

## **9.9 Socio-Economic Conditions**

### **9.9.1 Introduction**

The NSE requires that proponents provide a compilation of data on the current socio-economic conditions that could potentially be affected by the Project. For purposes of this EA, the Project area includes the primary Project area (i.e., the proposed LNG facility, water pipeline and Meadow Lake) and the Project area (i.e., Guysborough and Antigonish counties). The County of Guysborough has a population of 8,140. The County of Antigonish has a population of 19,590. The MODG is one of two municipalities in Guysborough. It is comprised of 2,116.86 km<sup>2</sup>, has a population of 4,995 (Statistics Canada, 2011) and a population density of 2.36 persons per km<sup>2</sup>. The Project area is in the MODG.

The Project area communities are mostly small hamlets consisting of few homes, a gas station, and a general store which service a greater population that is distributed along the major paved roads, primarily Route 316.

The main service centres for the Project area are the Towns of Guysborough and Antigonish. Guysborough is located 40 km northeast of Goldboro and is the main service oriented area for the Municipality. There are no major industries located in the Town; however it does provide many services, both government and private, for its residents. The Town is home to the Municipal Building, court facilities, a hospital and rest home complex, and a small shopping mall.

The Town of Antigonish is located 70 km northwest of Goldboro. It is home to the only university in the Project area (St. Francis Xavier University) and has many associated services including a regional health centre (St. Martha's Regional Hospital), hotels and motels, restaurants, and a large centre suitable for conventions, sporting events, and cultural activities.

### **9.9.2 NS Historical Growth and Economic Outlook**

The data for this review were obtained mainly from:

- Statistics Canada;
- Nova Scotia Department of Finance (NSF), Economics and Statistics Division; and
- Canadian Occupational Projection.

NS's economic output has lagged the national average for most of the past decade. However, the province outperformed the national average during the 2008-2009 financial crisis and recession. The latest estimates of Real Gross Domestic Product (GDP) suggest NS's economy advanced 1.9% in 2010 and 0.5% in 2011 (NSF, 2013a).

Year to date 2012 (Jan – Oct), consumer prices are up +2.0% in NS compared with an average of +1.7% in Canada. Energy prices continue to be one of the major sources of higher inflation in NS with energy prices rising +6.5% in the province during that time compared to an increase of +2.1% nationally (NSF, 2013b).

Since the announcement of the Irving Shipbuilding Contract the consensus outlook for NS has improved for 2013 and 2014. The consensus outlook for growth in 2012 was 1.3%, 2.0% in 2013, and 2.1% in 2014. The NSF expects the average consensus outlook for the 2013-2015 periods to be similar (NSF, 2013a).

Recent projections from the Canadian Occupational Projection System suggest that NS's labour market will require an additional 74,700 workers over the five year period from 2011 to 2016. New employment growth is expected to increase the number of jobs by 18,700 (or 4.1%) in a wide variety of occupational areas and across a range of skills – from entry level skills in the service sector to highly advanced skills in specialized manufacturing areas.

NS's employment has been relatively steady over the past few years. Following a 0.1% decline in 2009, employment advanced 0.2% in 2010 followed by 0.1% in 2011. Year to date (Jan-Nov) 2012, employment is up 0.9% in NS compared to the same period in 2011, averaging 456,155 persons. The average unemployment rate year to date in NS was 8.9% in 2012, unchanged from the same period in 2011.

NS's labour force participation is highest in health care, education, and trade sectors. However, participation in both trade and educational services declined year over year from 2011 to 2012. There significant increases in participation in the utility, professional, scientific, and technical services sectors over the same period (Table 9.9-1).

**Table 9.9-1 NS Labour Force Statistics, by Industry**

Seasonally Adjusted Data ('000)	4 <sup>th</sup> Qtr.	%	4 <sup>th</sup> Qtr.	Yearly Variation	
	2012		2011	#	%
Total employed, all industries('000)	454		454.2	-0.2	0.00%
Goods-producing sector ('000)	83.1	0.0%	82.9	0.2	0.30%
Agriculture	6.2	1.4%	4.6	1.6	35.50%
Forestry, fishing, mining, quarrying, oil and gas	11.4	2.5%	10.7	0.7	6.20%
Utilities	4.4	1.0%	3.8	0.6	15.70%
Construction	30.3	6.7%	31.1	-0.8	-2.70%
Manufacturing	30.8	6.8%	32.6	-1.8	-5.50%
Services-producing sector ('000)	370.9	0.0%	371.3	-0.4	-0.10%
Trade	69.7	15.4%	76.9	-7.2	-9.40%
Transportation and warehousing	20.7	4.6%	22.2	-1.5	-6.70%
Finance, insurance, real estate and leasing	23.2	5.1%	23.3	-0.1	-0.40%
Professional, scientific and technical services	27.7	6.1%	24.3	3.4	14.00%
Business, building and other support services	21	4.6%	20	1	5.20%
Educational services	36.8	8.1%	37.9	-1.1	-2.90%
Health care and social assistance	68.4	15.1%	68	0.3	0.50%
Information, culture and recreation	19.2	4.2%	21	-1.8	-8.40%
Accommodation and food services	34.9	7.7%	26.2	8.7	33.20%
Other services	19.7	4.3%	20.2	-0.5	-2.60%
Public administration	29.7	6.5%	31.3	-1.7	-5.30%

Source: NSF, 2013b- data modeled from Statistics Canada, Census of Population

The rate of population growth will be a key feature of the economy because it will be a major influence on consumer spending and the ability of industry to hire labour. The aging of the baby boom generation, combined with net out-migration from the younger age cohorts is demonstrated in Table 9.9-2 for the period 2001 - 2011.

**Table 9.9-2 NS Population by 5-Year Age Groups**

Age Groups	2001		2006		2011		Percent Change 2001 - 2011
	#	%	#	%	#	%	
Total Reporting	908,005	100	913,465	100	921,725	100	1.5
<b>By 5-year Age Groups</b>							
0-4 yrs	47,455	5.2	42,045	4.6	43,980	4.8	-7.3
5-9 yrs	55,840	6.1	48,145	5.3	44,420	4.8	-20.5
10-14 yrs	61,725	6.8	56,250	6.2	49,815	5.4	-19.3
15-19 yrs	61,750	6.8	61,435	6.7	57,440	6.2	-7
20-24 yrs	56,180	6.2	56,770	6.2	59,620	6.5	6.1
25-29 yrs	54,495	6	50,595	5.5	51,920	5.6	-4.7
30-34 yrs	60,725	6.7	54,635	6	51,540	5.6	-15.1
35-39 yrs	75,475	8.3	60,935	6.7	56,380	6.1	-25.3
40-44 yrs	76,955	8.5	75,720	8.3	62,110	6.7	-19.3
45-49 yrs	71,065	7.8	77,210	8.5	76,280	8.3	7.3
50-54 yrs	67,210	7.4	71,705	7.8	77,465	8.4	15.3
55-59 yrs	51,270	5.6	67,880	7.4	70,960	7.7	38.4
60-64 yrs	41,300	4.5	51,925	5.7	66,425	7.2	60.8
65-69 yrs	35,960	4	40,155	4.4	48,915	5.3	36
70-74 yrs	30,685	3.4	33,145	3.6	36,395	3.9	18.6
75-79 yrs	25,680	2.8	26,435	2.9	27,655	3	7.7
80-84 yrs	18,735	2.1	19,870	2.2	20,020	2.2	6.9
85+ yrs	15,510	1.7	18,615	2	20,385	2.2	31.4

Source: NSF, 2013b- data modeled from Statistics Canada, Census of Population

Total population has remained essentially unchanged, through a combination of net out-migration from younger age groups and net in-migration of older age groups, for the last ten (10) years.

Non-residential construction investment is expected to fluctuate according to developments in offshore hydrocarbon production, development, and exploration. Intense construction activity could occur over the next five to eight years, assuming the development of both the proposed Project and the Melford International Terminal.

The \$25 billion Irving Ship Building contract will play an important role in the economy of NS for the foreseeable future. The Project is expected to generate \$117 million in personal income tax, \$115 million in indirect taxes and \$34 million in corporate income tax in an average year during the 25 year lifespan of the Project. As well, Project -related personal income will average \$447 million a year over the life of the Project (Greater Halifax Partnership, 2011). These significant

increases in personal income and tax revenue across NS will drive economic activity in the province's retail and service industries and assist in alleviating government fiscal constraints.

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.13.2.

### 9.9.3 First Nations Communities

While it is known that the Project area was once occupied by Mi'kmaq families who frequented the area for its rich fishing, since the implementation of Federal policies under the *Indian Act*, no First Nations communities (reserves) are located in or in close proximity to the Project area.

A review of outstanding specific claims was undertaken by Mi'kmaq All Points Services (Mi'kmaq All Points Services, 2011). No specific claims are pending within the Project area. This does not imply, however, that a specific land claim may not arise in the future.

The nearest mainland First Nation (Mi'kmaq) community is Paq'tnkek First Nation (in Afton, NS). It is located 77 km north of Goldboro in Antigonish County near Heatherton - mid way between the Canso Causeway and the Town of Antigonish.

#### 9.9.3.1 Paq'tnkek First Nation

The Paq'tnkek First Nation has a registered population of 539, of which 376 live on Reserve. The Paq'tnkek Band Council consists of six members. Paq'tnkek First Nation administers three Reserve properties (Table 9.9-3)

**Table 9.9-3 Paq'tnkek First Nation Reserve Properties**

Community	Area	Location	Population	Date established
Franklin Manor 22 (48% share with Pictou Landing First Nation)	212.5 ha (525 acres)	32 km. southeast of Amherst	0	March 3, 1865
Paq'tnkek-Niktuek 23	218.1 ha (539 acres)	24 km. east of Antigonish	373	March 3, 1820
Welnek 38	43.4 ha (107 acres)	18 km. east of Antigonish	0	August 28, 1990

In addition to Paq'tnkek some Band members from the Millbrook and Indian Brook First Nations have been involved in the resource harvesting in the lands and waters near the Project area, and are, as a result familiar with the region.

#### 9.9.3.2 Millbrook Band

The Millbrook Band is located near Truro, NS, and has a 12 member Band Council. Millbrook First Nation administers seven Reserve properties (Table 9.9-4).

**Table 9.9-4 Millbrook Band Reserve Properties**

Community	Area	Location	Population	Date established
Beaver Lake 17	49.4 ha (122 acres)	78.4 km southeast of Halifax	23	March 3, 1867
Cole Harbour 30	18.6 ha (46 acres)	9.6 km east of Halifax	194	March 3, 1880
Millbrook 27	302.0 ha (746 acres)	8 km south of Truro	847	March 3, 1886
Sheet Harbour 36	32.7 ha (81 acres)	91.2 km northeast of Halifax	15	March 3, 1915
Truro 27A	16.7 ha (41 acres)	Joined south of Truro town limit	0	March 3, 1904
Truro 27B	16.4 ha (41 acres)	Joined with 27A on south	0	March 3, 1907
Truro 27C	9.5 ha (23 acres)	Joined with 27B on south	0	March 3, 1909

### 9.9.3.3 Indian Brook First Nation

The Indian Brook First Nation is located near Shubenacadie, NS and also has a 12 member Council. Indian Brook First Nation administers four Reserve properties (Table 9.9-5).

**Table 9.9-5 Indian Brook First Nation Reserve Properties**

Community	Area	Location	Population	Date established
Indian Brook 14	1,234.2 ha (3,050 acres)	28.8 km southwest of Truro	1,084	July 8, 1820
New Ross 20	408.3 ha (1,009 acres)	64 km northwest of Halifax	0	March 3, 1820
Pennal 19	43.5 ha (107 acres)	67.2 km northwest of Halifax	22	March 3, 1858
Shubenacadie 13	412 ha (1,020 acres)	32 km north of Halifax	0	March 3, 1820

As part of the environmental assessments for the previous Keltic Project, a Mi'kmaq Ecological Knowledge Study (MEKS) was conducted by Membertou Geomatics Consultants (2005). As part of the Project, a recent update of the MEKS was completed and is presented in Appendix L. This updated report identifies lands and resources of use and interest to the Mi'kmaq of NS in the Project area, and which may potentially be affected by Project development. The updated Goldboro LNG MEKS report has been presented to the Mi'kmaq Chiefs as a separate document. It should be noted that during Project conceptualization of the Project Pieridae initiated an ongoing comprehensive Aboriginal Community Engagement Strategy (see Section 13.2 below).

In accordance with the existing protocols adopted by the Assembly of Nova Scotia Chiefs, the objective of the MEKS is to support the integration of Mi'kmaq knowledge of use and occupation of Mi'kma'ki (the Mi'kmaq homeland, including the Atlantic Provinces and Gaspé Peninsula) into development decisions via the environmental assessment process. The MEKS includes:

- a study of historic and current Mi'kmaq land and resource use;
- an evaluation of the potential impacts of the Project on Mi'kmaq use and occupation and constitutionally based rights;
- an evaluation of the significance of the potential impacts of the Project on Mi'kmaq use and occupation; and
- recommendations to Pieridae and provincial regulators that include recommendations for mitigation measures, further study, or consultation with Mi'kmaq.

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.14.6.

## 9.9.4 Guysborough County Socio-Economic Conditions

### 9.9.4.1 Population

The census population of Guysborough County was 8,140 in 2011. Table 9.9-6 demonstrates that the population has been in constant decline over the past decade; declining by 17.2% from 2001 to 2011.

**Table 9.9-6 Guysborough County, Population by 5-Year Age Groups**

Age Group	2001		2006		2011		Percent Change 2001 – 2011
	#	%	#	%	#	%	
Total Reporting	9,825	100	9,055	100	8,140	100	-17.2
<b>By 5-year Age Groups</b>							
0-4 yrs	400	4.1	300	3.3	260	3.2	-35
5-9 yrs	490	5	405	4.5	295	3.6	-39.8
10-14 yrs	635	6.5	460	5.1	405	5	-36.2
15-19 yrs	745	7.6	600	6.6	415	5.1	-44.3
20-24 yrs	455	4.6	390	4.3	295	3.6	-35.2
25-29 yrs	410	4.2	285	3.1	270	3.3	-34.1
30-34 yrs	500	5.1	385	4.3	270	3.3	-46
35-39 yrs	750	7.6	470	5.2	385	4.7	-48.7
40-44 yrs	800	8.1	720	8	445	5.5	-44.4
45-49 yrs	740	7.5	795	8.8	685	8.4	-7.4
50-54 yrs	800	8.1	740	8.2	755	9.3	-5.6
55-59 yrs	660	6.7	850	9.4	750	9.2	13.6
60-64 yrs	585	6	710	7.8	845	10.4	44.4
65-69 yrs	565	5.8	565	6.2	655	8	15.9
70-74 yrs	480	4.9	480	5.3	510	6.3	6.3
75-79 yrs	330	3.4	385	4.3	400	4.9	21.2
80-84 yrs	255	2.6	260	2.9	270	3.3	5.9
85+ yrs	230	2.3	250	2.8	235	2.9	2.2

Source: NSF, 2013b - data modelled from Statistics Canada, Census of Population

### 9.9.4.2 Economic Structure

Table 9.9-7 provides an overview of the economic structure of Guysborough County based on 2006 Census data, the most recent data available on a county by county basis. The numbers in bold reflect the economic sectors in which the proportion of the labour force in that sector in the County is at least two times higher or lower than that in NS.

Guysborough County has over three times the percentage of its labour force involved in Agriculture, Forestry, Fishing and Hunting and Mining and Oil and Gas Extraction relative to NS. The proportion of the labour force involved in Manufacturing is 30% higher than that of the Province and almost twice that of Antigonish County.

Relative to the Province Guysborough County has a low representation of Information and Cultural Industries, Finance, Insurance and Real Estate and Professional, Scientific and Technical Services in its economic structure. These numbers are indicative of the distance of Guysborough County from Metropolitan Halifax.

**Table 9.9-7 Labour Force by Industry, 2006**

Industry	Guysborough County		Antigonish County		NS	
	#	%	#	%	#	%
All Industries	4,310	0.90%	11,014	2.30%	478,875	
Agriculture, Forestry, Fishing & Hunting	866	20.10%	1,123	10.20%	24,902	5.20%
Mining and Oil & Gas Extraction	108	2.50%	121	1.10%	3,831	0.80%
Utilities	0	0.00%	33	0.30%	2,873	0.60%
Construction	366	8.50%	958	8.70%	28,733	6.00%
Manufacturing	578	13.40%	782	7.10%	47,888	10.00%
Wholesale & Retail Trade	461	10.70%	1,619	14.70%	77,099	16.10%
Transportation & Warehousing	198	4.60%	385	3.50%	21,549	4.50%
Information & Cultural Industries	52	1.20%	143	1.30%	11,493	2.40%
Finance, Insurance & Real Estate	99	2.30%	352	3.20%	22,507	4.70%
Professional, Scientific & Technical Services	99	2.30%	330	3.00%	20,592	4.30%
Administration, waste management and remediation	69	1.60%	220	2.00%	22,507	4.70%
Educational Services	328	7.60%	1,597	<b>14.50%</b>	34,479	7.20%
Health Care & Social Assistance	409	9.50%	1,278	11.60%	53,155	11.10%
Accommodation & Food Services	181	4.20%	859	7.80%	34,479	7.20%
Other Services (except public administration)	250	5.80%	760	6.90%	32,564	6.80%
Public Administration	241	5.60%	430	3.90%	40,704	8.50%

Source: NSF, 2013b



### 9.9.4.3 Labour Force Age Group and the Active Labour Force

The key labour force age group (30 to 54 years) comprises about 31.2% of the County's population (Table 9.9-6). This is lower than the Provincial rate (Table 9.9-2) of about 35.1%. This is partially explained by the fact that Guysborough County has a substantially lower portion of its population in the age group from the 0 to 34 years than NS; 27.1% for Guysborough County versus 38.9% for NS. The low percentage is likely due to modest economic opportunities in the Guysborough County area.

The employment rate for Guysborough County residents aged 15 and over increased by 5.8 percentage points to 54.8% between 1996 and 2006 and there were 45 more employed workers. NS's employment rate exhibited an increase of 1.9 percentage points to 62.9% between 1996 and 2006, and there were 51,800 more employed workers, during the period.

Table 9.9-8 describes labour force activity in Guysborough County and shows that the labour force age group from 1996 to 2006 declined by 7.3% compared to an 11.3% decline in the total population of Guysborough County in the period. However, the relative strength of the labour force age group is due to the relatively large proportion of the population aged 55 years and older. Table 9.9-9 describes labour force activity in the province.

**Table 9.9-8 Labour Force Activity - 15 Years and Over, Guysborough**

Activity	1999		2001		2006		Percent Change 1996 - 2006
	#	%	#	%	#	%	
<b>Total Reporting</b>	<b>8,785</b>	<b>100</b>	<b>8,200</b>	<b>100</b>	<b>7,790</b>	<b>100</b>	<b>-11.3</b>
In the labour force	4,605	52.4	4,365	53.2	4,270	54.8	-7.3
Employed	3,575	40.7	3,365	41	3,620	46.5	1.3
Unemployed	1,025	11.7	1,000	12.2	650	8.3	-36.6
Not in the labour force	4,185	47.6	3,835	46.8	3,520	45.2	-15.9
Participation rate	n/a	52.4	n/a	53.2	n/a	54.8	4.6
Employment rate	n/a	40.7	n/a	41	n/a	46.5	14.3
Unemployment rate	n/a	22.3	n/a	22.9	n/a	15.2	-31.8

Source: NSF, 2013b

**Table 9.9-9 Labour Force Activity - 15 Years and Over, NS**

Activity	1996		2001		2006		Percent Change 1996-2006
	#	%	#	%	#	%	
<b>Total Reporting</b>	<b>719,970</b>	<b>100</b>	<b>732,365</b>	<b>100</b>	<b>756,595</b>	<b>100</b>	<b>5.1</b>
In the labour force	438,970	61	451,375	61.6	476,125	62.9	8.5
Employed	380,790	52.9	402,295	54.9	432,590	57.2	13.6
Unemployed	58,185	8.1	49,080	6.7	43,530	5.8	-25.2
Not in the labour force	281,000	39	280,990	38.4	280,470	37.1	-0.2
Participation rate	n/a	61	n/a	61.6	n/a	62.9	3.1
Employment rate	n/a	52.9	n/a	54.9	n/a	57.2	8.1
Unemployment rate	n/a	13.3	n/a	10.9	n/a	9.1	-31.6

Source: NSF, 2013b



By comparing Tables 9.9-8 and 9.9-9 it is evident that the labour force age group in Guysborough County is substantially lower than that for the rest of NS.

#### 9.9.4.4 Potential New Labour Supply

Table 9.9-10 shows that the education attainment levels of the labour force age group in Guysborough County are substantially lower than those for the rest of NS (i.e., 40.5% of people aged 20 years and older have less than high school education). Although the County is roughly comparable to the rest of NS in terms of the attainment of post secondary certificates or diplomas it has much lower attainment levels with respect to those having a university degree. These rates are very low and suggest a difficulty in participating in a Project like Pieridae's which demands highly skilled trades. However, the data show that the labour force age group in Guysborough County has about the same propensity to hold a high school graduation certificate as the highest level of education attained as the rest of the Province.

**Table 9.9-10 Educational Attainment, Population 20+ (%), 2006**

Location	Less than High School	High school Graduation Certificate	Post-Secondary Certificate or Diploma	University Degree - Bachelors or Higher
Guysborough County	40.5%	19.7%	29.3%	10.5%
Antigonish County	19.0%	20.2%	34.4%	26.4%
NS	22.9%	22.6%	32.3%	22.2%

Source: NSF, 2013b

#### 9.9.4.5 Income

Table 9.9-11 shows household income in Guysborough County is substantially lower than in NS. The average household income is at about 77.7% of that in the rest of NS. The median household income is at about 74.9% of that in the rest of NS.

Notwithstanding the lower household income, according to Statistics Canada (2006), the incidence of low income among households is roughly the same in Guysborough County as in the rest of NS. The change in the incidence of low income households from 1996 to 2006 suggests that the Sable Gas Project enabled the households in Guysborough County to substantially improve their incomes.

**Table 9.9-11 Household Income for Guysborough County, Antigonish County, and NS**

Location	Household Income, 2006		Incidence of Low Income in Households (%)		
	Average Household Income	Median Household Income	1996	2001	2006
Guysborough County	\$44,553	\$34,894	23.5	16.1	13.2
Antigonish County	\$60,236	\$49,581	16.0	12.7	9.7
NS	\$57,366	\$46,605	18.8	16.6	13.8

Source: NSF, 2013b

### 9.9.4.6 Socio-economic Planning in Guysborough County

The Guysborough County Regional Development Authority (GCRDA) is the lead economic planning agency in Guysborough County. The “*Strategic Planning Report, 2012-2017*” describes the principal strategic directions to improve economic conditions in the County (GCRDA, 2013). The strategic directions are:

- attracting Investment;
- retaining and expanding existing businesses;
- developing community infrastructure;
- examining development issues;
- engaging youth; and
- welcoming people.

### 9.9.5 Antigonish County Socioeconomic Conditions

#### 9.9.5.1 Population

Table 9.9-12 shows that the population of Antigonish County remained relatively constant from 2001 to 2011. Although there was a decline from 2001 to 2006, the increase in population from 2006 to 2011 resulted in a modest 0.1% population increase over the past ten years.

**Table 9.9-12 Antigonish County, Population by 5-Year Age Groups**

Age Group	2001		2006		2011		Percent Change 2001 - 2011
	#	%	#	%	#	%	
<b>Total Reporting</b>	<b>19,580</b>	<b>100</b>	<b>18,835</b>	<b>100</b>	<b>19,590</b>	<b>100</b>	<b>0.1</b>
<b>By 5-year Age Group</b>							
0-4 yrs	1,080	5.5	960	5.1	1,040	5.3	-3.7
5-9 yrs	1,320	6.7	1,070	5.7	1,055	5.4	-20.1
10-14 yrs	1,610	8.2	1,280	6.8	1,120	5.7	-30.4
15-19 yrs	1,685	8.6	1,585	8.4	1,380	7	-18.1
20-24 yrs	1,410	7.2	1,350	7.2	1,515	7.7	7.4
25-29 yrs	1,000	5.1	960	5.1	1,045	5.3	4.5
30-34 yrs	1,185	6.1	985	5.2	1,025	5.2	-13.5
35-39 yrs	1,365	7	1,120	5.9	1,120	5.7	-17.9
40-44 yrs	1,540	7.9	1,345	7.1	1,230	6.3	-20.1
45-49 yrs	1,505	7.7	1,510	8	1,435	7.3	-4.7
50-54 yrs	1,455	7.4	1,515	8	1,565	8	7.6
55-59 yrs	1,065	5.4	1,480	7.9	1,535	7.8	44.1
60-64 yrs	805	4.1	1,055	5.6	1,440	7.4	78.9
65-69 yrs	665	3.4	745	4	1,040	5.3	56.4
70-74 yrs	570	2.9	595	3.2	720	3.7	26.3
75-79 yrs	505	2.6	475	2.5	525	2.7	4
80-84 yrs	415	2.1	370	2	375	1.9	-9.6
85+ yrs	405	2.1	435	2.3	420	2.1	3.7

Source: NSF, 2013b

### 9.9.5.2 Economic Structure

Table 9.9-7 provides an overview of the economic structure of Antigonish County. It has roughly twice the percentage of its labour force involved in Agriculture, Forestry, Fishing and Hunting and Educational Services than NS as a whole. Relative to the Province it has a low representation of Utilities, Information and Cultural Industries, Management and Administration and Public Administration in its economic structure.

With the exception of the relatively low representation of Information and Cultural Industries these numbers are not surprising given the strong university presence in Antigonish County and the role of the Town of Antigonish as a service and retail centre for the North Shore area.

### 9.9.5.3 Labour Force Age Group/Active Labour Force

The key labour force age group, aged 30 years to 54 years, comprises about 32.5% of the County's population (Table 9.9-12). This is slightly lower than the Provincial rate (Table 9.9-2) of about 35.1%. The major difference in population structure shows up in the fact that Antigonish County has a higher portion of its population in the age group from the 0 to 34 years (41.6%) than NS (38.9%). The higher percentage is due mainly to the existence of St. Francis Xavier University in the Town of Antigonish.

Table 9.9-13 describes labour force activity for Antigonish County. It shows that the labour force age group (i.e., the population aged 15 and over) from 1996 to 2006 grew by 8.4% compared to a 0.1% increase in the total population of the County in the same time period.

The demographic data indicate that Antigonish County, relative to Guysborough County, is home to more families with young children.

**Table 9.9-13 Labour Force Activity - 15 Years and Over, Antigonish County**

Activity	1996		2001		2006		Percent Change 1996-2006
	#	%	#	%	#	%	
<b>Total Reporting</b>	<b>14,960</b>	<b>100</b>	<b>15,370</b>	<b>100</b>	<b>15,395</b>	<b>100</b>	<b>2.9</b>
In the labour force	9,335	62.4	9,575	62.3	10,120	65.7	8.4
Employed	8,165	54.6	8,345	54.3	9,160	59.5	12.2
Unemployed	1,170	7.8	1,235	8	955	6.2	-18.4
Not in the labour force	5,625	37.6	5,795	37.7	5,275	34.3	-6.2
Participation rate	n/a	62.4	n/a	62.3	n/a	65.7	5.3
Employment rate	n/a	54.6	n/a	54.3	n/a	59.5	9
Unemployment rate	n/a	12.5	n/a	12.9	n/a	9.4	-24.8

Source: NSF, 2013b

#### **9.9.5.4 Potential New Labour Supply**

As Table 9.9-10 shows, education attainment levels of the labour force age group in Antigonish County are generally higher than those for the rest of NS. The lower propensity of the labour force age group in Antigonish County to have less than high school or a high school graduation certificate is a reflection of the higher rates of post-secondary certificates, diplomas or degrees.

#### **9.9.5.5 Income**

Table 9.9-11 indicates that household incomes in Antigonish County are about 105% of that in the rest of NS. The median household income is about 106.4% of that in the rest of NS.

According to Statistics Canada (2006), the incidence of low income households is lower in Antigonish County than in NS as a whole. The change in the incidence of low income in households from 1996 to 2006 suggests that the Sable Gas Project, combined with the generally improving conditions in the Canadian economy in the late 1990s, enabled the households in Antigonish County to substantially improve incomes.

#### **9.9.5.6 Socio-economic Planning in Antigonish County**

The Antigonish Regional Development Authority (ARDA) is the lead economic and community development agency in Antigonish County. Their primary objective is to improve the quality of life for citizens through increasing the number of quality job, increasing the population, and by reducing the percentage of people that are either unemployed or underemployed. The ARDA 2008 Strategic Plan presents the following strategic directions:

- business development;
- community development;
- marketing Antigonish; and
- population attraction and retention.

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.13.2.

#### **9.9.6 Property Values**

The average value of a dwelling in Guysborough County was \$91,800 in 2006. In Antigonish County, the average value of a dwelling was \$145,442 in 2006. The average value of a dwelling for NS as a whole was \$158,000 for the same time period (Statistics Canada, 2006).

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.14.2.

#### **9.9.7 Physical Infrastructure**

##### **9.9.7.1 Potable Water, Wastewater, and Solid Waste Management**

The Goldboro LNG site is a green field site in a rural setting. As such, it does not have access to municipal services such as potable water, wastewater collection, and treatment. These services are left to the tenant to develop.

Municipal water and sewer systems are available in the towns of Guysborough, Mulgrave, Sherbrooke, and the community of Canso. Municipal sewer service is also available in Little Dover and municipal water service is provided in Hazel Hill and the Tickle. There are plans to expand these services. The Town of Antigonish provides both drinking water and wastewater collection and treatment to its residents. The other areas of Antigonish and Guysborough counties rely on wells for potable water and septic systems for wastewater disposal.

The MODG provides waste management services to 230,000 Nova Scotians. It is located off Route 16 Meagher's Hill, between the Communities of Boylston and Lincolnville.

The Municipality of the County of Antigonish has a solid waste management facility located on the Beech Hill Road in the County of Antigonish. The Town of Antigonish does not have a solid waste management facility. As such, the Town contracts out this service.

#### **9.9.7.2 Public Utilities**

Nova Scotia Power Inc. (NSPI) provides electrical power to the entire province. Electrical power from the NSPI grid is available throughout the Project area.

#### **9.9.7.3 Communications**

High speed internet service is available throughout the province and the Project area. 21 community access sites (C@P sites) are available throughout Antigonish and Guysborough counties providing internet access to the general public (NSF, 2013b).

Local, long distance, cellular, and cable television services are available throughout Antigonish and Guysborough counties with services being provided by Bell Aliant, Eastlink, and a number of smaller service providers.

#### **9.9.7.4 Municipal and Social Services**

Support services in Antigonish and Guysborough counties are provided by both the municipal and provincial governments.

#### **9.9.7.5 Land Administration**

The Government of NS requires municipalities to plan development in their areas. Within the Project area, land use planning is provided by five entities. Table 9.9-14 shows the organizations responsible for land use planning and their areas of jurisdiction. The Project area at Goldboro is within the jurisdiction of the MODG's planning authority.

**Table 9.9-14 Project Area Land Use Planning**

Planning Authority	Jurisdiction
Municipality of the District of Guysborough	Eastern Guysborough County from Boylston to Auld's Cove including the Town of Canso but excluding the Town of Mulgrave.
Municipality of the District of St. Mary's	Municipality of the District of St. Mary's.
Eastern District Planning Commission	Areas of Antigonish, Inverness, and Richmond Counties, and the Town of Port Hawkesbury.
Town of Antigonish	Antigonish Municipal Area.
Town of Mulgrave	Mulgrave Municipal Area.

Source: Service Nova Scotia and Municipal Relations, 2013, AMEC Interpretation

### 9.9.7.6 Housing and Accommodations

#### Housing

The primary residences in the vicinity of the Goldboro LNG site are single family dwellings, primarily older two storey homes and some bungalows. These homes are serviced by private wells and on-site septic systems. Table 9.9-15 presents housing data for the Guysborough and Antigonish counties.

**Table 9.9-15 Project Area Private Dwellings**

County/Community	Census Year 2001	Census Year 2006	Census Year 2011	Percent Change
	# of Dwellings	# of Dwellings	# of Dwellings	
<b>Antigonish County</b>	<b>7,000</b>	<b>7,225</b>	<b>7,855</b>	<b>12%</b>
Town of Antigonish	2,184	2,139	2,467	13%
Pomquet	503	529	541	8%
Paqtnekek First Nation	n/a	n/a	125	n/a
Remainder of county	4,313	4,557	4,722	10%
<b>Guysborough County</b>	<b>3,940</b>	<b>3,890</b>	<b>3,685</b>	<b>-7%</b>
Town of Guysborough	799	811	790	-1%
Town of Canso	671	625	593	-12%
Town of Mulgrave	450	440	399	-11%
Town of Sherbrooke	664	667	643	-3%
Remainder of county	1,356	1,347	1,260	-7%
<b>Total Dwellings</b>	<b>10,940</b>	<b>11,115</b>	<b>11,540</b>	

Source: NSF, 2013b

The census data indicates that there are 11,540 private dwellings in Antigonish and Guysborough Counties. Availability rates were reported in 2001 and 2006 but were not reported in the 2011 data. Based on the data from 2006, private area dwelling rental availability rates (i.e., units available for rent whether occupied or not) for Antigonish and Guysborough Counties average 18%.



## Temporary Housing

Table 9.9-16 and Table 9.9-17 list the temporary accommodations available in Guysborough and Antigonish Counties. Only one Bed and Breakfast in Guysborough County is within ½ hour driving time from the proposed site. The Salsman Provincial Camp Ground is 14 km from the site but has limited capacity and is seasonal in nature.

**Table 9.9-16 Accommodation in Guysborough County**

Name of Accommodation	Location
Birchill Bed & Breakfast	Liscomb
Boylston Provincial Park	Boylston
Cape Canso R.V. Park and Marina	Canso
Daysago Bed & Breakfast	Sherbrooke
DesBarres Manor Country Inn	Guysborough
Foxberry by the Sea Bed & Breakfast	Whitehead
Last Port Motel	Canso
Liscombe Lodge	Liscomb Mills
Lonely Rock Seaside Bungalows Ltd.	New Harbour
Nimrod's Campground	Stillwater
On the Harbour B&B	Isaac's Harbour
Osprey Shores Golf Resort	Guysborough
Pepperlane Manor	Guysborough
Queensport House Bed & Breakfast	Queensport
Salsman Provincial Park	Country Harbour
Seabreeze Campground and Cottages	Fox Island
Seawind Landing Country Inn	Charlos Cove
Sherbrooke Village Inn & Cabins	Sherbrooke
St. Mary's River Lodge	Sherbrooke
Wilson's Cove Cottage Rentals	Wilson's Cove

Source: GCRDA, 2013

**Table 9.9-17 Accommodation in Antigonish County**

Name of Accommodation	Location
Antigonish Evergreen Inn	Town of Antigonish
Antigonish Harbour Pat's B&B	Lanark
Antigonish Highland Heart (Shebby's) B&B	Town of Antigonish
Azelia Farmhouse Bed & Breakfast	Connor's Road (RR2)
Bekkers Bed and Breakfast	Clydesdale
Blue Tin Roof Bed and Breakfast	Livingstone's Cove
Brigadoon Bed & Breakfast	Lanark
Chateau Motel	Town of Antigonish
Clanranald Tourist Suite	Town of Antigonish
Coastal Inn	Town of Antigonish
Country Mouse Bed & Breakfast	William's Point
Fisherman Crossing Bed 'n' Breakfast	Lakevale
Greenway Claymore Inn	Town of Antigonish
Hastain House Bed & Breakfast Antigonish	Town of Antigonish
Island Tree Farm B&B	Merigomish
June's B&B By the Sea	Malignant Cove
Keltic Gates Bed and Breakfast	Town of Antigonish
Killingwoth Bed and Breakfast	Town of Antigonish

Name of Accommodation	Location
Lighthouse Gate Bed & Breakfast	Linwood
Linwood Harbour Camp Ground	Linwood
Little Star Camp Ground	Marshy Hope
Maritime Inn	Town of Antigonish
McCarron's bed and Breakfast	Highway 245, 10 Km NW of Antigonish
Morrison's bed and Breakfast	Town of Antigonish
Oasis Motel	Town of Antigonish
Oasis Trailer and Camp Ground	Lower South River, Hwy 104
Peggy's Bed & Breakfast	St. Andrew's
Piping Plover Bed & Breakfast	Pomquet
Porter's Bed & Breakfast	Pomquet
Rose & Thistle Bed & Breakfast	Lower South River
Rouden Daach Bed and Breakfast	McArras brook
Silver Glen Suites	Town of Antigonish
St. Francis Xavier University Antigonish	Hostel and Conference, Antigonish
The Carpenter's Mrs.)	St. Andrew's
Victorian Inn	Town of Antigonish
Welcome Inn	Town of Antigonish
Whidden's Camp Ground	Town of Antigonish

Source: worldweb.com, 2013 and Bed and Breakfast Canada, 2013

#### 9.9.7.7 Public Health and Acute Care Services

##### Public Health Services

The Guysborough Antigonish Strait Health Authority (GASHA) is one of nine district health authorities established by the Nova Scotia Department of Health. GASHA provides healthcare services to over 44,000 individuals, Richmond County, Guysborough County, Antigonish County, and the southern portion of Inverness County. GASHA is comprised of three community health boards (CHBs):

- Antigonish Town and County CHB;
- Guysborough County CHB; and
- Strait Richmond CHB.

GASHA operates five hospitals with a total capacity of 126 beds (Table 9.9-18). Each hospital offers 24-hour emergency services All but the Strait Regional Hospital are located in either Guysborough or Antigonish counties.

**Table 9.9-18 GASHA Hospitals and Capacity**

Hospital Name	Location	Number of Beds
St Martha's Regional Hospital	Antigonish	89
Guysborough Memorial Hospital	Guysborough	10
St. Mary's Memorial Hospital in	Sherbrooke	6
Eastern Memorial Hospital in	Canso	6
Strait Richmond Hospital	East of Port Hawkesbury	15
<b>Total</b>		<b>126</b>

Source: GASHA, 2013a, AMEC Interpretation

GASHA also provides a variety of public health services, including: communicable disease control, maternal and child health, school health, chronic disease prevention, and healthy lifestyle promotion. Addiction services include a 10 bed detoxification facility in the Strait Richmond Hospital and a 20 bed recovery house in Antigonish (GASHA 2013a). The five programs GASHA runs are:

- addiction services;
- public health services;
- mental health services;
- primary health care; and
- continuing care.

The area served by GASHA has both fewer physicians and fewer registered and licensed practical nurses than the provincial average (Table 9.9-19).

**Table 9.9-19 Representation of Doctors and Nurses in NS and GASHA, 2010**

	#	Per 10,000 Population
<b>Doctors</b>		
NS Doctors	2451	26
GASHA Doctors	79	18
<b>Registered Nurses and Licensed Practical Nurses</b>		
NS RN	9173	97
GASHA RN	325	73
NS LPN	4034	43
GASHA LPN	114	26

Sources: NS Department of Health and Wellness, 2013b; Canadian Nurses Association, 2013; GASHA, pers. comm., 2013b; College of Licensed Practical Nurses of NS, pers. comm., 2013; AMEC interpretation

All nursing homes in the Province are managed by the NS Department of Health and Wellness. There are five nursing homes in the Project area with a combined capacity of 266 beds. They are situated in Guysborough, Canso, Sherbrooke, and two in Antigonish (NS Department of Health and Wellness, 2013b).

#### **9.9.7.8 Community Well-being and Family Social Services**

The health of the population of the Province of NS compared to the population served by GASHA in accordance with several indicators is presented in Table 9.9-20.

Residents served by GASHA exceed the Province in certain areas of health status. For instance, they smoke slightly less and have a slightly higher instance of women breastfeeding and those reporting diabetes. Residents of this area have about the same number of cardiac catheterizations but less coronary interventions and coronary arterial bypass grafts. According to data collected by Cardiac Health NS, GASHA residents not only have the lowest number of cardiac interventions and coronary artery bypass grafts in the province, but also the lowest rates of cardiac incidents, and the lowest cardiac mortality rates based on both in-hospital treatment

periods and in the first year following treatment (AMEC, 2008b). They have higher overweight/obesity rates and similar cancer incidence rates as their provincial counterparts. However, residents of this area are less active than the average Nova Scotian.

**Table 9.9-20 Regional Health Indicators**

Indicator (2003 Unless Otherwise Stated)	GASHA	NS
Breastfed / tried to breastfeed last child	76.3%	75.1%
Percentage of people physically active	40.2%	49.2%
Percentage of People Smoking	22.6%	23.10%
Adult incidence of Overweight/Obesity	62.9%	58.0%
Incidence counts - females with cancer per 100,000 of population -2007/08	400	390
Incidence counts - males with cancer per 100,000 of population -2007/08	482	482
Prevalence of Diabetes	7.5%	6.5%
Cardiac Catheterizations per 100,000 of population 2007-08	315	310
Coronary interventions per 100,000 of population 2007-08	125	167
Coronary Artery Bypass Graft per 100,000 of population 2007-08	51	76

Source: NS Department of Health, 2008; Cancer Care NS, 2013; AMEC Interpretation

The provincial Department of Community Services delivers community and family social services in the Project area. The Department offers services and information for children, youth and families, persons with disabilities, employment support and financial assistance, housing and repairs. The Department has offices in Guysborough, Port Hawkesbury, and Antigonish ([www.gov.ns.ca/coms](http://www.gov.ns.ca/coms)).

The Town of Antigonish, the largest municipality in the area, provides many services to the Project area. Within the community there are several homes for special care (nursing homes), senior citizen complexes, home care services and family counselling.

## 9.9.8 Emergency Services Infrastructure

### 9.9.8.1 Policing and Crime Rates

Policing in both Antigonish and Guysborough County is provided by the Royal Canadian Mounted Police (RCMP) through four detachments and 31 officers (Table 9.9-21). The proposed site is serviced by the Guysborough Detachment (approximately 40 km distance).

**Table 9.9-21 Project Area Police Services**

Detachment	Offices	Officers
Guysborough County	Guysborough, Sherbrooke, Canso	11
Antigonish County	Antigonish Town and County Detachment	20

Sources: RCMP, 2013, Hunter, V., pers. com., 2013, AMEC Interpretation

Table 9.9-22 shows crime statistics and rates for the area. The crime rates for both adults and youths are, in general, well below the provincial rates. The crime rate in Antigonish County is lower than that in Guysborough County.

**Table 9.9-22 Crime Statistics for Antigonish and Guysborough Counties, 2011**

County	Total # Crimes	Criminal Code Offences						
		Crime Rate/10,000 Population	Violent Crimes	Violent crime rate/10,000 population	Property Crimes	Property Crime rate/10,000 population	Other Crimes	Other Crime Rate/10,000 population
Guysborough	234	316	91	123	115	155	28	38
Guysborough Youth	24	505	8	168	14	295	2	42
Antigonish	372	254	82	56	227	155	63	43
Antigonish Youth	20	181	9	81	10	90	1	9
Province	61462	650	13786	146	38013	402	9663	102
Province Youth	5715	898	1685	265	2843	447	1187	187

Source: NSF, 2013b - AMEC Interpretation

### 9.9.8.2 Emergency Response

NS's Emergency Management Office coordinates Emergency Services for the Province. Emergency Management Office aims to ensure the health, safety, and security of Nova Scotians, their property and the environment by providing a prompt and coordinated response to an emergency. Emergency Management Office works with municipal authorities to provide assistance in planning for emergencies (including health emergencies), coordinating provincial resources when an emergency occurs, and assisting with analysis and evaluation after an emergency. Emergency Management Office delivers the provincial 911 service which provides assistance in an emergency ([www.emo.gov.ns.ca](http://www.emo.gov.ns.ca)).

The Department of Health has a province-wide Master Emergency Response Plan that describes how the Department of Health will coordinate information received from District Health Authorities during emergencies (AMEC, 2008b). GASHA developed a District Emergency Response Plan to clearly outline measures required for protecting and maintaining human health and welfare under emergency or disaster situations. The aim is to ensure continued operation of the health care system in GASHA in the event of an imminent or actual emergency affecting the district (GASHA Emergency Response Plan, September 2011).

GASHA tests and updates their plan at regular intervals. The plan was tested in March 2010 when St. Martha's Regional Hospital, the Antigonish Volunteer Fire Departments, local Emergency Health Services (EHS), the Antigonish RCMP detachment, and others participated in emergency exercises ([www.gasha.nshealth.ca](http://www.gasha.nshealth.ca)). The agency responded to several emergencies in the last several years – a school bus accident in a storm in 2005 and an

offshore helicopter crash in 2006. GASHA has not responded to any significant emergencies since 2006 (MacGillivray, D., pers. comm., 2013).

#### **9.9.8.3 Search and Rescue**

The Project area receives SAR services from three organizations. The Strait Ground Search and Rescue Association is comprised of 50 volunteers and serves all of Antigonish County as well as a small area of western Guysborough County. The remainder of Guysborough County is served by the Pictou County Ground Search and Rescue Organization and the Sheet Harbour and Area Ground Search and Rescue Association (Muisse, G., pers. comm., 2013).

The members are experienced in ground and night searches. All members are trained in winter survival and other SAR techniques, with some members trained in search management and advanced first aid. The Emergency Management Office assists with the administration, coordination and training of NS's Ground Search and Rescue teams.

#### **9.9.8.4 Fire Safety**

There are 20 volunteer fire departments in Guysborough County and eight in Antigonish County (NSF, 2013b). The nearest volunteer fire department to the Project area is the Harbourview Volunteer Fire Department in Goldboro about 2 km west of the site.

#### **9.9.8.5 Ambulance**

EHS is a division of the Nova Scotia Department of Health and Wellness. It is responsible for the continual delivery, development, implementation, monitoring and evaluation of pre-hospital EHSs in the province (NS Department of Health and Wellness, 2013b). EHS has a fleet of 139 ground ambulances, six patient transfer units, one helicopter, and one fixed wing aircraft within the Province of NS (NS Department of Health and Wellness, 2013b). Both aircraft are stationed at Halifax Airport. Emergency Medical Care Inc. is a privately-owned company that manages and operates ground ambulance, medical communications centre and air medical transport through contract with EHS. Emergency Medical Care Inc. operates 65 ambulance bases throughout the province and a central communications dispatch centre in Dartmouth ([www.emci.ca](http://www.emci.ca)).

The northern region of EHS maintains five ground bases in the Project area with seven ambulances and one patient transfer unit (Semple, D., pers. comm., 2013). The ground bases are located in:

- Guysborough;
- Sherbrooke;
- Canso;
- Antigonish; and
- Country Harbour.



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#### **9.9.8.6 Community Response Planning**

Under the *Nova Scotia Emergency Management Act*, municipalities must have an emergency plan which requires them to:

- establish and maintain a municipal emergency by-law;
- establish and maintain a municipal emergency management organization;
- appoint a coordinator of the municipal emergency management organization and prescribe the duties of the coordinator which shall include the preparation and coordination of emergency management plans for the municipality;
- appoint a committee consisting of members of the municipal council to advise it on the development of emergency management plans; and
- prepare and approve emergency management plans.

#### **9.9.9 Marine Aids to Navigation**

The Stormont Bay area has a standard range of lights and buoys for safe navigation. In total there are 14 aids to navigation between Fisherman's Harbour and Coddle's Harbour, seven operated year round, and seven seasonal (DFO, 2009).

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.13.4.

## 9.10 Existing and Planned Land Uses

The MODG County has developed an industrial strategy for the region. Goldboro and the proposed Goldboro LNG site are covered under the District 7 Planning Strategy and Land Use Bylaws. The proposed site has been zoned with an I-3 designation that targets the marine aspect of future development (Figure 9.10-1). This designation encompasses an area between 2833 and 3238 ha. The existing land use at Meadow Lake is primarily commercial forestry operations.

### 9.10.1 The Goldboro Industrial Park

The Goldboro Industrial Park (Figure 1.7-2) is owned and operated by the MODG. Construction of the SOEI gas plant in the Goldboro Industrial Park spurred expansion of the current industrial site to include land for the proposed Goldboro LNG development.

Land use in the Goldboro Industrial Park, which includes the proposed Goldboro LNG site, is regulated by the District 7 Land Use Bylaw (2011). Figure 9.10-1 represents a zoning map of the site and adjacent areas. These areas are rural in nature, sparsely populated and have been zoned as Industrial Resource (I-3), Commercial General (C-1), Coastal Community (CC-1), and Natural Resource (NR-1). The proposed site is zoned with an I-3 designation. Lands with Industrial Resource I-3 Zoning specifically target:

- oil refineries and manufacturing;
- natural gas processing, including liquefaction, gasification and transport plants and facilities;
- petrochemical industrial production facilities;
- marine/container terminals, including wharfs and storage facilities;
- power generation facilities, including large scale wind turbines and wind farms; and
- temporary uses related to industrial development.

The I-3 zoned Goldboro Industrial Park comprises an area of 428 ha (Torrey, D., pers. comm., 2013), of which approximately 150 ha has been allocated to Goldboro LNG. The area includes the shoreline of Red Head to Betty's Cove, including the existing pipeline and NSPI line corridors. The adjoining SOEI Gas Complex (Figure 1.7-2) has a footprint of 49 ha; other small landowners in the park include M&NP, EnCana, Irving, Exxon Mobil, and George Fisher (Torrey, D., pers. comm., 2013).

The MODG recently commissioned the installation of 3 to 50 kW wind turbines at the Goldboro Industrial Park. The turbines have been operational since March 2013 and are located just north of the Project area (Figure 1.7-2). The MODG is the operator with Seaforth Energy providing maintenance (Torrey, D., pers. comm., 2013).

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.14.2.

### 9.10.2 Mining

There are no active mines in the area; however, gold mining has been a major resource extraction activity in Goldboro and the surrounding area in the past. Abandoned mine sites exist around Goldboro and abandoned mines and tailings are present on the proposed site. More details on mineral exploration licensing, abandoned mine workings, and tailings deposits can be found in Section 9.1 of this report.

In recent years, the price of gold has risen to a level high enough to encourage more interest in active gold exploration and mining. Although most activity today is exploratory, there is a move to re-open the Orex site near Goldboro. Orex has recently completed (August 2012) a validation of all of the recent drilling from 2010 and 2011, as well as all previous drilling, in order to develop a new geological model of the Goldboro Gold Property. The Company is planning to conduct a Preliminary Economic Assessment to examine the economic feasibility of a production scenario at Goldboro (Mercator Geological Surveys Limited, 2013).

Acadian Gold also has interests in the Project area, namely the Forest Hill and Golden Seal Deposits; however, their current focus is 50 km east of the Project site in the Fifteen Mile Stream and Beaver Dam areas north of Sheet Harbour (<http://www.acadianmining.com>).

It should be noted that mineral rights holders must obtain permission of the landowner to access the site for mineral exploration.

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.14.2.

### 9.10.3 Protected Areas and Parks

Wilderness areas protect NS's natural landscapes, biological diversity, and wilderness recreation opportunities. There are eight protected areas/nature reserves in Guysborough County and one in Antigonish County (Figure 1.7-2 and Table 9.10-1). The closest protected area to the site is Bonnet Lake which is 25 km to the northeast (NSE, 2013f).

NS's provincial park system provides opportunities to enjoy the rich natural and cultural heritage across the province. There are three provincial parks in Guysborough County and four in Antigonish County (Table 9.7-1). The nearest park is Salsman Provincial Park which is approximately 20 km northwest of the proposed Goldboro LNG site (NSE, 2013f).

**Table 9.10-1 Protected Areas, Nature Reserves, and Provincial Parks**

Name	Description
<b>Guysborough County</b>	
Bonnet Lake Barrens Wilderness Area (Canso Peninsula)	Bonnet Lake Barrens Wilderness Area is 10,380 ha of near-coastal wilderness in the heart of the Canso Peninsula.
Indian Man Lake Nature Reserve	126 ha located near Lower Caledonia, Guysborough County, in the St. Mary's Plain Natural Landscape.
Alder Grounds Wilderness Area	755 ha bordering the Liscomb River between Hunting Lake and Island Lake, Alder Grounds Wilderness Area.
Boggy Lake Wilderness Area	Adjacent to, and partially within the Liscomb Game Sanctuary and covers 3,700 ha, most of which is located in Guysborough County.
The Big Bog Wilderness Area	2690 ha characterized by its unique domed mire bogs and raised dry bogs and is located in the heart of Guysborough County.
Liscomb River Wilderness Area	2970 ha located along the eastern shore of the Liscomb River in western Guysborough County.
Ogden Round Lake Wilderness Area	5490 ha dotted with lakes and a mixture of mature forests in eastern Guysborough County.
Canso Coastal Barrens Wilderness Area	Canso Coastal Barrens Wilderness Area is 8226 ha along the northeastern shoreline of Guysborough County.
Boylston Provincial Park	Located between the communities of Boylston and Guysborough (town).
Tor Bay Provincial Park	Located on Port Felix Bay, Atlantic Coast. Small area on a rocky point looking out to the open Atlantic 8 km south of Larry's River.
Salsman Provincial Park	Located on a small peninsula on the east side of Country Harbour, Guysborough County.
<b>Antigonish County</b>	
Eigg Mountain-James River Wilderness Area	5490 ha located in the Pictou-Antigonish Hills approximately 10 km northwest of the Town of Antigonish.
Arisaig Provincial Park	Located near the community of Arisaig, 27 km north of Antigonish.
Bayfield Beach Provincial Park	Located on St. Georges Bay 6 km north of Exit 36 off Highway 104.
Beaver Mountain Provincial Park	Located 12 km southwest of Antigonish, 3 km south of Exit 30 off Highway 104.
Pomquet Beach Provincial Park	Located in the community of Pomquet. Take either Exit 35 or 36 north off Highway 104.

Source: NSE, 2013g

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.14.5.

## 9.10.4 Tourism, Culture and Recreation

### 9.10.4.1 Tourism and Culture

The Guysborough County Heritage Association (GCHA) is a registered non-profit organization consisting of approximately 17 heritage/culture organizations from across the county. These organizations work as a cohesive group to develop and present the county's heritage resources and to preserve particular aspects of the region's heritage through promotion and/or interpretive services. The members of the GCHA are listed in Table 9.10-2.

**Table 9.10-2 GCHA Membership Organizations**

African Canadian Heritage Friendship Centre
Canso Islands National Historic Site of Canada
Commercial Cable Heritage Site
Communities along the Bay Interpretive Centre
Goldboro Interpretive Centre
Goldenville Goldmine Interpretive Centre
Out of the Fog Museum/Queensport Lighthouse
Lincolnvile Monument/Redhead Project
Mulgrave Heritage Centre
NS Lighthouse Museum/Port Bickerton Beach Park
Old Courthouse Museum
Prince Henry Sinclair Society of NA
St. Mary's River Association
Sherbrooke Village
Tor Bay Acadian Society
United Empire Loyalists Circa 1783 Municipal Park
Whitman House Museum/Canso Historical Society

Source: GCHA, 2013

Most cultural and heritage activity appears to be associated with coastal communities. Interior communities (such as Erinville) do not currently have any active membership promoting local cultural or heritage resources (AMEC, 2006). Cultural and heritage resources include the Goldboro Interpretive Centre, Port Bickerton Lighthouse Interpretive Centre, and Country Harbour Cultural Centre. Community halls exist in Goshen, Port Bickerton, and Erinville (firehall).

Specific heritage projects include the exhumation and relocation of a former black settlement cemetery on Redhead, the site of the proposed marine terminal. The Lincolnvile Community Development Society was instrumental in this Project, and the gravesites have now been moved to another cemetery on Gold Brook Road (AMEC, 2006). Another project is the United Empire Loyalists' Municipal Park, which is a small seaside park (approximately 1 ha) in Country Harbour opened in 1983 but neglected for years. The park which can be accessed via a 2.2 km walking trail leased from the NSDNR off of Highway 316 was reopened in 2006 and includes a memorial cairn and interpretive signage describing the cultural and natural history of the area (Country Harbour Loyalist Trail Roadside Park, 2009).

Guysborough County's natural heritage is also protected in numerous provincial parks and natural areas. In the Goldboro area, Salsman Provincial Park is located off Highway 316, 8 km

north of Isaac's Harbour, on a peninsula on the east side of Country Harbour. The park is open during the summer months (June to September) and has campground facilities. The Fraser's Mills fish hatchery is located on Route 7, west of Erinville. This hatchery raises approximately 500 000 fish annually, including four different salmonid species. The facility also includes an interpretive centre.

Antigonish is the major cultural centre in the County of Antigonish. The Heritage Association of Antigonish, a registered Canadian charitable organization was established in 1982. The objects of the association are:

- to promote and preserve a cultural understanding of our heritage within the Town and County of Antigonish;
- to preserve Historical records and documents;
- to acquire by way of grant, gift, purchase, bequest, devise, or otherwise, real and personal property and to use and apply such to the realization of the objects of the Society; and
- to buy, own, hold, lease, mortgage, sell and convey such real and personal property as may be necessary or desirable in the carrying out of the objects of the Society. The Heritage Association of Antigonish operates the Antigonish Historical Museum as the main vehicle to promote and preserve the region's cultural and historical heritage.

#### **9.10.4.2 Recreational Opportunities**

The proposed location of the Goldboro LNG site is situated along Highway 316 in an existing Industrial Park in a sparsely populated area of Guysborough County. The area offers a variety of non-formal recreational opportunities such as hiking, boating, fishing, hunting, (all-terrain vehicle) ATVing, camping, scuba diving, etc. The Goldboro Interpretive Centre is approximately 4 km northwest of the site.

Hunting and angling occur throughout Guysborough and Antigonish counties. Hunters are required to obtain a permit from the Department of Natural Resources. Seasons vary depending on the game and method; hunting for big game generally runs from October through December. Both counties have shooting ranges. All residents and non-residents over the age of 15 require a fishing license and must adhere to bag limits and seasonal restrictions (NSDNR, 2013g and h). As well, all residents and non-residents are required to be licensed to hunt in NS.

There are several marinas and numerous community wharfs in Guysborough and Antigonish counties. In the smaller communities, recreational boaters use community wharfs. Other communities including Guysborough, Canso, Auld's Cove and Ballantyne's Cove have serviced marinas. The Salsman Park Marina Association is currently attempting to fund and build a marina with finger piers and a boat launch at Salsman Provincial Park on Country Harbour (Hallett, C., pers. comm., 2013).

Both Guysborough and Antigonish counties have sports and recreation complexes offering a wide range of activities including organized sports such as hockey, soccer, baseball, basketball.



As well, parks and playgrounds equipped with swings, slides, and other features are located throughout the counties. Other facilities include community pools, outdoor tennis and basketball courts, athletic fields and baseball diamonds. Additionally, there are two golf courses in Antigonish and one in Guysborough as well as a series of hiking trails (Table 9.10-3).

**Table 9.10-3 Hiking Trails in Project Area**

Antigonish County	Guysborough County
Antigonish Landing Trail	Guysborough Nature Trail
Arisaig Provincial Park Trails	Grassy Island Trail
Beaver Mountain Provincial Park Trails	Chapel Gully Coastal Trail
Cape George Hiking Trails	Black Duck Trail
Eigg Mountain: Mountain Biking Trail	Queensport Road
Fairmont Ridge Hiking Trails	Look Off Trail
Linwood Heritage Nature Trail	Bull Hill Road
Mahoneys Beach Trail	Liscomb Lodge Trails

Source: Government of NS, 2012

The St. Mary's Trail Association is working to connect and complete the TransCanada Trail through the eastern portion of Guysborough County (Hallett, C., pers. comm., 2013). The Guysborough Nature Trail (Table 9.10-3) is part of the TransCanada Trail system. The TransCanada Trail in the north eastern part of Guysborough County has been identified but is not yet operational (Hallett, C., pers. comm., 2013). The TransCanada Trail does not pass through the County of Antigonish at this time.

#### **9.10.4.3 Cultural Events**

The counties of Antigonish and Guysborough offer a variety of community events featuring theatre, music, local food, and outdoor activities, representing the cultural and diverse interests of the area.

Table 9.10-4 presents a list of events in Guysborough County. Other events include performances at the Chedabucto Place Performance Centre in Guysborough and the Mulgrave Road Theatre in the Town of Mulgrave.

Antigonish does not provide a comprehensive list of events but they offer a Community Portal at [www.antigonishportal.org](http://www.antigonishportal.org) where groups are invited to add events to a calendar for the viewing public. Events of note in the community include the Antigonish Highland Games, productions at Theatre Antigonish, and a weekly Farmers Market.

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.14.5.

**Table 9.10-4 Cultural and Recreational Events in Guysborough County**

Event	Location
Guysborough and Area Fishing Derby	MacPherson's Lake
Sherbrooke Village Courthouse Concerts	Sherbrooke Village
Stan Rogers Folk Festival	Canso
Ceilidh on the Waterfront	Guysborough Waterfront
Farmer's Market	Guysborough Waterfront
Scotia Days Festival	Mulgrave
Guysborough Come Home Week	Guysborough
Guysborough County Triathlon,	Guysborough
Gaelic/Scottish Heritage Day	Sherbrooke Village
Liscomb Lodge Community Picnic	Liscomb
Sawmill & Goldmine Frolics	Goldmine/Sawmill
Smokey Hollow Holidays	Country Harbour
Seal Harbour Days	Seal Harbour
Little Dover Parish Picnic	Little Dover
Whitehead Days	Whitehead
Festival Savalette	Larry's River
Sherbrooke 5 km Road Race	Sherbrooke
St. Mary's Boat Club Floatilla	Sherbrooke
Charlos Cove Picnic	Charlos Cove
Canso Regatta	Canso
Ecum Secum Days	Ecum Secum
New Chester Days	New Chester
Sherbrooke Village Rally	Sherbrooke Village
Queensport Mackerel Derby	Queensport
Older Adult Games	Liscomb
Larry's River Labour Day Weekend Picnic	Larry's River
Show and Shine Classic Car Show	Sherbrooke
Old Fashioned Christmas	Sherbrooke
Broad Horn St Mary's ATV Fish Derby	McKeen Lake
Christmas House Tour	Guysborough

Sources: GCRDA, 2013 and Hallett, C., pers. comm., 2013

### 9.10.5 Water Use Including Groundwater

The seasonal and permanent residences as well as the nearby SOEI facility which are located outside but adjacent to the Project site derive their water from wells (AMEC, 2006 and NSE, 2013d). More details on area wells are provided in Section 9.2.1. Surface water uses near the Project site include recreational fishing (e.g., Dung Cove, Betty's Cove Brook), commercial fishing in the near-shore area, and an aquaculture operation in Country Harbour, a more detailed description of surface water usage in the vicinity is provided in Table 9.2-3 of Section 9.2.2.

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.2.

### **9.10.6 Agriculture and Forestry**

Current agriculture and forestry is extremely limited within the Project footprint. No agricultural lands are crossed and soil capability for agriculture is classed “unsuitable” (Section 9.8.1).

The forest within the LNG facility footprint is largely non-merchantable (Section 9.8.3). Minor forest resources may exist along the Water Supply Pipeline ROW. The proposed ROW will be approximately 10 ha in total area and crosses municipal, crown, industrial, and private properties.

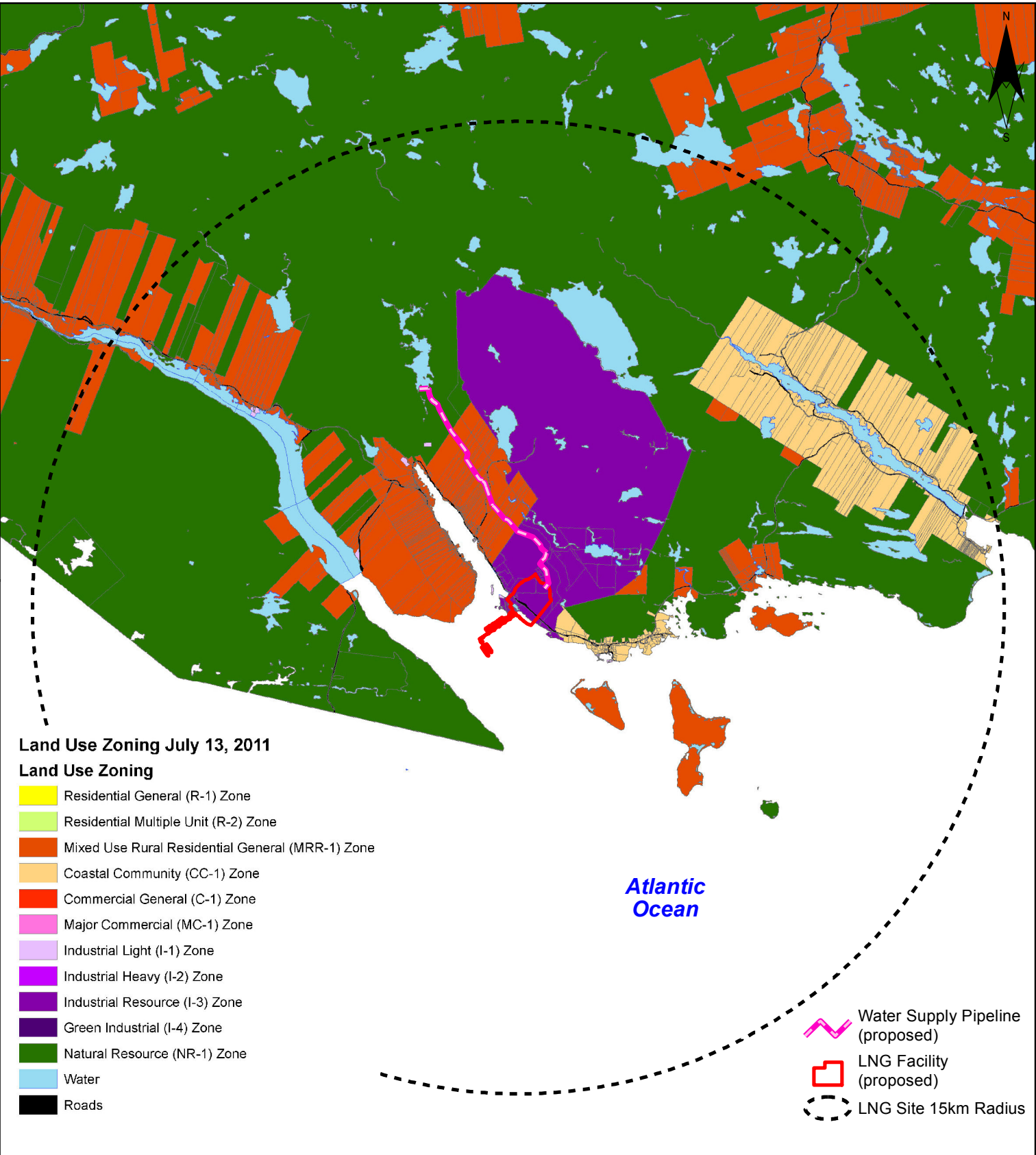
For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.14.3 and Section 10.14.4.


### **9.10.7 Mi’kmaq Interests**


The significance of the area to the Mi’kmaq is independent of the scope and nature of any particular development, as noted by the previous Keltic Project MEKS prepared by Membertou Geomatics Consultants (2005) and the subsequent AMEC MEK update. The updated Goldboro LNG MEKS (Appendix L) includes additional historical and archival information for the region, and additional surveys that provide current information on culturally significant resources. Both the initial and updated study reports conclude that the site contains various culturally significant resources (plants, mammals and fish) that continue to be harvested by Mi’kmaq and that Mi’kmaq continue to have an interest in the area. In some instances traditional harvesting activities are still undertaken throughout the region in or near the Project area. These resources are, however, found in other areas in other areas of NS where there is greater access and opportunity for harvesting by Mi’kmaq harvesters.

The Keltic Project MEK study found various references to burial sites within Guysborough County (Membertou Geomatics Consultants, 2005). No archival reference to, or archaeological evidence of Aboriginal burials or occupation was identified for the Project footprint (see Section 9.12 below).

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.14.6.



CLIENT:	Pieridae Energy (Canada) Limited
AMEC Environment and Infrastructure A Division of AMEC Americas Ltd.	
50 Troop Avenue, Unit 300 Dartmouth, N.S., B3B 1Z1 (P) 902-468-2848 (F) 902-468-1314	

SCALE:	2,000 1,000 0 2,000 4,000
	
	Metres 1:160,000
DATUM:	UTM Zone 20
PROJECTION:	NAD83
PROJECT NO:	TV121039

PROJECT:	 <b>GOLDBORO LNG</b> ENVIRONMENTAL ASSESSMENT
TITLE:	<b>LAND ZONING MAP</b>

DWN BY:	JT
CHK'D BY:	TM/GB
DATE:	June 2013
REV. NO:	N/A
FIGURE NO:	9.10-1

## 9.11 Transportation

The Goldboro LNG site is accessible by both land and sea. Transportation infrastructure includes the existing and proposed roads in the Project area that may be used during the construction and operation of the Project. There is no rail service to the area.

Transportation infrastructure provides support for:

- worker and equipment access during construction activities;
- worker access to the Project area during operation of those facilities;
- transportation of maintenance equipment, production, and waste materials needed during operation; and
- local traffic.

### 9.11.1 Description of Existing Road Conditions

The route most likely to be used to travel from Antigonish to Goldboro was identified in the Keltic Project EA and confirmed in the December 2007 Traffic Impact Study performed to satisfy Condition 1.3 of the EA approval; the route is Trunk 7 from Highway 104 to Route 276, Route 276 from Trunk 7 to Route 316, and Route 316 from Route 276 to Goldboro. The travel distance from Highway 104 to the Sable Gas Plant Road by the existing route is about 76.7 km, and the majority of posted speed limits are at or below 80 km/h (Table 9.11-1).

**Table 9.11-1 Route Length, Travel Speed and Travel Time**

Road and Section	Speed Limits km/h	Lengths km/h	Totals
Trunk 7 - Highway 104 to Route 276	70	1.352	
	80	1.632	
	90	26.513	29.497
Route 276 - Trunk 7 to Route 316	70	0.713	
	80	4.593	5.306
Route 316 - Route 276 to Sable Gas Plant Road	60	3.814	
	70	9.831	
	80	28.279	41.924
<b>Total Route Length</b>			<b>76.7 km</b>
<b>Average Travel Speed</b>			<b>81 km/h</b>
<b>Travel Time</b>			<b>57 minutes</b>

Source: AMEC, 2006

Trunk 7 is considered a Trunk road and Routes 276 and 316 are Collector roads. All are two lane paved roads with one lane for each direction of travel. Pavement width typically is between 6.4 and 6.8 m, and gravel shoulders are usually between 1.0 and 1.5 m wide. The roads are not access controlled and private driveways occur frequently (averaging up to about seven accesses per km) (AMEC, 2006).

The Trunk 7 section of the route is rated as a Maximum Weight – Spring Exempt road, meaning that trucks can carry maximum registered loads all year. While Routes 276 and 316 are



designated as 'B-Train' routes, a considerable section of Route 316 from south of Route 276 to north of Goldboro is subject to 'Spring Weight Restrictions,' which means that gross allowable weights will be reduced considerably below registered weights for about six to eight weeks each spring.

The Traffic Impact study:

- identified timber bridges for NSTIR to evaluate;
- made suggestions for horizontal alignment improvements;
- determined that signage along the access route was adequate but should be reviewed annually;
- determined that climbing lanes were not required; and
- evaluated the collision history in the Project area and determined that they were lower than the average provincial rates.

### **9.11.2 Speed Zones**

About 65% of the existing Trunk 7 - Route 276 - Route 316 route has posted speed limits of 80 km/h or less. Table 9.11-1 illustrates distance, posted speed limits, average speed, and travel time.

The existing Trunk 7 - Route 276 - Route 316 route from Highway 104 at Antigonish to the Sable Gas Plant Road at Goldboro is about 76.7 km long. Assuming one can travel at the posted speed limits, the average travel speed is 81 km/h and the travel time is about 57 minutes (AMEC, 2006).

### **9.11.3 Traffic Volumes**

Existing traffic volume for the access route road sections was the subject of detailed study in 2007, as follow-up to the previous Keltic Project (Atlantic Road & Traffic Management (ARTM), 2007). The traffic volumes used in the 2007 study included data collected by NSTIR up to 2005, but more recent data from the NSTIR 2008 and 2011 count programs are now available. A new Traffic Impact Review of Site Access Roadways has been conducted for the Project (Appendix M), in which traffic volume and annual growth trends have been reviewed and updated using the more recent data with reference to the 2007 study results. Future conditions have been predicted for "count years" corresponding to the construction peak period in 2017 and the operations period as of five years post construction in 2024.

Since it is not practical to design roadways to accommodate the highest hourly volume of the year, it is generally accepted that the 30<sup>th</sup> highest hour of the year be used as the Design Hourly Volume (DHV) for rural roads. Average AM and PM peak hourly volumes from the 2008 and 2011 machine traffic counts obtained on access route road sections have been increased by 10% to provide estimated DHVs for the count year. DHVs estimated from traffic counts have then been increased by an 1.5% annual volume growth rate to provide estimated 2013, 2017 and 2024 AM and PM DHVs which are included in Table 9.11-2.



**Table 9.11-2 Projected 2013, 2017, and 2024 Background DHVs**

Location	2013 DHVs <sup>1</sup>		2017 DHVs <sup>2</sup>		2024 DHVs <sup>2</sup>	
	AM	PM	AM	PM	AM	PM
Trunk 7 – 1.0 km South of Highway 104	370	455	390	480	430	530
Trunk 7 – 1.0 km South of Salt Springs	220	225	235	240	260	265
Route 276 – Halfway Trunk 7 and Route 316	55	60	60	65	65	70
Route 316 – 1.0 km South of Route 276	50	65	55	70	60	75
Route 316 – 1.5 km north of Isaac's Harbour	40	65	40	70	45	75

Notes:

1. 2013 DHVs have been estimated by increasing average AM and PM peak hour volumes from 2008 or 2011 machine counts by 10% and a 1.5% annual traffic volume growth factor.
2. 2017 and 2024 DHVs have been estimated using the 2013 values increased by 1.5% per year.

Existing 2013 background DHVs on Trunk 7 are considered to be low to moderate for a primary trunk highway, and volumes on Routes 276 and 316 are very low for a normal collector road. Review of recent traffic count data indicates that while volumes have generally reduced since the 2007 study (ARTM, 2007) was completed, an annual traffic volume growth rate of 1.5% is still considered to be appropriate to Project future background DHVs.

The following 2011 Annual Average Daily Traffic volumes for several two lane roads are provided to provide an example of the potential for two lane roads to accommodate higher volumes:

- Highway 104 – Pictou / Antigonish County Line – 6800 vehicles per day (vpd);
- Highway 104 – Lower South River to Heatherton – 10,000 vpd;
- Route 213 – Highway 103 to Upper Tantallon (Halifax County) – 15,300 vpd; and
- Route 333 – Goodwood to Brookside (Halifax County) – 10,600 vpd.

#### 9.11.4 Seasonal Variation in Traffic Volumes

Daily volumes fluctuate from one time of year to another, with volumes typically higher in the summer and lower in the winter. NSTIR maintains a number of permanent count and vehicle classification stations throughout the Province. Permanent counters are grouped in accordance with their seasonal variation patterns; Group AA counters have the least seasonal variation and Group H counters have the greatest seasonal variation. While most roads in the Project area are considered to be in Group C, seasonal variations for Groups A, B, C, and D permanent counters are presented in Table 9.11-3. These factors indicate how the average weekly volumes vary from season to season in comparison to the Annual Average Daily Traffic. For example, a Group C road with an Annual Average Daily Traffic volume of 1000 will have average volumes of 720 during the winter, 980 during spring and fall, and 1230 during the busier summer months. However, since traffic volumes in the Project area are generally low, seasonal variation has little impact level of service.

**Table 9.11-3 Seasonal Variation in Average Daily Volumes**

Season	Average Daily Volume as a Percent of Annual Average Daily Traffic by Counter Group			
	A	B	C	D
Winter (December, January, February, March)	0.82	0.79	0.72	0.65
Spring / Fall (April, May, October, November)	1.01	1.00	0.98	0.96
Summer (June, July, August, September)	1.11	1.15	1.23	1.22

Source: NSTIR, 2009

### 9.11.5 Vehicle Classification

The traffic stream on arterial and collector roads is composed of a mixture of passenger cars, vans, light trucks, heavy single unit trucks, and tractor trailer units. When calculating vehicle distribution for a road, passenger cars, vans, and light trucks (four (tires) are classified as 'passenger vehicles,' and heavy single unit trucks (six or more tires) and tractor trailer units are classified as 'trucks.' While vehicle classification counts are not available for all road sections in the Project area, the 2008 NSTIR classification counts are as follows:

- Route 316, south of Highway 104 - 92% passenger vehicles and 8% trucks;
- Route 276, 0.75 km east of Trunk 7 - 93.5% passenger vehicles and 6.5% trucks; and
- Trunk 7, 1 km west of Highway 104 - 94.5% passenger vehicles and 5.5% trucks (NSTIR, 2009).

### 9.11.6 Collision Rates

The relative safety of a section of highway is evaluated by comparing average collisions rates in Antigonish and Guysborough counties to the rest of the Province. Collision rates are generally expressed as number of collisions per hundred million vehicle kilometres. NSTIR calculates five year average collision rates for highway sections, as well as Provincial average collision rates by severity and highway class.

Recent detailed collision data for the area is not available from NSTIR (Smith, P, pers. comm., 2013). The data presented in Table 9.11-4 for the existing Trunk 7 - Route 276 - Route 316 Access Route road sections for the five years 2001 to 2005 was obtained from NSTIR. The collision rates for the entire 76.7 km road length, as well as Provincial average collision rates for road classes included in the Transport Project area, are also included in the Table.

The collision rates for the all portions of the route are lower than provincial average rates for Trunk and Collector road classes.

**Table 9.11-4 Five Years (2001 to 2005) Collision Data for Transport Project Area Roads**

Road Section	Number of Collisions by Severity				Collision Rates by Severity <sup>1</sup>			
	PDO <sup>1</sup>	Injury	Fatal	Total	PDO <sup>1</sup>	Injury	Fatal	Total
Trunk 7 - Highway 104 to Route 276	25	14	1	40	26.9	15.1	1.1	43.0
Route 276 - Trunk 7 to Route 316	2	1	0	0	30.1	15.1	0.0	45.2
Route 316 – Country Harbour Cross Roads to Drum Head	8	7	1	16	31.6	27.6	3.9	111.6
<b>Provincial 1999 to 2003 Average Collision Rates for Road Classes in the Transport Project Area</b>								
100 series - Two Lanes					38.2	17.7	0.3	56.2
Trunk Road - Rural (Trunk 7)					44.1	26.8	0.7	71.6
Collector Route - Two Lanes (Routes 276 and 316)					53.9	29.3	0.6	83.0

Source: AMEC, 2006

Notes:

1. PDO = Property Damage Only

Limited collision data for the Counties of Guysborough and Antigonish and the Province is available for 2006 and is presented in Table 9.11-5. Guysborough County exhibits a higher rate of injuries and fatalities per 10,000 population than both Antigonish County and NS but has a lower incidence of reported property damage. Antigonish exhibits fatalities and property damage on par with the provincial average and a much lower incidence of injury.

**Table 9.11-5 2006 Collision Data**

	2006 population	PDO	PDO per 10,000 population	Injured	Injured per 10,000 population	Fatalities	Fatalities per 10,000 population
Nova Scotia	913,465	9,361	102	3,480	38	79	1
Guysborough	9,055	49	54	90	99	2	2
Antigonish	18,835	190	101	30	16	2	1

Source: AMEC, 2006

Notes:

1. PDO = Property Damage Only

Based on a review of the 2000 to 2004 collision history and rates for access route road sections was included in *Traffic Impact Study, Keltic Petrochemical Inc. and Maple LNG Liquefied Natural Gas Facilities* (ARTM, 2007). It was concluded that since collision rates on the access route sections are lower than Provincial average, there is no indication of abnormal collision experience on those road sections. Since the NSTIR collision database does not include records for recent years, it is not feasible to update the evaluation from that included in the 2007 report. However, since there has been no significant change in traffic volumes on the access route road sections since 2007, it is assumed that the conclusion relative to collision experience is still valid.

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.15.

## 9.12 Archaeological Resources

### 9.12.1 Previous Archaeological and Heritage Investigations

#### 9.12.1.1 *Goldboro LNG site*

ARIA studies were conducted for the proposed “Goldboro Industrial Park” in 2004 and the proposed “MapleLNG” and “Keltic Petrochemical” facilities in 2007 (Davis Archaeological Consultants Limited (Davis), 2004; Davis, 2007a; Davis, 2007b). The Project impact area for the presently proposed Project is located within the Project area of the ARIA investigations conducted in 2004 and 2007. The presently proposed Project footprint is located primarily within the Project footprint associated with the MapleLNG Facility (Davis, 2007a), with the area associated with the previously proposed Keltic Project being located to the northwest and northeast (Davis, 2007b). Thus, the archaeological/heritage data and information gleaned from these previous studies remains valid for the present Project.

The 2004 ARIA (Davis, 2004) investigations for the Goldboro Industrial Park included an historical background studies, informational interviews, a visual field survey of the Project area, and limited subsurface testing at one location. The background studies and informational interviews of the Project area and vicinity identified references to at least three prehistoric Native Mi'kmaq encampments located at Schoolhouse Brook, the head of the harbour on Isaac's Harbour River, and at Webb's Cove (Davis, 2004). Isaac's Harbour was referred to as Raspberry Harbour by the French in the 17<sup>th</sup> century, Port Hinchbrook by the English in the 18<sup>th</sup> century, and ultimately Isaac's Harbour in the 19<sup>th</sup> century after a Black Loyalist settler by the name of Isaac Webb (Davis, 2004.). “There is no documented European settlement in [Isaac's Harbour] prior to 1817” (Davis, 2004.). However, according to historic mapping, by the mid-late 1800s settlement appears within the Project area likely as a result of the influx of mining activities in the area. Gold was discovered in the Isaac's Harbour area in the 1860s and was mined at numerous locations on both the east and west sides of the harbour (including Hurricane Island) until 1943 (Davis, 2004). Isaac's Harbour East was renamed “Goldboro” in 1898.

In 2000-2001 the Black Loyalist Cemetery at Red Head point was assessed and mitigated out of concern over negative impacts resulting from shoreline erosion (Niven 2001 cited in Davis, 2004). This resulted in the discovery and removal of 24 burials (Davis, 2004). To ensure that no burials remained at this location, the 2004 studies included limited subsurface testing, which did not encounter any additional burials (Davis, 2004). The remainder of the 2004 study area, within which the present Project area is located, was visually surface surveyed in 2004 (Davis, 2004). While no additional subsurface investigations were conducted at that time, 13 additional archaeological sites<sup>1</sup> were identified within the Project area (Davis, 2004). Thus, the 2004 investigations identified 13 sites in total located in the vicinity to the present Project area: Red Head Cemetery, Sculpin Cove 1, Sculpin Cove 2, Sculpin Cove 3, Sculpin Cove 4, Sculpin Cove 5, Hurricane Island Mine, McMillan Mine, Dung Cove, Giffin's Mill, Hattie's Belt, Giffin

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<sup>1</sup> While all of these sites were recorded according to standard procedures set forth by the Nova Scotia Museum (Davis, 2004), not all of them have been registered with a Borden number due to insufficient physical evidence (Coutreau-Robbins pers. com., 2013).

Lead, Skunk Den Mine Crusher, and South Mulgrave Lead (Figure 9.11-1). In addition to these 14 historic sites, several areas of cultural activity were noted associated with historic mining and prospecting activities at the head of Betty's Cove, 350 m east of the South Mulgrave Lead site, 100 m east of Route 316 and 50 m north of Sable Road, and a linear stone feature in the vicinity of South Mulgrave Lead site. Numerous 20<sup>th</sup> century refuse middens were also identified as a result of the visual surface survey (Davis, 2004).

The following are the Conclusions and Recommendations resulting from the ARIA conducted by Davis in 2004:

1. There is a high level of confidence that additional burials at the Red Head cemetery site are unlikely and, therefore, Davis does not believe that further manual excavation is necessary. However, due to the remaining cultural sensitivity of the site, ***it is recommended that excavation by a small backhoe be monitored by a qualified archaeologist during ground disturbance. It is also recommended that consultation with the Lincolnville Black community be initiated prior to any ground disturbance in order to address any possible cultural and political issues surrounding the site.***
2. The Sculpin Cove one to five sites are not expected to be directly impacted by construction and, therefore, ***no recommendations for their mitigation are made at this time. However, due to lack of information regarding their age, function, and cultural affiliation, should construction plans be altered so that any of these five sites is impacted, they should be investigated prior to disturbance. The potential effect of changes in tidal amplitude as a result of construction in the vicinity of these sites is not known at this time. Should it be believed that these sites are to be impacted by shoreline erosion as a result of rising tide levels, it is recommended they be investigated by a qualified archaeologist prior to construction.***
3. Hurricane Island is also not expected to be directly impacted by construction but ***may be affected by rising tidal amplitude. Again, should this be a factor in construction, it is recommended that the mining site be investigated as it is of high archaeological significance.***
4. The McMillan Mine is expected to be impacted by construction of the product storage area and wharf at Sand Cove as well as by the associated access road. However, it is believed to be of low archaeological sensitivity given its recent age and, therefore, ***no pre-construction investigation of the features is required. However, it is recommended that the site be monitored during ground disturbance to ensure that no earlier and archaeologically/culturally sensitive features exist which may be impacted by construction.***
5. The Dung Cove site is believed to be of high archaeological and cultural sensitivity. The level of confidence concerning an understanding of the full extent of the site is low due to the obscurity of features by low tree cover. At this time, the site is not located within a direct impact zone (i.e., within the footprint of necessary infrastructure). However, ***should the development corridor impact the site or should the development plans change so that the site is expected to be directly impacted by construction, it is***

***recommended that the site be investigation by a qualified archaeologist prior to any ground disturbance.***

6. Giffin's Mill, Hattie's Belt, Skunk Den Mine, and the Giffin Lead are not expected to be impacted by construction at this time. However, due to elevated levels of archaeological sensitivity, ***it is recommended that these site be further investigated should development plans change so that they are vulnerable to disturbance.***
7. The east portion of the South Mulgrave Lead site is expected to be heavily impacted by construction at the northwest extremity of the Project area. However, it is evident that this portion of the site has been recently disturbed by ground levelling for safety reasons. As a result, no intact features are visible on the surface and, therefore, ***no pre-construction investigation of the site is required at this time. It is recommended that ground disturbance be monitored by an archaeologist in order to better assess the archaeological integrity of the site as it is of high archaeological sensitivity.***
8. Although Buckley's Farm was not identified as an intact archaeological site since it was not located during the archaeological survey, ***it is recommended that the area be resurveyed by an archaeologist once the brush is cleared from the impact area as his location is slated for development.***
9. Those areas of surface prospecting and random cultural activity which were noted throughout the Project area during the archaeological survey are believed to be of no archaeological significance and, therefore, ***no recommended mitigation is necessary. However, should in situ artifacts be encountered in any of these features, it is recommended that they be recovered and reported to the Nova Scotia Museum.***

Each of these recommendations is made based on the current development plan and the expected impact on heritage features, as noted. Should any portion of the development plans change so that impact zones shift, it is recommended that these areas be reinvestigated and re-assessed prior to ground disturbance (Davis, 2004).

In 2007, further ARIA investigations were conducted for the proposed "MapleLNG" and "Keltic Petrochemical" facilities at that time (Davis, 2007a and Davis, 2007b). These investigations included an archaeological reconnaissance of Betty's Cove (shoreline and high ground above the cove), a visual survey of the proposed Route 316 bypass, a detailed visual survey of the Hattie's Belt Site and vicinity, a shoreline survey of Meadow Lake (including limited subsurface testing)<sup>2</sup>, a visual survey and subsurface testing at Dung Cove, and subsurface testing at Giffin's Mill. As result of these investigations, no significant archaeological resources were identified at Betty's Cove or for the proposed alignment of the Route 316 bypass. In the vicinity of Hattie's Belt Site a previous road alignment (approximately 28 m to the northeast) and additional physical evidence of mining activity were identified. In addition, "[a]djoint to the southwest edge of the highway opposite the Hattie's Belt site... is potentially the remains of David Buckley's house" (Davis, 2007a) (Figure 9.11-1). However, the remains of the David Buckley house and the Hattie's Belt Site are both considered to be of low archaeological

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<sup>2</sup> Meadow Lake is located over six km to the northwest of the present Project area and is not directly relevant to the present Project impact area.



sensitivity (Davis, 2007a). The survey and testing at Dung Cove revealed a possible stone well feature, a circular depression, a linear stone feature, and numerous stone piles; however, no cultural materials were identified as a result of subsurface testing (Davis, 2007b). At Giffin's Mill, in addition to surface remains of the mill infrastructure, subsurface testing revealed structural elements of the mill building (Davis, 2007a). According to historic aerial photographs, the Giffin's Mill was still standing in 1935, but demolished by 1939 (Davis, 2007a). Also according to 1935 historic aerials the Dung Cove area, a building at McMillan Mine and at least four buildings at Webb Cove are visible (Davis, 2007a).

Table 9.12-1 presents the recommended archaeological mitigation the identified sites following the 2007 investigations, excluding those associated with the Meadow Lake investigations (Davis, 2007a and Davis, 2007b). Implicit in all of the recommendations for mitigation is that the site will be negatively impacted by the Project construction. Should a site fall outside of the Project impact area or should increased shoreline erosion not be anticipated (shoreline sites), negative impact would not be anticipated for that site.

**Table 9.12-1 2007 ARIA Archaeological Site Mitigation Recommendations**

Site	Recommended Mitigation
Hattie's Belt	Construction Monitoring
David Buckley House	Construction Monitoring
Giffin Mill	Construction Monitoring
Buckley Farm	Clear and Resurvey
Skunk Den Mine	Construction Monitoring
Red Head	Construction Monitoring
Dung Cove Site	Clearing, Mapping and Testing
Sculpin Cove Sites (1-5)	Testing
McMillan Mine	Construction Monitoring

In addition to the site specific mitigation recommendations above, the following general Project recommendation was made by Davis (2007a and b):

- It is recommended that an Archaeological Monitoring and Contingency Plan be in effect in order to ensure that no significant archaeological resources are impacted during construction. It is also recommended that Archaeological Awareness and Sensitivity Training be conducted prior to ground disturbance in order to inform work crews of the level of importance and sensitivity of potential resources. These efforts are intended to ensure a productive work schedule while protecting any significant or sensitive archaeological resources.

A review of the provincial database for registered archaeological sites in the vicinity of the Project area resulted in the identification of one registered site identified since the completion of the ARIAs conducted for the Project area. Registered site BgCj-2 (Deep Panuke Historic Site) was identified during ARIA investigations for an M&NP pipeline (Permit A2008NS70). As indicated on Figure 9.11-1, this 19<sup>th</sup> century site is located outside of the Project impact area, immediately to the northeast. Therefore, there is no anticipated impact to this site resulting from the proposed Project.



### **9.12.1.2 Meadow Lake Water Supply Pipeline**

The Meadow Lake water supply pipeline will be located adjacent to the existing M&NP pipeline easement that runs southeast of Meadow Lake to the Goldboro Industrial Park. An assessment for archaeological resources was conducted for the M&NP pipeline in 1997 (WGA, 1998c). As a result of these investigations no elevated potential areas or archaeological resources were ultimately identified within a 100 m wide study corridor centred on this section of the M&NP pipeline easement (WGA, 1998c).

An archaeological resource impact assessment was conducted for the proposed Keltic Project (Davis, 2007b) that included the shoreline of Meadow Lake. While the desktop review indicated high potential for Native (prehistoric) archaeological resources in the vicinity of the lake, none were identified during the subsequent field research. There was evidence of past historic settlement at the north end of the lake (at “Clyburn”) and remnants of a stone dam structure where Meadow Lake flows into Isaac’s Harbour River. However, the Meadow Lake shoreline that was investigated (including the location of the water intake structure) was assessed as having low potential for archaeological resources (Davis, 2007b).

There are two sections along the water supply pipeline routing that were not included in either of the previous archaeological assessments. Approximately 600 m of the pipeline routing from the Meadow Lake water intake location to the M&NP easement and approximately 1.5 km at the southeast end of the pipeline routing do not appear to have been included in previous archaeological studies. Therefore, it is recommended that the Goldboro LNG archaeological program for the EA include these two areas for additional investigations. These investigations should include limited desktop research and a visual field survey of these previously unsurveyed linear corridors.

### **9.12.2 Regulatory Consultation**

In response to the Environmental Registration EA 13-02-28 Goldboro LNG Project (AMEC, 2013b), the Department of Communities, Culture and Heritage commented that they agreed with four of the recommendations made following the 2007 ARIA investigations. These are the following:

1. Archaeological monitoring for the MacMillan Mine Site.
2. The Dung Cove Site must be subject to archaeological investigation prior to any development work in the area.
3. The development plans around the Griffin’s Mill Site should be monitored carefully. If this site is threatened with impact, it should be the subject of archaeological investigation before the area is disturbed.
4. The development plans around the South Maitland [*sic* Mulgrave] Lead Site should be monitored carefully. If this site is threatened with impact, it should be the subject of archaeological investigation before the area is disturbed.

### 9.12.3 Potential Interaction with Current Goldboro LNG Project

Based on the documentation on the ARIA conducted for this area in 2004 (Davis 2004) and 2007 (Davis 2007a and b), it is understood that the current Project land-based area has been entirely captured by these previous investigations. However, it is also evident that, while in the vicinity of the present Project area, many of the identified sites and archaeological features observed in previous studies are outside of the impact area. Therefore, based on the presently proposed Project impact area, the results and recommendations from the previous ARIAs conducted for the Project area and vicinity (Davis, 2004; 2007a and b), and the comments made by the provincial regulator (Department of Communities, Culture and Heritage), it is understood that there are potential impacts to archaeological and heritage resources from implementation of this Project. The following is a list of areas that may be impacted by the Project that will require mitigative measures:

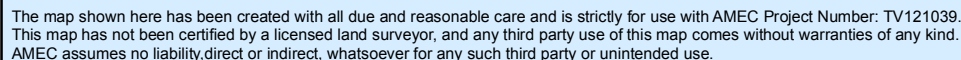
- Red Head;
- Giffin Lead;
- Skunk Den Mine;
- Hattie's Belt;
- David Buckley House;
- Shoreline Sites (Sculpin Cove 1-5, Hurricane Island Mine, Dun Cove, Giffin's Mill, and McMillan Mine); and
- Buckley Farm (location not yet identified).

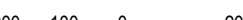

However, should the Project impact area be modified to potentially impact the other archaeological and heritage resources identified in previous studies, mitigation measures may also be required for those locations.

It is also understood that undiscovered archaeological resources may be present within the Project area; in particular First Nations resources given their documented presence in the general area. Therefore, the possibility exists for accidental discovery of archaeological and heritage resources as well as human remains. Mitigation for this is described in Section 10.16.3, such as construction monitoring and a communications protocols.

In addition, previous ARIA investigations did not include investigations of potential underwater archaeological resources (i.e., ship wrecks) within the immediate area of the proposed shoreline infrastructure and shipping lanes. Therefore, an initial desktop review is required in order to identify any known underwater resources in the vicinity of the Project area.

For an assessment of the interaction between the Project and the herein described environment, refer to Section 10.16.



CLIENT:  Pieridae Energy (Canada) Limited	SCALE:  	PROJECT:   <b>ENVIRONMENTAL ASSESSMENT</b>	DWN BY: JT
AMEC Environment and Infrastructure A Division of AMEC Americas Ltd.  50 Troop Avenue, Unit 300 Dartmouth, N.S., B3B 1Z1 (P) 902-468-2848 (F) 902-468-1314	DATUM: UTM Zone 20  PROJECTION: NAD83  PROJECT NO: TV121039	TITLE:  <b>LOCATION OF IDENTIFIED HERITAGE RESOURCES AT LNG FACILITY</b>	CHK'D BY: TM/GB  DATE: June 2013  REV. NO: N/A  FIGURE NO: 9.12-1