

## 4.0 ENVIRONMENTAL SETTING AND CONTEXT

This Chapter provides an overview of the existing environmental setting for the proposed Project, including a description of relevant components of the natural and socioeconomic environments.

### 4.1 Physical and Biological Environment

The proposed Project is located in Lewisporte, Central Newfoundland. The Project Site is on Route 340 on the South Side of Lewisporte on Burnt Bay between the developed part of Lewisporte and the Town of Campbellton (Figure 1-1). The following sections provide a general description of the existing natural environment based on existing and available information, which is limited for some topics. The objective is to present an overview of existing conditions and context for the Project.

#### 4.1.1 Climate and Air Quality

This section provides an overview of the regulatory regime for air quality in Newfoundland and Labrador. Existing conditions for the Project Site are also described based on published data and information for nearest monitoring sites in Central Newfoundland.

#### Regulatory Regime

The Government of Newfoundland and Labrador has set ambient air quality standards under the *Newfoundland and Labrador Air Pollution Control Regulations, 2004* under the *Environment Protection Act* (O.C. 2004-232). Tables 4-1 and 4-2 summarize NL ambient air quality standards for criteria air contaminants and dioxin/furans, respectively.

**Table 4-1: Provincial Ambient Air Quality Standards at Reference Conditions**

Parameter	Averaging Time Period	Newfoundland Standards
Nitrogen Dioxide ( $\mu\text{g}/\text{m}^3$ )	1 hour	400
	24 hour	200
	Annual	100
Sulphur Dioxide (ppb)	24 hour	65
	Annual	4
Total Suspended Particulate Matter ( $\mu\text{g}/\text{m}^3$ )	24 hour	120
	Annual	60
PM <sub>10</sub>	24 hour	50
PM <sub>2.5</sub>	24 hour	25
	Annual	8.8
Carbon Monoxide ( $\mu\text{g}/\text{m}^3$ )	1 hour	35,000
	8 hour	15,000
Ozone	1 hour	160
	8 hour	87

Source: GOC, 2021

**Table 4-2: Provincial Ambient Air Quality Standards – Dioxin/Furans at Reference Conditions**

Contaminant	Unit	Concentration	Time Period	Note
Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) (TEQ)	Picograms (TEQ) per cubic metre of air	5	24 hour	The TEQ concentration of PCDDs and PCDFs is determined by multiplying the concentration of each cogener listed in Column 1 of Table III (in the <i>Air Pollution Regulations, 2004</i> document) by the corresponding toxicity factor set out in column 2 of that item and by adding the products of them.

Source: GOC, 2021

The Province of Ontario has established ambient air criteria for other parameters, such as VOCs, not provided by NL regulations. Table 4-3 provides a list of relevant Ontario ambient air criteria.

**Table 4-3: Ontario Ambient Air Quality Criteria**

Parameter	Unit	Averaging Time Period	Criterion
Fluorides (as HF) (gaseous)	ppb	24 hour	1
		30 day	0.4
Hydrogen Chloride	( $\mu\text{g}/\text{m}^3$ )	24 hour	20
Lead and lead compounds	( $\mu\text{g}/\text{m}^3$ )	24 hour	0.5
		30 day	0.2
Mineral Spirits	( $\mu\text{g}/\text{m}^3$ )	24 hour	2,600
Styrene	( $\mu\text{g}/\text{m}^3$ )	30 day	400

Source: GOC, 2021

#### **End of Stack Limits**

The Government of Newfoundland and Labrador provides end of stack limits for the operation of new incineration or pyrometric equipment and under the *Newfoundland and Labrador Air Pollution Control Regulations, 2004* under the *Environment Protection Act* (O.C. 2004-232. This equipment cannot have an in-stack concentration exceeding the standards prescribed in Table 4-4.

**Table 4-4: Provincial In-Stack Standards – Incineration and Pyrolysis**

Facility	Mercury	Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs)
Municipal Waste Incinerator	20 $\mu\text{g}/\text{m}^3$	80 pg I-TEQ/ $\text{m}^3$

Source: GOC, 2021

Note: This information is also provided in Table 6-6.

**Dioxin and furan emissions** from the rotary kiln gasification process are inherently low due to the high residence time at temperature in the LoNO<sub>x</sub> burner. Temperatures and residence times in the reforming and burning stages are sufficient to destroy dioxin, furans, and most other harmful organic compounds. Thereafter in the APCS, activated carbon is injected prior to the baghouse to remove VOCs including dioxins and furans. The numbers mentioned for incinerator dioxin and furan emissions are from incinerators operating on MSW in which the proportion of plastics is normally in the range from 10% to 20%. At TNEC, plastics are removed from the feedstock by optical sorting before it is gasified. Based on testing of similar gasification systems, operating on mixed waste, dioxin and furan concentrations in the cleaned flue gas should be no higher than 0.5 µg/m<sup>3</sup>.

The air pollution regulations also provide penalties emissions exceedances. Refer to Table 4-5 for a list of these penalties.

**Table 4-5: Summary of Emission Penalties for Emissions Exceedances**

<b>Pollutant</b>	<b>Maximum Allowable Annual Emission without Administrative Penalty</b>	<b>Administrative Penalty</b>
Ammonia	10 tonnes	\$2/tonne
Nickel	10 tonnes	\$2/tonne
Vanadium	10 tonnes	\$2/tonne
Carbon Monoxide	20 tonnes	\$2/tonne
Nitrogen Oxides	20 tonnes	\$2/tonne
Particulate Matter	20 tonnes	\$2/tonne
Sulphur Dioxide	20 tonnes	\$2/tonne
Arsenic	50 kilograms	\$2/kilogram
Lead	50 kilograms	\$2/kilogram
Cadmium	5 kilograms	\$2/kilogram
Mercury	5 kilograms	\$2/kilogram
Polychlorinated dibenzo-p-dioxins (PCDDs) and poly-chlorinated dibenzofurans (PCDFs) (TEQ)	1,000 milligrams TEQ	\$2/milligram TEQ

Source: GOC, 2021

Note: This information is also provided in Table 6-7.

## Existing Conditions

The Central Newfoundland climate is the most continental on the island, with the warmest summers and coldest winters. Lewisporte is within the North Shore Forest ecoregion, which is generally characterized by lower moisture levels (PAA, 2008). The nearest Canadian Climate Normals Station to the Project Area is Rattling Brook Norris Arm (Climate ID 8403085; Latitude 49°04'00.000" N; Longitude 55°18'00.000 W), approximately 25 km southwest (ECCC, 2021a). The Grand Falls Climate Station is

located approximately 65 km southwest of Lewisporte. The Gander International Climate Station is located approximately 50 km southeast of Lewisporte.

A summary of key climatic characteristics from the Rattling Brook Norris Arm and Grand Falls stations are presented in Tables 4-6 and 4-7. Overall, the mean monthly temperature is 4.7°C with a low of -7.5°C in February to a high of 17.3°C in July. The area receives consistent precipitation throughout the year, averaging 1,139.6 mm annually. The total annual snowfall is 840.3 cm, generally occurring between November and April. Winds are dominantly westerly with annual normal of 20.1 per hour (Table 4-8). The maximum hourly wind speed of 117 km/hr, with maximum gusts of 172 km/hr, was recorded in January 1982.

**Table 4-6: Climate Normals for Rattling Brook Norris Arm Station (1981-2010)**

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Temperature (°C)	-7.5	-7.7	-3.4	2.4	8.1	12.6	17.3	17.2	12.6	6.7	1.5	-3.7	4.7
Precipitation (mm)	95.0	88.2	91.0	84.5	86.9	87.9	90.6	103.2	111.2	104.1	99.6	97.2	1139.6
Rainfall (mm)	24.2	24.6	36.4	57.1	83.3	87.3	90.6	103.2	111.2	101.5	79.1	41.8	840.3
Snowfall (cm)	70.8	63.6	54.7	27.4	3.7	0.6	0.0	0.0	0.0	2.6	20.5	55.4	299.3

Source: ECCC, 2021a

**Table 4-7: Climate Normals for Grand Falls Station (1981-2010)**

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Temperature (°C)	-7.7	-8.0	-3.8	2.3	8.1	12.7	17.1	16.8	12.2	6.4	1.4	-4.1	4.5
Precipitation (mm)	93.6	93.7	90.8	84.0	78.5	89.4	88.5	107.3	95.6	94.2	93.6	89.8	1098.9
Rainfall (mm)	31.8	30.3	36.8	53.1	74.1	88.7	88.5	107.3	95.6	90.4	72.5	36.8	806.1
Snowfall (cm)	59.8	59.0	49.7	27.4	4.2	0.6	0.0	0.0	0.0	3.5	21.6	49.2	275.0

Source: ECCC, 2021a

**Table 4-8: Wind Climate Normals for Gander International Airport (1981-2010)**

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Speed (km/hr)	23.6	22.7	22.7	20.5	19.1	17.8	16.6	16.3	17.9	19.5	21.1	23.0	20.1
Most Frequent Direction	W	W	W	W	W	SW	SW	SW	W	W	W	W	W
Maximum Hourly Speed	117	105	83	80	84	77	77	77	77	83	96	107	-
Direction of Maximum Hourly Speed	S	W	S	SW	N	E	NW	S	SW	S	SE	SE	-
Date (yyyy/dd)	1982/ 10	1967/ 22	1993/ 14	1964/ 01	1962/ 01	1962/ 07	1958/ 21	1958/ 17	1955/ 22	1987/ 02	1987/ 22	1979/ 17	-
Maximum Gust Speed	172	145	135	116	114	116	105	113	130	148	133	159	-
Date (yyyy/dd)	1982/ 10	1967/ 22	1965/ 23	1964/ 03	1970/ 27	1962/ 07	1959/ 01	1958/ 17	1955/ 21	1987/ 02	1986/ 14	1979/ 17	-
Direction of Maximum Gust	S	W	W	SW	S	E	NW	S	SW	SW	W	SE	-

Source: ECCC, 2021a

No baseline air quality information is available for the immediate area of the proposed Project Site. NL Environment and Climate Change operates six ambient air monitoring stations throughout the Province (i.e., Port Au Choix, Corner Brook, Grand Falls-Windsor, Burin, Mount Pearl, St. John's) that provide data. The closest air monitoring station is at Grand Falls-Windsor, approximately 40 kms southwest of the Site. This station monitors for the following parameters:

- Particulate Matter less than 2.5 microns (PM<sub>2.5</sub>)
- Ozone
- Nitric Oxide
- Nitrogen Dioxide
- Oxides of Nitrogen
- Carbon Monoxide
- Sulfur Dioxide

The closest air monitoring station measuring Particulate Matter less than 10 microns (PM<sub>10</sub>) is in Marystown, which is located approximately 275 km to the south of Lewisporte. Table 4-9 provides a summary annual mean data for the year 2019 for the Grand Falls-Windsor ambient air monitoring station with PM<sub>10</sub> data from Marystown.

**Table 4-9: 2019 Ambient Air Monitoring data for Grand Falls-Windsor NAPS Station**

Parameter	NO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	NO (µg/m <sup>3</sup> )	SO <sub>2</sub> (ppb)	CO (mg/m <sup>3</sup> )	PM <sub>10</sub> <sup>(1)</sup> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )
Annual Mean	3.76	3.68	2.45	0.5	0.160	9	3	58.9

Source: GOC, 2021

Note: (1) Data is from NL Environment and Climate Change Ambient Air Monitoring Station, Marystown, NL

The Project Site is considered remote and has no industrial developments with potential to impact existing air quality in the immediate area. For purposes of comparison, the ambient air monitoring station at Grand Falls-Windsor is located on the border of the Town, which had a 2016 population of 14,171, while Lewisporte's population was 3,409. NL Environment and Climate Change classifies the area where the ambient air station is located as urban. Table 4-10 provides a comparison of the 2019 mean annual data with available NL standards. The Government of NL provides annual ambient air quality standards for the following parameters: NO<sub>2</sub>, SO<sub>2</sub>, and PM<sub>2.5</sub>. All annual means for these three parameters were well below their respective annual standards. NL does not provide annual standards for the remaining parameters, CO, PM<sub>10</sub> and O<sub>3</sub>. However, standards are provided for lesser time periods (8 hours and 24 hours) for these parameters. Although a direct comparison cannot be made for these parameters, since averaging periods for these parameters do not match, the mean averages are lower than the standards provided for the CO, PM<sub>10</sub> and O<sub>3</sub> three parameters. Since the Project Site is located in a more rural area with minimal anthropogenic sources, it is likely the concentrations for the

parameters will be even lower than the concentrations measured in the more urban area of Grand Falls Windsor, which already meet the NL standards. PM<sub>10</sub> data was collected in Marystown.

**Table 4-10: 2019 Ambient Air Monitoring data for Grand Falls-Windsor NAPS Station**

Parameter	NO <sub>2</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (ppb)	CO (mg/m <sup>3</sup> )	PM <sub>10</sub> <sup>(1)</sup> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )
Annual Mean	3.76	3.68	0.160	9	3	58.9
Time Period	Annual	Annual	8 hours	24 hours	Annual	8 hours
Newfoundland Standard	100	4	15,000	50	8.8	87

Source: GOC, 2021

Note: (1) Data is from NL Environment and Climate Change Ambient Air Monitoring Station, Marystown, NL

No volatile organic compound (VOC) or dioxin/furan monitoring data are available for the Project Site or Newfoundland (GOC, 2021). The processing activities have a potential to either generate emissions or end use products, which may release the following parameters as referenced in Table 4-3: fluorides (as HF), hydrogen chloride, lead, mineral spirits (naptha/diesel) and styrene (plastics).

#### **Air Pollutant Inventories – Newfoundland and Labrador**

This section provides a summary of CAC emissions for all sources in Newfoundland and Labrador (Table 4-11) and for other parameter emissions (Table 4-12) that may be released from the site.

**Table 4-11: 2018 Air Pollutant Inventory CAC Emissions of Newfoundland and Labrador (tonnes/year)**

Category	TPM	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO
Total Ores and Mineral Industries	10,296	2,438	534	5,290	5,686	292	5,219
Total Oil and Gas	908	856	796	8,704	8,146	5,835	5,061
Total Electric Power Generation	430	253	233	3,641	3,489	24	333
Total Manufacturing	100	92	81	14	220	231	141
Total Transportation	1,182	1,163	895	569	27,223	5,422	51,053
Total Agriculture	281	50	12	5	6	645	1
Total Commercial/Residential/Institutional	7,258	6,846	6,822	503	1,340	10,690	43,793
Total Incineration and Waste	159	110	90	9	36	329	463
Total Paints and Solvents	-	-	-	-	-	4,905	-
Total Dust	206,791	62,228	8,428	-	-	-	-
Total Fires	2	2	2	-	-	2	11
Total	227,408	74,038	17,893	18,735	46,145	28,374	106,076

Source: GOC, 2021

**Table 4-12: 2018 Air Pollutant Inventory: Other Project Emissions - Newfoundland and Labrador (tonnes/year)**

Category	Pb	Cd	Hg	D/F	PAHs
Total Ores and Mineral Industries	10,296	48.1	24	0	8.8
Total Oil and Gas	74.4	24.3	6.7	0	0.4
Total Electric Power Generation	200.4	2.0	0	0.058	0
Total Manufacturing	10.3	0	0	0	0
Total Transportation	238.8	2.5	0	1.817	115.2
Total Agriculture	0.2	0.1	0	0	0
Total Commercial/Residential/Institutional	115.3	22.8	5.3	0.283	3,683
Total Incineration and Waste	4.9	0.9	4.8	0.806	25.6
Total Paints and Solvents	0	0	0	0	0
Total Dust	0	0	0	0	0
Total Fires	0	0	0	0	0
Total	2,391.6	100.6	40.9	2.964	3,833.2

Source: GOC, 2021

## **Climate Change**

In 2018, Newfoundland and Labrador generated 9,780 kt of CO<sub>2</sub>, 36 kt of CH<sub>4</sub> and 0.47 kt of N<sub>2</sub>O. The total kt CO<sub>2</sub> eq for the Province of NL was 11,000. The Province has implemented an action plan to address climate change (GNL, 2020). In 2015, in recognition of the importance of tracking progress between 2020 and 2050, the Province joined other members of the Conference of New England Governors and Eastern Canadian Provinces in adopting a regional greenhouse gas (GHG) reduction marker for 2030. The marker is to reduce regional GHG emissions by 35 to 45 percent below the 1990 regional GHG emissions level. In response to this recommendation, NL has committed to reducing provincial GHG emissions by 30 percent below its 2005 GHG emissions level by 2030.

In addition to adopting a GHG reduction marker, as of January 1st, 2019, the Province of NL began implementing a “hybrid” carbon program comprised with the following two elements:

- A carbon price applied to combusted fossil fuels across the economy, except where exemptions are provided; and
- A performance standard for large industrial facilities and large-scale electricity generation that emit more than 25,000 tonnes of GHG emissions per year.

### **4.1.2 Geology and Topography**

The topography of the region is generally defined as gently rolling to hilly with most elevations below 130 m (PAA, 2008). This ecoregion is geologically diverse, with underlying rock formations from the Dunnage zone, Gander zone, Avalon zone and Humber zone. Areas west of the Gander River including



this site fall within the Dunnage zone, with shales, sandstones, conglomerates and volcanic rocks with an age between 430 and 550 million years.

## **Coastal Geology**

The Lewisporte/Loon Bay area is located within the Central Volcanic belt of Newfoundland (Livaccari, 1980). It contains rocks of upper Cambrian to Ordovician in age. The Luscombe Formation (370 m thick) is composed of manganiferous cherts that grade upward into highly argillaceous chert.

Chert rocks tend to be hard at lower depths but are expected to be friable in the upper regions to facilitate any sheet piling that may be required although it is expected that the jetty deck will sit on driven piles rock socketed into the strata and any sheet piling limited to shoreline works. SWPNL will carry out Geotechnical site investigations early in the Project to ensure the design is appropriate to local geological conditions.

### **4.1.3 Vegetation and Soils**

Damman 1979, defined ecoregions as areas where comparable vegetation and soil can be found on sites occupying similar topographic positions on the same parent material, provided these sites have experienced a similar history of disturbance (NLFFA, 2016). According to Damman, there are nine ecoregions on the island portion of the province. Most of these are further divided into subregions (also known as ecodistricts).

The Project Area is within the North Shore Forest Ecoregion (Meades, 1994). This ecoregion, one of the smallest on the island, is made up of a long narrow zone along the northeastern edge of the island. Most of the ecoregion is in direct contact with the North Atlantic Ocean due to the long, irregular coastline with many bays and islands, allowing the influence of the sea far inland.

The Canadian Boreal Forest is characterized by black spruce, white spruce, balsam fir, eastern larch, trembling aspen, white birch and jack pine (CCELC, 1989). The dominant species on the Island of Newfoundland are black spruce and balsam fir.

Due to the lower moisture levels, forest fires are common in Central Newfoundland and can be extensive (PAA, 2008). Black spruce often grows in areas following a forest fire and these fire stands of black spruce are common in this region. Balsam fir and sheep laurel can be found in areas where there has not been a recent forest fire event. Proximity to the ocean also impacts vegetation type and growth. Closer to the shoreline, trees are smaller due to the impact of higher winds. White spruce is also commonly found in this region, as are several arctic-alpine plants such as alpine bilberry, Swedish bunchberry (*Cornus suecica*) and bunchberry (*C. canadensis*).

Mountain alder swamps are also found in Central Newfoundland, as mountain alder is adapted to the conditions found in this region (PAA, 2008). Most soils found in this region are "humo ferric podzols", which are brown soils that contain mostly inorganic material.

#### 4.1.4 Aquatic Fish and Fish Habitat

A stream and a small waterbody with a limited upstream catchment area are visible within the Project Area, on 1:50,000 scale topographic maps. The Campbellton River and Tributaries, including Neyles Brook and Indian Arm River and Tributary Streams scheduled salmon river is approximately 2 km away. (Figure 4-1).

Species likely to be present in the immediate Project Area include brook trout and threespine stickleback. Atlantic salmon and brook trout are present in scheduled salmon rivers northeast of the proposed Project Area (Porter et al. 1974; PAA, 2008; WERAC, 2016). Campbellton River, east of the Project Area is within Salmon Fishing Area (SFA) 4, which is considered a productive salmon zone (Downton and Reddin 1998; Veinott et al. 2018). Other species that may occur in the area (based on regional distributions) include rainbow smelt and American eel (WERAC, 2016). No freshwater species at risk (SARA schedule 1) are known to occur in the area. However American eel is listed as Vulnerable under the *NL Endangered Species Act* (ESA) (Table 4-13).

**Table 4-13: Freshwater Fish Species at Risk That May Occur in the Region**

Name	Conservation Status	Biological/Habitat Details
American Eel ( <i>Anguilla rostrata</i> )	Vulnerable (NL ESA)  Threatened (COSEWIC)	<ul style="list-style-type: none"> <li>• Catadromous species that occupies freshwater or estuaries as adults though adult spawning migrations and early life history stages occur in marine environments</li> <li>• Spawning occurs in the Sargasso Sea with pelagic eggs and larvae drifting north in currents before entering freshwater as elvers</li> <li>• In freshwater, preferred habitat parameters include water temperatures of 0-19°C, water depths of &lt;1 m and a range of substrate from mud to boulders</li> </ul>

Sources: Grant and Lee, 2004; COSEWIC, 2012a

#### 4.1.5 Wildlife

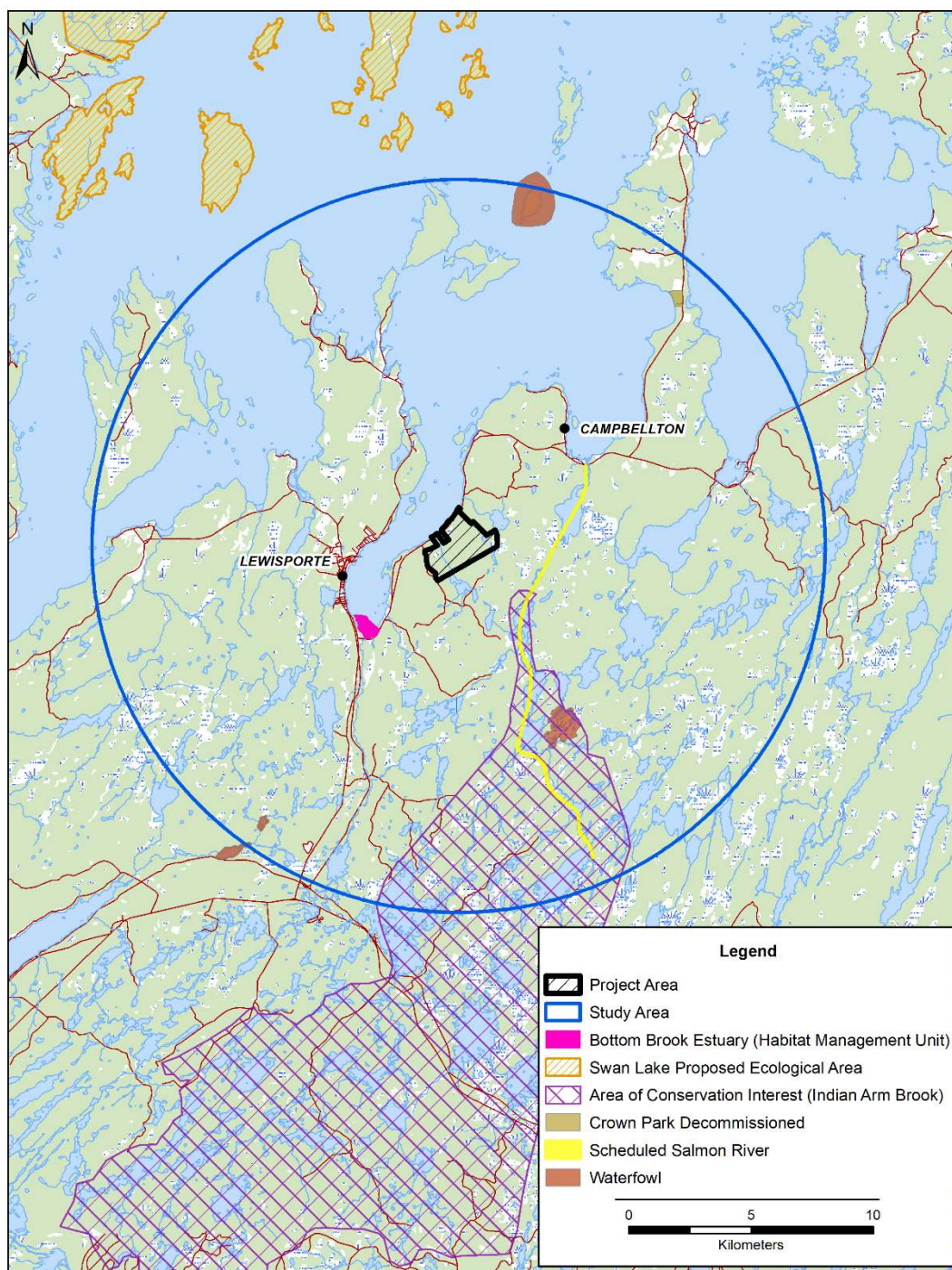
The Project Area is within the North Shore Forest Ecoregion typically comprised of continuous forest of black spruce and balsam fir with some white spruce (NLFFA, 2021a). Structured wildlife surveys have been limited in the region. Inference on the wildlife occurrence is based on known occupancy in similar habitats at a larger spatial scale and through opportunistic observations (i.e., citizen science) that note presence but not absence of species.

##### Birds

Bird habitats in the proposed Project Area include coastal shorelines and boreal forests. The Bottom Brook Estuary Habitat Management Unit, located along the southern edge of Lewisporte Harbour within the Study Area, is a waterfowl feeding and staging area (Figure 4-1) (SAM, 2017). Approximately

74 bird species including seabirds, raptors, waterfowl, shorebirds and songbirds have been observed along the South West Brook Estuary Bird Sanctuary Trail, which located in the Habitat Management Unit (eBird, 2021). Seabird colonies are present in the region with breeding seabird species including Leach's storm-petrels, herring gulls, ring-billed gulls, common terns, Arctic terns, black-legged kittiwakes, great black-backed gulls and Atlantic puffins (PAA, 2008). Many birds in this region including bald eagle, boreal owl, osprey, blackpoll warbler, grey-cheeked thrush, yellow warbler, Wilson's warbler and common redpoll are present elsewhere on the island (PAA, 2008; WERAC, 2016). Ponds and bogs in the region provide breeding habitat for Canada Geese, black ducks, great black-backed gulls, greater yellowlegs and Wilson's snipes (WERAC, 2016).

Species at risk (SARA schedule 1 and NL ESA) were identified for the region based on general distribution patterns (Table 4-14). Ivory gull (Endangered) and buff-breasted sandpiper (Special Concern) have also been observed in the Lewisporte area based on opportunistic observations (eBird, 2021).



**Figure 4-1 Freshwater and Terrestrial Habitats**

**Table 4-14: Marine and Terrestrial Bird Species at Risk That May Occur in the Region**

<b>Name</b>	<b>Conservation Status</b>	<b>Biological/Habitat Details</b>
Barrow's Goldeneye, Eastern Population ( <i>Bucephala islandica</i> )	Vulnerable (NL ESA) Special Concern (SARA /COSEWIC)	<ul style="list-style-type: none"> <li>• Main breeding area in eastern North America is along the North shore of the St. Lawrence Estuary and Gulf</li> <li>• NL is a wintering area for this species</li> <li>• Feeds upon aquatic insects, crustaceans, molluscs and vegetation</li> </ul>
Eskimo Curlew ( <i>Numenius borealis</i> )	Endangered (NL ESA/SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Breeding areas are thought to be the Arctic</li> <li>• Migrates in the fall to South America, staging in NL where it uses a variety of habitats including intertidal and terrestrial habitats</li> <li>• Feeds upon insects and berries</li> </ul>
Harlequin Duck ( <i>Histrionicus histrionicus</i> )	Vulnerable (NL ESA) Special Concern (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Breeds in fast flowing rivers of QC and NL and winters along marine coastlines on the south coast of NL and eastern North America</li> <li>• Coastal areas of Newfoundland and southern Labrador may be migratory stopovers</li> <li>• Feeds upon crustaceans and molluscs in marine wintering areas</li> </ul>
Ivory Gull ( <i>Pagophila eburnea</i> )	Endangered (NL ESA/SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Circumpolar patchy breeding distribution across the high Arctic including Arctic Canada, Greenland, Spitzbergen and Russia</li> <li>• May winter off the Atlantic coast and generally found among pack ice and more occasionally seen along the NL coast</li> <li>• Feeds upon small fish (e.g., lanternfish, Arctic cod) and zooplankton (e.g., amphipods, krill)</li> </ul>
Gray-Cheeked Thrush ( <i>Catharus minimus minimus</i> )	Threatened (NL ESA)	<ul style="list-style-type: none"> <li>• Newfoundland is the southern limit of the breeding range, which is generally from May to August</li> <li>• Preferred breeding habitats are dense low coniferous and deciduous thickets</li> <li>• Feeds upon insects, arachnids, grubs, fruits and berries</li> </ul>
Short-ear owl ( <i>Asio flammeus</i> )	Vulnerable (NL ESA) Special Concern (Under consideration) (SARA) Threatened (COSEWIC)	<ul style="list-style-type: none"> <li>• In coastal areas, feeds upon small mammals and birds</li> <li>• Thought to have been widespread breeders in NL with majority of historical sightings at coastal areas</li> <li>• Settlement in breeding areas occurs from March to May, with egg-laying between late April and early June</li> </ul>



Name	Conservation Status	Biological/Habitat Details
Red Crossbill ( <i>Loxia curvirostra perna</i> )	Endangered (NL ESA)  Threatened (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Feeds upon cones and seeds of coniferous and deciduous trees, fruit, insects, and larvae.</li> <li>• Inhabits coniferous forests and are associated with red pine stands.</li> <li>• This species does not undergo regular seasonal migrations. Movement on regional scales may be based on food availability (i.e., productivity of cone-bearing trees).</li> </ul>
Buff-breasted sandpiper ( <i>Calidris subruficollis</i> )	Special Concern (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Breeding distribution across Arctic regions including Russia, Alaska, Yukon, and north central Canada.</li> <li>• Juveniles migrate south along Atlantic and Pacific coasts.</li> <li>• Information on diet is limited. Migrants feeds on terrestrial invertebrates, plant seeds, copepods, and gammarid crustaceans</li> </ul>

Sources: COSEWIC 2000, 2006a, 2009, 2012a, 2013a, 2016; Dalley et al. 2005; Schmelzer, 2006; Whitaker et al. 2015

## Terrestrial Mammals

Mammalian species that may occur in the proposed Project Area include large mammals such as moose, woodland caribou and black bear (NLFFA, 2021a). Caribou core areas do not intersect the Study Area, but a local woodland caribou population inhabits the proposed Indian Arm Brook Reserve that is within the Study Area (**Error! Reference source not found.**) (WERAC 2016). Insular Newfoundland mammals that may be present in this area include lynx, red fox, beaver, otter, muskrat, snowshoe hare, short-tailed weasel, mink, red squirrel, meadow vole and coyote (PAA, 2008; WERAC, 2016; NLFFA, 2021a). Mink and red squirrels are non-native species and coyotes are considered recent colonizers to the island (NLFFA, 2021a). The Newfoundland marten is a species of conservation concern (Threatened under the NL ESA) associated with extensively forested landscapes (Gosse et al., 2005; Hearn, 2007; NLFFA, 2021a) (Table 4-15). Due to habitat associations, it is not expected that this species occurs in the proposed Project Area.

**Table 4-15: Terrestrial Mammal Species at Risk That May Occur in the Region**

Name	Conservation Status	Biological/Habitat Details
Newfoundland Marten ( <i>Martes americana atrata</i> )	Threatened (NL ESA/COSEWIC)	<ul style="list-style-type: none"> <li>• Feeds on small mammals including voles, shrews, mice and hares</li> <li>• Historically associated with old-growth/overmature forests but also utilizes a variety of habitat types including immature regenerating forests</li> </ul>

Name	Conservation Status	Biological/Habitat Details
		<ul style="list-style-type: none"> <li>Historically distributed throughout many areas of insular Newfoundland with current breeding populations in western Newfoundland, Northern Peninsula and eastern Newfoundland</li> </ul>

Sources: COSEWIC, 2007; The Newfoundland Marten Recovery Team, 2010

#### 4.1.6 Marine Fish and Fish Habitat

The presence of marine species and habitats are inferred from regional studies in Notre Dame Bay as there are no directed studies around the Project Area. The Bay is considered a refuge for warm water seaweeds and marine invertebrates (CPAWS, 2018). Shorelines are generally dominated by hard substrates with areas of gravel and cobble beaches. Macroalgae that occur along rocky shores in the region include rockweed, kelp species, and Irish moss (LGL Limited, 2001). Finfish occurring in the region include Atlantic cod, mackerel, herring, capelin, lumpfish, winter flounder, witch flounder and wolffish (LGL Limited 2001, CPAWS 2018). Atlantic salmon, American eel and smelt that inhabit marine and freshwater also likely occur in the area (CPAWS, 2018). Marine invertebrates that may occur in the region include green sea urchins, bivalves (mussel, clam, scallop), crustaceans (American lobster, toad crab, rock crab) and sea snails (whelk, periwinkles) (LGL Limited, 2001).

Species at risk (SARA schedule 1) were identified for Burnt Bay using the aquatic species at risk map tool (DFO, 2019). Species of conservation concern potentially found in this area include spotted wolffish and white shark (Table 4-16).

**Table 4-16: Marine Fish Species at Risk That May Occur in the Region**

Name	Conservation Status	Biological/Habitat Details
Spotted Wolffish ( <i>Anarhichas minor</i> )	Threatened (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>Benthivore that mainly feeds on echinoderms, crustaceans, molluscs and fish</li> <li>Demersal species that typically occurs from 200 to 750 m water depth</li> <li>Likely to inhabit deeper, colder waters than those found in the Project Area</li> <li>Critical habitat established for this species does not overlap with Project Area</li> <li>Eggs are likely benthic, and larvae are pelagic</li> </ul>
White Shark, Atlantic Population	Endangered (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>Feed upon fish, marine mammals, other sharks, marine invertebrates, marine birds and sea turtles</li> <li>Pelagic species that dives to water depths of 1,200 m and occupies water temperatures of 1.6 - 30.4°C</li> </ul>

Name	Conservation Status	Biological/Habitat Details
( <i>Carcharodon carcharias</i> )		<ul style="list-style-type: none"> <li>• Undergoes large migrations to Atlantic Canada waters to feed from June to February</li> <li>• Telemetry studies suggest Atlantic Canada distribution in is mainly south of Newfoundland and Nova Scotia, however, white shark have been observed on the Northern peninsula of Newfoundland</li> <li>• Mating and pupping are not well understood, possible pupping area in the Mid-Atlantic Bight</li> </ul>

Source: COSEWIC, 2006, 2012; DFO, 2020; Bastien et al., 2020

#### 4.1.7 Marine Wildlife

Eleven species of whales and dolphins, four species of seals along with sea turtles may occur in Notre Dame Bay. Whales and dolphins that occupy the area include humpback whale, blue whale, fin whale, sei whale, minke whale, sperm whale, killer whale, long-finned pilot whale, Atlantic white-sided dolphin, white beaked dolphin and harbour porpoise (Riewe, 1975; LGL Limited, 2001). These species may have seasonal occurrence in the area associated with foraging or are year-round residents. Harbour and grey seals may occur regionally year-round, whereas harp and hooded seals are mainly present in winter. Leatherback sea turtles have a global distribution with seasonal occurrence in Canadian waters.

Species at risk (SARA schedule 1) were identified for Burnt Bay using the aquatic species at risk map tool (DFO, 2019). Species of conservation concern potentially found in this area include fin whale, north Atlantic right whale, blue whale and leatherback sea turtle (Table 4-17).

**Table 4-17: Marine Mammal and Sea Turtle Species at Risk That May Occur in the Region**

Name	Conservation Status	Biological/Habitat Details
Blue whale, Atlantic Population ( <i>Balaenoptera musculus</i> )	Endangered (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Occurrence is associated with high krill productivity</li> <li>• Mating and calving take place in the winter in warmer, less productive southern waters</li> <li>• Important habitat in Canadian waters include the lower St. Lawrence Estuary – Northwestern Gulf of St. Lawrence, Mecatina Trough, south and southwestern Newfoundland, southern continental shelf edge, Honguedo Strait and Cabot Strait</li> <li>• The Project Area does not overlap with areas considered important for Blue Whale</li> </ul>
Fin Whale, Atlantic Population	Special Concern (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Occurrence is associated with productive oceanic fronts, cool waters and high densities of schooling fish and crustaceans (krill)</li> </ul>



Name	Conservation Status	Biological/Habitat Details
( <i>Balaenoptera physalus</i> )		<ul style="list-style-type: none"> <li>• Capelin are the main prey for fin whales off Newfoundland and Labrador</li> <li>• Found in a wide variety of areas from continental shelf and deep canyons to shallow coastal areas</li> <li>• Generally, has seasonal migrations with summer foraging in higher latitudes and winter breeding in lower latitudes but individuals have been observed year-round in Canadian waters</li> </ul>
North Atlantic Right Whale ( <i>Eubalaena glacialis</i> )	Endangered (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Migratory species associated with dense aggregations of their primary prey, copepod <i>Calanus finmarchicus</i></li> <li>• Occupies a range of water depths from shallow coastal to offshore waters</li> <li>• Seasonal northward migration in late winter to early spring with occurrence in Canadian waters mainly during summer with occasional occurrence in Newfoundland waters but no recorded evidence of aggregations</li> </ul>
Leatherback Sea Turtle, Atlantic population ( <i>Dermochelys coriacea</i> )	Endangered (SARA/COSEWIC)	<ul style="list-style-type: none"> <li>• Feeds on gelatinous organisms (e.g., Cnidaria, Ctenophora, Urocordata)</li> <li>• Primarily occurs in Atlantic Canada from April to December</li> <li>• Occupies a range of water depths from shallow coastal to offshore waters (2 - 5,033 m water depth)</li> <li>• Important habitats have been identified in the Atlantic coast off Nova Scotia, the southeastern Gulf of St. Lawrence and waters south and east of the Burin Peninsula, Newfoundland</li> </ul>

Sources: COSEWIC 2013b, 2013c, 2019; DFO 2018a, 2020a, 2020b, 2020c

#### 4.1.8 Protected and Special Areas

Various special areas in Newfoundland and Labrador have been designated as protected under provincial, federal and/or other legislation and processes, or have been formally identified through relevant forums and processes as being otherwise special or sensitive due to their ecological, historical and/or socio-cultural characteristics and importance. The Provincial Government establishes and manages a series of wildlife, wilderness and ecological reserves, which are created to protect and conserve wildlife, wilderness and biodiversity. Provincial parks provide recreational opportunities and contribute to conservation objectives. Federal and international agencies also identify and/or protect special areas. No special areas are within the Project Area.

The proposed Project Area does not intersect or occur adjacent to any formally designated ecological reserves, wilderness reserves or Provincial/National Parks (Figure 4-1). Several special areas including a Scheduled Salmon River (Campbellton River and Tributaries, including Neyles Brook and Indian Arm

River and Tributary Streams), a Habitat Management Unit (South West Brook Estuary Bird Sanctuary Trail), a Provincial Park (Notre Dame Junction Provincial Park), a former Provincial Park, an Area of Conservation Interest (Indian Arm Brook as proposed by the Norte Dame Rod and Gun Club) and Waterfowl Areas are identified within the Study Area (GNL, 2021a; WERAC, 2016).

The Protected Areas Plan for the island of Newfoundland released in 2020 identifies the proposed Swan Island Ecological Reserve (42 km<sup>2</sup>), in the outer Bay of Exploits north of Lewisporte, as a representative component of the North Shore Forest Ecoregion (WERAC, 2020). This archipelago of approximately 20 islands includes forests of spruce, larch, birch, poplar and aspen considered to be one of the most intact areas found within this natural region. Swan Island itself has some forestry resource roads and previously harvested areas, and recreational cabins occur throughout the islands included in the proposed protected area. The proposed ecological reserve is 15.5 km from the Project Area.

## **4.2 Human Environment**

The following sections provide an overview of the existing socioeconomic environment, including various anthropogenic components and activities that occur near the Project area and surrounding region, and which may potentially interact with the proposed Project.

### **4.2.1 Region and Communities**

The Project is located off Route 340, the Road to the Isles, within the municipality of Lewisporte in Central Newfoundland (Figure 4-3). Lewisporte harbour is a deep-water port located approximately 15 km from the Notre Dame Junction at the Trans Canada Highway and 65 km from Gander International Airport.

The baseline information included in this section focuses on various socioeconomic components and indicators, including population, community services and infrastructure, economy and employment, land and resource use and heritage resources, which are described using the most current and relevant data and information available for geographic regions, including Municipalities and Regional Economic Zones, Figure 4-3, as defined below:

- Project Area is the footprint of proposed development as shown in Figure 4-1.
- The Study area includes the Project Area along with a 15 km radius from the centre of the site and which encompasses Town of Lewisporte.
- Some information included in this project description is intended to provide regional context:
  - Local Area 61: Lewisporte, Brown's Arm, Embree, Laurenceton, Little Brunt Bay, Porterville and Stanhope
  - Economic Zones 12<sup>1</sup> and 14: the Central Newfoundland region including other communities and service centres such as Grand Falls, Bishop's Falls, Botwood, Gander and Norris Arm.

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<sup>1</sup> Although the Regional Economic Zone Boards were operationally discontinued in Newfoundland and Labrador, socioeconomic information is available based on these boundaries and they are a useful focus for presentation and analyses of such data at the regional level.

## Local and Regional Population

Lewisporte is located at the head of Burnt Bay in Notre Dame Bay. Due to its large and deep protected harbour and strategic location, the seaport has a history of supporting the marine shipping and boating industries. In 1887, settlers first arrived in Lewisporte to take part in the fishing, logging and shipbuilding industries (Town of Lewisporte, No Date). Following construction of a railway station in 1900, at Notre Dame Junction six miles south of Lewisporte, a sawmill operation began to use Lewisporte a shipping port. Other industries established at Lewisporte and developed infrastructure such as docking and large storage facilities. Lewisporte became the oil delivery and storage port for military operations at Gander (which has no sea access).

In 1947, Lewisporte Wholesalers began operations and in 1949 Steers Limited began a wholesale business with both acting as suppliers (Town of Lewisporte, No Date). Other companies followed and Lewisporte became a major distribution centre for the entire province. Canadian National (CN) Marine installed wharf and warehousing infrastructure during the 1950s and 1960s. In 1965, a marine service centre was established to serve as an over-wintering and maintenance facility for inshore fishing boats, tuna boats, recreational craft, and other boats. CN Marine and its successor, Marine Atlantic, operated the Labrador marine service until 1997 when the Government of Newfoundland assumed responsibility (Marine Atlantic, 2015).

Data from the 2021 census are not yet available. The population of these areas show limited growth between the 2011 and 2016 censuses. In addition, the median age of the population is higher than that of Newfoundland and Labrador (Table 4-18) and that of Canada, which was 41.2 years (Stats Canada, 2017). Population is aging and declining in many parts of rural Newfoundland and Labrador, but an industrial development project can attract working people with young families who contribute to the economy and the community.

**Table 4-18: Population**

<b>Geographic Area</b>	<b>2011</b>	<b>2016</b>	<b>% Change</b>	<b>Median Age</b>
Town of Lewisporte	3,483	3,409	-2.1	53
Local Area 61	5,420	5,650	4.2%	53
Economic Zone 12	26,190	26,300	0.4%	50
Economic Zone 14	46,275	45,985	-0.6%	50
Newfoundland and Labrador	514,535	519,715	1.0%	46

Sources: Stats Canada, 2017; NLSA, No Date

In the 2016 census, 5% of Lewisporte residents identified as Indigenous (Statistics Canada, 2017). Of these, most identified as First Nations (2%), Métis (2%) and Inuk (1%). A small visible minority population included those who identified as Filipino, Arab and Chinese. One hundred percent surveyed indicated knowledge of English.

## Indigenous Peoples

The Island of Newfoundland is currently home to two recognized Indigenous groups: Qalipu First Nation (QFN) Band and Miawpukek First Nation (MFN). Historical evidence demonstrates that the Mi'kmaq were living in Newfoundland by the 16th century; by the 17th century there are increasing historical references to the Mi'kmaq people (Heritage NL, 2021). As of 2013, 21 Mi'kmaq archaeological sites had been identified in interior and coastal Newfoundland between the Port au Port Peninsula and Clarenville (Inside NL Archaeology, 2013).

The Miawpukek First Nation Reserve is located on the south coast of Newfoundland 200 km from the Project. The QFN, which is a landless band, identifies 67 communities in Newfoundland where its members reside (QFN, 2016). These communities are mainly clustered in several areas: the west coast of the Island in areas around St. George's Bay, Stephenville and the Port au Port Peninsula, around Corner Brook and the Bay of Islands and the Bay of Exploits including Lewisporte and neighbouring communities. The Band's main administrative office is in Corner Brook with satellite offices in Stephenville, Glenwood, Grand Falls-Windsor and St. George's.

In 2008, the Government of Canada signed an agreement with the Federation of Newfoundland Indians (FNI) to establish a landless Band and initiate the enrolment process for the Mi'kmaq of Newfoundland (QFN, 2016). In 2011, QFN was established as an Indian Band under the Indian Act and approximately 23,000 people were registered as founding members. As QFN members live in communities that are not exclusively occupied by Qalipu Mi'kmaq, consolidated information on infrastructure and services, economic conditions and community health is not readily available for the Qalipu. Members access services and programs provided by municipal and provincial agencies, private businesses and service agencies in communities and regions where they reside.

Economic and corporate development for QFN are led by the Qalipu Development Corporation (QDC) (QFN, 2016). QFN has several commercial enterprises including Mi'kmaq Commercial Fisheries Incorporated (MCF) (QFN, 2019). Marine Contractors Inc. Qalipu (MCIQ) was created as a partnership between QFN and Marine Construction to bid on Maritime Link construction projects. Other business entities include Qalipu Project Support Services (QPSS), Qalipu Safety and Industrial Services and Eastern Door Logistics. In 2020 to 2021, the QFN earned revenues of \$18.6 million and had total expenditures of \$18.3 million (QFN, 2021).

QFN and the MFN own a joint fisheries initiative, Mi'kmaq Alsumk Moiwimsikik Koqoey Association (MAMKA) which holds commercial-communal licenses for various fish and marine species. The QFN, MCF and MAMKA hold commercial-communal fishing licenses for a variety of fish and marine species (Table 4-16). The licence areas include the eastern Newfoundland offshore, eastern Newfoundland, western Newfoundland, southern Newfoundland and coastal Labrador (DFO, 2018c).

From a cultural perspective, QFN's practices and resources are focused on the lands and waters of the Island of Newfoundland. The QFN undertake current land and resource use activities in their traditional territory, which includes extensive areas of land and water as well as coastal and marine areas.

Important sources of traditional food include moose, caribou, partridge, snowshoe hare, salmon, trout, eel, shellfish, and wild berries (Equinor, 2020). Migratory birds, seals, and groundfish are harvested but of lesser importance. Groundfish, pelagic fish, shellfish and seal harvesting are of importance to the Mi'kmaq on the west coast of Newfoundland. Limited publicly available information exists on historic and cultural Qalipu sites, but one has been identified: seal rocks is near the Town of St. George's on the west coast of Newfoundland (St. George's Indian Band, 2017).

Qalipu Natural Resources is undertaking conservation studies to understand and monitor terrestrial, aquatic and marine environments including species at risk and invasive species (QFN, 2021). Qalipu Aboriginal Fishery Guardians are also engaged in conservation enforcement with DFO and other agencies.

#### 4.2.2 Services and Infrastructure

Lewisporte was incorporated as a municipality in 1946 (Town of Lewisporte, No Date). During the 1950s and 60s, the Town developed its infrastructure and services (water and sewage systems, a high school, paved streets) to serve the growing population. Presently, the Town of Lewisporte provides municipal services and infrastructure to residents and businesses. This includes drinking water supply and distribution, wastewater collection and recreation facilities (e.g., ice stadium, walking trails, a community park, neighbourhood playgrounds, sports fields and multi-use trails for ATV's and snowmobiles). Solid waste and recyclable materials from all sectors in Central Newfoundland is delivered to Central Newfoundland Waste Management at Norris Arm (CNWM, 2017). Provincially protected water supplies for Lewisporte and Campbellton are within the Study Area but do not intersect the Project Area (GNL, 2021a).

Lewisporte is a regional service centre for the surrounding communities. Banking, financial, legal and medical services are available, along with restaurants, hotel and retail services, health care, long term care and education. The Town offers government services such as education and health care. None of these services are located on Route 340, the South Side of Burnt Bay.

The Lewisporte has limited hotels and other short-term accommodations (Table 4-19). Gander, which is also the site of the nearest airport, has hotel capacity as the community is a destination for provincial meetings conferences and sporting events.

**Table 4-19: Lewisporte and Area Hotels and Accommodations**

Facility	Location	Capacity
Bluewater Lodge & Retreat	Notre Dame Junction	9 rooms
Brittany Inn	Lewisporte	34 rooms
Flighthouse Vacation Rentals	Campbellton	3 bedroom vacation home
Islands' Villa	Lewisporte	8 rooms
Lucy's Cottage	Stanhope	3 bedroom vacation home
Ocean View Bed & Breakfast	Lewisporte	4 rooms

Source: NL Tourism, 2021

Three schools are located in the municipality, including Lewisporte Academy (Grades K-6), Lewisporte Intermediate (Grades 7-9) and Lewisporte Collegiate (Grades 10-12) (NLE, 2021). Dietrac Technical Institute in Lewisporte offers programs in the following trades: carpenter, construction/industrial electrician, heavy duty equipment technician, powerline technician, steamfitter/pipefitter and welder (Dietrac, 2021). The College of the North Atlantic has campuses in Grand Falls-Windsor and Gander. Grand Falls-Windsor generally offers programs in business, health care and renovation technician (CNA, 2021). Programs at the Gander campus are focussed on the aeronautics industry, with programs in engineering technology and instrumentation and control technician. Lewisporte Memorial Public Library is in the Town.

Lewisporte is within the Central Health Region. Limited primary health services are available in Lewisporte, and other services are provided at larger facilities such as those in Grand Falls-Windsor and Gander. The Lewisporte Health Centre provides diagnostic laboratory, diagnostic imaging and x-ray clinics (Central Health, 2021). The Community Health Centre provides nursing services (i.e., public health, continuing care, community development) and social work services (i.e., community supports and family rehabilitation, behavioural management specialist, child youth and family services).

Lewisporte has access to emergency response services. Lewisporte Regional Fire Rescue serves approximately 4,000 residents in Lewisporte and surrounding communities including Browns Arm, Porterville, Stanhope and Indian Arm as well as other outlying areas (Town of Lewisporte, No Date). The station is equipped with three pumper trucks, a mobile command/clothing vehicle, two pickup trucks, a zodiac and a skidoo with rescue sled. A 2015 evaluation of fire departments in Newfoundland and Labrador found that Lewisporte Regional Fire Rescue received an acceptable rating for both offensive interior and defensive exterior fire fighting (NLFES, 2015). An RCMP detachment is in the community (RCMP, 2015).

Lewisporte has several facilities catering to children and families. Lewisporte and Area Family Resource Centre is one of 31 centres throughout the province that deliver healthy child development programs to families with children ages 0-6 (NLEED, No Date). New Fun Land III offers services for children aged 2-13 years. The availability of quality childcare is essential for women's participation in employment opportunities.

#### **4.2.3 Economy and Employment**

Newfoundland has a long history of marine economic activity and related vessel traffic. Eastern/Central Newfoundland has a number of seaports with domestic and international shipping. These include Lewisporte, Botwood, Carmanville, Catalina, Clarenville, Fortune, Marystown, Come By Chance, Arnold's Cove, Argentia, Long Harbour, Harbour Grace, Bay Roberts, Holyrood, Long Pond, Bay Bulls, St. John's and the Newfoundland Offshore base at St. John's (Statistics Canada, 2013). Smaller harbours are maintained primarily for fishing and recreational activities.

Lewisporte was the base of the Labrador Coastal Service (transporting passengers and goods) to coastal Labrador for more than 75 years. However, the community has suffered economic losses due to changes in the shipping industry. In 2007, Atlantic Wholesalers announced closure of its operations



in Lewisporte (CBC, 2007). Also, the freight ferry service from Lewisporte to Labrador ended in 2019 following completion of the highway connection in Southern Labrador and when the Woodward Group opened roll-on/roll-off service at Happy Valley-Goose Bay to serve Northern Labrador (Greenham, 2019).

Lewisporte remains an important seaport in Central Newfoundland particularly as large communities such as Gander and Grand Falls-Windsor do not have marine access. Limited data are available to describe Lewisporte's current marine activities, but Statistics Canada provided an overview for 2011 when 114 vessel movements were recorded at Lewisporte (Table 4-20). The Labrador freight service was discontinued in 2019 meaning that Lewisporte would currently have less activity. These data represent traffic from large shipping vessels while most marine activity is small local vessels.

**Table 4-20: Lewisporte International and Domestic Marine Shipping (2011)**

Jurisdiction	Ballast			Cargo			Total
	Movements	Gross	Net	Movements	Gross	Net	
International	8	185.4	80.8	7	147.7	66.2	114.7
Domestic	64	424.4	199.8	35	151.8	69.9	150.4
Total	72	609.8	280.6	42	299.5	136.1	265.1

Source: Statistics Canada, 2013

The Port of Lewisporte is a deep-water port that can be navigated year-round (Town of Lewisporte, 2020). The port offers freshwater, supplies, stevedoring, power supply, warehousing, lay down area, customs service, internet access, marine fuelling services, harbour pilotage as well as side and stern loading with roll-on/roll-off. These facilities and services are an important support for industrial development and economic diversification.

The Port also offers support services to recreational vessels through the Lewisporte Marina, which is managed by the Lewisporte Marina Administrative Authority (LMAA) and the Lewisporte Yacht Club (LYC, 2021). The Marina, which supports recreational boating in the Central Newfoundland region and beyond, has 170 berths at finger piers and provides docking for boats up to 40' (larger boats can be accommodated through special arrangement). The LMAA provides water and electrical at all docks, Wi-Fi, Fuel dock (gasoline and diesel), showers and laundry, galley access, lounge and a repair shed.

Lewisporte is located in Economic Zone 14, which encompasses an area of the northeast coast between Gambo and Lewisporte and South to Fogo. Currently, an estimated \$17.9 billion in major capital projects, valued at \$25 million or more, is planned or under construction in Newfoundland and Labrador (GNL, 2021b). Of the listed initiatives, only one is identified as located in Zone 14, a new 60 bed long-term care home under construction in Gander

For the Lewisporte population aged 15 years and older in the labour force, the participation rate for males is higher than that of females (Table 4-21). Males have higher employment/unemployment rates and income.

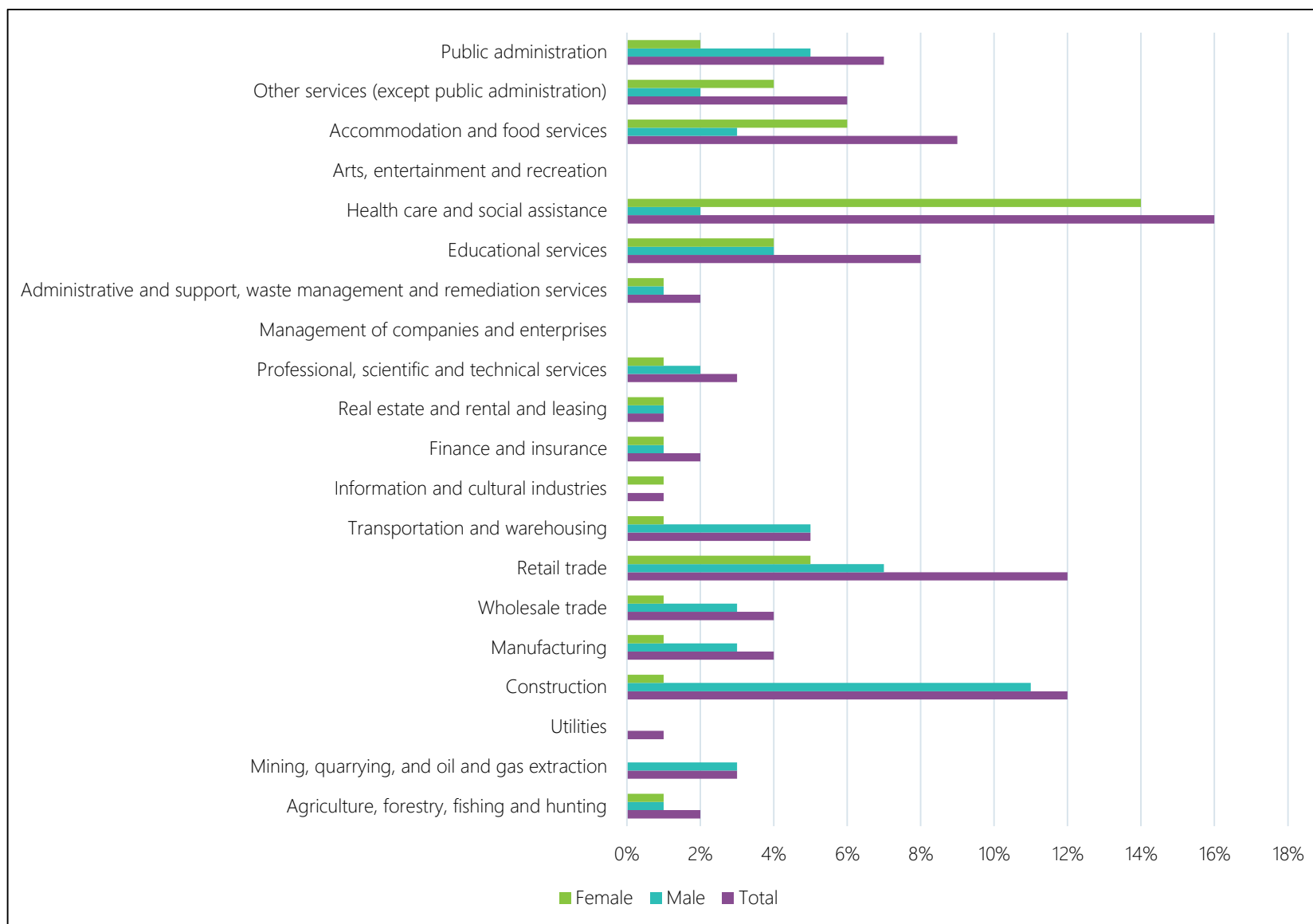
**Table 4-21: Lewisporte Labour Force (2016)**

Indicator	Total	Male	Female
Total population aged 15 years of age and over	2,780	1,340	1,440
In the Labour Force	1,365	740	625
Employed	1,110	575	530
Unemployed	260	165	95
Participation Rate	49.1%	55.2%	43.4%
Employment Rate	39.9%	42.9%	36.8%
Unemployment Rate	19.0%	22.3%	15.2%
Median Total Income Among Recipients (2015)	\$27,232	\$36,672	\$21,312

Source: Statistics Canada, 2017

Like many regional services centres, Lewisporte has strong employment in service sectors (Figure 4-2). In 2016, 16% of those employed were working in health care and social assistance (Statistics Canada, 2017). Twelve percent were in both construction and the retail trade. Transportation and warehousing made up five percent of the workforce. Along gender norms, women dominate in sectors such as health care and social assistance and men in construction.





**Figure 4-2 Lewisporte Labour Force by Industry (2016)**

From a professional education standpoint, Lewisporte males and females both tend to have a postsecondary certificate, diploma or degree (Table 4-22). These certificates and diplomas are most notably in the apprentice or trades (Statistics Canada, 2017). High participation in trades may be a response to opportunities available in Central Newfoundland or a result of the types of programs available, which are suitable for industrial development.

**Table 4-22: Lewisporte Labour Force Education (2016)**

<b>Highest Certificate, Diploma or Degree</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>
No certificate, diploma or degree	24%	11%	13%
Secondary (high) school diploma or equivalency certificate	21%	9%	12%
Postsecondary certificate, diploma or degree	55%	28%	27%
College, CEGEP or other non-university certificate or diploma	25%	12%	13%
University certificate or diploma below bachelor level	3%	1%	2%

Source: Statistics Canada, 2017

#### **4.2.4 Land and Resource Use**

The following discussion is focused on land and resource use in the area where the Project is proposed to be constructed. Various industrial, commercial, recreational and subsistence land and resource use activities are known to occur in the general area. Maps are provided to illustrate these land uses as appropriate and where mapping data are available.

#### **Land Use Planning**

The Project Area is located on Crown Lands partially within the Town of Lewisporte Municipal Planning Area and partially without (GNL, 2021a). As shown in Figure 4-3, under the Town's Municipal Plan and Development Regulations, that portion of the Project Area with the Municipal Boundary is designated as Rural (Town of Lewisporte, 2005).

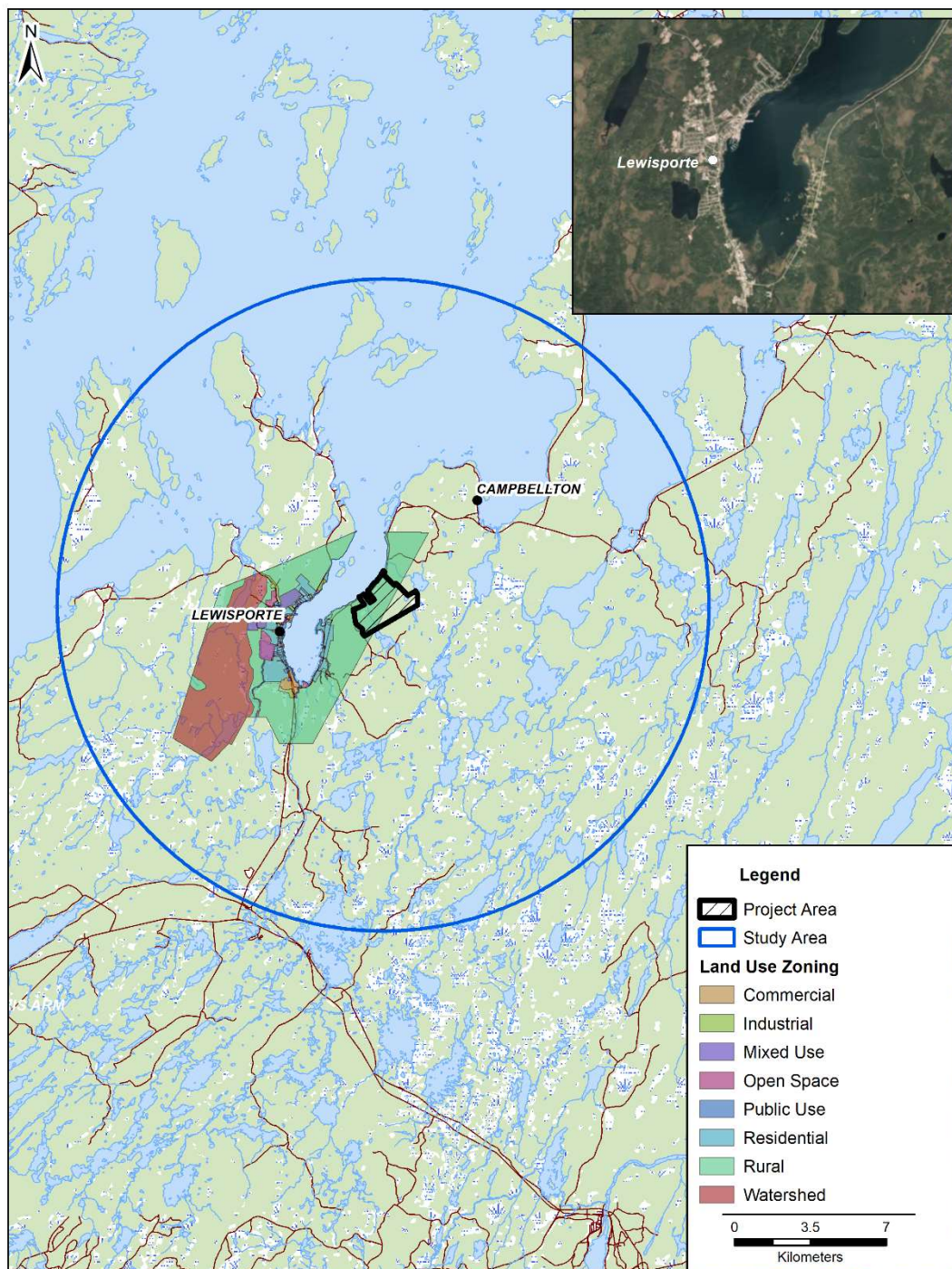
The Rural Zoning Designation is intended for uses associated with rural based industry such as forestry, fishing, hunting, agriculture or aggregate extraction. Activities such as electric power transmission, other public utilities or road construction and maintenance, consistent with the objective of retaining the qualities of the rural environment, may not be permitted. A rezoning application would be required for industrial development to be permitted in this area (Table 4-23).

Other development regulations may apply particularly since a portion of the Project Area is outside the Lewisporte Municipal Planning Area. Route 340 is listed under Schedule C of the Building Near Highways Regulations, 1997, meaning approval from the Minister of Transportation is required for any work within 20 metres of the centre line of Route 340 (GNL, 2007). Crown Lands applications have been submitted for access to properties required for this development. These do not require EA registration as they are linked to the process for this Project.

**Table 4-23: Lewisporte Zoning (2005)**

Group	Division	Class	Examples
Industrial Uses	Industrial uses involving combustible and hazardous substances and processes	Hazardous industry	Bulk storage of hazardous liquids and substances Chemical plants Distilleries Feed mills Lacquer, mattress, paint, varnish and rubber factories Spray painting
	General industrial uses involving limited hazardous substances and processes	General industry	Factories Cold storage plants Freight depots General garages Warehouses Workshops Laboratories Laundries Planing mills Printing plants Contractors yards
		Service station	Gasoline service stations Gas bars
	Light, non-hazardous or non-intrusive industrial uses	Light industry	Light industry Parking garages Indoor storage Warehouses Workshops

Source: Town of Lewisporte, 2005



**Figure 4-3 Town of Lewisporte Municipal Planning**

## **Mining and Quarrying**

No mining sites are located within the study area though mining is an important economic activity in Central Newfoundland. The nearest operating facility is Hi-Point Industries in Bishop's Falls (NLIET, 2020). A number of quarries are located along Route 340 including several near the Project Area (GNL, 2021a). Mineral exploration licences are many in the region and some overlap the Project Area (Figure 4-4).

## **Commercial Forestry and Domestic Harvesting**

The Project is within Forest Management District 8 (NLFFA, 2021a). The Five Year Operating Plan: 2022 – 2026 for FMD 8 shows portions of the Project Area are within Operating Area No. CC08520 – Domestic Harvesting Plan Map Planning Zone 3, Map – Lewisporte South Side (Figure 4-4). Silviculture activities also occur in portions of the Project Area. For the five-year operating plan (2017-2021), 896 (average 151 annually) domestic cutting permits (each for 22 m<sup>3</sup>) were issued on 13 domestic timber blocks.

## **Agriculture**

The Newfoundland and Labrador Farm Guide identifies Central Newfoundland farms and/plant nurseries located at Campbellton, Lethbridge, Bishop's Falls, Woodale and Grand Falls-Windsor (GNL, No Date). No agricultural sites intersect the Project Area. Several areas identified as Agrifoods Area of Interest or Agricultural Development Area are within the Study Area (Figure 4-5). The only farm identified within the Study Area is the Campbellton Berry Farm, which is 10 km from the Project Area.

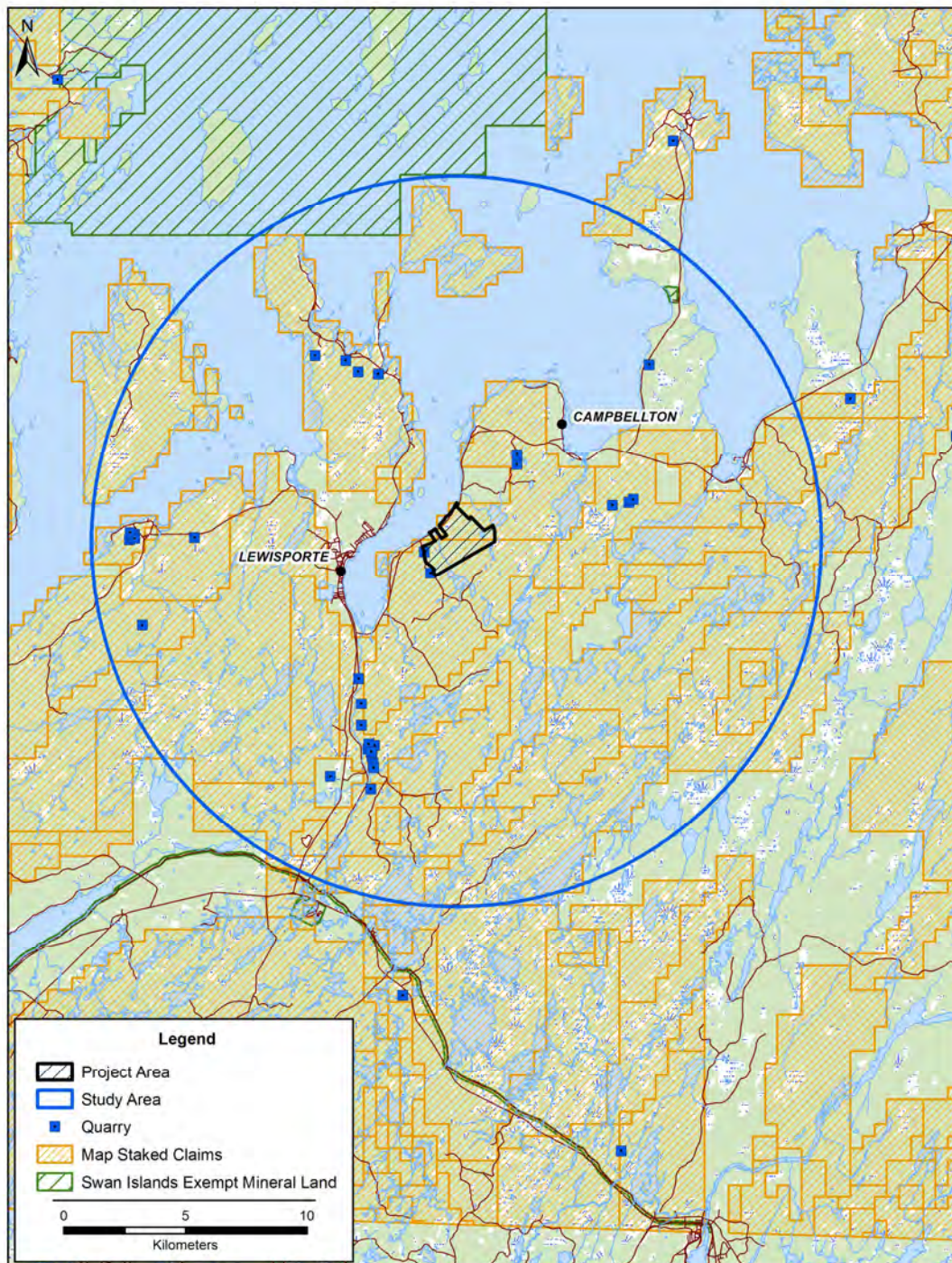
## **Commercial Fishing and Aquaculture**

No core fishing harbours are located within Burnt Bay. However, core fishing harbours are located at Little Burnt Bay, Campbellton and Comfort Cove on Indian Arm (DFO, 2021). No aquaculture sites are located in Burnt Bay or Indian Arm, but several are within the Bay of Exploits (NLFFA, 2021b). A higher concentration is to the west in Notre Dame Bay (Figure 4-5).

## **Outfitting**

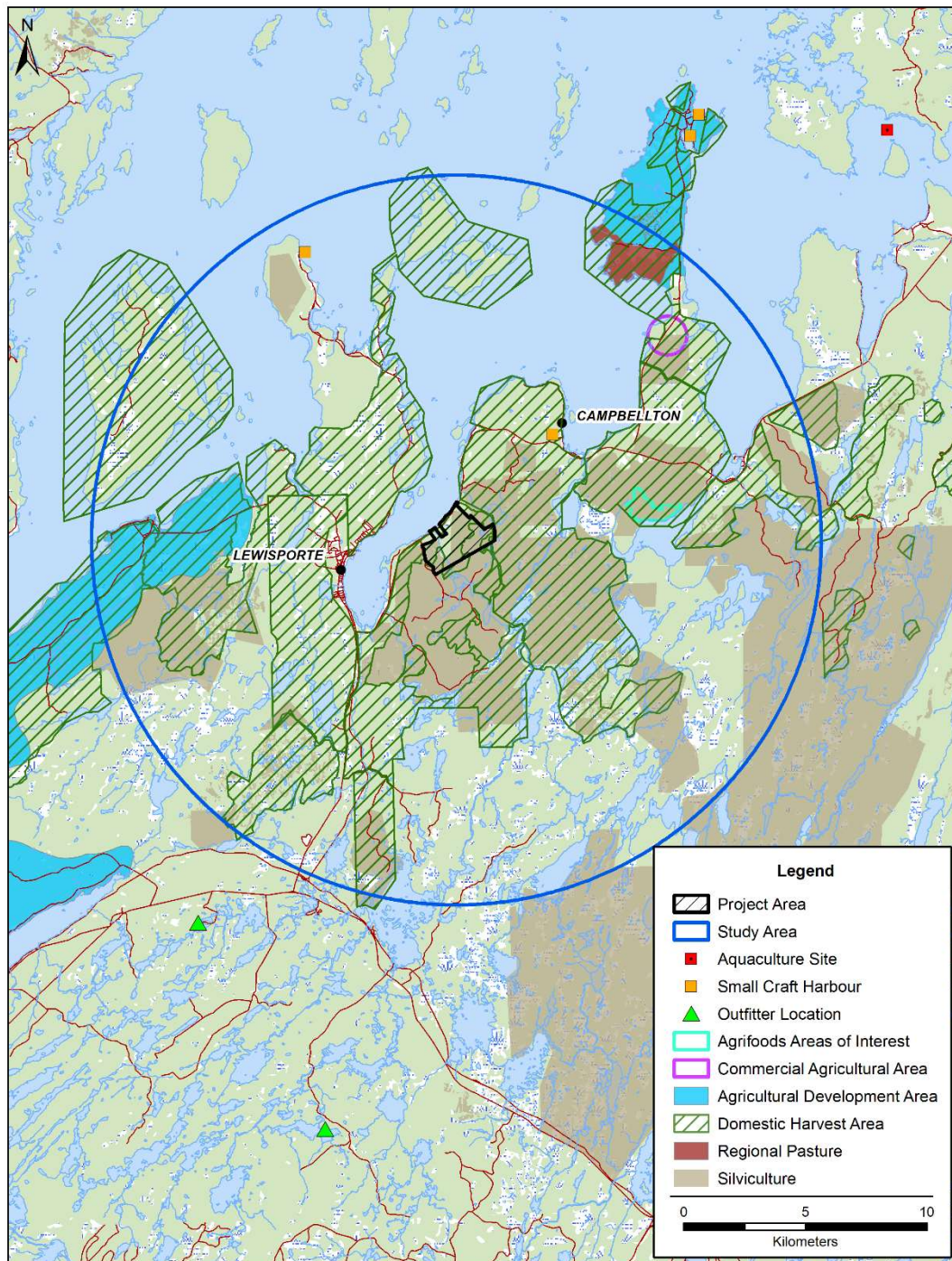
Outfitters provide facilities for sport angling/fishing, hunting or other recreational activities. The Province has a moratorium on new outfitting licences due to declining caribou populations and the potential for negatively affecting the profitability of existing operations. In addition, a buffer (8 km radius) may be identified around outfitters and but used to review development applications for new land uses such as recreational cabins or other developments. Various hunting and fishing outfitters are located in Central Newfoundland (NLTCAR, 2021). No outfitters are within the Project Area or Study Area.





**Figure 4-4 Mining and Quarrying**





**Figure 4-5 Other Resource Use Activities**

## Hunting and Trapping

In Newfoundland and Labrador, hunting and trapping are regulated by the Department of Fisheries and Land Resources, under the *Wild Life Act*. The province is divided into three types of big game management areas: moose, black bear and caribou (NLFFA, 2021c). Small game management areas and zones apply to a variety of species including waterfowl and murre, the harvesting of which is governed by the federal Migratory Birds Regulations of the Migratory Birds Convention Act.

The Project overlaps with management areas for hunting moose, black bear, small game, waterfowl and snipe (Table 4-24). No caribou hunting is available in this area. All species have fall and/or winter hunting seasons except black bear, which may also be harvested in a spring/summer season (May 1 to July 15, 2022 in the current season). A total quota of 393 moose is permitted in moose management area (MMA) 22 in the 2021-2022 season. The success rate for this area was 68.3 percent in the 2019-2020 season. Success rates for black bear hunting are not available.

**Table 4-24: Hunting Areas and Seasons (2021-2022)**

Game	Management Area	Fall/Winter Season	Quota/Bag Limit
Moose	22: Lewisporte	September 11 – December 31, 2021	1 moose per licence
Black Bear		September 11 – November 14, 2021	2 black bears per licence. May harvest either 2 bears in spring, 2 in fall or one in each season.
Willow and Rock Ptarmigan (combined)	Remainder of Island	Shooting: September 18, 2021 – December 5, 2021 Snaring: October 2, 2021 – March 13, 2022	Bag Limit – 12/Possession Limit - 24
Showshoe Hare		Shooting: October 2, 2021 – March 13, 2022 Snaring: October 2, 2021 – March 13, 2022	Possession Limit- 40
Ruffed and Spruce Grouse	Island of Newfoundland	Shooting: September 18, 2021 – December 26, 2021 Snaring: October 2, 2021 – March 13, 2022	Bag Limit – 20/Possession Limit - 40
Ducks (other than Common and Red-Breasted Mergansers, Long-tailed Ducks,	Northeastern Coastal	September 18 – December 25, 2021	Bag Limit – 6/Possession Limit – 18



Game	Management Area	Fall/Winter Season	Quota/Bag Limit
Harlequin Ducks, Eiders and Scoters),			Bag Limit – 5/Possession Limit - 10
Geese			
Snipe			
Common and Red-Breasted Mergansers		October 10, 2021 – January 23, 2022	Bag Limit – 6/Possession Limit –12
Long-tailed Ducks, Eiders and Scoters		November 1, 2021 – February 14, 2022	

Source: NLFFA 2021c; ECCC, 2021b

Furbearing species regulated for trapping in Newfoundland include beaver, coyote, ermine (weasel), fox (coloured and white), lynx, mink, muskrat, otter and squirrel (NLFFA, 2021c). Harvesting occurs generally in fall and winter, and during optimal periods for fur quality. Trapping seasons may vary by species but all generally occur between October and April on the island of Newfoundland.

The Project is in the Island of Newfoundland Trapping area and Lynx Zone: Northern Region (NLFFA, 2021c). Trappers may harvest a variety of species occurs in fall and winter during optimum periods for fur quality (Table 4-25). Marten trapping is not permitted on the Island of Newfoundland. Trapping occurs for both recreational and commercial reasons, as pelts may be sold depending on the market at any given time.

**Table 4-25: Trapping Areas and Seasons (2021-2022)**

Game	Fall/Winter Season
Coyote	October 20, 2021 – February 1, 2022
Fox, Coloured	
Fox, White	
Wolf	
Ermine (Weasel)	October 20, 2021 – February 28, 2022
Squirrel	
Muskrat	October 20, 2021 – March 15, 2022
Otter	
Beaver	October 20, 2021 – April 15, 2022
Mink	November 1, 2021 – February 28, 2022
Lynx	January 1, 2022 – February 1, 2022

Source: NLFFA, 2021c

## Fishing and Angling

The annual Newfoundland and Labrador *Angler's Guide* lists applicable regulations, seasons, locations, retention and possession limits as well as catch and release procedures for angling and sport fishing. In Newfoundland, angling is available for a variety of species (Table 4-26). The nearest scheduled salmon river is Campbellton River and Tributaries, including Neyles Brook and Indian Arm River and Tributary Streams (DFO, 2021). This River is 2 km from the Project Area

Coastal and inland fisheries are regulated by DFO through the *Newfoundland and Labrador Fishery Regulations*. Recreational sport and subsistence fishing occurs in both freshwater (rivers, lakes and ponds) and marine (mostly inshore) environments. Zone 1: Insular Newfoundland includes the Study Area, where the summer fishing season opened on May 15 and closed on September 7, 2021 (DFO, 2021). The winter season opens on February 1 and closes on April 15, 2022. Anglers must comply with bag and possession limits where applicable and special conditions apply to ice fishing.

**Table 4-26: Trout Fishing (2021-2022)**

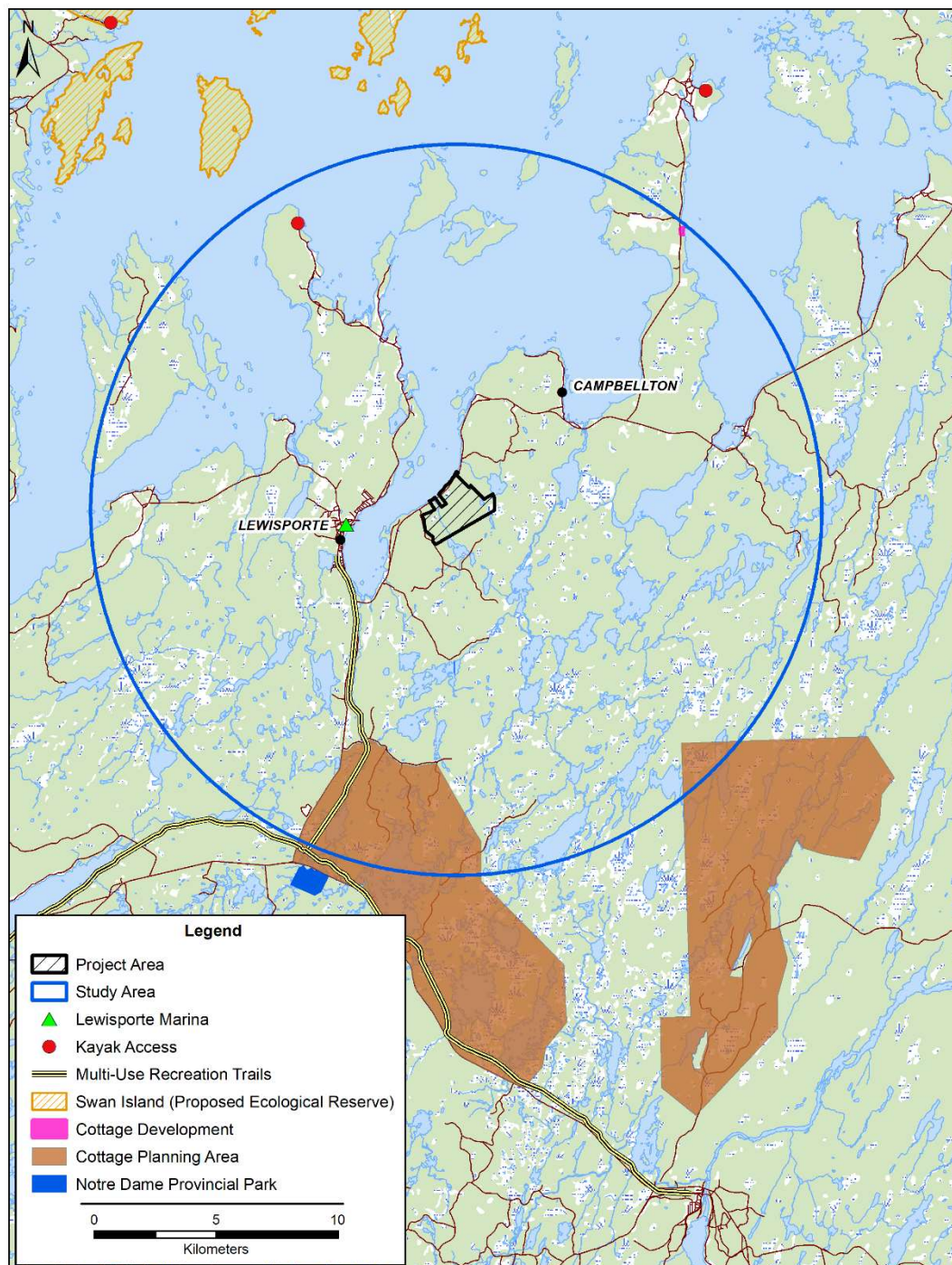
Species	Daily Bag Limit	Possession Limit
Trout (includes speckled trout, brown trout, rainbow trout and ouananiche)	12 fish combined or 2.25 kg round weight + 1 fish (either species), whichever is reached first. No rainbow or ouananiche less than 20 cm may be retained	24 fish or 4.5 kg + 1 fish
Arctic Char	12 Arctic char, or 2.25 kg round weight + 1 fish of that species, whichever limit is reached first	24 fish or 4.5 kg + 1 fish
Smelt	No limit	No limit

Source: DFO, 2021

## Other Recreational Activities

The Bay of Exploits with its many islands and channels is a popular destination for sailing and sea kayaking. A recreational marina is located at Lewisporte (see Section 4.2.2). Kayaking access points are located on Indian Arm at Little Burnt Bay and Indian Cove Neck (a former provincial park) as well as at Lawrence Harbour, Cottlesville and Comfort Cove-Newsted in the Bay of Exploits (Mussio Ventures, 2014). The Notre Dame Snowmobile Trail, which connects to the Newfoundland T'Railway Provincial Park, runs adjacent to Route 240 into Lewisporte but not along Route 340.

In Newfoundland and Labrador, recreational cottage lot grants are available, under the jurisdiction of the *Lands Act*, in rural areas that are accessible by conventional motor vehicle, in communities where land is appropriately zoned under a municipal plan or designated Cottage Development Areas. Cottage development area are located off Route 340 (GNL, 2021a). The nearest is 8.5 km from the Project Area (Figure 4-6.)



**Figure 4-6 Recreational Activities**

#### 4.2.5 Heritage Resources

Heritage resources include sites and objects of historic and archaeological, cultural, spiritual and paleontological importance. In NL, such resources fall under the authority of the Provincial Archaeology Office (PAO) of the Department of Tourism, Culture, Arts and Recreation. The *Historic Resources Act (1990)*, administered by the PAO, protects the province's more than 5,000 documented archaeological sites and prohibits any unauthorised interference with newly-discovered heritage resources. Known archaeological sites date from almost 9,000 years ago to the 20th century and represent Pre-Inuit, Inuit, Intermediate Period, Innu, Maritime Archaic, Recent Period, Mi'kmaq, Beothuk and European. Areas exhibiting elevated potential for undiscovered archaeological resources have been identified throughout the province, on land and in coastal waters (PAO, 2015).

According to the PAO, there are no known heritage resources within, or near, the immediate Project Area (2021). However, previous archaeological investigations have demonstrated the region's archaeological significance with respect to Maritime Archaic, Dorset, Recent Period, and Beothuk cultures (Penney 1999; Erwin et al 2019). European settlement of the region began on the outer islands of Notre Dame Bay. By the mid-1800s, salmon stations and lumbering camps were being established along the Bay's inner coves and harbours. Settlement around Lewisporte began in 1860, and the area was subject to intensive lumbering between then and 1920 (Penney, 1999).

The nearest developed archaeological site is the Beothuk Interpretation Centre at Boyd's Cove, approximately 30 km northeast of the Project Area (PHS, 2011). The interpretation centre is built around the Boyd's Cove site (DiAp-3), a late 17th-century Beothuk village. Historic evidence, and the presence of several registered archaeological sites, indicates that the Beothuk were active in the area between Notre Dame Bay and Exploits River throughout the 17th to 19th centuries (MacLean, 1990). As such, undiscovered heritage resources may be preserved within the Project Area.

Three formal archaeological investigations have been conducted in Lewisporte. In 1997, Gerald Penney Associates Limited assessed Commercial Harvesting Areas in the Lewisporte Resource Management District (Penney, 1999). The assessment did not include the current Project Area.

In 2018, the PAO conducted a preliminary shoreline survey in the northwest quadrant of the Project Area to determine whether a Historic Resource Impact Assessment was required prior to the land being designated as Industrial Reserve by the Town of Lewisporte. A visual inspection of the eroding shoreline revealed no archaeological resources, "nor did there appear to be much potential" for any (Erwin et al, 2019: 89). The survey covered a portion of the Project Area with no subsurface testing.

The PAO undertook an investigation on the west side of Lewisporte Harbour in 2018 to examine a small peninsula that had the appearance of a wharf. The evaluation determined that the peninsula did not have historic value (Erwin et al, 2019).

Construction activities, and associated ground disturbance, may damage or destroy previously-unknown heritage resources. Prior to detailed planning for the Project, a review of the area's archaeological potential is required to identify any possible constraints to development.



## 5.0 CONSULTATION AND ENVIRONMENTAL ISSUES SCOPING

Stakeholder Communication: SWPNL staff and management include a former electric utility senior executive, senior US and UK scientists and engineers and a UK media company founder. This team has a strong track record in publication, communication and public outreach supporting construction and operation of infrastructure projects including power plants, substations, transmission lines, large laboratory facilities and other critical infrastructure in North America, Europe, and the Middle East. Well-articulated statements of the Mission, Vision and Core Values of SWPNL and its parent company are in place. The SWPNL communications campaign will be organized for pre-construction early in the Project, a community update midway through the Project, and an implementation plan to transition to operations support with the commissioning of the plant.

**PESO Channels:** From the perspective of Paid, Earned, Shared, and Owned (PESO)[10] media channels, SWPNL will rely mainly on the latter three as described above. SWPNL will make little use of paid channels for communication. Paid advertising is relatively expensive and of relatively little influence in this case because the SWPNL product is a commodity, the customer base for which is provided under long term contracts with the power off-takers.

Specifically, SWPNL will have pages on the current SWP website describing the facility and its benefit to the local community through job creation, tax base support, enhanced energy security and long-term environmental improvement. As with the current EPR website, there will be a library with in-house expert generated content and extensive FAQ. A hosted blog with a comments section will provide for communication with the public.

SWPNL will maintain educational outreach to the local elected officials, key governmental department decision makers, and the public. Management will conduct local interviews with the local news to educate the public about the benefits of the SWPNL Project. SWPNL will sponsor and contribute to local technical educational programs in the sciences and engineering and, if needed, respond to critical press or intervenors with fact-based publications in the print and digital media.

### 5.1 Government and Regulatory Consultation

SWPNL is committed to engagement with regulatory stakeholders. The proponent has held meetings with key regulators prior to preparation of this Registration Document (Table 5-1) and has made modifications to the Project Description based on regulator input.

**Table 5-1: Meetings with Regulatory Agencies**

Date	Description	Regulatory Agencies/Departments in Attendance	Comments
July 2019	Meeting to introduce TNEC	Lewisporte Town Council Representatives	Supportive of Project
July 2019	Meeting to introduce TNEC	Full Lewisporte Town Council	Supportive of Project

<b>Date</b>	<b>Description</b>	<b>Regulatory Agencies/Departments in Attendance</b>	<b>Comments</b>
August 2019	Meeting to introduce TNEC	Nalcor Energy and NL Hydro	Supportive of Project
August 2019	Meeting to introduce TNEC	NL Hydro	
August 2019	Meeting to introduce TNEC	Various Provincial Government Departments	
April 27, 2021	Videoconference to present Project update	Town of Lewisporte	Supportive of Project
August 18, 2021	Meeting and presentation to provide overview of the project followed by discussion with regulatory agencies	Province of Newfoundland Labrador Department of Environment and Climate Change Environmental Assessment Division Municipal Affairs & Environment Climate Change Waste Management Division Pollution Prevention Division	Input was used to modify Project design and planning
August 20, 2021	Meeting and presentation to provide overview of the project followed by discussion with regulatory agencies	Government of Canada Impact Assessment Agency Environment and Climate Change Canada Health Canada	Input was used to modify Project design and planning

## 5.2 Stakeholder and Public Engagement

SWPNL has been engaged with local stakeholders regarding the TNEC project since 2019 (Table 5-2). Table 5-3 provides a list of media relations contacts related to the TNEC project. A more comprehensive list and examples of stakeholder outreach are provided in Appendix H. For the most part, stakeholders (especially those in Central Newfoundland) have been supportive of the Project. SWPNL also participated in media interviews and other activities regarding the TNEC.

**Table 5-2: Engagement with Stakeholders and the Public**

<b>Date</b>	<b>Description</b>	<b>Stakeholders in Attendance</b>	<b>Comments</b>
July 2019	Meeting	Member of Parliament and Member of House of Assembly	
July 2019	Meeting	Town of Grand Falls-Windsor	
2019	Meeting	Dietrac Technical Institute	
August 2019	Meeting	Towns of Lewisporte, Grand Falls-Windsor and Campbellton	

Date	Description	Stakeholders in Attendance	Comments
August 2019	Meeting and Tour	Central Newfoundland Waste Management	
August 2019	Meeting	Provincial Government Leaders	Project presentation
August 2019	Meeting	Provincial Government Leaders	Second Meeting
2021	Meeting	Lewisporte Harbour Master	Supportive of Project
2021	Meeting	Petroleum Storage Tank Manufacturer	Supportive of Project
2021	Meeting	Lewisporte Harbour Master	Supportive of Project
2021	Meeting	Chamber of Commerce	
2021	Meeting	Potential Contractors	
2021	Meeting	Regional Municipal Officials	

**Table 5-3: Media Relations**

Date	Media	SWPNL/EPRD Participants
August 2019	Local Television Interview	Keith Hulbert
August 30, 2019	Appearance on Local Radio Call-In Show	Keith Hulbert
September 7, 2019	Appearance on Local Radio Call-In Show	Keith Hulbert
2019	Letter to the Editor of the Telegram from Mercy Centre for Ecology and Justice	N/A
2019	Response to Letter from Mercy Centre for Ecology and Justice	Bary Wilson, Todd Manuel
2019	Posting an Extensive FAQ on the SWP Website <a href="http://www.synergyworldpower.com">www.synergyworldpower.com</a>	Bary Wilson, Brandon Wilson
2019	Blog Post in Response to CBC Article on the TNEC Project	Bary Wilson
2021	Local Media Interviews	Todd Manuel

### 5.3 Overview of Identified Issues and Concerns

The following sections provide descriptions of concerns expressed by an environmental non-government organization (NGO). Responses provided by EPRD are also included.

#### 5.3.1 Expressed Public Concerns Addressed in the Media

This section is the text of a letter in response to the questions raised by the Mercy Centre for Ecology and Justice regarding the SWPNL liquid fuels and power plant facility proposed for Lewisporte.

**Air Quality:** The Lewisporte plant will be designed, permitted and operated in strict accordance with Newfoundland Provincial Air Emission and Ambient Air Quality Standards. TNEC stack emission concentrations will be well within regulatory limits. As shown in the example below, the TNEC contribution to ground level concentrations of regulated constituents in Schedule A of the regulations will be minimal. The contribution of the proposed plant to the total particulate at ground level in the immediate vicinity of the plant, as compared to Provincial ambient air standards, is as follows ( $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter):

NL Total particulate limit:  $120 \mu\text{g}/\text{m}^3$

NL Total particulate average:  $60 \mu\text{g}/\text{m}^3$

TNEC Total particulate average contribution:  $0.5 \mu\text{g}/\text{m}^3$  (2 x WTE plants + 2x 5MW gensets)

To put this in context, the reported  $\text{PM}_{2.5}$  particulate concentrations at the Grand Falls-Windsor air quality monitoring station 010501 (nearest monitoring station to Lewisporte) ranged between near zero and approximately  $10 \mu\text{g}/\text{m}^3$  between September 5 and October 5 of 2019, for example. The average total particulate measurement due to plant operation at or near the Lewisporte plant site will be  $0.5 \mu\text{g}/\text{m}^3$ . This is 20 times lower than the peak value for  $\text{PM}_{2.5}$  particulate measured during this time period, and only 0.8% of the  $60 \mu\text{g}/\text{m}^3$  regulatory annual limit for average total particulate. The  $\text{PM}_{2.5}$  particulate fraction from the plant will be a small proportion of the total ( $\text{PM}_{10}$ ) particulate.

**Energy Use:** The TNEC plant will be a net generator of energy and fuel from dry plastic and biomass (SRF). It will require no energy from the grid and will generate mainly renewable power that will be available to the grid at a cost below that of current provincial power rates. The primary purpose of this plant is to convert the plastic material into an ultra-low sulfur diesel (ULSD) and naphtha fuel that meets the 2020 15 ppm sulfur limit in motor fuels.

**Water Use:** The plant will obtain fresh water from a large pond on the TNEC site. The water will be treated as needed for domestic and industrial use at the plant. Wastewater from the plant will be treated to surface water standards. Storm water runoff will be held in a settling pond and released in accordance with Provincial environmental guidelines.

**Long term environmental risks to water soil and air:** The approximate 280-hectare site set aside for the Project will include a engineered pad for storage of the sintered ash and inert rejects from the feedstock supply, such as PVC and Teflon. Although no leaching is anticipated at the landfill, a leachate treatment system will be installed to remove and treat rainwater from the liner. EPRD has elected to store the sintered ash material onsite until it can be exported back to the EU as aggregate or find beneficial use as daily cover at the nearby landfill or as sand for use on icy roads. There will be no ground water contamination from the plant, sintered ash storage pad, or bale storage area.

**Other countries where these plants have been accepted for use:** The best example is here in Canada. The Sustane Technologies plastics to liquids fuels (PTLF) pyrolysis plant in Nova Scotia produces 9,000 liters of liquid fuel per day. SRF is widely used as fuel in rotary kilns in Europe with the plant closest in design to the SWP system operating in China and built by the manufacturer in Finland



who will build the 50 MW power plant. SWP will use its patented LoNOx technology to reduce air emissions for both the PTLF and 50 MW gasification power plants.

**Financial security:** The TNEC facility in Lewisporte will be built solely with private investment, without the need for sovereign guarantees. With the possible exception of sustainability grant or low interest loan to help cover permitting and project development costs, EPRD will not be seeking financial subsidies from the Government. EPRD, the TNEC developer, is asking for a customary tax holiday while it is making substantial new investments in the community. It is also requesting that the Government build the Route 340 overpass needed so the plant site can be accessed from the new port without interruption of Route 340 traffic. This request is to assure the residents that current traffic patterns are not disturbed.

**Community Support:** EPRD has seen a very positive response to the Project in our initial meetings with local community leaders in Lewisporte and Grand Falls Windsor, as well as the ministries in St. John's that will be involved in permitting and regulating plant operation. TNEC has built a project website with descriptions of the plant and its operation, as well as the answers to frequently asked questions about our facilities and processes. Please see the web site at [www.synergyworldpower.com](http://www.synergyworldpower.com) for further information on this Project. EPRD is planning a series of open presentations and Q&A sessions in public meetings in the Lewisporte and Grand Falls Windsor areas.

**Transport of materials, the possible introduction of toxic species:** Feedstock is slated to be transported to the plant at Lewisporte in bulk carrier ships. Clean dry plastic, paper, cardboard and wood (designated as SRF) will be baled and wrapped in plastic to prevent fugitive material from leaving the ship while underway or the site while in storage. It will look much like the baled material at the CNWM MRF on Norris Arm near Lewisporte. This type of baled material has been shipped internationally around Europe for decades and EPRD experts are unaware of any incidence of toxic species or agents being transferred as a result.

**Carbon footprint:** Life cycle assessment (LCA) carbon footprint calculations, using an US EPA standard model, shows the integrated biomass gasification power plant and PTLF plant facility will have a smaller carbon footprint by approximately 530,000 tons of greenhouse gas equivalent (GHGe) emissions per year when compared to the alternatives for the SRF.

**Disposition of stored material in case of plant failure:** The plant plans to keep a 3-month supply of feedstock on hand to ensure a reliable and continuous supply of electrical power. The maximum amount of feedstock onsite would be approximately 180,000 bales. TNEC will have financial responsibility to properly store, process and dispose of this material. This SRF material can be readily used by another plastics process plants to make an ultralow sulfur diesel (ULSD) fuel product. Alternatively, it can be safely stored on-site until a suitable location for it is identified.

**Plant operability, reliability, environmental performance, and safety:** EPRD will be designing this plant for a 30 to 50-year operating life. Equipment used in this facility will be mainly off the shelf and of a type commonly used in the mining and petroleum industries. Operation of the overall facility according to specification will be guaranteed by the Engineering, Procurement and Construction

company that builds the plant, backed up by the warranties from the major equipment manufacturers. Unlike conventional thermal power plants and refineries that must pay for their fuel or feedstock, the TNEC facility will be paid for its feedstock and fuel. Design priorities were therefor shifted from most efficient use of feedstock and fuel to environmental performance, reliability, and safety.

**Thorough Independent Environmental Assessment prior to approval:** EPRD has engaged the services of an independent international engineering firm, with offices in St. John's, to prepare the Project Registration Document, which is a requirement of the Provincial regulatory system. The Provincial regulators may require additional studies and processes prior to Project approvals. As a component of this effort, an environmental baseline study will be conducted. It will entail analysis of air, water and soil samples with the data used to assess the present state of the environment in and around the plant site. These studies normally also include surveys of plant and animal species that may be impacted by construction and operation of the plant. This baseline environmental assessment will underpin the permitting process.

## **6.0 POTENTIAL ENVIRONMENTAL INTERACTIONS AND PLANNED MITIGATIONS**

The following sections provide a summary of potential environmental interactions and effects, key environmental planning considerations and proposed mitigations for the proposed Project, including each of its associated components and activities. The analysis focuses upon the following themes:

- Atmospheric Environment
- Freshwater Environment
- Terrestrial Environment
- Marine Environment
- Human Environment

The information contained in these sections related to atmospheric, freshwater, terrestrial and marine environments is largely generic as no field work has been completed in the Project Area and limited information was found from secondary research. Chapter 6 concludes with an overview of any environmental monitoring and follow-up which may be required during one or both phases of Project implementation.

### **6.1 Construction**

This section describes potential effects of construction on various components of the biophysical and human environment. For a project such as the TNEC, the primary effects on the environment are anticipated to occur during construction.

#### **6.1.1 Atmospheric Environment**

The main potential interactions between the Project and the Atmospheric Environment during construction relate to the use of equipment and associated noise, dust and emissions from engines and generators that may be associated with these activities. The atmospheric emissions from this equipment will occur within a localized area over a relatively short period. Project-related vehicles and equipment will be maintained in good repair and inspected regularly, and any associated air emissions from equipment and vehicles will conform to applicable regulations and guidelines. Any fugitive dust from construction activities will be controlled as necessary using dust control agents such as water. Appropriate provincial and federal permits and approvals, Section 2.10, will be obtained prior to initiating construction, and all associated regulations and mitigations will be implemented.

#### **6.1.2 Freshwater Environment**

The Freshwater Environment includes surface water (quantity and quality) and fish and fish habitat, which may interact with the Project. Any required watercourse crossings will be completed using appropriate culverts or bridges designed to accommodate high flow conditions without creating a restriction to water or fish movement, subject to regulatory approvals. All construction activities will be performed in a manner that will ensure no deleterious substances enter, either directly or indirectly, the surrounding freshwater aquatic environment. Deleterious substances can include sediments and

excess runoff, fuels and oils and any other substance that can have a negative impact on the aquatic environment. Standard environmental protection procedures (i.e., silt fencing, revegetation where necessary and environmental monitoring) will be in place and adhered too for the duration of this phase of the project.

### **6.1.3 Terrestrial Environment**

Project construction will result in the direct disturbance to landforms and soils within the Project footprint. Vegetation will be cut, and overburden removed. Standard construction practices will limit the disturbance to these elements of the landscape to the immediate construction area.

The mechanisms by which wildlife are affected by project development include direct effects (e.g., collisions with vehicles, disturbance of nesting birds) and indirect effects (e.g., habitat loss, disruption of migratory routes and foraging patterns and increased predation). Direct effects could potentially result in mortality of individual animals while indirect effects may result in lowered reproductive rates, both of which may influence the eventual occurrence and/or density of wildlife in the Project area. Species that may be susceptible to direct mortality includes those with limited mobility (e.g., beavers) or animals that utilize linear corridors for travel (e.g., moose, woodland caribou) or nesting opportunities (various songbird species).

Construction will result in indirect effects including some degree of habitat loss and fragmentation, the extent of which will vary depending on the ability of the affected species to tolerate disturbance or to utilize the modified habitat. Essentially all terrestrial birds and mammals that utilize the immediate siter for denning or nesting will be excluded from using this area once vegetation and associated micro-habitats are removed. However, utilization of less affected areas adjacent to the site will continue to provide habitat for a variety of mammals and birds. Given the limited spatial area of the proposed Project relative to the surrounding ecoregion, disturbance from construction activity is not expected to have population level consequences for the majority of bird and mammal species. However, the potential effect on the local distribution of species at risk and woodland caribou is unknown since recent, spatially explicit information on their occurrence and distribution in the Project Area is not available.

### **6.1.4 Marine Environment**

The marine environment includes marine fish and fish habitat, and marine wildlife, which may interact with the Project. Project construction will directly disturb coastal habitats and operations may result in disturbance to fish and marine wildlife.

The mechanisms by which fish and fish habitat, and marine wildlife are affected by project development include direct effects (e.g., collisions with vessels, loss of benthic communities, habitat loss or alteration) and indirect effects (e.g., disturbance to marine species). Construction activities will result in direct alteration of marine coastal habitats and loss of immobile benthic communities within the Project footprint. Water quality may be affected by excavation activities that increase suspended sediment and turbidity and may result in localized and temporary disturbance to marine species.

Underwater sound from pile driving activities may disturb marine mammals, promoting avoidance of the area. Appropriate provincial and federal permits and approvals, Section 2.10, will be obtained prior to initiating construction, and all associated regulations and mitigations will be implemented. All construction activities will be performed in a manner that will ensure no deleterious substances enter, either directly or indirectly, the surrounding marine aquatic environment. Deleterious substances can include sediments and excess runoff, fuels and oils and any other substance that can have a negative impact on the aquatic environment. Standard erosion and sediment control measures will be implemented for land-based construction and silt curtains or other measures may be considered for marine construction. Installation of rip rap and concrete structures may provide an offset to habitat alterations resulting from dock construction.

### **6.1.5 Special Considerations and Mitigations for Wildlife and their Habitats**

The seasonal timing in which construction activity occurs is critically important in influencing the extent of disturbance to wildlife populations. Food availability, predation risk, and weather-induced stress all vary throughout the year and influence individual fitness. Late winter/early spring is generally the period when mammals experience the greatest degree of stress as food resources are often depleted and energy reserves are low (Adamczewski et al., 1987). Cold temperatures add to the physiological demand and the susceptibility to predation increases, particularly when deep snow limits mobility (Gese and Grothe, 1995). Early spring is also the time when nesting, denning and the rearing of offspring occurs, which adds further energetic stress on adult females.

The Project Area does not intersect any protected or special areas for aquatic, terrestrial or marine species but some types of habitats require special consideration. Because of the heterogeneous nature of habitats and their associated resources (i.e., food, nesting structures, protective cover etc.) some habitats support a greater diversity and density of wildlife species. For this Project area, the following habitats may be particularly sensitive to physical disturbance.

- Aquatic habitats are ecologically rich and functionally important components of the boreal forest biome. In addition to supporting invertebrate, fish and bird communities, these habitats are essential for the occurrence of beavers, muskrats and river otters on the landscape. Beavers are a critically important ecosystem component as their modification of landscapes creates novel habitats (including flooded woodland and grassy meadows), which in turn are exploited by other mammals including meadow voles and southern red-backed voles. These biologically rich areas then provide foraging habitats for higher-level carnivores including red foxes and lynx. Maintaining the integrity of these aquatic habitats is essential for preserving mammalian diversity on the landscape.
- Species diversity in barren, upland areas is generally less diverse compared with forest habitats. However, these environments provide foraging habitat for red foxes and breeding habitat for a range of bird species including willow ptarmigan (*Lagopus lagopus*), rock ptarmigan (*Lagopus muta*) and short-eared owls. Maintaining naturally occurring rock structures and sensitive alpine vegetation is important for ensuring the persistence of these upland specialists.



- Maintaining the structural integrity and complexity of late successional forest stands is important for supporting populations of forest associated species including Canada lynx and bat species that may utilize tree cavities for roosting structures. These species extensively utilize dense, closed canopied forests for foraging, denning and rearing young. Other species that depend on this habitat type include some birds of prey (e.g., northern goshawks [*Accipiter gentilis*], osprey), primary cavity excavators (e.g., woodpeckers), and secondary cavity nesters (e.g., boreal chickadees [*Poecile hudsonicus*]).

Although some loss and fragmentation of naturally occurring habitats is unavoidable during construction, a number of mitigating measures will be implemented to reduce the effect of construction activity on terrestrial wildlife. These include:

- Minimizing the Project footprint by confining vegetation clearing and other forms of ground disturbance to the extent possible.
- Avoiding construction during the pre-calving/calving season (early May to late June) if woodland caribou are detected in the Project area.
- Conducting nest searches in advance of site clearing during the breeding season (15 May to 15 August) to avoid disturbance to nesting birds.
- Establishing protective buffer zones around all active nests. Buffer sizes are species-specific and are based on the perceived susceptibility of each species to anthropogenic disturbance.
- Avoiding wildlife-vehicle collisions by ensuring safe driving practices, adhering to posted speed limits and yielding to wildlife. Collisions may also be reduced if the public are restricted from using the access road.
- Minimizing the use of artificial lighting to reduce disturbance to nocturnal bird and bat species.
- Prohibiting the hunting or harassment of wildlife species by personnel within the Project Area.
- Appropriately disposal of all waste to avoid the attraction of wildlife to artificial food sources.
- Implementing dust control and site water treatment measures during construction.
- Implementing Environmental Protection Plans (EPP) to prevent forest fires and chemical spills.

The proposed Project will likely result in adverse environmental effects on wildlife species present in the immediate area. However, the significance of this disturbance can be minimized by implementation of appropriate mitigative measures.

#### **6.1.6 Human Environment**

Project construction will be characterized by standard and non-intrusive activities and practices and occur within a small and localized area over a relatively short period. The proposed Project is in a relatively undeveloped portion of Lewisporte but could possibly have adverse effects (e.g., noise, dust, discharges, emissions, visibility) for the Town of Lewisporte, especially homeowners and cabin users on the South Side of the community.

The Project is located in a remote area within the Municipal Planning Area Boundary of The Town of Lewisporte zoned for activities intended for uses associated with rural based industry such as forestry, fishing, hunting, agriculture or aggregate extraction. A zoning amendment under the Municipal Plan and Development Regulations will be required to facilitate Project development.

Development projects may result in increased demands on local, regional and provincial services and infrastructure. This may include both direct Project requirements, such as in the use of local transportation and accommodations, as well as indirect demands from Project workers. Given the size and duration of the Project's construction labour force, the local community may not have the capacity to provide the necessary services for a temporary work force. However, the Project is within the undeveloped portion of the community and will not be dependent upon water, sewer or solid waste management services of the Town of Lewisporte.

Given this and the application of mitigations such as hiring locally, housing out-of-town workers in accommodations camps and providing medical services at the Project site will reduce or eliminate effects related to the availability or quality of community services and infrastructure. Increased traffic to and from the site may be experienced along Route 340 and the South Side of Burnt Bay but should have limited effects on the Town of Lewisporte or other communities.

The Proponent will consult with the local municipalities and other stakeholders regarding Project construction related activities that may be disruptive to ongoing activities. These measures will include sharing schedules and requirements for activities such as the transportation of any large equipment to and through the communities or on Route 340 or through Lewisporte harbour during Project construction and sharing environmental and emergency response plans with stakeholders.

The Project Area intersects with several types of land use and resources extraction activities. The area has land use interests for mineral exploration, domestic wood harvesting and silviculture, trapping and hunting (i.e., large and small game and migratory birds) but little is known about the extent of these activities within the Project Area or Study Area. Cottage development areas are located 8.5 km from the Project Area. No quarries, farms, outfitters, fishing harbours, aquaculture sites, scheduled salmon rivers, snowmobile/ATV trails, kayaking access points or marinas are located within the Project Area but these are all found within the Study Area.

There are no known heritage resources within or near the Project Area. Development activities and associated ground disturbance have the potential to disturb or destroy archaeological sites and other historic resources, where they exist. During Project construction, standard precautionary and reporting procedures will be implemented. Should an accidental discovery of historic resources occur, all work will cease in the immediate area of the discovery until authorization is given for the resumption of the work. Any archaeological materials encountered will be reported to the PAO, including information on the nature of the material discovered and the location and date of the find.

Project construction will be carried out by a qualified and experienced contractor. The Project will therefore create business opportunities during its construction phase, and the requirement for labour, goods and services during Project construction may provide opportunities for local and provincial

workers and businesses. These direct economic benefits will be supplemented by indirect and induced “spin-off” effects through, for example, spending by Project employees and contractors. The proponent will communicate Project-related opportunities to stakeholders (e.g., municipalities, business associations, employment agencies) in a timely fashion to ensure these organizations are prepared and can communicate with stakeholders.

## 6.2 Operations and Maintenance

The section describes potential effects, mitigations and special planning considerations related to operations and maintenance of the TNEC. Many of the adverse effects of the Project from construction activities (e.g., noise, dust, traffic stoppages) will not be present during operations and maintenance.

### 6.2.1 Atmospheric Environment

The primary air emission source at TNEC will be the 40 MW power plant that will gasify biomass extracted from municipal solid waste, light construction and demolition waste, source-separated commercial waste, and other materials such as green waste and wood chips, when available. Other sources of emissions onsite will include hotel idling of marine vessels, dust from the landfilling of residue left after processing, dust from the landfilling of electrostatic precipitator and baghouse particulate, and the venting of VOCs from the storage tank farm. A description of the CHP Gasification Plant is included in Section 2.3.1 and Figure 2-4. Appendices D, E and F provide additional information related to air emissions, emissions abatement, and overall TNEC mass balance.

Table 6-1 provides a summary of sources of emissions and emissions parameters for operations.

**Table 6-1: Summary of Sources and Emissions Parameters: Operation Scenario**

Type of Emission	Source	Emissions Parameters
Exhaust Emissions	Exhaust emissions from biomass mass waste units and HTL units	PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , CO, HF, HCL, Cadmium, Lead, Mercury, Dioxin/Furans
Vent Emissions	VOCs from process stacks and vents and storage tank vents.	VOCs
Stockpiling, landfilling inert residual material, precipitator/baghouse particulate	Particulate matter from materials handling of inert residual material and particulate	PM <sub>2.5</sub> , Cadmium, Lead, and Mercury
Hotel Idling of Marine Vessels	Exhaust emissions from marine vessels	PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , CO, PAHs, and VOCs

The source power island includes electrical power generating equipment and a generator substation. The source will consume on average 1,200 and up to 1,400 tonnes of SRF per day and will reduce the

volume of incoming waste by approximately 90 percent, producing a safe, inert residue that is non-leachable and suitable for use as construction fill, road grit or cement block manufacture.

In the US, the source is classified as a synthetic minor stationary source of SO<sub>2</sub> emissions, and a minor source for all other pollutants, and as determined under NAICS 221119 (Other Electric Power Generation and SIC 4911: Electric Services.)

Actual emissions estimates are based upon use of a redundant air pollution control system, which consists of one or more of the following units in series, as required to meet emission standards:

- In-line acid gas removal unit (AGRU), into which fine powered bicarbonate is injected to capture the acid gases. In the acid gas removal (scrubbing) system a dry reagent is injected downstream of the boiler. Once the reagent mixes with the flue gas and reacts with any acid gases including HF, HCl or SO<sub>2</sub>, the reacted material is then removed by the particulate control device.
- Electrostatic precipitator (ESP) to remove fine (<20micron) dust/fly ash that is not readily captured in the cyclone that is incorporated in each gasifier-combustion system up stream of the boilers. The electrostatic precipitator is sized to remove the particulate load from the gas stream to the emission level specified. The precipitator uses high voltage to charge the particulate which then migrates to the grounded surfaces. The precipitator will be followed by the SCR systems.
- Catalytic Reduction Oxidation System for CO & VOCs the CO catalyst system is sized to reduce carbon monoxide and VOCs from the gas stream to the specified emission level.
- Selective Catalytic Reduction System (SCR) for NO<sub>x</sub>: The NO<sub>x</sub> catalyst system is sized to reduce the nitrogen oxides from the gas stream to the specified emission level.
- Bag House with in-line activated carbon and bicarbonate injections upstream of a fabric gas filtration system.

## Comparison of Project Emissions to Newfoundland Emissions Inventory

Certain of the Tables in this section contain data that has been presented above and are included in this section for convenience in comparing project emissions with Newfoundland emissions inventories. Table 6-2 provides an inventory for project emissions from the significant emissions sources for the Project.

**Table 6-2: Project Emissions Inventory: Operation Scenario (tonnes/year)**

Source	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	VOC	CO	HF	HCL
Biomass Waste Units	17	45	45		36	0.4	4.4
HTL Units			13	15	14		
Marine Vessel Hoteling	Spliethoff ships currently use Canadian ports and are approved by Transport Canada to run on ULSD fuels with scrubbers that clean the exhaust before release. .						

Source	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	VOC	CO	HF	HCL
Total	17	45	58	20	70	0.4	4.4

Table 6-3 provides a comparison of the Project emissions with the 2018 NL CAC emissions inventory. The comparison indicates the Project will contribute 17, 45, 58, 20, and 70 tonnes per year, respectively, to the provincial totals for PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub>, VOC and CO. Spliethoff vessels are approved for use of Canadian Ports. Their contribution to the NL emissions inventory will be obtained from the manufacturer provided for the site-specific air dispersion modeling study to be provided by the Applicant.

**Table 6-3: Comparison of Project CAC Emissions Inventory with 2018 Provincial Inventory (tonnes/year)**

Parameter	TPM	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	VOC	CO
2018 NL Emissions (From Table 4-11)	227,408	74,038	17,893	18,735	46,145	28,374	106,076
Project Emissions Inventory (From Table 6-2)	17	17	17	45	58	20	70
%	0.007	0.023	0.10	0.24	0.13	0.07	0.066

Table 6-4 provides a comparison of Project emissions with the 2018 provincial totals for Pb, Cd, Hg, D/F and PAHs.

**Table 6-4: Comparison of Other Project Emissions Inventory with 2018 Provincial Inventory (tonnes/year)**

Parameter	Pb	Cd	Hg	D/F	PAHs
2018 NL Emissions (From Table 4-12)	2,391.6	100.6	40.9	2.964	3,833.2
Project Emissions Inventory	0.009	0.0003	0.00001	0.000002	
%	0.000%	0.000%	0.000%	0.000%	

## Comparison of Project GHGs to NL GHGs

In 2018, Newfoundland and Labrador generated 9,780 kt of CO<sub>2</sub>, 36 kt of CH<sub>4</sub>, and 0.47 kt of N<sub>2</sub>O (GNLK 2020). The total kt CO<sub>2</sub> eq for the Province was 11,000. A comparison of the Project's estimated GHGe (590 kt) with the Provincial total GHGe (11,000 kt) for 2018 indicates the Project will contribute 5.36% to the Provincial total (Table 6-5).



**Table 6-5: Major Greenhouse Gas Emission Sources at TNEC**

Process	Fuel Used (Giga Jules/year)	GHGe (tonnes/year)
Gasification	5,814,000	498,000
HTL	1,631,000	92,000
Total	7,445,000	590,000

Note: This information is also provided in Table 2.14.

### Comparison of Project End of Stack Emissions to Newfoundland Regulations

The Government of Newfoundland and Labrador provides end of stack limits for the operation of new incineration or pyrometric equipment and under the *NL Air Pollution Control Regulations, 2004* under the *Environment Protection Act (O.C. 2004-232)*. This equipment cannot have an in-stack concentration of in excess of the standards prescribed in Table 6-6.

**Table 6-6: Provincial In-Stack Standards – Incineration and Pyrolysis**

Facility	Mercury	Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs)
Municipal Waste Incinerator	20 µg/m <sup>3</sup>	80 pg I-TEQ/m <sup>3</sup>

Source: GOC, 2021

Note: This information is also provided in Table 4-4.

The air pollution regulations also provide penalties emissions exceedances. Refer to Table 6-7 for a list of these penalties.

**Table 6-7: Summary of Emission Penalties for Emissions Exceedances**

Pollutant	Maximum Allowable Annual Emission without Administrative Penalty	Administrative Penalty
Ammonia	10 tonnes	\$2/tonne
Nickel	10 tonnes	\$2/tonne
Vanadium	10 tonnes	\$2/tonne
Carbon Monoxide	20 tonnes	\$2/tonne
Nitrogen Oxides	20 tonnes	\$2/tonne
Particulate Matter	20 tonnes	\$2/tonne
Sulphur Dioxide	20 tonnes	\$2/tonne
Arsenic	50 kilograms	\$2/kilogram
Lead	50 kilograms	\$2/kilogram
Cadmium	5 kilograms	\$2/kilogram
Mercury	5 kilograms	\$2/kilogram

Pollutant	Maximum Allowable Annual Emission without Administrative Penalty	Administrative Penalty
Polychlorinated dibenzo-p-dioxins (PCDDs) and poly-chlorinated dibenzofurans (PCDFs) (TEQ)	1000 milligrams TEQ	\$2/milligram TEQ

Source: GOC, 2021

Note: This information is also provided in Table 4-5.

## Comparison of Project Ground Level Concentrations to Newfoundland Schedule A Regulations

Impacts to air quality in the vicinity (20 km cartesian grid) will be assessed by performing a detailed air dispersion modeling study which will include site specific information on emission sources, meteorology and topography of the area and sensitive receptors. The facility will be designed to ensure compliance to Schedule A of the *NL Air Pollution Control Regulations, 2004* under the *Environment Protection Act (O.C. 2004-232)*.

The outcome of this assessment will determine whether air monitoring will be required, and, if so, the parameters to monitor along with the preferred location based on the highest ground level concentration contours generated by the air dispersion model.

As described in Table 6-8, EPRD will carry out a site-specific air dispersion modeling study to assess any potential effects on local ambient air quality. A preliminary air dispersion modelling exercise has been carried out by the Proponent scientists and engineers using AERMOD. In addition, the TNEC plans to establish an air quality monitoring station at the property boundary closest to the Lewisporte town centre to monitor air quality "at the fence" of the TNEC project.

### 6.2.2 Freshwater Environment

During planned operations, there will be no direct effects on surrounding freshwater aquatic habitats. The Proponent will continue to comply with all regulations and permit conditions as well as the EPP to ensure environment protection of freshwater habitats and species.

### 6.2.3 Terrestrial Environment

During the operations phase of the Project there will be no additional soil or vegetation disturbance, and therefore, little or no potential for effects to these aspects of the terrestrial environment. Wastes, fuels and other such materials and substances will continue to be handled, used and disposed of properly throughout the life of the Project, as outlined earlier. Potential direct and indirect effects on wildlife during operation and maintenance are similar to that described for construction but should be lessened by the lower intensity of vehicle and human activity for operation and maintenance versus construction. The Proponent will continue to comply with all regulations and permit conditions as well as the EPP to ensure environment protection of freshwater habitats and species.

#### **6.2.4 Marine Environment**

Marine shipping would interact with the marine environment during operations and includes potential for marine mammal and sea turtle vessel strikes and disturbance to fish and marine wildlife. Marine shipping activities will comply with all regulation and permit conditions as well as the EPP to ensure protection of marine habitats and species. Wastes, fuels and other such materials and substances will continue to be handled, used and disposed of properly throughout the life of the Project, as outlined earlier.

#### **6.2.5 Human Environment**

Development projects may result in increased demands on local, regional and provincial services and infrastructure but this effect differs between construction and operations. As Lewisporte and Local Area 61 experiences some unemployment and residents have access to local technical training, the Project may employ local people and/or attract new people to live in the community. As a community with decreasing population, Lewisporte and area should be able to absorb new individuals and families. The Proponent will consult with the local municipalities and other stakeholders regarding Project related activities and anticipated labour force requirement to promote hiring locally as much as possible.

During the operations and maintenance phase, the Project will continue to be visible within the Town of Lewisporte. There will be no further ground disturbance, and therefore, little or no potential for effects to historic and heritage resources. However, the precautionary and reporting procedures implemented for construction will continue to be in place throughout the life of the Project.

During operations, SWPNL estimates that the TNEC will initially receive a maximum of 30/40 vessel trips annually. This means three vessels per month will continuously serve the facility with potentially a fourth added to facilitate shipment of parts and equipment when required. These vessels, which will move through Notre Dame Bay and Indian Arm to Burnt Bay and Lewisporte, will be consistent with the types of marine shipping activities that have occurred in Lewisporte Harbour for more than 100 years. The marine waters of Lewisporte, Burnt Bay, Indian Arm and Notre Dame Bay have existing vessel traffic routes that can be used with minimal resource conflicts and environmental risks. The number of movements by large vessels would likely be higher than is currently experienced but lower than the level of traffic seen in 2011.

Given that the site development includes the provision for partnership with the Town of Lewisporte and local farmers, the Proponent will establish a Community Liaison Committee to facilitate ongoing communications and interactions between the operator and the local stakeholders.

### **6.3 Decommissioning**

This section describes the potential effects of Project decommissioning. At this point, the TNEC facility is planned for 50 to 60 years of service with refurbishment of components at 20 to 30 into the plant life cycle.

At decommissioning, machinery or other components may be sold for reuse elsewhere, while the steel and other recoverable materials are removed, processed and sold for scrap. Once removal of the buildings and equipment is complete, the site is remediated to remove any residual hazardous materials. Concrete masonry and other inert materials are placed in a construction and demolition landfill or repurposed for road or waterway riprap. The TNEC will have an engineered inert materials landfill onsite that will be suitable for placement of any non-recyclable inert material generated during remediation.

Decommissioning activities will entail increased noise and potentially other emissions.

Decommissioning activities may result in disturbance to humans and wildlife, but these effects are anticipated to result in short term nuisance effects. The Proponent will comply with all regulations and permit conditions throughout decommissioning to ensure environmental effects and disturbances are minimized.

The decommissioning phase will result in loss of both direct and indirect economic activity related to procurement and employment at TNEC. The Proponent will communicate with the Town of Lewisporte and stakeholders regarding timelines and plans for decommissioning.

#### **6.4 Potential Accidental Events and Malfunctions**

Accidents and malfunctions are considered unlikely but could potentially occur during construction and operations and maintenance of development projects. During construction, the potential for accidental events and malfunctions are related to operation of construction equipment, which will be maintained in good operating condition throughout the construction period. During operations and maintenance, there is a risk of failure of a component of the air pollution control system that could impact emissions. An air quality monitoring station is proposed to be constructed and operated by TNEC.

During construction, any accidental events or malfunctions will be handled in a safe manner while minimizing potential impacts on the surrounding environment. Accidental events and malfunctions would primarily be limited to fuel or oil spills, or the loss of equipment into a surrounding waterbody or soils. In either instance, proper reporting of the incident will be completed, and all necessary clean-up will be completed.

An accidental event or malfunction during any phase of the Project could affect the community or region through an effect on human health and well-being or through an increased demand for local safety and health services. The probability of such events occurring is low, and potential effects would depend upon the specific nature and magnitude of the event. SWPNL will implement various measures, plans and procedures to prevent and respond to, a fire, explosion or other accidental event at its operations. The Proponent will develop, maintain and periodically exercise an environmental emergency response plan (EERP) in relation to environmental risks associated with facility operations, including dock operations.

## **6.5 Environmental Effects and Mitigations Summary**

Table 6-8 provides a summary of potential project interactions, effects, key environmental planning considerations and proposed mitigation for the Project. Potential issues have been identified through baseline research and consultation with regulators and stakeholders. By complying with all regulations and permit conditions, SWPNL will meet municipal, provincial and federal requirements for the Project. Other mitigations are the Proponent's commitments to enhancing beneficial effects of the Project and minimizing adverse effects through best practices based on the company's experience in other areas and measures used for other projects in Newfoundland and Labrador.



**Table 6-8: Summary of Potential Environmental and Socioeconomic Interactions, Effects and Mitigations**

Component	Potential Interactions	Potential Effects	Key Considerations and Mitigations
Atmospheric	Routine Project activities or accidental events could potentially result in changes to air quality and noise	<ul style="list-style-type: none"> <li>• Changes to air quality due to release of air contaminants to the atmosphere and changes in the quantities of greenhouse gases released to the atmosphere during construction and operations</li> <li>• Changes to ambient noise levels during construction</li> <li>• Increase in vibrations during construction</li> </ul>	<ul style="list-style-type: none"> <li>• Substantial distance from residential areas</li> <li>• Compliance with regulations and permit conditions during construction and for routine/non-routine maintenance</li> <li>• Prepare a site-specific air dispersal model to include cargo ship hotelling source emissions data from Spliethoff manufacturer</li> <li>• Establish EPP</li> <li>• Establish air quality monitoring station on northeastern property boundary</li> <li>• Localized and short-term construction activity</li> <li>• Standard construction and operational practices</li> <li>• Regular inspection and maintenance of equipment.</li> <li>• Accidental event prevention and response</li> <li>• Onsite workers will follow OHS requirements re personal protective equipment</li> <li>• Develop, maintain and periodically exercise an (EERP)</li> </ul>
Freshwater	Routine Project activities or accidental events could potentially result in changes to hydrology	<ul style="list-style-type: none"> <li>• Changes in hydrological regime</li> <li>• Change in water quality or quantity</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with regulations and permit conditions during construction and for routine/non-routine maintenance</li> <li>• Work areas will be isolated from running water and appropriate barriers will be installed to prevent accidental released of deleterious substances</li> <li>• When isolation is not possible, silt fencing or another barrier type will be used</li> <li>• Water samples will be collected from key areas throughout the construction period</li> <li>• A response plan will be developed to address potential accidental releases of deleterious substances</li> <li>• Develop, maintain and periodically exercise an (EERP)</li> </ul>

Component	Potential Interactions	Potential Effects	Key Considerations and Mitigations
Terrestrial	Routine Project activities or accidental events could potentially result in changes to vegetation and soils, terrestrial wildlife (e.g., mammals, amphibians, avifauna)	<ul style="list-style-type: none"> <li>• Direct and indirect loss of plant groups</li> <li>• Change in plant communities</li> <li>• Change in wetland quality and quantity</li> <li>• Changes to wildlife abundance and distribution due to habitat or food availability, or avoidance behaviour to disturbance</li> <li>• Change in habitat availability</li> </ul>	<ul style="list-style-type: none"> <li>• Localized and clearly delineated work areas</li> <li>• Compliance with applicable regulations and permit conditions</li> <li>• Accidental event prevention and response</li> <li>• Avoiding construction during the pre-calving/calving season (early May to late June) if woodland caribou are detected in the Project area</li> <li>• Conducting nest searches in advance of site clearing during the breeding season (15 May to 15 August) to avoid disturbance to nesting birds</li> <li>• Establishing protective buffer zones around all active nests. Buffer sizes are species-specific based on the perceived susceptibility of each species to anthropogenic disturbance</li> <li>• Avoiding wildlife-vehicle collisions by ensuring safe driving practices</li> <li>• Minimizing the use of artificial lighting to reduce disturbance to nocturnal bird and bat species</li> <li>• Policy and training of a no harvesting or harassment of wildlife by Project personnel</li> <li>• Waste and other materials management (facilities and procedures)</li> <li>• Accidental event prevention and response</li> <li>• Develop, maintain and periodically exercise an (EERP)</li> </ul>
Marine	Routine Project activities or accidental events could potentially result in changes to marine habitat and species (e.g., fish, mammals, turtles, avifauna)	<ul style="list-style-type: none"> <li>• Change in habitat quality and quantity</li> <li>• Changes to wildlife abundance and distribution due to habitat or food availability, or avoidance behaviour to disturbance</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with regulations and permit conditions during construction and for routine/non-routine maintenance</li> <li>• Establish EPP for construction and operation activities.</li> <li>• Localized and short-term construction activity</li> <li>• Standard erosion and sediment control measures for terrestrial and marine construction</li> </ul>

Component	Potential Interactions	Potential Effects	Key Considerations and Mitigations
			<ul style="list-style-type: none"> <li>• Underwater sound mitigations as appropriate (e.g., minimizing construction duration, bubble curtains)</li> <li>• Shipping vessels to travel within a pre-determined shipping lane.</li> <li>• Reduction of speeds to avoid collisions with marine mammals</li> <li>• Implement a Marine Offsetting Plan pursuant to the <i>Fisheries Act</i> Section 35(2)(b)</li> <li>• Waste and other materials management (facilities and procedures)</li> <li>• Accidental event prevention and response</li> </ul>
Human	Communities and Region	<ul style="list-style-type: none"> <li>• Change in air quality, noise and nuisance effects (e.g., traffic stoppages) during construction</li> </ul>	<ul style="list-style-type: none"> <li>• Project located in a remote area of Lewisporte</li> <li>• No anticipated interaction with distant communities</li> <li>• Compliance with applicable regulations and permits</li> <li>• Communications on timing and location of Project activities</li> <li>• Community Liaison Committee to facilitate ongoing communications and interactions between the operator and the local stakeholders</li> <li>• Develop, maintain and periodically exercise an (EERP)</li> </ul>
	Services and Infrastructure: Presence of Project employees can place stress on nearby communities if capacity within existing community services and infrastructure is insufficient.	<ul style="list-style-type: none"> <li>• Change in access to and use of municipal services (e.g., water, sewer, solid waste, roads)</li> <li>• Change in access to regional (e.g., health and education) services and infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• No anticipated demand on municipal services and infrastructure</li> <li>• The Project will be self-sufficient in terms of water and sewer services</li> <li>• The Project will use the Norris Arm Landfill as a commercial user for its domestic solid waste.</li> <li>• Medical services will be provided on-site to reduce potential demand on local medical services</li> <li>• Accident prevention and response plans will be established</li> <li>• A local work force will be hired as much as possible</li> </ul>

Component	Potential Interactions	Potential Effects	Key Considerations and Mitigations
			<ul style="list-style-type: none"> <li>• Non-resident construction workers will be housed in accommodations camps located on-site</li> <li>• The Project (especially during construction) may result in increased traffic</li> <li>• Communications on timing and location of Project activities and anticipated service requirements</li> <li>• Community Liaison Committee to facilitate ongoing communications and interactions between the operator and the local stakeholders</li> <li>• Develop, maintain and periodically exercise an (EERP)</li> </ul>
	Economy and Employment: Employment and expenditures generated by the Project	<ul style="list-style-type: none"> <li>• Beneficial economic effects</li> <li>• Potential adverse effects associated with a potential influx of workers during construction</li> </ul>	<ul style="list-style-type: none"> <li>• Measures will be identified to optimize local benefits</li> <li>• Measures will be identified to optimize gender equity, diversity and inclusion (e.g., women's employment plan)</li> <li>• A local work force will be hired as much as possible</li> <li>• Non-resident construction workers will be housed in accommodations camps located on-site</li> <li>• Communications on Project employment and procurement activities and requirements</li> <li>• Community Liaison Committee to facilitate ongoing communications and interactions between the operator and the local stakeholders</li> </ul>
	Land and Resource Use: Routine Project activities or accidental events may result in changes to the environment that may affect land use activities and opportunities in and around the Project Area	<ul style="list-style-type: none"> <li>• Loss of commercially-exploitable mining or forest resources</li> <li>• Change in encroachment on hunting or trapping land</li> <li>• Change in access to angling resources</li> <li>• Change in access and use of seasonal residences</li> <li>• Change in access and use of recreational areas</li> </ul>	<ul style="list-style-type: none"> <li>• Construction activity will be localized, routine and short-term</li> <li>• Compliance with regulations and permit conditions during construction and for routine/non-routine maintenance</li> <li>• Location largely inaccessible and Project will not increase accessibility as it will be a secured site</li> <li>• Communications with stakeholders regarding timing and duration of activities</li> </ul>

Component	Potential Interactions	Potential Effects	Key Considerations and Mitigations
			<ul style="list-style-type: none"> <li>• Community Liaison Committee to facilitate ongoing communications and interactions between the operator and the local stakeholders</li> </ul>
	Heritage Resources: Any new ground disturbance may uncover heritage resources	<ul style="list-style-type: none"> <li>• Loss of or damage to heritage resources</li> </ul>	<ul style="list-style-type: none"> <li>• No publicly identified heritage resources in the area</li> <li>• New Project-related ground disturbance will be localized and in clearly delineated work areas</li> <li>• Standard precautionary and reporting procedures</li> <li>• Compliance with regulations</li> </ul>



## **6.6 Environmental Monitoring and Follow-up**

Any potential environmental issues which may be associated with the Project can be addressed and mitigated through the use of good construction and operational and maintenance practices and procedures. These will be further addressed through the specific environmental permitting requirements and compliance standards and guidelines which will apply to Project activities and components.

Once operational, the Project will be subject to regular inspections and maintenance as required. The Proponent is committed to obtaining all required authorizations for the proposed Project, and to complying with all applicable regulations. No other follow-up is considered necessary in relation to the proposed Project.

## **7.0 SUMMARY AND CONCLUSION**

EnviroPower Renewable Development, Inc. (EPRD) is proposing to construct the Terra Nova Energy Centre, a major industrial and commercial enterprise located on the south shore of Burnt Bay in Lewisporte, Newfoundland. Once permitted and financed, the project will be owned by Synergy World Power Newfoundland, Ltd. (SWPNL), a yet to be formed company. The primary focus of the Project is the environmentally responsible conversion of waste plastics to fuels and conversion of biomass to renewable energy in the form of hot water for greenhouses and steam for generating electricity. Hot water from the TNEC gasification thermal energy plant will be provided to the agricultural industry at a low cost to help achieve the Provincial mandate of increasing local production of the fruit and vegetables to support the local economy and to improve food security.

This Environmental Assessment Registration is intended to initiate the provincial EA process for the proposed Project, which will undergo review in accordance with applicable regulatory requirements. Based on this preliminary analysis, the Project is likely to result in some adverse effects to atmospheric, freshwater, terrestrial and marine environmental components in the area, especially during construction. While there will be socioeconomic nuisance effects, especially on a nearby business, those business owners have expressed strong support for the project looking forward to the economic advantages it affords after construction.

The Project will be planned and implemented to avoid or reduce any potential adverse environmental effects. The Project will be undertaken in accordance with environmental protection and regulations/guidelines and in keeping with best practices to help ensure that it is constructed and operated in a safe and environmentally responsible manner.

The Project is anticipated to be highly beneficial to the Lewisporte area and the Province of Newfoundland and Labrador as it entails a major construction project with related spending on employment and procurement. The operations of the Project will result in nominally 200 highly paying professional and technical positions in an area of the Province where an economic downturn has been experienced. The Project will also result in other social and environmental benefits in Lewisporte, Newfoundland and Labrador and beyond.

## **8.0 PROJECT RELATED DOCUMENTS**

No fieldwork has been undertaken in support of this EA Registration. Sections 4.1 and 4.2 include an overview of the biophysical and human environmental setting of the Project Area and Study Area based on available published information. This secondary research was undertaken to provide a description of the area and to identify any issues of concern early in the EA process. It is anticipated that primary research and fieldwork will be completed in support of development related permits and approvals or an environmental preview report or environmental impact statement, if required, for this Project.

Draft documents that have been prepared for the TNEC project include:

- Provisional TNEC Operations Plan (including detailed key staff position descriptions)
- Preliminary Design with Closed Heat and Material Balance for the CHP plant.

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