TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

10.0 CUMULATIVE EFFECTS

The approach to the CEA has been described in Section 4.0. For the purposes of the assessment, it is assumed that the existing status or condition of each VEC reflects the influence of other past and current projects and activities occurring within or outside of the Project area. It also assumes (unless there is evidence to the contrary, such as predictable down or upward trends in a population) that these existing activities will continue to be carried out in the future and will have similar effects as are currently observed. The assessment has, therefore, integrated the cumulative effects of these ongoing projects and activities. The CEA thus focuses on the effects of other future projects and activities, as considered and assessed for each VEC.

10.1 SCOPING

The scoping exercise conducted for the Project entailed:

- identification of VECs and rationale for their selection;
- definition of the spatial and temporal boundaries for the CEA; and
- identification of past, present, and/or foreseeable other projects or activities that could impact VECs in combination with the Project.

Although at insignificant levels, potentials for residual effects have been identified for all VECs analysed in the direct effects assessment (Sections 6 and 7). Consequently, all VECs were considered in the CEA. The rationale for the VECs has been established as part of the direct effects assessment of the Project (Section 4.5.1).

The predictions of the direct effects assessment are associated with VEC-specific spatial and temporal boundaries (for VEC-specific boundaries refer to effect assessment for individual VECs in Sections 6 and 7). The same boundaries have been applied in the CEA.

Other past, present, and/or foreseeable projects or activities that have a potential to act in combination with the Project have been identified through a screening exercise, which is discussed below. The information on other projects was obtained from the following sources:

- Day, Sean. Planner, Town of Antigonish. Telephone Conversation, September 4, 2007.
- Hart, Michelle. Clerk, Town of Canso. Telephone Conversation, September 5, 2007.
- Hearn, Cathy. Town Clerk, Town of Mulgrave. Telephone Conversation, September 6, 2007.
- Torrey, Deborah. Development Officer, Municipality of the District of Guysborough. Telephone Conversations, September 4 and 11, 2007.
- Nova Scotia Department of Environment and Labour. Environmental Assessment Division. www.gov.ns.ca/enla/ea.
- Strait of Canso Superport Corporation website: www.straitsuperport.com

10.1.1 Identification of Other Projects and Activities

The identification of other projects and activities relevant to the CEA considered the potential for:

- spatial overlap;
- temporal overlap; and
- overlap with respect to the type of effects.

The scoping was conducted in a step-wise fashion. Firstly, potentially relevant projects were identified based on agency and public consultation and the team's own familiarity with the developments in the region. The identified Projects are listed in Table 10.1-1. Next, each of the identified projects and activities were reviewed as to whether or not there was a potential to cause effects on any of the VECs that may overlap with the effects of the subject Project (spatial overlap). If an effect was likely, then these effects were discussed with emphasis on the temporal extent (temporal overlap). Where an overlap of the temporal boundaries was identified, the question was investigated whether or not the type of effects may be similar (i.e., overlap with respect to the type of effect).

The results of the scoping are presented in Table 10.1-1. A total of three projects were identified for inclusion within the CEA:

Existing

- NSPI Marine Coal Terminal

Planned/ Certain Projects:

- Bear Head LNG Terminal

Reasonably Foreseeable Projects:

- Melford Industrial Park

The locations of these projects are depicted in Figure 10.1-1. Each of the projects is briefly described in the following section.

No individual projects were identified for inclusion with the CEA based on the potential for overlap with socio-economic effects of the subject Project alone. Instead projects with potential for cumulative socio-economic effects are briefly discussed in Section 10.2.4.

10.1.2 Description of Existing Projects

10.1.2.1 NSPI Marine Coal Terminal

NSPI and Logistic Stevedoring Atlantic Incorporated have completed construction of a new marine coal terminal at the NSPI Point Tupper Generating Station on the north shore of the Strait of Canso, northwest of the proposed MIT (Figure 10.1-1). This project consists of two components; a marine terminal and a land-based coal storage and rail shipping facility. The purpose of the facility is to serve as the offshore coal unloading and storage site for NSPI's

generating stations, primarily for the Point Tupper and Trenton Stations. The fuel received consists mainly of coal, but will also include petroleum coke.

The terminal has been designed to accommodate Panamax Belted Self Unloading, Grab, and Bulk Vessels (approximately 70,000 dead weight tonnage). The facility is approximately 180 m long and 16 m wide consist of a berthing facility supporting unloading hoppers and an unloading crane. The pier connecting the berthing facility to shore extends out approximately 450 m and supports an in-haul conveyor to transport coal from the berthing facility to the new and existing on-shore coal storage pad. A coal load out area adjacent to the new storage pad allows the loading of coal into rail cars and subsequent shipping by train.

The project underwent an Environmental Assessment pursuant to federal and provincial legislation. Further details of the Project proposal were provided in the Environmental Assessment report (Nova Scotia Power Incorporated 2003).

The NSPI Marine Coal Terminal project has only been recently completed (2007). As stated in the introductory paragraph to this Section, it is generally assumed that the existing status or condition of each VEC reflects the influence of other past and current projects and activities occurring within or outside of the Project area. The NSPI Marine Coal Terminal has nevertheless been identified and described in this cumulative effects assessment as its effects may not have been captured by the description of the existing environment due to its recent start date.

10.1.3 Description of Planned/Future Projects

10.1.3.1 Bear Head LNG Terminal

The Bear Head Liquefied Natural Gas (LNG) Terminal Project is proposed by Access Northeast Energy Inc. (ANEI) in the Point Tupper/Bear Head Industrial Park in Richmond County. The project site is located along the north shore of the Strait of Canso, northeast of the proposed MIT (Figure 10.1-1). The Bear Head project footprint, excluding the marine jetty, is approximately 17 ha. The municipal planning strategy has designated the project area as Port Industrial (I-2) zoning (permitted uses include fuel bunkering, marine terminals and other heavy industrial or port activities). Included in the project are the construction and operation of an LNG terminal and associated facilities. The development of the facility is proposed to occur in two phases. The construction and operation of an approximately 7.5 million-ton-per-annum (mtpa) capacity LNG terminal with a natural gas sendout capacity of 1,000 million standard cubic feet per day (MMscfd) is proposed for Phase I. Phase II represents a future expansion of the sendout capacity to 1,500 MMscfd (approximately 11.3 mtpa). The proposed LNG terminal is envisaged to include three major components: ship unloading facilities; the LNG storage tank area; and regasification areas. The LNG jetty will be able to berth LNG ships with a capacity of up to 250,000 cubic metres (m^3). The capacity of the proposed on-shore gas storage tanks is 180,000 m^3 per tank. The development proposal aims at two such tanks for Phase I and a third tank in Phase II.

Once completed, the Bear Head LNG facility will be operating 24 hours per day and seven days per week, year round. The number of vessels approaching/leaving the facility will depend on the market, capacity of the vessel, and continued maintenance of the facility. The development proposal anticipates one vessel departing from the facility every two to five days. The terminal design will be such that it can serve the largest vessels currently in service or on order (e.g., about 67,000 to 83,000 deadweight tonnes, overall length about 270 to 290 m, draught about 11

to 13 m). Further details on the project are provided in Jacques Whitford, 2004, *ANEI Bear Head LNG Terminal Environmental Assessment*.

10.1.4 Description of Reasonably Foreseeable Projects

10.1.4.1 Melford Industrial Reserve

The Melford Industrial Reserve was established in the early 1970s. The objective of the reserve was to meet the demand for petroleum, petrochemical, and deep-water related industrial activity associated with high world energy prices and off-shore petroleum potential. The development of the reserve halted during the 1980s due to slumping energy prices but interest was renewed in the mid 1990s when oil energy prices bounced back to record high levels.

The industrial park is administered jointly by the Nova Scotia Department of Transportation and Infrastructure Renewal (TIR) and Nova Scotia Business Inc., a crown corporation of the Province of Nova Scotia (Guysborough County Regional Development Authority, 2005). Further details on the project are provided through the website of the Guysborough County Regional Development Authority Melford Industrial Reserve (http://www.gcrda.ns.ca/index.php). The reserve encompasses approximately 14,500 acres (5,868 ha) of land located along the Strait of Canso with road access via Highway 344. At this point in time, MITI is the only foreseeable tenant in the park. No other development proposals have been identified. Consequently, no information is available about specific future development proposals and land uses.

10.1.5 Other Regional Issues and Developments

In addition to the above identified future Projects a number of land uses and developments have been taken place and are expected to continue in the general region with likely cumulative effects on a number of VECs that are also of relevance to the Project. Beyond the specific past and present developments listed in Table 10.1-1 (e.g., Rhodena Rock Quarry Expansion) developments have taken place that are not project-specific but constitute rather gradual trends and land uses. Included in this are the past, current and future regional forestry activities, the expansion of existing commercial land uses along the Strait, and likely gradually increasing residential and recreational uses (e.g., cottage developments, ATV use, boating) in coastal and interior environments. These developments and land uses are likely risk factors contributing to the conservation status of SAR populations (e.g., mainland moose, an endangered species under the NSESA (Beazley et al. 2006)). Specific causes likely involve habitat loss and alteration, habitat fragmentation, drainage/infilling of wetlands, and loss of interior and old growth forest habitat. These trends are expected to continue within the regional context of the proposed Project. They have the potential to also adversely affect such factors as surface water resources, freshwater and marine habitat and biota, and groundwater resources. It is of note that the resulting cumulative effects of such past and future developments also provide opportunities for beneficial cumulative effects. This relates to the local and regional socio-economic conditions involving factors such as employment, education, training, and municipal tax base. Both, the potentially adverse and beneficial effects that result from these regional trends and gradual land use developments are beyond the influence of the MIT proponent and the assessment of their significance is beyond the scope of this EIS. The degree and significance of these effects largely depends on lower and upper tier political decision making and planning as well as economic conditions.

Table 10.1-1: Identified Other Projects and Activities and Potential for Cumulative Effects

#	Project	Location	Description	Status & Time Frame	Potential for Cumulative Effects (Screening)[1]	Rationale
1	**Past and Present Projects**					
1.1	Ocean Nutrition	Mulgrave	Nutritional supplement manufacturing and exporting	In operation		Project and its effects captured by baseline description; addressed through direct effects assessment;
1.2	Premium Seafoods	Arichat	Seafood brokering, seafood processing, vessel offloading	In operation		See above
1.3	Statia Terminals	Madden Cove/Wright Point	Petroleum products, terminalling, and bunkering facility	In operation		See above
1.4	Nova Scotia Power Point Tupper	Point Tupper	Power generation plant and terminal	In operation		See above
1.5	NewPage (formerly Stora Enso)	Madden Point (east of Point Tupper)	Newsprint and super calendar paper mill	In operation		See above
1.6	Federal Gypsum	Point Tupper	Gypsum wall board manufacturing and export facility	In operation		See above
1.7	Georgia Pacific	Point Tupper	Gypsum export facility	In operation		See above
1.8	Port Hawkesbury Pier	Port Hawkesbury	Service vessel, fishing boat, tug boat, barge, patrol vessel, pleasure craft & cruise ship berthage	In operation		See above
1.9	Canso Causeway	Between Cape Porcupine and Port Hastings	Transportation link between mainland Nova Scotia and Cape Breton	In operation		See above
1.10	Martin Marietta	Auld's Cove (East of Canso Causeway; across from Port Hastings)	Aggregate quarry and deep water terminal	In operation		See above
1.11	Mulgrave Marine Terminal	Mulgrave	Deep water terminal	In operation		See above

Table 10.1-1: Identified Other Projects and Activities and Potential for Cumulative Effects

#	Project	Location	Description	Status & Time Frame	Potential for Cumulative Effects (Screening)[1]	Rationale
2	**Planned and Certain Projects**					
2.1	Canso Wind Farm	Southeast of the Town of Canso, Guysborough County	Establishment and operation of wind farm to generate electricity. Proposed project for up to 8 wind turbines with a capacity of 1.5 or 0.8 MW each.	Approved	-	Overlap unlikely o Temporal overlap: yes, operational phase o Spatial overlap: no o Overlap related to types of effects: not relevant Note: Potential for beneficial cumulative effects on regional scale within socio-economic environment (see text for discussion of regional issues);
2.2	Highway 104	Antigonish (Addington Forks to Lower South River)	New road alignment to bypass Antigonish beginning near Addington Forks and ending near Lower South River.	Approved	-	Overlap unlikely o Temporal overlap: yes, operational phase o Spatial overlap: no o Overlap related to types of effects: not relevant Note: Potential for beneficial cumulative effects on regional scale within socio-economic environment (see text for discussion of regional issues);

Table 10.1-1: Identified Other Projects and Activities and Potential for Cumulative Effects

#	Project	Location	Description	Status & Time Frame	Potential for Cumulative Effects (Screening)[1]	Rationale
2.3	Rhodena Rock Quarry Expansion	Off Highway 344 near Mulgrave.	Expand the boundaries of the existing Rhodena Rock Quarry located on Porcupine Mountain, Guysborough County. The expansion will allow continued aggregate production (blasting and crushing) and additional stockpiling. The estimated project lifespan is approximately 40 years. The current and anticipated operating schedule is 12 hrs/day, 6 days/week, or 24 hrs/day, 7 days/week, if required. The quarry will operate on a year-round basis, weather permitting. The Project will commence upon obtaining applicable approvals and authorizations.	Approved	-	Overlap unlikely o Temporal overlap: yes o Spatial overlap: no o Overlap related to types of effects: not relevant Note: Potential for beneficial cumulative effects on regional scale within socio-economic environment (see text for discussion of regional issues);
2.4	NSPI Marine Coal Terminal	Point Tupper Generating Station	Marine terminal and coal storage facility for Point Tupper Generating Station	EA Approved 2004 Completed and commenced operating in 2007	X	Overlap likely o Temporal overlap: yes, operation phase; o Spatial overlap: yes, with respect to marine environment o Overlap related to types of effects: yes, related to marine environment effects (water quality; effects on marine biota incl. mammals); effects on climate change (GHG emissions), and beneficial effects on socio-economic environment
2.5	Point Tupper Wind Farm	Richmond County, Point Tupper	Renewable Energy Services Ltd. (RESL) intends to develop a 22 megawatt (MW) wind farm in Richmond County. The project is proposed to be developed on industrial land owned by NuStar Energy, Statia Terminals, where there is already one 1 wind turbine in operation since 2006. The proposed development includes 11 new turbines to be erected on 80 m-high towers.	Planning Stage; implementation scheduled for November 2009	-	Overlap unlikely o Temporal overlap: yes o Spatial overlap: no o Overlap related to types of effects: not relevant Note: Potential for beneficial cumulative effects on regional scale within socio-economic environment (see text for discussion of regional issues);
3.	**Reasonably Foreseeable Projects**					

Table 10.1-1: Identified Other Projects and Activities and Potential for Cumulative Effects

#	Project	Location	Description	Status & Time Frame	Potential for Cumulative Effects (Screening)[1]	Rationale
3.1	Keltic Petrochemicals Inc.	Goldboro, Guysborough County	Liquefied Natural Gas (LNG) marine terminal, LNG storage, petrochemical plant for production of polymer pellets, marine shipping terminal (product export), co-generation plant, utilities and support facilities.	Provincial EA approved; Federal EA (CSR) for marine portion of Project approved	-	Overlap unlikely o Temporal overlap: yes; operational phase o Spatial overlap: no o Overlap related to types of effects: not relevant Note: Potential for beneficial cumulative effects on regional scale within socio-economic environment (see text for discussion of regional issues);
3.2	MacLeod Settlement Pit Development	Near SW Mabou, Inverness County	Excavation, screening, mixing and stockpiling sand. Estimated aggregate reserves are in excess of 4.3 million tonnes, enough to last 80 to 90 years, depending on demand. Anticipated operating schedule is 12 hrs/day, 6 days/week. Anticipated average production rate is 50,000 tonnes per year.	Project registered with NSE; under review with Provincial environmental assessment division	-	Overlap unlikely o Temporal overlap: yes; operational phase o Spatial overlap: no o Overlap related to types of effects: not relevant Note: Identified potential for cumulative effects limited to beneficial socio-economic effects on regional scale (see text for discussion of regional issues);
3.3	Bear Head LNG	Point Tupper/Bear Head Industrial Park	Access Northeast Energy Inc. proposes to construct and operate an LNG Terminal in the Point Tupper/Bear Head Industrial Park to meet demand for natural gas and other forms of energy in Canada and the United States.	Approved Environmental Assessment (2004); currently on hold; implementation dependent on outcome of negotiations with LNG suppliers	X	Overlap likely (pending Approval) o Temporal overlap: yes, operation phase; o Spatial overlap: yes, with respect to marine environment o Overlap related to types of effects: yes, marine environment related effects (water quality; effects on marine biota incl. mammals); effects on climate change (GHG emissions). Note: Identified potential for cumulative effects limited to beneficial socio-economic effects on regional scale (see text for discussion of regional issues);

Table 10.1-1: Identified Other Projects and Activities and Potential for Cumulative Effects

#	Project	Location	Description	Status & Time Frame	Potential for Cumulative Effects (Screening)[1]	Rationale
3.4	Melford Industrial Reserve	Melford	14,500 acre industrial zoned park located on the Strait of Canso (The proposed MIT is located within this Park).	Zoning in place	X	Overlap likely o Temporal overlap: yes, operation phase; o Spatial overlap: yes, with respect to marine environment Overlap related to types of effects: yes, marine environment related effects (water quality; effects on marine biota incl. mammals) and beneficial socio-economic effects.
3.5	Goldboro Industrial Park	Goldboro	700 acres industrial zoned park located at the landfall site of the Sable natural gas sub-sea pipeline; the Park already includes the SOEI natural gas processing plant and is proposed site for The Keltic Petrochemical Inc. Development and LNG facility.	Zoning in place; Portion already developed	-	Overlap unlikely o Temporal overlap: yes; operational phase o Spatial overlap: no o Overlap related to types of effects: not relevant Note: Identified potential for cumulative effects limited to beneficial socio-economic effects on regional scale (see text for discussion of regional issues);
3.6	Maritimes and Northeast Pipeline (M&NP) Future Tie-In	Bear Head LNG facility to M&NP mainland pipeline	Buried natural gas pipeline lateral from Bear Head LNG facility to transport re-gasified LNG to the M&NP mainland pipeline (precise location currently not known; crossing of Strait of Canso anticipated near and parallel existing rights-of-way in Point Tupper area.	Conceptual	-	Overlap unlikely o Temporal overlap: yes, operation phase; o Spatial overlap: yes, with respect to marine environment o Overlap related to types of effects: none identified..

[1] **X**= Potential for cumulative effects with Proposed Project identified and forwarded for Cumulative Effects Assessment

10.2 ASSESSMENT OF CUMULATIVE EFFECTS

As mentioned earlier, the CEA does not specifically consider past and present projects and activities. These projects and activities are captured by description of the baseline conditions and their effects will have been evaluated in the assessment of effects of the Project. The potential for cumulative environmental effects with future projects (planned and certain, and reasonably foreseeable projects) is discussed below. As an exception to this approach, the NSPI Marine Coal Terminal has also been included in the assessment. This project was implemented in 2007. As such the Project's effects may not have been captured by the baseline studies conducted for the MIT. The following discussion of potential cumulative effects therefore also includes the NSPI Marine Coal Terminal.

All projects for which a potential for adverse cumulative effects with the proposed MIT has been identified involve the introduction of a marine terminal and additional large vessels to the Strait of Canso. If approved and implemented, the effects of these projects are likely to occur during the design life of the MIT (temporal overlap) and are likely to cause effects in the same geographic region, i.e. Strait of Canso waters and shoreline (spatial overlap). The NSPI Marine Coal Terminal started its operation in 2007.It represents a potential for cumulative effects with implementation of the MIT proposal. The types of effects for which a spatial and temporal overlap have been identified relate to effects on the following VECs that were described in Section 5.0:

Biophysical Environment

- Air Quality (Climate, GHG);
- Marine water quality;
- Marine mammals; and
- Marine Species at Risk.

Socio-Economic Environment

- Marine Transport;
- Economy (regional); and
- Commercial fisheries.

The potential for adverse cumulative effects related to these VECs is discussed separately for each VEC in the following sections. Each of the individual projects is likely to affect other VECs (e.g., terrestrial habitat, wetlands, and freshwater environments) during the lifetime of the MIT. However, none of these effects is expected to constitute measurable environmental change in the same geographic area as the changes predicted for the MIT Project.

It is of note that each of the planned and reasonably foreseeable projects listed in Table 10.1-1 (i.e., not only those selected for CEA) can be expected to cause beneficial cumulative effects together with the MIT Project on local and/or regional level:

Potential for cumulative local economic/ socio-cultural benefits

- Melford Industrial Park

Potential for cumulative regional economic/ socio-cultural benefits

- Canso Wind Farm
- Highway 104
- Rhodena Rock Quarry Expansion
- NSPI Marine Coal Terminal
- Keltic Petrochemicals Inc./MapleLNG
- MacLeod Settlement Pit Development
- Bear Head LNG
- Goldboro Industrial Park
- Point Tupper Windfarm

If approved and realized, the beneficial cumulative effects are likely related to the following VECs:

- Economy, Labour Force, Education and Training Business;
- Physical Infrastructure (incl. Transportation); and
- Municipal and Social Services Infrastructure.

The significance of beneficial cumulative effects of future projects on these VECs has not been evaluated in further detail. A general assessment is provided in 10.2.4.

10.2.1 Cumulative Effects on Air Quality (Climate Change, GHG Emissions)

As part of the direct effects assessment for the MIT Project it has been estimated that the Project will contribute annually approximately 93,000 tonnes CO_{2eq} or 0.39 percent of the Provincial GHG emissions total for Nova Scotia (Section 6.3).

MITI has been unable to obtain information on the GHG emissions associated with the NSPI Coal Terminal. For the Melford Industrial Reserve, no estimate of GHG emissions can be established given the absence of any other development proposals than the MIT project.

The GHG emissions of the Bear Head LNG project are estimated to represent 2.8 percent of the provincial total (Jacques Whitford 2004). With the implementation of mitigation measures such as utilization of waste heat, the project is predicted to only emit 0.17 percent of the provincial total (Jacques Whitford 2004). The project therefore may contribute to an increase in local GHG emissions; however, on a regional and global scale, the overall effects will largely depend on the use of the delivered natural gas in the Atlantic region for the replacement of GHG emission intensive fuels (e.g., No. 6 fuel, No. 2 fuel, coal). The replacement of such fuels can off-set or can at least contribute to off-setting the emissions associated with the LNG transport and processing.

10.2.2 Cumulative Effects on Marine Water Quality

The MIT project is not expected to release surface water to the marine environment other than stormwater and effluent from its wastewater treatment system. None of the MIT project components involves the use of process water. Waste water streams are limited to sanitary

waste water from office and administration buildings and stormwater from operation and maintenance areas where run off could be contaminated with fuel and oil from machinery and equipment. These waste waters will all be captured and treated in an on-site treatment facility to meet all applicable regulatory standards before they are released to the marine environment. The resulting changes of the water quality in the marine environment are considered not measurable and therefore, cumulative adverse effects are not likely to occur with the other identified projects. It is of note that none of the effects on marine habitat (including water quality) predicted for the Bear Head LNG and the NSPI Coal terminals were considered significant (Jacques Whitford 2004; Nova Scotia Power Incorporated 2003).

10.2.3 Cumulative Effects on Marine Mammals / Marine Species at Risk

The construction phases of the Bear Head LNG Terminal and the MIT are not expected to overlap in time. As a result, construction-related underwater noise (e.g., sheet pile driving) is not a concern for the cumulative effects assessment. Concerns related to cumulative effects on marine mammals and marine species at risk are primarily related to the possible increase in collisions between vessels and marine mammals (whales) as a result of increased vessel traffic. Three whale species are possibly occurring within the Strait of Canso and Chedabucto Bay area. These are the long-finned pilot whale (*Globicephala melas*), minke whale (*Balaenoptera acuterostrata*) and the fin whale (*Balaenoptera physalus*) (Section 5.8). Of these whale species, the fin whale is listed as a species of special concern by SARA and COSEWIC.

In addition, a search of the SARA Species at Risk Web Mapping Application (EC, 2005) identified two species that could potentially occur in the vicinity of the project area, the Blue whale (*Balaenoptera musculus*) and North Atlantic right whale (*Eubalaena glacialis*). Both of these species are listed as Endangered by SARA and COSEWIC (Section 5.8). Although the fin whale had been identified as being in the general vicinity of the project area and is listed as a species of special concern by SARA and COSEWIC, it did not appear on the SARA mapping application.

The MIT Project is expected to involve 5 vessel calls per week or about 260 vessels per year (Section 2.7.1). The Bear Head project is estimated to involve one vessel departing from the facility every two to five days or about 75 to 180 vessels per year. No information has been identified for vessel traffic associated with the new NSPI Marine Coal Terminal. Since the new terminal will replace an existing facility within the Strait of Canso, the vessel numbers are assumed to be reflected in the overall vessel numbers recorded for the Strait of Canso.
In 2006, there were around 1,300 commercial vessel trips (650 vessels) through the Strait of Canso. These included dry/liquid bulk carriers including super tankers as well as smaller container ships carrying materials such as gravel and gypsum to the Maritimes and Eastern Canada. Also in 2006, the Canadian Coast Guard recorded 637 pleasure crafts in the Strait of Canso. These included small boats of all types along with seven cruise ships (Section 5.11.6.1.2). Table 10.2-1 summarizes existing and estimated future vessel numbers for the Strait of Canso.

Table 10.2-1: Estimated Absolute Vessel Numbers and Incremental Increase

	Existing and Future Projects	Estimated Number of Vessels	Incremental Increase Over Existing (650) As a %	Contribution to Potential Total Future Volume (1090)
1	Existing (commercial vessels only)	650	-	-
2	Bear Head LNG Terminal	75-180	12-28	8-17
3	NSPI Coal Terminal	Assumed to be included with "Existing"	NA	NA
4	Melford Industrial Reserve	Unknown	Unknown	Unknown
5	MIT	260	40	24

Source: (1) Existing: Section 5.11.6.1.2; (2) Bear Head: Jacques Whitford 2004; (5) MIT: Section 2.7.1)

Together, the Bear Head LNG Terminal and the MIT are expected to cause an increase in vessel traffic up to about 70 percent (Bear Head 28 percent, MIT 40 percent).

No information has been identified on the past number of vessel collisions with whales in the Strait of Canso. It is uncertain to what extent the cumulative increase of 70 percent in vessel traffic may lead to an increased number of vessel collisions with whales. In general, reported collisions with whales are a rare event due to the infrequent occurrence of both whales and ships in many parts of the world (Laist 2001). Ship collisions become a particular concern, where shipping lanes traverse or run close to traditional areas of whale concentration such as areas known in the Bay of Fundy. An example where some data exists is with respect to the beluga whale population in the Saguenay region of the St. Lawrence Estuary. These waters are subjected to many transits in the course of a shipping season. In 2004 approximately 25% of the total of 4090 ships using the St. Lawrence Seaway system moved to and from overseas ports and thus passed near the habitat of this population (Saint Lawrence Seaway Development Corporation). Of the 18 cases of collisions reported in the Saguenay—St. Lawrence Marine Park region between 1992 and 2005, at least one was a fatality. Of the 175 beluga whale carcasses recovered along the shores of the St. Lawrence from 1982 until recently, 11 deaths were caused by a collision (Whales on Line 2008). Thus, the average known beluga mortality due to ship collisions appears to be about 0.5 individuals per year, in a beluga population estimated to be in the 1,000-1,400 range. Assuming 1,000 ship transits per shipping season (there are considerably more if purely domestic shipping is included, as well as a multitude of whale-watching vessels), this equates to 0.0005 individual mortalities per transit.

The Strait of Canso is not known to be an area where whales congregate on a seasonal basis. In fact, whales with conservation status (i.e., fin whale, blue whale and North Atlantic right whale) in the Strait are considered a rare occurrence. In addition, studies have shown that collisions causing lethal or severe injuries to whales occur at vessel speeds greater than 14 knots (Laist 2001). Large vessels are typically travelling at a speed of less than 12 knots (largest vessels at 5 to 6 knots) within the rather narrow Strait of Canso (Donald McKinnon, Canso Traffic; verb. Comm. 10 April, 2008). Consequently, a collision of a large vessel with a whale species is considered to be a rare event.

10.2.4 Cumulative Effects on Socio-Economic Factors

Marine Transportation

The Strait of Canso is busy with about 650 commercial vessel recorded in 2006 (i.e., 1300 vessel movements). Between 22,000 and 27,000 smaller vessels (including nearly 300 fishing vessels) use the Canso lock system each year. Also more than 600 pleasure crafts used the Strait in 2006. The predicted cumulative increase in vessel traffic (see Table 10.2-1) has the potential to affect marine passenger and freight traffic in that it may increase the risk for accidents amongst the various vessels in the Strait.

10.2.4.1 Fishing Industry

The above increase in vessel traffic shown in Table 10.2-1 has the potential to create cumulative adverse effects on the fisheries within the Strait. Increase vessel traffic may limit fishing activities and result in increased loss of fishing gear. It is of note that the cumulative increase in large vessel numbers is relatively small if the numbers for smaller vessels are also taken into consideration (22,000 to 27,000 vessels). These small craft may also cause disruption in fishing activities and may represent a potential threat to fishing gear. With the small vessels included, the overall cumulative adverse effect on fishing activities in the Strait is likely not significant.

The MIT Project is not expected to cause measurable changes in the environment with respect to effects on marine habitat, and fisheries and aquaculture. The implementation of the proposed fish habitat compensation plan will result in no-net-loss of marine fish habitat in the region. MITI's policy for compensation of damage to fishing gear caused by vessels utilizing MIT, and for demonstrated loss of income due to the Project, will ensure that there are no project-related monetary losses incurred by local fishers. Therefore, the Project will not contribute to cumulative effects with respect to fisheries and aquaculture.

10.2.4.2 Economy

The MIT Project is expected to have immediate and long-lasting impacts on the provincial, regional and local economies. They range from project development and administration costs, to permitting and engineering, marketing and public relations, as well as legal and consulting services, and are estimated at $10.3 million over a time period of approximately 5 years. The total construction costs are estimated at $460.0 million. The MIT construction is expected to take just over two years and generate 1,500-1,600 person-years of work. The logistics park construction will be phased as required by demand, and is expected to generate 1,300-1,400 person-years of work. By its nature, this work and the associated jobs will occur in the Strait of Canso area. The MIT would generate initial annual expenditures in Nova Scotia and the rest of Canada estimated at about $1.1 billion (for more details on the MIT see Section 7.4)

All other future and reasonably foreseeable projects identified in Table 10.1-1 will also contribute in a beneficial way to the local, regional and perhaps provincial economy. The particular magnitude of the associated investments and job opportunities are beyond the scope of this cumulative effects assessment and have therefore not been investigated.

10.3 MITIGATION

10.3.1 Mitigating Effects on Climate

MIT will be employing electrically powered equipment (e.g., electrically powered STS gantry cranes) to the extent that it is technically and economically feasible. Once in operation, MITI will continue to examine evolving technologies and methodologies which may assist in reducing or offsetting GHG emissions associated with the MIT operation (e.g., use of biodiesel in equipment powered by fossil fuel combustion engines). MIT will not own and operate any of the vessels using MIT and therefore has no control over the fuel used by these vessels and on-board emission controls. Regulation of vessel fuel usage and emissions is within the jurisdiction of the federal and provincial governments. MIT is committed to adhering to all present and future legislation relevant to climate change mitigation.

10.3.2 Mitigating Effects on Water Quality

MITI will employ a project-inherent engineering and design approach to stormwater and wastewater management (Section 2.7). Therefore, no potential for significant adverse cumulative effects with the other projects has been identified. No additional mitigation measure are considered necessary other than the monitoring of effluent quality prior to the discharge to the marine environment and, if required, water quality in the marine environment itself (see Section 6.8). It is of note that both projects, the Bear Head LNG and the NSPI Coal Terminal, have also established mitigation measures to protect marine habitat (including water quality). The implementation of these is predicted to keep the effects below significant levels (Jacques Whitford 2004; Nova Scotia Power Incorporated 2003).

10.3.3 Mitigating Effects Related to Marine Mammals/ Marine Species at Risk

As stated in the effects assessment (Section 10.2.3), from a cumulative effects perspective, vessel-whale collisions are of particular concern. The likelihood and significance of such effects depends to a large degree on vessel speed and navigational routes with respect to areas where whales tend to concentrate. However, standard vessel operating procedures address avoidance of marine mammal issues. The establishment of general navigational restrictions is the responsibility of Transport Canada. MITI is committed to cooperate fully with the MCTS Division known as Canso Traffic and DFO.

10.3.4 Mitigating Effects on Socio-Economic Factors

10.3.4.1 Marine Transportation

To mitigate adverse effects on marine transportation MIT is committed to:

- Comply with the Eastern Canada Vessel Traffic Services Zone Regulations of the *Canada Shipping Act* (CSA);
- Comply with navigational and operational requirements of Atlantic Pilotage Authority and Coast Guard;
- Provide marine vessel volumes and schedules to marine management operators responsible for traffic movement in the Strait of Canso; and
- Participate in an integrated marine management planning, if any such initiative is established.

10.3.4.2 Fishing Industry

To mitigate adverse effects of Project activities (during construction and operations) on the Fishing Industry, MIT is committed to an on-going dialogue with stakeholders related to the fishing industry in the area in particular to:

- develop a vessel traffic management plan in consultation with relevant stakeholders;
- communications and operations protocols, gear and vessel damage policies, and compensation arrangements; and
- provide for habitat compensation (Section 6.8, Appendix 6.8-A) for the marine terminal area and comply with all applicable federal and provincial permits.

Further MIT–specific mitigation measures related to potential adverse effects on the fishing industry are discussed in Section 7.

10.3.4.3 Economy

In order to maximize its contribution to the local economy and to enhance local business opportunities, MIT is committed to a number of enhancement measures including such things as a procurement policy that favours local labour markets and suppliers and on-going information sharing regarding anticipated requirements for goods and services, construction schedules, available contracts, and protocols for bidding. Further MIT–specific enhancement measures related to maximizing the beneficial economic effects of the Project are discussed in Section 7. It is beyond the scope of the cumulative effects assessment to investigate if other planned/ future projects in the area intend to implement similar enhancement schemes.

10.4 RESIDUAL EFFECTS AND SIGNIFICANCE

The results of the CEA are summarized in Table 10.4-1. Taking the various mitigation measures into account, residual adverse cumulative effects are expected to occur related to climate effects, marine mammals/species at risk, and marine transportation. None of these residual effects are considered significant. The significance for the cumulative effects on marine mammals/species at risk and on marine transportation was not determined due to insufficient information. The likelihood of the effects to occur, however, is considered low.

Table 10.4-1: Summary – Residual Cumulative Effects and Significance

Other Projects	VEC Related Potential Cumulative Effects (MIT and Other Future Projects)	Mitigation	Significance Criteria					Residual Cumulative Effects & Significance
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility (R= reversible NR = Not reversible)	Ecological/ Social-cultural and Economic Context t	
NSPI Coal Terminal, Bear Head LNG Terminal, Melford Industrial Reserve	Climate Contributions to regional and global climate change as a result of: • GHG emissions from operation of combustion engines of vessels and on-shore equipment (all project phases) • GHG emissions from LNG Re-gasification process •	MITI: • Application of electric power to the extent operationally and economically feasible; • Support of development and implementation of regulatory guidelines and standards for the reduction of GHG emissions/measures for off-setting GHG emissions Other Projects: • Use of best available technology (LNG Terminal); the use of the natural gas as replacement fuel for GHG intensive fuel types will mitigate effects on a more regional/global level. • Mitigation measures applied by NSPI Coal Terminal unknown; • Future developments and operations within Melford Industrial Reserve unknown	Cumulative Unknown MIT GHG emissions: annually 0.39% of provincial emissions	Local to global	On-going	NR	MIT proposal supported by local policies on economic development	Yes Not significant

Table 10.4-1: Summary – Residual Cumulative Effects and Significance

Other Projects	VEC Related Potential Cumulative Effects (MIT and Other Future Projects)	Mitigation	Significance Criteria					Residual Cumulative Effects & Significance
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility (R= reversible NR = Not reversible)	Ecological/ Social-cultural and Economic Context t	
NSPI Coal Terminal, Bear Head LNG Terminal, Melford Industrial Reserve	<u>Marine Water Quality</u> Contributions to marine water quality in Strait of Canso as a result of: • Discharge of contaminated stormwater • Discharge of sanitary sewage	<u>MITI:</u> • Collection of potentially contaminated stormwater • Collection of all sanitary sewage • Treatment of potentially contaminated stormwater and sanitary sewage in on-site treatment facility to regulatory standards <u>Other Projects:</u> • On-site treatment of waste water; routine discharges in compliance with CEPA requirements (Bear Head LNG Terminal); routine discharges from vessels only to extent that applicable guidelines and regulations are met. • Mitigation measures applied by NSPI Coal Terminal unknown; • Future developments and operations within Melford Industrial Reserve unknown;	<u>Cumulative</u> Quantity and quality unknown <u>MIT</u> Quantity unknown; quality to be within regulatory guidelines/standards; no measurable change in marine environment expected	All discharges to Strait of Canso; no overlap anticipated	On-going (Operation Phase)	R	MIT proposal supported by local policies on economic development	No

Table 10.4-1: Summary – Residual Cumulative Effects and Significance

Other Projects	VEC Related Potential Cumulative Effects (MIT and Other Future Projects)	Mitigation	Significance Criteria					Residual Cumulative Effects & Significance
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility (R= reversible NR = Not reversible)	Ecological/ Social-cultural and Economic Context t	
NSPI Coal Terminal, Bear Head LNG Terminal, Melford Industrial Reserve	Marine Mammals and Marine Species at Risk • Ship collisions with whales (including three whales with conservation status)	MIT: • Full cooperation with Canso Traffic and DFO Other Projects: • unknown	Cumulative: Projects contribute 68% of estimated total future vessel numbers MIT: Increase represents 24% of estimated total future vessel numbers	Cumulative Strait of Canso	Cumulative Likely daily large vessel traffic over lifetime of projects MITI: Approximate ly 5 vessels / week	NR	Occurrence of whales with conservation status rare; Strait not known to have high numbers of whale individuals and their occurrence is seasonal	Yes Significance unknown; effects unlikely to occur

Table 10.4-1: Summary – Residual Cumulative Effects and Significance

Other Projects	VEC Related Potential Cumulative Effects (MIT and Other Future Projects)	Mitigation	Significance Criteria					Residual Cumulative Effects & Significance
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility (R= reversible NR = Not reversible)	Ecological/ Social-cultural and Economic Context t	
NSPI Coal Terminal, Bear Head LNG Terminal, Melford Industrial Reserve	Marine Transportation • Increased numbers of vessel collisions	MIT: Beyond control of MITI; container vessels will not be owned or operated by MITI; marine traffic in Strait managed by Canso Traffic; MIT support Canso Traffic to extent possible in implementation of its rules and regulations and the advancement of these should the need be identified. Other Projects: Subject to same regulatory requirements	Cumulative: Projects contribute 68% of estimated total future vessel numbers; resulting increase for number of accidents unknown MIT: 24% of estimated total future vessel numbers; resulting increase for number of accidents unknown	Strait of Canso	Lifetime of projects	R	Strait is well regulated by Canadian Coast Guard's Strait of Canso and Eastern Approaches Vessel Traffic Services Zone; well managed by Canso Traffic	Yes Significance unknown Occurrence considered unlikely

Table 10.4-1: Summary – Residual Cumulative Effects and Significance

Other Projects	VEC Related Potential Cumulative Effects (MIT and Other Future Projects)	Mitigation	Significance Criteria					Residual Cumulative Effects & Significance
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility (R= reversible NR = Not reversible)	Ecological/ Social-cultural and Economic Context t	
NSPI Coal Terminal, Bear Head LNG Terminal, Melford Industrial Reserve	<u>Fishing Industry</u> Increase vessel traffic could lead to • Disruption of fishing activities • Loss or damage of fishing gear	<u>MIT</u>: dialogue with stakeholders related to the fishing industry in the area in particular to • develop a vessel traffic management plan; • develop communications and operations protocols, gear and vessel damage policies, and compensation arrangements; and • provide for habitat compensation for the marine terminal area and comply with all applicable federal and provincial permits.	For larger vessels – see incremental increase stated above; incremental increase insignificant if small boats taken into account	Strait of Canso	Lifetime of projects	R	Incremental increase in vessel numbers is minimal if smaller craft taken into account=	Yes Not significant
Other economic developments in region (see Section 10.2)	<u>Local and Regional Economy:</u> Beneficial effects as a result of • Increased job opportunities • Reduced out-migration • Increased municipal tax base	<u>MIT:</u> • Procurement Policy to support local/regional labour market and suppliers Early consultation with stakeholders (business community, unions, chamber of commerce, municipalities) regarding construction schedule, project requirements (construction and operation related)	Beneficial effect – magnitude not determined	Local, regional, and potentially provincial economy	Construction and Operation Phases of all Projects involved	Not applicable	Minimal to negative economic growth in local and regional economies	Beneficial effect – significance not determined

10.5 REFERENCES

Guysborough County Regional Development Authority. 2005. Melford Industrial Reserve. Available at: http://www.gcrda.ns.ca/index.php and http://www.gcrda.ns.ca/index.php?option=com_content&task=view&id=39&Itemid=259#melford

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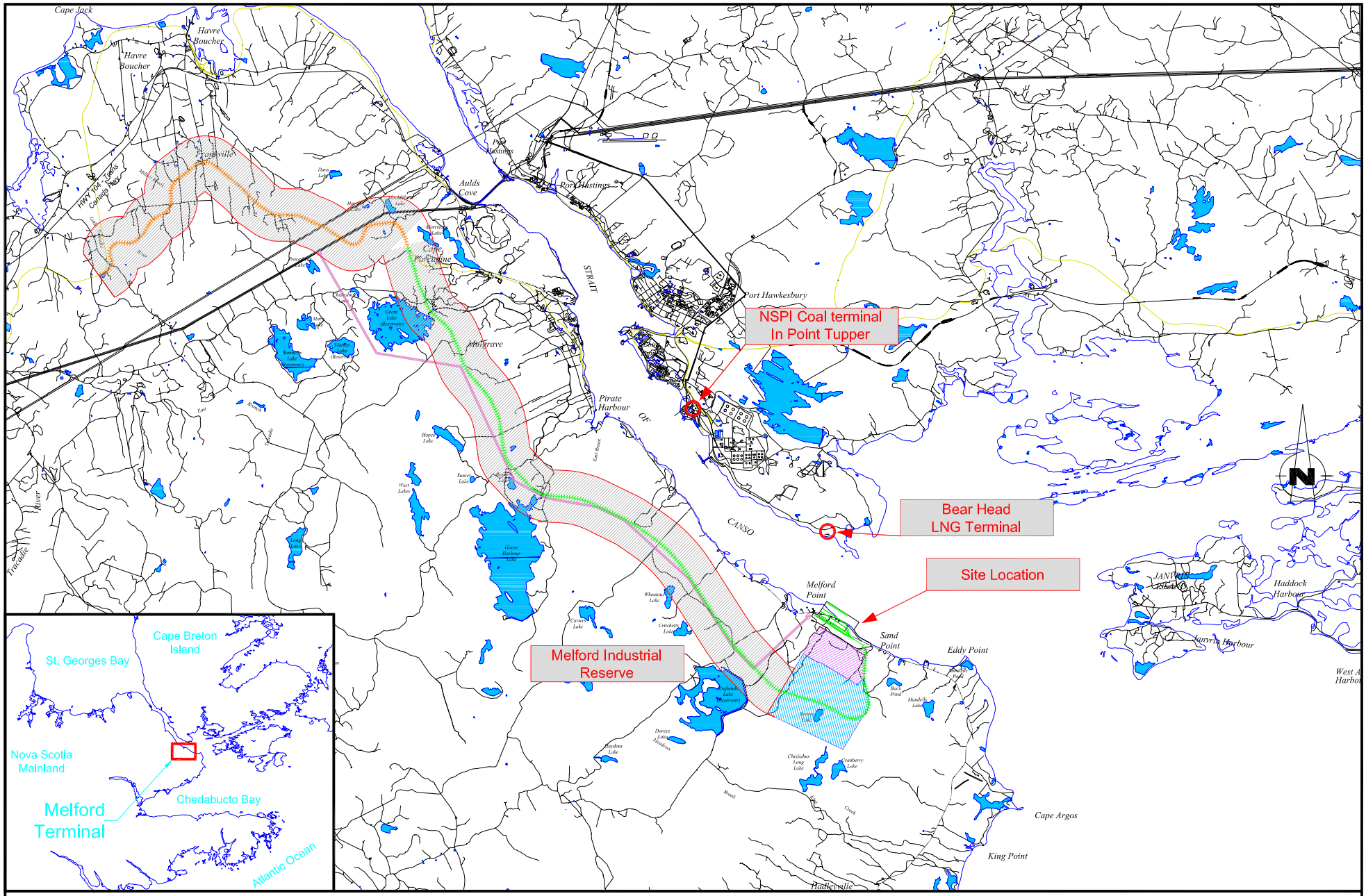

LEGEND:

- Proposed Melford Rail Track
- Proposed Melford Rail Track (On Existing Rail Bed)
- Existing Route 344
- Road Network
- Proposed Melford International Terminal
- Environmental Baseline Study Corridor
- Initial Logistics Park
- Future Logistics Park Expansion
- Proposed NSPI Easement

Source:
Nova Scotia Atlas, 5th Edition, 2001. Service
Nova Scotia and Municipal Relations, Nova Scotia Geomatics Centre

Figure 10.1-1
Melford International Terminal
Location of Other Projects
July 2008