record shows the Company would mitigate this risk by installing conductor sleeves. Otherwise, environmental impacts of Alignment 1 are similar or lower than other alignments. The Company selected Alignment 1, which has the shortest construction period, with generally favorable engineering and constructability conditions, and the lowest cost among the potential highway crossing alignments.

Given the opportunity to use an existing ROW, and the requirement for routes to interconnect the HDD exit point and the Wilbur GRS, the Company appropriately identified a study area that would encompass reasonable siting options. Applying reasonable criteria, the Company identified and evaluated alternative routes to the Primary Route to ensure that it did not overlook a clearly superior route for replacing the Wilbur Lateral. The Company examined possible routing options with diverse geographic considerations, including routes which utilized public roadways both north and south of Route 3. The Company performed an adequate comparative analysis of these alternatives, using its identified criteria. Upon completion of this analysis, the Company determined that none of the alternatives would result in a shorter or less costly project or have fewer overall community and environmental impacts than the Primary Route. The Company was also able to determine that neither Reroutes A or B, requested by Siting Board staff, nor Additional Routes A, B, or C, requested by the MEPA Office, are clearly superior to the Primary Route. The Siting Board accepts these comparisons and finds that the Company's selection of the Primary Route was reasonable.

The Siting Board notes that the Stedman Street Workaround and Route 3 Workaround proposed by the Company were not evaluated under the Company's full route selection scoring process. Although the Company's workarounds could provide some incremental flexibility, the record shows that both the Stedman Street and Route 3 Workarounds would result in greater traffic

disruptions during construction and permanent wetland impacts adjacent to Route 3, and would likely result in cost increases related to additional route length and property rights acquisition. In addition, the Company did not make a clear case that it would likely be impeded in constructing on the Primary Route.

Accordingly, the Siting Board declines to approve the Company's requested option of using the Stedman Street Workaround or the Route 3 Workaround. Should the Company be unable to secure property rights on the Primary Route, and find either of the workarounds to be necessary, the Company shall submit a project change filing to the Siting Board for its review and approval.

The Siting Board finds that the Company has: (1) developed and applied a reasonable set of criteria for identifying and evaluating alternative routes in a manner that ensures that it has not overlooked or eliminated any routes that are clearly superior to the Project; and (2) identified a range of practical pipeline routes with some measure of geographic diversity. Therefore, the Siting Board finds that the Company has demonstrated that it examined a reasonable range of practical siting alternatives while seeking to minimize cost and environmental impacts and ensuring a reliable energy supply.

V. MINIMIZATION OF ENVIRONMENTAL IMPACTS

A. Standard of Review

In implementing its statutory mandate under G.L. c. 164, §§ 69H and 69J, the Siting Board requires a petitioner to show that its proposed facility minimizes costs and environmental impacts while ensuring a reliable energy supply. Vineyard Wind at 35; Colonial Gas (2016) at 29 New England Power Company d/b/a National Grid, EFSB 10-1/D.P.U. 10-107/10-108, at 39 (2012) ("Hampden County"). To evaluate the proposed facility, the Siting Board first determines whether the petitioner has provided sufficient information regarding environmental impacts and potential mitigation measures to enable the Siting Board to make such a determination. The Siting Board then examines the environmental impacts of the proposed facility and determines: (1) whether environmental impacts would be minimized; and (2) whether an appropriate balance would be achieved among conflicting environmental impacts as well as among environmental impacts, cost

and reliability. Vineyard Wind at 35; Needham-West Roxbury at 32; see also Berkshire Gas (2006) at 31; Colonial Gas (2006) at 59-60.

B. Description of the Primary Route

The Company stated that the Project, using the Primary Route, would replace the Highway Crossing and would replace the Wilbur Lateral within the existing ROW, adjacent to the existing pipeline (Exh. NG-2, at 4-15). The existing Wilbur ROW continues northwest from the western end of the Highway Crossing, through mostly undeveloped properties on the northeast of Route 3 for about two miles to the Wilbur GRS (id. at 5-2). The Company noted that it shifted a portion of the Primary Route through 32 Reiss Avenue to follow the perimeter of the parking lot, and shifted approximately 1,450 feet of the alignment near West Forest Street a maximum of 175 feet north of the existing pipeline in order to accommodate utility clearance requirements along the New England Power Company ("NEP") overhead electric transmission ROW (Exhs. NG-8, at 15; EFSB-G-2).[21] In areas where the existing ROW is less than 30 feet wide, the Company is seeking to expand the permanent easement by approximately ten feet (Exh. NG-2, at 5-2).

C. Description of Construction Methods

According to the Company, Project construction would consist of distinct elements including the Highway Crossing Replacement, Wilbur Lateral replacement, installation of pig launching and receiving facilities, and replacement of minor sections of the Tewksbury Mainline (Exh. NG-2, at 1-9). The Company indicated that schedules for these individual construction activities would overlap and that construction would proceed simultaneously in multiple locations (id.).

The Company anticipates replacing the 2.0-mile Wilbur Lateral within its existing ROW over approximately nine-to-ten months (Exh. NG-2, at 1-9). Existing pipeline would remain in service during replacement activities; locations requiring a tie-in to, or in-kind replacement of, the

[21] Evaluation of environmental impacts in this section includes construction of the Highway Crossing, the Wilbur Lateral, the Whipple Road elbow replacement, the Brick Kiln Road tee replacement, and pig launching and receiving facilities.

existing pipeline would require bypass installations until the existing pipeline is retired (id.). While installation of the new pipeline might take place over winter months, tie-ins would be installed in summer months, coincident with low demand for natural gas service (id.).

Colonial stated that it is seeking a 75-foot temporary easement accommodate pipeline installation construction, except for where work occurs in roadways or paved areas, where the Company only required a 50-foot temporary work area (Exh. NG-2, at 5-2). Colonial stated that the Wilbur Lateral would be replaced using an open-trench excavation and either string-and-lay, stove-pipe, or push-pull pipe installation methods (id. at 5-10).[22] Pipe would be installed under the Highway Crossing with HDD, which the Company estimated would take approximately three to four months (id. at 1-9). The Company indicated that installation of the launching and receiving facilities at the Tewksbury Take Station and the Wilbur GRS, and work at Brick Kiln Road and Whipple Road would likely to take place over one construction season (id.).[23]

The Company indicated that typical construction hours would be from 7:00 a.m. to 5:00 p.m., Monday through Saturday, but anticipated that some work might require night or weekend scheduling (id. at 5-4 to 5-5). The Company noted that activities requiring nighttime work and/or extended construction hours would be coordinated with the municipalities involved and might include HDD work, tie-ins, pressure testing, and the crossing of Route 110 (id.).

The Company stated that it would select a qualified Environmental Inspector to monitor activities carried out by the construction crews to ensure that construction activities are in compliance with requirements of applicable federal, state, and local environmental permits and

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22 String-and-lay installation, typically used on cross-country ROW, involves welding together several sections of pipe adjacent to the excavation trench and placing these strings of pipeline into the excavated trench (Exh. NG-2, at 5-9; RR-EFSB-37). Stove-pipe installation, typically used in tighter spaces, involves excavating shorter trenches, placing shorter lengths of pipe into the trench, and welding the pipe sections together within the trench (Exh. NG-2, at 5-9; RR-EFSB-37). Push-pull installation, typically used in unconsolidated soils and ponded water, involves digging an initial trench, casting spoils on the adjacent construction mats, and pulling or pushing the pre-assembled pipeline segment into place (RR-EFSB-37).

23 The Company considered the construction season as typically from mid-April to mid-November (Tr. 3, at 445).

approvals (Exh. NG-2, at 5-5). The Environmental Inspector would be independent of the construction contractor and would report directly to the Company (id.).

1. Laydown/Staging

The Company stated that the construction contractor (yet to be selected) would be responsible for Project laydown and staging, including securing staging sites and maintaining them during Project construction, and restoring such areas to original condition at construction completion (RR-EFSB-32). For the mainline installation and HDD, the Company expected the contractor to store pipe and other material within its temporary workspace along the ROW, where feasible (RR-EFSB-32). For locations where construction would take place on National Grid property or ROW (i.e., the launcher and receiver installations, Brick Kiln Road tee replacement, and Whipple Road elbow replacement), the Company anticipated storing materials on site (id.).

2. Trench Excavation and Pipe Installation

The Company would use heavy equipment to excavate a trench generally measuring approximately three by five feet deep (Exh. NG-2, at 5-10). Multiple crews would work along the line throughout construction, installing pipe at a rate of approximately 80 feet per day in developed or commercial areas, and approximately 160 feet per day in undeveloped areas (the majority of the route) (id. at 1-9). The Company stated that upland work areas would require a 50-foot construction ROW and that wetland work areas would require a 75-foot construction ROW (id. at 5-17; Exh. NG-10, at 45-46). Colonial explained that upland work areas require less space because no temporary construction matting will be required, the equipment required for construction is smaller, and no additional space is required for dewatering and associated environmental controls (Exh. NG-10, at 46).

3. HDD Installation

Horizontal directional drilling is a trenchless pipeline installation procedure that can be used where open cut trenching methods are not feasible or would otherwise have unacceptably high impacts (Exh. NG-2, at 4-26). HDD operations require work areas at both the entry and exit

points for drilling equipment, laydown space, and pipe stringing (id., app 4-1, at 7). The Company stated that the Highway Crossing HDD would be constructed in multiple stages and take approximately three to four months (Exh. EFSB-CM-4). The drill path would be approximately 1,925 feet long (Exh. NG-2, at 5-7). In preparing for drilling, the Company would install conductor sleeves and excavate trenches at the entry and exit points (id. at 5-7, 5-8; Exh. NG-8, at 65). The HDD process would start by drilling a small-diameter pilot borehole, and then advancing several reaming passes until the required borehole diameter is achieved (Exh. NG-2, at 5-7, 5-8). Pipeline sections would be strung out, welded together, and x-ray tested (id. at 5-8). The assembled pipeline string would be hydrostatically tested, placed on rollers, and then pulled back the borehole (id.). The Company stated that the new Highway Crossing would be temporary capped until the twelve-inch Wilbur Lateral replacement is complete, after which the Highway Crossing would be tied into the Wilbur Lateral and the Tewksbury Mainline (id.).

4. Dewatering

The Company indicated that it would be subject to the U.S. Environmental Protection Agency's ("USEPA") National Pollution Discharge Elimination System ("NPDES") Construction General Permit ("CGP") and would need to develop a Stormwater Pollution Prevention Plan ("SWPPP") (Exh. NG-8, at 119). The SWPPP will describe how Project construction will comply with the CGP and will include details about the installation of erosion and sediment controls (id.). The Company anticipated dewatering in select locations where water is encountered and work requires dry conditions (id. at 120; Exh. NG-2, at 5-6). The Company stated that it would undertake dewatering in accordance with its Environmental Policy for Natural Resource Protection and in keeping with practices delineated in its Environmental Guidance Document, EG-303NE (Exhs. NG-2, at 5-6 and app. 5-2; NG-8, at 119). The Company indicated it would pump groundwater and storm water from the excavation trench outside wetland resource areas and outside the state- and locally regulated 100-foot buffer zone, if feasible (Exh. NG-8, at 120). The Company further indicated that, where available, it would generally discharge water to vegetated land surface locations in upland areas, which function as a filter medium (id.).

At sites without vegetation or with excessive slope, the Company would pump water into a filter bag or temporary dewatering basin, or into a fractionation tank (Exh. NG-8, at 120). The Company stated that along large wetland crossings where pumping water outside the resource area is not feasible, it would place geotextile fabric between layers of construction mats such that all discharged water would go through a filter bag placed within a secondary dewatering basin (id. at 120 to 121). The Company indicated that it would take additional precautions within the excavation trench, screening the pump intake and preventing it from resting on the bottom of the excavation trench throughout dewatering (id. at 121). The Company also stated that, following dewatering, it would remove accumulated sediment and any filter bags or containment basins used (id.).

5. Welding and Nondestructive Testing of the Welds

The Company explained that each pipeline joint would receive a protective coating in the manufacturing process (Exh. NG-2, at 5-10). Crews would weld together sections of pipeline joint prior to placing the pipeline into the prepared trench when using the string-and-lay method (id.). When using the stove-pipe method, crews would weld pipeline sections in place within the trench (id.). Crews would radiographically inspect each weld and apply a protective exterior coating whether using either the string-and-lay method or the stove-pipe method (id.).

With respect to the string-and-lay method, the Company explained that following assembly of a string of pipeline, a side-boom tractor, excavator, or backhoe would lower the pipeline into the prepared open trench (Exh. NG-2, at 5-10). Multiple operators would then support placement of longer sections of welded main replacement along the sections of string-and-lay construction (id.). The Company stated that, where turns in the lines are required, either as designed or to avoid obstacles along the alignment, it would install pre-manufactured or field bend fittings prior to lowering the main into the trench (id.). A welding crew operating from within the trench would weld the sections of pipe together (id.).

6. Corrosion Protection

The Company would protect its replacement main from corrosion in multiple ways, including the installation of cathodic protection devices within the trench prior to backfill and the application of a protective anti-corrosion exterior coating (Exh. NG-8, at 68, 69). The Company indicated that ILI would provide better information about the degree of pipeline corrosion compared to ECDA (Exh. NG-2, at 2-6).

7. Hydrostatic Pressure Testing

Colonial stated that, although it does not intend to use hydrostatic pressure testing for the purpose of a seven-year integrity management program assessment, there is a separate requirement to hydrostatically test all new sections of pipe immediately after construction and before placing the pipeline into service (Exhs. NG-2, at 2-6; EFSB-N-9). The Company stated that the fully welded and x-ray tested Highway Crossing segment will be hydrostatically tested prior to installation and again after being pulled through by HDD, and that after the Wilbur Lateral and Highway Crossing segments are joined, the complete segment again would be tested (Exhs. NG-2, at, 5-12 to 5-13; NG-8, at 70-71; EFSB-W-3).[24]

8. Backfill and Compaction

The Company stated that it would backfill the trench with either temporarily stockpiled excavated material or a suitable material trucked into the site (Exhs. NG-2, at 5-10; NG-8, at 69). The Company stated that it generally places four to six inches of suitable backfill material, typically sand, beneath and around the pipe, then backfills the remainder of the trench with the temporarily stockpiled excavated materials (Exh. NG-2, at 5-10; Tr. 2, at 257). Generally, the Company places three feet of cover above the pipeline; where the pipeline would have less than

[24] Colonial stated that the Brick Kiln Road tee replacement and Whipple Road elbow replacement will be hydrostatically tested at an off-site location prior to installation (Exh. NG-8, at 70-71).

two feet of cover (in the event of utility conflicts, for example) the Company would place concrete shielding or steel plates above the pipeline for protection (Exh. NG-2, at 5-10).

9. Site Restoration

The Company would complete final restoration and stabilization of the Project upon successful testing and gas-in of the replacement pipeline (Exh. NG-8, at 72). Once the replacement pipeline is complete and tied-in to the Tewksbury Main Line, the existing Wilbur Lateral would be capped at each end and abandoned in place (Exhs. NG-2, at 5-10; EFSB-P-7; EFSB-CM-11). Where the trench location requires cutting of pavement, the Company stated it would restore pavement in compliance with Section 9.0 of the Department's Street Restoration Standards (Exh. NG-8, at 69-70).

Disturbed surfaces, including vehicle/equipment rutting and excavated areas, would be graded to pre-construction conditions (Exh. NG-8, at 72). To the extent necessary, Colonial's crews would restore disturbed wetland soils caused by swamp mats through in situ restoration measures (id.). These measures include minor grading of ruts, seeding exposed soil surfaces with an appropriate seed mix, and mulching bare soil surfaces (id.). The Company indicated that erosion control barriers would remain in place until at least 70 percent vegetative cover was re-established (id.)

D. Description and Analysis of Environmental Impacts

Environmental impacts from the Project along the Primary Route are described below. Because of characteristics particular to the instant case, discussed at greater length in Section IV.D, above, the Siting Board does not consider a noticed alternative route, but instead confines its description and analysis of environmental impacts to those of the proposed Project along the Primary Route.

1. Land Use and Historic Resources

a. Description

The Company stated that its Project, to be constructed primarily underground in Company-owned property or easements, would not permanently convert any existing land uses, and that it would therefore have no permanent land use impacts (Exh. NG-2, at 5-24). The Wilbur Lateral replacement would require the acquisition of both new permanent ROW, related to the widening or relocation of the existing permanent ROW, and temporary easements, associated with the temporary work space for construction operations (id.). In addition, the Company stated that Project would require a total of approximately 4.3 acres of tree clearing, including both the temporary work area and new permanent ROW (id.). The Company stated that the areas cleared for temporary work space would be allowed to revegetate after construction (Exh. NG-2, at 5-24). The Company asserted that tree clearing is not anticipated to result in adverse impacts to the use of adjacent properties (id.). Impacts to wetland and water resources and visual related impacts from tree clearing are discussed further below.

With regard to the acquisition of new permanent ROW, the Company explained that it would seek to expand the permanent width by approximately ten feet throughout the Wilbur Lateral ROW (Exh. NG-2, at 5-2).[25] The Company stated that it has engaged in negotiations with individual landowners where it has sought to increase its permanent ROW to 30 feet (RR-ESFB-20). At the time of the proceeding, the Company stated that negotiations were ongoing, and that it had developed a variety of accommodations in response to the preferences or concerns of individual landowners (RR-EFSB-14; RR-ESFB-20). The Company affirmed that it would enter into an agreement with each property owner to memorialize the discussions, and that the easements would be finalized after construction is complete to reflect the as-built location of the replacement pipeline (RR-ESFB-20).

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[25] The Company stated that is would seek a 30-foot-wide easement, where possible, to accommodate the replacement pipeline, provide sufficient area for future operations and maintenance activities without the need to acquire temporary work space, and provide additional setback to prevent future encroachments on the pipeline ROW (Exh. NG-8, at 126).

Land uses adjacent to the ROW include forested areas, wetlands, open fields, and a mix of commercial/industrial and residential areas and crosses several local roadways as well as Interstate-495, the Lowell Connector and Route 110 (Exh. NG-8, at 130). On the western extent of the Project route, portions of the ROW pass along the edge of the Mount Pleasant Golf Club (Exh. NG-2, at fig. 5-3). The Company reported that it consulted with Mount Pleasant Golf Club representatives on minimizing Project impacts to the golf course (Exh. EFSB-LU-2; Tr. 2, at 204-207).[26] To the west of the Highway Crossing, the ROW crosses through the parking areas associated with several commercial properties, including a cinema (Exhs. NG-8, at 130; EFSB-LU-3). The Company reported that it had adjusted its planned route across the cinema parking lot to follow the perimeter, at the request of the cinema owner (Tr. 1, at 122-123).

The Company stated that the ROW to be used for the Project is composed of easements and fee-owned properties in Lowell, Chelmsford, and Tewksbury (Exh. NG-8, at 130). The Company indicated that it has maintained the ROW free from trees and larger shrubs in accordance with National Grid's Vegetation Management Plan (id. at 120).

The Company stated that the ROW crosses the Middlesex Canal, which is an archaeological/historical site listed on both the State and National Register of Historic Places (Exhs. NG-8, at 130; EFSB-LU-6). The Company stated that it would work with the U.S. Army Corps of Engineers ("USACE"), Massachusetts Historical Commission ("MHC"), and other consulting parties to investigate archeological resources, including the Middlesex Canal (RR-EFSB-44). The Company would, if appropriate, develop a suitable archeological monitoring program for the Project (id.).[27] The Company reported no Priority and Estimated Habitat within

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[26] The Company stated that as a result of negotiations with Mount Pleasant Golf Club, it has reduced the total amount of temporary work space along southern border of the golf course to reduce the total amount of tree clearing and work within associated buffer zones and riverfront areas (Exh. NG-10, at 14).

[27] Subsequent to the Company Brief, the MHC directed the Company to conduct an intensive (locational) archaeological survey for the archaeologically sensitive portion of the selected project impact areas (Exh. NG-9, at 10, 14). The MHC stated that the scope of the survey should include a proposal for archaeological monitoring and recording at locations where buried potions of the historic Middlesex Canal may be affected by the Project (id. at 14).

the Project ROW identified by the Massachusetts Natural Heritage and Endangered Species Program ("NHESP") (Exh. NG-8, at 130).

The pig launcher would be constructed within the existing fence line of the Tewksbury Take Station, so land use is not anticipated to change (Exh. NG-2, at 5-24). Construction of the pig receiver would require an expansion of the Wilbur GRS fence line within Company-owned parcels at 61 and 63 Wilbur Street (Exh. NG-2, at 5-2, 5-24, and app. 1-1, ENF Plan Set at page 1 of 20).

The Company stated that it did not propose any permanent mitigation measures for land use because it anticipates no permanent land use impacts (Exh. NG-2, at 5-25). Colonial stated that it would mitigate temporary construction-period impacts by following its Environmental Policy for Natural Resource Protection and Environmental Guidance document, EG-303NE – Access, Maintenance, and Construction Best Management Practices ("BMPs"), and that it has committed to working with individual land owners to minimize the potential for daily disruptions from the Project (id. at 5-5, 5-25).

b. Analysis and Findings

The record shows that, because of its location primarily underground along Company-owned property or easements, and the limited expansion for ILI facilities, the Project has limited potential to affect land use. With regard to tree clearing, the record shows that areas used for temporary work space would be allowed to revegetate. Although no trees would be allowed to grow in areas where the permanent ROW is expanded, the Company is committed to working with and accommodating individual land owners where it has sought to widen or realign its permanent ROW. The record shows that the Company has committed to cooperate with the USACE and MHC to investigate the Middlesex Canal and other archeological resources. The Siting Board directs the Company to notify the Siting Board if it is required to develop an archeological monitoring program. With implementation of the construction-period mitigation measures

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The Company applied for a permit from the state archaeologist on April 18, 2019 to perform locational surveys in the Project ROW (Exh. NG-10, at 62).

proposed by the Company, the Siting Board finds that land use and historic resource impacts of the Project would be minimized.

2. Visual

a. Description

The Company emphasized that the proposed location of Project construction, primarily underground, would limit visual impacts (Exh. NG-2, at 5-35). The Company stated that widening the ROW would create wider sight lines (RR-EFSB-26(S1)(1)). Areas of temporary work space would be cleared and then allowed to regrow (Exh. NG-2, at 5-33). In one short section of ROW near the intersection of Marshall and West Forward Streets, the Company will expand the permanent ROW clearing further, due to a realignment of the pipeline away from the adjacent NEP electrical easement (Exhs. EFSB-G-2; EFSB-V-4). The Company pledged, as a general matter, to work on a case-by-case basis with abutters to mitigate visual impacts through post-construction restoration and landscape impact mitigation (Exhs. NG-2, at 5-35; EFSB-V-5). The Company specifically indicated that it would provide plantings for abutters at the Brick Kiln Road GRS, Whipple Road elbow replacement, and Tewksbury Take Station (Exh. NG-2, at 5-35).

The Company undertook discussions with the Mount Pleasant Golf Club about visual concerns, among other issues (RR-EFSB-14). The Company reported that the discussion focused, in part, on using a temporary fence to mitigate views of ongoing construction (id.). The Company indicated that it had shifted the location of its Project at the golf course and that minimization of visual impacts at the Mount Pleasant Golf Club was one benefit of the realignment (Exh. EFSB-V-2). The Company stated that it would work with the Mount Pleasant Golf Club and the adjacent property owner to maintain an existing vegetative buffer and to identify key ornamental shrubs and trees to be protected (Exh. EFSB-V-1). The Company committed to working with the Mount Pleasant Golf Club and the adjacent property owner to identify options for replanting in the event that the Project led to removal of certain trees or tree groups and to adverse visual impacts as a consequence (id.).

The Company expected, in a few instances, that above-grade changes for the Project would result in permanent visual impacts (Exh. NG-2, at 5-33). Colonial asserted that the pig launcher at

the Tewksbury Take Station and the pig receiver at the Wilbur GRS would result in minimal visual impacts (id. at 5-34 to 5-35). The pig launcher would be within the existing fence line of the Tewksbury Take Station, where visual exposure is limited by existing evergreen trees and the setback distance from Chapman Road (id. at 5-34). Construction of the pig receiver at the Wilbur GRS would require an expansion of the facility and some tree clearing; however, the Company stated that visual impacts would be minimal due to the wooded nature of the surrounding area and the dead-end nature of Wilbur Street (id. at 5-35). Additionally, there would be four aboveground control boxes off pavement at the 32 Reiss Avenue cinema (Tr. 2, at 222).

b. Analysis and Findings

As the Project would be primarily underground, most visual impacts would be temporary from construction; the few aboveground exceptions would be located at facilities owned and operated by the Company as part of its existing Tewksbury Line System. Permanent impacts of construction are likely to occur from the Company's removal of trees, shrubs, and groundcover at aboveground facilities, in some temporary work space locations, and along the Company's newly cleared ROW. At the cinema parking area, the Tewksbury Take Station launcher and at the Wilbur GRS receiver, limited aboveground facilities supporting the underground pipeline would be visible.

The Company has committed to work on a case-by-case basis with individual abutters to mitigate visual impacts. In addition, the Company has agreed to work with the Mount Pleasant Golf Club and the adjacent property owner to mitigate visual impacts at those locations. The record shows that the Project's visual impacts would be limited by the underground location of the pipeline and by the Company's use, in large part, of its existing ROW and facilities. The Project's visual impacts would be minimized by the Company's proposed mitigation. The Siting Board therefore finds that visual impacts of the Project would be minimized.

3. Wetlands and Water Resources

a. Description

The Project would cross freshwater wetlands, surface waterbodies, and waterways subject to jurisdiction under the Massachusetts Wetland Protection Act (G.L. c. 131, § 40), the Massachusetts Surface Water Quality Standards (314 CMR 4.00), and Sections 401 and 404 of the Federal Clean Water Act ("CWA") (33 U.S.C. § 1251 et seq.) (Exh. NG-2, at 5-14). Wetland resource areas along the Project include Bordering Vegetated Wetlands ("BVWs"), Bordering Lands Subject to Flooding ("BLSF"), Riverfront Area ("RFA"), Land Under Waterbodies and Waterways ("LUWW"), and Bank, as well as the 100-foot buffer zone to wetland resource areas (id. at 5-14).

The Company described wetlands within the ROW as generally consisting of shrub and herbaceous vegetation communities, with small areas of forested wetlands along the borders of the ROW (Exh. NG-8, at 130). The Company listed one of the Project endpoints, the Tewksbury Take Station, as within the 100-foot buffer zone of wetlands adjacent to the site, but reported no wetland resource areas present within space designated for temporary work at the Whipple Road, Brick Kiln Road, or Wilbur GRS (Exh. NG-2, at 5-16).

The Company stated that the Project would pass through several BVWs, including a large marsh, and through 3,285 linear feet of BLSF, primarily along the Wilbur Lateral (id.).[28] The Company explained that because no fill or aboveground structures are proposed within BLSF, no impacts to BLSF are anticipated, and therefore, no mitigation would be required (id. at 5-16). The Company stated that in addition to wetlands crossings, the Wilbur Lateral replacement would traverse two perennial stream crossings (Black Brook and River Meadow) and a canal crossing (the Middlesex Canal), with temporary impacts to RFA, LUWW, and Bank resulting from the perennial stream crossings (id. at 5-17, 5-21). The Company anticipated using traditional open-cut crossing methods at the historic Middlesex Canal, but stated that it would make a final determination on the crossing method in consultation with the MHC and USACE during CWA permitting (id. at 5-21).

[28] The historic Middlesex Canal also passes through this marsh (Exh. NG-2, at 5-16).

During the Highway Crossing HDD process, the Company explained that there is a risk of drilling fluids inadvertently escaping the borehole and returning to the ground surface, possibly impacting wetlands (id. app. 4-1, at 9).[29] To mitigate the risk of drilling fluids impacting wetlands, the Company stated it would install steel casing at the entry and exit points of the HDD borehole to contain drilling fluids that may otherwise escape to the ground surface (id. at 5-7; Tr. 1, at 139-140).

The Company anticipated that construction in Project work areas would result in a total temporary disturbance of approximately 379,841 square feet of wetlands due to use of mats for construction access and material storage (Exhs. NG-2, at 5-17; NG-10, at 14). The Company anticipated temporary and permanent impacts from tree clearing in wetlands within the 75-foot temporary work space alongside the Project, as well as permanent impacts associated with tree clearing within wetlands of the proposed expanded easement, resulting in a permanent conversion of the vegetative wetland cover type (Exh. NG-8, at 88; RR-EFSB-51). Tree clearing within the 75-foot temporary work area, beyond the new permanent easement, would be allowed to revegetate, and therefore the impact would be temporary (Exh. NG-8, at 88; RR-EFSB-51). The Company further stated that Project would not result in any permanent fill of wetlands (Exhs. NG-2, at 5-16; NG-10 at 49). Table 5, below, summarizes anticipated Project impacts to wetland resource areas (RR-EFSB-51).

[29] The inadvertent return of drilling fluids to the ground surface at an unplanned location can occur where the bearing pressure of the soil is overcome by the pressure of the fluid within the borehole (Tr. 1, at 139).

Table 5. Anticipated Impacts to Wetland Resource Areas (in linear feet and square feet)

	BVW (SF)	LUWW (SF)	Bank (LF)	RFA (SF)	100' BVW Buffer	100' Bank Buffer (SF)
Lowell						
Tree Clearing	122,390	0	0	3,494	28,432	9,256
Temporary Impacts[2]	369,327	5,475	411	9,326	222,409	32,681
Permanent Impacts[3]	24,365	0	0	1,019[4]	7,040	2,514
Chelmsford						
Tree Clearing	0	0	0	0	0	0
Temporary Impacts	5,039	0	0	0	36,866	0
Permanent Impacts	0	0	0	0	0	0
Tewksbury						
Tree Clearing	0	0	0	0	0	0
Temporary Impacts	0	0	0	0	547	0
Permanent Impacts	0	0	0	0	0	0
Total						
Tree Clearing	122,390	0	0	3,494	28,432	9,256
Temporary Impacts	374,365	5,475	411	9,326	259,823	32,681
Permanent Impacts	24,365	0	0	1,019[4]	7,040	2,514

[1] Tree Clearing includes the total amount of trees cleared. This includes both temporary clearing and the proposed permanent conversion of vegetation cover type.

[2] Temporary impacts include the proposed square footage of construction matting and the proposed length and width of the excavated trench.

[3] Permanent impacts include the total square footage of tree clearing within the proposed expanded easement. Although there will be no loss of wetlands within the proposed expanded easement, the Company will convert the vegetation cover type from forested to either scrub-shrub or herbaceous cover.

[4] Note that the Riverfront Area in Lowell is 25-feet as defined in 310 CMR 10.58(3).

Source: EFSB-RR-51

The Company stated it would minimize construction-phase impacts to wetland resource areas through the use of sediment and erosion controls and other Best Management Practices ("BMPs") (Exhs. NG-2, at 5-17; NG-8, at 92). The Company anticipated that in situ restoration, including restoring and mulching disturbed surfaces and allowing wetland vegetation to regenerate from existing root and seed stock, would be the primary mitigation for temporary impacts due to trenching within wetlands and use of construction matting (Exhs. NG-2, at 5-17; NG-8, at 91-92).

The Company indicated that it would work with the USACE, MassDEP, and local conservation commissions to develop compensatory mitigation plans, including, if required by the USACE, in-lieu fee payment (Exh. NG-8, at 92; RR-EFSB-41). As noted in Section V.C.4, above, the Company has committed to developing a Project SWPPP (Exh. NG-8, at 119).

Colonial evaluated whether HDD construction techniques, rather than open cut, could reduce temporary construction impacts to a large wetland complex alongside Route 3 (Wetland 2), the Black Brook, and the River Meadow Brook (Exhs. NG-8, at 57; NG-10, at 40). The Company stated that HDD pipe assembly and pull-back areas would potentially be located within wetlands along the ROW, necessarily reducing some of the benefit of wetland avoidance that HDD would otherwise offer (Exh. NG-10, at 43). HDD operation would generate more noise than open trench methods, incur the risk of drilling fluid escaping from the bore hole into the wetlands due to poor geotechnical conditions, and potentially require temporary and permanent easement rights (id.). After considering the feasibility and potential environmental impacts, the Company rejected HDD as an alternative construction method for crossing Wetland 2, the Black Brook, or the River Meadow Brook (id.).

The Company indicated that there would be no impacts to drinking water from construction of the Project (Exhs. NG-2, at 5-21; NG-8, at 95). While the Project intersects the East Chelmsford Water District Zone II Wellhead Protection area in two locations, the Company reported that the Project will not result in any increase in impervious cover within the Wellhead Projection area and therefore is not expected to have an impact to recharge or the water supply (Exh. NG-2, at 5-21).[30]

With regard to potential wetland and water resource impacts from hydrostatic pressure testing, the Company stated that it would develop a Hydrostatic Test Plan ("HTP") prior to hydrostatically testing all sections of the line that would describe how it will manage water throughout the pressure test (Exh. NG-8, at 70-71). The Company expects that the individual

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[30] A Zone II Wellhead Protection Area, as identified by MassDEP, is the area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation) (Exh. NG-2, at 5-20).

Highway Crossing hydrostatic tests will require approximately 11,000 gallons of water, and the full test of the joined Wilbur Lateral and Highway Crossing will require approximately 82,000 gallons of water, likely from a municipal water source (id. at 60-61).

The Company reported that, upon completion of the hydrostatic test, it would pump the water from the pipeline into storage tanks temporarily deployed on site and then discharge the water to an upland area or haul it by truck for off-site disposal (Exh. NG-2, at 5-13). The Company stated that its preference is to discharge the test water from the storage tanks to an upland area, which would allow the test water to recharge local groundwater resources (Exhs. EFSB-W-3; KT-W-1; Tr. 3, at 340-341). In this case, the water would be released in a slow and controlled manner to avoid erosion and encourage infiltration (Exh. EFSB-W-3; Tr. 3, at 344). Colonial explained that discharging test water to an upland area could be authorized by a MassDEP groundwater discharge permit or its underground injection control program (Tr. 3, at 345). The Company indicated that discharging test water directly to storm sewers would require prior authorization through EPA's Remediation General Permit, and that it would avoid direct discharges to surface water (Exh. KT-W-1; Tr. 3, at 346). In any case, the Company stated that it would collect water quality samples of the test water prior to discharge (Exh. EFSB-W-3). If water quality results exceed any applicable standards, the test water would instead be hauled offsite for disposal at an appropriate receiving facility (Exhs. EFSB-W-3; KT-W-1; Tr. 3, at 341). The Company anticipates that eight to sixteen truck trips would be needed for offsite disposal (RR-EFSB-21).

b. Analysis and Findings

The record shows that tree clearing for the Project would result in permanent impacts to 100-foot BVW buffer and to BVW itself of approximately 7,040 square feet and 24,365 square feet, respectively, due to the conversion of the vegetative wetland cover. Permanent impacts to other specific wetland resource areas would be notably less (see Table 5 Anticipated Impacts to Wetland Resource Areas, above). The record also shows that the Project would not result in the permanent fill of wetlands. The Company would minimize construction-phase impacts to wetland resource areas though sediment and erosion controls, other BMPS, and in situ restoration.

Furthermore, the Company has committed to allowing temporary work areas outside the proposed permanent ROW of the Project to revegetate. The Company has also pledged to develop plans for compensatory mitigation with local conservation commissions, MassDEP, and USACE, including arrangement of an in-lieu fee payment through the USACE, if required.

The Company plans for hydrostatic testing of all sections of its pipeline where replacements have been made or new equipment installed. As previously noted, the Company has indicated that it will not use hydrostatic testing for ongoing maintenance of the Tewksbury Line System. On-site hydrostatic testing for the Project would use approximately 82,000 gallons of water. The Company affirms that it will develop an HTP prior to implementing hydrostatic testing of its replacement/new pipeline. The Company's HTP will account for water use, as well as discharge, in a manner consistent with applicable statutory and regulatory requirements and the Company's policies. In the case of any test water discharged in the vicinity of the Project, the Company commits to discharging in upland locations, or if that is not possible, to have the test water disposed offsite in a suitable manner. The Siting Board directs that the Company provide a copy, when available, of its final HTP to the Siting Board. In addition, the Siting Board directs the Company to notify the Siting Board of final discharge plans for water used in hydrostatic testing upon completion of Project construction.

The record shows that water quality at drinking water wells and Zone II Wellhead Projection Areas is not at risk due to Project-related construction. Given implementation of the mitigation measures proposed by the Company, and the conditions described above, the Siting Board finds that wetlands and water resources impacts of the Project would be minimized.

4. Traffic

a. Description

The Company anticipated that the majority of its Project would use the same off-roadway route as its existing natural gas pipeline (Exh. NG-2, at 5-27). The Company stated that the Highway Crossing HDD and the Wilbur Lateral replacement would include public roadway crossings in Chelmsford and Lowell (id.). The HDD Highway Crossing would pass under I-495 and the Lowell Connector, associated access ramps, and the Riverneck Road in Chelmsford (id.

at 5-27 to 5-28). The Company described the I-495 and Lowell Connector roadways as wide, high volume/speed Massachusetts Department of Transportation ("MassDOT") jurisdictional roadways that carry regional traffic through the area (id.). By contrast, Riverneck Road is a 30-foot-wide urban minor arterial under local jurisdiction and located in a mixed residential and commercial area (id.).

The Company stated that HDD stringing and pull-back operations would require temporary closure of Canal Street, a roadway under local jurisdiction in Chelmsford (id. at 5-27 to 5-28). The Company noted that the HDD stringing and pull-back operations would not involve any pipeline replacement within Canal Street (id. at 5-28). The Company stated that remaining Project components south of the Highway Crossing would be completed at specific locations in off-roadway areas within the existing natural gas ROW (id. at 5-28).

The Company specified that, at the northern end of the Wilbur Lateral, the Project would cross West Forest Street and Marshall Avenue in Lowell, both local roadways in a residential area, each roughly 30-feet-wide, typically with low traffic volumes (id. at 5-28). The Company explained that the Project would also cross Chelmsford Street (Route 110) at a location where Chelmsford Street was approximately 50-feet wide, in a residential/ commercial area, with moderate-to-high traffic volumes (id. at 5-28).

The Company stated that all traffic impacts would be temporary in nature and confined to the amount of time necessary for construction (Exh. NG-2, at 5-28). The Company ascribed low levels of traffic congestion from the Project to the anticipated delivery and removal of construction materials in off-roadway areas (id.). The Company affirmed that it would coordinate construction to minimize impacts to residences, businesses, and others using transportation corridors in the vicinity, and committed to working closely with the local municipalities to reduce impacts of construction-related traffic on the traveling public (id.; NG-8, at 103 and app. E; RR-EFSB-31). The Company stated that, with input from the appropriate municipal authorities, it would develop a Traffic Management Plan ("TMP") prior to the start of in-street construction (Exh. NG-2, at 5-29).

The Company indicated that items addressed by the final version of its TMP would likely include some or all of the following: ongoing coordination with police and fire departments; provisions for emergency vehicle access; adjustments to timing and delivery of equipment and

materials; refinement of lane location and width within the work zone to reduce impacts to vehicular traffic impacts and promote safe passage; coordination of work schedules and limited duration of proposed lane closures; use of traffic control devices and signage; maintenance of access to homes and businesses; protection of pedestrian and bicycle traffic; establishment of good communication with homes and businesses to avoid disruptions to residents, patrons, and employees; and systems of communication to alert municipal officials, local businesses, and the public of the timing and duration of travel restrictions (id. at 5-28 to 5-29; NG-8, at 103-104 and app. E; RR-EFSB-31).[31]

The Company reported that for in-street construction it would use temporary plates or permanent patches at the end of each work day depending on field conditions and on the preferences of municipal authorities and private property owners (Exh. NG-8, at 102). The Company further indicated that it would complete pavement restoration in compliance with the Department's Street Restoration Standards (Exh. NG-2, at 5-11).

The Company stated that construction activities for the Wilbur Lateral replacement would temporarily reduce the available number of parking spaces at commercial properties crossed by the Project south of Route 110 (id. at 5-24). The Company committed to working with property owners to develop temporary construction-phase traffic management arrangements to address parking concerns (id.).[32]

b. Analysis and Findings

Based on the record, traffic impacts of the Project would be temporary in nature and limited to Project construction. Further, the Company's plan to construct the majority of the Project in its ROW minimizes construction in public roadways and allows delivery and removal of

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31 The Company stated that it would submit its TMP to appropriate municipal authorities for review and approval prior to the start of in-street construction as part of the Grant of Location permit process (Exh. NG-2, at 5-29).

32 Colonial further indicated that it would engage with commercial property owners to develop TMPs addressing vehicle detours and parking during construction for the entirety of the Project (Exh. NG-2, at 5-11).

construction materials away from paved roads, with an associated reduction in potential traffic congestion.

The Company's construction planning addresses the logistics of its Highway Crossing HDD under I-495 and passage of the Project across other public roadways. The record shows that the Company will consult with municipalities and affected residents, business owners, service providers, and other individuals or entities to avoid, reduce, and mitigate impacts of construction-related traffic. The Company will then produce a final TMP reflective of these consultations to address traffic management during construction. When its final TMP is available, including measures specific to the Highway Crossing HDD, the Company shall provide a copy to the Siting Board.

With the implementation of the Company's TMP for the Project, including measures specific to the Highway Crossing HDD, and the condition described above, the Siting Board finds that traffic impacts from construction and operation of the Project would be minimized.

5. Noise

a. Description

The Company stated that there would be construction-related noise impacts Monday through Saturday from 7:00 a.m. to 5:00 p.m. during its anticipated hours of construction (Exhs. NG-2, at 5-4 to 5-5; EFSB-NO-1). The Company stated that construction noise impacts would be mitigated primarily by limiting work to the construction hours prescribed in local noise ordinances of Tewksbury, Chelmsford, and Lowell (Exh. EFSB-NO-1; EFSB-NO-2).[33] The Company indicated that if circumstances arose where it needed to extend construction beyond typical work hours, the Company would coordinate with the municipalities and affected abutters to address any local concerns (Exh. EFSB-NO-2).

[33] The City of Lowell noted in its Final Environmental Impact Statement ("FEIR") comments that hours of operation in the City of Lowell are 7:00 a.m. to 6:00 p.m. and that work outside of these hours requires permission from the Commissioner of Public Works and the Building Commissioner (Exh. NG-11, at 14)

The Company stated that it would provide information about likely hours and areas of noise impacts from construction to all Project abutters prior to the start of construction (Exh. EFSB-NO-1). With respect to the Mount Pleasant Golf Club, the Company reported that it would tailor construction activities in that vicinity to minimize noise impacts by adjusting construction hours for certain activities such as using a jack hammer (Exhs. EFSB-NO-1; EFSB-EI-5).

The Company stated that, along the Wilbur Lateral, noise from construction activity would vary greatly, with sound fluctuating based on the activity, the equipment in use, and the distance between the source of sound and the receiver (Exhs. NG-8, at 126; EFSB-NO-1(1)). The Company indicated that most equipment would not operate continuously and that homes, vegetation, and local terrain would likely mitigate sound levels (Exhs. NG-8, at 126; EFSB-NO-1(1)). The Company further stated that noise impacts would be consistent with the existing urban and suburban location of the Project, which includes noise contributions from nearby highways (Exh. NG-8, at123-124).

The Company explained that pavement sawing and trench excavation would likely be the loudest phase of construction along the Wilbur Lateral (Exh. EFSB-NO-1(1)). The Company anticipated that, under normal trenching conditions, (i.e., no ledge, no excessive underground utilities), the construction crews involved in trench excavation and pipeline installation would progress at an average rate of approximately 160 feet per day on an unpaved route, and 80 feet per day along a paved route (Exh. NG-2, at 1-9). The Company stated that this would result in construction equipment present for an average duration of approximately three-to-four days in front of or nearby any one location (Exh. EFSB-NO-1(1)). Noise levels would temporarily increase if the Company had to trench through ledge, a process that would require use of a hoe ram (id.).

The Company explained that installation of the Highway Crossing would consist generally of two principal phases: (1) pipe ramming of the conductor sleeves; and (2) HDD (Exh. NG-8, at 124). The Company stated that the HDD entry point would occur in an existing parking area of a residence and storage facility at 128 Riverneck Road in Chelmsford (Exh. NG-2, at 5-34). The

HDD exit point would occur in an existing parking lot of the Showcase Cinema de Lux, located at 32 Reiss Avenue in Lowell (id.).

The Company stated that pipe ramming, a matter of installing a steel conductor sleeve at both the entry and exit side of the alignment, would be the primary noise-producing activity (Exh. NG-8, at 125).[34] Active pipe ramming would occur for approximately one hour at any one time before another pipe section would be welded onto the conduit (id.). The welding process would take approximately four hours before active pipe ramming would begin again (id.). The Company stated that, after completion of pipe ramming, the remainder of HDD construction would last about a month or more and would produce noise levels similar to typical earthwork projects (id.).

The Company indicated that Project construction noise would be noticeable but would be similar to maximum sound levels currently in the area on the order of 65 to 80 A-weighted decibels ("dBA") (Exhs. NG-2, at 5-42; NG-8, at 125). The Company stated that the use of sound curtains at the perimeter of the HDD construction site and at the hammer locations would help to mitigate noise impacts associated with the HDD construction, and committed to installing sound curtains in these locations (Exhs. NG-2, at 5-42; NG-8, at 125). The Company committed to additional steps to mitigate noise levels from HDD activities at 32 Reiss Avenue in Lowell, the location of a paved lot and cinema (Exh. EFSB-NO-4). At the identified location, the Company indicated that HDD construction would require a staging area of approximately 250 feet by 260 feet for construction vehicles and other equipment associated with the HDD portion of the Project (Exh. NG-8, at 65, 170). The Company promised the property owner at 32 Reiss Avenue that it would limit work hours at the staging area to no later than 4:00 p.m. and committed to coordinating closely with the property owner regarding the timing of pipe ramming (id. at 64; EFSB-NO-2). To the extent necessary, the Company also agreed to limit to the use of jack hammers and pipe ramming to before noon to avoid disruption to the cinema (Exh. NG-8, at 64; Tr. 3, at 322). The Company stated that limiting its construction activities in this manner would

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[34] The Company indicated that the highest one-second L_{eq} from pipe ramming at a receptor address would be approximately 76 dBA with the use of perimeter and hammer sound curtains (Exh. NG-2, at 5-42).

extend the duration of this phase of construction and would likely require beginning earlier in the morning (Exh. EFSB-EI-5).

b. Analysis and Findings

The record shows that the Project would result in noise impacts at and around construction sites during typical construction hours of 7:00 a.m. to 5:00 p.m., from Monday through Saturday. Intermittent (as opposed to continuous) operation of equipment, in addition to partial buffering from homes, vegetation, and local terrain, would afford some mitigation from noise impacts to individuals and entities in the vicinity of Project construction.

The Company has stated that it would coordinate with municipalities and affected abutters to address local noise concerns. The Company has committed to alerting abutters to the hours and areas of noise impacts from construction. The record shows that the Company's steps to address noise mitigation include: (1) noise impact mitigation measures specific to the Mount Pleasant Golf Club along the Wilbur Lateral; and, (2) noise mitigation tailored to the Showcase Cinema de Lux Lowell at 32 Reiss Avenue, including the use of sound curtains for HDD operations.

The Company would further mitigate noise impacts by adhering to its proposed construction schedule and observing local noise-related ordinances. The Company proposes to conduct no work on Sundays and holidays. Should the Company determine that it is necessary to perform construction work outside these hours or days, the Company shall seek written permission from the relevant municipal authority prior to the commencement of such work, and provide the Siting Board with a copy of such permission. If the Company and municipal officials are not able to agree on such requested extended construction hours or days, the Company may file a written request for prior authorization from the Siting Board, provided that it also notifies the relevant municipal authorities in writing of such request.

With the implementation of the noise mitigation measures and schedule-related conditions stated above, the Siting Board finds that noise impacts from construction and operation of the Project would be minimized.

6. Air

a. Description

The Company indicated that potential air quality impacts of the Project would include construction vehicle emissions and possible fugitive dust generation from construction, but that these impacts would be limited to areas immediately adjacent to active construction (Exh. NG-2, at 5-6).

The Company committed to ensuring that construction activities would comply with MassDEP Air Pollution Control Regulations at 310 CMR 7.02 and 310 CMR 7.09 (id.). The Company indicated that it would implement additional air quality mitigation measures to keep generation of construction dust at a minimum and to reduce local airborne particulate levels (id. at 5-7). These measures would include sweeping construction areas and surrounding streets and sidewalks, as necessary; enclosing in trailers any construction waste removed from the location of the Project; and wetting exposed soils and soil stockpiles to minimize dust (id. at 5-6 to 5-7; Exh. NG-8, at 111). The Company also stated that it would minimize on-site stockpiling of materials and storage on site of construction waste (Exh. NG-2, at 5-6 to 5-7). The Company guaranteed that its contractor(s) would comply with the National Emission Standards for Hazardous Pollutants during all construction activities (id. at 5-7).

The Company stated that it would require contractors to use ultra-low sulfur diesel ("ULSD") fuel in off-road diesel vehicles (id.). The Company also committed to compliance with MassDEP Diesel Retrofit Program requirements which would ensure that all diesel-powered non-road construction equipment with engine power ratings of 50 horsepower and above to be used for 30 or more days over the course of Project construction have USEPA-verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies (to the extent they are commercially available) installed on the exhaust system side of the diesel combustion engine (id. at 5-8). The Company stated it would comply with the Massachusetts anti-idling law, G.L. c. 90, § 16A; G.L. c. 111, §§ 142A-142M; and MassDEP regulations at 310 CMR 7.11, by limiting vehicle idling to five minutes except when engine power is necessary for delivery of materials or to operate vehicle accessories, such as power lifts (id.).

b. Analysis and Findings

The record shows that the Company would control dust by limiting soil migration from the construction site and by wetting exposed soils as needed. The record also shows that the Company would limit vehicle idling and use ULSD fuel to reduce air emissions and committed to compliance with MassDEP Diesel Retrofit Program requirements.

With the proposed measures to minimize dust and air emissions from construction equipment, the Siting Board finds that potential air impacts from the Project would be minimized.

7. Hazardous and Solid Waste

a. Description

Colonial reported that thirteen Massachusetts Contingency Plan ("MCP") sites were identified within a 500-foot radius of the along the Primary Route and Tewksbury Take Station (Exh. NG-2, at 5-25). The Company noted that none of the disposal sites identified has Activity and Use Limitations (id.). The Company stated that it would contract a Licensed Site Professional ("LSP") to confirm whether reported conditions at the identified sites were reasonably expected to affect environmental conditions within the Project area (RR-EFSB-33). The Company's LSP would prepare a soil and groundwater management plan prior to the commencement of Project construction (id.). Colonial stated that the soil and groundwater management plan would account for real or potential impacts from each location at which soil or groundwater contamination would likely affect the Project area (Exh. EFSB-S-5; RR-EFSB-33). The Company indicated, in addition, that it would file a utility-related abatement measure ("URAM") notification, subsequent URAM Status Reports (if needed), and a URAM Completion Report with MassDEP immediately following discovery in excavation areas of concentrations of oil and/or hazardous materials constituting a 120-day reportable obligation (Exh. EFSB-S-5). The Company would report the identified materials to MassDEP to ensure soil and groundwater management in accordance with the MCP, 310 CMR 40.0460 (id.).

The Company stated that construction crews or contractors would be alerted to the presence of contaminated soil or groundwater, if any, in bid documents prior to the submittal of proposals for award (RR-EFSB-45). In addition, to the extent that any unforeseen hazardous

materials were discovered in the field during Project construction, the Company's Environmental Policy and Procedure provides that construction crews or contractors would cease work immediately and notify the Company's site supervisor who would then arrange for the removal of said media through certified National Grid-approved hazardous waste vendors (id.; RR-EFSB-32).

With respect to the Highway Crossing, the Company stated that it reviewed the potential to encounter oil and hazardous materials along the proposed drill path as part of its route selection process (Exh. NG-2, app 4-1, at 4). The Company obtained an Environmental Data Resources, Inc. report and reviewed the MassDEP records of potential sources of contamination within a half mile of the HDD alignment, and did not identify any records of active disposal sites that require environmental investigation or cleanup (id. app 4-1, at 4 to 5). Several properties with potential environmental impacts were identified within a half-mile of the HDD alignment; however, only one site warranted further inquiry based on its proximity and active regulatory status (id. app 4-1, at 5). A site with documented groundwater contamination located at 2 Industrial Avenue in Lowell is within one-quarter-mile of the HDD alignment; however, the Company explained that recent MassDEP records indicate groundwater contamination is limited and is not likely to affect design or construction of the Highway Crossing (id. app 4-1, at 5-6; Tr. 2, at 275-276).

The Company stated that it would minimize the onsite storage of construction waste and that all construction waste would be removed from the Project site and disposed of in accordance with applicable laws and regulations, and that the solid waste management for the Project would be described in the SWPPP (Exhs. NG-2, app 1-1, at 9; EFSB-S-4; NG-8, at 120).

b. Analysis and Findings

The record shows that the Company would minimize the onsite storage of construction waste, would appropriately dispose of hazardous materials, and would follow MassDEP procedures should it encounter existing contamination when excavating for the Project. Accordingly, the Siting Board finds that hazardous and solid waste impacts from construction and operation of the Project would be minimized.

8. Safety

a. Description

The Company stated that Project-specific safety policies and procedures, including work area protection, would be developed when it engaged its contractor (Exh. EFSB-S-1). The Company stated that its policy mandates project-specific safety training before the start of construction and daily safety reviews for the duration of the Project (id.). The Company indicated that it would install and maintain construction signage on a daily basis from the start of construction (id.). The Company also anticipated that it would install fencing and excavation protection at the start of construction and maintain both measures until final backfill of any Project-related excavation (id.).

The Company indicated that use of ILI after completion of the Project would provide information above and beyond that available through ECDA for the Company's operation of its pipeline system in a safe and reliable manner (Exh. EFSB-S-2). The Company stated that ECDA would detect potential coating defects, which could signal external corrosion, but might fail to detect damage for a pipeline segment with its coating intact (id.). The Company indicated that ILI is a more robust inspection process that assesses the overall condition of the pipe as opposed to the state of the exterior coating alone (id.). The Company stated that ILI-enabled pipelines make possible the identification of additional threats (including external corrosion, third-party damage, internal corrosion, casing defects, and lamination and manufacturing flaws) using a standard field magnetic flux leakage tool (id.).[35]

The Company explained, in addition, that regulators and natural gas pipeline operators have expressed interest in ILI as an alternative to hydrostatic testing for operations to identify pipe conditions related to stress corrosion cracking defects (Exhs. EFSB-S-3; EFSB-Z-3). According to the Company, these regulators and operators would prefer not to use hydrostatic pressure testing

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[35] The Company stated that an ILI-enabled pipe would facilitate advanced sensors such as a transverse field magnetic flux leakage tool, to detect cracks, long-seam defects, stress corrosion cracking, and long, linear-type defects; a low-field magnetic flux leakage tool, to assess material grouping/verification and coating condition; and, an electro-mechanical attenuated transducer tool, to detect cracks, long-seam defects, stress corrosion cracking, and long, linear-type pipe defects (Exh. EFSB-S-2).

because it can potentially be a destructive testing method, and would therefore opt to use ILI methods over hydrostatic pressure tests in the interest of better risk evaluation and management of pipeline safety (Exhs. EFSB-S-3; EFSB-Z-3).

b. Analysis and Findings

The record shows that the Company has committed to observing all state and federal laws and regulations, as well as Company policies, pertaining to worker safety. These applicable laws, regulations, and policies include daily safety reviews, work area protection, and project-specific safety training. During Project construction, the Company will use signage and fencing to deter public access to the construction zone and will backfill its trench. The evidence also shows that the Project should improve the Company's ability to operate its pipeline system safely and reliably. The record demonstrates that, post construction, the availability of ILI, to be installed as part of the Project, would provide pipeline condition data above and beyond that afforded by the Company's current use of ECDA. Given the Company's stated commitment to constructing its Project in strict compliance with applicable rules and regulations, and, furthermore, to improving the safe and reliable operation of its pipeline system with Project-installed ILI, the Siting Board finds that the identified safety impacts of the Project would be appropriately addressed.

E. Conclusions on Environmental Impacts

The Project would replace portions of the Tewksbury Main Line and replace in its entirety the Wilbur Lateral. Most of the Project would be located underground within Colonial's ROW or beneath pavement, with the exception of the pig-launcher, the pig-receiver, and two aboveground control boxes. The Company has completed, or is in the process of completing, necessary planning to ensure construction-related impacts are minimized and mitigated. The Company has presented detailed information describing a wide variety of potential environmental impacts of the Project, including impacts to land use and historic resources, visual impacts, impacts to wetlands and water resources, traffic and noise impacts, impacts to air quality, hazardous and solid waste impacts, and safety impacts, and mitigation for these impacts.

Based on review of the record, the Siting Board finds that the Company provided sufficient information regarding environmental impacts and potential mitigation measures to allow the Siting Board to determine whether environmental impacts would be minimized. Based on the information provided, the Siting Board finds that, with the implementation of the mitigation and conditions specified, and given compliance with all local, state, and federal requirements, the temporary and permanent environmental impacts of the Project would be minimized. The Siting Board finds that the Project would achieve an appropriate balance among conflicting environmental impacts, as well as among environmental impacts, reliability, and cost.

VI. CONSISTENCY WITH POLICIES OF THE COMMONWEALTH

A. Standard of Review

G.L. c. 164, § 69J, requires the Siting Board to determine whether plans for construction of the applicant's new facilities are consistent with current health, environmental protection, and resource use and development policies as adopted by the Commonwealth. Vineyard Wind at 127; Needham-West Roxbury at 74; IRP at 73.

B. Positions of the Parties

Ms. Kristofferson argues that construction and operation of the Project would not be consistent with the Global Warming Solutions Act ("GWSA") (Kristofferson Brief at 5). She notes that one of the Project's results would be to provide "additional capacity to meet potential future demand growth" (id. citing Exh. NG-2, at 2-1). Ms. Kristofferson argues that this objective "is in contradiction to the [GWSA] mandates, which require greenhouse gas emission reductions, not increases" (id. at 5).

The Company, on the other hand, asserts that the "Project is . . . fully consistent with the Global Warming Solutions Act" (Company Brief at 62, citing Exh. NG-2, at 6-4). In support, the Company asserts that there will be "no fugitive emissions" of natural gas from the Project (id. at 62-63, citing Tr. 3, at 405-407). The Company also states that there will be "minimal GHG [greenhouse gas] emissions as a result of Project construction, testing and commissioning" (id. at

63). Furthermore, the Company argues that any construction-phase emissions that do occur will be minimized through mitigation measures (id. citing Exh. NG-8, at 102-105).

C. Analysis and Conclusions on Consistency

1. Health Policies

The Restructuring Act states that reliable electric service is of "utmost importance to the safety, *health*, and welfare of the Commonwealth's citizens and economy." St. 1997, c.164, § 1(h) ("Restructuring Act") (emphasis supplied). The Commonwealth has, therefore, established a nexus between reliable energy service and the health of its residents. In this decision, the Siting Board finds that the Project will contribute to reliable energy service (Sections III.D, V.D, above). In addition, construction of the Project will provide natural gas to customers with increased reliability (Exhs. NG-2, at 6-1; EFSB-PC-1). Based on this information, the Siting Board finds that approval and construction of the Project would be consistent with the health policies of the Commonwealth.

2. Environmental Protection Policies

a. Global Warming Solutions Act

The Company explains that by providing additional gas capacity, the Project will help facilitate oil-to-gas conversion in the Lowell area, and that such conversions are expected to reduce future emissions of carbon dioxide (Exh. NG-2, at 6-4). Furthermore, the Project will be consistent with the GWSA through the Company's compliance with MassDEP's regulations implementing the GWSA, including 310 CMR 7.73. "The purpose of 310 CMR 7.73 is to assist the Commonwealth in achieving greenhouse gas emissions reductions goals adopted pursuant to M.G.L. c. 21N, § (3)(b) by reducing methane (CH_4) emissions from natural gas" facilities. 310 CMR 7.73(1).

ILI inspection is superior to the Company's current method, ECDA inspection, as it provides additional information that will allow the Company to monitor the pipeline more carefully and maintain it more effectively (Exh. EFSB-S-3; Tr. 1, at 100-101). In particular, ILI inspection is more effective "for identifying pipe conditions that are related to stress corrosion

cracking defects" (Exh. EFSB S-3, citing PHMSA Proposed Rule, 81 Fed. Reg. 20,721, 20,722 (2016)). Consequently, the use of ILI inspection will aid in the reduction the potential for natural gas emissions due to leaks – and, therefore, it could aid in the reduction of methane emissions – in accordance with the purposes of 310 CMR 7.73. The Company expects the Project to have limited GHG emissions from one-time events such as pipeline commissioning, tie-ins, and pipeline decommissioning; however, it anticipates no fugitive GHG emissions from ongoing operations because the Project would be constructed and monitored to maintain a zero-leak rate (Exh. NG-8, at 112).[36]

Based on the above findings, the Siting Board rejects Ms. Kristofferson's argument alleging an inconsistency between the Project and the GWSA. To the contrary, the Siting Board finds that construction of the Project would be consistent with and promote the objectives of the Global Warming Solutions Act.

b. Environmental Justice and Language Access Policy

The record shows that the Project does not exceed any environmental impact thresholds that would necessitate enhanced participation requirements or enhanced analysis of impacts under the Environmental Justice Policy of the Energy and Environmental Affairs Secretariat (Environmental Justice Policy of the Executive Office of Energy and Environmental Affairs at ¶¶ 17, 20).

With regard to language access, after review of the demographic and linguistic data regarding local residents in Project area, the Presiding Officer required that the Notice and the Please Read documents be translated, and published, in Spanish, Portuguese, and Khmer

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[36] The Company stated a zero leak rate would be achieved by the following measures: (1) pipeline and pipeline fittings are designed and installed in a manner to not allow any gas to escape while in operations; (2) annual leak surveys are conducted of the pipeline ROW; (3) any more significant leaks would be visible to the Company's gas control personnel as pressure changes on the line; and (4) consistent with 49 CFR 192, Subpart O, the Tewksbury Line System is periodically assessed using one of the prescribed technical methods (Exh. NG-8, at 112). The Company also stated that the assumption of a zero-leak rate is supported by the fact that there have been no leaks on the pipeline to date, based on Company records (id.).

(Cambodian) as well as in English (see Section I.B supra). Furthermore, Spanish, Portuguese, and Khmer interpreters were present at the public comment hearing (Transcript of Public Comment Hearing, June 19, 2018, at 22-23). These actions were intended to ensure consistency with the language access policies of the Commonwealth and the Department.

In view of the above, the Siting Board finds that the Project, and the methods used in this adjudication, are consistent with the Executive Office of Energy and Environmental Affairs ("EEA") Environmental Justice Policy and the Commonwealth's and Department's Language Access Policies.

c. Other State and Local Environmental Policies

The Project will acquire numerous state and local approvals based on environmental criteria (Exh. NG-2, at 6-2 to 6-4). Obtaining these approvals will indicate consistency with other state and local environmental policies. For example, the Company has filed a Draft Environmental Impact Report ("DEIR") and an FEIR for the Project with the MEPA office; and the Project has proceeded through the full environmental and agency review of the MEPA process (Company Brief at 62, citing Exhs. NG-2, at 6-2; NG-8; Tr. 3, at 394).[37] The Project will also obtain all necessary state permits (id. at 62). These authorizations include those issued by MassDEP pursuant to the following: (1) the federal Clean Water Act (Section 401); (2) the Massachusetts Clean Water Act; (3) the Massachusetts Wetlands Protection Act; (4) Orders of Conditions of the Tewksbury, Chelmsford, and Lowell conservation commissions (Exh. NG-2, at 6-1 to 6-4). Based on fulfillment of these requirements, the Siting Board finds that this Project is consistent with other state and local environmental policies of the Commonwealth.

3. Resource Use and Development Policies

In 2007, the EEA's Smart Growth/Smart Energy Policy established the Commonwealth's "Sustainable Development Principles" (Exh. NG-2, at 6-5). Several aspects of the Project promote

[37] On November 16, 2018, the EEA Secretary issued a Certificate on the DEIR; the Certificate was filed with the Siting Board on December 11, 2018 (Exh. NG-9). The Company filed the FEIR with the Siting Board on May 8, 2019 (Exh. NG-10). The EEA Secretary issued a Certificate on the FEIR on June 14, 2019 (Exh. NG-11).

these principles. For example, one of the principles is to encourage remediation and reuse of existing sites, structures, and infrastructure rather than new construction in undeveloped areas (id.). The Project furthers this principle by using an existing ROW and much of the existing infrastructure (id. at 1-6, 6-5). By using the existing ROW, rather than creating a new ROW, the Project also furthers another principle: promoting development that conserves land and that is compact (id. at 1-6, 6-5). Another principle is the protection of environmentally sensitive lands, natural resources, critical habitats, and wetlands and water resources (id. at 6-5). The ways in which construction of the Project will further these goals have been discussed in Section V.C, above.

Based on this information and analysis, the Siting Board concludes that construction and operation of the Project would be consistent with the resource use and development policies of the Commonwealth.

D. Summary

Based on the analysis above, and subject to the specific mitigation and the conditions set forth in this Decision, the Siting Board finds that plans for the Project are consistent with current health, environmental protection, and resource use and development policies as adopted by the Commonwealth.

VII. ANALYSIS UNDER G.L. C. 40A, § 3 – ZONING EXEMPTIONS

Pursuant to G.L. c. 40A, § 3, the Company has petitioned the Department for individual and comprehensive zoning exemptions from the operation of the Town of Tewksbury Zoning Bylaw as amended (Exh. NG-7). The Company argues that these exemptions are required in order to make the necessary upgrades at the Tewksbury Take Station (Exh. NG-7, at 11).

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 by-law 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.[38] First, the petitioner must qualify as a public service corporation. 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 public convenience or welfare. Vineyard Wind at 132; Woburn-Wakefield at 139-140; NSTAR Electric Company d/b/a Eversource Energy, EFSB 14-2/D.P.U. 14-73/14-74, at 90 (2017) ("Walpole-Holbrook"); Tennessee Gas Pipeline Company, D.T.E. 01-57, at 3-4 (2002). Finally, the petitioner must establish that it requires exemption from the zoning ordinance or bylaw. Vineyard Wind at 132; Woburn-Wakefield at 140; Boston Gas Company, D.T.E. 00-24, at 3 (2001).

Additionally, the Siting Board favors the resolution of local issues on a local level whenever possible to reduce concern regarding any intrusion on home rule. The Siting Board believes that the most effective approach for doing so is for a petitioner to consult with local officials regarding its project before seeking zoning exemptions pursuant to G.L. c. 40A, § 3 Vineyard Wind at 132; Woburn-Wakefield at 140; Russell Biomass LLC-Western Massachusetts Electric Company, EFSB 07-4/D.P.U. 07-35/07-36, at 61-62 (2009) ("Russell Biomass/WMECo"). Thus, the Siting Board encourages petitioners to consult with local officials, and in some circumstances, to apply for local zoning permits, before seeking zoning exemptions from the Department under G.L. c. 40A, § 3. Vineyard Wind at 132; NSTAR Electric Company

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[38] G.L. c. 40A, § 3, applies to the Department. The Department refers zoning exemption petitions to the Siting Board for hearing and decision pursuant to G.L. c. 25, § 4 (see Section I.B supra). In accordance with G.L. c. 164, § 69H, when deciding cases under a Department statute, the Siting Board applies Department and Siting Board standards "in a consistent manner." G.L. c. 164, § 69H(3). Thus, the Department and the Siting Board implement G.L. c. 40A, §3 using consistent standards of review. Consequently, the standard of review, and this Decision, cites to both Siting Board Decisions and Department Orders interpreting G.L. c. 40A, §3.

d/b/a Eversource Energy, EFSB 15-03/D.P.U. 15-64/15-65, at 77 (2017) ("Mystic-Woburn"); Russell Biomass/WMECo at 68.

1. Public Service Corporation

a. Standard of Review

In determining whether a petitioner qualifies as a "public service corporation" 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; Vineyard Wind at 133; Berkshire Power Development, Inc., D.P.U. 96-104, at 26-36 (1997) ("Berkshire Power").[39]

b. Analysis and Finding

The Company is a "gas company" as defined in G.L. c. 164, § 1 (Exh. NG-1, at 1). Because it is a gas company, it is therefore a public service corporation. Woburn-Wakefield at 141; New England Power d/b/a National Grid, D.P.U. 15-44, at 8 (2016); NSTAR Electric

[39] The Department interprets this list not as a test, but rather as guidance to ensure that the intent of G.L. c. 40A, § 3 would 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. See Berkshire Power at 30; Save the Bay, 366 Mass. at 685-686; Town of Truro v. Department of Public Utilities, 365 Mass. 407, 410 (1974). 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." Berkshire Power at 30; see also Dispatch Communications of New England, D.P.U./D.T.E. 95-59-B/95-80/95-112/96-113, 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 public service corporation status. See Berkshire Power at 31; New England Power d/b/a National Grid, D.P.U. 15-44, at 6 (2016); Eversource-Hopkinton at 4-5.

Company d/b/a Eversource Energy, D.P.U. 15-02, at 6-7 (2015) ("Eversource-Hopkinton"). Accordingly, the Siting Board finds that the Company qualifies as a public service corporation for the purposes of G.L. c. 40A, § 3.

2. Public Convenience and Welfare

a. Standard of Review

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 v. Department of Public Utilities, 365 Mass. 407, 409 (1974). 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) ("NY Central Railroad"). When reviewing a petition for a zoning exemption under G.L. c. 40A, § 3, the Department is empowered and required to consider the public effects of the requested exemption in the State as a whole and upon the territory served by the applicant. Save the Bay, 366 Mass. at 685; NY Central Railroad, 347 Mass. at 592.

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 need for, or public benefits of, the present or proposed use; (2) the present or proposed use and any alternatives or alternative sites identified;[40] 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

[40] 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); NY Central Railroad at 591.

structures is reasonably necessary for the convenience or welfare of the public. Woburn-Wakefield at 142; Walpole-Holbrook at 92-93; Tennessee Gas Company, D.T.E. 98-33, at 4-5 (1998).

b. Analysis and Findings

The need for the Project is discussed in Section II, above (see also Exh. NG-2, at 2-1 to 2-12). Based on the discussion and analysis above and in the cited material, the Siting Board finds in Section II.F that the Project is needed and that it will benefit the region's natural gas customers by enhancing safety and reliability, mitigating low delivery pressures from the interstate pipeline, and providing capacity for future energy needs.

As described in Section III above, the Siting Board has examined the Company's evaluations of the alternatives to the Project: both assessing to what extent these alternatives might meet the identified needs and evaluating the expense and difficulties involved in implementing these alternatives. The Siting Board found in Section III.D that the Project is superior to the other alternatives with respect to meeting the identified need and providing a reliable energy supply for the Commonwealth with minimum impact on the environment at the lowest possible cost." In Section IV above, the Siting Board performed a review of the Company's route selection process, finding that the Company has: (1) developed and applied a reasonable set of criteria for identifying and evaluating alternative routes in a manner that ensures that it has not overlooked or eliminated any routes that are clearly superior to the Project; and (2) demonstrated that it examined a reasonable range of practical siting alternatives while seeking to minimize cost and environmental impacts while ensuring a reliable energy supply.

As detailed in Section V above, the Company has conducted a comprehensive analysis of the Project's environmental impacts and the appropriate mitigation while also balancing safety, design standards, cost, and reliability considerations (see also Exh. NG-2, at 5-1 to 5-45). In Section V.D, we concluded that with the implementation of mitigation conditions specified herein, and compliance with relevant laws and regulations, the Project's environmental impacts would be minimized. In the same section we further found that the Project would achieve an appropriate

balance among conflicting environmental impacts as well as among such impacts, reliability and cost (see Section V.D, above).

Based on the record and on findings made above, the Siting Board finds that the Project is reasonably necessary for the public convenience or welfare.

B. Individual Exemptions Required

1. Standard of Review

In determining whether exemption from a particular provision of a zoning bylaw is "required" for purposes of G.L. c. 40A, § 3, the Department looks to whether the exemption is necessary to allow construction or operation of the petitioner's project. Vineyard Wind at 143; Woburn-Wakefield at 143-144; Mystic-Woburn at 80-81. The Petitioner bears the burden to identify the individual zoning provisions applicable to the Project and then to establish 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 would 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); NRG Canal 3 Development LLC, EFSB 15-06/D.P.U. 15-180, at 145 (2017) ("NRG"); Mystic-Woburn at 80-81.

2. Individual Exemption Sought

The Company seeks only one individual exemption, an exemption from the limitations on the use of property in the residential district in which the Tewksbury Take Station is located.

The Project includes the installation of a pig launcher and the replacement of fittings at the Tewksbury Take Station (Exh. NG-2, at 1-5). Colonial stated that the installation of these items would constitute an essential service, and the Tewksbury Town Manager confirmed this understanding (Exh. NG-7, at 11, 12). Essential services are defined in Section 10000 of the Tewksbury Zoning Bylaw as: "Services provided by a public service corporation . . . through

erection, construction, alteration, or maintenance of gas . . . transmission or distribution . . . systems[.] . . . Facilities necessary for the provision of essential services include . . . pipes, conduits . . . and other similar equipment" (id. att. A at 134). The Tewksbury Take Station is located entirely within the Residence 40 ("R40") zoning district (id. at 11; EFSB-Z-9). The Tewksbury Zoning Bylaw explicitly prohibits essential service use in the R40 zoning district (Exh. NG-7, att. A at 144). Furthermore, the Zoning Board of Appeals is expressly prohibited from issuing any use variances (Exhs. EFSB-Z-8; NG-7, Att. A at 120, § 9222). Consequently, the Company argues that the proposed upgrade may not be legally installed as its use is prohibited by the relevant Tewksbury Zoning Bylaw, and the Zoning Board of Appeals cannot grant a use variance (Company Brief at 69-71).[41]

After a review of the record, we find that construction of the Tewksbury Take Station would require a use variance from the Table of Use Regulations. The Zoning Board of Appeals, however, is expressly prohibited from issuing a use variance (Exhs. EFSB-Z-8; NG-7, Att. A at 120, § 9222). Therefore, the Siting Board finds that unless we grant the requested exemption, the Tewksbury Take Station portion of the Project cannot be constructed. Under these circumstances, the Siting Board finds that the requested exemption from the Tewksbury Zoning Bylaw is required within the meaning of G.L. c. 40A, § 3.

3. Consultation with Municipalities

The record shows that the Company has engaged in substantial outreach to the residents and the municipal officials of the affected municipalities with respect to the Project generally and, specifically, the zoning exemption requested (Exhs. NG-2, at 1-11, table 1-1; NG-7, at 10, 11; Tr. 2, at 179). Using information obtained from the assessor's offices in Lowell, Chelmsford, and Tewksbury, the Company compiled a list of approximately 560 property owners whose property lines were within 300 feet of the edge of the Project's ROW (Exh. EFSB-G-2). The Company stated that it sent multiple mailings describing the Project to each owner; and that its stakeholder

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41 The Department previously exempted aspects of the Tewksbury Take Station from the application of the Tewksbury Zoning Bylaw by Orders issued in 1959 and 1968 (Company Brief at 70 n.12).

outreach team visited each location (id.). Furthermore, the Company held at least ten separate meetings with Lowell, Chelmsford, and Tewksbury officials (Exh. NG-2, at table 1-1, at 1-10, 1-11).

With respect to zoning, the record shows that the Company's representatives[42] met with Tewksbury's Assistant Town Manager, Town Planner, and Town Engineer on November 16, 2017, to discuss the Project in general, the applicability of the Tewksbury Zoning Bylaw to the Project, and the process for seeking zoning exemptions for the Project (Exh. NG-7, Att. C at 1). The Company's counsel sent a letter dated January 26, 2018, to the Assistant Town Manager summarizing the meeting, and on January 29, 2018, the Assistant Town Manager replied stating that the January 26, 2018, letter accurately summarized the meeting (id. Att. C, Att. D). In that letter, the Assistant Town Manager further stated: "I do not object to Colonial's determination to secure such [zoning] exemptions, understanding that it will achieve clear, consistent and efficient regulation of the project, and will allow it to proceed in a timely manner" (id. Att. D). Consequently, we find that the Company has made a good faith effort to consult with municipal authorities regarding its proposal to seek zoning relief for construction of the Project pursuant to G.L. c. 40A, § 3, and that the Company's communications have been consistent with the spirit and intent of Russell Biomass/WMECo and Salem Cables.

C. Conclusion

The Siting Board has found that: (1) the Company is a public service corporation; (2) the proposed use is reasonably necessary for the public convenience and welfare; and (3) the specifically identified zoning exemption is required for the construction of the Project within the meaning of G.L. c. 40A, § 3. Additionally, the Siting Board has found that the Company engaged in good faith consultation with the Town of Tewksbury.

Accordingly, the Siting Board grants the Company's request for the individual zoning exemption that prohibits an essential services use in a R40 residential district. This restriction is set forth in the "Table of Use Regulations" found in Exhibit NG-7, Att. A at 143.

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42 The Company's representatives included its law firm counsel, the project manager, the project engineer, and in-house counsel (Exh. NG-7, Att. C at 1).

VIII. REQUEST FOR COMPREHENSIVE ZONING EXEMPTION PURSUANT TO G.L C. 40A, § 3

A. Standard of Review

The Company has requested a comprehensive zoning exemption from the Tewksbury Zoning Bylaw. The Siting Board grants such requests on a case-by-case basis where the applicant demonstrates that issuance of a comprehensive exemption could avoid substantial public harm by serving to prevent a delay in the construction and operation of the proposed use. Vineyard Wind at 153; Woburn-Wakefield at 150; Hampden County at 92.

In order to make a determination regarding substantial public harm, the Department and the Siting Board have articulated relevant factors, including, but not limited to, whether: (1) the proposed project contributes to a reliable energy supply for the Commonwealth; (2) the project is time sensitive; (3) the project involves multiple municipalities that could have conflicting zoning provisions that might hinder the uniform development of a large project spanning these communities; (4) the proponent of the project has actively engaged the communities and responsible officials to discuss the applicability of local zoning provisions to the project and any local concerns; and (5) the affected communities do not oppose the issuance of the comprehensive exemption. Vineyard Wind at 153; Woburn-Wakefield at 150; NRG at 154.

B. Company's Position

The Company argues that the comprehensive exemption it seeks must be granted in order to avoid substantial public harm (Company Brief at 71-73). In support of this argument, the Company asserts that the Project is needed in order to address reliability issues (id. at 72). The Project would address these issues by: (1) enabling the use of state-of-the-art ILI inspection methods that are likely to be required by proposed federal regulations; (2) improving operational flexibility in addressing low delivery pressures from TGP; and (3) providing additional capacity to meet projected long-term growth (Exh. NG-7, at 14; see also Company Brief at 72). Furthermore, the Company notes that it has discussed the need for a comprehensive zoning exemption with Tewksbury officials and has received their support (Company Brief at 72, citing Exh. NG-7, Att. C and D).

The Company further argues that granting the Project a comprehensive zoning exemption would expedite construction in ways that granting the individual exemption discussed above cannot accomplish (Exh. NG-7, at 14-15; Company Brief at 71-73). In support of this argument, the Company presents three possible scenarios. First, it is conceivable that there may be changes to the work to be performed at the Tewksbury Take Station that are not currently contemplated (Exh. NG-7, at 14-15; Company Brief at 72-73). These changes could result in zoning nonconformities not mentioned in the Zoning Exemption Petition, and a comprehensive zoning exemption would prevent any such nonconformity from halting or delaying the Project (Exh. NG-7, at 14-15; Company Brief at 72-73).

Second, it is possible that an existing provision of the Tewksbury Zoning Bylaw that is now interpreted as inapplicable to the Project might later be determined to be applicable (Company Brief at 73; Exh. NG-7, at 15). Third, a subsequently enacted zoning bylaw might be held to be applicable to the Project (Company Brief at 73; Exh. NG-7, at 15). Again, the Company argues that the grant of a comprehensive zoning exemption would prevent either scenario from resulting in a delay of, or prohibition against, Project construction (Company Brief at 73; Exh. NG-7, at 15). The Company's final argument is that the grant of a comprehensive exemption would enable it to promptly address beneficial design changes without the fear that such changes would result in a zoning violation (Company Brief at 73; Exh. NG-7, at 15).

C. Analysis and Findings

The Project is time-sensitive[43] and the Town of Tewksbury does not oppose the grant of a comprehensive zoning exemption. Under these circumstances, the Siting Board finds that any delay in the construction of the Project would cause substantial public harm because it would impede the Company's ability to address important reliability issues. Consequently, the Siting Board finds that the Company has demonstrated a comprehensive zoning exemption is warranted

[43] According to the Company, Project construction was anticipated to begin during summer 2019, and finish in November 2020; ILI inspection of the Tewksbury Mainline and Wilbur Lateral would take place by October 2021 (Exh. NG-2, at 1-9). If the Company is unable to perform ILI of the Tewksbury Line System before October 30, 2021, it will be required to continue ECDA (Tr. 1, at 52).

in this instance. Other considerations, however, indicate that there should be some limitations to the grant of a comprehensive zoning exemption.

Even when a comprehensive zoning exemption is granted, one class of zoning bylaws is often excluded: zoning restrictions relating to the environmental aspects of the ongoing operation of the proposed project. Woburn-Wakefield at 151; Walpole-Holbrook at 99; Boston Edison Company d/b/a NSTAR Electric, EFSB 04-1/ D.P.U. 04-5/04-6, at 153-154 (2005) ("Stoughton-Boston"). In this case, the Environmental Performance Standards of the Tewksbury Zoning Bylaw, §§ 5300 et seq., address such issues as stormwater, outdoor lighting, solid waste storage, as well as "inflammable and explosive material" (Exh. NG-7, Att. A, at 31-34).

Consequently, were the Siting Board to include all of the Environmental Performance Standards of the Tewksbury Zoning Bylaw in the grant of comprehensive exemption, the town could not exercise control over the on-going operations of the Project with respect to these important environmental impacts. Stoughton-Boston at 153-154. Therefore, the Siting Board does not include the Environmental Performance Standards in the grant of a comprehensive zoning exemption, with one exception. Section 5310 in the Environmental Performance Standards of the Tewksbury Zoning Bylaw prohibits any use that would be "offensive because of injurious or obnoxious noises, vibrations, smoke, gas, fumes, odors, dust, debris, or other objectionable features…or may prove destructive of property values because of any excessive nuisance qualities" (Exh. NG-7, att. A at 31). This provision is overly broad and susceptible to application in a highly subjective manner, which could present unwarranted risks to the ongoing operation of the Project, even though no such nuisance conditions are reflected in the record or reasonably anticipated for the Project. Therefore, the Siting Board includes Section 5310 in its grant of a comprehensive zoning exemption.

The Siting Board finds that these circumstances justify the grant of a comprehensive zoning exemption as it relates to both the construction and the operation of the Project subject to the following provisions: (1) the comprehensive exemption excludes the Environmental Performance Standards (Section 5300) for the ongoing operations of the Project, with the exception of Section 5310 et seq.; and (2) Section 5310 is included within the scope of the comprehensive zoning exemption for both the construction and the operation of the Project.

IX. SECTION 61 FINDINGS

MEPA provides that "[a]ny determination made by an agency of the commonwealth shall include a finding describing the environmental impact, if any, of the Project and a finding that all feasible measures have been taken to avoid or minimize said impact" ("Section 61 Findings"). G.L. c. 30, § 61. Pursuant to 301 CMR 11.01(3), Section 61 Findings are necessary when an environmental impact report ("EIR") is submitted to the Secretary of EEA and Section 61 Findings should be based on such EIR. Where an EIR is not required, Section 61 Findings are not necessary. 301 CMR 11.01(4).

The record shows that the Company filed an ENF for the Project with MEPA on November 30, 2017 (Exh. NG-5), and that the Secretary issued a Certificate on the ENF on January 5, 2018, requiring the Company to file a DEIR (Exh. NG-6). Therefore, a finding under G.L. c. 30, § 61, is necessary for the Company's Zoning Petition.[44] The Company submitted its DEIR to MEPA on October 1, 2018 (Exh. NG-8); and the Secretary of EEA issued a Certificate on the DEIR on November 16, 2018 (Exh. NG-9). In the DEIR Certificate, the Secretary stated that the DEIR "adequately and properly complies with MEPA and its implementing regulations" (Exh. NG-9, at 1). The DEIR Certificate also required the Company to prepare and submit for review an FEIR, which was completed in April 2019. The Secretary of EEA issued a Certificate on the FEIR on June 14, 2019; the FEIR Certificate stated that the FEIR "adequately and properly complies with MEPA and its implementing regulations" (Exh. NG-11, at 1).

The Siting Board recognizes the Commonwealth's policies relating to GHG emissions, including G.L. c. 30, § 61, and the MEPA Greenhouse Gas Emission Policy and Protocol. The Siting Board notes that the Project is expected to have limited GHG emissions from one-time

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[44] The Siting Board is not required to make a G.L. c. 30, § 61, finding in a G.L. c. 164, § 69J proceeding, as the Siting Board is exempt by statute from MEPA requirements. G.L. c. 164, § 69I. However, the Board must comply with MEPA with respect to review of the Company's Zoning Exemption Petition. Zoning Exemption Petitions are filed pursuant to G.L. c. 40A, § 3, a Department statute, and the Department is not exempt from MEPA. Accordingly, in approving the Company's Zoning Exemption Petition in this case, the Siting Board has conducted the review and made the findings required by MEPA.

events such as pipeline commissioning, tie-ins, and pipeline decommissioning, but that fugitive GHG emissions from ongoing operations are not expected. As such, the Project would not have direct emissions from a stationary source or indirect emissions from energy consumption. In Section V.C, above, the Siting Board conducted a comprehensive analysis of the environmental impacts of the Project. Based on the record in this case, implementation of the required mitigation measures, and compliance with all applicable federal, state, and local laws and regulations, the Siting Board finds that the Company has taken all feasible measures to avoid or minimize the environmental impacts of the Project.

The record contains, and the Siting Board has reviewed, the MEPA documents submitted by the Company, including the ENF, DEIR, and FEIR for the Project, as well as the Secretary's Certificate on the DEIR, which contained public comments on the DEIR, and the Secretary's Certificate on the FEIR, which contained public comments on the FEIR (Exhs. NG-5; NG-8; NG-9; NG-10; NG-11). Additionally, in Section V.C above, the Siting Board conducted a comprehensive analysis of the potential environmental impacts of the Project. The Siting Board found that the Company's plans for the construction of the Project, as presented to the Siting Board and as conditioned and mitigated in this Decision, would provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H.

In accordance with the requirements of MEPA, the Siting Board has: reviewed the DEIR and the FEIR for the Project; evaluated and determined the impact of the Project on the natural environment; and specified in detail in this Decision measures to be taken by the Company to avoid damage to the environment or, to the extent damage to the environment cannot be avoided, to minimize and mitigate damage to the environment to the maximum extent practicable. G.L. c. 30, § 61. The Siting Board notes that the Secretary has determined that the DEIR and FEIR for the Project adequately and properly complies with MEPA (Exhs. NG-9, at 1; NG-11, at 1). Accordingly, as provided by MEPA, the Siting Board finds that all feasible measures have been taken to avoid or minimize the environmental impacts of the proposed Project. G.L. c. 30, § 61; 301 CMR 11.12(5).

X. DECISION

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G.L. c. 164, §§ 69H to 69Q, to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. Thus, an applicant must obtain Siting Board approval under G.L. c. 164, § 69J, prior to construction of a proposed energy facility.

In Section II, above, the Siting Board finds that there is a need for construction of the Project in order to facilitate in-line inspection, and that the improved inspection will enhance the reliability and safety of the system.

In Section III, above, the Siting Board finds that the Project is, on balance, superior to the other alternatives identified with respect to meeting the identified need and providing a reliable energy supply for the Commonwealth with minimum impact on the environment at the lowest possible cost.

In Section IV, above, the Siting Board finds that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternatives routes in a manner that ensures that it has not overlooked or eliminated any routes that are clearly superior to the Project. The Siting Board also finds that the Company has identified a range of practical pipeline routes with some measure of geographic diversity. Consequently, the Siting Board finds that the Company has demonstrated that it examined a reasonable range of practical siting alternatives while seeking to minimize cost and environmental impacts and ensuring a reliable energy supply.

In Section V, above, the Siting Board finds that with the implementation of specified mitigation measures, and compliance with all applicable local, state, and federal requirements, the environmental impacts of the Project would be minimized, and that the Project would achieve an appropriate balance among conflicting environmental impacts, as well as among environmental impacts, reliability, and cost.

In Section VI, above, the Siting Board finds that with the implementation of the specified mitigation and the conditions set forth in this Decision, the Project is consistent with the current health, environmental protection, and resource use and development policies of the Commonwealth.

In addition, the Siting Board finds, pursuant to G.L. c. 40A, § 3, that: (1) the Company is a public service corporation; (2) the Project is reasonably necessary for the public convenience and welfare; and (3) the specifically identified zoning exemption is required for the construction of the Project. Accordingly, the Siting Board approves the Company's Petition for an exemption from one specific provision of the Town of Tewksbury Zoning Bylaw. In addition, the Siting Board finds pursuant to G.L. c. 40A, § 3, that a comprehensive zoning exemption is warranted for construction and operation of the Project. Accordingly, the Siting Board approves the Company's Petition for a comprehensive exemption from the Town of Tewksbury Zoning Bylaw with the limitation noted in Section VII.C, above.

Accordingly, the Siting Board approves pursuant to G.L. c. 164, § 69J, the Company's Petition to construct the Project, as described herein, and pursuant to G.L. c. 40A, § 3 approves the Company's Zoning Exemption Petitions, both for an individual exemption and a comprehensive exemption, subject to the following Conditions A through G.

A. The Siting Board directs the Company to notify the Siting Board if it is required to develop an archeological monitoring program.

B. The Siting Board directs that the Company provide to the Siting Board a copy, when available, of its Hydrostatic Test Plan.

C. The Siting Board directs the Company to notify the Siting Board of final discharge plans for water used in hydrostatic testing upon completion of Project construction.

D. The Siting Board directs that the Company provide to the Siting Board a copy, when available, of its final Traffic Management Plan, including measures specific to the Highway Crossing Horizontal Directional Drilling.

E. The Siting Board directs the Company to adhere to its proposed construction schedule: i.e., Monday through Saturday, 7:00 am till 5:00 pm, and no work on Sundays or holidays. Should there be construction work that the Company determines is necessary outside these hours or days, the Company shall seek written permission from the relevant municipal authority prior to the commencement of such work, and provide the Siting Board with a copy of such permission. If the Company and municipal officials are not able to agree on such requested extended construction hours or days, the Company may file a written request for prior authorization from the Siting Board, provided that it also notifies the relevant municipal authorities in writing of such request.

F. The Siting Board directs the Company and its contractors and subcontractors to comply with all applicable federal, state, and local laws, regulations, and ordinances from which the Company has not received an exemption.

G. The Siting Board directs the Company, within 90 days of Project completion, to submit a report to the Siting Board documenting compliance with all conditions contained in this Decision, noting any outstanding conditions yet to be satisfied, and the expected date and status of such resolution.

Because issues addressed in this Decision relative to this facility are subject to change over time, construction of the proposed Project must be commenced within three years of the date of the Decision.

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

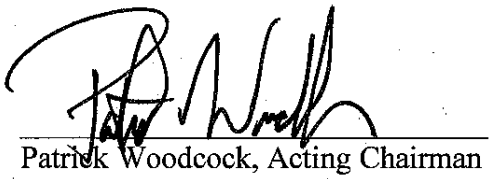
The Secretary of the Department shall transmit a copy of this Decision and the Section 61 findings herein to the Executive Office of Energy and Environmental Affairs, and the Company shall serve a copy of this Decision on the Town of Tewksbury Board of Selectmen, the Town of Tewksbury Planning Board, the Town of Tewksbury Zoning Board of Appeals, the Town of Chelmsford Board of Selectmen, and the City Council of the City of Lowell, within five days of its issuance. The Company shall certify to the Secretary of the Department within ten business days of issuance that such service has been made.

Robert J. Shea

Robert J. Shea
Presiding Officer

Dated this 26th day of September 2019

APPROVED by a unanimous vote of the Energy Facilities Siting Board at its meeting on September 25, 2019, by the members present and voting. Voting for the Tentative Decision as amended: Patrick Woodcock, Undersecretary of the Executive Office of Energy and Environmental Affairs and Acting Siting Board Chairman; Matthew Nelson, Chair of the Department of Public Utilities; Cecile M. Fraser, Commissioner of the Department of Public Utilities; Judith Judson, Commissioner of the Department of Energy Resources; Robert McGovern, Deputy General Counsel and designee for the Secretary of the Executive Office of Housing and Economic Development; Gary Moran, Deputy Commissioner and designee for the Commissioner of Massachusetts Department of Environmental Protection; and Brian Casey, Public Member.



Patrick Woodcock, Acting Chairman
Energy Facilities Siting Board

Dated this 26th day of September 2019

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