Environmental Assessment Focus Report for Alton Natural Gas Pipeline Project

Prepared for Alton Natural Gas Storage LP by Stantec Consulting Ltd.

February 28, 2013

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1.0 Introduction

On July 10, 2012, Alton Natural Gas Storage LP (Alton; the Proponent), a limited partnership between AltaGas Ltd. and Veresen Inc., registered the Alton Natural Gas Pipeline Project (the Project) for environmental assessment (EA) in accordance with Part IV of the Nova Scotia *Environment Act* and the associated Environmental Assessment Regulations. In consideration of the comments submitted during public and government review of the EA Registration, the provincial Minister of Environment determined on August 29, 2012 that additional information in the form of a Focus Report is required for the Project.

This document is intended to satisfy the Minister's requirement for a Focus Report. It was prepared in accordance with Terms of Reference issued by Nova Scotia Environment (NSE), dated September 24, 2012.

1.1 BACKGROUND

Alton proposed in 2007 to develop an underground natural gas storage facility (*i.e.*, the Alton Natural Gas Storage Project) in Colchester County, Nova Scotia to meet the growing demand for natural gas in Nova Scotia, New Brunswick, and the northeastern United States. Following assessment under the provincial EA process, the Minister issued an EA Approval on December 18, 2007 with terms and conditions for the development of storage caverns and other infrastructure associated with the underground natural gas storage facility, including water pipelines to the Shubenacadie River. The planned location of this infrastructure is indicated on Figure 1.

Subsequent to receiving EA Approval, several other permits were also obtained under Part V of the Nova Scotia *Environment Act*, including Industrial Approvals and Water Approvals, for various phases of the Alton Natural Gas Storage Project. In June 2011, Alton submitted an application to the Nova Scotia Utility and Review Board (NSUARB) for approval to construct the caverns for gas storage.

The Alton storage caverns will be located within the confines of the Hydrocarbon Storage Area Lease obtained by Alton, while the surface facilities will be located within surface lands owned or leased by Alton. The Alton cavern site has a number of advantages, including its subsurface geological properties, access to existing natural gas pipeline infrastructure (*i.e.*, Maritimes and Northeast Pipeline (M&NE) Halifax Lateral), and proximity to valuable markets.

The storage facility requires a natural gas transmission pipeline in order to transport natural gas to and from the caverns. The Alton Natural Gas Pipeline Project is therefore proposed to connect the caverns and facilities to the M&NE Halifax Lateral (refer to Figure 1), which then joins a larger network of pipelines that supply natural gas to the Maritimes and other markets.

Although the two projects are closely related, the Alton Natural Gas Pipeline Project was not included within the scope of the EA for the Alton Natural Gas Storage Project because, at the time of that assessment in 2007, it was not yet clear whether the pipeline would be built, owned, and operated by Alton or by M&NE. The Alton Natural Gas Pipeline Project therefore underwent a separate provincial EA process in 2012.

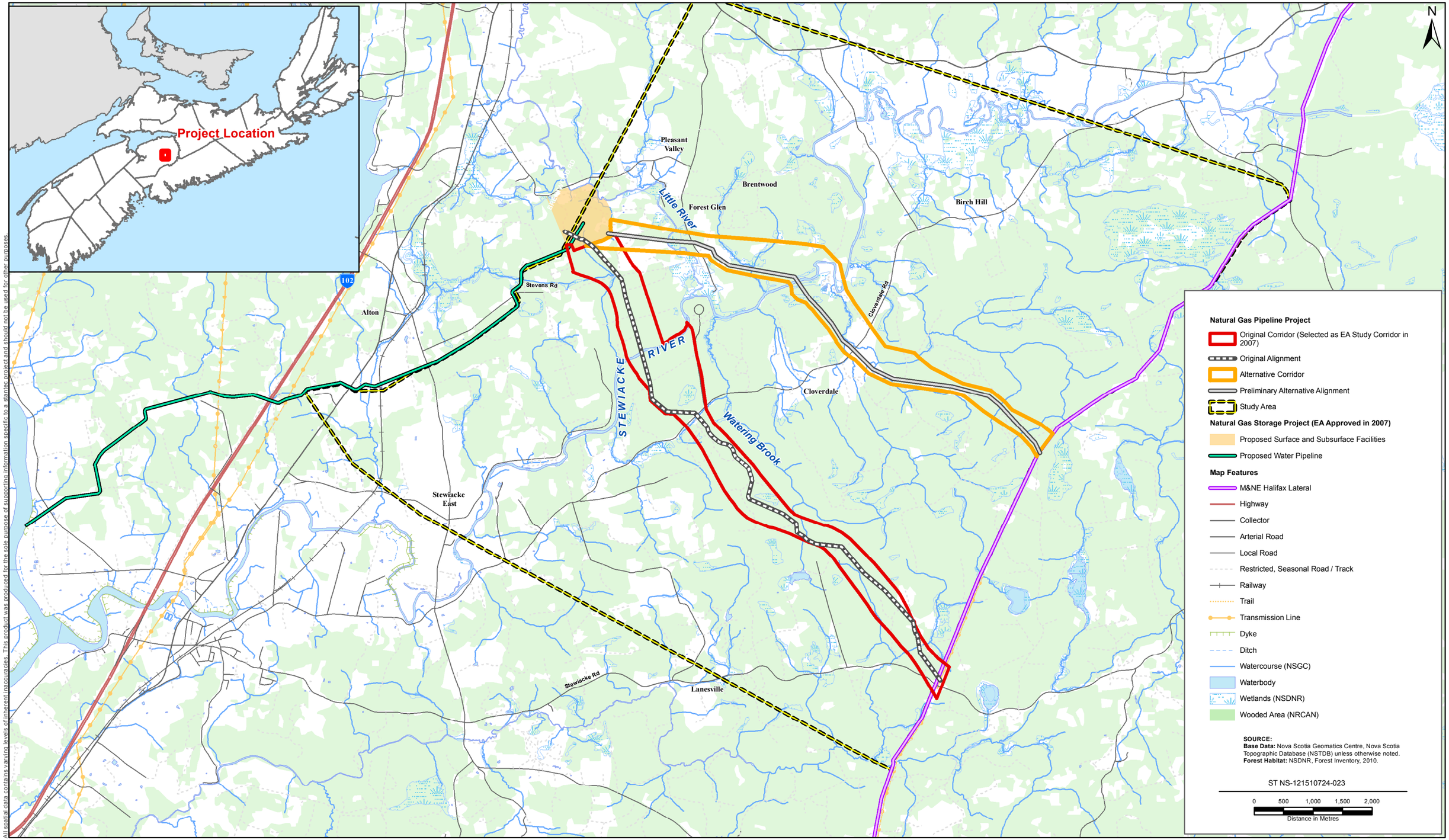
The EA Registration for the Alton Natural Gas Pipeline Project (Stantec 2012) describes and evaluates potential environmental and socio-economic effects associated with construction, operation and decommissioning of a 10.8 km natural gas pipeline along a right-of-way (referred to herein as the "Original Alignment") within a defined Study Corridor (referred to herein as the "Original Corridor"). The assessment primarily focuses on identifying and mitigating potential Project interactions with the following Valued Environmental Components (VECs): Groundwater Resources; Fish and Fish Habitat; Rare Vascular Plants; Wildlife and Wildlife Habitat; Wetlands; Land and Resource Use; and Archaeological and Heritage Resources. The Original Alignment was carefully designed to avoid environmentally sensitive areas wherever practical, and technically and economically feasible mitigation measures were proposed to further reduce or eliminate potential adverse Project-related environmental effects.

As required by the NSE Terms of Reference, this Focus Report compares and assesses various aspects of the Original Alignment against the best possible alternative pipeline corridor (referred to herein as the "Alternative Corridor"), both of which are shown on Figure 1.

1.2 PURPOSE AND OBJECTIVES OF THIS FOCUS REPORT

During the EA process for the Original Alignment, regulatory reviewers and the Mi'kmaq expressed concerns with respect to the location of the proposed route, as it traverses the following lands and resources:

- provincial Crown lands under consideration as candidates for potential protected area designation to help the Province achieve its commitment to protect 12% of the land mass in Nova Scotia for conservation purposes by 2015;
- lands that are utilized by the Mi'kmaq for traditional and current use activities, such as hunting, fishing and gathering;
- lands with potential to contain archaeological resources pertaining to Mi'kmaq cultural heritage; and
- lands within the Stewiacke Watershed Protected Water Area, which contains the St. Andrews River (*i.e.*, the source of drinking water supplies for the Town of Stewiacke) and associated tributaries.



PREPARED BY:	R Sutcliffe
REVIEWED BY:	A Fox
CLIENT:	alton NATURAL GAS STORAGE LP

Alton Natural Gas Pipeline Project

Project Location

FIGURE NO.:	1
DATE:	Feb 26, 2013

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Based on review of the information submitted by the Proponent; the comments provided by government agencies, the Mi'kmaq of Nova Scotia, and the public; and in consideration of the above-listed concerns raised during the EA process, the Minister decided to require a Focus Report to better understand the potential for Project-related adverse effects or significant environmental effects. The Minister directed Alton to provide a Focus Report to examine potential effects on the Crown lands identified by the Province's 12% process, traditional and current Mi'kmaq use, and drinking water supplies. As per the Minister's EA determination letter (dated August 29, 2012), the Focus Report must:

- provide a comprehensive analysis and discussion of alternate routes for the proposed pipeline that avoid the Crown lands identified by the Province's 12% process, and provide mitigative options to address impacts on conservation values identified within the candidate 12 Percent Lands;
- identify how any potential impacts on traditional and current Mi'kmaq use of the proposed Project lands will be addressed; and
- provide a complete analysis of potential impacts to drinking water supplies, proposed mitigation (including avoidance as a preferred approach), and monitoring and reporting plans.

A document entitled *Terms of Reference for the Preparation of a Focus Report, Alton Natural Gas Pipeline, Alton, Colchester County, Nova Scotia* (dated September 24, 2012) was subsequently issued by NSE to provide guidance on specific information requirements for the Focus Report. Table 1 indicates where the various requirements specified in the Terms of Reference can be found in this Focus Report.

Table 1 Concordance Table

Requirement Specified in Terms of Reference	Reference in Focus Report
1.0 Reason for the Undertaking	**3.0** Reason for the Undertaking
2.0 Alternatives to Carrying Out the Undertaking	**4.0** Pipeline Route Options Under Consideration
2.1 Protected Areas	**5.1** Protected Areas
(a) Identification of best possible alternative pipeline route that does not impact the candidate 12 Percent Lands	**4.1.2** Alternative Route **5.1.2** Analysis and Mitigation
(b) Technical, financial and environmental costs and benefits of alternative route and preferred route indicated in the EA Registration	**4.2** Comparison and Characterization of Pipeline Route Options
2.2 Mi'kmaq Interests	**5.2** Mi'kmaq Interests
(a) Comprehensive analysis and discussion of how potential impacts on historical, traditional and current Mi'kmaq use of Project lands will be addressed for the	**5.2.2** Analysis and Mitigation

Table 1 Concordance Table

Requirement Specified in Terms of Reference	Reference in Focus Report
pipeline route presented in the EA Registration	
(b) Comprehensive analysis and discussion of how potential impacts on historical, traditional and current Mi'kmaq use of Project lands will be addressed for alternative routes	**5.2.2** Analysis and Mitigation
2.3 Drinking Water Supplies	**5.3** Drinking Water Supplies
(a) Comprehensive plan to protect public and private drinking water supplies, including mitigative options to address potential impacts associated within the Stewiacke Watershed Protected Water Area (PWA) for the pipeline route as presented in the EA Registration	**Appendix C** Water Supply Protection Plan
(b) Identification of best possible alternative pipeline route that avoids the Stewiacke Watershed PWA	**4.1.2** Alternative Route **5.3.2** Analysis and Mitigation
(c) Proposed mitigation, contingency plans, and monitoring and reporting plans for the protection of private drinking water supplies that may be impacted by the alternative pipeline route	**Appendix C** Water Supply Protection Plan
(d) Technical, financial and environmental costs and benefits of alternative route and preferred route indicated in the EA Registration	**4.2** Comparison of Pipeline Route Options
3.0 Project Description	**6.0** Project Description
• Project location	**Figure 1**
• Project boundaries clearly delineated on a map	**Figures 1-5**
• Air photos and satellite imagery	**4.2.1** Terrestrial Habitat **Figure 1**
• Assumptions and impact avoidance opportunities	**6.0** Project Description
4.0 Focus Report Summary and Conclusions	**6.0** Summary and Conclusions

The objective of this Focus Report is to identify the best possible alternative pipeline route to address the issues raised during government and Mi'kmaq review of the EA Registration and, in accordance with the Terms of Reference, provide the Minister with sufficient information to approve the Project (either as the Original Alignment proposed in the EA Registration, or as the Alternative Corridor proposed in this Focus Report) with terms and conditions.

In consultation with the Nova Scotia Department of Natural Resources (NSDNR), NSE has advised the Proponent that the analysis in the Focus Report may rely on desktop research only.

2.0 Study Boundaries

The summary of study boundary terms provided in Table 2 is intended to reconcile the different terms used to refer to various aspects of pipeline configuration and planning in the EA Registration and this Focus Report.

Table 2 Summary of Report Terminology

Updated Wording in this Focus Report	Superseded Wording from EA Registration	Description
Study Area	Study Area	Spatial boundaries in which it would be reasonable to construct a pipeline connecting the Alton Natural Gas Storage Project to the M&NE Halifax Lateral pipeline (the Study Area for this Focus Report is identical to the Study Area for the EA Registration)
Study Corridor	Study Corridor	Preferred corridor within the Study Area to investigate for pipeline planning purposes
Original Pipeline Route Previously Proposed in EA Registration		
Original Corridor	Study Corridor or Southern Corridor	Identified in 2007 as the Study Corridor to be assessed in the EA Registration (refer to Section 4.1.1)
Original Alignment	Proposed RoW or Preferred RoW	20 m pipeline right-of-way (RoW) previously proposed and assessed in the EA Registration (refer to Section 4.1.1)
Original Route	N/A	Collective reference to the Original Corridor and Original Alignment
Alternative Pipeline Route Currently Introduced in this Focus Report		
Alternative Corridor	N/A	Identified in 2013 as the alternative Study Corridor to be assessed in this Focus Report (refer to Section 4.1.2)
Preliminary Alternative Alignment	N/A	Provisional concept intended to facilitate comparison with the Original Alignment in this Focus Report (refer to Section 4.1.2)
Alternative Route	N/A	Collective reference to the Alternative Corridor and Preliminary Alternative Alignment

3.0 Reason for the Undertaking

To enable storage of natural gas within the caverns associated with the Alton Natural Gas Storage Project, the facility must be connected to a natural gas transmission system. The Alton Natural Gas Pipeline Project is needed to fulfill this purpose. The Project involves construction and operation of a pipeline to connect the storage facility to the existing M&NE Halifax Lateral. Presently, no storage facilities connect to the M&NE system.

In addition to direct employment, the Project is expected to contribute to benefits for local communities and the greater region by:

- bringing gas closer to the communities of Alton, Brookfield, Stewiacke, and Truro through the development of a gas pipeline to the Alton facility;
- decreasing gas price and gas price volatility for Nova Scotia gas customers;
- decreasing gas price volatility, and hence power price volatility, for natural gas-fired power generation;
- potentially reducing greenhouse gas emissions (to the extent that stable gas prices and security of supply result in greater gas-fired power generation, and hence less coal-fired generation);
- providing for growth of compressed natural gas (CNG), natural gas-fired power generation, and natural gas distribution in Nova Scotia and Atlantic Canada;
- increasing operational pressures and flow to the Halifax region where capacity constraints are expected to be a significant challenge in the near future;
- increasing regional security of supply levels;
- contributing to the tax base (income, property, and sales);
- allowing for the potential of developing other energy-related projects as a result of storage; and
- contributing to the overall economic growth of the community.

4.0 Pipeline Route Options Under Consideration

This section contains an overview of the process for selecting the Study Corridor and pipeline RoW previously identified in the EA (*i.e.*, Original Corridor and Original Alignment, respectively), as well as the new Study Corridor (*i.e.*, Alternative Corridor) identified in this Focus Report, all of which are indicated on Figure 1. The general Study Area used for both the EA and this Focus Report is also indicated on Figure 1. Key features, constraints and issues are also compared and discussed for each pipeline route option.

4.1 ROUTE SELECTION

Selection of the Original Corridor was informed by the results of a pipeline corridor evaluation study undertaken in support of the EA. Detailed planning was subsequently carried out to configure a specific pipeline route that was ultimately proposed and assessed in the EA Registration. The resultant Original Alignment is a 20 m wide RoW extending approximately

10.8 km in a continuous route from the underground caverns site near Alton, Nova Scotia, to a tie-in to the Halifax Lateral pipeline (refer to Figure 1).

4.1.1 Original Route

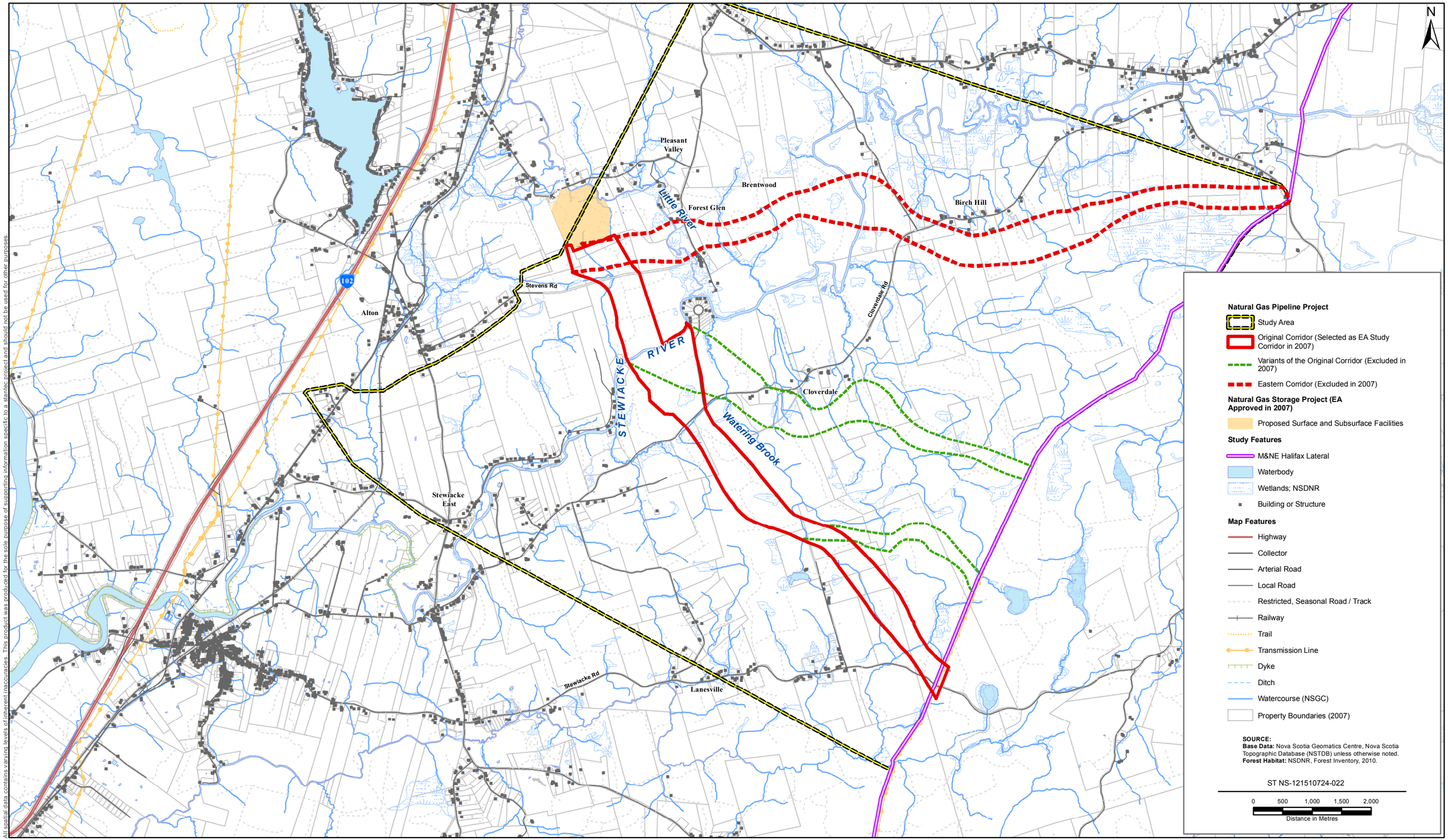
Original Corridor

A pipeline corridor evaluation study was conducted in 2007 to identify a preferred EA Study Corridor (approximately 1 km wide) from a larger Study Area (approximately 10 km wide) based on potential environmental, socio-economic, technical and cost constraints. Four potential Study Corridors (refer to Figure 2) were assessed: the Original Corridor; two Variants of the Original Corridor; and another route described in the EA Registration as the Eastern Corridor. The following constraints were reviewed at a high level for each of the four potential pipeline corridors:

- geological and geotechnical conditions known to affect pipeline constructability and integrity (*e.g.*, steep slopes, and exposed or shallow bedrock);
- watercourse crossings and fisheries resources requiring special consideration (*e.g.*, potential for wet crossings and/or horizontal directional drilling (HDD));
- terrestrial resources requiring special consideration (*e.g.*, high value habitat, concentration of sensitive species, wetlands);
- land use (*e.g.*, First Nations reserves, parks and protected areas, developed areas, proximity to residents, and land use planning); and
- archaeological/cultural sites.

M&NE also added criteria with respect to preferred conditions at the tie-in to the Halifax Lateral; these are: easy accessibility, readily available electric power supply and telephone service, and availability of land.

Potential constraints were identified through a desktop review of existing information, including readily available technical reports, databases, professional judgment and experience locating linear development projects in Canada. The review identified potential environmental, technical, and social issues or constraints in the area, based on readily available data. Sources of these data include the Maritimes Breeding Bird Atlas, NSDNR, the federal *Species at Risk Act* Registry, the Canada Land Inventory, the Atlas of Canada, official plans, and other regional sources of information, where available for the area.



PREPARED BY: M Huskins-Shupe	Alton Natural Gas Pipeline Project
REVIEWED BY: A Fox	**2007 Pipeline Corridor Evaluation Study**
CLIENT: alton NATURAL GAS STORAGE LP	FIGURE NO.: 2
	DATE: Feb 26, 2013
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The Original Corridor was selected as the preferred option in consideration of several factors:

- As shown on Figure 2, the Original Corridor traverses fewer environmentally sensitive areas, particularly government-identified wetlands, than the Eastern Corridor.
- The properties crossed by the Original Corridor was owned by only six private landowners, whereas the properties crossed by the Eastern Corridor were owned by 33 different landowners (refer to Figure 2).
- The Original Corridor maintains greater setback distances from residential properties than the Eastern Corridor (refer to Figure 2).
- The length of the Original Corridor (approximately 10.8 km) is shorter than the length of the Eastern Corridor (approximately 13 km). The Original Corridor is preferable from this perspective because selection of a shorter pipeline route is generally expected to translate into relatively less environmental disturbance during Project construction and reduced potential for adverse environmental effects caused by accidental events.

The two potential variants branching off of the Original Corridor were excluded due to the absence of one or more of M&NE's above-listed criteria for a preferred interconnection point.

Following identification of the Original Corridor as the preferred EA Study Corridor, Alton conducted a pipeline constructability investigation/review that did not identify any unmanageable constraints. A meeting was subsequently held with NSE on June 25, 2008 to review the Original Corridor proposal, and no serious issues were raised at that time. All further investigation and analysis undertaken in support of the Project and the EA focused in the Original Corridor.

Original Alignment

Alton selected a preferred 20 m wide RoW (*i.e*., the Original Alignment) within the Original Corridor based on refined constraint mapping and further investigation. This RoW selection process involved a number of field surveys as well as discussions with property owners and other stakeholders.

A substantial amount of land within the Study Area was acquired by the Province in 2010, after the Original Corridor had already been identified and a significant amount of work had been completed in support of RoW selection and EA preparation for the Original Alignment. As a result of the purchase, most of the land in the Original Route became Crown lands under consideration for potential protected area designation in accordance with the Province's commitment to protect 12% of the land mass in Nova Scotia by 2015. Issues associated with these candidate protected areas are discussed further in Section 5.1.

4.1.2 Alternative Route

Alternative Corridor

Following the Minister's decision to require a Focus Report, the Proponent has directed a substantial amount of effort towards the identification of a viable alternative to the Original Alignment. Key steps taken by Alton in this process have included:

- mapping various environmental and land use constraints within the Study Area in order to support identification and evaluation of alternative Study Corridor options (Figures 3 and 4);
- meeting with representatives of NSE's Protected Areas and Wetlands Branch (NSE-PAW) on September 26, 2012 regarding their expectations for information to be included in the Focus Report with respect to the candidate 12 Percent Lands (NSE-PAW also presented six potential alternative corridor alignments for consideration);
- meeting with a representative of NSE-EA on October 3, 2012 to review the process and Terms of Reference for the Focus Report and discuss key issues and potential approaches for addressing them;
- consulting with a representative of NSDNR-W (directly as well as through NSE-EA) regarding their expectations for data collection and the type of information to be included in the Focus Report with respect to plant and wildlife species;
- contacting a representative of NSE's Water and Wastewater Branch (NSE-WW) on October 10, 2012 to solicit input;
- conducting a field visit to publicly accessible portions of the Study Area in November 2012 to take photographs and begin to review those areas for apparent technical or environmental constraints;
- delineating a new Proponent-identified corridor for further assessment that generally avoids candidate 12 Percent Lands and completely avoids the Stewiacke Watershed Protected Water Area (refer to Figure 4);
- meeting with NSE-EA and NSE-PAW on November 20, 2012 to inform them regarding the new Proponent-identified corridor under consideration, provide a Focus Report status update, and discuss next steps;
- conducting a helicopter fly-over of the Original Alignment and potential alternative corridors (including those suggested by NSE-PAW and the new Proponent-identified corridor) in which Alton's senior pipeline engineer, a senior pipeline consultant from ROW Pipeline Consultants, and a senior terrestrial ecologist from Stantec made observations, took

photographs, and considered the technical feasibility and environmental acceptability of the various corridor options; and

- meeting with NSE-PAW on December 11, 2012 to discuss how and when to initiate contact with potentially affected property owners.

The new Proponent-identified corridor has been selected as the best possible (*i.e.*, most technically feasible and environmentally acceptable) alternative to the Original Alignment based on the following factors:

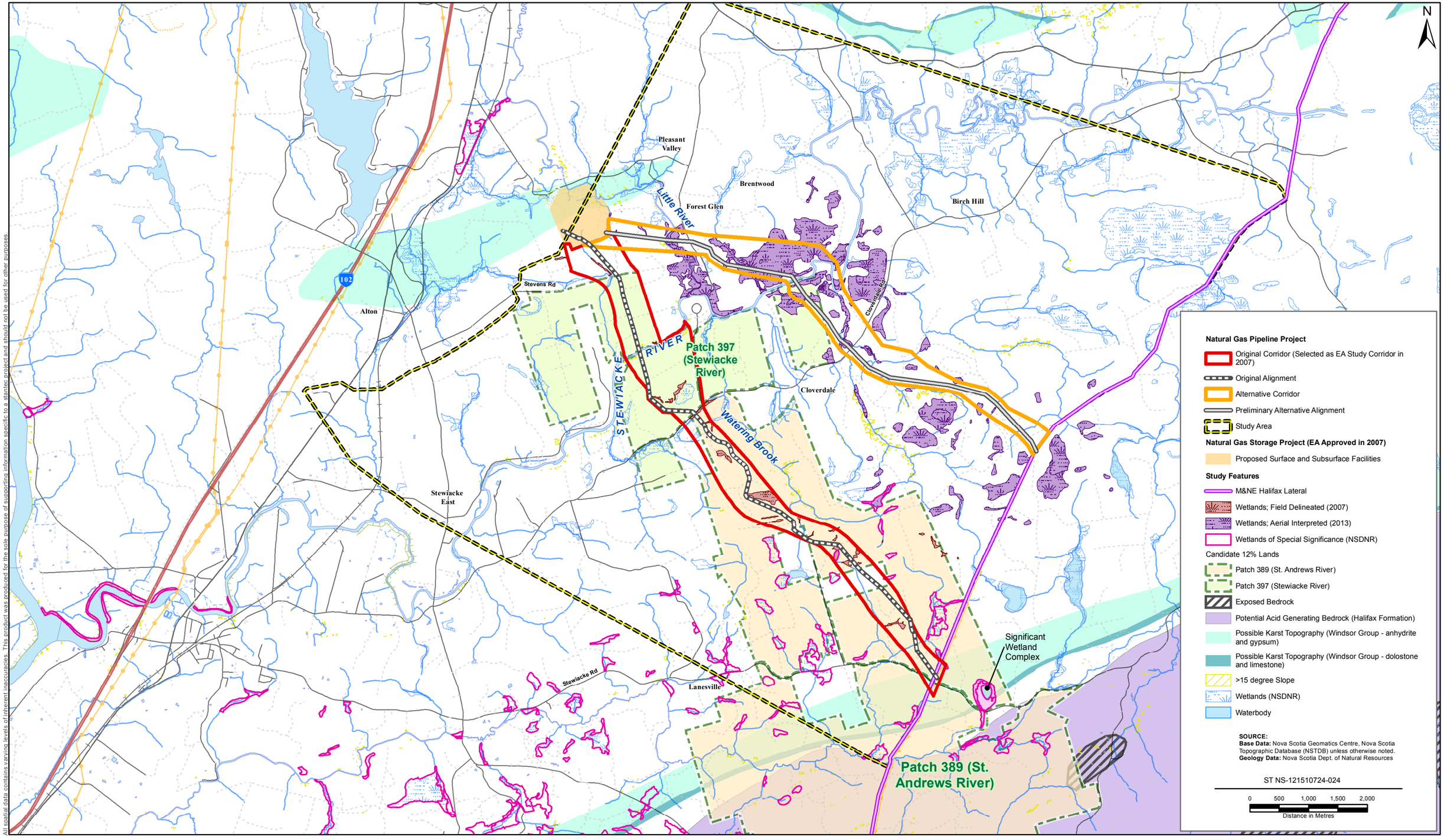
- discussions between the Proponent and NSE-PAW;
- desktop review of environmental and land use constraints (*e.g.*, wetlands, watercourses, acid generating bedrock, steep slopes, Crown lands and candidate 12 Percent Lands, property boundaries, buildings, access roads and utilities, agricultural lands, *etc.*) for each of the alternative corridor options;
- the results of the November 2012 field visit; and
- the results of the helicopter fly-over.

The new Proponent-identified corridor is therefore proposed as the Alternative Corridor to be compared with the Original Alignment for the purposes of this Focus Report. As noted above and reiterated throughout this report, the Alternative Corridor generally avoids candidate 12 Percent Lands and completely avoids the Stewiacke Watershed Protected Water Area (refer to Figures 3 and 4).

Preliminary Alternative Alignment

In addition to the Original Corridor, Original Alignment, and Alternative Corridor, all of which have already been defined, this Focus Report also considers a “Preliminary Alternative Alignment” (refer to Figures 3 and 4); this is an approximate route that the pipeline RoW could potentially follow within the Alternative Corridor to further reduce interaction with environmental, land use, and technical constraints.

The Preliminary Alternative Alignment is a provisional concept intended to facilitate comparison with the Original Alignment. It was carefully selected based on review of desktop information and aerial reconnaissance. Although they have not yet been finalized based on detailed field surveys, the Alternative Corridor and Preliminary Alternative Alignment are based on information of sufficient accuracy to permit the assessment of environmental effects and regulatory decision-making with respect to this Focus Report. Alton will conduct follow-up field work in the Alternative Corridor if it is selected for Project development, and the RoW will be refined to further avoid sensitive features within the corridor wherever feasible – as was done for the Original Alignment.



PREPARED BY: R Sutcliffe	Alton Natural Gas Pipeline Project	FIGURE NO.: 3
REVIEWED BY: A Fox	**Environmental Constraints**	DATE: Feb 26, 2013
CLIENT: alton NATURAL GAS STORAGE LP		Stantec

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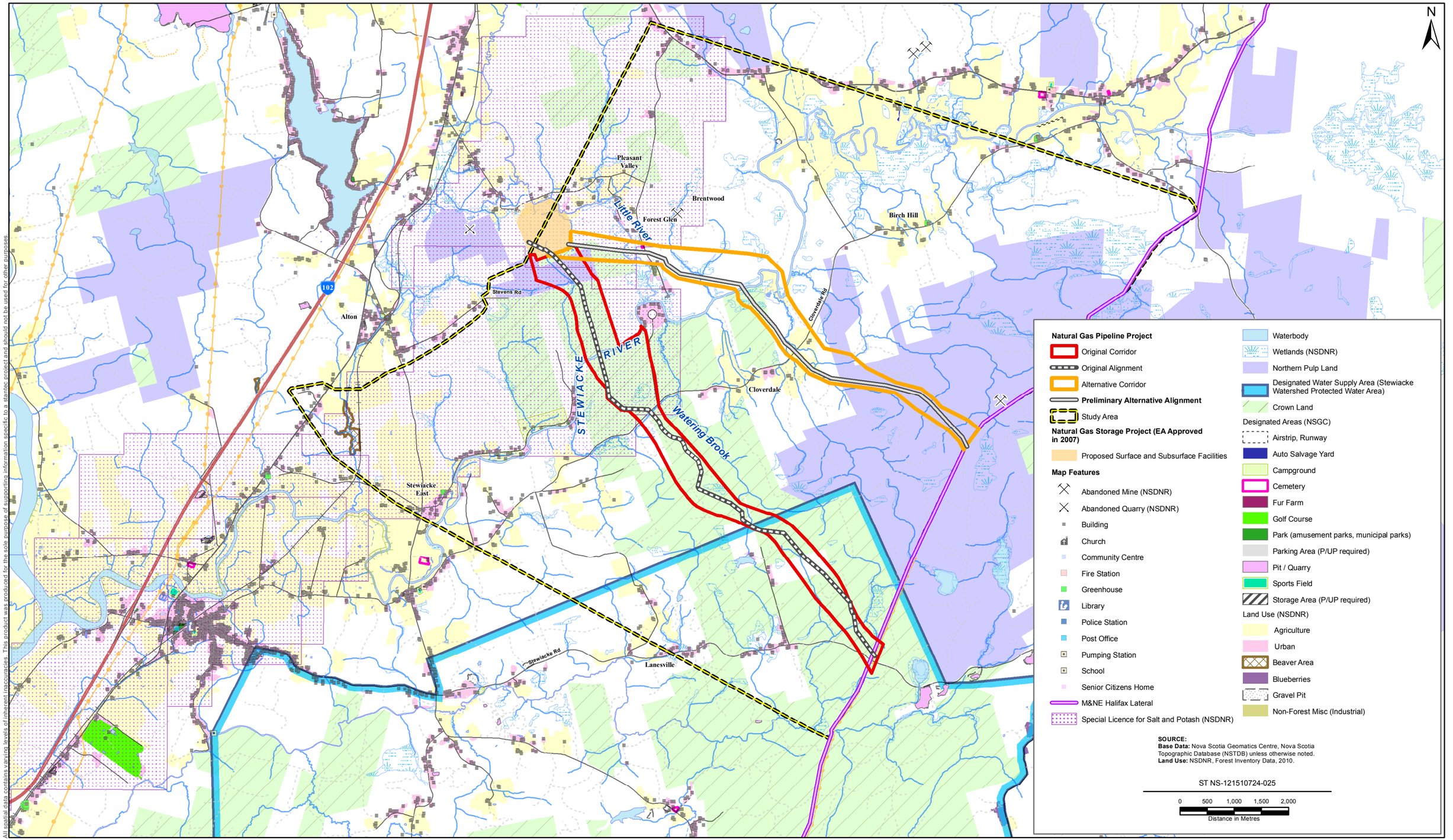

PREPARED BY:	R Sutcliffe
REVIEWED BY:	A Fox
CLIENT:	alton NATURAL GAS STORAGE LP

Alton Natural Gas Pipeline Project

Land Use Constraints

FIGURE NO.:	4
DATE:	Feb 26, 2013

Stantec

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4.2 COMPARISON AND CHARACTERIZATION OF PIPELINE ROUTE OPTIONS

Table 3 summarizes and compares key features and constraints for the various pipeline route options under consideration. Following the table is a narrative of terrestrial and aquatic habitat characterization for both routes.

Table 3 Key Features and Constraints for Original Route and Alternative Route

Features / Constraints / Issues	Original Route		Alternative Route	
	Original Corridor	Original Alignment	Alternative Corridor	Preliminary Alternative Alignment
Footprint				
Length (km)	~ 9.5	10.84	~ 8.6	8.74
Maximum Width (m)	~ 1,175	20	~ 950	20
Minimum Width (m)	~ 275	20	~ 200	20
Area (ha)	566.842	21.716	432.540	17.515
Environmental				
Wetlands, Area Within Route [1] (ha)	21.345	0.084	108.860	2.628
Wetlands of Special Significance, Area Within Route (ha)	1.551	0	0	0
Watercourses	5,629 m of total watercourse length within route	5 watercourse crossings within route	10,136 m of total watercourse length within route	9 watercourse crossings within route
Species of Conservation Concern (SOCC), Number Potentially Present within Route	• 53 plant SOCC • 21 animal SOCC	• 46 plant SOCC • 16 animal SOCC	• 59 plant SOCC • 33 animal SOCC	• 55 plant SOCC • 28 animal SOCC
Deer Wintering Areas, Area Within Route (ha)	0	0	0	0
Forested Lands, Area Within Route (ha)	320.657	9.319	237.422	9.771
Mature and Over-Mature Forest, Area within Route (ha)	105.012	3.149	84.975	2.412
Forest Interior Habitat [2], Area Within Route (ha)	• 27.722 pre-construction • 20.853 post-construction	1.002	• 46.016 pre-construction • 38.701 post-construction	0.409
Non-Forested (Undeveloped) Lands [3], Area Within Route (ha)	96.529	3.813	104.629	3.880
Non-Forested (Developed) Lands [3], Area Within Route (ha)	1.374	0.038	48.273	2.046
Clear-Cut Lands. Area within Route (ha)	77.745	3.695	53.678	3.150

Table 3 Key Features and Constraints for Original Route and Alternative Route

Features / Constraints / Issues	Original Route		Alternative Route	
	Original Corridor	Original Alignment	Alternative Corridor	Preliminary Alternative Alignment
Land Use				
Candidate 12% Lands, Area Within Route (ha)	463.117	17.59	23.415	1.515
Protected Water Area, Area Within Route (ha)	150.137	7.049	0	0
Property Ownership [4]	• 10 different landowners • 10 parcels of Crown property occupying 472.462 ha • 8 parcels of private property occupying 37.057 ha	• 5 different landowners • 9 parcels of Crown property occupying 17.989 ha • 3 parcels of private property occupying 2.468 ha	• 17 different landowners • 2 parcels of Crown property occupying 45.81 ha • 23 parcels of private property occupying 274.305 ha	• 10 different landowners • 2 parcels of Crown property occupying 2.670 ha • 10 parcels of private property occupying 9.079 ha
Urban Areas, Area Within Route (ha)	0	0	1.418	0
Buildings, Number Within Route	0	0	6	0
Sensitive Receptors (*e.g.*, Schools, Churches, Hospitals, Cemeteries), Number Within Route	0	0	1 (Cemetery)	0
Recreational Land Use, Area Within Route (ha)	0	0	0.04 (small segment of ~2 ha park)	0
First Nation Reserves, Number Within Route	0	0	0	0
Agriculture, Area Within Route (ha)	0	0	46.855	2.046
Forestry, Area Within Route (ha)	320.657	320.657	9.319	77.905
Special License for Salt and Potash, Area Within Route (ha)	268.601	268.602	58.125	2.534
Technical				
Exposed and/or Shallow Bedrock	0	0	0	0
Acid Generating Bedrock	0	0	0	0
Steep Slopes (>15°)	1.975	0.075	2.834	0.035
Sinkhole Geology	0	0	0	0
Potential Horizontal Directional Drilling Requirements	Stewiacke River only		Stewiacke River and Little River (Crossing location for Stewiacke River is technically preferable to crossing location for Original Route)	

Table 3 Key Features and Constraints for Original Route and Alternative Route

Features / Constraints / Issues	Original Route		Alternative Route	
	Original Corridor	Original Alignment	Alternative Corridor	Preliminary Alternative Alignment
Tie-In to the Halifax Lateral, Approximate Distance to Nearest Access Road	N/A	• 100 m to local road	N/A	• 60 m to seasonal road • 3.5 km to local road
Cost				
Relative Capital Cost	Relatively higher capital costs compared with Alternative Route due to shorter length of pipeline. This will be offset somewhat by relatively lower cost for utility access to the Halifax Lateral tie-in (*i.e.*, more direct)		Relatively lower capital costs compared with the Original Route due to shorter length of pipeline. This will be offset somewhat by relatively greater length of road and utility access to the Halifax Lateral tie-in.	
Relative Operating and Maintenance Cost	Relatively higher operating and maintenance costs compared with Alternative Route due to longer pipeline corridor and compression costs. Relatively lower costs associated with more direct tie-in access.		Relatively lower operating and maintenance costs compared with Original Route due to shorter pipeline corridor and compression costs. Relatively higher costs associated with longer tie-in access maintenance.	

Notes:
[1] Wetlands in the Original Route were identified/confirmed and delineated in the field. Wetland data for the Alternative Route consists of NSDNR-identified wetlands augmented with additional aerial interpreted wetlands.
[2] Clear-cut areas were buffered 100 m for forest interior habitat calculations.
[3] Non-Forested (Undeveloped) Lands include clear-cuts, rock outcrops, waterbodies, wetlands, *etc*. Non-Forested (Developed) Lands include roads, urban areas, agriculture, quarries, *etc*.
[4] Property parcels are based on unique PID value (*i.e.*, adjacent properties under the same ownership are considered multiple parcels). The number of landowners excludes undetermined road parcel owners. Property ownership data is from 2007.

The length of the Alternative Route is shorter than the length of the Original Route. Construction of a shorter pipeline route would generally be expected to disturb a relatively smaller area, thereby reducing the spatial footprint that would be subject to potential environmental effects associated with Project activities. A shorter route would also typically be associated with lower construction costs. However, despite its shorter overall length, development of the Alternative Route has potential to affect a greater number of landowners, some of whom may be reluctant to grant a pipeline easement through their property. Alton is committed to fair dealing with landowners, including financial compensation and accommodation for owner access and continued use of the lands for many uses.

4.2.1 Terrestrial Habitat

Wetlands and Wetlands of Special Significance

Figure 3 shows the distribution of wetlands along the Original Route and Alternative Route. It is important to note that the wetland inventory for the Original Route is derived based on the results of field surveys and in-field delineations completed in support of the EA Registration, whereas the wetland inventory for the Alternative Route has been derived using a combination

of the provincial wetland inventory, air photo interpretation, and information collected during the helicopter over-flight of the alternative route. As such, the wetland inventory for the Original Route is more detailed than that of the Alternative Route. The number of wetlands actually present in the Alternative Route is likely to be higher than the current inventory indicates.

Based on available desktop information, the Alternative Corridor is estimated to contain approximately 109 ha of wetland habitat, which represents 25% of the total area of the corridor. By comparison, the Original Corridor contains approximately 21 ha of field-delineated wetland habitat which represents 3.8% of the total area of the corridor. Thus, the Alternative Corridor contains substantially more wetland habitat than the Original Corridor.

The Original Alignment crosses only two wetlands, with a total area of approximately 0.08 ha to be altered due to pipeline construction. The small amount of wetland habitat affected by the Project is attributable to the fact that the pipeline route was optimized to avoid wetland habitat and the pipeline corridor traverses an area of undulating topography that contains relatively little wetland habitat.

The Preliminary Alternative Alignment crosses seven wetlands with a total area of approximately 2.6 ha of wetland habitat potentially altered due to pipeline construction. Given the preliminary nature of this alignment, its configuration has not yet been optimized to avoid wetland habitat. Further refinement of the alternative RoW route can be expected to reduce the amount of wetland habitat traversed; however, it is unlikely that all wetlands in the Alternative Corridor can be avoided or that the amount of wetland habitat traversed by the corresponding RoW will be similar to or lower than that affected by the Original Alignment. This is attributable to the presence of two large areas of treed wetland which span the entire width of the Alternative Corridor at the Little River crossing site (Photo 1) and just north of the Stewiacke River crossing site (Photo 2). The presence of wetland across the entire width of the corridor at these locations has not been confirmed by ground surveys, so there is some potential that wetland habitat in these areas may not be as widespread as the existing mapping and air photo interpretation indicate. Field delineations will be required before an optimal route through these areas can be determined.

Photo 1 **Portion of the Alternative Corridor at the crossing of Little River, including areas of treed swamp**

Photo 2 **Treed Swamp to the northeast of the Stewiacke River crossing within the Alternative Corridor**

NSE was contacted regarding the presence of Wetlands of Special Significance (WSS) in the Original and Alternative Routes. Data provided by NSE (2013, Wetlands of Special Significance GIS layer) revealed that there are three WSS located completely or partially within the Original Corridor (refer to Figure 3). All of these wetlands have been designated as WSS due to the fact that they are situated within the Stewiacke Watershed Protected Water Area (refer to Figure 4),

which serves as the drinking water supply for the Town of Stewiacke. None of these wetlands is traversed by the Original Alignment. No WSS are situated within the Alternative Corridor.

Mature Forest

Both Study Corridors have been heavily logged in the last 20 years. Along the Original Corridor there are approximately 105 ha of mature forest present in the corridor which represents 18.5% of the total area in the corridor. In the Alternative Corridor, approximately 85 ha of mature forest are present in the corridor (*e.g.*, Photo 3). This represents approximately 20% of the total area of the corridor.

These area estimations were based on available satellite imagery (Bing) which is several years old. The eastern end of the Alternative Corridor has been heavily logged in the last few years (Photo 4), and it appears that the entire eastern third of the corridor has been harvested. Photos taken during the helicopter over-flight were used to map out areas that had been harvested in the last year. Photography was not available for the entire route, so it was not possible to update the presence of new clear-cuts for the entire corridor. As such, the current estimate of mature tree cover in the Alternative Route is likely an overestimate.

Photo 3 Relatively mature forest stand along the banks of the Stewiacke River within the Alternative Corridor

Photo 4 Recent clear-cut in the eastern end of the Alternative Corridor

Construction of the Original Alignment would result in the loss of approximately 3.1 ha of mature forest and would account for 14.5% of the total area of habitat affected by construction activities. Construction of the Preliminary Alternative Alignment would result in the loss of approximately 2.4 ha of mature forest, which represents 13.8% of the entire area disturbed by pipeline construction. The Preliminary Alternative Alignment has not been optimized to minimize loss of mature forest. Although the Alternative Route already crosses relatively less mature forest habitat than the Original Route, additional refinement of the Preliminary Alternative Alignment may further reduce the amount of mature forest potentially affected by pipeline construction.

Forest Interior Habitat

Clearing activities associated with pipeline construction will contribute to habitat fragmentation. Forest interior birds are particularly sensitive to habitat loss since they are affected both by direct habitat loss and through the adverse effects of habitat edge. Forest interior habitat for the purpose of this report is defined as mature forest that is free of edge and is greater than 10 ha in size. The distribution of mature forest habitat in the forest interior assessment area was determined by establishing 100 m buffers around edge producing features such as existing highways and streets, electrical transmission lines, railroads, heavily disturbed non-forested habitat, borrow pits, quarries, woods roads, recent clear-cuts and large areas of recent wind throw. Areas remaining after buffering these features were classed as forest interior habitat if they were mature forest and/or forested wetland 10 ha or greater in size.

Two patches of forest interior habitat are partially present within the Original Corridor, occupying a total area of approximately 28 ha of forest interior habitat within the corridor. This represents 5% of the total area of the corridor. Both of the forest interior patches are located at the eastern

end of the corridor. One of these patches is crossed by the Original Alignment. This results in the loss of 6.9 ha (1.2%) of forest interior habitat inside the corridor, including direct loss of forest interior habitat, the extension of edge effect 100 m on either side of the RoW, and cleaving of the forest interior patch into two pieces that are too small to be classed as forest interior patches. It is important to note that, because the effects of pipeline construction can extend beyond the footprint of the RoW (*i.e.*, edge effects), potential Project effects on forest interior habitat can potentially extend outside of the pipeline corridor; in this case, it is estimated that approximately 4.3 ha of forest interior habitat would be lost outside of the Original Corridor.

Portions of two patches of forest interior habitat are present in the Alternative Corridor; one near the Stewiacke River and the other near the eastern end of the corridor. The total amount of forest interior habitat present within the corridor is 46 ha. The Preliminary Alternative Alignment affects both patches of forest interior habitat and the combined effects of direct habitat loss and edge effects would result in the loss of 7.3 ha of forest interior habitat inside the corridor and another 0.4 ha outside of the corridor. The amount of forest interior habitat within the corridor lost to pipeline construction would be approximately 1.7% of the total amount of forest interior habitat present in the Alternative Corridor. The Preliminary Alternative Alignment has not been optimized to reduce adverse effects on forest interior habitat. Modification of the route can reduce the amount of forest interior habitat lost; however, it will not be possible to completely avoid it since the patch near the Stewiacke River extends across the complete width of the corridor.

Deer Wintering Areas

A review of the Significant Species and Habitats data base (NSDNR 2007) revealed that there are no deer wintering areas located within or in close proximity to either of the two pipeline corridors.

Species of Conservation Concern

A species of conservation concern modeling exercise was conducted to determine which plant and animal species of conservation concern could potentially be present in the Original and Alternative Corridors. In order to conduct the modeling, a data request was made to the Atlantic Canada Conservation Data Centre (ACCDC) to determine what plant and animal species of conservation concern have been recorded within a 20 km radius of the centroid for the Alternative Corridor. This radius encompasses both the Original Corridor and the Alternative Corridor. The habitat preferences of the species found within the 20 km radius were compared to the vegetation types present in the two corridors, which was derived from air photo interpretation, forest inventory mapping, low-level helicopter over-flights, and past site visits. In instances where suitable habitat for a particular species of conservation concern recorded within 20 km of the corridors was found within a particular corridor, that species was deemed to be potentially present.

A total of 71 plant species of conservation concern have been recorded within a 20 km radius of the corridors. Suitable habitat was present for 59 of these species within either of the two corridors with 59 species potentially present in the Alternative Corridor and 53 species potentially present in the Original Corridor (Appendix A). These results suggest that the Alternative Corridor has a somewhat greater potential to harbor plant species of conservation concern. This is attributable to several factors:

- the Alternative Corridor passes through a greater number of vegetation types than the Original Corridor;
- the Alternative Corridor passes through more wetland habitat and a greater variety of wetland types than the original route; and
- the Alternative Corridor passes through two patches of riparian habitat rather than the single patch that the original route passes through.

Although the number of plant species of conservation concern potentially present in the Alternative Corridor is greater than in the Original Corridor, it is important to note that approximately 90% of the plant species of conservation concern potentially present in either of the two corridors are present in both corridors. This is attributable to overall similarities in soils, surficial geology, and land use practices along the two corridors.

The modeling exercise was also conducted for the Original Alignment and Preliminary Alternative Alignment. Forty-six of the 53 plant species of conservation concern found in the Original Corridor could potentially be present in corresponding Original Alignment. The reduction in the number of species potentially present is largely attributable to optimization of the pipeline route in this corridor to avoid habitats such as wetlands (*e.g.*, Photo 5) that have high potential to harbor plant species of conservation concern.

Photo 5 Wetland located to the south of the Stewiacke River within the Alternative Corridor

Fifty-five out of the 59 plant species of conservation concern found in the Alternative Corridor could potentially be present in the corresponding Preliminary Alternative Alignment. The smaller reduction in the number of species potentially present is attributable to the fact that the Preliminary Alternative Alignment has not yet been optimized to avoid habitats that have high potential to support plant species of conservation concern.

A total of 43 animal species of conservation concern have been recorded within the 20 km radius encompassing the two corridors. Suitable habitat was present for 33 of these species in either of the corridors, with 33 species potentially present in the Alternative Corridor and 21 species potentially present in the Original Corridor (Appendix B). As was the case for plant species of conservation concern, there are several factors that likely contribute to the greater number of animal species of conservation concern in the Alternative Corridor, including the facts that this corridor runs through a greater number of vegetation types, a greater area of wetland and a wider variety of wetlands. One factor of particular importance is the presence of agricultural land (Photo 6) along this corridor, which attracts species that are attracted to grasslands (such as Bobolink (*Dolichonyx oryzivorus*) and Northern Bobwhite (*Colinus virginianus*)) or farm infrastructure (such as Barn Swallow (*Hirundo rustica*) and Cliff Swallow (*Petrochelidon pyrrhonota*)). Another important factor is the presence of shallow water wetlands and marshes along this route that are attractive to species such as Blue-winged Teal (*Anas discors*) and Rusty Blackbird (*Euphagus carolinus*).

Photo 6 Agricultural land near the center of the Alternative Corridor

Sixteen of the 21 animal species of conservation concern found in the Original Corridor could potentially be present in the Original Alignment. The reduction in the number of species potentially present is largely attributable to optimization of the pipeline route in this corridor to avoid habitats such as wetlands that have high potential to harbor animal species of conservation concern.

Twenty-eight out of the 33 animal species of conservation concern found in the Alternative Corridor could potentially be present in the Preliminary Alternative Alignment. The smaller reduction in the number of species potentially present is attributable to the fact that the current provisional RoW has not yet been optimized to avoid habitats that have high potential to support animal species of conservation concern.

Field surveys were conducted within the Original Corridor in support of the EA Registration. These surveys revealed the presence of 18 plant species of conservation concern, four three animal species at risk, and 11 animal species of conservation concern (Table 4). The Alternative Corridor is located near the Original Corridor, contains the same soils and surficial geology, similar vegetation types, and has similar patterns of land use. A comparison of the habitat preferences of the species found in the Original Corridor and the vegetation types present in the Alternative Corridor suggests that all of these species could be potentially present in the Alternative Corridor as well.

Table 4 Species of Conservation Concern Recorded During 2007-2008 Field Surveys

Common Name	Scientific Name	NSDNR Rank	ACCDC Rank	SARA Status
Plant Species				
Nova Scotia Agalinis	*Agalinis neoscotica*	Secure	S3	
Triangle Moonwort	*Botrychium lanceolatum*	Sensitive	S2S3	
Lesser Brown Sedge	*Carex adusta*	Sensitive	S2S3	
Hay Sedge	*Carex foenea*	Secure	S3?	
Houghton's Sedge	*Carex houghtoniana*	Sensitive	S2?	
Pennsylvania Sedge	*Carex pensylvanica*	Undetermined	S1S2	
Bicknell's Crane's-bill	*Geranium bicknellii*	Secure	S3	
Clammy Hedge-Hyssop	*Gratiola neglecta*	Sensitive	S1S2	
Woodland Rush	*Juncus subcaudatus*	Sensitive	S3	
Yellow-seeded False Pimperel	*Lindernia dubia*	Secure	S3S4	
Northern Clubmoss	*Lycopodium complanatum*	Secure	S3S4	
Canada Rice Grass	*Piptatherum canadense*	Sensitive	S2	
Large Purple Fringed Orchid	*Platanthera grandiflora*	Secure	S3	
Hooker's Orchid	*Platanthera hookeri*	Secure	S3	
Gmelin's Water Buttercup	*Ranunculus gmelinii*	Secure	S3	
Alder-leaved Buckthorn	*Rhamnus alnifolia*	Sensitive	S3	N/A
Yellow Ladies'-tresses	*Spiranthes ochroleuca*	Sensitive	S2S3	N/A
Blue Vervain	*Verbena hastata*	Secure	S3	N/A
Bird Species				
Common Nighthawk	*Chordeiles minor*	At Risk	S3B	Threatened (Schedule 1)
Canada Warbler	*Wilsonia canadensis*	At Risk	S3B	Threatened (Schedule 1)
Olive-sided Flycatcher	*Contopus cooperi*	At Risk	S3B	Threatened (Schedule 1)
Eastern Wood Peewee	*Contopus virens*	Sensitive	S3S4B	N/A
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Sensitive	S3S4B	N/A
Golden-vrowned Kinglet	*Regulus satrapa*	Sensitive	S4	N/A
Ruby-crowned Kinglet	*Regulus calendula*	Sensitive	S4B	N/A
Boreal Chickadee	*Poecile hudsonica*	Sensitive	S3	N/A
Gray Jay	*Perisoreus canadensis*	Sensitive	S3S4	N/A
Black-backed Woodpecker	*Picoides arcticus*	Sensitive	S3S4	N/A
Killdeer	*Charadrius vociferus*	Sensitive	S3S4B	N/A
Spotted Sandpiper	*Actitis macularius*	Sensitive	S3S4B	N/A
Wilson’s Snipe	*Gallinago delicata*	Sensitive	S3S4B	N/A
Bay-breasted Warbler	*Dendroica castanea*	Sensitive	S3S4B	N/A
Herpetile Species				
Wood Turtle	*Glyptemys insculpta*	Sensitive	S3	Threatened (Schedule 1)
Mammal Species				
Little Brown Bat	*Myotis lucifugus*	Sensitive	S1	N/A

There are several areas of the Alternative Corridor that would be of particular concern due to the potential presence of species at risk. The Little River and Stewiacke River crossing sites may contain habitat for Wood Turtle (*Glyptemys insculpta*). The Stewiacke River (Photo 6) would provide hibernation sites while the Little River crossing site could contain nesting sites. The large wetland complex located just north of the Stewiacke River has potential to provide nesting habitat for Canada Warbler (*Wilsonia canadensis*) and Olive-sided Flycatcher (*Contopus cooperi*). Similarly, the cluster of wetlands on the south side of the Stewiacke River could provide nesting habitat for these species. The recent clear-cuts at the eastern end of the corridor could provide nesting habitat for Common Nighthawk (*Chordeiles minor*).

Photo 7 Stewiacke River and associated tributary within the Alternative Corridor

Any caves associated with karst topography in the area could provide hibenaculum sites for hibernating bats such as Little Brown Bats (*Myotis lucifugus*). There are some areas of potential karst topography along the edges of the Study Area, including a small area of overlap with the Original Corridor (Figure 3).

A review of the Abandoned Mine Openings database (NSDNR 2009) revealed the presence of five known abandoned mines sites within a five kilometer radius of the Study Corridors. Four of these abandoned mines may provide suitable hibernaculum sites and are located in closer proximity to the Alternative Corridor than to the Original Corridor.

Recently, white nose syndrome has been detected in Nova Scotia. This fungal disease of bats has caused large scale mortality in bat populations in the American Northeast and most recently in New Brunswick. It is likely that heavy mortality will also occur at hibernation sites in Nova Scotia. It is expected that the general status rank of hibernating bats will soon change to reflect this new threat.

4.2.2 Aquatic Habitat

The Original Alignment was determined to cross eight watercourses, five of which are found on 1:10,000 provincial topographical maps. The remaining three watercourses were identified by aquatic or wetland scientists conducting field assessments in support of the EA Registration. An additional five drainage channels were identified during these field assessments; however, the drainage channels were not included in the watercourse count as they were either dry at the time of the field assessment or were determined to be dry at some point of the year and do not constitute fish habitat.

Of the eight watercourses intersected by the Original Alignment, five were determined to provide potential fish habitat. All five of these watercourses are connected to waters (*i.e*., the Stewiacke River) bearing fish species at risk. Atlantic Salmon of the Stewiacke River are a part of a larger population assemblage known as the Inner Bay of Fundy (IBoF) population of Atlantic Salmon, which is listed as endangered under Schedule 1 of the federal *Species at Risk Act* (SARA). Therefore, these five potentially fish-bearing watercourses are all considered to provide possible habitat for species at risk. The fish habitat within the five watercourses was determined to be able to support salmonids based on water quality, observed water quantity, stream channel characteristics, riparian zone characteristics, and connectivity. The largest and most diverse fish communities would likely be associated with the Stewiacke River and its larger tributaries (*i.e*., Watering Brook and the tributary to St. Andrew's River).

Based on 1:10,000 scale mapping, the Preliminary Alternative Alignment interacts with eight mapped watercourses. Further investigation using aerial photographs of the route identified one mapped watercourse which appears to now be agricultural land and no longer a watercourse. An additional two potential watercourses were identified through the use of aerial imagery, although the forest canopy limited the identification of additional small watercourses and drainage channels. Based on the ratio of mapped to field-identified watercourses found during the assessment of the Original Alignment, the number of watercourses along the Preliminary Alternative Alignment is estimated to be in the order of 12.

The mapped watercourses along the Preliminary Alternative Alignment are all connected to the Stewiacke River; therefore, any of these watercourses that contain salmonid habitat have the potential to host a SARA-listed species. The largest and most diverse fish communities would likely be associated with the Stewiacke River and its tributaries (*i.e*., Little River, East Brook and its tributary).

Overall, the Alternative Corridor has a potential to cross a greater number of watercourses and is lower in the watershed then the Original Corridor. This leads to larger and more defined watercourses with a greater likelihood of fish habitat and fish presence. The quality of fish habitat within each route option is likely similar, although the Alternative Corridor may provide better quality fish habitat. Potential for SARA-listed species is equal for each option.

5.0 Analysis of Special Issues

5.1 PROTECTED AREAS

5.1.1 Context

Since 1992, the Government of Nova Scotia has adopted or endorsed various commitments related to the establishment of a network of protected areas that exemplifies the diversity of the province's natural landscapes (NSPLC 2006). Accordingly, the framework that guides Nova Scotia's protected areas program is to select and conserve representative (or typical) portions of 80 distinctive natural landscapes throughout the province. In this context, a natural landscape is a "mosaic of different but interacting ecosystems that are repeated in a similar pattern to form a distinct and definable land unit or area. [It is] characterized by distinctive local environmental and biotic factors or elements (*i.e*., the local variety and distribution of landforms, vegetation communities, local climate, and local natural disturbance regime)" (NSE 2009a).

By passing the *Environmental Goals and Sustainable Prosperity Act* (EGSPA) in 2007, the Government of Nova Scotia made a legislated commitment to legally protect 12% of the total land mass in the province by the year 2015, which will entail protection of approximately 66,360 hectares (ha) of Nova Scotia's 5,528,000 ha land base (NSE 2012a). This will be a challenging task, considering that almost 70% of land in the province is privately owned (NSE 2010b).

As of September 2012, about 9.4% (514,540 ha) of the province is already comprised of legally protected areas – *i.e*., Wilderness Areas (354,545 ha), Nature Reserves (4,998 ha), Provincial Parks (10,319 ha), National Parks (134,988 ha), National Wildlife Areas (2,397 ha), and Land Trust Areas (7,293 ha) (NSE 2012a), each of which have slightly different purposes and rules. An additional 2.6% (143,728 ha) of land within Nova Scotia still needs to be protected in order to meet the 12% target (NSE 2012a).

Implementation of 12 Percent Lands Initiative

The "6-Rs" of conservation values are the main criteria for selecting candidate 12 Percent Lands. Accordingly, the areas being targeted for protection are those that:

- contain **rare** landscapes, plants and/or animals;
- have potential to contribute to the **reconnection** of fragmented natural areas;
- are **remote** (*i.e*., in a natural state with few human impacts) and/or have high potential for **recovery/restoration** to a natural state;
- are **representative** examples of the variety of natural landscapes in Nova Scotia; and

- support a **rich** assemblage of species.

The steps in a five-year process for achieving the Province's 12% land protection goal are described by NSE as follows (NSE 2011b):

1) **Step 1 – 12 Percent Lands Identification (2009-2011):** The government received the Colin Stewart Forest Forum (CSFF) report in November 2009, which identified 269,000 hectares of land with high conservation values. NSE and the Department of Natural Resources (NSDNR), along with other government departments and the Mi'kmaq of Nova Scotia, reviewed the lands with a focus on "assessing the natural quality of the lands and confirming ownership." The government website clearly states that:

> *As a result of this step, government has identified possible "12 per cent lands" for further review in Step 2. These include provincial Crown lands, and some lands owned by major forestry companies. To provide flexibility in decision making, more than 200,000 hectares of land is included in these 12 per cent selections.* ***These 12 per cent lands are not proposed protected areas****. However, government will select most of the proposed protected areas from these lands.* [Emphasis included in original website text.]

2) **Step 2 – 12 Percent Lands Review (2011-2012):** The stated goal of Step 2 was to "learn as much as possible about all lands under review before drafting a list of potential protected areas." This step culminated in the development of a draft protected areas plan that is being used to support Step 3.

3) **Step 3 – Public Consultation (2012):** This step is currently ongoing and consists of opportunities for the public comment on the draft protected areas plan through a variety of avenues. The website notes that the government "expects the draft protected areas plan to change based on these consultations. This is the stage where people can share their support or concern for individual areas. This is also a time to identify how proposed boundaries could be changed to reduce conflict, or enhance protection or public enjoyment."

4) **Step 4 – Final Plan (2013-2015):** The final areas to be protected will ultimately be identified during Step 4, in a final protected areas plan that will "consider all the feedback received during public consultation (Step 3). It will identify the areas to be protected, along with their boundaries. It may also describe special agreements for area use or management." Measures will also be taken to legally protect each formally designated protected area during this time.

12 Percent Patches within the Study Area

In 2010, it was announced that the Province would purchase 22,258 ha (55,000 acres) of forestry lands from Northern Pulp in Cumberland, Colchester, Pictou, Halifax, Hants and Guysborough counties as part of a larger land purchase agreement with Northern Pulp and Neenah Paper. Most of the land was to be slated for protection in support of the 12% initiative (NSDNR 2010). As a result of this transaction, a large portion of land within the Study Area – including the majority of the land within the Original Corridor and crossed by the Original Alignment – became Crown lands under consideration for potential protected area designation.

As noted in Section 4.1, the initial pipeline corridor evaluation study was conducted in 2007 and no serious issues were raised during a meeting held with NSE in 2008 (*i.e.*, prior to publication of the CSFF report identifying lands with high conservation values) to review the Original Corridor proposal. When Alton became aware of the locations of the candidate 12 Percent Lands, the Proponent contacted NSE-PAW by email on June 20, 2011 to provide notification of a proposed natural gas pipeline within the Stewiacke/Alton area and to formally request involvement in the 12 Percent Lands review process. No concerns were brought to Alton's attention until after the EA for the Original Alignment was registered the following year in July 2012.

For reference purposes, each of the candidate 12 Percent Lands has been given a Patch number by NSE-PAW. Patch 389 (St. Andrews River) and Patch 397 (Stewiacke River) occupy most of the Original Corridor and are intersected by the Original Alignment. During the September 26, 2012 meeting (refer to Section 4.1.2), NSE-PAW explained that these two Patches are important because they comprise natural landscapes that are currently underrepresented within the provincial network of protected areas.

Wilderness Area Designation

It is the Proponent's understanding, based on the Terms of Reference for this Focus Report (NSE 2012b) and recent discussions with NSE-PAW, that the protected area designation most likely to apply to the candidate 12 Percent Lands crossed by the Original Alignment (if the lands become officially designated for protection) is that of Wilderness Area. According to NSE (2012a), Wilderness Areas are "large areas selected to protect nature while supporting wilderness recreation, hunting, sport fishing, trapping, and other uses."

The following activities are prohibited within a Wilderness Area under Nova Scotia's *Wilderness Areas Protection Act*:

- acquisition of a mineral right or petroleum right;
- construction or development of an energy-resource development, including a hydro-electric or water-resource development or associated impoundment;

- construction or development of a transmission or distribution line, pipeline or tunnel; and
- forestry or aquaculture activities.

The following activities are restricted in a Wilderness Area except as provided in the Act or associated regulations:

- mineral or petroleum development, quarrying or mining;
- construction, maintenance or operation of a structure or facility, utility line or bridge;
- agricultural activities;
- creation, construction, maintenance or operation of a trail, road, railway, aircraft landing strip or helicopter pad;
- use or operation of a vehicle or bicycle;
- camping, tenting or occupation of the land;
- alteration of the surface of the land;
- removal, destruction, or damage to any natural object, flora or fauna, whether living or dead;
- removal, destruction or damage to any object of scientific, historical, archaeological, cultural or paleontological interest;
- introduction of a substance or thing that may destroy or damage existing flora, fauna or ecosystems;
- dumping or deposition of any litter, garbage or refuse other than in containers provided or designated by the Minister for that purpose;
- ignition or maintenance of a fire; and
- creation of a nuisance or acting in a manner or doing anything that may be, or may cause, a nuisance.

5.1.2 Analysis and Mitigation

Table 5 provides an overview of the key features of Patches 389 and 397, which are the only two 12 Percent Patches situated within the Study Area.

Table 5 Key Features of 12 Percent Patches Within Study Area

Features	Relevant 12 Percent Patches	
Patch Number	**389**	**397**
Patch Name	**St. Andrews River**	**Stewiacke River**
Number of Sites	2	5
Size of Area	3,875 ha	840 ha
Description	Large forest patch	Relatively large forest patch with 3 km of frontage on Stewiacke River
Landscape(s)	• 61% Shubenacadie River Rolling Hills • 39% Interior Ridges (Wittenburg Ridge)	100% Shubenacadie River Rolling Hills
Conservation Values	• Habitat for rare Black Ash • Opportunity to increase representation of currently under-represented natural landscape • Disturbed area, but with good potential to recover to a natural condition over time • Large significant wetland complex	• Habitat for rare species such as Wood Turtle and Atlantic Salmon • Opportunity to increase representation of currently under-represented natural landscape • Disturbed area, but with good potential to recover to a natural condition over time • Old Eastern Hemlock and Red Oak along river
Recreational Values	Reported off-highway vehicle use	Stewiacke River is a popular canoe route
Forestry Values	• Primarily young softwood, mixedwood and hardwood • Most of area was cut between 1980s and 2009 (primarily clear-cutting with Hurricane Juan salvage and hardwood strip cuts) • Contains approximately 50 km of access road, as well as several plantations and treated stands • Small portion of area currently unavailable for forestry due to NSDNR Old Forest Policy	• primarily young softwood, mixedwood, and hardwood • Subject to extensive clear-cutting dating back to at least 1970s, with much of Patch clear-cut between 2005 and 2009 • Contains approximately 9 km of access road and 60 ha of plantation
Other Resource Values	• Medium mineral potential • High petroleum potential • Low wind potential	• Medium mineral potential • High petroleum potential • Low wind potential
Owner	100% Crown owned	100% Crown owned
Additional Comments	86% of Patch overlaps with Stewiacke Watershed Protected Water Area	N/A
Area of Overlap with Original Corridor *	260.785 ha (Approximately 7% of Patch)	202.332 ha (Approximately 24% of Patch)
Area of Overlap with Original Alignment *	11.652 ha (Approximately 0.3% of Patch)	5.938 ha (Approximately 0.7% of Patch)
Area of Overlap with Alternative Corridor *	No overlap	23.415 ha (Approximately 3% of Patch)
Area of Overlap with Preliminary Alternative Alignment *	No overlap	1.515 ha (Approximately 0.2% of Patch)

Sources: NSE 2011c and NSE 2011d.
* Project-specific information calculated by Stantec GIS specialists.

Patch 389 and Patch 397 are both crossed by the Original Route such that approximately 18 ha of candidate 12 Percent Lands are intersected by the Original Alignment. This represents approximately 0.4% of the total area of the two relevant 12 Percent Patches.

As shown on Figure 3, the Alternative Corridor generally avoids the candidate 12 Percent Lands. The Alternative Corridor encompasses approximately 2.7% (23 ha) of Patch 397; however, it is important to remember that only a small portion of the Alternative Corridor would be developed as a result of the Project. The amount of overlap between Patch 397 and the Preliminary Alternative Alignment therefore provides a more realistic basis for estimation of the spatial extent to which the Patch may be directly altered if the Alternative Corridor is approved. Only 1.5 ha of Patch 397 falls within the Preliminary Alternative Alignment. This represents only 0.17% of the total area of Patch 397.

The parcel of Patch 397 that is traversed by the Preliminary Alternative Alignment appears, based on available desktop information, to contain the most technically feasible alternative location for crossing the Stewiacke River via horizontal directional drilling (HDD). Adjusting the Alternative Route to completely avoid Patch 397 is not practical because the overall length of the route would need to be substantially increased in order to find another potentially viable HDD crossing location. It is expected that this would result in high financial costs for the Proponent as well as increased environmental disturbance associated with a longer pipeline.

5.1.2.1 Potential Project Effects on Conservation Values

Without the application of appropriate mitigation measures, the Project has potential to compromise the conservation values associated with Patch 389 and Patch 397 through the generation of adverse environmental effects relating to disturbance and fragmentation, species of conservation concern, and wetlands.

Disturbance and Fragmentation

The land within the Study Area that is being considered for conservation and protection under the provincial 12 Percent Process is currently disturbed and fragmented as a result of existing development in the area (*e.g.*, construction and operation of existing roads and utilities, construction and use of buildings, forestry activities, *etc.*). Of particular note, the existing M&NE Halifax Lateral natural gas pipeline currently runs through candidate 12 Percent Lands (Patch 389) in the Original Route. The presence of this existing pipeline was evidently not deemed incompatible with the potential future designation of a Wilderness Area at that location, and it is similarly expected that the Alton Natural Gas Pipeline Project would not preclude conservation protection plans in Patches 389 and/or 397. The Proponent believes that the proposed pipeline can co-exist with the 12 Percent Lands if officially established in this area.

Project construction will include clearing activities that will result in additional local fragmentation, particularly during the first few years following pipeline installation, as well as permanent loss of some habitat types. Initially, there will be little vegetation on the RoW, which

may discourage very small mammals (*e.g.*, mice and shrews) from moving from one side of the RoW to the other due to lack of cover and increased risk of predation. Vegetation on the RoW, including tree and shrub species, will be allowed to recover following burial of the pipeline; however, it will not be permitted to grow more than a few meters tall. Habitat for species that require mature and pole-sized forest habitat will therefore be lost for the duration of the Project within the RoW. These effects are anticipated to be generally consistent with those caused by RoW maintenance for the M&NE Halifax Lateral pipeline that is partially located within the boundaries of the Original Route.

The Original Alignment traverses the candidate 12 Percent Lands in recently deforested regions and along existing roads/trails wherever possible to reduce disturbance and associated habitat fragmentation. Approximately 0.2% of the Original Alignment passes through developed non-forested areas, such as urban areas, agricultural lands, and alongside existing roads. An additional 17.6% of the Original Alignment traverses undeveloped non-forested lands, such as clear-cuts, rock outcrops, waterbodies, and wetlands.

The Preliminary Alternative Alignment was carefully selected based on review of desktop information and aerial reconnaissance as noted in Section 4.1.2. For example, it has been routed through non-forested areas as much as possible based on available desktop information. The percentage of the Preliminary Alternative Alignment that is located within developed and undeveloped non-forested lands is approximately 11.7% and 22%, respectively. If the Alternative Corridor is approved, additional opportunities to shift the RoW away from forest and wetland vegetation types and onto existing roads and clear-cuts would be sought and pursued where feasible, and informed by the results of field work, as more detailed route planning progresses. Optimization of the Preliminary Alternative Alignment would also include efforts to avoid disturbing any stands of old Eastern Hemlock (*Tsuga canadensis*) and Red Oak (*Quercus rubra*) encountered, along the Stewiacke River within Patch 397, if applicable and practical.

Preferential placement of the pipeline RoW in deforested areas and developed areas will help mitigate habitat fragmentation since there will be little difference in habitat structure between the RoW and the surrounding habitat (*i.e.*, roads and clear-cuts). This, in combination with the regrowth of low and medium-height vegetation within the RoW, will reduce potential conflicts with conservation values. More specifically, it will mitigate potential Project interference with the ability of the candidate 12 Percent Lands to **recover** over time to a more **remote** (*i.e.*, natural) state and contribute to the **reconnection** of fragmented natural areas.

Species of Conservation Concern

The **rarities** specified in Table 5 as having particular conservation value for Patches 389 or 397 are:

- Black Ash (*Fraxinus nigra*), which is considered sensitive by NSDNR and is ranked as S2S3 by the ACCDC, indicating that it is rare to uncommon throughout its range in the province;

- Wood Turtle (*Glyptemys insculpta*), which is considered sensitive by NSDNR; is ranked as S3 by the ACCDC, indicating that it is uncommon or found only in a restricted range; and is listed as threatened under Schedule 1 of SARA; and

- Atlantic Salmon (*Salmo salar*), which is considered at risk by NSDNR; is ranked as S2, indicating that it is locally rare and is vulnerable to extirpation due to rarity or other factors; and is listed as endangered under Schedule 1 of SARA (for the IBoF population).

Regardless of the pipeline route that is ultimately selected, the RoW will avoid the locations of known habitat for species of conservation concern – including Black Ash, Wood Turtle and Altlantic salmon – wherever feasible, with appropriate mitigation measures put in place where avoidance is not possible.

No Black Ash was observed during early or late vegetation surveys or wetland surveys conducted in the Original Corridor (between late June and late August in 2007 and late June and early September in 2008) in support of the EA Registration. Black Ash was similarly not recorded during Project-specific vegetation surveys conducted in the Original Alignment in October 2011 by a qualified botanist. Although field surveys have not yet been undertaken in the Alternative Corridor and the RoW has not yet been refined to avoid interaction with sensitive species and areas where practical, the alternative route avoids all of Patch 389 and most of Patch 397 and is therefore considered unlikely to adversely affect this species of conservation value within the candidate 12 Percent Lands.

The Original Route and Alternative Route both cross the Stewiacke River. The Alternative Route also crosses Little River, a tributary of the Stewiacke River. Both rivers (Stewiacke and Little) are known to provide habitat for Wood Turtles. During a field survey carried out in June 2008 for the EA Registration, an adult Wood Turtle was observed in a hay field near the banks of the Little River. The Little River provides good habitat for foraging and nesting, whereas the portion of the Stewiacke River located within the Original Corridor has the right water depth and structural elements (*e.g.*, submerged logs) to provide good winter hibernation sites. However, the steep mud banks along this section of the river do not provide suitable nesting sites and hinder access to the adjacent riparian forest which could provide foraging habitat. As such, the portion of the Stewiacke River within the Original Corridor does not provide high quality Wood Turtle habitat. The quality of Wood Turtle Habitat in the portion of the Stewiacke River within the Alternative Corridor is not yet known due to a lack of field reconnaissance to date.

Although Wood Turtles were not noted at locations other than the Little River during the EA-related field surveys, this species could potentially also occur along tributaries of Little River and the Stewiacke River, particularly during the summer months. As a precautionary measure, it is best to proceed with the assumption that Wood Turtles are present within the Project area, and may be encountered. If Wood Turtles are found during construction, they will be picked up and moved just off-site, along the same habitat corridor in the direction of travel the turtle was originally oriented. A New York State study (Carroll and Ehrenfeld 1978) showed that 84% of

Wood Turtles displaced less than two kilometres overland were able to return to their home range. Moving the Wood Turtles 100 m to 400 m from the original site where they were found should not be unduly disruptive to them. Construction crews will be provided with environmental awareness training and will be educated on the protection of wildlife, including herpetiles.

Trenchless crossings of the Stewiacke River and the Little River are proposed to be completed using HDD, which is a method that is generally considered applicable where large watercourses must be crossed and/or in-stream activity is not preferred for reasons such as the complex nature of the channel or presence of sensitive habitat features. HDD involves using a drill that can be steered as it progresses to drill a hole underneath a watercourse of sufficient size to accommodate the pipe. The drill rig is set up above the approach slope on one side of the watercourse and a small diameter pilot hole is drilled under the watercourse and out at the target point on the other side of the watercourse, above the approach slope. Consecutively larger reams are then used to enlarge the hole until the pipe can be pulled through. HDDs generally originate and terminate more than 10 m from the edges of the watercourse due to the approach angles needed to attain the required depth of cover over the pipe beneath the streambed. Set-up of the HDD rig and support structures will occur outside the riparian buffer zone with vegetation maintained. This crossing method is expected to cause little or no disturbance to the Stewiacke River or Little River channels, or the riparian habitats along their banks, thereby mitigating potential disturbance to Wood Turtle habitat within those areas.

The use of HDD to cross the Stewiacke River and the Little River will also mitigate potential adverse effects on any Atlantic Salmon potentially present in those waters. Pipeline installation across other watercourses along the selected route will be attempted via a dry crossing wherever feasible. Dry watercourse crossings, specifically dam and pump crossings, are achieved by removing any fish populations from the section of watercourse where the in-stream work is to occur. Once fish populations are removed, the flow of water within the watercourse is isolated from the pipeline trench by damming the flow upstream of the crossing and diverting the water around the construction area using water pumps. A number of techniques are available to isolate the water flow (*e.g.*, cofferdams, AquaDams®). Water flow downstream is maintained using appropriately sized pumps and hoses to accommodate the anticipated flow over the duration of the crossing. Once the watercourse flow is successfully diverted, construction of the crossing can be conducted in a dry watercourse bed. It should be noted that if a stream channel is dry at the time of the crossing, the crossing will be conducted as an open trench crossing (*i.e.*, no dam and pump set up). The materials to conduct a dam and pump crossing will be on-site or readily available as a contingency.

The proposed dry crossing method reduces the potential for environmental effects on fish and fish habitat downstream of the crossing. Given the limited footprint of a dry crossing, there will be minimal disturbance to the watercourse channel and to fish and fish habitat. With implementation of appropriate mitigation, including construction sequencing and fish salvage, dry crossings generally do not constitute harmful alteration, disruption or destruction (HADD) of fish habitat under the *Fisheries Act*. The appropriate mitigation measures associated with dry

crossing methods of watercourses described in Section 6.2.5 of the EA Registration will be implemented as applicable.

In the unlikely event that any Project activities are anticipated to result in HADD effects or the destruction of fish, authorization under the *Fisheries Act* will be obtained from Fisheries and Oceans Canada (DFO). Alton will comply with all terms of conditions of any such authorization, potentially including additional mitigation requirements and/or the development and implementation of a fish habitat compensation plan to achieve no net loss in the productive capacity of fish habitat in accordance with the federal *Policy for the Management of Fish Habitat* (DFO 1986).

Wetlands

Patch 389 contains a wetland complex with high ecological value. It was identified by NSE-PAW as part of the Significant Ecosite database and is defined as two or more wetland types within interacting hydrology that is significantly different from the typical wetlands associated with the surrounding natural landsape (R. Cameron, pers. comm. 2013). NSE-PAW also noted that it is large in relation to other wetland complexes in the natural landscape. Although it would be considered ecologically significant anywhere within the natural landscape in which it is located, it is also designated as a WSS due to its overlap with the Stewiacke Watershed PWA (ibid). This large significant wetland complex (and WSS) is identified as a key conservation value for Patch 389 in Table 5. However, it is situated outside of the Study Area, approximately 630 m southeast of the Original Alignment (Figure 3), and therefore will not be disturbed as a result of the Project.

A mitigative sequence will be applied to reduce potential Project effects on wetlands (in whichever Study Corridor is ultimately selected) and protect wetland functions, including those that support species **richness**. In accordance with the Nova Scotia Wetland Conservation Policy (NSE 2011a), the objective of this mitigative sequence is to achieve no net loss of wetland habitat as a result of the Project. The sequence promotes wetland conservation through the application of a hierarchy of preferred alternatives: (1) avoidance of impacts; (2) reduction of unavoidable impacts; and (3) compensation for residual impacts that cannot be reduced. Approvals will be sought, within the context of this sequence, for unavoidable wetland alterations.

Avoidance

Avoidance of wetland habitat has been implemented at several stages in the planning and design of the Original Alignment. Due to the abundance of wetlands in the Original Corridor and limitations of other technical and environmental constraints, complete avoidance of impacts to wetlands is not practical. However, the Original Alignment is considered to have effectively reduced effects on wetland habitat.

As detailed in Section 6.5.5 of the EA Registration, the expected amount of direct wetland alteration to be caused by construction of the Original Alignment is limited to portions of two wetlands totaling 0.08 ha. This represents only 0.4% of wetland habitat identified within the Original Corridor during field surveys. The Original Alignment has been located within the narrowest point of one of the affected wetlands and positioned to also reduce disturbance to the other affected wetland nearby. The area proposed for direct alteration to each of the wetlands is approximately 0.03 ha and 0.05 ha, accounting for approximately 1.8% and 18.7% of their total areas, respectively. Although the Original Alignment crosses a third wetland, it does so at the location of an existing woods road (*i.e.*, an area which has already been infilled) and no direct impacts to that wetland have been identified at the crossing site.

The amount of wetland habitat expected to be directly influenced by Project construction within the Original Alignment has been substantially reduced as a result of route modifications. A preliminary version of the Original Alignment included direct effects to eight wetlands, accounting for an area of almost three hectares. Re-routing of the initially proposed alignment has avoided direct impacts to seven of these wetlands.

Based on review of aerial photography and publicly available desktop information, construction of the Preliminary Alternative Alignment has potential to directly alter a total of approximately 2.6 ha of wetland habitat from seven different wetlands. This constitutes approximately 2.4% of all wetland habitat currently believed to be present within the Alternative Corridor. These estimates have not yet been field-truthed. If the Alternative Corridor is selected for development, the results of follow-up field surveys and field delineation will be used to adjust the Preliminary Alternative Alignment as necessary to avoid environmentally sensitive areas, including wetlands, wherever feasible. Therefore, there may be opportunities to reduce the total amount and area of wetland habitat to be altered in the Alternative Corridor.

Regardless of which route is ultimately selected, additional measures will be taken to avoid disturbance to wetlands which are not crossed by the RoW. Wetlands adjacent to the RoW will be documented in a Project-specific Environmental Management Plan and avoided by construction-related activities. Wetland habitat will not be disturbed without a Water Approval for Wetland Alteration from NSE. In accordance with the Activities Designation Regulations, the Water Approval application will contain site specific plans for reducing indirect wetland alteration.

Mitigation

A variety of mitigation measures will be implemented during the construction phase to reduce potential indirect impacts to wetland habitat and wetland functions. Restoration of wetland habitat directly affected by construction activities will be conducted and a number of generic and wetland-specific measures will serve to reduce impacts to wetland habitats during all phases of construction. Mitigation will be outlined in detail in a Project-specific Environmental Management Plan, and will include measures related to vegetation clearing, rare and/or sensitive wildlife,

minimal disturbance zones, temporary work room, erosion and sediment control, dust control, operation of machinery, grubbing, grading and topsoil stripping, blasting, trenching, stringing and bending, crossing of watercourses, trench dewatering, and backfilling.

There is some potential for the backfilled pipeline trench to affect adjacent hydrology, including adjacent wetlands. Methods for backfilling the trench that will mitigate this potential effect are provided below.

Wetland restoration efforts along the RoW will aim to return wetland functionality to a close approximation of their condition prior to disturbance. Restoration activities typically begin immediately after backfilling activities. Wetland mitigation and restoration will involve the following procedures:

- corduroy or other permanent protective measures will be installed to allow continued pipeline access without further wetland alterations;
- care will be taken to avoid altering wetland hydrology during Project activities such that wetland restoration is not possible;
- where flow through the wetland is parallel to the pipeline, altered hydrology issues should be minimal; however, where flow, even sheet flow, is more perpendicular to the pipeline, great care will be taken to maintain that flow through careful backfilling and avoid creating a dam-effect and ponding;
- wetland vegetation and peat material will be salvaged during initial disturbance of wetlands;
- substrate will be graded and filled after pipeline installation to accommodate hydrology and vegetation;
- wetland vegetation and peat material will be replaced in wetland areas; and
- monitoring and adaptive management will be undertaken as needed.

More specific methods proposed to restore disturbed wetlands are summarized in Section 6.5.5.1 of the EA Registration.

Mitigative measures involving the flagging of setbacks, and use of mechanical vegetation control (and no herbicides), will be implemented to prevent disturbance to wetland habitats during operations and maintenance. No vehicles will be permitted to operate from within the boundaries of wetlands for vegetation control (*i.e.*, they will be operated from outside the edge of wetlands or hand tools will be used). Further details on the site specific mitigation will be outlined during the Wetland Alteration Approvals process.

The presence of the RoW could increase access to wetlands by individuals other than Project personnel, possibly resulting in increased disturbance to wildlife or physical disturbance of wetland habitat. However, due to the fragmented nature of the area, most of the wetlands within

the Study Area are already located close to roads. Therefore, the establishment of the pipeline corridor is not considered to greatly improve access to the wetlands.

Compensation

Approval of wetland alteration normally requires implementation of a wetland habitat compensation program to promote “no net loss” of wetland function as a result of the Project. This goal will primarily be achieved through on-site wetland restoration initiatives, which aim to reinstate wetland habitats that are disturbed during pipeline installation activities. However, compensation requirements may require residual impacts on wetland functions to be compensated by the enhancement, restoration, or creation of additional wetland habitat, at an area ratio commensurate with the loss. A conceptual wetland compensation plan will be included in the Wetland Alteration Approval, upon consultation with NSE.

5.1.2.2 Potential Project Effects on Recreational Values

As indicated in Table 5, use of off-highway vehicles (OHVs) is a recreational value for Patch 389 and canoeing along the Stewiacke River is a recreational value for Patch 397.

The Project will result in a short-term reduction in access to OHV use (*e.g.*, ATVs, snowmobiles) during construction and may lead to an increase in potential OHV access along the RoW during operations. The level of potential OHV traffic following construction is expected to be generally comparable with that of the existing RoW for the M&NE Halifax Lateral that is also located in Patch 389. Signage, natural barriers and fencing may be used as per landowner agreements with Alton to reduce any trespassing associated with OHV use along the RoW. In areas where forestry roads intersect the RoW, Alton is prepared to construct locked gates along the RoW if requested by land owners, where feasible. In addition to impeding trespassing associated with OHV use, this would also decrease potential disturbance to wildlife along the RoW caused by OHV traffic. Such measures may therefore be desirable from a conservation perspective if the candidate 12 Percent Lands are officially protected, particularly given that vehicle operation is subject to restrictions in Wilderness Areas in accordance with the *Wilderness Areas Protection Act* and associated Regulations. Conversely, OHV use along the RoW could be permitted if it is deemed an important recreational value to be protected in the area.

Use of the HDD trenchless crossing method at the Stewiacke River will prevent any adverse effects on the ability of paddlers to canoe along the river.

5.1.2.3 Potential Project Effects on Forestry Values

The loss of merchantable timber during pipeline construction will be permanent. However, as the RoW will be relatively small compared to the overall forest resources available in Colchester County, it is not anticipated that the Project will result in a significant decrease in the merchantable forest resources. It is therefore expected that forest resource managers will be able to meet the present and future forestry needs in Study Area. Alton will work with forestry

resource owners to salvage merchantable timber that may be affected by Project construction. Forestry use on the pipeline easement during Project operations would be limited to low growing trees (*e.g.,* Christmas tree plantation) as per the easement covenant that will be negotiated between Alton and forestry resource owners.

5.1.2.4 Potential Project Effects on Other Resource Values

Forent Energy has a three-year exploration license from 2011 to 2014 and tenure to April 8, 2020 for approximately 208,000 ha of land in the area known has the Alton Block (Forent Energy 2011a). Numerous oil and gas shows have been detected throughout the Block. In 2010, Forent completed a gravity gradiometry survey of the Block and completed a 2D seismic program in July 2011 (Forent Energy 2011a). Forent announced in November 2011 that the company has received approval from both the Nova Scotia Department of Energy and NSE to drill three wells on the Alton Block (Forent Energy 2011b).

The Alton Block encompasses all of Patch 389 and Patch 397 as well as the entire Study Area for the Alton Natural Gas Pipeline Project. Given that the original and alternative routes are both entirely located within the Alton Block, both routes are equivalent with respect to potential interactions with this resource value. The RoW will be relatively small and will occupy a negligible amount of the total area available for resource extraction within the Alton Block; therefore, the Project is not expected to conflict with hydrocarbon exploration activities in the region, assuming reasonable measures are taken to avoid pipeline infrastructure.

5.1.3 Conclusion

The Alternative Corridor is preferable from the perspective of: avoiding candidate 12 Percent Lands; reduced interactions with protected watershed and wetland areas; and reduced constructed length of pipeline and the associated linear impact area and capital costs. However,, with the application of mitigation measures described above and in the EA Registration, both routes are considered unlikely to result in conflicts with the conservation values, recreational values, forestry values, and other resource values associated with Patches 389 and 397.

5.2 MI'KMAQ INTERESTS

5.2.1 Context

There are 13 Mi'kmaq First Nation communities with Chiefs in Council in Nova Scotia. The Assembly of Nova Scotia Mi'kmaq Chiefs (the Assembly) acts on behalf of the Councils and communities of all of these First Nation reserves.

Two established Mi'kmaq reserves are located within 30 km of the centre of the Study Area. The first community is the Indian Brook First Nation (also known as the Shubenacadie First Nation), located approximately 21 km southwest of the Study Area midpoint. It is located west of the

town of Shubenacadie and the Shubenacadie River. The other community is the Millbrook First Nation, and it is located approximately 17 km north of the Study Area midpoint, near the town of Truro. The Mi'kmaq people of both these communities have a history of continuous occupation in this area that spans centuries and begins hundreds of years before European contact.

The *Constitution Act, 1982* enshrines constitutional protection from Crown infringement of the rights of Aboriginal people in Canada. These rights have subsequently been recognized and protected under more recent legislation and Supreme Court decisions. For example, a number of court cases (*e.g.*, *Haida Nation v. BC* in 2004; *Taku River Tlingit v. BC* in 2004; *Mikisew Cree v. Canada* in 2005) have found that governments have a duty to consult with Aboriginal peoples when proposed activities have the potential to adversely affect Aboriginal rights, including title, and treaty rights (NSOAA 2011a).

The Made-in-Nova Scotia Process is the forum for the Mi'kmaq, Nova Scotia, and Canada to resolve issues related to Mi'kmaq treaty rights; Aboriginal rights, including Aboriginal title; and Mi'kmaq governance. The Process involves the Mi'kmaq of Nova Scotia, as represented by the Assembly, and the provincial and federal governments (NSOAA 2011b).

On August 31, 2010, the Assembly signed a historic agreement with the governments of Canada and Nova Scotia under the Made-in-Nova Scotia Process. The resultant *Terms of Reference for a Mi'kmaq-Nova Scotia-Canada Consultation Process* outlines a consultation process for the parties to follow when governments are making decisions that have the potential to adversely affect asserted Mi'kmaq Aboriginal and Treaty rights (NSOAA 2011a).

The Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO or Mi'kmaq Rights Initiative) supports and represents the Assembly during consultations and negotiations with the Crown. Some Mi'kmaq people living off-reserve in the province are represented by the Native Council of Nova Scotia (NCNS).

In June 2009, the Province released a *Proponents' Guide: Engagement with the Mi'kmaq of Nova Scotia*, which was subsequently revised and republished in November 2011 as the *Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia* (NSOAA 2011c). The Guide outlines how proponents can fulfill the important role they play in consultation with the Mi'kmaq of Nova Scotia. Although third parties (*e.g.*, proponents) have no legal duty to consult, governments may delegate procedural aspects of consultation to third parties. The Guide outlines those procedural aspects (NSOAA 2011a).

Mi'kmaq Engagement Efforts Undertaken by the Proponent

Over the past several years, Alton has endeavoured to develop a positive business relationship with the Mi'kmaq. The following summarizes Mi'kmaq engagement activities conducted by the Proponent:

- issuance of request for bids for the 2008 clearing contract for the water pipeline associated with the Alton Natural Gas Storage Project – representation of underrepresented groups would be one criteria used to select the successful bidder;

- presentation/discussions with the KMKNO in September 2008 and on an ongoing basis leading up to submission of the EA for the Alton Natural Gas Pipeline Project in July 2012;

- invitation of Mi'kmaq-owned businesses to attend an Alton site tour and Supplier Session in July 2009;

- commissioning a Mi'kmaq Ecological Knowledge Study (MEKS) for the natural gas pipeline in April 2010 and subsequent discussions regarding moving forward with the MEKS in the summer and fall of 2011 (the MEKS was finalized in March 2012);

- provision of Project updates to Eric Christmas of the KMKNO as well as representatives of the NCNS on an ongoing basis, including an update at a public open house session in Stewiacke on November 30, 2011; and

- participation in meetings with Economic Development Officers for Millbrook and Indian Brook (Shubenacadie) Bands.

Notification letters have been prepared to inform the KMKNO and NCNS regarding the Proponent's obligation to conduct a Focus Report and the locations of the pipeline route options under consideration. The letters invite the submission of any questions or concerns and state that members of the Alton team would be pleased to meet with representatives of the KMKNO, NCNS, and/or other Mi'kmaq organizations to provide additional information about pipeline routing and to receive input about the pipeline Project. These letters were provided to the KMKNO and NCNS on February 28, 2013.

Mi'kmaq Ecological Knowledge Study

Data collection in support of the EA for the Original Alignment included commissioning Membertou Geomatics Solutions (MGS) to conduct a Mi'kmaq Ecological Knowledge Study (MEKS) regarding Mi'kmaq traditional use activities that have taken place or currently are taking place in the vicinity of the Project. The MEKS was completed in March 2012 as an update to an earlier MEKS that had been prepared in 2007 for the Alton Natural Gas Storage EA. The complete 2012 MEKS report is appended to the EA Registration.

The spatial boundaries within the scope of 2012 MEKS comprise the Original Alignment (referred to in the MEKS as the “Project Site”) as well as a 5 km radius surrounding the Original Alignment (referred to in the MEKS as the “Study Area”) that includes the following areas and communities: Alton, Brentwood, Forest Glen, Wittenburg, and Stewiacke East. Although the MEKS Study Area does not overlap exactly with the Study Area identified for the EA and Focus Report, it does encompass the entire Original Corridor and Alternative Corridor (Figure 5), which constitute the primary areas of interest for this Focus Report. In the absence of an updated MEKS, the 2012 MEKS findings are relied upon for the purposes of this Focus Report. These findings will be reviewed for relevance and applicability to the Alternative Corridor if it is ultimately approved as the preferred route option for development, and a MEKS update may be undertaken at that time if necessary.

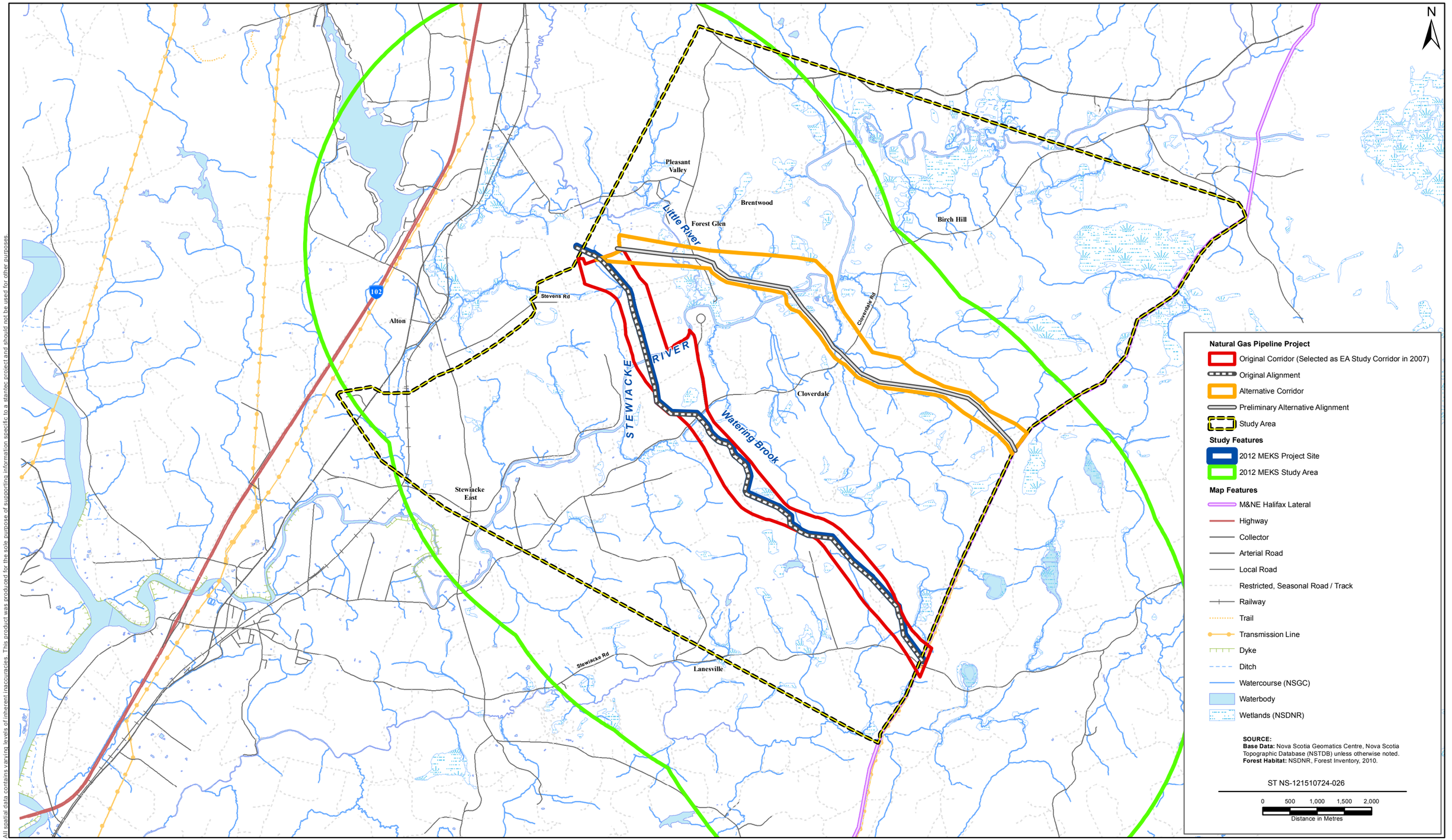
The 2012 MEKS contains:

- an overview of historic and current Mi’kmaq land and resource use in the vicinity of the Project;
- an inventory of plants of traditional significance to the Mi’kmaq in the vicinity of the Project;
- analysis of potential effects of the Project on Mi’kmaq land and resource use; and
- recommendations for further action or mitigation.

The two main components of the MEKS are:

- a study of past and present Mi’kmaq traditional land and resource use activities (using interviews as the key source of information); and
- a Mi’kmaq species significance analysis considering resources that are important to Mi’kmaq use.

MEKS information was collected through a combination of literature review and archival research, interviews, and field sampling. For the literature review and archival research, various documents were reviewed for information regarding the past or present Mi’kmaq occupation of the MEKS Study Area, including census records, colonial government records, and published books.



PREPARED BY: R Sutcliffe	Alton Natural Gas Pipeline Project
REVIEWED BY: A Fox	**Spatial Boundaries of 2012 Mi'kmaq Ecological Knowledge Study**
CLIENT: alton NATURAL GAS STORAGE LP	FIGURE NO.: 5
	DATE: Feb 26, 2013
	Stantec

File Path: V:\1215\active\121510xxx\121510724_Alton\geomatics\mapping\mxd\ReportFigures\ST_NS_121510724-026_MikmaqEcoKnowledge_20130225.mxd

Interviews were the key source of information regarding Mi'kmaq use of the MEKS Project Site and MEKS Study Area. Fifteen interviews were undertaken with individuals from the Mi'kmaq communities of Millbrook and Indian Brook in November and December 2011. All of these interviews were completed in accordance with the Mi'kmaq Ecological Knowledge Protocol (Assembly 2007), which describes the process, procedures and results that are expected of an MEKS. Interviewees were shown maps of the MEKS Study Area and asked various questions regarding their Mi'kmaq traditional use activities, including where and when they undertook those activities and what type of resource they used.

MGS staff members were accompanied by a Mi'kmaq Ecological Knowledge holder from the Waycobah First Nation community while undertaking site visits over three days in October 2011 along the MEKS Project Site (*i.e*., Original Alignment). This provided the opportunity for further identification of traditional use activities occurring within the MEKS Project Site and MEKS Study Area.

The 2012 MEKS findings indicate that the Mi'kmaq have historically undertaken some traditional use activities, primarily fishing, in or adjacent to the MEKS Project Site (*i.e*., Original Alignment) and MEKS Study Area, and that this practice continues to occur today. These activities occur in varying locations throughout the MEKS Project Site and MEKS Study Area and at varying times of the year.

Trout is the most fished species in the MEKS Project Site, followed by bass and salmon, with shad, smelt and eel also fished at comparatively fewer locations. All of the fishing areas were identified as food harvest fisheries. Hunting of deer, partridge, porcupine, rabbit, and – to a relatively lesser extent – pheasant, beaver, bobcat, muskrat, raccoon, and squirrel was also reported by interviewees, as was gathering of alder, mayflowers, apples, birchbark, evergreens, spruce trees, and blueberries. These activities occur in varying locations throughout the MEKS Project Site and at varying times of the year.

Trout was similarly found to be the most fished species in the MEKS Study Area and other species noted as commonly fished were bass and salmon. Fishing of shad, eel, smelt, gaspereau, perch, and pickerel was reported to a relatively lesser degree. Deer, rabbit, partridge, and porcupine were recorded as being hunted in multiple areas. Other species identified as being hunted within the MEKS Study Area, but in relatively smaller numbers than those mentioned above, are beaver, muskrat, raccoon, bobcat, and squirrel. Blueberries were the most gathered species within the MEKS Study Area, with birch bark, evergreens, maple syrup, mayflower, alders, apples, golden thread, spruce trees, and teaberry also gathered relatively less commonly.

Table 6 presents the results of the Mi'kmaq species significance analysis conducted in support of the 2012 MEKS.

Table 6 Mi'kmaq Species of Significance Identified in MEKS Study Area

Type of Use	Number of Areas	Number of Species
Food/Sustenance	230	23
Medicinal/Ceremonial	21	7
Tools/Art	9	6

Aside from Atlantic Salmon, which is listed as endangered under Schedule 1 of SARA, all of the other species identified during the course of the 2012 MEKS are considered common and abundant throughout Nova Scotia.

In summary, the primary issue of concern identified in the 2012 MEKS is the potential for the Project to interact with traditional trout and salmon fishing activities. The MEKS 2012 report concludes with a recommendation that "the traditional use activities of the Mi'kmaq be reflected upon in the overall environmental presentation and any remediation or project work consider the interest the Mi'kmaq have in the area."

Concerns Identified by the Mi'kmaq Rights Initiative and Native Council of Nova Scotia

Within the context of the provincial Crown consultation process, the KMKNO submitted a letter (dated July 19, 2012) to NSE-EA expressing a number of concerns regarding the Project as well as their interest in protecting the land. The KMKNO has been working closely with NSE-PAW to further the Province's commitment to protect 12% of the land mass in Nova Scotia by 2015, and asserts that running a pipeline across Crown lands under consideration for protection would compromise the objectives of the 12% initiative.

The KMKNO letter also notes that there are eight recorded archaeological sites pertaining to Mi'kmaw cultural heritage within 9 km of the Original Corridor, and cites the high potential for archaeological resources in the area (particularly at watercourse crossings and elevated areas adjacent to watercourses, including the Stewiacke River, St. Andrews River, and Little River) as another cause for concern. Subsurface testing and discussions with the KMKNO are requested to alleviate the concerns of the Assembly regarding potential Project-related archaeological impacts.

Finally, in consideration of the level of traditional and current use activities in the area, including fishing as well as hunting of deer and small game, the KMKNO states their expectation that the Mi'kmaq will be consulted and accommodated for any infringement of their hunting and fishing rights as a result of the Project in the event that the pipeline is routed along the Original Alignment.

A subsequent letter from the KMKNO (dated August 9, 2012) was submitted to NSE-EA during the 30-day public comment period associated with the EA registration process. This correspondence generally reiterated the concerns expressed in the previous KMKNO letter, with the addition of the following comments:

- The KMKNO describes the candidate 12 Percent Lands in the Stewiacke-St. Andrews River area (*i.e.*, Patches 389 and 397) as "highly significant to the Mi'kmaq of Nova Scotia" and advises that they are "highly utilized by the Mi'kmaq of Nova Scotia for traditional and current use activities" such that development of the Original Alignment would affect Mi'kmaq Rights and Title.

- In general, the proposed mitigation and avoidance commitments in the EA Registration "are considered satisfactory" by the KMKNO, although concerns remain with respect to potential Project interactions with archaeological resources, habitat and wetlands, and surface water and groundwater resources.

- Protection of the large significant wetland complex in the Project area is important to the KMKNO as the Mi'kmaq use wetland areas to access traditional plant species for ceremonial and medicinal purposes. The KMKNO supports and encourages the restoration and/or creation of wetland areas, but questions the ability of such activities to ensure no net loss.

- It is noted that that the Crown land parcels crossed by the Original Alignment contain areas of mature softwood, mature mixed-wood and mature hardwood, as well as a small area of old-growth forest that is unavailable for forestry due to the Old Growth Policy administered by NSDNR. The letter states that the "Mi'kmaq of Nova Scotia have an [interest] in protecting these forested areas for traditional and current use purposes as there is insufficient Crown land for the Mi'kmaq to utilize in this area."

- The KMKNO "is satisfied with the findings of the MEKS" and reiterates the importance of the area for Mi'kmaq traditional and current use activities, including hunting and fishing. With respect to fishing, the letter indicates that at least eight Mi'kmaq Bands are known by the KMKNO to participate in a food, social and ceremonial (FSC) fishery in the Stewiacke River for a variety of species, including trout, Rainbow Trout, eels, smelts, Gaspereau, Striped Bass, and Small-mouth Bass. As in their previous letter, the KMKNO expresses an expectation for additional consultation and accommodation in relation to any impacts and/or infringements on Mi'kmaq Rights and Title.

- Due to its concerns regarding potential Project effects on surface water and groundwater resources, as well as to aquatic species and habitats of significance to the Mi'kmaq, the KMKNO recommends a 50 m buffer for all watercourses (rather than the 30 m buffer proposed in the EA Registration).

- With respect to archaeological resources, the KMKNO advises that "the subsurface testing completed to date is of insufficient quantity to allay the archaeological concerns and that

testing a grid across the area is preferred, as opposed to a single transect. Further, as areas of [archaeological] potential can extend back from watercourses further than previously thought (based on recent investigations elsewhere in the province), it is strongly recommended that testing of high potential areas be conducted back from watercourses significantly further than has been demonstrated in the [archaeological impact assessment conducted in support of the EA]."

- In consideration of the significance of the Stewiacke River watershed to the Mi'kmaq of Nova Scotia, the KMKNO recommends development of an Impact Benefits Agreement (IBA).

The NCNS also submitted a letter (dated August 7, 2012) to NSE-EA in the context of the 30-day EA review and public comment period. They note that the Crown lands within the Study Area are used for gathering/harvesting purposes by the NCNS community of Mi'kmaq peoples, that the NSCNS community exercises Aboriginal and Treaty rights in this respect, and that NCNS' Netekulimkewe'l Commission (also known as the Natural Life Commission) has a management responsibility for harvesters. The NCNS therefore advises the Proponent to initiate Project-specific consultation with the Natural Life Commission.

Although the letter states that the MEKS is "replete with information about Mi'kmaq access and use of natural resources", it nonetheless strongly urges Alton to meet with the Natural Life Commission to discuss potential Project effects on NCNS community members' access to and use of land and water resources in the area, as well as mitigative options.

The NCNS further requests that the Proponent be required, as a condition of EA approval, to engage the Natural Life Commission with respect to development of a communications plan to notify NCNS-affiliated harvesters regarding the timing and location of construction activities, particularly blasting (if applicable), as a safety measure. A preliminary Blasting Plan is also recommended.

It is noted in the letter that NSDNR does not define Mi'kmaq harvesting times in Nova Scotia and that the NCNS community may harvest at different times of the year than the hunting seasons specified in the provincial *Wildlife Act* and associated Regulations.

5.2.2 Analysis and Mitigation

The Original Route and Alternative Route both have potential to affect land and water resources of traditional importance to the Mi'kmaq. Efforts will be made to avoid routing the pipeline through known locations of such resources wherever practical. Based on the information gathered for the 2012 MEKS, it is likely that potential Project interactions with traditional land and resource use will be effectively managed through a variety of mitigative measures that are technically and economically feasible. These include mitigative measures described throughout the EA Registration to protect other VECs that are of concern to traditional use (*e.g.*, vegetation, wildlife, fish and fish habitat).

Project construction will be temporary and will disturb a very small footprint relative to the total area available for Mi'kmaq traditional land and resource use activities outside of each of the respective Study Corridors. The Project is therefore generally expected to have only a negligible effect on these activities.

Potential Project effects on fisheries resources, hunting and gathering, Mi'kmaq access, and archaeological resources are considered and addressed more specifically below.

Fisheries Resources

Potential environmental effects on fish, fish habitat, and fishing activity could disrupt Mi'kmaq traditional use activities as well as compromise an important source of income for Mi'kmaq, thus having adverse socio-economic effects. Fish populations in the Stewiacke River and watershed have long been a source of subsistence for First Nations and continue to have a high cultural and economic significance to the Mi'kmaq people of the area. The Stewiacke River is crossed by the Original Route as well as the Alternative Route. However, Project construction activities will be temporary and highly localized and it is anticipated that several other fishing areas are available for Mi'kmaq use in the general vicinity of the Study Area. Furthermore, as noted in Section 5.1.2.1, it is anticipated that Project construction will not directly affect fish or fish habitat within the Stewiacke River (applicable for the Original Route as well as the Alternative Route) or the Little River (applicable for the Alternative Route only) due to the planned use of a trenchless HDD watercourse crossing technique.

In addition to the planned use of HDD at the aforementioned locations, a dry crossing method is proposed to be used for all other watercourse crossings, wherever feasible. Appropriate mitigation measures, such as construction sequencing and fish salvage, will be implemented at dry crossings with the intention of avoiding adverse effects on fish and fish habitat.

Hunting and Gathering

A certain degree of residual Project-related interference with potential hunting and gathering activities within the RoW may be unavoidable for a short period during construction. However, since most of the resources in question are common and abundant throughout Nova Scotia, alternative areas should be readily available. It is noted that large portions of both routes are currently accessible through existing paved and woods roads, and access along the RoW will generally be restored after construction.

Mi'kmaq Access

Traditional Mi'kmaq land use may be affected by access restrictions during construction of the pipeline. However, construction activities and associated access restrictions within the RoW will be temporary, and the operation of the pipeline and associated infrastructure will not substantively restrict land use in the surrounding area. Therefore, it is expected that the pre-Project level of public access will be restored following construction and that Mi'kmaq use of the

land and resources in the RoW can continue thereafter, albeit potentially subject to certain measures to dissuade trespassing (if requested by affected landowners). It is likely that access along some currently undeveloped and overgrown sections of the transmission corridor will improve after the corridor is cleared for installation of the pipeline.

Archaeological Resources

The Phase 1 Archaeological Impact Assessment and pedestrian survey conducted for the Original Alignment (under Heritage Research Permit No. A211NS33) identified the banks of the Stewiacke River as having a high potential for containing First Nation's archaeological resources. The complete Archaeological Impact Assessment report is appended to the EA Registration. Based on the findings of the pedestrian survey, a shovel testing program was conducted in the vicinity of the proposed Stewiacke River crossing site. All of the shovel tests were negative. The results of the site visit suggest that the potential in that area is mitigated by a steep slope on the south side and both slope and wet areas on the north side. The report concluded that no further archaeology is necessary for the Project to proceed as initially proposed in the EA Registration.

A desktop Archaeological Impact Assessment was subsequently conducted for the Original Corridor and Alternative Corridor in support of this Focus Report. The assessment consisted mainly of historical background research and did not include any field work. The findings of the study indicate that that there is very little to separate the archaeological potential of either of the corridors, but that there remains a high potential for First Nation's archaeological resources on both banks of the Stewiacke River.

While there are no recorded archaeological sites within the Study Area, background research indicates the presence of at least five recorded pre-Contact archaeological sites within 6 km of the Study Corridors (*i.e.*, BgCt-01, 03, 04, 05, and BhCt-01). All of these sites were identified by artifacts that were found as a result of cultivation (plowing), which would imply that there are more sites likely on uncultivated land. There has been no recent archaeological investigation conducted to determine the extent and condition of these recorded sites, so there is really no useful data that could contribute to any potential modeling for First Nation's sites.

The Shubenacadie River is one of the largest in Nova Scotia and contains a significant number of recorded First Nation's archaeological sites. The confluence of the Shubenacadie and the Stewiacke Rivers is an area of extremely high archaeological potential. The Stewiacke River is the one major watercourse that runs within the corridors, traveling approximately 60 km inland from where it meets the Shubenacadie and, as mentioned above, it contains five recorded First Nation's archaeological sites. While there are a number of minor watercourses running through each of the corridors, all are considered as having low archaeological potential, mainly based on the fact that they are too narrow and shallow to have been navigable. Both banks of the Stewiacke River are considered to have high archaeological potential within both corridors and

up to at least 40 m from the river. This potential would be mitigated by the degree of slope on either side as well as the extent of wetlands within the corridors.

In summary, the only areas identified as having a high potential for containing First Nation's archaeological resources were the banks of the Stewiacke River and that the potential would be the same for both the Original and the Alternate Corridors. In the absence of a field evaluation of the Alternative Corridor, it is not possible to determine what mitigating factors may be present for that area. Archaeological field reconnaissance will be carried out in the Alternative Corridor if it is approved as the preferred pipeline route.

Given the potential to discover previously unknown archaeological resources, Alton will develop and implement an Archaeological Contingency Plan as part the Emergency Response and Contingency Plans. This Plan will include procedures for notification (*e.g.*, Curator of Archaeology at Nova Scotia Museum), requirements for work stoppage and conservation of resources. Worker awareness training will address archaeological resources and relevant procedures. This mitigation will be applied regardless of which route is selected.

5.2.3 Conclusion

Potential Project-related effects on the use of land and water resources for traditional purposes by the Mi'kmaq, and the potential for encountering First Nation's archaeological resources, are generally anticipated to be similar for the Original Route and Alternative Route. Given the expected temporal and spatial limitations of the Project-related disturbance, and with the application of appropriate mitigation measures (including planned HDD and dry watercourse crossings), both routes are considered unlikely to result in conflicts with Mi'kmaq interests. However, given the concerns expressed by the KMKNO regarding potential Project-related interference with Mi'kmaq use of candidate 12 Percent Lands, the Alternative Corridor is anticipated to be preferred by the KMKNO.

5.3 DRINKING WATER SUPPLIES

5.3.1 Context

The Stewiacke River is the largest tributary of the Shubenacadie River, with a watershed in the order of 777 km^2, or 30%, of the Shubenacadie River watershed. This river rises in Pictou County and flows southwest and west over 70 km to its confluence with the Shubenacadie River at Stewiacke. The Stewiacke River watershed contains one designated water supply area on the St. Andrews River that is used by the Town of Stewiacke.

The Province's Drinking Water Strategy (NSE 2002) is based on a multiple-barrier approach for managing municipal drinking water supplies in Nova Scotia. Municipalities or water utilities are required by the Province to have a Source Water Protection Plan (SWPP) in place to address the first barrier of keeping clean water clean. One of the various management options available to fulfill this requirement is to designate the water supply as a Protected Water Area (PWA)

under the *Environment Act*, thereby enabling the water utility to regulate activities that may impair water quality within the source water supply area (NSE 2010a).

Stewiacke Watershed Protected Water Area

Section 106 of the *Environment Act* allows the Minister of Environment to designate an area surrounding a drinking water resource as a PWA, at the request of a water works operator, provided certain requirements are met. The appropriate municipal water utility should be contacted regarding any activities being planned in these areas (NSE 2009b).

The Stewiacke Watershed was designated as a PWA in 1973 because the St. Andrews River is the source of drinking water supplies for the Town of Stewiacke. As shown on Figure 4, the proposed Original Alignment crosses a portion of the PWA. The PWA is also traversed by the existing M&NE Halifax Lateral natural gas pipeline.

Regulated and Prohibited Activities

Certain activities are regulated or prohibited in PWAs in accordance with their respective PWA Regulations; however, no construction/development activities are specifically prohibited or regulated within the Stewiacke Watershed PWA (NSE 2010a). The only activities prohibited under the Stewiacke Watershed PWA Regulations are: the discharge/deposit of materials that impair water quality (*e.g.*, gasoline, chemicals and sediment); washing, bathing and swimming; boating; and the use of motorized vehicles (*e.g.*, snowmobiles and ATVs). Regulated activities include those in relation to: pesticides, forestry operations, certain agricultural activities, disposal of wastes (*i.e.*, landfill/waste disposal sites), discharge of domestic sanitary waste (*e.g.*, on-site sewage disposal systems), storage/handling of petroleum products, and storage of wood processing waste (NSE 2010a).

Stakeholder Consultation

Sheldon Dorey, the Chief Administrative Officer (CAO) of the Town of Stewiacke and member of the municipal Source Water Protection Committee, was contacted on February 5, 2013. Mr. Dorey was informed that a Focus Report and Water Supply Management Plan were in development and invited to raise questions or concerns. He did not identify any issues of concern regarding the Original Route or the Alternative Route and was supportive of the Project in general.

5.3.2 Analysis and Mitigation

The Alternative Corridor has been identified as the best possible alternative pipeline route that avoids the Stewiacke Watershed PWA. The corridor does not intersect with any portion of the PWA; at the closest point, they are separated by a distance of approximately 183 m. The Alternative Corridor is therefore preferable from the perspective of avoiding potential Project interactions with the PWA and municipal drinking water supplies for the Town of Stewiacke.

Refer to Appendix C for a Water Supply Protection Plan (WSPP) developed to protect public and private drinking water supplies that may be affected by the Original Route or the Alternative Route. The WSPP contains water supply protection procedures, contingency plans, and monitoring and reporting plans that are applicable for both potential pipeline routes, including mitigative options to address potential Project interactions with the Stewiacke Watershed PWA as a result of the partial overlap of the PWA and Original Alignment.

5.3.3 Conclusion

The Alternative Corridor is preferable from the perspective of avoiding the Stewiacke Watershed PWA; however, with the application of mitigation measures described in the WSPP (refer to Appendix C), both routes are considered unlikely to result in conflicts with public or private drinking water supplies.

6.0 Project Description

The Terms of Reference for the Focus Report (NSE 2012b) requests a description of the proposed pipeline Project. A brief description of the Project is provided below and in the preceding sections of this report. For additional detail, readers are referred to Section 2.0 of the 2012 EA Registration document, which is publicly available for review at the NSE library (located on the fifth floor of the NSE office at 5151 Terminal Road, Halifax) or online at http://www.gov.ns.ca/nse/ea/alton-natural-gas-pipeline-project.asp.

The Project will consist if a natural gas pipeline situated within a 20 m wide right-of-way (RoW) that extends approximately 9-11 km in a continuous route from the site of the Alton Natural Gas Storage Project to a tie-in to the M&NE Halifax Lateral pipeline. Details related to Project infrastructure and activities, labour requirements, emissions and waste discharges, and environmental and safety protection systems that will remain generally applicable regardless of the pipeline route that is ultimately selected for development. Information regarding the different pipeline route options under consideration is provided in Section 4.0 of this document.

Components of the proposed Project include:

- Approximately 9-11 km of NPS 16” to 24” steel buried pipeline designed to a maximum operating pressure of 9,930 kPa (1,440 psig) (see Table 7). The pipeline will be designed to allow for pigging capabilities using internal inspection tools and will be designed, constructed, operated and maintained in accordance with the 2011 edition of CAN/CSA Z662 - Oil and Gas Pipeline Systems.

- The proposed pipeline will require a 20 m wide permanent RoW with additional temporary work spaces in all crossing locations. The work space required will vary depending upon the size and nature of the crossing.

Table 7 Line Pipe Specifications

Specification	CAN/CSA Z245.1
Nominal Diameter (inches)	NPS 16 to NPS 24
Minimum Burial Depth m	0.91
External Coating	Extruded HDPE or Fusion Bonded Epoxy
Design Pressure (kPa)	9,930
Joint Type	Welded
External Coating at Joints	Per coating manufacturer's instructions

Wherever practical, the pipeline will parallel existing lateral disturbances (*e.g.*, woods roads) and utilize existing infrastructure for construction purposes. Contractor marshaling yards will be located on commercial property. A few new access roads (temporary or permanent) will be necessary for the construction of this pipeline and associated facilities. The location of new access roads and additional work areas will be determined prior to construction using environmental siting procedures similar to those used to locate the Original Alignment (refer to Section 4.1.1).

The construction of the approximately 9-11 km pipeline can be completed within approximately two months.

In general, RoW clearing activities will be scheduled to avoid potential interactions with VECs during sensitive periods (*e.g.*, breeding bird periods between April 15 and August 31) where recommended as specific mitigative measures (refer to Section 6.4 of the EA Registration), as general environmental protection practices specified in the Environmental Management Plan for the Project, or to comply with specific conditions of required permits. In-stream work at watercourses will generally be limited to the period from June 15 through September 30 to avoid fish migration and periods of higher precipitation and runoff potential. Winter construction may be undertaken in some cases where there may be advantages to working on frozen ground. Clean-up activities will begin late summer or early fall. Any remaining clean-up will be completed the following summer as well as repair of any settlement that occurs during the spring

Development of the Project will create a number of direct and indirect benefits for the Nova Scotian and Canadian economy.

Canadian pipeline companies operate almost a quarter of a million kilometres of natural gas pipelines and have maintained an exceptional safety record. Pipeline safety and reliability are achieved primarily through prudent design, construction, and maintenance practices.

The Alton Natural Gas Pipeline Project is being designed and will be constructed and operated by personnel employed or contracted by Alton, owned by AltaGas and Veresen who are leaders in the North American gas industry with numerous regulated facilities. Construction procedures will be based on extensive experience on similar projects. Canadian pipeline industry involvement in research and development of pipeline safety and system integrity-related projects has resulted in:

- up-to-date regulations, codes, and material standards (*e.g.*, Nova Scotia *Pipeline Act* and Regulations and CAN/CSA Z662, Oil & Gas Pipeline Systems);
- corporate proprietary standards that contain supplemental requirements to the industry standards;
- techniques and procedures for non-destructive examination, inspection, and testing;
- operational procedures including monitoring, surveillance, Call-Before-You-Dig programs, and supervisory control; and
- emergency response and contingency plans and procedures.

Alton will comply with 2011 CAN/CSA Z662 standards and safety and environmental protection guidelines and regulations.

Alton will incorporate the following design, construction, and operation elements to produce a state-of-the-art pipeline that will exhibit a very low probability of failure by corrosion.

- The external surface of the pipe will be coated with fusion bonded epoxy or extruded high density polyethylene that is highly resistant to disbonding, and provide a durable primary protection against galvanic corrosion.
- The pipeline will include an impressed current cathodic protection system as secondary protection in addition to external coating. Monitoring procedures will be used to optimize the complete corrosion protection system.
- Provision for launchers and receivers will be installed on the pipeline system to allow for periodic inspection with in-line electronic inspection tools.

Material and construction defects are being reduced as technology improves. Defects of critical dimensions will be eliminated by the post-construction pressure test at pressures higher than the maximum operating pressure, as well as a post-construction internal inspection for deformation. The probability of an uncontrolled rupture of the pipeline is extremely low. Alton will develop an Emergency Response and Contingency Plan in consultation with local and provincial emergency response organizations to facilitate rapid and effective response in the unlikely event of a serious accidental gas release.

A custody transfer metering station may be constructed at the tie-in point of the 16" to 24" steel gas pipeline and the 12" M&NE Halifax Lateral. This station will measure and control the natural gas flow to and from the storage cavern system. An ESD (Emergency Shutdown) system will allow for the isolation of the Alton Gas Pipeline in case of an emergency. A similar control and ESD system will be installed at the Alton Natural Gas Storage Site. If the emergency is a fire or potential fire, these will close off the main source of fuel. Equipment will be housed in a lockable building and the site will be fenced.

Environmental protection will continue to be integrated into the Project as a key feature throughout Project planning. In particular, the pipeline route will avoid sensitive environmental areas wherever possible. The pipeline has been designed to comply with all current codes and standards reflecting the most current knowledge about pipeline safety and integrity.

A Project-specific Environmental Management Plan (EMP) will be prepared at the Industrial Approval stage to provide the required procedures to adhere to regulatory obligations and other environmental commitments.

A sample table of contents for a typical EMP is shown below:

Environmental Management Plan Table of Contents

7.0 Summary and Conclusions

As discussed throughout this Focus Report, the Original Route and Alternative Route are both associated with several potential relative advantages and disadvantages; these include, but are not limited to, the key considerations summarized in Table 8.

Table 8 Key Relative Advantages and Disadvantages of Original Route and Alternative Route

Pipeline Route	Advantages	Disadvantages
Original Route	• Fewer landowners potentially affected • Fewer wetlands potentially affected • Fewer watercourses potentially affected • Fewer species of conservation concern potentially affected • Existing access and communications infrastructure at Halifax Lateral tie-in location • Field surveys have already been conducted and RoW has been optimized • Lower level of uncertainty	• Longer distance and more associated opportunities for potential environmental effects • Traverses candidate 12 Percent Lands • Traverses Stewiacke Watershed Protected Water Area • Potential to disturb more mature forest and forest interior habitat • Stewiacke River crossing location more technically challenging
Alternative Route	• Shorter distance and fewer associated opportunities for potential environmental effects • Generally avoids candidate 12 Percent Lands • Avoids Stewiacke Watershed Protected Water Area • Crosses less mature forest and forest interior habitat • Crossing location for Stewiacke River is technically preferable to crossing location for Original Route	• More landowners potentially affected • More wetlands potentially affected • More watercourses potentially affected • More species of conservation concern potentially affected • May need to construct road access and power/communications infrastructure at Halifax Lateral tie-in location • No field surveys have been conducted and RoW has not yet been optimized • Greater level of uncertainty

The Proponent has committed to implement a variety mitigation measures to address potential Project effects in relation to disturbance and fragmentation; species of conservation concern; wetlands; Mi'kmaq land and resource use; and public and private drinking water supplies. Among other things, these mitigation measures include the planned use of horizontal directional drilling to cross the Stewiacke River (for the Original Route and Alternative Route) and Little River (for the Alternative Route only); optimization of the selected RoW to avoid environmentally sensitive areas wherever practical; and implementation of the mitigation and contingency procedures described in the attached Water Supply Management Plan (Appendix C). Furthermore, all of the non route-specific commitments made in the EA Registration will remain applicable for the Alternative Corridor if it is determined to be the preferred route.

A Project-specific Environmental Management Plan will be developed for whichever pipeline route is selected, and will provide additional details regarding environmental protection procedures, monitoring and reporting requirements, and emergency response and contingency plans.

The Alternative Route is preferable (compared with the Original Route) because it: generally avoids the candidate 12 Percent Lands and Mi'kmaq use of those lands; avoids the Stewiacke Watershed Protected Water Area; has shorter pipeline length and less associated disturbance and lower capital costs. While aerial reconnaissance with engineering, construction and environmental personnel has been completed, on the ground field reconnaissance has not yet been undertaken in the Alternative Corridor. It is expected that the Preliminary Alternative Alignment can be optimized to further avoid potential environmental and technical constraints. The Original Alignment has already been optimized and, despite overlap with the 12 Percent Lands and Stewiacke Watershed Protected Water Area, is considered by the Proponent to be a valid potential pipeline route.

In conclusion, based on currently available information, the Original and Alternative pipeline routes are both considered environmentally acceptable and technically feasible options for pipeline development. With the application of the mitigation measures described herein and in the EA Registration, neither of the proposed routes are anticipated to result in any significant adverse environmental effects or conflicts with protected areas, Mi'kmaq interests, or drinking water supplies. The Proponent therefore requests, based on the evidence presented in this Focus Report, that both pipeline routes be considered for Ministerial approval under the Nova Scotia *Environment Act* and Environmental Assessment Regulations.

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8.2 PERSONAL COMMUNICATION

Cameron, Robert. Ecologist, Protected Areas and Wetlands Branch, Nova Scotia Environment. Email correspondence dated February 22, 2013.

APPENDIX A

Plant Species of Conservation Concern

Plant Species of Conservation Concern Recorded Within a 20 km Radius of the Pipeline Routes Under Consideration
(Source: ACCDC 2013)

Common Name	Scientific Name	Provincial Rarity	Provincial Status	Original Route		Alternative Route	
				Original Corridor	Original Alignment	Alternative Corridor	Preliminary Alternative Alignment
Alder-leaved Buckthorn	*Rhamnus alnifolia*	S3	Sensitive	Likely	Likely	Likely	Likely
Black Ash	*Fraxinus nigra*	S2S3	Sensitive	Likely	Unlikely	Likely	Likely
Blood Milkwort	*Polygala sanguinea*	S2S3	Sensitive	Likely	Likely	Likely	Likely
Blue Cohosh	*Caulophyllum thalictroides*	S2	May Be At Risk	Likely	Likely	Likely	Likely
Blue Vervain	*Verbena hastata*	S3	Secure	Likely	Likely	Likely	Likely
Broad-Glumed Brome	*Bromus latiglumis*	S1	May Be At Risk	Unlikely	Unlikely	Likely	Likely
Canada Lily	*Lilium canadense*	S2S3	Sensitive	Likely	Likely	Likely	Likely
Canada Wood Nettle	*Laportea canadensis*	S3	Sensitive	Likely	Likely	Likely	Likely
Clammy Hedge-Hyssop	*Gratiola neglecta*	S1S2	Sensitive	Likely	Likely	Likely	Likely
Climbing False Buckwheat	*Polygonum scandens*	S3	Sensitive	Likely	Likely	Likely	Likely
Common Bedstraw	*Galium aparine*	S1	Exotic	Unlikely	Likely	Likely	Likely
Dudley's Rush	*Juncus dudleyi*	S2?	Sensitive	Likely	Likely	Likely	Likely
Dwarf Clearweed	*Pilea pumila*	S1	May Be At Risk	Likely	Likely	Likely	Likely
Dwarf Scouring-Rush	*Equisetum scirpoides*	S3S4	Secure	Likely	Likely	Likely	Likely
Early Coralroot	*Corallorhiza trifida*	S3	Secure	Likely	Likely	Likely	Likely
Eastern White Cedar	*Thuja occidentalis*	S1S2	At Risk	Likely	Likely	Likely	Likely
Farwell's Water Milfoil	*Myriophyllum farwellii*	S2	Sensitive	Likely	Unlikely	Likely	Unlikely
Flat-stemmed Pondweed	*Potamogeton zosteriformis*	S2S3	Sensitive	Likely	Likely	Likely	Likely
Fries' Pondweed	*Potamogeton friesii*	S2	May Be At Risk	Likely	Likely	Likely	Likely
Fringed Blue Aster	*Symphyotrichum ciliolatum*	S2S3	Sensitive	Likely	Likely	Likely	Likely
Gmelin's Water Buttercup	*Ranunculus gmelinii*	S2	Secure	Likely	Likely	Likely	Likely
Heart-leaved Foamflower	*Tiarella cordifolia*	S2	Sensitive	Likely	Likely	Likely	Likely
Hidden-scaled Sedge	*Carex cryptolepis*	S3?	Secure	Likely	Likely	Likely	Likely
Hooked Agrimony	*Agrimonia gryposepala*	S3	Secure	Likely	Likely	Likely	Likely
Hop Sedge	*Carex lupulina*	S3	Secure	Likely	Likely	Likely	Likely
Houghton's Sedge	*Carex houghtoniana*	S2?	Sensitive	Likely	Likely	Likely	Likely
Labrador Bedstraw	*Galium labradoricum*	S2	Sensitive	Likely	Unlikely	Likely	Likely
Large Purple Fringed Orchid	*Platanthera grandiflora*	S3	Secure	Likely	Likely	Likely	Likely
Lesser Brown Sedge	*Carex adusta*	S2S3	Sensitive	Likely	Likely	Likely	Likely
Long-leaved Starwort	*Stellaria longifolia*	S3	Sensitive	Unlikely	Unlikely	Likely	Likely
Marsh Bellflower	*Campanula aparinoides*	S3	Sensitive	Likely	Likely	Likely	Likely
Marsh Mermaidweed	*Proserpinaca palustris var. crebra*	S3	Secure	Likely	Unlikely	Likely	Likely
Marsh Mermaidweed	*Proserpinaca palustris*	S3	Secure	Likely	Unlikely	Likely	Likely
Meadow Horsetail	*Equisetum pratense*	S2	Sensitive	Likely	Unlikely	Likely	Likely
Meadow Willow	*Salix petiolaris*	S3	Secure	Likely	Likely	Likely	Likely
Mistassini Primrose	*Primula mistassinica*	S2	Sensitive	Likely	Likely	Likely	Likely
Narrow-leaved Blue-eyed-grass	*Sisyrinchium angustifolium*	S3S4	Secure	Likely	Likely	Likely	Likely

Plant Species of Conservation Concern Recorded Within a 20 km Radius of the Pipeline Routes Under Consideration
(Source: ACCDC 2013)

Common Name	Scientific Name	Provincial Rarity	Provincial Status	Original Route		Alternative Route	
				Original Corridor	Original Alignment	Alternative Corridor	Preliminary Alternative Alignment
Pennsylvania Smartweed	*Polygonum pensylvanicum*	S3	Secure	Likely	Likely	Likely	Likely
Prickly Hornwort	*Ceratophyllum echinatum*	S2?	May Be At Risk	Unlikely	Unlikely	Likely	Unlikely
Pubescent Sedge	*Carex hirtifolia*	S2S3	Sensitive	Likely	Likely	Likely	Likely
Purple-stemmed Angelica	*Angelica atropurpurea*	S3S4	Secure	Likely	Likely	Likely	Likely
Richardson's Pondweed	*Potamogeton richardsonii*	S2S3	May Be At Risk	Likely	Likely	Likely	Likely
Rugel's Plantain	*Plantago rugelii*	S2	Undetermined	Likely	Likely	Likely	Likely
Short-awned Foxtail	*Alopecurus aequalis*	S2S3	Sensitive	Likely	Likely	Likely	Likely
Showy Lady's-Slipper	*Cypripedium reginae*	S2	May Be At Risk	Likely	Likely	Likely	Likely
Siberian Water Milfoil	*Myriophyllum sibiricum*	S3S4	Secure	Unlikely	Unlikely	Likely	Unlikely
Small Burreed	*Sparganium natans*	S3	Secure	Likely	Unlikely	Likely	Likely
Spreading Wild Rye	*Elymus hystrix var. bigeloviana*	S1	May Be At Risk	Unlikely	Unlikely	Likely	Likely
Stalked Bulrush	*Scirpus pedicellatus*	S1	Undetermined	Likely	Likely	Likely	Likely
Stout Smartweed	*Polygonum robustius*	S3S4	Secure	Likely	Likely	Likely	Likely
Swamp Milkweed	*Asclepias incarnata ssp. pulchra*	S2S3	Secure	Likely	Likely	Likely	Likely
Swamp Milkweed	*Asclepias incarnata*	S3	Secure	Likely	Likely	Likely	Likely
Swamp Rose	*Rosa palustris*	S3	Secure	Likely	Likely	Likely	Likely
Sweet Wood Reed Grass	*Cinna arundinacea*	S1	May Be At Risk	Likely	Likely	Likely	Likely
Virginia Anemone	*Anemone virginiana var. virginiana*	S2	Sensitive	Likely	Likely	Likely	Likely
Water Beggarticks	*Megalodonta beckii*	S3	Sensitive	Likely	Likely	Likely	Likely
Whorled Water Milfoil	*Myriophyllum verticillatum*	S2	Sensitive	Likely	Unlikely	Likely	Unlikely
Wild Celery	*Vallisneria americana*	S2	Exotic	Likely	Likely	Likely	Likely
Wood Anemone	*Anemone quinquefolia*	S2	Sensitive	Likely	Likely	Likely	Likely

APPENDIX B

Animal Species of Conservation Concern

Terrestrial Animal Species of Conservation Concern
Recorded Within a 20 km Radius of the Pipeline Routes Under Consideration
(Source: ACCDC 2013)

Common Name	Scientific Name	Provincial Rarity	Provincial Status	Original Route		Alternative Route	
				Original Corridor	Original Alignment	Alternative Corridor	Preliminary Alternative Alignment
Barn Swallow	*Hirundo rustica*	S3B	Sensitive	Unlikely	Unlikely	Likely	Unlikely
Bay-breasted Warbler	*Dendroica castanea*	S3S4	Sensitive	Likely	Likely	Likely	Likely
Black-backed Woodpecker	*Picoides arcticus*	S3S4	Sensitive	Likely	Likely	Likely	Likely
Black-billed Cuckoo	*Coccyzus erythropthalmus*	S3?	May BE At Risk	Unlikely	Unlikely	Likely	Likely
Blue-winged Teal	*Anas discors*	S3B	May Be At Risk	Unlikely	Unlikely	Likely	Unlikely
Bobolink	*Dolichonyx oryzivorus*	S3S4B	Sensitive	Unlikely	Unlikely	Likely	Likely
Boreal Chickadee	*Poecile hudsonica*	S3	Sensitive	Likely	Likely	Likely	Likely
Brown-headed Cowbird	*Molothrus ater*	S2S3B	Secure	Unlikely	Unlikely	Likely	Likely
Canada Warbler	*Wilsonia canadensis*	S3B	At Risk	Likely	Unlikely	Likely	Likely
Cape May Warbler	*Dendroica tigrina*	S3?	Sensitive	Likely	Likely	Likely	Likely
Cliff Swallow	*Petrochelidon pyrrhonota*	S3B	May Be At Risk	Unlikely	Unlikely	Likely	Unlikely
Common Nighthawk	*Chordeiles minor*	S3B	At Risk	Likely	Likely	Likely	Likely
Cougar - Eastern pop.	*Puma concolor pop. 1*	SH	Undetermined	Likely	Likely	Likely	Likely
Eastern Bluebird	*Sialia sialis*	S3B	Sensitive	Unlikely	Unlikely	Likely	Unlikely
Eastern Kingbird	*Tyrannus tyrannus*	S3S4	Sensitive	Likely	Unlikely	Likely	Likely
Eastern Wood-Pewee	*Contopus virens*	S3S4B	Sensitive	Likely	Likely	Likely	Likely
Gray Catbird	*Dumetella carolinensis*	S3B	May Be At Risk	Unlikely	Unlikely	Likely	Likely
Gray Jay	*Perisoreus canadensis*	S3S4	Sensitive	Likely	Likely	Likely	Likely
Killdeer	*Charadrius vociferus*	S3S4	Sensitive	Likely	Likely	Likely	Likely
Northern Bobwhite	*Colinus virginianus*	-	-	Unlikely	Unlikely	Likely	Likely
Northern Goshawk	*Accipiter gentilis*	S3S4	Secure	Likely	Likely	Likely	Likely
Olive-sided Flycatcher	*Contopus cooperi*	S3B	At Risk	Likely	Unlikely	Likely	Likely
Pied-billed Grebe	*Podilymbus podiceps*	S3B	Sensitive	Unlikely	Unlikely	Likely	Unlikely
Pine Grosbeak	*Pinicola enucleator*	S3?	May Be At Risk	Likely	Likely	Likely	Likely
Pine Siskin	*Carduelis pinus*	S3S4B,S5N	Secure	Likely	Likely	Likely	Likely
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S3S4	Sensitive	Unlikely	Unlikely	Likely	Likely
Rusty Blackbird	*Euphagus carolinus*	S2S3B	May Be At Risk	Unlikely	Unlikely	Likely	Likely
Snapping Turtle	*Chelydra serpentina*	S5	Secure	Likely	Likely	Likely	Likely
Spotted Sandpiper	*Actitis macularius*	S3S4	Sensitive	Likely	Likely	Likely	Likely
Tennessee Warbler	*Vermivora peregrina*	S3S4	Sensitive	Likely	Unlikely	Likely	Likely
Wilson's Snipe	*Gallinago delicata*	S3S4	Sensitive	Likely	Unlikely	Likely	Likely
Wood Turtle	*Glyptemys insculpta*	S3	Sensitive	Likely	Likely	Likely	Likely
Yellow-bellied Flycatcher	*Empidonax flaviventris*	S3S4	Sensitive	Likely	Likely	Likely	Likely

APPENDIX C

Water Supply Protection Plan

Water Supply Protection Plan for Alton Natural Gas Pipeline Project

February 2013

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1.0 Introduction

1.1 PROJECT BACKGROUND

The Alton Natural Gas Pipeline Project underwent a provincial Environmental Assessment (EA) in 2012. Following the review of information submitted by the Proponent it was determined by the Minister of Environment that a Focus Report comparing the Original Alignment and an Alternative Corridor was required to better assess potential for adverse effects or significant environmental effects. The Original Alignment and Alternative Corridor evaluated in the Focus Report are shown on Figure 1. To address potential impacts associated with project activities on public and private drinking water supplies this comprehensive Water Supply Protection Plan (WSPP) has been developed in accordance with the Terms of Reference for the Focus Report.

Project description information for the construction and operation of the Project is described in Section 2.0 of the Alton Natural Gas Pipeline Environmental Assessment (Stantec 2012). Information on mitigation measures and contingency planning have been largely derived from the Alton Natural Gas Pipeline Environmental Assessment and the Halifax Lateral Pipeline Project Stewiacke Watershed Area Management Plan prepared by Jacques Whitford Environment Limited (now Stantec) in 1999.

2.0 Public Water Supply

The public water supply in the context of this WSPP refers to the Stewiacke Watershed Protected Water Area (PWA), which is intersected by the Original Alignment assessed in the Alton Natural Gas Pipeline Environmental Assessment. Section 106 of the *Environment Act* allows the Minister of Environment to designate an area surrounding a drinking water source as a Protected Water Area (PWA), provided certain requirements are met. PWAs are created at the request of a water works operator (Province of Nova Scotia 2009).

The Stewiacke Watershed was designated as a PWA in 1973 because the St. Andrews River is the source of drinking water supplies for the Town of Stewiacke. As shown on Figure 1, the Original Alignment crosses only one known water supply intake which is located 1.5 km south of Stewiacke and 7 km downstream of the two stream crossings in this watershed (GL-14 and GL-15).

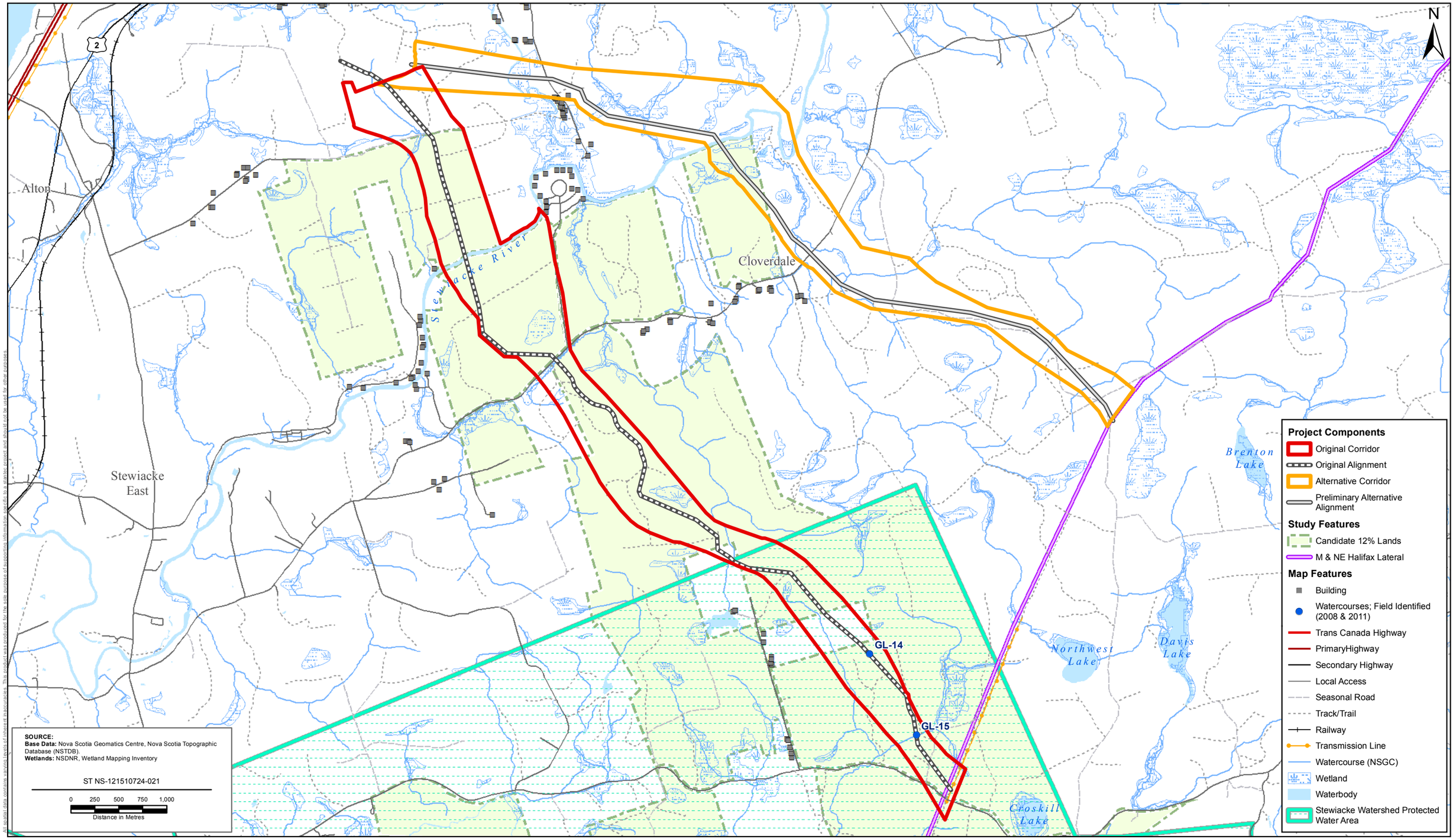
Certain activities are regulated or prohibited in PWAs in accordance with their respective PWA Regulations; however, no construction/development activities are prohibited or regulated within the Stewiacke Watershed PWA (NSE 2010). Maritimes and Northeast (M&NE) Pipeline Halifax

Lateral, which also intersects the Stewiacke Watershed PWA, was approved for construction and has been in operation since 1999.

The main effects from the Project on surface water resources involve changes in water quality, mainly from suspended solids caused by erosion and sediment transport from all areas or acidic drainage from geological acid risk areas. Acid drainage is not considered to be a risk for this pipeline route. These effects have the greatest potential to affect surface water resources in the immediate vicinity of stream crossings. In these areas, effects may be felt both locally and up to several kilometres downstream; however, most effects are expected to dissipate within 1 km due to natural stream flow dispersion and proposed mitigation measures.

Pipeline installation across the protected watercourse in the Stewiacke Watershed PWA will be attempted via a dry crossing. With proper mitigation and contingency planning, the Maritimes and Northeast (M&NE) Pipeline Halifax Lateral, which also intersects the Stewiacke Watershed PWA, was approved for construction and has been in operation since 1999. According to a representative from the Town of Stewiacke, to date there have been no impacts on the Public Water Supply from construction or operation of all projects within the PWA (Dorey pers. comm. 2013). Similar mitigative measures will be applied to the construction and operation of the Alton Natural Gas Pipeline RoW which will connect the Alton Natural Gas Storage facility to the existing Maritimes and Northeast (M&NE) Pipeline Halifax Lateral.

The Alternative Corridor proposed in the Focus Report avoids the Stewiacke Watershed PWA (Figure 1) and therefore the remainder of Section 2 will apply to the Original Alignment only.



PREPARED BY:	R Sutcliffe
REVIEWED BY:	MJ Keefe
CLIENT:	alton

Alton Natural Gas Storage LP

Original and Alternative Pipeline Corridors

FIGURE NO.:	1
DATE:	Feb 14, 2013

Stantec

File Path: V:\1215\active\121510xxx\121510724_Alton\geomatics\mapping\mxd\ReportFigures\ST_NS_121510724-021_OriginalandAlternativeCorridors_20130212.mxd

2.1 POTENTIAL ENVIRONMENTAL EFFECTS FROM THE PROJECT

2.1.1 Construction

Potential adverse effects on surface water resources during construction may include downstream sedimentation due to soil erosion from the RoW during clearing, grubbing, trenching, stream and wetland crossings or dewatering of the trench Changes in surface water quality may also be caused by accidental release of hazardous substances such as small spills from equipment. As the pipeline route does not cross any areas underlain by Halifax Formation slates, acid drainage is not considered to be a risk for this pipeline route.

Mitigation

During construction, the RoW will be cleared and grubbed, followed by stripping and stockpiling of useable topsoil and subsoil, RoW grading, trench excavation, pipeline installation and backfill, and final cleanup and reclamation, including revegetation. During these construction activities, there will be potential for erosion and transportation of sediment into nearby watercourses. The severity of erosion and sediment transport depends on several factors, including precipitation, soil type, slope, vegetation cover, distance to a watercourse, and season. In general, fine-grained clay-silt materials situated on steep slopes are of greatest concern. In general. steep slopes are avoided during pipeline routing for a variety of reasons.

To reduce the potential for erosion, vegetation will remain within the 30 m buffer alongside stream crossings during clearing and grubbing and will be removed by hand just prior to the watercourse crossing to eliminate the potential for sedimentation from erosion. All stockpiled material (topsoil and grade spoil (subsoil) will be stored at least 30 m from watercourses and protected from erosion in all cases.

After clearing and grubbing has been completed, runoff and erosion may increase along the pipeline RoW slopes unless careful erosion control measures are applied. Erosion controls will be developed, once engineering has been finalized, and prescribed within the EMP for each watercourse crossing. In general, Alton will use the methods described within Sections 5.2 of the 3rd Edition of the *Pipeline Associated Watercourse Crossings* (CAPP 2005) guidance document endorsed by DFO.

These methods to reduce erosion and sediment transport during pipeline construction will include:

- the control of surface runoff;
- specific procedures for storage and handling of excavated materials;
- provision of temporary erosion control measures after initial clearing is completed;
- avoidance of introduction of deleterious materials (mineral and organic) into streams or wetlands;

- isolation and stabilization of topsoil/subsoil storage piles from watercourses with drainage barriers, plastic sheeting, or other measures; and
- timely revegetation/stabilization of area after construction.

The potential effects of erosion and sedimentation are considered to be temporary, since all areas disturbed by pipeline construction will be stabilized with appropriate erosion and sedimentation control and reclamation measures both during and after construction.

Dewatering will occasionally be necessary for flooded trenches or trenches with considerable groundwater inflow. Uncontrolled discharge to watercourses from dewatering operations may degrade water quality by sedimentation, in a manner similar to sedimentation of soils eroded from the RoW and deposited into watercourses.

The following mitigative measures should be implemented as appropriate for control of excavation dewatering discharges:

- reduce dewatering volumes by diverting surface runoff away from excavations;
- dewater excavations only as necessary for pipeline installation; and
- discharge all pumped water a minimum of 30 m from stream and ensure sufficient filtration prior to re-entry to a watercourse.

Stream Crossings

The corridor crosses only one known watershed that is protected under provincial legislation as a designated water supply watershed: the headwaters of the St. Andrews River supplying the Town of Stewiacke. The water supply intake is located 1.5 km south of Stewiacke and 7 km downstream of the two stream crossings in this watershed (GL-14 and GL-15). Water quality protection measures will be followed (as outlined in this Plan) for these and all other stream crossings alson the pipeline RoW.

Based on information contained in the 2012 EA, the following mitigation measures will be used to control possible surface water effects during stream crossings; Alton will:

- maintain levels of clean flow around water crossing during installation at dry crossings;
- employ erosion/sedimentation abatement measures as described in the EMP;
- provide contingency plans for mitigation of potential erosion and stream sedimentation;
- leave a 30 m wide undisturbed (vegetated buffer) zone on either side of fish-bearing streams until specific water crossing activities commence;
- prepare equipment and piping ahead of time to reduce duration of stream crossing work;
- avoid unnecessary disturbance to a stream bed or wetland;

- construct temporary bridges or use alternate pathways (logging roads, bridges) where applicable;
- erect sediment control structures along all stream banks prior to crossing work;
- maintain sediment control structures (by inspecting and repairing structural problems during and after storm events, stabilize exposed soil as soon as possible (*e.g.*, stabilize interim exposed soil with mulch, erosion control blankets or final exposed soil with fast-growing, non-invasive, native vegetation);
- discharge all pumped water a minimum of 30 m from watercourses and ensure sufficient filtration prior to re-entry to a watercourse; and
- restore watercourse channels and banks following pipeline installation.

Due to the mitigative measures outlined including erosion and sedimentation control procedures, residual environmental effects on surface waters are predicted to be very low.

Summary

No significant adverse effects residual environmental effects are expected on the public drinking water supply due to construction of the Project. Due to the use of well understood water crossing and mitigation methods (*e.g.*, CAPP standards) and brief duration of crossings along the RoW, impacts to the public water supply are not predicted. A follow up monitoring program (see Section 2.2) will be designed and implemented.

2.1.2 Operation and Maintenance

During the operational phase of the Project, there will be little effect on surface water resources. Erosion is likely to be minimal after final clean-up and reclamation is completed and the RoW is stabilized. Possible long-term effects due to changes to down-gradient water quality caused by or sedimentation are expected to be minimal given implementation of the mitigation measures discussed for the construction phase.

The Stewiacke-St. Andrews River watershed designation (see Figure 1) restricts the use of any herbicides within the catchment; thus herbicides will not be used to control vegetation along RoW portion within the watershed, nor will herbicides be used along the rest of the RoW. Mechanical means using bush-cutters will primarily be used, especially on slopes in the vicinity of streams, wetlands, and upstream of water supply catchments. Streams and wetlands will be avoided during vegetation maintenance and pipeline inspection.

Summary

Based on the limited interaction of the pipeline with environmental components during the operational phase, the materials used during operation and mitigation, adverse residual environmental effects on surface water resources during Project operation are predicted to be

not significant. Contingency planning for malfunctions and accidents will be further addressed in Section 4.1.

2.2 FOLLOW-UP AND MONITORING

All stream crossings will undergo follow-up monitoring to ensure that the aquatic habitat within the dry crossings, where initially present, has regenerated. All stream crossings upstream of water supply systems (*e.g.*, St. Andrews River, two crossings) will be monitored for suspended solids, pH, and hydrocarbons during construction and clean-up of crossing site. Inspection of erosion control devices will be conducted periodically after major storm events during construction until vegetation is re-established, and following construction.

3.0 Private Water Supplies

Private Water Supplies for the purposes of this WSPP are limited to groundwater. Groundwater is an integral component of the hydrologic cycle that originates from the infiltration of precipitation or surface water into the ground. In general, groundwater flows through soil and bedrock from areas of high elevation (recharge areas) to areas of low elevation (discharge areas) where it discharges from the sub-surface to springs, streams, and lakes.

The yield of dug or drilled water wells can vary greatly, depending on the hydraulic properties of overburden or bedrock aquifers into which the wells are constructed. In many areas of rural Nova Scotia, even the poorly permeable rocks and soils are the only water supply. Based on the desk top review and NSE Water Well records, on the Original Alignment, there appears to only be one well within 500 m of the preferred RoW. Two other wells are located between 500 m and 1,000 m from the pipeline. On the Alternative Alignment there appears to be six wells located within 500 m of the preferred RoW.

3.1 POTENTIAL ENVIRONMENTAL EFFECTS FROM THE PROJECT

3.1.1 Construction

The main potential adverse effects on groundwater resources during the construction phase include changes in groundwater quantity or quality in nearby or down-gradient water wells. Physical changes in groundwater flow may be caused by trench excavation, dewatering, or blasting operations. Changes in aquifer or well water quality may be caused by blasting, drainage, or accidental release of hazardous substances. Blasting along the pipeline route is not anticipated.

Trench Excavation and Dewatering

During construction, the pipeline trench will typically be excavated to average depths ranging from 1.5 to 2 m. While much of the excavation will occur in unconsolidated overburden deposits, some areas of thin overburden or exposed bedrock may require ripping of bedrock; blasting is not anticipated.

Depth to water table in Nova Scotia averages 3 m; it is deeper in upland areas and closer to the surface in lowland areas and near stream crossings. Where the water table is encountered above the trench bottom and in significant cuts required to maintain pipeline gradient, it may be necessary to dewater the trench, which may have a temporary effect on groundwater level.

Excavation is more likely to affect the shallow (<10 m depth) groundwater flow regime in overburden and shallow bedrock, with minimal effect on deeper flow systems. Interception or diversion of horizontal groundwater flow could temporarily or permanently affect down-gradient dug or shallow drilled wells, springs, and wetlands. Excavation dewatering may possibly result in loss of yield for dug wells in the immediate vicinity of the excavation, typically 4 to 5 m deep, especially during dry periods when water levels are naturally low. This is not expected to be a problem for this Project due to lengthy distance to the closest residences.

Desktop research shows that the distance to the closest residence is approximately 320 m on the Original Alignment and 100 m on the Alternative Corridor. The magnitude of the effect on water supply will depend on distance, location (up-gradient or down-gradient) of the excavation, hydraulic properties of the overburden deposits, depth of the excavation, and duration of excavation dewatering operations. For example, effects are unlikely to be significant at distances over 50 m from the excavation, and would be of more concern in highly permeable sand and gravel areas than in the glacial till terrain intersected by most of the route (overburden hydrogeology has not been assessed on a site-specific basis). The magnitude of water level decline in a dug well is likely to be greater up-gradient of an excavation.

Effects, if any, should be temporary, since most excavations will be shallow (1.5 m), and will be open for a few days to weeks at most, and pumping durations would be measured in hours to days on a site-specific basis during construction. No aquifer dewatering should occur during operation; however, long-term diversion of groundwater along the pipeline could occur unless the mitigative measures (*i.e.*, trench plugs) discussed below are implemented.

Shallow spring water supplies located close to and hydraulically down-gradient of the pipeline may be temporarily or permanently affected by the presence of a pipeline. This is not expected to occur if the water table is lower than the depth of the pipeline (1.5 m in this case), and if the pipeline installation does not interfere with surface re-charge of the aquifer, which is likely to be the case particularly after a year or two of settlement. Changes in the local aquifer permeability caused by equipment compaction or use of fill materials of lower permeability than the natural surrounding aquifer could reduce or intercept flow to some springs. The excavated material is the only expected fill material, so the permeability should not be significantly different.

Groundwater contributions to local stream waters may be affected if considerable flow interception occurs. Baseflow quantity effects are expected to be minimal. Since pipeline trenches are shallow and oriented perpendicular to most streams, deeper unaffected groundwater will still contribute to stream flow, and typical streams are supplied over a much larger area than that affected by a typical pipeline. Water quantity changes to stream waters due to trench excavation are therefore not considered to be significant.

Disposal of groundwater pumped from trenches will be controlled through standard erosion and sedimentation control practices to prevent siltation of nearby streams or overland flow towards wells. Mitigation measures will be implemented for areas within 200 m of residential water wells and near stream crossings. Procedures for disposal of pumped water and erosion control measures will be presented in the EMP that will be prepared prior to construction (see outline in Section 2.8.5 of the Alton Natural Gas Pipeline Environmental Assessment Registration, 2012).

Most effects on groundwater resources due to pipeline construction can be mitigated during planning and construction by using proven mitigation methods for control of runoff, excavation dewatering, and blasting. Most wells in the Original Alignment and the Alternative Alignment have been avoided due to the avoidance of residential areas during the route selection process. Mitigation should include, as required, measures to:

- identify and monitor water quantity and quality in all wells within 200 m of an excavation;
- avoid interruption of major springs used as water supplies;
- dewater excavations only where necessary;
- adjust scheduling to reduce the duration of excavation dewatering;
- use materials in trench backfill that closely approximate natural aquifer hydraulic properties;
- provide temporary potable water to affected users as required; and
- replace seriously affected wells with deeper dug wells or drilled wells.

Desktop research on the Original Alignment shows that the distance to the closest residence is approximately 320 m and 100 m distance on the Alternative Alignment. After ground-truthing, any wells within 200 m of the pipeline will be located, inspected, and inventoried for type, depth, water level, and probable yield. Baseline water quality samples should be collected for these wells, and analysis performed for total coliform bacteria, pH, and selected indicator parameters, depending on site-specific concerns (*e.g.*, acidity, turbidity). A water sample will be collected, labeled, and archived for later analysis in the event of a damage claim.

Careful scheduling can reduce the probability of well yield losses in areas prone to aquifer dewatering. Dewatering of excavations should be done only when necessary for safe installation of pipe and the duration of dewatering operations reduced. The preferred method is to reduce the length of time the excavation is open, by having the pipe ready and installing it as soon as possible after the trench is dug. This is how we plan to construct.

Depending on the nature of the potential groundwater disruption, composition of pipeline backfill materials should be considered. For example, it may be desirable to use permeable materials as backfill for pipeline segments completed in permeable media up-gradient of a spring, to maintain natural flow patterns towards a spring. In poorly permeable terrain, such as glacial till or bedrock, trench plugs consisting of impermeable materials may be necessary to prevent the trench from acting as an interceptor drain. The excavated material will normally be used as backfill, which will satisfy this requirement, except possibly at bedrock excavations.

In the unlikely event that interruption of residential wells or springs affects water supply, it may be necessary to provide a temporary water supply to affected users for a few days to weeks, depending on the construction schedule in each residential area. This is usually done using a portable storage tank and pumping system for the entire water supply, or a filter system or bottled supply for potable uses only.

In the unlikely event that a water supply well or spring is permanently impaired by pipeline construction, the well will be replaced as soon as practical with a drilled well of equivalent capacity and water quality. Drilled wells are preferred to replace dug wells or springs. Where drilled wells are not practical (*e.g.*, in gypsum terrain), a deeper dug well or cistern system may be appropriate.

Residual environmental effects of excavation and dewatering on groundwater resources should be temporary and of limited extent, provided that the above mitigative measures are implemented.

Blasting

Non-rippable bedrock within the typical excavation zone of about 1.5 to 2 m depth may require blasting. Deeper excavations may be required, depending on the gradient requirements of the pipeline. Alton is not anticipating any requirement for blasting.

Damage to water wells from blasting of the scale that would be carried out for the proposed pipeline is extremely unlikely. Studies have shown that relatively high levels of ground vibration have no significant or lasting effect on drilled or dug wells. The most likely noticeable effect would be a temporary increase in turbidity due to ground vibration. Well known relationships exist between blast charge weight, distance, and ground vibration. These relationships can be applied to design blasts to protect adjacent wells from damage.

Provided that the mitigation procedures are followed, significant adverse environmental effects on groundwater resources from blasting are unlikely to occur.

Summary

In summary, adverse residual environmental effects on groundwater resources during Project construction are predicted to be not significant. Contingency planning for malfunctions and accidents will be discussed further in Section 4.2.

3.1.2 Operation and Maintenance

Project interactions with groundwater resources during pipeline operation are anticipated to be minimal. Possible long-term effects, including interception of recharge to water wells, will be effectively controlled with the mitigative measures described above for the construction phase, and as described in the following discussion.

Herbicides will not be used to control vegetation along RoW. Mechanical means using bush-cutters will primarily be used to control vegetation growth on the RoW.

Depending on the local hydrogeology, the pipeline trench could cause permanent diversion of groundwater flow to shallow springs or dug wells. However, the shallow trench depth is unlikely to affect deep regional flow systems or most shallow flow systems.

Residual environmental effects on groundwater resources during Project operation are predicted to be not significant.

3.2 FOLLOW-UP AND MONITORING

Pre-construction monitoring will be conducted to collect baseline groundwater data for wells potentially affected by trench excavation and dewatering, and blasting.

- All wells within 200 m of RoW where trench excavation and dewatering will occur will be located, inspected and inventoried for depth, water level and probable yield. Baseline water quality samples will be collected (*e.g.* RCAP-MS+bacteria) as appropriate; and

- All wells within 500 m of blasting areas will be ground truthed. Low yield wells within 500 m of blasting zone will be identified.

4.0 Contingency Planning

Malfunctions and accidental events that may have an effect on private and public water supplies include:

- spills of fuel or hazardous materials; and
- pipeline rupture resulting in explosion and/or fire (*i.e.,* forest fire).

Hazardous material from equipment maintenance (*i.e.*, oil or fuel spill) could accidentally spill into the nearby environment. Spills would be limited to relatively small quantities, typically broken hydraulic systems or small amounts of spilled fuel from construction or maintenance vehicles or equipment. In the unlikely event that such a spill should occur, a Spill Management Plan and Emergency Response and Contingency Plans will be in place to quickly address

environmental risks. For example, these Plans would specify clean-up materials to be kept on site as well as clean-up procedures, notifications and worker training.

There is a possibility of mechanical failure of the pipeline. This could result in high pressure gas escaping into the atmosphere. Since natural gas is lighter than air, the gas would rise upward and dissipate. Wind would affect the area of dissipation. The natural gas (methane) meets pipeline specifications, and therefore will not include hydrogen sulphide. If the escaping gas were to ignite, this could cause a localized explosion and fire. A custody transfer metering station may be constructed at the tie-in point of the 16” to 24” steel gas pipeline and the 12” M&NE Halifax Lateral. This station will measure and control the natural gas flow to and from the storage cavern system. An ESD (Emergency Shutdown) system will allow for the isolation of the Alton Gas Pipeline in case of an emergency. This ESD system may be activated by local controls, by remote signals from the Alton cavern site facilities, or by remote signals from the Maritimes & Northeast pipeline control centre. Equipment will be housed in a lockable building and the site facilities will be fenced.

4.1 PUBLIC DRINKING WATER SUPPLY

Malfunctions or accidents during any of the Project phases could cause adverse effects on surface water resources if these occurred close to watercourses. These could occur from spills of hazardous materials during pipeline construction and operation and from the use of firefighting chemicals. Spills that could reasonably be expected to occur would typically be limited to relatively small quantities.

Accidental releases near or into surface waters could cause a contamination of the public drinking water supply. The severity of an accidental release would depend on the chemical characteristics and volume of the release, the proximity to a watercourse, and hydraulic properties of the aquifer between the spill site and the watercourse.

Relatively small amounts of fuel and hydraulic fluid spilled during equipment operation are the most likely types of accidental releases of hazardous materials. During most spills of this kind, construction equipment would not be operating near the stream. Several mitigative measures can be applied during the construction and operation stages to further reduce the release of hazardous substances to the environment. In the event of a serious release, the following will occur as applicable:

- notify NSE by contacting the Environmental Emergency Line: 1-800-565-1633;
- immediately notify any downstream water supply authorities; (not applicable to natural gas releases);
- carry out emergency clean-up and/or isolation of the release; (not applicable to natural gas releases);
- carry out hydrogeological or hydrological assessment of contaminant fate and mobility if water supplies are at risk; (not applicable to natural gas releases);

- install down-gradient monitoring between the source and any downstream receptors; (not applicable to natural gas releases); and
- provide monitoring, treatment, or replacement of the affected water supply, if required. (not applicable to natural gas releases).

In order to reduce the potential for discharge of hazardous materials into watercourses the maintenance and cleaning of mobile construction equipment, including refueling, will not be carried out within 30 m of watercourses.

Since there exists a potential for significant adverse effects in the event of a major accident or release of a hazardous liquid, a contingency and emergency response plan is required. A Spill Management Plan and Emergency Response and Contingency Plan will be prepared prior to construction. These Plans will also be filed by Alton with the Nova Scotia UARB prior to construction.

Adverse effects could occur from firefighting foams and other accident response activities. However, these effects would be naturally mitigated over time, and would likely only temporarily affect the immediate area. Due to natural flushing processes, the watercourse would likely return to normal soon after repairs were completed.

Significant residual environmental effects on surface water resources due to malfunctions and accidents are predicted to be low, provided accidental releases or pipeline leaks are discovered early through routine monitoring and maintenance and are remediated or repaired in a timely manner.

A spill of hydrocarbons associated with equipment involved in construction and maintenance of the pipeline could cause a variety of adverse effects on surface water quality in the watercourses encountered by the Project. Spill prevention is the most important step in preventing these potential effects. Prevention is based on effective and well-planned procedures and maintenance of equipment. Spills that could reasonably be expected to occur would be limited to relatively small quantities.

In the case of a minor spill, cleanup efforts would begin immediately in accordance with the Spill Management Plan and the Emergency Response and Contingency Plans.

General mitigative measures to avoid the releases of toxic chemicals are as follows:

- limiting areas of disturbance and situating temporary ancillary elements at least 30 m from watercourses;
- equipment/vehicles working within 30 m of a watercourse will be inspected to identify potential sources of hydrocarbon leaks and any defects corrected before work commences;
- wastewater from washing equipment will not be released within 30 m from a watercourse;

- fuel storage and designated fuelling areas will be located at least 30 m from watercourses and wetlands;
- storage of hazardous materials will not occur within 30 m of watercourses.
- refuelling and equipment maintenance required in the field will not be undertaken within 30 m of a watercourse or wetland;
- storage of all hazardous materials will comply with WHMIS requirements, and appropriate material safety data sheets will be located at the storage site.

Based on the nature of materials used during construction and small quantities, mitigation and contingency planning, residual environmental effects due to accidental spills are considered to be not significant.

4.2 PRIVATE DRINKING WATER SUPPLY

Malfunctions or accidents during any of the Project phases could have some adverse effects on groundwater resources. These may include spills of hazardous materials during pipeline construction and operation, gas leaks during operation, and the use of firefighting chemicals to fight fires.

Accidental releases of petroleum hydrocarbons or other compounds or release of firefighting chemicals could theoretically degrade local and down-gradient groundwater quality to below acceptable criteria specified by the Guidelines for Canadian Drinking Water Quality (Health Canada 1996). The significance of an accidental release would depend on the chemical characteristics and volume of the release, the proximity to wells, and hydraulic properties of the aquifer affected. For example, a spill in an area of thick, poorly permeable soil is less likely to affect aquifers or down-gradient wells than a spill in an area of highly permeable overburden or permeable fractured bedrock.

Several mitigative measures can be applied during the construction and operation stages to prevent release of hazardous substances to the environment. In the event of a spill (a natural gas spill will not interact with private drinking water supplies except for potential effects associated with fighting a fire) , and depending on the size and type of spill, the contractor or operator would be expected to:

- notify NSE by contacting the Environmental Emergency Line: 1-800-565-1633;
- carry out emergency clean-up and/or isolation of the release; (not applicable to natural gas releases);
- carry out hydrogeological assessment of contaminant fate and mobility if wells are at risk; (not applicable to natural gas releases);
- install down-gradient groundwater monitoring between the source and any receptors (wells, streams) or receptors, depending on distance; (not applicable to natural gas releases); and
- provide treatment or replacement of affected water supply, if required. (not applicable to

natural gas releases).

Emergency response measures will be described in detail in the Emergency Response and Contingency Plan.

No significant residual environmental effects to Groundwater Resources due to accidental releases during construction and operation are anticipated, provided that the above mitigation measures are followed. Any water supply wells or springs permanently affected by groundwater flow diversion, accidental release of hazardous material, or blasting damages will be replaced to correct the problem.

5.0 References

5.1 PERSONAL COMMUNICATION

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