ATLANTIC BRIDGE PROJECT

RESOURCE REPORT 10
Alternatives

FERC Docket No. CP16-__-000

October 2015
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<tr>
<th>Filing Requirement</th>
<th>Location in Environmental Report</th>
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<tbody>
<tr>
<td>✗ Address the “no action” alternative. For large projects, address the effect of energy conservation or energy alternatives to the project.</td>
<td>Section 10.3</td>
</tr>
<tr>
<td>✗ Identify system alternatives considered during the identification of the Project and provide the rationale for rejecting each alternative.</td>
<td>Section 10.5</td>
</tr>
<tr>
<td>✗ Identify major and minor route alternatives considered to avoid impact on sensitive environmental areas (e.g., wetlands, parks, or residences) and provide sufficient comparative data to justify the selection of the proposed route.</td>
<td>Sections 10.7</td>
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<tr>
<td>✗ Identify alternative sites considered for the location of major new aboveground facilities and provide sufficient comparative data to justify the selection of the proposed site.</td>
<td>Section 10.8</td>
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### RESPONSE TO FERC AUGUST 19, 2015 COMMENTS ON ATLANTIC BRIDGE PROJECT RESOURCE REPORT 10 – ALTERNATIVES

<table>
<thead>
<tr>
<th>FERC COMMENTS ON DRAFT RESOURCE REPORT 10</th>
<th>LOCATION OR RESPONSE TO COMMENT</th>
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<tbody>
<tr>
<td>1. Evaluate a system alternative based on Algonquin’s system that would meet the purpose and need of the project by increasing the amount of pipeline but reducing the amount of new compression required at the Weymouth Compressor Station site. Identify the length and locations of the required facilities and compare the impacts of these alternative facilities to the preferred project facilities. Discuss why this system alternative is not preferred.</td>
<td>See Section 10.5.2 for a response to this comment.</td>
</tr>
<tr>
<td>2. Develop and evaluate an alternative route to the current Stony Point Discharge alignment that would avoid/minimize the routes proximity to residences congestion located between approximate MP 1.4 and MP 2.3.</td>
<td>Two alternative routes to the Stony Point Discharge Take-up and Relay are described in Section 10.7.1.</td>
</tr>
<tr>
<td>3. Develop and evaluate an alternative route to the current Southeast Discharge alignment that would deviate avoid/minimize the routes proximity to residential areas and the need for in-street construction between MPs 0.0 and 0.6.</td>
<td>An alternative route to the Southeast Discharge Take-up and Relay is discussed in Section 10.7.2.</td>
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<tr>
<td>4. Provide a detailed discussion and mapping of the alternative sites that were examined for the new Salem Pike M&amp;R station. The discussion should identify specific engineering or environmental reasons why each alternative site was not selected.</td>
<td>See Section 10.8.5 for a discussion of the site selection process for the new Salem Pike M&amp;R Station.</td>
</tr>
<tr>
<td>5. Explain the factors as to why an HDD along the Southeast Discharge Take-Up and Relay from MP 0.0 to 0.7 would be infeasible.</td>
<td>A discussion of why using the HDD method from milepost 0.0 to 0.7 along the Southeast Discharge Take-up and Relay segment is not feasible is provided in Section 10.6.</td>
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<td>FERC COMMENTS ON DRAFT RESOURCE REPORT 10</td>
<td>LOCATION OR RESPONSE TO COMMENT</td>
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<td>6. Provide a discussion of the two Weymouth Compressor Station site alternatives (Children’s Island and Long Island) that were identified by Nathaniel Wales in scoping comments on June 30, 2015. Explain the feasibility of each site (as appropriate) and compare these to the proposed Weymouth Compressor Station site. Include environmental features evaluated for each alternative site versus the preferred site.</td>
<td>Children’s Island and Long Island, along with the other alternate compressor station sites, are described in Section 10.8.4.</td>
</tr>
<tr>
<td>7. Recent information regarding the Access Northeast Project indicates that the project would include approximately 3.5 miles of new lateral pipe from the Weymouth Compressor Station south along National Grid’s existing electric transmission corridor. Update the alternatives analysis to include an evaluation of alternative sites for the Weymouth Compressor Station along the proposed route of this 3.5-mile-long lateral.</td>
<td>The analysis of the three alternate compressor station sites in Weymouth that was provided in the Pre-filing draft included the 3.5-mile section of new lateral pipeline along the existing transmission corridor. The analysis of the pipeline and the three Weymouth alternate sites are described in Section 10.8.4.</td>
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## ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>Algonquin</td>
<td>Algonquin Gas Transmission, LLC</td>
</tr>
<tr>
<td>Applicants</td>
<td>Algonquin and Maritimes</td>
</tr>
<tr>
<td>Bcf/d</td>
<td>billion cubic feet per day</td>
</tr>
<tr>
<td>CTCES</td>
<td>Connecticut Comprehensive Energy Strategy</td>
</tr>
<tr>
<td>d/b/a</td>
<td>doing business as</td>
</tr>
<tr>
<td>Dth/d</td>
<td>dekatherms per day</td>
</tr>
<tr>
<td>EIA</td>
<td>Energy Information Administration</td>
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<tr>
<td>EPAct</td>
<td>The Energy Policy Act of 2005</td>
</tr>
<tr>
<td>Eversource</td>
<td>NSTAR Electric Company d/b/a Eversource Energy</td>
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<tr>
<td>FERC or Commission</td>
<td>Federal Energy Regulatory Commission</td>
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<tr>
<td>HDD</td>
<td>horizontal directional drill</td>
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<tr>
<td>hp</td>
<td>horsepower</td>
</tr>
<tr>
<td>Iroquois</td>
<td>Iroquois Gas Transmission System</td>
</tr>
<tr>
<td>MADOER</td>
<td>Massachusetts Department of Energy Resources</td>
</tr>
<tr>
<td>MADPU</td>
<td>Massachusetts Department of Public Utilities</td>
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<tr>
<td>MAOP</td>
<td>maximum allowable operating pressure</td>
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<tr>
<td>Maritimes</td>
<td>Maritimes &amp; Northeast Pipeline, L.L.C.</td>
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<tr>
<td>M&amp;R</td>
<td>metering and regulating</td>
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<tr>
<td>MP</td>
<td>milepost</td>
</tr>
<tr>
<td>MW</td>
<td>megawatt</td>
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<tr>
<td>MWh</td>
<td>megawatt hour</td>
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<tr>
<td>NED</td>
<td>Northeast Energy Direct</td>
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<tr>
<td>NHESP</td>
<td>Natural Heritage and Endangered Species Program</td>
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<tr>
<td>NLCD</td>
<td>National Land Cover Database</td>
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<tr>
<td>NPU</td>
<td>Norwich Public Utilities</td>
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<tr>
<td>NWI</td>
<td>National Wetlands Inventory</td>
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<tr>
<td>Project</td>
<td>Atlantic Bridge Project</td>
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<tr>
<td>Project Shippers</td>
<td>Heritage Gas Limited, Maine Natural Gas Company d/b/a Liberty Utilities,</td>
</tr>
<tr>
<td></td>
<td>NSTAR Gas Company d/b/a Eversource Energy, Exelon Generation Company, LLC</td>
</tr>
<tr>
<td></td>
<td>(as assignee of Summit Natural Gas of Maine), Irving Oil Terminal Operations</td>
</tr>
<tr>
<td></td>
<td>Inc., New England NG Supply Limited, and Norwich Public Utilities</td>
</tr>
<tr>
<td>PNGTS</td>
<td>Portland Natural Gas Transmission System</td>
</tr>
<tr>
<td>psig</td>
<td>pounds per square inch gauge</td>
</tr>
<tr>
<td>ROW</td>
<td>right-of-way</td>
</tr>
<tr>
<td>SCFH</td>
<td>standard cubic feet per hour</td>
</tr>
<tr>
<td>Tennessee</td>
<td>Tennessee Gas Pipeline</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>USDOE</td>
<td>U.S. Department of Energy</td>
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10.1 Introduction

Algonquin Gas Transmission, LLC ("Algonquin") and Maritimes & Northeast Pipeline, L.L.C. ("Maritimes") (collectively the "Applicants") are seeking authorization from the Federal Energy Regulatory Commission ("FERC" or "Commission") pursuant to Section 7(c) of the Natural Gas Act\(^1\) to construct, install, own, operate, and maintain the Atlantic Bridge Project ("Project"). The Applicants are also seeking authorization pursuant to Section 7(b) of the Natural Gas Act\(^2\) to abandon certain facilities as a related component of the Atlantic Bridge Project.

The Atlantic Bridge Project will create additional firm pipeline capacity necessary to deliver natural gas supplies that will meet supply and load growth requirements in the Northeast market area. The Project will create additional capacity between a receipt point on Algonquin’s system at Mahwah in Bergen County, New Jersey and various delivery points on the Algonquin system, including at Beverly, Massachusetts for further transportation and deliveries on the Maritimes system. The Project capacity of up to 132,705 dekatherms per day ("Dth/d") will be created through pipeline take-up and relay facilities and additional compression on Algonquin’s system. South-to-north transportation on the Maritimes system will be achieved through minor modifications to existing facilities to provide bi-directional flow on the existing Maritimes system. The target in-service date for the Project is November 1, 2017.

As is more fully described in Resource Report 1, the Atlantic Bridge Project includes the construction of approximately 6.3 miles of take-up and relay pipeline facilities on the Algonquin system. These pipeline facilities include the following:

- **New York:**
  - Stony Point Discharge Take-up and Relay – 4.0 miles of 42-inch diameter pipeline.
- **Connecticut:**
  - Southeast Discharge Take-up and Relay – 2.3 miles of 42-inch diameter pipeline.

On the Algonquin and Maritimes systems, the Project also includes aboveground facilities including modifications at three existing compressor stations, five existing metering and regulating ("M&R") stations, and one existing regulator station, as well as the construction of one new compressor station and one new M&R station. To the extent feasible, existing public and private roads along the proposed Atlantic Bridge Project routes will be used as the primary means of accessing pipeline rights-of-way ("ROW") and aboveground facilities. These aboveground facilities are listed below and are described in more detail in Resource Report 1.

- **New York:**
  - Stony Point Compressor Station – uprate existing compressor unit\(^3\).
  - Yorktown M&R Station – install over pressure protection facilities for existing station.

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3. The proposed uprate to the existing Mars 100 compressor unit at the Stony Point Compressor Station in New York will utilize constructed but uncertificated horsepower capacity. The uprate simply requires the removal of a software control, installed previously to limit the horsepower output. As a result, the uprate will not require any facility construction or ground disturbance, and there will be no additional impacts relating to such activities. As a result, the proposed work at the Stony Point Compressor Station is not discussed further in this resource report.
• Connecticut:
  o Oxford Compressor Station – add compression and cooling facilities.
  o Chaplin Compressor Station – add compression and cooling facilities and upgrade existing compressor units.
  o Danbury M&R Station – install over pressure protection facilities for existing station.
  o Salem Pike M&R Station – construct new station to replace existing.

• Massachusetts:
  o Weymouth Compressor Station – construct new station.
  o Needham Regulator Station – modify existing station.
  o Pine Hills M&R Station – rebuild existing station.
  o Plymouth M&R Station – rebuild existing station.

• Maine:
  o Westbrook M&R Station – modify existing station.

This Resource Report 10 provides a description of potential alternatives identified by the Applicants and reflects discussion with local landowners and the input received from agency consultations, residents, public officials, and at the numerous stakeholder meetings held in the majority of the communities where various Atlantic Bridge Project facilities are proposed.

10.2 Purpose and Need

The purpose of the Atlantic Bridge Project is to economically provide the pipeline capacity necessary for the transportation of significant and diverse natural gas supplies from a receipt point at Mahwah, New Jersey to the Project shippers’ delivery points primarily in Massachusetts, Maine and at the United States (“U.S.”) – Canadian border. The Project would provide additional capacity on the Algonquin system and facilitate south-to-north flow on the Maritimes system in order to provide additional gas supply to New England and the Maritime provinces of Canada.

Demand is growing in the Northeast for increased utilization of natural gas - an economic source of fuel that is domestically produced, clean-burning, and efficient. Demand in this region is expected to continue to increase as more homes and commercial buildings convert heating units and appliances to natural gas and as natural gas is increasingly used for industrial purposes. In addition, expanded access to the Northeast natural gas markets is critical to alleviate existing capacity constraints that have resulted in natural gas prices that are higher than neighboring markets.

The Applicants held an open season for the Atlantic Bridge Project from February 5, 2014 through March 31, 2014 and held a reverse open season from January 16, 2015 through January 26, 2015 (collectively, the “Open Seasons”). As a result of the Open Seasons, the Applicants have executed precedent agreements with seven shippers, serving four local distribution companies (“LDCs”), two manufacturing companies, and a municipal utility (collectively, “Project Shippers”). These agreements are for firm transportation service to deliver new natural gas supplies to the Project Shippers’, or a Project Shipper’s customer’s, service areas or for their end use, as applicable, with a projected in-service date of November 1, 2017. The Project Shippers are Heritage Gas Limited, Maine Natural Gas Company, NSTAR Gas Company d/b/a Eversource Energy, Exelon Generation Company, LLC (as assignee and asset manager of Summit Natural Gas of Maine), Irving Oil Terminal Operations Inc., New England NG Supply Limited, and Norwich Public Utilities.

The Atlantic Bridge Project is specifically designed and scheduled to satisfy the operational and load demands of the Project Shippers and, as applicable, their retail customers in New England and the Maritime provinces of Canada. Specifically, the Project will increase Algonquin’s mainline capacity by up to an
additional 132,705 Dth/d and facilitate south-to-north flow on the Maritimes system, enhancing access to traditional and new supply sources for the New England States and Atlantic Canada. The strategic receipt point at Mahwah, New Jersey provides additional access to growing supply areas in the Northeast, which should furnish the Northeast markets with additional economic supplies of natural gas. The increased pipeline capacity along a significant portion of Algonquin’s mainline will also partially alleviate existing system constraints, resulting in increased commodity price competition and reduced gas price volatility. Placing the Project facilities in service by November 1, 2017 will allow the Applicants to meet their contractual commitments to provide service, as described in the precedent agreements for the Project, enable the LDCs to meet increased peak demand at the beginning of the traditional heating season and satisfy the industrial needs of other Project Shippers.

ICF International anticipates that the demand for natural gas in New England will increase by 13.5 percent by 2020.4 Similarly, a recent report prepared for the Massachusetts Department of Energy Resources (“MADOER”) found that electric generators will have an insufficient supply of natural gas from 2015 through 2019, which will result in spiking natural gas prices. Scarcity-driven high natural gas prices will force economic curtailment of natural gas-fired generators in favor of oil-fired units. Critical to this result is the assumption that winter peak hour gas shortages cannot be addressed using known measures (e.g. renewable energy, demand response or the addition of new natural gas pipeline) in years 2015 through 2019 and, as a result, gas prices are expected to reflect an out-of-balance market in those years. According to the MADOER report, the electric sector will respond to these high prices by shifting dispatch from gas to oil generation in the peak hour, reducing reliance on natural gas.5 In order to alleviate these shortages by 2020, the report determines that an additional 600 to 800 million cubic feet of additional pipeline capacity will be required.6

In a Policy Statement issued on December 5, 2013, the New England Governors committed their six states to an energy initiative designed to bring affordable, cleaner, and more reliable power to homes and businesses across the region. The Governors’ initiative intended to accelerate regional cooperation on expanding renewable energy and energy infrastructure in New England, including natural gas pipelines. In a joint statement, the Governors committed to more thoughtful and strategic investments focused on expanding the region’s energy portfolio. The Governors believed that regional expansion would bring New England lower electricity and heating costs, increased economic development, competitiveness and job growth, and improved air quality through a reduction in air emissions from the burning of coal and fuel oils.

In February 2015, the Governors of Massachusetts, Connecticut, and Rhode Island agreed on a partnership in order to consider natural gas capacity options for their states and to explore new clean energy resources to address the region’s high energy costs and demands. In Massachusetts, Governor Baker subsequently directed the MADOER to file a request with the Massachusetts Department of Public Utilities (“MADPU”) to begin considering methods to pursue new natural gas contracts that could improve the reliability of gas supply to the region and lower winter electricity costs.7 The MADPU subsequently opened an investigation into the means by which new natural gas delivery capacity could be added to the New England market, including actions to be taken by the electric distribution companies. The matter was docketed as D.P.U.  

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4 ICF Natural Gas Market Compass, July 2013.
6 Id.
In a decision issued on October 2, 2015, the MADPU concluded that increasing regional gas capacity will lead to lower wholesale gas and electricity prices for Massachusetts ratepayers.

The New England Governors recently announced their collective support for investment in new natural gas infrastructure as part of their plans for addressing inadequate energy infrastructure in the region. In a joint statement dated April 23, 2015, the New England Governors explained that “New England is challenged by a lack of natural gas pipeline infrastructure and is losing non-gas power plants, both of which threaten power system reliability.” Accordingly, the Governors pledged their support for investing in “new natural gas infrastructure.” The New England Governors also released a six-state action plan, in which the Governors advised “that the region’s economy is limited by existing natural gas pipeline capacity” and expressed their support for “regional efforts to expand natural gas capacity in New England to address reliability risks to the electric system and price impacts on electric consumers during the winter period.”

In Maine, the 2013 Maine Omnibus Energy Bill addressed the need to expand natural gas transmission capacity into Maine to decrease prices of electricity and natural gas for consumers in the state. To that end, the law authorizes the Maine Public Utility Commission to execute agreements for up to 200 million cubic feet of interstate pipeline capacity. More recently, Governor LePage of Maine filed a letter with the Commission in Docket No. CP14-96-000 stating that the Atlantic Bridge Project “is particularly critical for Maine’s economic strategy and [encouraging] FERC to consider [Maine’s] support as the equivalent to a precedent agreement when considering the project’s imminent FERC filing.” Attached to that letter was a letter sent by Governor LePage to Spectra Energy stating that the Atlantic Bridge Project is a “critical project for the future of Maine and the region.”

The Administrator of the Environmental Protection Agency has also called for additional investment in natural gas pipeline infrastructure. At an energy industry conference hosted by Barclays on September 2, 2014, Administrator McCarthy stated, “This industry needs investment in infrastructure that values the industry the way that I think this administration values this industry.”

The Atlantic Bridge Project also advances President Obama’s Climate Action Plan. On June 25, 2013, President Obama outlined a series of executive branch actions to address climate change. The Climate Action Plan builds on previous commitments to reduce U.S. greenhouse gas emissions by 17 percent below 2005 levels by 2020 and is founded on the following three “pillars”:

1. Reduce carbon emissions (with an emphasis on emissions from power plants);
2. Mitigate domestic impacts of climate change; and
3. Lead international efforts to address climate change.

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8 http://www.ct.gov/deep/cwp/view.asp_q=564676&A=4707
9 Id.
11 Letter to Chairman LeFleur dated September 23, 2014 at 2, Docket No. CP14-96-000 (filed September 25, 2014); see also Letter to Chairman LeFleur dated May 7, 2014, Docket No. CP14-96-000 (filed May 8, 2014) (stating that the “lack of gas infrastructure … is exacerbating already high business energy costs” and requesting the support of FERC to expand pipeline capacity in New England).
12 Id. at 3.
14 Available at: http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.
President Obama’s remarks on his Climate Action Plan frame natural gas as a cleaner, domestic energy source that can help in the transition to a lower carbon economy, while ensuring America’s national security and supporting the economy and job creation. The Climate Action Plan encourages investment in building and upgrading natural gas pipelines to help further reduce methane emissions – acknowledging investment as a source of jobs and stimulus for the economy.

10.3 No-Action Alternative

The Atlantic Bridge Project would provide additional natural gas transportation capacity to help meet the Project Shippers’ growing demand in New England and the Maritime provinces of Canada and enhance energy reliability and flexibility by expanding the current pipeline infrastructure to transport efficiently diverse supplies of natural gas.

The No-Action Alternative would entail no construction of the Project facilities, thereby resulting in no environmental impacts. However, without these facilities, the New England States would be no closer to alleviating capacity constraints that have resulted in natural gas prices that are higher than neighboring markets, the Project Shippers would not be able to satisfy their natural gas transportation needs, and the Northeast region (in particular, New England and Atlantic Canada) would forego numerous benefits. Those lost benefits include: (1) providing physical connection to new and more economic supply options for northern New England and Atlantic Canada, thus enhancing operational performance and reliability of those systems; (2) increasing competition in natural gas commodity markets, reducing natural gas price volatility, and delivering operational benefits by providing additional access to diverse natural gas supply sources and eliminating system bottlenecks; (3) addressing escalating residential and commercial demands for energy with clean-burning natural gas; and (4) supporting economic development in the Northeast through construction of more robust energy infrastructure that provides access to a cheaper, cleaner energy source.

The No-Action Alternative would also eliminate transportation infrastructure for new, long-term natural gas supply sources for the local distribution utilities and end users in the Northeast, causing traditional and potential users of natural gas to either find other natural gas transportation options or rely on other fuels (such as heating oil, with its recent price volatility and supply constraints and its higher air emissions). Without new pipeline infrastructure to transport natural gas from multiple upstream supply sources into the Northeast region, the region would continue to experience supply constraints which, in turn, perpetuates the highest natural gas basis in North America and exacerbates price volatility for all natural gas users in the region.

Finally, the No-Action Alternative would eliminate the economic and environmental benefits associated with greater inter-fuel and gas-on-gas competition in the Northeast energy markets. As identified in Section 10.2 above, the facilities and services proposed herein will increase gas transportation capacity to these markets, allowing consumers greater choice among the abundant supplies attached to the North American pipeline grid and thereby encouraging greater competition in fuel markets. Accordingly, the No-Action Alternative would deprive the Northeast region of the benefits of this enhanced competition. The No-Action Alternative would also deprive the Northeast of cleaner air and reduced carbon emission benefits while allowing residential, commercial, and industrial users the opportunity to increase their reliance on natural gas over other energy sources such as coal and fuel oil. Accordingly, the No-Action Alternative is not a reasonable alternative, because it does not meet the purpose and need for the Project.
10.4  Energy Alternatives

In preparing this section, the Applicants relied upon publicly available information to identify and describe energy conservation measures and sources of renewable energy in the Project area, including information contained in the Environmental Impact Statement issued in FERC Docket No. CP14-96-000 (FERC/EIS-0254F) (FERC, 2015).

10.4.1 Energy Conservation

Energy conservation measures are playing an increasing role in reducing future energy demand in the U.S. The Energy Policy Act of 2005 (“EPAct”) provides guidelines to: (1) diversify America’s energy supply and reduce dependence on foreign sources of energy; (2) increase residential and business’ energy efficiency and conservation (e.g., Energy Star Program); (3) improve vehicular energy efficiency; and (4) modernize the domestic energy infrastructure. While the EPAct encourages energy efficiency and conservation by supporting new energy efficient technologies and increasing funds for energy efficiency research, the results of energy conservation and its success are long-term and therefore beyond the timeframe of the needs to be satisfied by the Atlantic Bridge Project.

Since enactment of the EPAct, several other federal laws have been enacted that enhance the federal role in energy conservation and efficiency. For example, the U.S. Congress passed the Energy Independence and Security Act of 2007 to increase the efficiency of products, buildings, and vehicles by establishing new incentive programs (U.S. Congress, 2007). Important components of the Energy Independence and Security Act of 2007 include improved corporate fuel efficiency, a renewable fuels standard, and new energy efficiency standards for lighting and other appliances (Congressional Research Service, 2007).


Several state-led initiatives have also contributed to or encouraged energy conservation in the Project area. For example, one of the goals identified in the 2013 Connecticut Comprehensive Energy Strategy (“CTCES”) is an expanded commitment to reducing energy consumption through “all cost-effective” energy efficiency programs. The CTCES indicates that reducing energy consumption through energy conservation and efficiency is one of the most cost-effective ways to lower the State’s contributions to global warming and other air pollutants, while at the same time boosting Connecticut’s economy by preserving capital that Connecticut companies can invest in their core business. The CTCES’s energy conservation framework includes programs that:

- reach a broader range of sectors and buildings, with a particular focus on groups that have not historically been targeted by efficiency programs in the past;
- extend beyond the traditional focus on lighting and weather stripping upgrades and achieve “deeper efficiency gains” in areas such as heating, air conditioning, ventilation, insulation, windows, furnaces, boilers, and other appliances;
- implement innovative financing mechanisms aimed at leveraging private capital; and
- ensure that any expanded energy efficiency programs encompass the industrial sector, with particular attention to the State’s manufacturing companies (CTDEEP, 2013).
Other states in the Project area have implemented similar energy conservation plans focused on reducing demand for energy efficiency initiatives. As an example, the Massachusetts Clean Energy and Climate Plan for 2020 proposes a building energy rating and labeling program designed to facilitate “apples-to-apples” comparisons of energy efficiency among buildings (the buildings equivalent of the U.S. Environmental Protection Agency miles-per-gallon rating on cars and trucks) (MEOEEA, 2010).

The 2014 New York State Energy Plan encourages energy efficiency through a variety of policies and objectives, including the coordination of end-use efficiency programs, improved energy efficiency in public buildings, and improved training and compliance initiatives (New York State Energy Planning Board, 2014).

Each state in the Project area, however, recognizes energy conservation as only one aspect of a larger portfolio of solutions aimed at providing residents with an energy future that is cleaner, cheaper, and more reliable. Moreover, each state in the Project area identifies natural gas as playing a significant role in the region’s push towards a more sustainable energy future (Kumar and Howland, 2013). Given that natural gas has lower emissions than any other fossil fuel, it would be environmentally preferable to rely on energy conservation to reduce the consumption of fossil fuels other than natural gas (USEPA, 2015).

More importantly, even with these federally and state imposed conservation measures, there continues to be a demand and need for natural gas supply in the New England region (see Low Demand Study that was commissioned by the MADOER, dated January 7, 2015).

10.4.2 Renewable Energy

Renewable energy sources, including wind, hydropower, biomass, solar, and tidal and wave energy, represent another long-term fuel source alternative to natural gas. According to the USDOE, Energy Information Administration (“EIA”) *Annual Energy Outlook 2014 with Projections to 2040* [USDOE/EIA (2014)], USDOE/EIA projects that the share of U.S. electricity generation from renewable energy will grow from 12 percent in 2012 to 16 percent in 2040. Wind, solar, and biomass account for most of the growth. The USDOE/EIA report indicates that regional growth in renewable fuels consumption is primarily due to three factors: availability of renewable energy sources, cost competitiveness with fossil fuel technologies, and the existence of state renewable portfolio standard programs for electricity generation. Below is a summary of potential renewable energy use in the Project area.

**Wind**

Wind power is a proven technology that has experienced significant technology advancements, reductions in installed costs, improved turbine performance, and reduced maintenance cost over the last 20 years. Although wind projects have no emissions, such developments can affect wildlife, visual, and other environmental resources associated with construction and maintenance activities. In the Project area, the windiest sites tend to be located along shorelines or on high elevation ridgetops. Shorelines are challenging to access, densely populated, and highly valued for other uses while ridgetop locations can have adverse visual and wildlife (primarily bird and bat) impacts.

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15 The U.S. Environmental Protection Agency reports the following national average energy production fuel emissions. Natural Gas: 1,135 lbs/MWh CO₂; 0.1 lbs/MWh SO₂; and 1.7 lbs/MWh NOₓ. Coal: 2,249 lbs/MWh CO₂; 13 lbs/MWh SO₂; and 6 lbs/MWh NOₓ. Oil: 1,672 lbs/MWh CO₂; 12 lbs/MWh SO₂; and 4 lbs/MWh NOₓ. Accordingly, energy conservation measures should displace fossil fuels other than natural gas in order to provide the highest overall environmental benefit.
With respect to land-based wind generation Projects, Rhode Island, Massachusetts, New Hampshire, and Maine have nine megawatts (“MWs”), 107 MWs, 171 MWs, and 440 MWs of installed wind generation capacity, respectively; Connecticut has not yet reported wind generation (USDOE, 2014). In southern New England, most of the existing wind farms are small operations that individually generate less than 15,000 kilowatts of power. Several new wind farm projects have been permitted or proposed in the Project area, particularly offshore. Deepwater Wind has two proposals for off-shore wind farms in the Atlantic Ocean, one of which is the Deepwater Wind Energy Center located 30 miles east off Montauk, New York and 15 miles southwest of Martha’s Vineyard in Massachusetts (Deepwater Wind, 2015).

The Deepwater Wind Energy Center would produce 900 to 1,200 MW of power. Deepwater Wind has won the exclusive right to develop in this 256 square mile area in the outer continental shelf from the U.S. government (Deepwater Wind, 2015). Power could be sold to Long Island or New England. However, it is not likely that construction of this project would commence until Deepwater Wind has a buyer for the additional power.

With respect to offshore wind power in Massachusetts, the future of the proposed 454-MW Cape Wind Project is uncertain, as utilities terminated their contracts to purchase electricity from this project this past January (WBUR, 2015).

Assuming continued financial incentives and state and public support, wind projects will continue to be developed in the Northeast, and in the long term, wind energy may be able to replace some of the demand for electricity generation from fossil-fuel sources in the Project area. However, in the short term, there is insufficient wind energy within the Project vicinity to meet the amount of energy that could be produced by the natural gas supplied by the Atlantic Bridge Project (up to 132,705 Dth/d) starting in November 2017 or to otherwise meet the needs of the Project Shippers.

**Hydroelectric**

Hydropower will be a major source of renewable electricity generation in the U.S. through 2040, but little new hydroelectric capacity is expected (USDOE/EIA 2014). However, there have been some small-scale hydroelectric projects licensed and others proposed in this area. New England Hydropower Company, LLC, for example, has been granted five preliminary permits from the FERC to develop new, small-scale, renewable electricity generation facilities in Connecticut, Massachusetts, and Rhode Island. If all five projects are constructed, the peak capacities of the new facilities would range from 30 to 300 kilowatts (New England Hydro, 2013).

In addition to small-scale projects, there have been several recent proposals to construct high voltage transmission lines to transport hydroelectric power produced in Canada to New England. These include the Northern Pass Transmission Line Project, which is a proposal to construct 153 miles of high voltage, direct current, 1,200-MW transmission line from the U.S./Canadian border to Franklin, New Hampshire. From there, about 34 miles of alternating current transmission line would be built to interconnect with existing grid facilities in Deerfield, New Hampshire. The Northern Pass Transmission Line Project submitted an application to USDOE in October 2010 and filed an amended application in June 2013 (Northern Pass, 2015).
Another project that would transport electricity generated by hydropower is the New England Clean Power Link Project, a recently announced proposal to construct about 150 miles of high voltage, direct current, 1,000-MW transmission line from the U.S./Canadian Border to a location in Ludlow, Vermont. The transmission line would interconnect with the Vermont Electric Power Company’s existing transmission grid for delivery service in Vermont and throughout the New England market. TDI New England has applied for permit applications, and construction is planned to begin in 2016, with a projected completion date of 2019 (TDI New England, 2015).

In conclusion, hydroelectric power may be able to replace some of the demand in the Project area for new electricity generation, but it would not meet the needs of the Project Shippers. However, regulatory review of these new projects is ongoing, and therefore, their future and, specifically, their commencement dates, are uncertain.

**Biomass**

Combustion of biomass is a proven technology using biomass feedstock, which, if properly grown, represents a renewable resource. Each state in the Project area is a participant in the Regional Greenhouse Gas Initiative cap-and-trade emissions reduction program, and each state incentivizes energy retailers to derive a certain amount of the energy they sell from biomass. Recent studies, however, have called into question the previously-held view of biomass as “carbon-neutral” (Sullivan, 2012). As a result, in 2012, Massachusetts suspended consideration of applications for biomass (Sylvia, 2012) and developed new standards for biomass facilities (MADOER, 2012). These new standards require all biomass plants to generate power at a minimum of 50 percent efficiency to receive one-half of a renewable energy credit and 60 percent efficiency to receive one full renewable energy credit.

A recently completed project in Dartmouth, Massachusetts includes a digester to convert food and other organic wastes into about 650 megawatt hours (“MWh”) per year (MAEOEEA, 2015). In addition, a proposed wood burning facility in Plainfield, Connecticut would convert clean wood waste from construction sites into 37.5 MWh of power per year (Enova Energy Group, 2014).

Biomass fuels used to generate electricity may be able to replace some of the demand in the Project area for new electricity generation, but this would not meet the objectives of the Project and would result in air pollutant emissions and other impacts.

**Photovoltaic**

Photovoltaic power systems convert sunlight directly into electricity. These systems are not well-suited for use as large-scale generation in the Project area due to relatively low direct insolation, higher capital costs, and lower efficiencies. Solar systems can be more easily deployed in densely populated areas than other renewables, and their output closely matches with peak demand; however, solar systems are among the most costly renewable technologies. In addition, large-scale solar projects require construction in a large area with associated impacts on land use, flora and fauna, wetlands, habitat, and other environmental resources. At present, New England has over 400 MWs of installed photovoltaic capacity, with over 2,000 MWs of installed photovoltaic generation anticipated by the end of 2021 (Independent System Operator of New England, 2014).
Several recent solar energy projects have been proposed or announced in the Project area. HelioSage Energy is planning to construct a 20-MW, alternating current, photovoltaic system on a 145-acre site in New London County, Connecticut (HelioSage, 2015). Massachusetts Electric Construction Company is in the process of constructing several ground-mounted solar arrays ranging in capacity from 1.5 to 5.9 MW at 12 sites in Connecticut and Massachusetts (Massachusetts Electric Construction Company, 2013). RS Energy is planning to develop solar farms at four sites in Massachusetts, with a combined generating capacity of 3.5 MW.

While solar energy could provide some energy resources, its use is limited by numerous factors: the very large area required for utility-scale facilities; the reduction of solar energy production during the winter months when demand for gas/electricity is high; and significant impacts associated with land use, visual, vegetation, and wildlife habitat, which may be greater than those of a gas pipeline project.

Like other renewable energy fuels, solar power may be able to replace some of the demand in the Project area for new electricity generation. However, there are no existing or planned solar energy projects that would meet the energy demand needs of the various shippers along the Algonquin and Maritimes systems. Additionally, construction of commercial-scale solar facilities would require development of new electric transmission facilities, which could result in impacts similar to or greater than those of the Atlantic Bridge Project. For all these reasons, solar energy would not be practical, would not provide a significant environmental advantage over the Project, and would not meet the needs of the Project Shippers.

**Tidal and Wave**

Wave energy technology is in the early stages of development and is currently not commercially available. Furthermore, it appears that the high cost of construction and potential environmental considerations may limit development. In contrast, tidal power technology is proven, but criteria for suitable site selection include the presence of relatively large water flows through narrow channels that lead into a substantial tidal basin.

The Town of Edgartown, Massachusetts is developing a five-MW pilot project in coordination with other towns, universities, and regulatory agencies, referred to as the Muskeget Tidal Energy Project. This project would involve a type of marine hydrokinetic technology to produce electricity from both incoming and outgoing tides in the Muskeget Channel. The pilot project still requires a number of permits from federal, state, and local agencies (Marine Renewable Energy Center, 2015).

Like the other renewable sources of energy, tidal and wave energy may be able to replace some of the demand in the Project area for new electricity generation. However, there are no existing or planned tidal or wave energy projects that would meet the energy demand needs of the various shippers along the Algonquin and Maritimes systems. Additionally, it is unlikely that the environmental impacts associated with construction and operation of large-scale hydrokinetic facilities, including any electric transmission lines needed to bring the power to market, would be significantly less than those of the Atlantic Bridge Project. This is due to the potential construction and operational impacts on the marine environment associated with a permanent, large-scale hydrokinetic generating facility. In addition, the hydrokinetic industry is still in its early stages of development, and the technology has not yet been proven as an economical and reliable technology on a large utility-scale system in the U.S. Thus, these projects would not meet the demand for electricity in the area. For the aforementioned reasons, tidal and wave energy would not be preferable to the Project, would not provide significant environmental advantages over the Project, and would not meet the needs of the Project Shippers.
Conclusion

While the renewable energy projects that have been and will be proposed in the Project area will help diversify the electricity market and decrease the need for traditional fossil fuel energy sources, siting and development issues associated with renewable energy projects remain. The renewable energy projects would provide intermittent sources of energy that are not reliable, most of the projects are speculative and none meet the Atlantic Bridge Project’s purpose and need which is to provide natural gas transportation. More specifically, construction and operation of new facilities would result in impacts on air, water, wildlife, and other resources, which could be similar to or greater than those for natural gas pipelines. Other renewable energy issues include high costs and additional time requirements to develop new electricity generation, transmission facilities, and other energy infrastructure.

Additionally, renewable energy is not 100 percent interchangeable with natural gas because of the many ways in which natural gas is used. Most renewable energy sources are used to generate electricity. While natural gas is used to generate electricity, it is also used for residential, commercial, and industrial uses. Though these uses could be served by electricity instead of natural gas, existing natural gas-based systems in the Project area would need to be converted to electric-based systems, which could be prohibitively expensive for many consumers. In contrast, the Project would provide additional natural gas supplies for residential, commercial, and industrial uses. Therefore, renewable energy alternatives are not a viable alternative to the Project and would not meet the needs of the Project Shippers.

10.5 System Alternatives

System alternatives are alternatives to the proposed action that would make use of other existing, modified, or proposed pipeline systems to meet the purpose and need of the proposed Project. System options would involve the transportation of the equivalent amount of incremental natural gas. System alternatives would make it unnecessary to construct all or most of the proposed Project, although modifications or additions to other existing pipeline system(s) may be required to increase capacity, or construction of another entirely new pipeline system may be required. Although these modifications or additions could result in environmental impacts, the impacts may be less than, similar to, or greater than that associated with construction of the proposed Atlantic Bridge Project.

System alternatives that would result in significantly less environmental impact might be preferable to the Project. However, only those alternatives that satisfy the underlying purpose and need of the Project are considered reasonable alternatives that require detailed analysis for National Environmental Policy Act purposes. Consequently, a reasonable system alternative must be technically and economically feasible and practicable to satisfy the Project’s purposes, including meeting the timing and capacity needs reflected in the contractual commitments made with Project Shippers supporting the development of the Project.

As discussed in Section 10.2, the purpose and need for the Atlantic Bridge Project is to provide the necessary infrastructure to transport natural gas from a receipt point at Mahwah, New Jersey to the Project shippers’ delivery points primarily in Massachusetts, Maine, and at the U.S. – Canadian border beginning in November 2017.

Based on the commitments from the Project Shippers to move specific volumes of gas to the Northeast markets, any viable system alternative composed of modifications to existing pipeline systems would need to transport up to 132,705 Dth/d from Mahwah, New Jersey to the proposed delivery points while creating less environmental impact. Figures 10.5-1 and 10.5-2 provide a geographic overview of the Algonquin and Maritimes pipeline systems showing the gas flow for the Atlantic Bridge Project for the new service proposed by the Applicants.
Figure 10.5-1 Gas Flow

Algonquin Gas Transmission, LLC

- Receipts: 265,410
- Less Duplicates: 132,705
- Net MDRO: 132,705
- MDDO Delivery: 132,705

Issued October 22, 2015
10.5.1 Status of Existing Systems

The Applicants do not have access to proprietary information concerning the flow characteristics of other existing interstate pipeline systems surrounding the Project area. However, based on publicly available information obtained from filings made with the FERC as well as through access to other sources, the Applicants believe that these pipeline systems are at or near capacity. In particular, the Applicants relied on the following sources:

- Tennessee’s 300 Line at Station 321 (West Clifford, PA) and Station 315 (Wellsboro, Pennsylvania) for similar Capacity Restrictions approaching the Tennessee/Algonquin Mahwah interconnection.
- Tennessee’s 300 Line Project (Docket No. CP 09-444-000) and the Commission’s Order issued May 14, 2010 (131 FERC ¶ 61,140).
- Tennessee’s Northeast Upgrade Project (Docket No. CP11-161-00 et. al) and the Commission’s Order issued May 29, 2012 (139 FERC ¶ 61,161).
- Filings made by Tennessee Gas Pipeline (Kinder Morgan) in Docket No. PF14-12-000 for the Northeast Energy Direct Project.

Regardless of the alternatives evaluated, as described above, a reasonable system alternative must meet the underlying purpose and need of the proposal, in this case the contractual commitments supporting the Project. In order to be a viable alternative, any system alternative would be required to transport an additional 132,705 Dth/d for deliveries to the Project Shipper’s requested delivery points in southern and northern New England, as well as to the existing Maritimes’ delivery point at the U.S. - Canadian border. Further, the gas supply must reach the delivery points requested by the Project Shippers by November 2017.

There are three interstate pipelines within the broad area around the Atlantic Bridge Project that were evaluated to render the same service as proposed by the Applicants (see Figures 10.5-3 and 10.5-4). These pipelines are Tennessee Gas Pipeline, Iroquois Gas Transmission, and Portland Natural Gas Transmission System (“PNGTS”). Each interstate pipeline was evaluated for suitability to render the same service as that proposed as part of the Atlantic Bridge Project.

Iroquois Gas Transmission

The existing Iroquois pipeline system currently serves southwestern Connecticut and Long Island and New York City, New York but does not serve eastern Connecticut or Massachusetts (see Figure 10.5-3). For the Iroquois system to render the same service as that proposed by the Applicants, Iroquois would have to build an entirely new pipeline system that would essentially duplicate the existing Algonquin and Maritimes systems. This would involve the construction of hundreds of miles of new pipeline, resulting in a far greater environmental impact than the modifications and enhancements proposed in the Atlantic Bridge Project. As a result, the use of the Iroquois system is not considered a viable alternative to the proposed Atlantic Bridge Project.
Figure 10.5-3 Area Pipelines

- Ramapo
- Mahwah
- Assonet
- Pine Hills
- Salem
- Plymouth
- Mystic
- Needham
- Salem Pike
- Wright I/C
- Algonquin
- Texas Eastern
- NEW YORK

Issued Jun-2015

Atlantic Bridge Project
Aglonquin System
Figure 10.5-3 Area Pipelines
Portland Natural Gas Transmission System

The existing PNGTS system connects with Maritimes at the Westbrook Interconnection point in Westbrook, Maine (see Figure 10.5-4). In theory, PNGTS could serve the same Maritimes customers proposed under the Atlantic Bridge Project. However, PNGTS supply enters the U.S. near East Hereford, Quebec, Canada, and the system cannot connect to the supply point of Mahwah, New Jersey or the Algonquin delivery points requested by the Project Shippers as currently constructed without extensive new pipeline. Such a pipeline would have to be several hundred miles long and would have a far larger environmental impact than the modifications and enhancements proposed in the Atlantic Bridge Project. Accordingly, the use of the PNGTS system is not considered a viable alternative to the proposed Project.

Tennessee Gas Pipeline

Tennessee’s existing pipeline system currently reaches western Connecticut, northern Rhode Island, and central Massachusetts (see Figure 10.5-3). The combination of Critical Notices affecting capacity and the recent Tennessee’s filing indicate that the Tennessee system in the Northeast is at capacity. Tennessee’s proposed Northeast Energy Direct (“NED”) Project routing (as Algonquin understands it to be) is also presented on Figure 10.5-3. The Tennessee systems, even with the inclusion of the NED Project, cannot serve southeastern Connecticut or southeastern Massachusetts without substantial new pipeline investment. Utilizing Tennessee’s system as an alternative will require the construction of new pipeline in new ROW to reach the Algonquin delivery points specified by the Project Shippers, resulting in the disturbance of many more miles of land than the Atlantic Bridge Project, which uses existing, previously disturbed ROWs to the maximum extent feasible. Moreover, this new construction would require Tennessee to duplicate large segments of the Algonquin system.

The Tennessee system is connected to Maritimes in Dracut, Massachusetts and theoretically can provide a transportation service to the Maritimes shippers. However, due to pressure differentials, the Tennessee system cannot physically deliver into Maritimes without the construction of a new compressor station. In addition, the Tennessee system is currently at capacity and would have to add new pipeline facilities to its system to accommodate the service to Maritimes shippers contemplated in Atlantic Bridge. Any potential service to Maritimes serves only part of the Atlantic Bridge Project and thus is not directly comparable.

Tennessee’s proposed NED Project is scalable for up to 2.2 billion cubic feet per day (“Bcf/d”) into the market (Kinder Morgan, 2015). Construction of the NED Project is proposed to begin in January of 2017, with an anticipated in-service date of November of 2018. In March of 2015, draft environmental resource reports for the NED Project were submitted to the FERC, and the certificate application is expected to be filed in October of 2015.

The NED Project will include infrastructure upgrades in Pennsylvania, New York, Connecticut, Massachusetts, and New Hampshire to meet increased demand for natural gas (see Table 10.5-1). The NED Project is a combination of Tennessee’s proposed Pennsylvania to Wright, New York and Wright, New York to Dracut, Massachusetts pipeline segments. The Pennsylvania to Wright, New York segment of the NED Project includes the construction of approximately 132 miles of greenfield pipeline from the existing Tennessee pipeline in Susquehanna County, Pennsylvania, northeast to the existing Tennessee pipeline in Schoharie County, New York. Construction of a 10-mile and 29-mile loop along the existing Tennessee pipeline in Bradford and Susquehanna Counties in Pennsylvania is also proposed. The Pennsylvania to Wright, New York portion of the NED Project will also include the construction of three new compressor stations.
Atlantic Bridge Project
Maritimes System

Figure 10.5-4 Area Pipelines

- PNGTS
- Tennessee Gas
- Algonquin Gas Transmission
- Maritimes & Northeast Pipeline
- Brunswick Pipeline
- Salem/Beverly I/C
- Dracut I/C
- Westbrook I/C
- M&N/PNPGTS
- M&N/TGPL
- M&N/AGT

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Maritimes & Northeast Pipeline

East Hereford, Quebec, Canada

Brunswick Pipeline

Tennessee Gas
NED Project

Algonquin Gas Transmission

Atlantic Bridge Project
Maritimes System
Figure 10.5-4 Area Pipelines
<table>
<thead>
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<th>State / County</th>
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<th>Facility Details</th>
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<td>Pennsylvania to Wright, Wright to Dracut</td>
<td>34.79 miles</td>
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<td>Albany</td>
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<td>Wright to Dracut</td>
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<td>Middlesex</td>
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<td>Worcester</td>
<td>Fitchburg Lateral Extension</td>
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### TABLE 10.5-1
Comparison of Northeast Energy Direct Project Facilities with Atlantic Bridge Project Facilities

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<th>State / County</th>
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<th>Facility Details</th>
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<td>Delaware</td>
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<td>Supply Path Tail Station, Market Path Head Station New compressor stations</td>
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<td>Schoharie</td>
<td>IGT-Constitution Bi-Directional Meter, NED Check, NED/200 Line Bi-directional OPP &amp; Check New meter stations</td>
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The Wright, New York to Dracut, Massachusetts portion of the proposed NED Project includes the construction of the following: approximately 53 miles of pipeline co-located with Tennessee’s existing system and an existing utility corridor in New York; approximately 64 miles of pipeline in Massachusetts; and approximately 71 miles of pipeline in New Hampshire, generally co-located with existing utility corridors. The Wright, New York to Dracut, Massachusetts segment of the NED Project will also include the construction of several new aboveground facilities and modifications to existing facilities. Additionally, approximately 59 miles of pipeline laterals and loops are proposed in Massachusetts, Connecticut, and New Hampshire.

Though the NED Project proposes to construct approximately 418 miles of new gas pipeline in the Northeast, the NED Project will not extend into areas in southeastern Connecticut and southeastern Massachusetts to be served by the proposed Atlantic Bridge Project. The NED Project and Atlantic Bridge Project pipeline facilities do not overlap (see Table 10.5-1). The NED Project would need to incorporate additional pipeline and aboveground facilities to deliver the supply proposed under the Atlantic Bridge Project, which would include additional laterals that would reach the delivery points incorporated in Atlantic Bridge. These additional facilities would have greater environmental impacts than the proposed Atlantic Bridge Project facilities.

The NED Project can reach the markets on the Maritimes system as it is currently configured by making deliveries into the Dracut, Massachusetts interconnection point and terminus for the NED Project mainline. The facilities listed in Resource Report 1 of the NED Project indicate that the Project will be able to deliver high pressure gas that can be received by Maritimes. The NED Project, however, is not expected to be in service until November of 2018, with some components not in service until November of 2019. Thus, the NED Project would not be able to satisfy the commitments to the Atlantic Bridge Project Shippers for service commencing in November 2017. When taken in its totality, the expansion by Tennessee to serve the same markets is an undertaking that would have a far larger environmental impact than the modifications and enhancements proposed in the Atlantic Bridge Project and would not meet the Project Shippers’ requested timing. As a result, the use of the Tennessee system is not a superior alternative to the Atlantic Bridge Project.

10.5.2 Analysis of Compression Reduction at the Weymouth Compression Station

As described in Resource Report 1, Algonquin has re-evaluated the hydraulics for the Atlantic Bridge Project and reduced the horsepower (“hp”) scope at the Weymouth Compressor Station with the proposed installation of a Taurus 60 unit (7,700 hp) instead of the previously proposed Taurus 70 unit (10,915 hp). This represents a reduction of approximately 3,200 hp at the Weymouth site.

In response to a request from FERC, Algonquin further analyzed the potential for reducing the amount of compression horsepower at the Weymouth Compressor Station through the installation of additional pipeline in other locations along the Algonquin system. The next level horsepower reduction below a Taurus 60 compressor unit is a Centaur 50 unit, which operates at 6,300 hp. The installation of a Centaur 50 at the Weymouth Compressor Station will require the installation of approximately 2.0 miles of 30-inch diameter loop pipeline along the existing Q-1 System in Medway, Bellingham and Franklin, Massachusetts. This pipeline loop would start at the Q-1 Tap on the Algonquin mainlines and continue easterly for approximately 2.0 miles.
The use of a Taurus 60 represents an increase in power of 1,400 hp over a Centaur 50 but avoids the need for 2.0 miles of 30-inch loop of the Q-1. Although it is possible to install the Centaur 50, the installation of two miles of new pipeline along the Q System will impact multiple landowners and natural resources including forest and wetlands (impacts the current Taurus 60 proposal will avoid). There are no additional land requirements or environmental impacts at the proposed Weymouth Compressor Station site between a Centaur 50 and Taurus 60. As such, this reduced compression alternative is not preferable to the proposed Taurus 60 at the Weymouth Compressor Station.

The Weymouth Compressor Station will also meet all federal and state construction, noise and emissions requirements regardless of whether a Taurus 60 or Centaur 50 unit is installed.

10.6 Facility Design and Siting Alternatives

The Atlantic Bridge Project utilizes, to the maximum extent feasible, existing facilities and existing ROW along the Algonquin and Maritimes systems. The proposed Project facilities are designed to create 132,705 Dth/d of additional firm transportation capacity from Algonquin’s Mahwah, New Jersey interconnection to the delivery points requested by the Project Shippers while continuing to meet all of Algonquin’s and Maritimes’ contractual obligations to existing customers.

The transportation path for the Atlantic Bridge Project encompasses a substantial portion of the Algonquin system from the receipt point at Mahwah, New Jersey, near the western end of the system, to Beverly, Massachusetts, at the easternmost end. This additional capacity requires a system-wide solution that balances Algonquin’s existing delivery obligations along with the increased delivery commitments to the Algonquin Project Shippers and the delivery to Maritimes at the Beverly interconnect. The system-wide facilities proposed herein are a combination of increased compression, a new compressor station, replacement of existing pipelines, a new metering station, and modifications to existing metering stations.

The Atlantic Bridge Project will include minor modifications to Maritimes’ existing facilities to provide south-to-north flow on the Maritimes system. Given that there are no viable alternatives to these minor modifications within the existing footprint that would provide south-to-north flow, this section only discusses alternatives to Algonquin’s project design.

To better understand the configuration of the proposed compression and pipeline facilities, it is necessary to understand the basic flow dynamics of natural gas along the Algonquin system. As natural gas leaves a compressor station and travels down a pipeline, pressure is lost due to turbulence and friction between the pipe and the gas. The pressure decreases at a faster rate as it travels farther away from a compressor station. The pressure will continue to decline until the natural gas is recompressed at the next compressor station and pushed into the next section of the system. There is a lower limit to which the pressure is allowed to drop, which is determined by contractual and operational requirements as discussed below.

When considering a new project, the Applicants conduct a hydraulic analysis of the effects of the proposed service on their existing systems. When the existing system is inadequate to meet the needs of the proposed and existing shippers, facilities are added as required to meet those needs. The facilities will generally consist of new/additional pipe and compression.

10.6.1 Pipeline Design

Pipe will be added based on restoring or enhancing the performance of the system to the point that it meets the overall system requirements and the operational and design requirements of the compressor stations along the Algonquin system. Part of those considerations is the effects of internal diameter, operating pressure, and pipeline length on system performance.
As is the case for prior Algonquin expansion projects, Algonquin considered both smaller and larger pipe in designing the Atlantic Bridge Project. Algonquin determined that utilizing 36-inch diameter pipe, as opposed to 42-inch diameter pipe, would require looping, which would increase the disturbance and cost unnecessarily. Algonquin also reviewed the effects of using 48-inch diameter pipe, but determined that it would not significantly reduce the length of pipe required due to the gas velocity in the remaining pipe further downstream. Algonquin also evaluated the proposed system for compatibility with the existing system. A system that is of a continuous diameter is easier to inspect, maintain and operate. Accordingly, Algonquin considered the operability and maintainability in the design of its system expansions.

For the Atlantic Bridge Project, Algonquin proposes to take-up and relay two segments of existing 26-inch diameter pipeline with new 42-inch diameter pipeline in the Towns of Yorktown and Somers in Westchester County, New York and in the City of Danbury in Fairfield County, Connecticut. In Westchester County, Algonquin is proposing to replace a 4.0-mile section of 26-inch diameter pipeline between the Stony Point and the Southeast Compressor Stations with new 42-inch diameter pipeline (Stony Point Discharge Take-up and Relay). This pipeline facility is needed to maintain the pressure profile that delivers the gas to the next station at a pressure high enough to allow for compression with reasonable levels of power and fuel consumption. The larger diameter pipe allows for much lower pressure losses per mile, and when combined with the additional length, the large diameter pipeline both restores the pressure profile and can carry the additional supplies requested by the Applicants’ customers.

The process of adding pipe will be repeated between the Southeast Compressor Station and the Oxford Compressor Station with the replacement of 2.3 miles of 26-inch diameter pipe with new 42-inch diameter pipe in Fairfield County, Connecticut (Southeast Discharge Take-up and Relay). As with the other take-up and relay segment, this pipeline facility is needed to maintain the pressure profile that delivers the pipeline volumes to the next compressor station at the design conditions for the downstream compressor station.

10.6.2 Replacement Pipeline Segments

The replacement of certain segments of the 26-inch diameter mainline with new 42-inch diameter pipeline is required to address several issues. First, to provide transportation service from Mahwah to the delivery points along Algonquin’s system as requested by the Project Shippers, Algonquin will be required to utilize both of Algonquin’s existing mainlines. Replacement of the existing 26-inch mainline with a larger, 42-inch diameter pipeline allows for an increase in carrying capacity by increasing cross-sectional area. Second, an 850 psig maximum allowable operating pressure (“MAOP”) of the 42-inch diameter mainline downstream of the Stony Point and Southeast Compressor Stations also increases the carrying capacity. Third, the area where the two replacement segments are being proposed is a populated area that does not readily allow for the construction of a third loop line that would require a wider construction work space and permanent ROW. Fourth, replacement with new heavier wall pipe within the existing ROW makes use of the existing facility footprint, thereby minimizing environmental impacts to the extent feasible.

10.6.3 Compressor Station Design

For the compressor station selection in an expansion project design, the Applicants use a combination of factors. These include compression ratio, fuel consumption, discharge temperature, suction pressure and discharge pressure. As a rule, the Applicants use a maximum compression ratio of approximately 1.6, which ratio is based on a minimum suction pressure of approximately 400 pounds per square inch gauge (“psig”) and a discharge pressure of 640 psig. This combination of factors has a direct impact on the power

16 Compression Ratio = the absolute discharge pressure divided by the absolute suction pressure (“psia”).
required, fuel consumption, and discharge temperature, all of which have a direct bearing on the facilities required for any particular project.

In short, the new facilities proposed for the Atlantic Bridge Project are added to the extent necessary to meet the volumetric and pressure requirements throughout the Algonquin and Maritimes systems. The Applicants believe that the proposed facilities strike the optimal balance between the requirements of compression and the performance of their pipeline systems, such that they meet the requirements of the Project Shippers while minimizing environmental disturbances, expense, and maintaining service to the existing customers.

10.6.4 Compressor Station Additions

As mentioned, the transportation path for the Atlantic Bridge Project encompasses a substantial portion of the Algonquin system from the receipt point at Mahwah, New Jersey, near the western end of the system, to Beverly, Massachusetts, at the easternmost end. This additional capacity requires a system-wide solution that balances Algonquin’s existing delivery obligations along with the increased delivery commitments to the Algonquin Project Shippers and delivery to Maritimes at the Beverly interconnect.

The Applicants’ systems do not have adequate unsubscribed capacity to accommodate the additional volumes contemplated under the Project. In addition to the pipeline facilities detailed previously, the Atlantic Bridge Project requires additional compression on the Algonquin system to transport the incremental Project volumes. The proposed horsepower takes the form of the addition of one new compressor unit at the existing Oxford Compressor Station, the addition of one new compressor unit and upgrades to two existing compressor units at the Chaplin Compressor Station, the uprate of existing horsepower capacity at the Stony Point Compressor Station, as well as the construction of a new station in Weymouth, Massachusetts.

As mentioned previously, service to the Project Shippers will be rendered from both of Algonquin’s existing mainline pipelines, and thus it is necessary to provide for additional compression capabilities on both lines. At the Oxford Compressor Station, the proposed Solar Taurus 60 will compress on the 30-inch diameter mainline loop, while the proposed Centaur 50 gas-fired compressor at the Chaplin Compressor Station will compress on the 24-inch diameter mainline. The new compressor station proposed in Weymouth, Massachusetts will interconnect with Algonquin’s existing I-10 pipeline system, the predominantly off-shore HubLine, to transport natural gas into the Maritimes pipeline system. In Weymouth, Algonquin proposes to install one Solar Taurus 60 gas-fired compressor unit providing the necessary horsepower to meet the pressure requirements for the required deliveries into the Maritimes system. To ensure system reliability, the gas turbine will be equipped with an emergency generator that is fueled by the same gas that the turbine is compressing and will be sufficiently sized to run the compressor station in the event of an electrical outage.

Algonquin considered the feasibility of installing electric driven compressor units for the Project at each of the modified compressor stations. In this consideration, Algonquin evaluated a broad scope of factors including proximity to existing electric power sources and whether to upgrade existing electric power sources and/or construct new transmission or service lines and ancillary substation facilities. Algonquin also evaluated the installed and operational costs, including a power company’s ability to obtain necessary approvals for the electric transmission facilities prior to the planned in-service date, along with the noise and emission standards applicable to turbine driven compressor units.

17 Mainline 26”/24” - 40,000 Dth/d, Mainline Loop 30” – 92,705 Dth/d.
Upon considering these factors, Algonquin concluded that the construction and siting activities associated with an electric driven compressor unit would cause additional construction, environmental, and other impacts to landowners. Furthermore, it is very unlikely from a regulatory and construction standpoint that electricity driven compressor units could be installed in time to meet the needs of the Project Shippers, whereas gas turbines could be installed in a timely fashion.

Algonquin further concluded that in contrast to a gas turbine system, the customers within the electric driven compressor unit’s service area would have no backup power supply for the electric driven compressor when the power supply is interrupted. Back-up generators at gas-fired compressor stations provide the lighting, small motor loads and the ability to power the 125 hp electric motor to start a gas turbine in the event the turbine is off line when utility power is lost, compared to an electric driven compressor that is solely dependent on the electric grid for its power source. Emergency generators are not sized to be a primary back-up electrical source for an approximately 7,700 hp electric drive motor that is connected to the gas compressor. After evaluating these factors in relation to the proposed Weymouth Compressor Station, Algonquin determined that a gas turbine driven compressor is needed to meet the November 2017 in-service date for the Project.

10.7 Pipeline Route Alternatives

As discussed in Section 10.1, the Atlantic Bridge Project will consist of the take-up and relay of existing Algonquin pipeline facilities. Although all of the take-up and relay pipeline will overlap with the existing Algonquin ROWs, various route alternatives were considered for the proposed pipeline segments to avoid and minimize proximity to residential areas as described below.

10.7.1 Stony Point Discharge Take-up and Relay Alternatives

Construction of the Stony Point Discharge Take-up and Relay pipeline segment will occur through some areas of residential congestion. During the Pre-filing review process for the Project, the FERC requested that the Applicants evaluate an alternate pipeline route to avoid and minimize the proximity of the Project to residential areas between milepost (“MP”) 1.4 and MP 2.3. Residences in this area start at the crossing of Strang Boulevard and include properties along Maple Brook Court, Sandpiper Court, Mallard Court, Rachel Drive, Challinor Drive, North Deerfield Avenue, Nutly Circle, and Quinlan Street in the Town of Yorktown, NY. In response to FERC’s request, the Applicants evaluated two potential alternatives for routing of the Stony Point Discharge Take-up and Relay (see Figure 10.7-1). Table 10.7-1 compares the two alternate pipeline routes with the proposed Stony Point Discharge Take-up and Relay route.

10.7.1.1 Alternate Route # 1

The Stony Point Discharge Take-up and Relay Alternate Route # 1 pipeline would deviate from the proposed pipeline route at approximately MP 1.35. Alternate Route # 1 would begin by crossing Strang Boulevard and then traverse to the north between Route 132 and Strang Boulevard for approximately 1,450 feet before extending to the east, at which point the pipeline would again cross Strang Boulevard. The route would continue eastward and cross Barkley Lane, running between Oakside Road to the north and Challinor Drive to the south. The alternate route would then cross North Deerfield Avenue and continue for approximately 250 feet before intersecting an existing transmission line corridor. The route would then continue south along the transmission corridor until connecting into the proposed pipeline route at MP 1.9.

Although Alternate Route # 1 avoids the residential area between MP 1.4 and MP 1.9 of the proposed Stony Point Discharge Take-up and Relay, the alternate route would still be in relatively close proximity to the residences located along Oakside Road and Challinor Drive. Furthermore, Alternate Route # 1 would still impact the residential areas of concern between MP 1.9 and MP 2.3 of the proposed route.
Alternate Route #1 would only result in an additional 0.2 mile of pipeline, this route would require approximately 4.6 acre of new permanent easement compared to no new permanent easement area for the proposed route (see Table 10.7-1). This alternate route would also result in significantly greater forest impacts when compared with the proposed route. The forest impacts associated with the alternate route are generated using the National Land Cover Database (“NLCD”) (2011) and are likely under estimated, as determined when comparing the dataset with current aerial photography. Alternate Route #1 would also result in new permanent conversion of forested wetland to emergent wetland, whereas the proposed Stony Point Discharge Take-up and Relay will not result in any permanent wetland conversion because of its use of the existing Algonquin pipeline easement for the installation of the 42-inch diameter pipeline. Similar to the land cover, wetland impacts for the alternate route are generated using National Wetlands Inventory (“NWI”) data, which also results in an under estimate of the amount of wetland impact when compared to the field delineated wetlands documented within the proposed route workspace.

The Alternative Route #1 would also impact slightly more area within the Croton Watershed during construction when compared to the construction of the preferred route. Approximately 3.4 miles of the Alternative #1 route would be within the watershed in comparison to approximately 3.2 miles for the preferred take-up and relay pipeline. This watershed area is part of the New York City public water supply system and is managed by the New York City Department of Environmental Protection.

Given that Alternate Route #1 would require a significant amount of new permanent easement when compared to the proposed route, would result in permanent forested wetland conversion, would impact significantly more forested land, and would not entirely avoid residential areas, the Applicants determined that this alternative route is inferior to the proposed take-up and relay pipeline alignment.

10.7.1.2 Alternate Route #2

Alternative Route #2 is an alternative suggested by FERC that would relocate the pipeline outside of Algonquin’s existing mainline ROW and move it northerly to the Jefferson Valley Mall where it would be collocated with the southern shoulder of Route 6. The Stony Point Discharge Take-up and Relay Alternate Route #2 pipeline would deviate from the proposed pipeline route at MP 1.4. Alternate Route #2 would commence by crossing Strang Boulevard and continue to the north along the western side of Strang Boulevard and crossing Oakside Road. The route would extend to the north until reaching the Jefferson Valley Mall area, at which point the route would traverse to the southeast along the southern side of Lee Boulevard. The alternate route would cross Strang Boulevard, and at the intersection of the existing transmission corridor, the route would then proceed north and cross Lee Boulevard. The route would continue along the transmission corridor until reaching Route 6, at which point the pipeline would traverse to the east, crossing Hill Boulevard. After crossing Hill Boulevard, the alternate pipeline would proceed east and north along the southern side of Route 6 for approximately 1.7 miles, with one street crossing (Curry Street) along this segment. The route would then proceed to the south and connect with the proposed route at MP 4.0.

The primary advantage of Alternate Route #2 is that would largely avoid residential areas in Yorktown; However, there are numerous reasons why Alternate Route #2 is inferior in comparison to the proposed Stony Point Discharge Take-up and Relay. Along the initial segment of this alternate route, from MP 0.0 to MP 0.43, the pipeline would run parallel to Strang Boulevard, approximately 50 feet to the west, and would traverse a large wetland area, requiring multiple crossings of Hunter Brook. Between MP 0.43 and MP 0.88, there is inadequate routing parallel to Strang Boulevard, thus the pipeline route would shift west approximately 200 to 500 feet west of Strang Boulevard. This would require the pipeline route to be located within a forested wetland complex. There is also inadequate workspace between residential structure and Route 202 from MP 0.88 to MP 1.08. The required workspace for the construction of the 42-inch pipeline
through this area would completely eliminate all existing privacy screening and noise attenuation vegetation and trees.

Inadequate workspace is also a constraint for Alternate Route #2 from MP 1.08 to MP 1.27 due to residential structures and the overhead utility corridor, and this segment would require substantial work in a wetland. From MP 1.27 to MP 1.42, the pipeline route would be located within a forested wetland complex and would require a crossing of Shrub Oak Brook. The alternate route would then parallel Route 6 from MP 1.42 to MP 2.39 and would again be located in a wetland complex. The alternate route would continue to parallel Route 6 from MP 2.39 to MP 2.64 and would be located adjacent to a residential area to the south, which would be negatively impacted by the removal of a visual barrier to Route 6, as well as increased noise from Route 6 due to the removal of the trees. Alternate Route #2 would continue to run parallel to Route 6 from MP 2.64 to MP 3.15 and would also be located in a wetland complex. Along MP 3.15 to MP 3.33 of the alternate route, the pipeline would traverse a wetland complex associated with the Muscoot River.

In addition to the construction concerns and constraints described above, there are further environmental impacts that make this alternate route inferior compared to the proposed Stony Point Discharge Take-up and Relay route. Though Alternate Route #2 is only 0.7 mile longer than the proposed pipeline route it will require approximately 20.1 acres of new permanent easement because the majority of the route would not be located within Algonquin’s existing permanent easement and would require new ROW. In contrast, the proposed take-up and relay route is entirely located within Algonquin’s easement from MP 1.4 to MP 4.0. Alternate Route #2 would also result in more forest impacts when compared with the proposed route (see Table 10.7-1). As described for Alternate Route #1, the forest impacts associated with this alternate route are generated using the NLCD and are likely under estimated, as determined when comparing the dataset with current aerial photography.

Alternate Route #2 would also result in the permanent conversion of forested wetland into non-forested wetland from the maintenance of the new permanent easement, whereas the proposed Stony Point Discharge Take-up and Relay will not permanently convert forested wetlands to non-forested wetlands because the pipeline will be installed as a take-up and relay operation. As described above, wetland impacts for the alternate route are generated using NWI data, which also results in an under estimate of the amount of wetland impact. An additional disadvantage of Alternate Route #2 is that the pipeline would parallel Route 6 for approximately 1.8 miles. Construction along this heavily traveled roadway would likely result in traffic disruptions.

One advantage of the Alternative #2 route is that it would disturb a smaller area within the Croton Watershed during construction when compared to the construction of the preferred route. Approximately 2.2 miles of the Alternative #2 route would be within the watershed in comparison to 3.2 miles of the proposed take-up and relay pipeline route.

Given that Alternate Route #2 is a longer pipeline route and would require extensive amounts of new permanent easements when compared to the proposed take-up and relay alignment (20.1 acres versus 0.34 acres), would result in new permanent forested wetland conversion, and would impact significantly more forested land than the proposed route, the Applicants determined that this alternative route is inferior to the proposed take-up and relay pipeline alignment (see Table 10.7-1).
TABLE 10.7-1
Comparison of the Proposed Stony Point Discharge Take-up and Relay Pipeline Route with Alternate Routes

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<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Croton Watershed Crossing Distance (miles)</td>
<td>3.2</td>
<td>3.4</td>
<td>2.2</td>
</tr>
<tr>
<td>In-Street Construction (miles)</td>
<td>0.04 mi</td>
<td>0.04 mi</td>
<td>0.0 mi</td>
</tr>
<tr>
<td>Pipeline Street and Rail Crossings</td>
<td>13 streets, 0 railways</td>
<td>14 streets, 0 railways</td>
<td>10 streets, 0 railways</td>
</tr>
<tr>
<td>Public Lands Crossed</td>
<td>11</td>
<td>13</td>
<td>11</td>
</tr>
</tbody>
</table>

a/ Forest impact for the alternate pipeline routes is based on the NLCD (2011) and does not necessarily provide an accurate representation of current conditions; therefore, forest impacts for the alternate routes are likely under estimated.

b/ Wetland impact for the alternate pipeline routes are based on NWI data as opposed to the field delineated data for the proposed pipeline route; therefore, wetland impacts for the alternate routes are likely under estimated.

10.7.2 Southeast Discharge Take-up and Relay Alternative

Construction of the Southeast Discharge Take-up and Relay pipeline segment will occur in a congested area within the City of Danbury, Connecticut. During the Pre-filing review process for the Project, the FERC requested that the Applicants evaluate an alternate pipeline route to avoid and minimize the proximity of the Project to residential areas between MP 0.0 and MP 0.6, which would also avoid the need for in-street construction along Berkshire Drive. The Applicants examined the potential of routing the Southeast Discharge Take-up and Relay along Algonquin’s existing Line 30B, which is located to the north of the proposed pipeline from MP 0.0 to MP 0.8 (see Figure 10.7-2). Table 10.7-2 compares the alternate pipeline route with the proposed Southeast Discharge Take-up and Relay route.

The alternate route would begin at MP 0.0 of the proposed pipeline route and follow Algonquin’s existing Line 30B between Maple Ridge Road and Farm Street. The route would cross Golden Hill Road and proceed along Line 30B, crossing Route 37 and continue through a residential area before connecting to the proposed route at MP 0.8. The proposed alternative pipeline route would be of similar length to the proposed Southeast Discharge Take-up and Relay segment, consisting of an approximately 0.86-mile segment of pipeline in this area.

There are several construction constraints along the entire length of the alternative pipeline route. The pipeline would be collocated in close proximity to numerous residences to the rear of the properties from
MP 0.0 to MP 0.24, which would result in clearing existing privacy trees and vegetation. Additionally, there is insufficient workspace at MP 0.20 for installation of the 42-inch pipeline. Further along the alternative route, from MP 0.24 to 0.35, Algonquin’s existing 30-inch pipeline is located in a linear drainage basin associated with the nearby residential area, discharging into Padanaram Brook. Extensive redesign of this existing drainage system would be required to install the alternative pipeline in this location. From MP 0.35 to MP 0.82, the alternate pipeline route would traverse a commercial area where the existing Line 30B pipeline bisects a parking lot. This route would also bisect parking lots in proximity to multi-unit apartment buildings, generating significantly more residential impacts compared to the currently proposed Southeast Discharge Take-up and Relay pipeline route.

In addition to the construction constraints associated with the alternate pipeline route, the environmental impacts resulting from this route are greater than those for the proposed Southeast Discharge Take-up and Relay route. The alternate route would require an additional 2.4 acres of new permanent easement when compared to 1.0 acre for the currently proposed route (see Table 10.7-2). According to the NLCD, the alternate route would result in greater forest impacts as well. Although the information in Table 10.7-2 suggests that there would be no impacts to wetlands as a result of constructing the alternate route, it is likely that the alternative route will encounter wetlands and waterbodies east of Golden Hill Road. As discussed in Section 10.7.1, wetland impacts for the alternate route are generated using NWI data, which results in an under estimate of the amount of wetland impact.

| TABLE 10.7-2 |
| Comparison of the Proposed Southeast Discharge Take-up and Relay Pipeline Route with the Alternate Route |
| Pipeline Length (miles) | 2.3 mi | 2.4 mi |
| Total Construction Workspace (acres) | 30.9 ac | 31.1 ac |
| New Pipeline Permanent Easement (acres) | 1.0 ac | 3.4 ac |
| Number of Residences within 50 feet of pipeline centerline | 25 | 25 |
| Forested Impacts (acres) a/ | 2.7 ac temporary impact | 4.7 ac temporary impact |
| | 0.4 ac permanent impact | 0.6 ac permanent impact |
| | 1.7 ac temporary impact | 0.0 ac temporary impact |
| Wetland Impacts (acres) b/ | 0.0 ac permanent impact | 0.0 ac permanent impact |
| | 0.0 ac wetland conversion | 0.0 ac wetland conversion |
| Waterbody Crossings | 2 | 2 |
| In-Street Construction (miles) | 0.4 mi | 0.0 mi |
| Pipeline Street and Rail Crossings | 11 streets, 0 railways | 13 streets, 0 railways |
| Public Lands Crossed | 0 | 0 |

a/ Forest impact for the alternate pipeline route is based on the NLCD (2011) and does not necessarily provide an accurate representation of current conditions; therefore, forest impacts for the alternate route are likely under estimated.

b/ Wetland impact for the alternate pipeline route is based on NWI data as opposed to the field delineated data for the proposed pipeline route; therefore, wetland impacts for the alternate route are likely under estimated.
In summary, this alternative route is inferior to the proposed Southeast Discharge Take-up and Relay because of the lack of space to install the 42-inch pipeline next to Line 30B, the significant amount of new permanent ROW required to construct the pipeline, and the increased amount of tree clearing required.

Based on the multiple construction limitations described above, the Applicants eliminated this alternative route from further consideration.

10.7.3 Southeast Discharge Take-up and Relay HDD Analysis

Construction of the Southeast Discharge Take-up and Relay pipeline segment will occur in a congested area of Danbury, Connecticut. During the Pre-filing review process, the FERC requested that the Applicants evaluate the feasibility of using the horizontal directional drill (“HDD”) method along the Southeast Discharge Take-Up and Relay from MP 0.0 to MP 0.7 due to congestion and the presence of numerous residences in proximity to the pipeline construction workspace. In response to this request, Algonquin evaluated the potential use of the HDD construction method in this area and determined that it is not feasible for the following reasons.

Staging areas are required on each end of an HDD section for the entry and exit points. For the Southeast Discharge Take-up and Relay segment, these staging areas would need to be roughly one acre in size, and there is not a sufficient area on either end of the alignment to support such staging areas. An additional staging area would be required to fully fabricate the pipe and complete a pre-installation hydrostatic test of the pipe prior to pull-back (installation). This staging area would need to be in-line with the HDD alignment for the pipe to successfully transition from aboveground to below ground.

Horizontal bends are necessary along the HDD alignment, which would require much smaller bend radii to remain within the proposed ROW than the typical radii associated with a 42-inch diameter pipeline. As such, the horizontal bends required along the alignment would likely result in the pipeline being installed under residences and other structures.

A further constraint is the elevation difference (approximately 190 feet) that exists between the proposed HDD entry and exit points. This elevation difference would result in an underbalanced HDD installation, with a long length of the bore void of supporting drilling fluids, as the fluids would attain the elevation of the lower elevation end. Lack of drilling fluids could increase ravelling and bore instability risks, increasing the potential for damage to protective pipeline coatings. Furthermore, the elevation difference would likely require the installation of casing pipe to support the soils lacking the supporting drilling fluid. The length of needed casing pipe (estimated to be over 800 feet) would greatly exceed the length of casing pipe commonly installed to support HDD operations. Upon completion of the installation, it may not be possible to remove the casing pipe due to its length, thereby increasing corrosion protection concerns. The casing pipe would also require a drill rig at the higher elevation end of the alignment. The potential for drilling fluid loss due to hydraulic fracturing of the overlying geotechnical materials would increase substantially with the installation of casing pipe, and the risk of inadvertent returns would be significantly high on the low elevation end of the HDD crossing in the vicinity of Padanaram Road.

For these reasons, Algonquin has determined that the use of the HDD method between MP 0.0 and 0.7 is not feasible.

10.8 Aboveground Facility Alternatives

With the exception of the proposed compressor station in Weymouth, Massachusetts and the replacement of an existing M&R station in Connecticut, the aboveground facilities for the Atlantic Bridge Project will involve modifications of existing Algonquin facilities in order to meet the needs of the Project Shippers.
The following sections provide additional details on the alternatives considered for the new aboveground facilities.

### 10.8.1 Oxford, Chaplin and Stony Point Compressor Stations

The Atlantic Bridge Project includes modifications to the existing Algonquin Oxford and Chaplin Compressor Stations and the uprate of existing horsepower capacity at the Stony Point Compressor Station. Accordingly, an evaluation of alternatives was not deemed necessary for this Project for work at existing aboveground facilities.

### 10.8.2 Weymouth Compressor Station Siting Requirements

Algonquin’s existing pipeline system extends through eastern Massachusetts and then offshore, eventually making landfall in the Beverly/Salem area on the north shore of Massachusetts (see Figure 10.8-1). After conducting a hydraulic modeling analysis of its existing pipeline system, Algonquin determined that a new compressor station is needed along the existing Algonquin I-10 System pipeline in order to maintain sufficient pressures in the Algonquin pipeline system and to meet flow and pressure commitments at the Project delivery points in Maine and the Maritime provinces of Canada. The following sections describe the system parameters for the proposed Weymouth Compressor Station and the other alternative sites that were considered as part of this analysis.

The proposed Weymouth Compressor Station site is located at a key interconnection point with the Algonquin I-10 and I-9 pipeline systems and is a critical component of the Atlantic Bridge Project. The primary explanation and necessity for this proposed site is based on the pressure operating parameters for the existing pipeline systems. A short section of the I-10 System (HubLine) in Weymouth is land-based, but the vast majority of the I-10 System pipeline extends offshore to the north from the Weymouth landfall site through Massachusetts Bay where there are no feasible alternate sites to locate the proposed compressor station (see Figure 10.8-1).

The I-10 System operates between 900 and 1,200 psig. In contrast, the existing Algonquin system located to the south and west of this point in Weymouth and Braintree (i.e., I-9 System, I-8 System, and I-3 System – see Figure 10.8-1) will operate between 400 and 650 psig with the Atlantic Bridge Project. Furthermore, the MAOP of the Algonquin pipelines located west of the I-10 System, and flowing in a northwesterly direction, ranges between 750 and 958 psig, while the I-10 System’s MAOP, flowing in a southeasterly direction, is 1,440 psig. Therefore, given that current natural gas pressures from the north exceed the natural gas pressure from the south, no natural gas can move northerly into the I-10 System without a booster compressor, and the best site for this is at the interconnection between the I-9 and I-10 Systems, which is in Weymouth.

The industrially zoned property located directly adjacent to the existing I-10 System is an optimal location that meets the overall operational requirements of the Algonquin system in order to deliver the required gas volumes to meet the needs of the Atlantic Bridge Project. This site is preferred for both engineering and environmental reasons. Specifically, the proposed site has sufficient acreage and is proximate to the existing Algonquin I-10 System pipeline. Also, the site provides excellent construction and operations access and would largely avoid impacts to natural resources because it is located on an existing industrial property that was previously used for fuel oil storage.
### Peabody
- 2.0 miles, 16-inch, Operating MAOP = 958 psig
- Potential MAOP = 750 psig

### Nahant
- 7.0 miles, 24-inch, Operating MAOP = 958 psig
- Potential MAOP = 1250 psig

### Marlborough
- 29.4 miles, 30-inch, Operating MAOP = 958 psig
- Potential MAOP = 1440 psig
The proposed compressor station would also be consistent with other industrial uses in the immediate vicinity. Directly south of the proposed Weymouth Compressor Station site is the Fore River power plant, which is located on the south side of Route 3A and the east side of the Fore River. The power plant, owned by Calpine Fore River Energy Center, LLC, is one of the larger plants in the Boston area and consists of one natural gas-fired turbine that can generate up to 787 megawatts. Also in the immediate vicinity of the proposed Weymouth Compressor Station is a sewage pumping station operated by the Massachusetts Water Resources Authority. The pumping station is located directly adjacent to the Weymouth Fore River and is immediately north of the proposed compressor station location.

Additional industrial development in the vicinity of the proposed Weymouth Compressor Station includes Algonquin’s existing M&R Station 00332, which is also located adjacent to the Fore River north of Route 3A and east of the proposed compressor station site. The proposed Weymouth Compressor Station is also located in close proximity to the Fore River Bridge, a gasoline/oil depot, a chemical plant, and a sewage pelletizing plant, among other industrial uses.

In summary, the Weymouth Compressor Station site is the preferred site for the new compressor station because it satisfies all of the operational parameters of the Algonquin system, meets the needs of the Atlantic Bridge Project, will be located on an industrial property that will be purchased by Algonquin, will not result in any impacts to forested lands, wetlands, waterbodies, or public roads, and will not require construction of any additional pipeline outside of the compressor station property (see Table 10.8-1).

10.8.3 I-8 and I-9 Systems Evaluation

Algonquin’s hydraulic modeling demonstrates that a new compressor station needs to interface with the existing I-10 System pipeline in Weymouth because given the I-10 system’s higher MAOP (1,440 psig), flowing in a southwesterly direction, when compared to the adjacent I-9 System and I-8 System pipelines that flow in a northeasterly direction. A compressor station connected to the Algonquin I-8 pipeline system to the south and west would not meet the needs of the Project Shippers, because the I-8 pipeline system has a lower MAOP (958 psig) than the I-10 System pipeline (1,440 psig), and as a result, cannot operate at pressures sufficient to deliver into the higher-pressure I-10 System pipeline. An increase of the I-8 System pipeline MAOP beyond the 958 psig is not possible without the replacement of the entirety of the 2.0-mile long 16-inch diameter I-8 System pipeline through Braintree. Algonquin evaluated pipeline construction within the I-8 System ROW for past projects and concluded that it was not feasible to install a larger diameter pipeline due to existing physical obstructions (e.g. underground utilities). Algonquin concluded that a new I-8 pipeline would need to be installed substantially deeper than the existing and smaller diameter I-8 System pipeline due to insufficient clearance above the numerous underground utilities situated within the studied segment of the I-8 System. In addition, Algonquin identified a number of locations where the horizontal movement of the pipeline could be required to increase the offset from existing manholes. These deviations would require a new ROW since the larger diameter pipeline could not be constructed within the current 16-inch-diameter pipeline ROW. Installation of a larger diameter pipeline would also be constrained by the existing commuter rail line and densely developed neighborhoods in the area.

The I-9 System consists of approximately 0.7 mile of pipe buried under the Fore River, which connects the I-8 System to the I-10 System (see Figure 10.8-1). The I-9 System has an MAOP potential of 1,250 psig but is currently operated at a maximum pressure of 958 psig due to the I-8 System’s lower MAOP. The I-9 System’s MAOP can be increased to 1,250 psig, but due to its immediate proximity to the I-8 System and its limited MAOP of 958 psig, the higher MAOP potential of the I-9 System cannot be reached without replacing the entire I-8 System. Furthermore, placing the Weymouth Compressor Station directly along the I-9 System route is not feasible because the entire I-9 System is buried under the Fore River.
10.8.4 Alternatives to the Weymouth Compressor Station Site

The Applicants conducted an evaluation of potential alternative compressor station sites to satisfy the needs of the Project Shippers. Seven alternate sites were considered on the Algonquin System and Maritimes System - to the south, west and north of the proposed Weymouth Compressor Station (see Figure 10.8-1). These alternate sites are described in more detail in the following sections.

10.8.4.1 Southern and Western Site Alternatives

There are two limiting site requirements associated with any alternative compressor station site located to the south or west of the proposed station site along the Fore River. The first siting limitation is the large property size needed for station construction (i.e., at least 10 acres of construction workspace). The second limitation is the need to construct extensive lengths of suction and/or discharge pipelines regardless of the alternate compressor station location. A 30-inch diameter discharge pipeline would be required to connect each alternative site to the I-10 System, along with a 30-inch diameter suction pipeline connecting each alternative station site with the Algonquin mainline pipeline system.

With these siting requirements in mind, the Applicants looked at the placement of a compressor station as far south as Rehoboth, Massachusetts along Algonquin’s existing G-System. However, the Atlantic Bridge Project gas needs to be delivered along Algonquin’s Q-System, which runs through the municipalities of Bellingham, Medway, Millis, Franklin, Norfolk, Walpole, Sharon, Stoughton, and Canton, Massachusetts. Over 50 miles of additional pipeline would have to be constructed to provide the required infrastructure to meet the purpose and need of the Project if a station were constructed in Rehoboth. Consequently, Algonquin did not find it feasible to locate the compressor station in Rehoboth.

Given the requirement for the discharge pipeline to connect to the I-10 System from any alternative site, the Applicants initially focused on areas in proximity to the required I-10 interconnect point near the Fore River. The Weymouth and Braintree area is highly developed with only a limited number of feasible tracts of land sufficient in size to accommodate the construction of a new compressor station. After selecting three initial alternate sites in Weymouth, and in response to requests from the Town of Weymouth and other public officials that the Project consider non-Weymouth alternatives, the Applicants expanded the search area to include sites outside of Weymouth. The Applicants also focused on areas where the suction and discharge pipelines could be collocated within existing utility corridors in order to minimize the impacts from pipeline construction. Using these siting criteria, the Applicant’s evaluated a total of five alternate sites located to the south and west of the proposed location for the Weymouth Compressor Station, including the three sites initially identified in Weymouth (see Figure 10.8-1).

These five alternate compressor station sites are located in the Towns of Franklin, Holbrook, and Weymouth. Unlike the proposed Weymouth Compressor Station site, the five alternate sites are all located a considerable distance from the I-10 interconnection point. Accordingly, these sites would require significant lengths of new 30-inch diameter pipelines to be constructed for the discharge lines and a separate suction line of sufficient length to connect to the existing Algonquin system (ranging up to seven miles). The suction and discharge pipelines for the site in Franklin would be collocated along various Algonquin systems. The suction and discharge pipelines for the sites in Holbrook and Weymouth would be collocated with existing electric transmission line corridors. The five alternate sites to the south and west of the proposed Weymouth Compressor Station are described in further detail below and in Table 10.8-1.

Alternate Compressor Station Site # 1 (Franklin)

Alternate Site # 1 is located in the Town of Franklin, Massachusetts along Algonquin’s existing Q-1 System (see Figures 10.8-2A and 10.8-2B). The site is entirely forested, and permanent access to the site would
likely occur via Elm Street, which is located to the east. The environmental resource impacts associated with Alternate Site #1 would far exceed those required for the proposed Weymouth Compressor Station due to the extensive amount of new pipeline that would be necessary for a compressor station in this location (see Table 10.8-1). Alternate Site #1 is in close proximity to the Q-1 System and would therefore only require a small length of suction pipeline to connect to the Q-1 System; however, approximately 30.8 miles of 30-inch diameter discharge pipeline would be required to deliver gas flows from Alternate Site #1 to the I-10 System (see Figure 10.8-2B). The new pipeline would result in an estimated 372.2 acres of land impacts associated with the construction workspace and an estimated 186.1 acres of new permanent pipeline easement. Construction of Alternate Site #1 and the necessary pipeline would result in approximately 155.5 acres of forested land impacts and approximately 77.6 acres of wetland impacts. According to MassDEP GIS data, this site would require at least 13 waterbody crossings, one of which would consist of an approximately 0.7-mile crossing of Town River Bay. Constructing a compressor station at this site would likely require three areas of in-street construction associated with the new pipeline, as well as 83 road crossings and seven railroad crossings. Four recreational areas would also be crossed during installation of the pipeline necessary for a compressor station at this site. In analyzing this site, approximately 131 residential structures and 330 properties were identified within 0.5-mile of the site, and 158 residences are located within 50 feet of the pipeline associated with this site (based on an analysis of aerial photography and GIS data layers). The pipeline would also cross an Estimated Rare Wildlife Habitat area and a Priority Rare Species Habitat area, as identified by the Massachusetts Natural Heritage and Endangered Species Program (“NHESP”) (see Figure 10.8-2B).

In contrast to the features of Alternate Site #1, the proposed Weymouth Compressor Station will be located on an industrial property that will be purchased by Algonquin. Development of this parcel for the compressor station will not result in any impacts to forested lands, wetlands, waterbodies, public roads, or residential properties and will not require construction of any additional pipeline outside of the proposed station property (see Table 10.8-1). For these reasons, Algonquin considers Alternative Site #1 inferior to the proposed Weymouth Compressor Station site.

Alternate Compressor Station Site #2 (Holbrook)

This site is located in the southeastern corner of the Town of Holbrook, Massachusetts (see Figures 10.8-3A and 10.8-3B). The site is entirely forested and would likely be accessed from Route 139. The natural resource impacts associated with Alternate Site #2 would be significantly greater than those required for the proposed Weymouth Compressor Station, primarily because of the new pipelines that would be necessary for a compressor station in this location (see Table 10.8-1). Approximately 9.5 miles of 30-inch diameter discharge pipeline would be required to deliver gas flows from Alternate Site #2 to the I-10 System (see Figure 10.8-3B). Additionally, approximately 6.8 miles of 30-inch diameter suction pipeline would be needed to connect the site to the I-3 System, for a total of 16.3 miles of new pipeline (see Figure 10.8-3B). The new pipelines would result in approximately 144.6 acres of land impacts associated with the construction workspace and approximately 81.2 acres of new permanent pipeline easement. Construction of Alternate Site #2 and the necessary pipeline would result in approximately 72.7 acres of forested land impacts and approximately 25.3 acres of wetland impacts. This site would require at least eight waterbody crossings, one of which would consist of an approximately 0.7-mile crossing of Town River Bay. Constructing a compressor station at this site would result in 21 road crossings, three railroad crossings, and three recreational area crossings during installation of the pipeline necessary for this alternate site. In analyzing this site, approximately 22 residential structures and 57 properties were identified within 0.5-mile of the site, and 32 residences are located within 50 feet of the pipeline associated with this site (based on an analysis of aerial photography and GIS data layers). The pipeline would also cross two Estimated Rare Wildlife Habitat areas, as identified by the NHESP, as well as an area of Critical Environmental Concern, as designated by the Massachusetts Secretary of Energy and Environmental Affairs (see Figure 10.8-3B).
In contrast to the features of Alternate Site #2, the proposed Weymouth Compressor Station will be located on an industrial property that will be purchased by Algonquin. Development of this parcel for the compressor station will not result in any impacts to forested lands, wetlands, waterbodies, public roads, or residential properties and will not require construction of any additional pipeline outside of the proposed station property (see Table 10.8-1). For these reasons, Algonquin considers Alternative Site #2 inferior to the proposed Weymouth Compressor Station site.

**Alternate Compressor Station Site # 3 (Weymouth)**

This site is located in Weymouth on the southwestern side of Route 3, approximately 3.4 miles south of the proposed Weymouth Compressor Station site and is entirely forested (see Figures 10.8-4A and 10.8-4B). Permanent access to the site would likely occur via Sunnyplain Avenue, a residential street, or via Finnell Street, which would pass through an industrial park and wetland area. Another potential access route for this site could be through Gagnon Park Memorial Playground.

The resource impacts associated with Alternate Site # 3 are substantially greater than those required for the proposed Weymouth Compressor Station as described below and detailed in Table 10.8-1. Approximately 3.7 miles of 30-inch diameter discharge pipeline would be required to deliver gas flows from Alternate Site # 3 to the I-10 System (see Figure 10.8-4B). Additionally, 1.0 mile of 30-inch diameter suction pipeline would be needed to connect the site to the I-3 System, for a total of 4.7 miles of new pipeline. The new suction and discharge pipelines would result in approximately 43.3 acres of land impacts associated with the construction workspace and approximately 21.6 acres of new permanent pipeline easement. Construction of Alternate Site # 3 and the necessary pipelines would result in approximately 20.9 acres of forested land impacts and approximately 6.2 acres of wetland impacts. This site would require at least five waterbody crossings, one of which would consist of an approximately 0.7-mile crossing of Town River Bay. Constructing a compressor station at this site would not necessitate any in-street construction or impacts to recreational areas, though seven streets and one railroad would be crossed by the pipelines. In analyzing this site, approximately 528 residential structures and 605 properties within Weymouth were identified within 0.5-mile of the site (based on an analysis of aerial photography and GIS data layers).

In contrast to the features of Alternate Site #3, the proposed Weymouth Compressor Station will be located on an industrial property that will be purchased by Algonquin. Development of this parcel for the compressor station will not result in any impacts to forested lands, wetlands, waterbodies, public roads, residential properties and will not require construction of any additional pipeline outside of the proposed station property (see Table 10.8-1). For these reasons, Algonquin considers Alternative Site #3 inferior to the proposed Weymouth Compressor Station site.

**Alternate Compressor Station Site # 4 (Weymouth)**

This alternate site is located in the same general area as Alternative Site # 3 to the northeast of Route 3 and is predominantly forested (see Figures 10.8-5A and 10.8-5B). Access to this site would occur along an existing transmission line maintenance road; however, this route would involve a permanent access road through wetlands and may require the purchase of a house. Additionally, significant clearing would be required, both for accessing the site and for constructing the compressor station. The site is very rocky and not level, and thus would likely require substantial grading. There are also condominium units nearby, which could limit the space available for stormwater drainage from the site.

Construction of the necessary suction and discharge pipelines for Alternate Site # 4 would result in similar land impacts as those described for Alternate Site # 3, as these sites are in close proximity to one another; therefore, the resource impacts associated with this site are also substantially greater than those required for the proposed Weymouth Compressor Station (see Table 10.8-1). The discharge pipeline that would
connect Alternate Site # 4 to the I-10 System would total approximately 3.7 miles, and approximately 0.9 mile of suction pipeline would be needed to connect to the I-3 System, with a total of 4.6 miles of new pipeline required (see Figure 10.8-5B). Approximately 42.6 acres of land would be impacted during pipeline construction, with approximately 21.3 acres of new permanent easement. Approximately 20.9 acres of forested land impacts would be associated with Alternate Site # 4, along with approximately 6.6 acres of wetland impacts. Constructing a compressor station at this site would require at least five waterbody crossings (including the Town River Bay), six street crossings, and one railroad crossing, though there would not be any in-street construction or impacts to recreational areas associated with Alternate Site # 4. Additionally, 504 residential structures and 615 properties within Weymouth and one school were identified within 0.5-mile of this site.

In contrast to the features of Alternate Site #4, the proposed Weymouth Compressor Station will be located on an industrial property that will be purchased by Algonquin. Development of this parcel for the compressor station will not result in any impacts to forested lands, wetlands, waterbodies, public roads, or residential properties and will not require construction of any additional pipeline outside of the proposed station property (see Table 10.8-1). For these reasons, Algonquin considers Alternative Site #4 inferior to the proposed Weymouth Compressor Station site.

**Alternate Compressor Station Site # 5 (Weymouth)**

This site is located in Weymouth approximately 2.4 miles south of the proposed Weymouth Compressor Station site and was formerly a quarry that has since been filled (see Figures 10.8-6A and 10.8-6B). The parcel is comprised of both forested and open land. The footprint area required for the compressor station is generally cleared and level with adequate space for equipment, buildings, and a buffer for adjacent wetlands. The area surrounding the site has a significant amount of rock outcroppings that could require blasting and/or hammering to develop an access road.

Alternate Site # 5 is accessible from three different locations: the backside of a business located off of Washington Street, an abandoned driveway to the original quarry, and an access adjacent to a self-storage facility. The first potential access route parallels the existing overhead transmission lines and would require upgrading and expanding the existing maintenance road for the lines, which is adjacent to a wetland. The abandoned driveway follows the same route as the first potential access and is comprised of a wide entrance that would provide accessibility for large trucks and only require a small amount of clearing. The third potential access route would be located off of Washington Street and would occur between several buildings before running perpendicular to the overhead transmission lines. This route appears to be the best option for accessing the site because it requires minimal upgrading and does not occur near wetlands.

Although the resource impacts associated with Alternate Site # 5 are slightly less than those required for Alternate Sites # 3 and # 4, the impacts are still significantly greater than those associated with the proposed Weymouth Compressor Station (see Table 10.8-1). As with the other two alternative sites in Weymouth, a new 30-inch diameter discharge pipeline would be required to deliver gas flows from this station site to the I-10 System, totaling 2.5 miles of pipeline (see Figure 10.8-6B). Additionally, approximately 2.2 miles of suction pipeline would be needed to connect Alternate Site # 5 to the I-3 System. These pipelines would total approximately 4.7 miles and would result in approximately 42.8 acres of land impacts for construction and 21.4 acres of new permanent easement. Approximately 17.4 acres of forested land would be impacted by Alternate Site # 5, as well as approximately 6.2 acres of wetland impacts. This site would involve at least three waterbody crossings, one of which would be the crossing of Town River Bay. Constructing Alternate Site # 5 would not require any in-street construction, though three streets and one railroad track would be crossed by the pipelines. Additionally, 680 residential structures and 903 properties in Weymouth and one school were identified within 0.5-mile of this site.
In contrast to the features of Alternate Site #1, the proposed Weymouth Compressor Station will be located on an industrial property that will be purchased by Algonquin. Development of this parcel for the compressor station will not result in any impacts to forested lands, wetlands, waterbodies, public roads, or residential properties and will not require construction of any additional pipeline outside of the proposed station property (see Table 10.8-1). For these reasons, Algonquin considers Alternative Site #5 inferior to the proposed Weymouth Compressor Station site.

**Summary**

In summary, construction at any of these five alternate compressor station sites, combined with constructing the required new suction and discharge pipelines for each site, would involve substantially greater environmental and landowner impacts than construction of the proposed Weymouth Compressor Station site (see Table 10.8-1). Unlike the proposed Weymouth Compressor Station site, these alternate sites are all located a considerable distance from the existing I-10 System and would require significant lengths of new suction and discharge pipelines to connect the station site to the existing I-10 System and the other Algonquin mainline pipelines (e.g., I-3, Q-1). These pipelines would impact a significant number of landowners during construction when compared to construction and operation at the proposed Weymouth Compressor Station site. In contrast to all five of these alternate sites, the proposed Weymouth Compressor Station will be located on an industrial property within an industrially zoned area that will be purchased by Algonquin and will not result in any impacts to forested lands, wetlands, waterbodies, public roads, and will not require construction of any additional pipeline outside of the station property (see Table 10.8-1). For these reasons, the proposed Weymouth Compressor Station site is superior to these five alternate sites.
TABLE 10.8-1
Comparison of the Proposed Weymouth Compressor Station and Land-Based Alternate Sites a/

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<tr>
<th></th>
<th>Proposed Weymouth Compressor Station</th>
<th>Alternate Site # 1</th>
<th>Alternate Site # 2</th>
<th>Alternate Site # 3</th>
<th>Alternate Site # 4</th>
<th>Alternate Site # 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipality</td>
<td>Weymouth</td>
<td>Franklin</td>
<td>Holbrook</td>
<td>Weymouth</td>
<td>Weymouth</td>
<td>Weymouth</td>
</tr>
<tr>
<td>Compressor Station Construction Work Area (acres)</td>
<td>10.0 ac</td>
<td>13.0 ac</td>
<td>13.0 ac</td>
<td>13.0 ac</td>
<td>13.0 ac</td>
<td>13.0 ac</td>
</tr>
<tr>
<td>Permanent Station Site Size (acres)</td>
<td>4.3 ac</td>
<td>4.5 ac</td>
<td>4.5 ac</td>
<td>4.5 ac</td>
<td>4.5 ac</td>
<td>4.5 ac</td>
</tr>
<tr>
<td>Length of New Pipeline (miles)</td>
<td>None</td>
<td>30.8 mi</td>
<td>16.3 mi</td>
<td>4.7 mi</td>
<td>4.6 mi</td>
<td>4.7 mi</td>
</tr>
<tr>
<td>Pipeline Construction Work Area (acres)</td>
<td>--</td>
<td>372.2 ac</td>
<td>144.6 ac</td>
<td>43.3 ac</td>
<td>42.6 ac</td>
<td>42.8 ac</td>
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<tr>
<td>New Pipeline Permanent Easement (acres)</td>
<td>--</td>
<td>186.1 ac</td>
<td>81.2 ac</td>
<td>21.6 ac</td>
<td>21.3 ac</td>
<td>21.4 ac</td>
</tr>
<tr>
<td>Site Access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential Structures within ½ Mile of Station Sites</td>
<td>587 b/</td>
<td>131</td>
<td>22</td>
<td>528</td>
<td>504</td>
<td>680</td>
</tr>
<tr>
<td>Residences within 50 feet of Pipeline Centerline</td>
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<td>158</td>
<td>32</td>
<td>9</td>
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<td>0</td>
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<tr>
<td>Schools within ½ Mile of Station Sites</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Forested Impacts (acres)</td>
<td>0</td>
<td>115.5 ac</td>
<td>72.7 ac</td>
<td>20.9 ac</td>
<td>20.9 ac</td>
<td>17.4 ac</td>
</tr>
<tr>
<td>Wetland Impacts (acres)</td>
<td>0</td>
<td>77.6 ac</td>
<td>25.3 ac</td>
<td>6.2 ac</td>
<td>6.6 ac</td>
<td>6.2 ac</td>
</tr>
<tr>
<td>Waterbody Impacts</td>
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<td>13 crossing</td>
<td>8 crossings</td>
<td>5 crossings</td>
<td>5 crossings</td>
<td>3 crossings</td>
</tr>
<tr>
<td>In-Street Construction</td>
<td>None</td>
<td>3 areas</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Pipeline Street and Rail Crossings</td>
<td>None</td>
<td>83 streets, 7 railroads</td>
<td>21 streets, 3 railroads</td>
<td>7 streets, 1 railroad</td>
<td>6 streets, 1 railroad</td>
<td>3 streets, 1 railroad</td>
</tr>
<tr>
<td>Recreational Area Impacts</td>
<td>None</td>
<td>4 crossings</td>
<td>3 crossings</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

a/ The calculations associated with the alternate sites are based on conceptual designs and therefore represent approximated figures.

b/ This number is based on a count of residential structures within ½ mile of the stations sites using GIS data. This does not account for residential structures containing multiple owners. For example, Algonquin has identified approximately 1,026 individual property owners within ½ mile of the Weymouth Compressor Station site.
10.8.4.2 Northern Site Alternatives

The Applicants evaluated the placement of a compressor station north of Boston on the Maritimes System to satisfy the needs of the Project Shippers, but this alternative was determined infeasible. Moving the compressor station north of Boston on the Maritimes System would require the Applicants to depressurize the I-10 System to be less than 450 psig on peak, which in turn would significantly constrain daily operations on the I-10 System and would prevent Algonquin from meeting its delivery obligations to existing customers in the Salem and Beverly area. Furthermore, to move the gas into the Maritimes System, additional compression horsepower and the construction of a new regulator station would be required beyond what is currently proposed in Weymouth. The Maritimes System would also have to lower its pressure, severely hindering its ability to carry gas along the Maritimes Phase III Pipeline. Given these significant operational concerns, locating the compressor station site to the north of Boston on the Maritimes System is not a feasible option.

In its comments on the Pre-filing resource reports, the FERC requested that the Applicants evaluate two off-shore sites as alternatives to the proposed Weymouth Compressor Station. Even though alternate sites to the north are not feasible from a Maritimes System operating standpoint, Algonquin evaluated the two offshore alternates. One site is located on Long Island in Boston Harbor and the other site is located on Children’s Island off the coast of Marblehead, Massachusetts. These two alternate sites are described below.

Alternate Compressor Station Site #6 (Long Island)

Alternate Site #6 is located on the southeastern portion of Long Island (see Figures 10.8-7A and 10.8-7B). Long Island is part of the City of Boston18 and is located in Boston Harbor (see Figure 10.8-7C). The island is approximately 1.75 miles long and consists of 225 acres of forested and developed land. Long Island is one of the many islands that comprise the National Park Service Boston Harbor Islands National Recreation Area. One affected property was identified within 0.5-mile of the Long Island site.

In addition to the environmental impacts associated with this site described below, there are numerous significant, construction and operational constraints presented by locating a compressor station on an isolated, offshore island. Access to the island is currently limited to marine transportation which would prevent the loading and offloading of workers, equipment and materials during construction. There is an existing dock on the island; however, the condition of this dock would likely not be sufficient for daily offloading of equipment and materials required for constructing the compressor station. Therefore, a temporary docking facility would need to be constructed along with additional dredging to provide the required access to Long Island. This would result in additional environmental impacts from the Project to the intertidal and subtidal habitats surrounding the island. In addition, the lack of direct access to the island due to the demolition of the Long Island Bridge raises significant concerns related to the ability to access the facility during its daily operation or the ability to respond to an emergency situation on this island in a timely manner.

18 The island had been home to approximately 450 shelter guests as well as approximately 250 to 300 individuals who received services through the Boston Public Health Commission and other nonprofit organizations that operated programs on Long Island. Programs for at-risk children have also been held on the island each summer. However, on October 8, 2014, because of safety concerns related to its structural condition, the Long Island Bridge, the bridge was demolished and the social service programs on the island were relocated. Replacement of the bridge is under consideration and is facing some opposition. A project cost of approximately $100 million has raised concerns about the ability to finance the construction of a new bridge. Given the historic uses, it is also highly unlikely that the City of Boston or National Park Service will support the construction of a new compressor station on this island property.
Long Island is located in an Estimated Rare Wildlife Habitat area and a Priority Rare Species Habitat area as mapped by the NHESP (see Figure 10.8-7B). The entire perimeter of Long Island is designated as a Shellfish Suitability Area for blue mussels, razor clams, and soft-shelled clams (as identified by the Massachusetts Division of Marine Fisheries. Additionally, significant impacts to benthic habitat would result from the estimated 13-acre seafloor dredging disturbance required to connect to the I-10 System. This seafloor dredging disturbance would result in substantial impacts to marine benthic habitats surrounding the island (including Essential Fish Habitat). Potentially affected resources would include marine fisheries, shellfish, benthic fauna, and marine mammals. Construction of an offshore pipeline could also disturb hard/complex seafloor areas that are considered valuable marine habitat. Blasting may be required in hard bottom substrates to excavate the trench resulting in potential impacts to marine fisheries and marine mammals.

The resource impacts associated with constructing a compressor station on Long Island are significantly greater than those required for the proposed Weymouth Compressor Station as described below and detailed in Table 10.8-2. Compressor station construction would also result in approximately 0.1 acre of forested land impacts, approximately 1.1 acres of freshwater wetland impacts, and 0.9 acre of marine wetland impacts. To minimize impacts, an HDD of approximately 1.25 miles in length could be used to install the 30-inch diameter suction line to connect from the I-10 System to the station (see Figures 10.8-7B and 10.8-7C). A second, 1.25-mile HDD would be needed to install the 30-inch diameter discharge pipeline to connect from the station to the I-10 System. The exit points for both HDDs would be located in approximately 25-30 feet of water and would require seafloor dredging to establish an acceptable profile geometry of the HDD. The suction and discharge pipelines, along with associated connections, would require dredging, and likely blasting, to complete the HDD installations and construct the hot tap tie-ins with the I-10 pipeline. Based on Algonquin’s experience with construction of the HubLine, dredging would cause at least 13 acres of sea bottom impact. This number does not account for the seafloor impacts associated with the use of anchors by the tugs and other construction vessels.

For these reasons, Algonquin considers Alternative Site #6 inferior to the proposed Weymouth Compressor Station site.

**Alternate Compressor Station Site # 7 (Children’s Island)**

Alternate Site # 7 is located on Children’s Island, also known as Cat Island (see Figures 10.8-8A and 10.8-8B). Children’s Island is located off the coast of Marblehead, Massachusetts and lies within the municipal boundary of the City of Salem (see Figure 10.8-8C). The island is approximately 0.4 mile long and consists of approximately nine acres of predominantly open land19. There is an existing dock on the island; however, the condition of this dock would be questionable for daily offloading of equipment and materials required for constructing the compressor station. Therefore, a temporary docking facility would need to be constructed along with additional dredging to provide the required access to Children’s Island. This would result in additional environmental impacts from the Project. One affected property was identified within 0.5-mile of this island site. In addition, the lack of direct access to the island raises significant concerns related to the ability to access the facility during its daily operation or the ability to respond to an emergency situation on this island in a timely manner.

The entire perimeter of Children’s Island is designated as a Shellfish Suitability Area for blue mussels, as identified by the Massachusetts Division of Marine Fisheries. Impacts to benthic habitat would result from

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19 For the past 60 years, the island has been home to the North Shore YMCA Kid’s Camp providing day, week, and weekend camping experiences for kids and families. Access to Children’s Island is via marine transportation only.
the significant seafloor disturbance that would be required to connect to the I-10 System. This seafloor disturbance would result in substantial impacts to marine benthic habitats surrounding the island (including Essential Fish Habitat). Potentially affected resources would include marine fisheries, shellfish, benthic fauna, and marine mammals. Construction of an offshore pipeline would also likely disturb hard/complex seafloor areas that are considered valuable marine habitat. Blasting may be required in hard bottom substrates to excavate the trench resulting in potential impacts to marine fisheries and marine mammals. Compressor station construction would not result in any forested land impacts or freshwater wetland impacts, though approximately 0.2 acre of marine wetlands would likely be impacted.

The resource impacts associated with constructing a compressor station on Children’s Island are similar to those described for Long Island (see Table 10.8-2). An HDD of approximately 0.5 miles in length would be required to install the 30-inch diameter suction line to connect from the I-10 System to the station (see Figures 10.8-8B and 10.8-8C). An additional 0.5-mile HDD would be needed to install the 30-inch diameter discharge pipeline to connect from the station to the I-10 System. The exit points for both HDDs would be located in approximately 28 feet of water and would require dredging to establish an acceptable profile geometry of the HDD. The suction and discharge pipelines, along with the pipeline required for the associated connections/tie-ins, would result in a total of approximately 1.3 miles of new pipeline. The new suction and discharge pipelines would require dredging, and likely blasting, to complete the HDD installations and construct the hot tap tie-ins with the I-10 pipeline. Based on Algonquin’s experience with construction of the HubLine, at least seven acres of sea bottom impact would occur from dredging associated with pipeline installation. This number does not account for the seafloor impacts associated with the use of anchors by the tugs and other construction vessels.

In addition to the significant environmental impacts and constraints, Children’s Island is not of sufficient size for construction of a compressor station, as the land requirements during construction are typically a minimum of ten acres. For these reasons, Algonquin considers Alternative Site #7 infeasible as a site for a new compressor station on Algonquin’s I-10 System.

Summary

In summary, construction of either of these two alternate offshore compressor station sites would involve substantially greater environmental impacts than the proposed Weymouth Compressor Station site. There are numerous marine ecological resources that would be affected by constructing a compressor station and the associated suction and discharge pipelines at these two sites. Dredging would be required at the tie-in points with the I-10 pipeline and to complete the associated HDDs. This dredging would result in direct impacts to the seafloor impacting benthic habitats such as soft sediment and hard bottom substrates.

Offshore construction of the pipelines associated with Alternate Sites #6 and #7 would also have to adhere to the time-of-year restrictions for marine fisheries and shellfish. Time-of-year restrictions associated with fishery resources that utilize Massachusetts Bay will be implemented by the regulatory agencies requiring dredging to occur in the winter months. These restrictions would limit the available time windows for construction work in the water and would likely cause the work to be performed over multiple time periods. Currently, the estimated duration of construction activity to construct the compressor station at the Weymouth site is eight months. To address the various fishery issues, two calendar years would be required to complete the construction of the compressor station and marine pipelines for a compressor station on Long Island or Children’s Island. In addition, these alternatives would involve many complex issues that would extend the permitting schedule for the Project. The additional permitting and construction time frames would push the in-service date well beyond 2017 which would not satisfy the Project purpose and need and contractual obligations to meet the proposed Project in-service date of November 1, 2017. Given the pipelines necessary at either of these sites, the Project would also have to address potential construction impacts to a wide variety of marine mammals (i.e., whales, dolphins, seals) as well as essential fish habitat.
regulated by the National Marine Fisheries Service. In addition, the lack of direct access to these islands raises significant concerns related to the ability to access the facility during its daily operation or the ability to respond to an emergency situation on either island in a timely manner. Lastly, Children’s Island is not of sufficient size for construction of a compressor station.

The necessary federal and state permits required to commence construction in the offshore marine environment would likely not be granted for an alternate compressor station on Long Island or Children’s Island since the environmental impacts result in significant marine resource and water quality impacts that can be avoided by constructing the compressor station at the proposed land-based site in North Weymouth.

For these reasons, the proposed Weymouth Compressor Station site is superior to these alternate sites.

<table>
<thead>
<tr>
<th>TABLE 10.8-2</th>
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</thead>
<tbody>
<tr>
<td>Comparison of the Proposed Weymouth Compressor Station and Long Island and Children’s Island Alternate Sites</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Proposed Weymouth Compressor Station</th>
<th>Alternate Site # 6 a/</th>
<th>Alternate Site # 7 a/</th>
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<tbody>
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<td><strong>CONSTRUCTION/OPERATION CONSIDERATIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipality</td>
<td>Weymouth</td>
<td>Boston (Long Island)</td>
</tr>
<tr>
<td>Compressor Station Construction Work Area (acres)</td>
<td>10.0 ac</td>
<td>10.0 ac</td>
</tr>
<tr>
<td>Permanent Station Site Size (acres)</td>
<td>4.3 ac</td>
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<td>Length of New Pipeline (miles)</td>
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<tr>
<td>Horizontal Directional Drill Length (miles)</td>
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<td>Offshore Pipeline Trenching (miles)</td>
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<td>New Pipeline Permanent Easement (acres)</td>
<td>0</td>
<td>3.0 ac</td>
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<tr>
<td>Site Access</td>
<td>Existing access off of Route 3A</td>
<td>Marine Transportation</td>
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<td>Residential Structures within ½ Mile of Station Sites</td>
<td>587 b/</td>
<td>0</td>
</tr>
<tr>
<td>Schools within ½ Mile of Station Sites</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>In-Street Construction</td>
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<td>None</td>
</tr>
<tr>
<td>Pipeline Street and Rail Crossings</td>
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<td>None</td>
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<tr>
<td>Recreational Area Impacts</td>
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<td>National Park Service Boston Harbor Islands National Recreation Area</td>
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<td>ENVIRONMENTAL CONSIDERATIONS</td>
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<tr>
<td>Forested Impacts (acres)</td>
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<td>Freshwater Wetland Impacts (acres)</td>
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<tr>
<td>Marine Dredging Impacts (acres)</td>
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<td>13.0 ac</td>
</tr>
<tr>
<td>In-water blasting</td>
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</tr>
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<td>NHESP Mapped Habitat c/</td>
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<td>Yes</td>
</tr>
<tr>
<td>Shellfish Bed Impacts</td>
<td>None</td>
<td>Yes</td>
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### Table 10.8-2
Comparison of the Proposed Weymouth Compressor Station and Long Island and Children's Island Alternate Sites

<table>
<thead>
<tr>
<th></th>
<th>Proposed Weymouth Compressor Station</th>
<th>Alternate Site # 6 (a/)</th>
<th>Alternate Site # 7 (a/)</th>
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</thead>
<tbody>
<tr>
<td>Marine Benthic Habitat Impacts</td>
<td>None</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Marine Hard Bottom Substrate Impacts</td>
<td>None</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

\(a/\) The calculations associated with the alternate sites are based on conceptual designs and therefore represent approximated figures.

\(b/\) This number is based on a count of residential structures within ½ mile of the stations sites using GIS data. This does not account for residential structures containing multiple owners. For example, Algonquin has identified approximately 1,026 individual property owners within ½ mile of the Weymouth Compressor Station site.

\(c/\) NHESP = Natural Heritage and Endangered Species Program (Massachusetts Division of Fisheries and Wildlife).

## 10.8.5 Metering & Regulating Stations

### Modifications to Existing M&R Stations

As stated in Section 1.3.2 of Resource Report 1, the Atlantic Bridge Project will include modifications to five existing M&R stations and one existing regulator station to accept the new gas flows associated with the Project. These stations include:

- Yorktown M&R Station;
- Danbury M&R Station;
- Plymouth M&R Station;
- Pine Hills M&R Station;
- Westbrook M&R Station; and
- Needham Regulator Station.

Modifications at these existing stations will take place primarily within the existing fenced sites and will not require any expansion of the stations. Accordingly, an evaluation of alternatives was not deemed necessary.

### Construction of New M&R Station

The Atlantic Bridge Project also includes the replacement of one existing Algonquin M&R station with a new station in the City of Norwich, Connecticut. Based on design and operational considerations, the existing Salem Pike M&R Station must be completely rebuilt at a new, nearby location to accept the new gas flows associated with the Project. The new proposed station site is located approximately 300 feet from the existing Salem Pike M&R Station directly across Briar Hill Road on Algonquin’s E-3 Lateral System. The parcel where the new M&R station will be located is owned by Norwich Public Utilities (“NPU”), which is one of the Project Shippers.

The existing Salem Pike M&R Station is limited in flow by the existing 2-inch and 4-inch station piping, which is sized for approximately 138,000 standard cubic feet per hour (“SCFH”). NPU is seeking to achieve up to 263,000 SCFH with the build-out of the Atlantic Bridge Project. Algonquin and NPU have determined that the current station site is inadequate to install the equipment required to reach up to 263,000 SCFH and that a new station site is needed. The existing station is built on the same footprint as the Algonquin mainlines so it severely limits siting options inside the current footprint for installing the
necessary upgrades. Additionally, NPU’s system planning requires uninterruptable service to the Salem Pike M&R Station; therefore, the existing station cannot be taken out of service to install the necessary upgrades. This issue is addressed by keeping the existing station in-service to maintain the existing flow while the new station is being constructed to achieve NPU’s higher requested volume.

Given that a new station site is necessary, the best option for Algonquin and NPU is to construct the new site directly across the street from the existing station on NPU-owned property, and thus alternative locations for the station were not considered. The proximity of the proposed station site will minimize the need for additional piping and station infrastructure. An additional benefit of constructing the station at the proposed location is that the site consists of open land, and construction will not result in forest impacts. Once the new station is constructed and in-service, the existing station will be removed.

10.9 Future Considerations Regarding Alternatives

The Applicants understand that as the Project moves forward through the FERC certificate process, the proposed route will be examined more closely by affected parties. Those parties may raise some additional concerns and issues and, as a result, the Applicants may propose additional alignment changes. The Applicants remain open to the consideration of such alternatives and will continue to investigate and evaluate viable alternatives.

10.10 References


APPENDIX 10A

- Figure 10.7-1: Stony Point Discharge Take-up and Relay Alternate Pipeline Routes
- Figure 10.7-2: Southeast Discharge Take-up and Relay Alternate Pipeline Route
Legend
- Project Milepost
- Proposed Pipeline Centerline
- Alternative Pipeline Route One
- Alternative Pipeline Route Two
- Existing Algonquin Gas Transmission Pipeline
- Public Land and Designated Recreation, Scenic, or Other Areas
- Croton Watershed
- NWI Wetlands
- Stream

Sources: ESRI, USFWS WWI, CT DEEP, SPECTRA, TRC
Projection: NAD83, UTM Zone 18N
US Survey Feet, Grid North.

Atlantic Bridge Project
Figure 10.7-1
Stony Point Discharge Take-up and Relay Alternative Pipeline Routes
Map 3 of 8 Created: 10/14/2015
Legend
- Project Milepost
- Proposed Pipeline Centerline
- Alternative Pipeline Route One
- Alternative Pipeline Route Two
- Existing Algonquin Gas Transmission Pipeline
- Public Land and Designated Recreation, Scenic, or Other Areas
- Croton Watershed
- NWI Wetlands
- Stream

Atlantic Bridge Project
Figure 10.7-1
Stony Point Discharge Take-up and Relay Alternative Pipeline Routes

Sources: ESRI, USFWS NWI, CT DEEP, SPECTRA, TRC
Projection: NAD83, UTM Zone 18N
US Survey Feet, Grid North.

Created: 10/14/2015
Map 5 of 8
Figure 10.8-2A: Alternate Compressor Station Site 1
Figure 10.8-2B: Alternate Compressor Station Site 1 Suction/Discharge Pipelines

Figure 10.8-3A: Alternate Compressor Station Site 2
Figure 10.8-3B: Alternate Compressor Station Site 2 Suction/Discharge Pipelines

Figure 10.8-4A: Alternate Compressor Station Site 3
Figure 10.8-4B: Alternate Compressor Station Site 3 Suction/Discharge Pipelines

Figure 10.8-5A: Alternate Compressor Station Site 4
Figure 10.8-5B: Alternate Compressor Station Site 4 Suction/Discharge Pipelines

Figure 10.8-6A: Alternate Compressor Station Site 5
Figure 10.8-6B: Alternate Compressor Station Site 5 Suction/Discharge Pipelines

Figure 10.8-7A: Alternate Compressor Station Site 6
Figure 10.8-7B: Alternate Compressor Station Site 6 Suction/Discharge Pipelines
Figure 10.8-7C: Alternate Compressor Station Site 6 Area Bathymetry

Figure 10.8-8A: Alternate Compressor Station Site 7
Figure 10.8-8B: Alternate Compressor Station Site 7 Suction/Discharge Pipelines
Figure 10.8-8C: Alternate Compressor Station Site 7 Area Bathymetry
Suction and Discharge Pipelines for Alternate Compressor Station Sites

- **Existing Algonquin Q-1 System**
- **Alternate Compressor Station Site**
- **Towns**

**Areas of Critical Environmental Concern**
- MassDEP Wetlands
- NHESP Natural Communities
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species

**Public Open Space**

**NOTE:** Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
Suction and Discharge Pipelines for Alternate Compressor Station Sites
- Existing Algonquin Q-1 System
- Existing Algonquin I-3 System
- Existing Algonquin I-8 System
- Existing Algonquin I-9 System
- Existing Algonquin I-10 System
- Alternate Compressor Station Site
- Proposed Compressor Station Construction Workspace

Data Sources: ESRI, SPECTRA, MASSGIS, USGS, TRC

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.

Algonquin Gas Transmission, LLC
Maritimes & Northeast Pipeline, L.L.C.

Atlantic Bridge Project
Figure 10.8-2B
Alternate Compressor Station Site 1
Suction/Discharge Pipelines

Map 1 of 6
Created: 9/17/2015
Suction and Discharge Pipelines for Alternate Compressor Station Sites

Existing Algonquin Q-1 System
Existing Algonquin I-3 System
Existing Algonquin I-8 System
Existing Algonquin I-9 System
Existing Algonquin I-10 System
Alternate Compressor Station Site
Proposed Compressor Station Construction Workspace

Stream
MassDEP Wetlands
Public Open Space
Areas of Critical Environmental Concern
NHESP Natural Communities
NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
Town Boundary

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
Suction and Discharge Pipelines for Alternate Compressor Station Sites

- Existing Algonquin Q-1 System
- Existing Algonquin I-3 System
- Existing Algonquin I-8 System
- Existing Algonquin I-9 System
- Existing Algonquin I-10 System
- Alternate Compressor Station Site
- Proposed Compressor Station Construction Workspace

Notation: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
Suction and Discharge Pipelines for Alternate Compressor Station Sites

- Existing Algonquin Q-1 System
- Existing Algonquin I-3 System
- Existing Algonquin I-8 System
- Existing Algonquin I-9 System
- Existing Algonquin I-10 System
- Alternate Compressor Station Site
- Proposed Compressor Station Construction Workspace

Stream
MassDEP Wetlands
Public Open Space
Areas of Critical Environmental Concern
NHESP Natural Communities
NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
Town Boundary

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.

Data Sources: ESRI, SPECTRA, MASSGIS, USGS, TRC

Atlantic Bridge Project
Figure 10.8-2B
Alternate Compressor Station Site 1
Suction/Discharge Pipelines

Map 4 of 6
Created: 9/17/2015
Suction and Discharge Pipelines for Alternate Compressor Station Sites

Existing Algonquin Q-1 System
Existing Algonquin I-3 System
Existing Algonquin I-8 System
Existing Algonquin I-9 System
Existing Algonquin I-10 System
Alternate Compressor Station Site
Proposed Compressor Station Construction Workspace

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.

Data Sources: ESRI, SPECTRA, MASSGIS, USGS, TRC

Created: 9/17/2015
Map 5 of 6
Suction and Discharge Pipelines for Alternate Compressor Station Sites
Alternate Compressor Station Site
Towns

Stream
MassDEP Wetlands
Areas of Critical Environmental Concern
NHESP Natural Communities
NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
Public Open Space

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.

Atlantic Bridge Project
Figure 10.8-3A
Alternate Compressor Station Site 2

Algonquin Gas Transmission, LLC
Maritimes & Northeast Pipeline, L.L.C.

Created: 9/17/2015
Figure 10.8-3B
Alternate Compressor Station Site 2
Suction/Discharge Pipelines

Data Sources:
- ESRI, SPECTRA, MASSGIS, USGS, TRC

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
Proposed Weymouth C/S
WEYMOUTH
NORFOLK County, MA

Data Sources: ESRI, SPECTRA, MASSGIS, USGS, TRC

Suction and Discharge Pipelines for Alternate Compressor Station Sites
- Existing Algonquin I-3 System
- Existing Algonquin I-8 System
- Existing Algonquin I-9 System
- Existing Algonquin I-10 System
- Alternate Compressor Station Site
- Proposed Compressor Station Construction Workspace

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
Proposed Weymouth C/S

Weymouth, Norfolk County, MA

Quincy, Norfolk County, MA

Braintree, Norfolk County, MA

WEYMOUTH

NORFOLK County, MA

Suction and Discharge Pipelines for Alternate Compressor Station Sites
Existing Algonquin I-3 System
Existing Algonquin I-8 System
Existing Algonquin I-9 System
Existing Algonquin I-10 System
Alternate Compressor Station Site
Proposed Compressor Station Construction Workspace

MassDEP Wetlands
Public Open Space
Areas of Critical Environmental Concern
NHESP Natural Communities
NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
Town Boundary

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
Alternate Site #4 (Weymouth)

WEYMOUTH
NORFOLK County, MA

Suction and Discharge Pipelines for
Alternate Compressor Station Sites

Alternate Compressor Station Site
Towns

MassDEP Wetlands
Areas of Critical Environmental Concern
NHESP Natural Communities
NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
Public Open Space

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.

Created: 9/17/2015

Atlantic Bridge Project
Figure 10.8-5A
Alternate Compressor Station Site 4
Proposed Weymouth C/S
Alternate Site #4 (Weymouth)

WEYMOUTH
NORFOLK County, MA

BRAINTREE
NORFOLK County, MA

QUINCY
NORFOLK County, MA

Suction and Discharge Pipelines for Alternate Compressor Station Sites
Existing Algonquin I-3 System
Existing Algonquin I-8 System
Existing Algonquin I-9 System
Existing Algonquin I-10 System
Alternate Compressor Station Site
Proposed Compressor Station Construction Workspace

Stream
MassDEP Wetlands
Public Open Space
Areas of Critical Environmental Concern
NHESP Natural Communities
NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
Town Boundary

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
Suction and Discharge Pipelines for Alternate Compressor Station Sites

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
Proposed Weymouth C/S

Alternate Site #5 (Weymouth)

WEYMOUTH NORFOLK County, MA

QUINCY NORFOLK County, MA

BRAINTREE NORFOLK County, MA

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.

Data Sources: ESRI, SPECTRA, MASSGIS, USGS, TRC

Atlantic Bridge Project
Figure 10.8-6B
Alternate Compressor Station Site 5
Suction/Discharge Pipelines

Map 1 of 1
Created: 9/17/2015

Algonquin Gas Transmission, LLC
Maritimes & Northeast Pipeline, L.L.C.
Suction and Discharge Pipelines for Alternate Compressor Station Sites

Alternate Compressor Station Site

Eelgrass

Shellfish Suitability Areas

Town Boundary

Stream

MassDEP Wetlands

Areas of Critical Environmental Concern

NHESP Natural Communities

NHESP Estimated Habitats of Rare Wildlife

NHESP Priority Habitats of Rare Species

Public Open Space

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.
**Suction and Discharge Pipelines for Alternate Compressor Station Sites**

- Existing Algonquin I-10 System
- Alternate Compressor Station Site
- Eelgrass
- Shellfish Suitability Areas
- Town Boundary

**Legend**
- Stream
- MassDEP Wetlands
- Areas of Critical Environmental Concern
- NHESP Natural Communities
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- Public Open Space

**NOTE:** Suction/Discharge Pipeline for Alternate Compressor Station Site is for conceptual purposes only and has not been field surveyed.

**Map 1 of 1**

**Created:** 9/17/2015

**Algonquin Gas Transmission, LLC**
**Maritimes & Northeast Pipeline, L.L.C.**

**Atlantic Bridge Project**
**Figure 10.8-7B**
Alternate Compressor Station Site 6
Suction/Discharge Pipelines
Suction and Discharge Pipelines for Alternate Compressor Station Sites

Existing Algonquin I-10 System

Alternate Compressor Station Site

Towns

Eelgrass

Shellfish Suitability Areas

Alternate Site #6 (Long Island)

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Site is for conceptual purposes only and has not been field surveyed.
Figure 10.8-8A
Alternate Compressor Station Site 7

Alternate Site #7 (Children’s Island)
Suction and Discharge Pipelines for Alternate Compressor Station Sites

Existing Algonquin I-10 System

Alternate Compressor Station Site

Eelgrass

Shellfish Suitability Areas

Town Boundary

Stream

MassDEP Wetlands

Areas of Critical Environmental Concern

NHESP Natural Communities

NHESP Estimated Habitats of Rare Wildlife

NHESP Priority Habitats of Rare Species

Public Open Space

NOTE: Suction/Discharge Pipeline for Alternate Compressor Station Sites is for conceptual purposes only and has not been field surveyed.

Algonquin Gas Transmission, LLC
Maritimes & Northeast Pipeline, L.L.C.

Atlantic Bridge Project
Figure 10.8-8B
Alternate Compressor Station Site 7
Suction/Discharge Pipelines

Map 1 of 1
Created: 9/17/2015