



CANADA NICKEL
COMPANY



Stantec

Crawford Nickel Project Impact Statement

Chapter 9 Description of Existing Environment



Prepared for:
Canada Nickel Company

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Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
amsl	above mean sea level
ATV	All-terrain vehicle
BCR	Bird Conservation Region
CBC	Christmas Bird Count
CDSSAB	Cochrane District Social Services Administration Board
CFDC	Community Futures Development Corporation
CMHA	Canadian Mental Health Association Cochrane-Timiskaming
CMHC	Canada Mortgage Housing Corporation
CoPC	Contaminant of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CSI	Crime severity index
CWQG-FAL	Canadian Water Quality Guidelines for the Protection of Aquatic Health
EC	Environment Canada
ECCC	Environment and Climate Change Canada
ECE	Early Childhood Educators
FMU	Forest Management Unit
FMZ	Fisheries Management Zone
FNETB	Far Northeast Training Board
GCDWQ	Guidelines for Canadian Drinking Water Quality

L _d	Daytime sound level (defined as 07:00 – 22:00 by Health Canada)
L _{dn}	Day-night sound level
L _{eq (n-hour)}	Equivalent sound level over 'n' hour(s)
L _{LM}	Logarithmic Mean Sound Level
L _{max}	Maximum sound level
L _n	Nighttime sound level (defined as 22:00 to 07:00 by Health Canada)
LQ	Location quotients
LSA	Local Study Area
Masl	metres above sea level
MECP	Ministry of the Environment, Conservation and Parks (formerly Ministry of Energy [MOE])
ML	Metal Leaching
MNR	Ministry of Natural Resources (formerly Ministry of Natural Resources and Forestry [MNR])
NAPS	Nishnawbe Aski Police Services
OAHS	Ontario Aboriginal Housing Services
ODWQS	Ontario Drinking Water Quality Standards
OGS	Ontario Geological Survey
ONTC	Ontario Northland Transportation Commission
OPP	Ontario Provincial Police
PA	Project Area
PAHs	Polycyclic aromatic hydrocarbons
PHU	Porcupine Health Unit
PM ₁₀	Particulate matter less than 10 microns

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PM _{2.5}	Particulate matter less than 2.5 microns
PoPC	Parameter of Potential Concern
PWQQ	Ontario Provincial Water Quality Objectives
RSA	Regional Study Area
SAR	Species at Risk
SO ₂	sulphur dioxide
SOCC	Species of Conservation Concern
SWH	Significant Wildlife Habitat
TMF	Tailings Management Facility
TP	total phosphorous
TPS	Timmins Police Service
VC	Valued Component
WMU	Wildlife Management Unit
WWR	Water Well Record

9 Description of Existing Environment

This chapter provides an overview of the existing environmental setting of the Project and the broader surrounding environment to provide context for the Impact Statement and a general description of the biological, health, social and economic conditions where the Project will be developed. The information in this chapter provides an overview of existing conditions as determined through a review of available background information, site-specific field investigations, and information provided through consultation and engagement activities as the basis for the impact assessment. Additional details regarding the existing condition of valued components (VCs) is provided in Appendix B of the Impact Statement (Baseline Reports) and within Chapters 6 through 23.

Baseline data pertaining to health and Indigenous nations is provided in Chapter 21 and Chapters 25 to 28 of the Impact Statement, respectively.

9.1 Regional Context

The Project is located within the unorganized geographic townships of Nesbitt, Crawford, Carnegie, Kidd, Beck, Lucas, Prosser, and Wark, including portions of these townships that are considered part of the City of Timmins. The nearest larger communities are the City of Timmins (42 km to the south), Town of Cochrane (35 km to the northeast), Town of Smooth Rock Falls (50 km to the northwest), and Town of Iroquois Falls (50 km to the east). Indigenous Reserve lands in proximity to the Project include Apitipi Anicinapek Nation's reserve (Abitibi 70) (95 km to the east), Flying Post First Nation's reserve (Flying Post 73) (46 km to the southwest), Matachewan First Nation's reserve (Matachewan 72) (85 km to the southeast), Mattagami First Nation's reserve (Mattagami 71) (85 km to the south), and Taykwa Tagamou Nation's reserve (New Post 69A) (37 km to the northeast).

The Project is situated in the Timmins-Cochrane Mining Camp in northeastern Ontario, Canada, a region with a strong mining history of gold, nickel, zinc and lead, and in a province favourable to mining with regulations that reflect this history. Primary resource uses occurring in the region include mining activities and forestry, as well as hunting, trapping, and recreation. Recreation includes fishing, camping, and outdoor trails (e.g., hiking, snowmobile, ATV), navigation.

The Project is located in an area well-connected by local infrastructure. The Project is bisected by Highway 655, a two-laned paved provincial highway connecting Highway 101 to Highway 11 (Trans-Canada Highway). An existing rail spur line connects Glencore's existing Kidd Mine west of Highway 655 to the Kidd Metallurgical Site to the southeast of the Project site. Other local infrastructure includes a regional transmission line (500 kV), which parallels Highway 655 and extends from the Hydro One Porcupine Transformer Station located east of Timmins. In addition, a 115 kV transmission line runs north south along the east side of the Project. The Lower Sturgeon hydro-electric generating station is located along Mattagami River to the west of the Project site. The Timmins Municipal Airport (Timmins Victor M. Power Airport) is located 47 km (driving) from the site and is serviced by several daily flights to Toronto Pearson International Airport and Billy Bishop Toronto City Airport.

The terrain is relatively flat with elevations onsite ranging from 265 to 290 m above mean sea level, with the majority of soils consisting of very poorly to poorly drained Organic and Gleysolic soils developed on nearly level to very gently sloped Lacustro-Till or Glaciolacustrine parent materials.

The major watersheds in the area include the North Driftwood River and West Buskegau River, which ultimately discharge to the Abitibi River to the north, and Jocko Creek, which is a tributary of the Mattagami River located to the west of the Project. Several small lakes occur on the landscape.

The fish communities in the North Driftwood River, West Buskegau River, and Mattagami River watersheds are represented by a mix of cool and cold-water fish species typical of northeastern Ontario. They include a variety of small-bodied (e.g., minnows) and large-bodied (e.g., northern pike, white sucker, yellow perch, and burbot) species. Lake sturgeon is the only aquatic SAR in the vicinity of the Project, which is known to inhabit the Mattagami River, the Abitibi River, and the Frederick House River.

Contiguous tracts of boreal forest span the area, dominated by upland mixed forests and coniferous forests. Wetlands are the largest ecosystem category in the area, consisting of swamps, fens, and bogs. Wildlife within the Ecoregion is typical of the boreal forest, which comprises moose, northern gray wolf, Canada lynx, American black bear, American marten, beaver, snowshoe hare and red squirrel. Representative species of amphibians and reptiles include blue-spotted salamander, boreal chorus frog, wood frog, mink frog, midland painted turtle, and eastern gartersnake.

9.2 Geology and Geologic Hazards

An overview of the baseline conditions for geology and geological hazards is provided in Appendix B.1 of the Impact Statement. The baseline information presented herein provides an overview of this information.

From the terrain mapping completed as part of the Soils and Terrain Baseline Report (Appendix B.1 of the Impact Statement), it was confirmed that the most frequent surficial materials expected in both the PA and LSA consist of (in order of importance) glaciolacustrine (LG), followed by organics (O) then till (M).

Within the PA, local ground surface elevations typically range between a high of 286 metres above sea level (masl) to the south, to a low of 266 masl to the northwest. Local average relief is generally under 15 m. Site slopes average 2 percent (%) (1.2 degrees [°]), with little evidence of underlying bedrock expression due to deep surficial materials; only 1 hectare (ha) of exposed bedrock was mapped ~285 m west of Highway 655 (existing alignment) in the southern portion of the LSA/RSA. Another area of shallow surficial materials (near surface bedrock) is situated in the southern portion of the LSA/RSA, east of the existing Highway 655.

The two most notable landforms in the LSA/RSA are the esker complex containing kettle lakes along the west of the current highway position (and planned Tailings Management Facility [TMF]) and the deeply incised Jocko Creek, which intersects the PA/LSA/RSA southwest of the TMF and north of Kidd Creek. The Jocko Creek floodplain is situated up to 8 m below the surrounding terrain due to creek incision through a fine-grained glaciolacustrine-dominated landscape.

The geotechnical characteristics of the PA and LSA/RSA are best documented in the Geotechnical Report (Appendix B.12.1 and B.12.2 of the Impact Statement).

Broadly, all bedrock is a succession of supracrustal rock units dated from 3.2 to 2.5 billion years. From north to south in the LSA, the main geological units are:

- Felsic to intermediate metavolcanic formations (dacitic and andesitic flows, tuffs and breccias)
- Mafic to intermediate metavolcanic flows (basalt, andesite, tuff and breccias)
- Metasedimentary rocks (wacke, siltstone, argillite)

Within all of these units, there are intrusive contact rocks, mafic to ultramafic rock, and granitoid intrusions. In the north and middle metavolcanic formations, iron formations have a northwest-southeast orientation.

Exposed bedrock was observed on the west side of Highway 655, due west of Boundary Lake in the southern portion of the LSA/RSA. Otherwise, unconsolidated sediments tend to be deep (up to 80 m), covering the bedrock over the majority of the LSA/RSA.

The Ontario Geological Survey (OGS) mapped three sub-parallel faults over the PA, starting northwest and converging southeast on the east side of the LSA/RSA. Several regional faults are found in the LSA/RSA, generally showing a north-northwest to south-southeast strike. The major regional faults following this trend are the Mattagami River Fault, the Buskegau River Fault and the Main Regional Fault (also referred to as CUC Fault). Multiple discontinuous, unnamed faults are showing similar strike. Faults in the LSA/RSA are generally steeply dipping although literature is sparse on the dip of the faults.

No historical or recent landslides were identified in the LSA/RSA; the main reason for this is the overall subdued topography. The future occurrence of small landslides is opined to still remain a possibility, and if they occur, are most likely along the moderately steep to steep slopes along the watercourses delineated throughout the LSA/RSA (in particular Jocko Creek).

Existing erosion along the banks of Jocko Creek is likely from review of the bare-earth hillshade (derived from LiDAR), particularly at the meander bends where the river erodes into the toe of moderately-steep (up to 50%) valley slopes.

As outlined above, the OGS does not indicate active versus inactive faults in the LSA/RSA; it is noted that in the last 40 years, no magnitude 3.0 or greater earthquake has been recorded by the OGS, which may indicate the identified faults in the LSA/RSA are currently inactive. As noted in the Soils and Terrain Baseline Report (Appendix B.1 of the Impact Statement), the Project is located in a stable continental region within the North American Plate and, as a consequence, has a relatively low level of seismic activity (Earthquake Canada 2024). Earthquakes recorded for the 2010-2019 period show only 1 or 2 magnitude events for the Timmins area, all are assumed related to blasting events associated to nearby mining activities (e.g., Kidd Creek Mine, southwest from the Project LSA/RSA).

At a regional scale, there is a still active isostatic rebound (rise) in the range of 6.4 ± 2.6 mm per year registered at nearby Timmins, Ontario (Peltier, Argus and Drummond 2015).

Subsidence, or gradual settling or sudden sinking of the earth's surface due to anthropogenic processes such as excavation, groundwater withdrawal, organic soil disturbance (wetland draining), underground mining, sinkholes (e.g., karst), and permafrost degradation, was not observed to be occurring within the limits of the PA and LSA/RSA from the review of background data and terrain mapping exercises.

No historical mining activities are evident in the LSA/RSA. As such, there are no associated instabilities with historical mining. The Kidd Mine, which is located approximately 0.7 km from the southwestern limit of the LSA/RSA is the closest existing mining activity to the project. Mining-related hazards such as subsidence, however, have occurred in the broader region, the most notable instances being related to the severe subsidence (sinkholes) that occurred at a number of locations on the former Hollinger and McIntyre mine sites located in Timmins.

9.3 Soil

The following are key findings from the Soils and Terrain Baseline Report (Appendix B.1 of the Impact Statement):

- The topography across the PA and LSA/RSA is flat to gently undulating, generally ranging between 265 and 290 m above sea level and averaging about 15 m in local relief. The few rare areas of relief are associated to an esker complex, locally entrenched river systems, and a few rare bedrock-controlled hills.
- Very poorly to poorly drained Organic and Gleysolic soils developed on nearly level to very gently sloped Lacustro-Till or Glaciolacustrine parent materials were mapped for most (82.3 percent [%]) of the LSA/RSA. Moderately well to imperfectly drained Luvisols were mapped on approximately 12.3% of the LSA/RSA. Coarse textured, well drained Brunisols with juvenile pedogenesis were mapped on well drained Glaciofluvial deposits and occupy 2.3% of the LSA.
- Surface layer water erosion risk is very low to low for approximately 28.1% of the LSA and subsurface layer water erosion is low and low to moderate for approximately 94.6% of the LSA. There is a high to severe water erosion risk on escarpments along Jocko Creek.
- Compaction risk is high for most soils in the LSA/RSA due to the combination of clay loam, clay, silt loam, silty clay loam, silty clay and clay textures and imperfect to very poor drainage regime.
- Approximately 34.2% of the surface layer has a 'good' or 'good to fair' reclamation suitability rating and approximately 47.9% surface layer in the LSA/RSA are organic soils. Approximately 15.8% of the surface layer and 34.3% of the subsurface layer have a 'poor' reclamation suitability rating. Soil limitations to reclamation suitability are usually due to fine soil textures (e.g., clay) and/or high Calcium Carbonate equivalent values.

9.4 Atmospheric Environment

An overview of the baseline conditions for the atmospheric environment is provided in Appendix B.2 (Baseline Air Quality Monitoring Report) and Appendix B.3 (Nighttime Light Level Baseline Report) of the Impact Statement. The baseline information presented herein provides an overview of the atmospheric environment baseline conditions for reference.

9.4.1 Climate

The PA lies in the subarctic region and the climate of the PA is typical of northern areas within the Canadian Shield.

9.4.1.1 Temperature

A summary of the daily average, maximum and minimum temperatures on a monthly basis (1991 – 2020) is shown below in Table 9.1. Temperatures for the Timmins area is characterized by warm summers and cold winters with the coldest temperatures occurring during the winter months of December to February and the warmest temperatures occurring in the summer months of July and August. The daily average temperature varies between -16.4 °C and 17.7 °C, with an annual average temperature of 1.9 °C.

Table 9.1 Summary of Average Temperature Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average (°C)	-16.4	-14.4	-7.5	0.9	9.7	15.3	17.7	16.2	11.7	4.5	-3.2	-11.2	1.9
Daily Maximum (°C)	-10.4	-7.6	-0.7	7.2	16.8	22.4	24.4	22.8	17.8	9.1	0.8	-6.5	8
Daily Minimum (°C)	-22.3	-21	-14.4	-5.3	2.5	8.1	10.9	9.6	5.5	-0.1	-7.1	-15.9	-4.1

9.4.1.2 Precipitation

A summary of the monthly average rainfall, snowfall, total precipitation (as equivalent rainfall based on a conversion factor for snowfall to equivalent rainfall of 0.1) and average snow depth is presented in Table 9.2. The average annual precipitation for the Timmins Airport is 796.2 mm.

Table 9.2 Mean Monthly Precipitation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	4	1.1	14.3	35.3	63.5	77.9	84.8	77	81.7	66.8	28.1	8.7	543.1
Snowfall (cm)	59.2	47.9	43.2	25.3	3.1	0.2	0	0	0.5	13.7	50.8	63.8	307.6
Precipitation (mm)	49	39.9	48.3	61.7	69.9	80.4	78.7	75.6	81.2	86.2	68.9	56.6	796.2
Average Snow Depth (cm)	44	54	48	18	1	0	0	0	0	0	7	22	16

9.4.1.3 Relative Humidity

Average monthly relative humidity (RH) levels at 6:00 AM and 3:00 PM local standard time (LST) the Timmins Airport are presented in Table 9.3. Monthly average RH for the Timmins Airport ranged from 76.5% - 92% at 6:00 AM and 45.7% - 76.9% at 3:00 PM.

Table 9.3 Summary of Average Relative Humidity Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average Relative Humidity – 0600 LST (%)	77.1	76.5	77.2	78.1	78.3	83	87.6	90.9	92	89.5	87.1	83.4	83.4
Average Relative Humidity – 1500 LST (%)	70.4	61.7	52.9	48.9	45.7	48.8	53.1	55.5	60.4	67.1	75.1	76.9	59.7

9.4.1.4 Wind Speed and Direction

Wind speed and direction climate normal data for Timmins are presented in Table 9.4. The annual average windspeed is 11.7 km/hr with the most frequent wind direction being southerly.

Table 9.4 Monthly Average Wind Speed and Direction Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Speed (km/h)	11.5	12.5	12.9	13	12.4	11.1	10.2	10	10.8	11.9	12.4	11.7	11.7
Most Frequent Direction	NW	S	NW	N	N	S	W	S	S	S	S	S	S

9.4.2 Ambient Air Quality

Background concentrations of air contaminants are used in dispersion modelling to represent the effect of other existing emissions sources (e.g., both anthropogenic and biogenic) in addition to the sources being included in the dispersion modelling. The MECP normally requires that 90th percentile ambient monitoring data be added to the dispersion model predictions to conservatively account for existing ambient concentrations. The background levels used in the assessment were therefore the 90th percentile values for short-term averages. For annual averages, an annual average value was used as the background level.

Background air concentrations for the Project were conservatively determined by taking the 90th percentile concentration of each contaminant of potential concern (CoPC) from the data sources presented in Section 12.2.1 of Chapter 12 of the Impact Statement. Table 9.5 summarizes the 90th percentile 24-hour and annual average concentrations for the CoPCs. Table 9.6 summarizes background concentrations for CoPCs with other averaging periods.

Table 9.5 24-hour and Annual Average Background Concentrations Used in the Dispersion Modelling Assessment

CoPC	CAS	90 th Percentile 24-Hour Average Concentration (µg/m ³)	Annual Average Concentration (µg/m ³)
PM	N/A	26.5	11.6
PM ₁₀	N/A	13.1	8.3
PM _{2.5}	N/A	12.4	6.2
CO	630-08-0	965	591
SO ₂	7446-09-5	2.1	0.4
NO _x	10102-44-0	2.2	0.3
1,3-butadiene	106-99-0	0.6	0.6
Acenaphthene	83-32-9	4.41E-03	8.46E-04
Acenaphthylene	208-96-8	8.15E-03	1.56E-03
Anthracene	120-12-7	1.61E-04	3.08E-05
Benzene	71-43-2	0.5	0.4
Benzo(a)pyrene (B(a)P)	50-32-8	5.29E-05	1.01E-05
Benzo(b+k)fluoranthene	205-99-2	2.79E-04	5.35E-05
Chrysene	218-01-9	3.38E-04	6.49E-05
Dustfall	N/A	1.48 (g/m ² , 30-day)	0.64 (g/m ²)
Fluoranthene	206-44-0	8.15E-04	1.56E-04
Fluorene	86-73-7	1.47E-03	2.82E-04
Phenanthrene	85-01-8	2.21E-03	4.24E-04
Pyrene	129-00-0	7.14E-04	1.37E-04
Mercury	7439-97-6	6.40E-05	6.80E-05
Aluminum	7429-90-5	4.20E-01	1.46E-01
Silver	7440-22-4	2.60E-04	2.60E-04
Arsenic	7440-38-2	1.26E-03	1.28E-03
Barium	7440-39-3	8.60E-03	1.08E-02
Beryllium	7440-41-7	7.60E-04	7.80E-04
Boron	7440-42-8	2.60E-02	2.60E-02
Bismuth	7440-69-9	1.26E-03	1.28E-03
Calcium	7440-70-2	6.80E-01	3.00E-01
Cadmium	7440-43-9	2.60E-04	2.60E-04
Cobalt	7440-48-4	7.60E-04	7.80E-04
Chromium	7440-47-3	6.00E-03	3.20E-03
Copper	7440-50-8	5.80E-03	3.20E-03
Iron	7439-89-6	2.20E-01	1.52E-01

CoPC	CAS	90 th Percentile 24-Hour Average Concentration (µg/m ³)	Annual Average Concentration (µg/m ³)
Potassium	7440-09-7	1.26E-01	1.30E-01
Magnesium	1309-48-4	1.92E-01	9.60E-02
Manganese	7439-96-5	8.60E-03	4.20E-03
Molybdenum	7439-98-7	7.60E-04	7.80E-04
Sodium	7440-23-5	5.20E-01	3.20E-01
Nickel	7440-02-0	2.60E-03	1.66E-03
Lead	7439-92-1	3.40E-03	1.64E-03
Antimony	7440-36-0	1.26E-03	1.28E-03
Selenium	7782-49-2	2.60E-03	2.60E-03
Tin	7440-31-5	2.40E-03	1.04E-03
Strontium	7440-24-6	1.50E-03	1.48E-03
Titanium	7440-32-6	8.80E-03	4.20E-03
Thallium	7440-28-0	2.60E-04	2.60E-04
Uranium	7440-61-1	2.60E-04	2.60E-04
Vanadium	7440-62-2	7.60E-04	7.80E-04
Zinc	7440-66-6	1.50E-02	1.38E-02
Quartz (in PM ₁₀)	14808-60-7	0.99	0.41
Chrysotile Asbestos	132207-32-0	0.0029	0.001
Diesel Particulate Matter (PM _{2.5} from Diesel Combustion)	N/A	9.40E-02	1.80E-02
Elemental Carbon (from diesel exhaust)	7440-44-0	9.40E-02	1.80E-02

Table 9.6 Background Concentrations Used in the Dispersion Modelling Assessment – Other Averaging Periods

CoPC	CAS #	Averaging Period (Hours)	Background Concentration (µg/m ³)
CO	630-08-0	0.5	1170
CO	630-08-0	1	965
CO	630-08-0	8	965
NO ₂	10102-44-0	1	5.4
SO ₂	7446-09-5	0.17	8.6
SO ₂	7446-09-5	1	5.2
1,3-butadiene	106-99-0	1	1.35
Benzene	71-43-2	1	1.2

CoPC	CAS #	Averaging Period (Hours)	Background Concentration ($\mu\text{g}/\text{m}^3$)
Diesel Particulate Matter (PM _{2.5} from Diesel Combustion)	N/A	2	0.19

9.4.3 Lighting

The ambient light environment in area surrounding the Project was, depending on season, characterized as “low district brightness” (E2) lighting environment for skyglow and a “dark” (E1) lighting environment for light trespass and glare.

9.5 Acoustic Environment

An overview of the baseline conditions for the acoustic environment is provided in Appendix B.4 (CNC Crawford Mine Baseline Noise Field Program) of the Impact Statement. The baseline information presented herein provides an overview of the acoustic environment baseline conditions for reference.

Table 9.7 presents the minimum hourly sound levels, $L_{\text{eq (1-hour)}}$, reported in Appendix B.4 (CNC Crawford Mine Baseline Noise Field Program) of the Impact Statement for both Leaves-On and Leaves-Off monitoring periods. Table 9.8 presents the calculated L_d , L_n , and resulting minimum L_{dn} , along with the minimum hourly sound levels for all monitoring locations presented in Appendix B.4 (CNC Crawford Mine Baseline Noise Field Program) of the Impact Statement.

Table 9.7 Measured Minimum $L_{\text{eq (1-hour)}}$ Baseline Sound Levels

Monitoring Location	Measured Daytime (7:00 to 19:00) Minimum $L_{\text{eq (1-hour)}}$ Sound Level (dBA)	Measured Evening (19:00 to 23:00) Minimum $L_{\text{eq (1-hour)}}$ Sound Level (dBA)	Measured Nighttime (23:00 to 7:00) Minimum $L_{\text{eq (1-hour)}}$ Sound Level (dBA)
ML1	23	19	16
ML2	23	20	19
ML3	27	21	22
ML4	22	18	17
ML5	29	24	20

Table 9.8 Calculated Minimum L_{dn} from Baseline Measurements

Monitoring Location	Daytime (07:00 to 22:00) Sound Levels, L_d^a (dBA)	Nighttime (22:00 to 07:00) Sound Levels, L_n^a (dBA)	Day-Night Sound Levels, L_{dn}^a (dBA)
ML1	33	26	35
ML2	32	23	33
ML3	37	27	37

Monitoring Location	Daytime (07:00 to 22:00) Sound Levels, L_d^a (dBA)	Nighttime (22:00 to 07:00) Sound Levels, L_n^a (dBA)	Day-Night Sound Levels, L_{dn}^a (dBA)
ML4	32	20	31
ML5	34	27	35

Note:
 a) Calculated from hourly noise data reported in the WSP Baseline Report

9.6 Groundwater

Key findings of the Groundwater Baseline Report (Appendix B.5 of the Impact Statement) were as follows:

- Topography across the LSA/RSA is generally flat, with local topographic lows typically associated with surface water features, and topographic highs associated with watershed boundaries and an esker. The PA is undeveloped and naturally forested with no known anthropogenic sources that may affect groundwater quantity or quality. Within the PA, local ground surface elevations typically range between a high of 286 m above mean sea level (amsl) to the south, with a low of 266 m amsl to the northwest.
- The PA is located primarily between the North Driftwood River and the West Buskegau River, both of which drain north into the Abitibi River. Jocko Creek crosses the southern portion of the PA and drains into Kidd Creek and subsequently the Mattagami River. Several lakes located adjacent to the PA drain into the North Driftwood River, including David Lake, Mel Lake, Sutherland Lake, Jack Lake, Gerry Lake and Martin Lake. Surface water flow is typically in a northerly direction, towards James Bay.
- Based on a review of the online MECP Water Well Record (WWR) database, there are three wells located within the PA, one of which is abandoned. The other two wells are registered as supply wells, one being a commercial water supply well screened within a sand and gravel overburden aquifer, and the second being a domestic supply well screened in bedrock. An additional five properties with the potential to be supplied by water supply wells have been identified through field reconnaissance although they are not in the MECP WWR database and so details of potential well construction are unknown. One property is known to have a drilled well, and the remaining four are suspected to be on surface water supply.
- There are two active Permits to Take Water (PTTWs) within the LSA/RSA: one is for a water supply well and for dewatering from a mine sump that expires in 2024, (with a 10-year extension request currently under review with the MECP), and the second is for dewatering of groundwater and surface water at the Carnegie Township Quarry that expires in 2027.
- The LSA/RSA is located in the Northern Clay Belt, which is characterized as low lying, undulating plain of glaciolacustrine clay. This surficial clay is nearly continuous across the RSA except where eskers and bedrock outcrops are present. Underlying the clay is a discontinuous glaciofluvial sand deposit followed by glacial till (silt and/or clay) that overlies bedrock. A north-south trending

esker composed of sand and gravel is located about 500 m west of the PA. There is only a small proportion of outcrop exposure, mostly confined to higher ground. Overburden thickness ranges from 10 m to 90 m, with an average thickness of about 40 m across the PA.

- The LSA/RSA is situated in the Abitibi Greenstone belt within the Superior Province. The bedrock in the LSA/RSA is composed of a felsic to mafic volcanic assemblage hosting the Crawford Ultramafic Complex, local metasediments (i.e., iron formation, minor metavolcanic rocks), and other local ultramafic sills. There is only one area in the northwest portion of the LSA/RSA where bedrock is outcropping.
- Several regional faults are found in the LSA/RSA, generally showing a north-northwest to south-southeast strike. The major regional faults following this trend are the Mattagami River Fault, the Buskegau River Fault, and the Main Regional Fault. Multiple discontinuous, unnamed faults have a similar strike.
- Testing indicates that the hydraulic conductivity of the Main Regional Fault is not significantly different than the average hydraulic conductivity of the surrounding rock suggesting the Main Regional Fault is not a preferential pathway for groundwater flow. Descriptions of the fault in four exploration drillholes suggest that fault contains gouge and some chlorite mineralization. The description on one exploration borehole indicates that the shearing of the fault is mostly annealed. Groundwater flow is generally in a south to north direction across the PA. Due to the surficial clay, artesian pressures are often observed at the monitoring wells. Given the confining nature of the surficial clay, direct water level responses to precipitation are not observed, and a muted seasonal water level response is noted (i.e., generally less than 1 m water level fluctuation throughout the year). Within the PA, the water table generally ranges from 267 to 281 m amsl.
- Where nested monitoring wells exist between the bedrock and overburden, a downward vertical hydraulic gradient was observed.
- A moderate regional baseflow index of 0.30 suggests that surface water features in the area may be groundwater discharge points and that upward vertical gradients are likely to be present in the shallow groundwater near surface water features.
- Mean concentrations of arsenic, cyanide (total and free), fluoride, iron, manganese, phosphorous, and hardness in overburden and/or bedrock wells in the PA exceeded at least one of the Ontario Drinking Water Quality Standards (ODWQS), Guidelines for Canadian Drinking Water Quality (GCDWQ), PWQO, and/or Canadian Water Quality Guidelines for the Protection of Aquatic Health (CWQG-FAL). Concentrations of these parameters above these criteria are typical of groundwater in Ontario and are reflective of the natural mineralization and geochemical processes in the area.
- Within bedrock monitoring wells, the mean groundwater concentrations in collected samples exceeded at least one of the ODWQS, GCDWQ, PWQO, and/or CWQG-FAL for the following parameters considered atypical of groundwater in Ontario: pH, ammonia (un-ionized), boron and zinc.
- Within overburden monitoring wells, the mean groundwater concentrations in samples collected exceeded at least one of the ODWQS, GCDWQ, PWQO, and/or CWQG-FAL on a consistent

basis for the following parameters considered atypical of groundwater in Ontario: pH, sodium and zinc.

- Within overburden monitoring wells, other parameters that were noted to be elevated above at least one of the ODWQS, GCDWQ, PWQO, and/or CWQG-FAL for mean concentrations in three or fewer wells included alkalinity, un-ionized ammonia, free cyanide, aluminum, cobalt, copper, silver, vanadium, and zirconium.
- Polycyclic aromatic hydrocarbons (PAHs) were generally non-detect in both overburden and bedrock wells. Select PAHs were detected in a single monitoring well screened within silty sand.

9.7 Surface Water

9.7.1 Surface Water Quantity

Key findings of the Surface Water Baseline Report (Appendix B.6 of the Impact Statement) on surface water quantity include:

- Regional hydrologic data was obtained from five Water Survey of Canada stations within 200 km of the PA, with watershed area no greater than one order of magnitude difference to the Project-impacted watershed and having a period of record greater than 20 years. An additional criterion of the station having a period of record that falls within one climate normal period - preferably the most recent Environment and Climate Change Canada (ECCC) climate normal period currently being estimated for climate stations in Canada (1991 to 2020) (ECCC 2023b) - was included for this assessment.
- As the Meteorological Service of Canada had not updated local climate station climate normals at the time of writing the Surface Water Resources Baseline Report (Appendix B.6 of the Impact Statement), the 1991-2020 climate normal precipitation and temperature data was developed using Timmins Victor Power Airport observations. The climate normal monthly mean temperature ranges from -16.4 degrees Celsius (°C) in January to 17.6°C in July. The annual climate normal precipitation was found to be 801.8 millimetres (mm).
- Data collected by the local hydrometric monitoring program was utilized for the generation of station-specific rating curves and hydrographs within the Jocko Creek, West Buskegau River, and North Driftwood River watersheds. These results provide a quantitative measure of the hydrological nature of the LSA.
- Three Hydrologic Engineering Centre Hydrologic Modelling System (HEC-HMS) models were developed, one for each watershed. For the baseline assessment, model calibration was performed to match historical recorded flows from nearby Water Survey of Canada Station Porcupine River at Hoyle.

9.7.2 Surface Water Quality

Key findings of the Surface Water Resources Baseline Report (Appendix B.6 of the Impact Statement) on surface water quality include:

- Regional water quality data was obtained from seven Provincial Water Quality Monitoring Network (PWQMN) stations. For local water quality, a total of 317 surface water quality samples were collected from 2021 to December 2023 at 33 watercourse locations and 13 waterbody locations across three main watersheds (Jocko Creek, North Driftwood River, and West Buskegau River).
- Local general water quality in the watercourses and waterbodies identified slightly acidic conditions with 25th percentile values below the CWQG-FAL and PWQO lower limit (6.5). Alkalinity is relatively low with limited acid buffering potential. Waters within the Project Area are typically classified as medium hard with soft waters in the Jocko Creek and West Buskegau watersheds.
- Three parameters were identified as parameters of potential concern (PoPCs) where local watercourse and waterbody 75th percentile values exceeded the corresponding guideline, in particular the PWQOs. Total phosphorus (TP) had a 75th percentile value of 0.032 milligram per litre (mg/L) for watercourses and 0.021 mg/L for waterbodies with PWQO TP values of 0.030 mg/L and 0.020 mg/L, respectively. For the assessment of aluminum, CWQG-FAL criteria was used to evaluate total aluminum and PWQO criteria (clay-free samples) used to evaluate dissolved aluminum. The 75th percentile value for dissolved aluminum exceeded the PWQO criteria of 75 micrometre per litre (µg/L) for the 0.2 µm filtered samples, with a value of 107 µg/L in watercourses. Total iron is identified as a PoPC as the 75th percentile values of both the watercourses and waterbodies exceeded the CWQG-FAL and PWQO value of 300 µg/L. There were no substantial differences in water quality parameter results between the three PA watersheds (Jocko Creek, North Driftwood River, and West Buskegau).
- Other metals and metalloids that reported at least one exceedance of the applicable guideline values as part of the local watercourse and waterbody monitoring program include: total cadmium, total cobalt, total copper, total lead, dissolved manganese, mercury, total selenium, total silver, total zinc, and total zirconium.
- Common PoPCs identified in the comparison of local and regional water quality datasets include total phosphorus, total aluminum, and total iron. Regional water quality data identified total arsenic, total cadmium, total cobalt, total copper, total lead, total silver, and total zinc as additional PoPCs at the regional scale that were not observed in the local data and are not considered PoPCs in the PA.
- Both the regional and local water quality exhibited seasonal trends for various parameters. Concentrations of parameters were typically higher in the late fall and winter months and lower in the spring and summer months (total ammonium/total ammonia (as N), total phosphorus, aluminum, iron, lead, and zinc).
- A 95th percentile confidence interval was calculated for both local and regional datasets to capture the water quality natural range of variability with the regional dataset typically having greater variability – potentially due to the longer monitoring period.

9.8 Vegetation, Riparian, and Wetland Environments

An overview of the baseline conditions for vegetation, riparian, and wetlands environments is provided in Appendix B.7.1 (Vegetation, Riparian and Wetland Environments Supplemental Baseline Report) and B.7.4 (2023 Terrestrial Ecology Baseline Study) of the Impact Statement. The baseline information presented herein provides an overview of the vegetation, riparian, and wetland environment baseline conditions for reference.

9.8.1 Ecological Land Classification and Land Cover

Within the RSA, upland treed habitat covers approximately 47 percent (%) (502,956 ha) with mixed forests and coniferous treed forests the most common upland forest types Table 9.9. Wetlands are the largest ecosystem category in the RSA, covering approximately 40% (422,875 ha) of the RSA, with swamps the most common wetland class covering approximately 27% (287,638 ha) of the RSA followed by fens with 5.0% (53,719 ha) and bogs with 4.7% (50,792 ha) of the RSA. Water, such as lakes, rivers, and ponds, covers a relatively small area of approximately 4% (45,730 ha) of the RSA and <1% (168 ha) of the LSA. The RSA and LSA are in a relatively undisturbed state with anthropogenic and sparsely vegetated areas covering approximately 9% (99,205 ha) of the RSA and 2% (1,329 ha) of the LSA. Cuts (harvested areas) are the largest anthropogenic or sparsely vegetated areas in the RSA and LSA, reflecting the history of logging in the RSA, followed closely by settlement and infrastructure areas.

Table 9.9 Summary of Land Cover in the Project Area, Local Study Area and Regional Study Area

Ecosystem Category	Land Cover Class	Project Area		Local Study Area		Regional Study Area	
		Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)
Upland - Treed	Coniferous Forest	490	4	4,796	9	167,902	16
	Deciduous Forest	99	1	486	1	30,091	3
	Mixed Forest	1,447	12	6,316	12	241,990	23
	Sparse Forest	216	2	1,218	2	62,972	6
Total Upland Treed		2,251	19	12,817	24	502,956	47
Wetland	Unclassified Bog	598	5	5,020	9	38,709	4
	Open Bog	25	<1	88	<1	1,420	<1
	Treed Bog	407	4	984	2	10,663	1
	<i>Subtotal Bog</i>	<i>1,030</i>	<i>9</i>	<i>6,092</i>	<i>11</i>	<i>50,792</i>	<i>5</i>
	Unclassified Fen	372	3	4,133	8	51,254	5
	Open Fen	1	<1	4	<0.1	588	<1
	Treed Fen	13	<1	87	<1	1,877	<1
	<i>Subtotal Fen</i>	<i>386</i>	<i>3</i>	<i>4,224</i>	<i>8</i>	<i>53,719</i>	<i>5</i>
	Marsh	260	2	656	1	11,153	1
	Swamp	7,414	63	29,039	54	287,638	27

Ecosystem Category	Land Cover Class	Project Area		Local Study Area		Regional Study Area	
		Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)
	Other Wetland	-	-	-	-	19,573	2
Total Wetland		9,091	77	40,010	74	422,875	40
Water	Open Water	-	-	-	-	408	<1
	Water - Deep or Clear	11	<1	168	<1	45,322	4
Total Water		11	<1	168	<1	45,730	4
Sparsely Vegetated or Anthropogenic	Bedrock	24	<1	24	<1	76	<1
	Burns	-	-	-	-	1,430	<1
	Cropland	-	-	-	-	25	<1
	Cuts	72	1	776	1	73,843	7
	Pasture	-	-	-	-	3,871	<1
	Sand/Gravel/Mine Tailings	5	<1	8	<1	6,688	1
	Settlement, Infrastructure	332	3	521	1	13,272	1
Total Sparsely Vegetated or Anthropogenic		432	4	1,329	2	99,205	9
Grand Total		11,785	100	54,324	100	1,070,765	100

A total of 50 ecosites and mapping units were identified in the LSA and 42 in the PA (Table 9.10, Figure 16.3 of Chapter 16 of the Impact Statement). Most of the LSA and PA are in a relatively natural condition. Wetlands cover most of the LSA and PA, occupying 72% (39,175 ha) and 74% (8,667 ha), respectively. Upland forests cover 24% (2,837 ha) of the PA and 26% (14,273 ha) of the LSA (Table 9.10). Conifer forests are the dominant upland forest type, covering 21% (2,521 ha) of the PA and 23% (12,386 ha) of the LSA (Table 9.10).

Open water is relatively uncommon in the LSA and occurs as scattered ponds and small lakes as well as rivers and creeks, occupying approximately <1% (26 ha) of the PA and <1% (288 ha) of the LSA (Table 9.10; Figure 16.3, Figure 16.4 of Chapter 16 of the Impact Statement).

Anthropogenic and other poorly vegetated areas cover 2.2% (254.8 ha) of the PA and 1.1% (577.8 ha) of the LSA (Table 9.10). Utility corridors account for the largest anthropogenic areas, covering 1.4% (167 ha) of the PA and 0.7% (359.8 ha) of the LSA and run throughout the LSA (Figure 16.3 of Chapter 16 of the Impact Statement).

Table 9.10 Summary of Ecological Land Classification in the Project Area and Local Study Area

Land Cover Class	Ecosite Code or Mapping Unit	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	%	Area (ha)	%
Upland Coniferous Forest	B012	Very Shallow, Dry to Fresh: Pine – Black Spruce Conifer	-	-	48	0
	B026	Very Shallow, Humid: Conifer	10	0	190	0
	B034	Dry, Sandy: Jack Pine – Black Spruce Dominated	10	0	15	0
	B035	Dry, Sandy: Pine – Black Spruce Conifer	-	-	6	0
	B050	Dry to Fresh, Coarse: Pine – Black Spruce Conifer	-	-	47	0
	B052	Dry to Fresh, Coarse: Spruce – Fir Conifer	7	<1	47	<1
	B065	Moist, Coarse: Pine – Black Spruce Conifer	13	<1	557	1
	B066	Moist, Coarse: Hemlock – Cedar Conifer	-	-	9	<1
	B067	Moist, Coarse : Spruce – Fir Conifer	13	<1	64	<1
	B068	Moist, Coarse: Conifer	-	-	66	<1
	B082	Fresh, Clayey Jack Pine – Black Spruce Dominated	16	<1	81	<1
	B083	Fresh, Clayey: Pine – Black Spruce Conifer	0	0	0	<1
	B085	Fresh, Clayey Spruce – Fir Conifer	4	<1	13	<1
	B098	Fresh, Silty to Fine Loamy Jack Pine – Black Spruce Dominated	7	<1	169	<1
	B099	Fresh, Silty to Fine Loamy: Pine – Black Spruce Conifer	739	6	1,630	3
	B101	Fresh, Silty to Fine Loamy: Spruce – Fir Conifer	473	4	1,178	2
	B102	Fresh, Silty to Fine Loamy: Conifer	234	2	362	<1
	B114	Moist, Fine: Pine – Black Spruce Conifer	881	7	7,403	14
B115	Moist, Fine: Hemlock- Cedar Conifer	1	<1	43	<1	
B116	Moist, Fine: Spruce – Fir Conifer	81	<1	341	<1	
B117	Moist, Fine: Conifer	30	<1	116	<1	
<i>Subtotal Coniferous Forest</i>			2,521	21	12,386	23

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Land Cover Class	Ecosite Code or Mapping Unit	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	%	Area (ha)	%
Upland Deciduous Forest	B040	Dry, Sandy: Aspen – Birch Hardwood	8	<1	57	<1
	B055	Dry to Fresh, Coarse: Aspen – Birch Hardwood	14	<1	114	<1
	B070	Moist, Coarse: Aspen – Birch Hardwood	<1	-	111	<1
	B088	Fresh, Clayey: Aspen – Birch Hardwood	<1	-	44	<1
	B104	Fresh, Silty to Fine Loamy Aspen – Birch Hardwood	135	1	751	1
	B119	Moist, Fine: Aspen – Birch Hardwood	159	1	810	1
<i>Subtotal Deciduous Forest</i>			316	3	1,887	3
Subtotal Upland Forest			2,837	24	14,273	26
Wetland – Bog	B126	Treed Bog	2,353	20	7,662	14
	B137	Sparse Treed Bog	-	-	198	<1
	B138	Open Bog	5	<1	32	<1
<i>Subtotal Wetland – Bog</i>			2,358	20	7,892	15
Wetland - Fen	B136	Sparse Treed Fen	781	7	4,465	8
	B139	Poor Fen	7.21	<1	143	<1
	B140	Open Moderately Rich Fen	<1	<1	52	<1
	B141	Open Extremely Rich Fen	-	-	16	<1
	B146	Open Shore Fen	-	-	22	<1
<i>Subtotal Wetland - Fen</i>			789	7	4,698	7
Wetland - Marsh	B142	Mineral Meadow Marsh	12	<1	143	<1
	B144	Organic Meadow Marsh	740	6	1,152	2
<i>Subtotal Wetland - Marsh</i>			752	6	1,295	2
Wetland - Swamp	B127	Poor Conifer Swamp	95	<1	1,249	2
	B128	Intermediate Conifer Swamp	2,931	25	19,938	37
	B129	Rich Conifer Swamp	625	5	1,538	3
	B133	Hardwood Swamp	3	<1	7	<1
	B134	Mineral Thicket Swamp	4	<1	31	<1
	B135	Organic Thicket Swamp	933	8	2,001	4
	B222	Mineral Poor Conifer swamp	177	2	334	<1
	B223	Mineral Intermediate Conifer Swamp	<1	<1	192	<1
<i>Subtotal Wetland - Swamp</i>			4,768	40	25,290	47
Subtotal Wetland			8,667	74	39,175	72
Water	-	Lakes, Rivers, Ponds	26	<1	288	<1
Subtotal Water			26	<1	288	<1

Land Cover Class	Ecosite Code or Mapping Unit	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	%	Area (ha)	%
Anthropogenic and Poorly Vegetated	B197	Pavement/Concrete	74	<1	196	<1
	U997	Commercial/Residential	13	<1	20	<1
	U998	Utilities	167	1	360	<1
	B007	Active Mineral Barren	<1	<1	12	<1
Subtotal Anthropogenic and Poorly Vegetated			255	2	289	1
Grand Total			11,785	100	54,324	100

Wetlands in the PA and LSA contain large, estimated volumes of peat. Within the PA a minimum of 34 Mm³ of peat is present, while in the LSA a minimum of 100 Mm³ is present. Bogs and Swamps contain the largest amounts of peat, accounting for 28% and 54%, in the PA and 20% and 64% in the LSA, respectively (Table 9.11).

Table 9.11 Summary of Estimated Peat Volumes in the Project Area and Local Study Area

Land Cover Class	Ecosite Code	Ecosite Name	Project Area			Local Study Area		
			Area (ha)	Peat Volume		Area (ha)	Peat Volume	
				m ³	%		m ³	%
Wetland - Bog	B126	Treed Bog	2,353	9,411,032	28	7,662	30,646,896	20
	B137	Sparse Treed Bog	-	-	-	198	793,098	1
	B138	Open Bog	5	20,720	<1	32	126,444	<1
<i>Subtotal Wetland -Bog</i>			<i>2,358</i>	<i>9,431,752</i>	<i>28</i>	<i>7,892</i>	<i>31,566,437</i>	<i>20</i>
Wetland - Fen	B136	Sparse Treed Fen	781	3,125,380	9	4,465	17,861,585	12
	B139	Poor Fen	7	28,850	<1	143	570,987	<1
	B140	Open Moderately Rich Fen	<1	770	<1	52	207,008	<1
	B141	Open Extremely Rich Fen	-	-	-	16	65,249	<1
	B146	Open Shore Fen	-	-	-	22	88,448	<1
<i>Subtotal Wetland - Fen</i>			<i>789</i>	<i>3,155,000</i>	<i>9</i>	<i>4,698</i>	<i>18,793,277</i>	<i>12</i>
Wetland - Marsh	B144	Organic Meadow Marsh	740	2,960,381	9	1,152	4,608,002	3
<i>Subtotal Wetland - Marsh</i>			<i>740</i>	<i>2,960,381</i>	<i>9</i>	<i>1,152</i>	<i>4,608,002</i>	<i>3</i>
Wetland - Swamp	B127	Poor Conifer Swamp	95	380,998	1	1,249	4,996,879	3
	B128	Intermediate Conifer Swamp	2,931	11,723,785	35	19,938	79,750,633	52
	B129	Rich Conifer Swamp	625	2,498,748	7	1,538	6,152,127	4
	B133	Hardwood Swamp	3	12,059	<1	7	29,388	<1
	B135	Organic Thicket Swamp	933	3,731,844	11	2,001	8,004,222	5
	B223	Mineral Intermediate Conifer Swamp	<1	814	<1	192	766,393	<1
<i>Subtotal Wetland - Swamp</i>			<i>4,587</i>	<i>18,348,249</i>	<i>54</i>	<i>24,925</i>	<i>99,699,642</i>	<i>64</i>
Total Wetlands			8,474	33,895,382	100	38,667	154,667,359	100

Riparian habitat covers 221 ha in the PA and 621 ha in the LSA (Table 9.12, Figure 16.6 of Chapter 16 of the Impact Statement). The majority of riparian habitat is forested with 80% (178 ha) in the PA and 89% (552 ha) in the LSA. Anthropogenic riparian habitat covers 20% (44 ha) in the PA and 11% (70 ha) in the LSA.

Table 9.12 Summary of Riparian Areas in the Project Area and Local Study Area

Broad Land Classification	Land Cover Class	Project Area		Local Study Area	
		Area (ha)	Area (%)	Area (ha)	Area (%)
Upland Forest	Coniferous Forest	167	76	524	84
	Deciduous Forest	10	5	28	4
<i>Subtotal Upland Forest</i>		<i>178</i>	<i>80</i>	<i>552</i>	<i>89</i>
Anthropogenic	Constructed	21	10	30	5
	Anthropogenic	22	10	40	6
<i>Subtotal Anthropogenic</i>		<i>44</i>	<i>20</i>	<i>70</i>	<i>11</i>
Total		221	100	621	100
Note: Numbers may not add up due to rounding.					

Baseline landscape fragmentation within the RSA is summarized in Table 9.13. Anthropogenic and non-vegetated communities have a lower mean patch size and higher perimeter to area ratio than naturally vegetated communities.

Table 9.13 Summary of Landscape Fragmentation in the Regional Study Area

Broad Land Cover Category	Land Cover Class	Mean Patch Size (ha)	Mean Perimeter/Area Ratio (km/ha)
Natural Vegetated Communities	Treed Communities	35	2
	Treed Wetland	2	1
	Open Wetland	137	1
<i>Subtotal Natural Vegetated Communities</i>		<i>174</i>	<i>3</i>
Anthropogenic and Non-vegetated Communities	Disturbed, Regenerating	8	1
	Non-vegetated	6	4
<i>Subtotal Anthropogenic and Non-vegetated Communities</i>		<i>14</i>	<i>5</i>
Total		188	8
Note: Numbers may not add up due to rounding.			

9.8.2 Rare Vegetation Communities

One ecosite with potential to support rare vegetation communities - Hardwood swamps (ecosite B133) - occurs in the PA and LSA (Table 9.14, Figure 16.3 of Chapter 16 of the Impact Statement).

Table 9.14 Summary of Potential Rare Vegetation Ecosites Identified in the Project Area and Local Study Area

Rare Vegetation Community	Ecosite Code	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	Area (%)	Area (ha)	Area (%)
Hardwood Swamp	B133	Hardwood Swamp	3	<1	7	<1
Grand Total			3	<1	7	<1

9.8.3 Wetlands and Wetland Functions

Wetlands are the dominant land cover in the LSA, covering 72% of the area (39,175 ha, Table 9.10, Figure 16.3, Figure 16.4 of Chapter 16 of the Impact Statement). Wetlands in the LSA are relatively diverse, with all four wetland classes (bog, fen, marsh, and swamp) present and distributed throughout the LSA (Table 9.15). Swamps are by far the most common wetland class within the PA and LSA, accounting for 55% (4,768 ha) of the PA and 65% (25,290 ha) of the LSA, while bogs cover 27% (2,358 ha) of the PA and 20% (7,892 ha) of the LSA. Fens and marshes are less common in the PA and LSA compared to swamps and bogs.

The most common swamp communities are intermediate conifer swamps (B128), accounting for approximately 34% (2,931 ha) of all wetlands in the PA and approximately 51% (19,938 ha) in the LSA. Treed bogs are the most common bog accounting for 27% (2,354 ha) of the PA and approximately 20% (7,662 ha) of the LSA. Sparse treed fens are by far the most common type of fen, covering approximately 9% (781 ha) in the PA and approximately 11% (4,465 ha) of the LSA.

Table 9.15 Summary of Wetland Ecosites in the Project Area and Local Study Area

Land Cover Class	Ecosite Code	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	%	Area (ha)	%
Wetland - Bog	B126	Treed Bog	2,353	27	7,662	20
	B137	Sparse Treed Bog	-	-	198	<1
	B138	Open Bog	5	<1	32	<1
Subtotal Wetland - Bog			2,358	27	7,892	20
Wetland - Fen	B136	Sparse Treed Fen	781	9	4,465	11
	B139	Poor Fen	7	<1	143	<1
	B140	Open Moderately Rich Fen	<1	<1	52	<1
	B141	Open Extremely Rich Fen	-	-	16	<1
	B146	Open Shore Fen	-	-	22	<1
Subtotal Wetland - Fen			789	9	4,698	12
Wetland - Marsh	B142	Mineral Meadow Marsh	12	<1	143	<1
	B144	Organic Meadow Marsh	740	9	1,152	3
Subtotal Wetland - Marsh			752	9	1,295	3
Wetland - Swamp	B127	Poor Conifer Swamp	95	1	1,249	3
	B128	Intermediate Conifer Swamp	2,931	34	19,938	51
	B129	Rich Conifer Swamp	625	7	1,538	4
	B133	Hardwood Swamp	3	<1	7	<1
	B134	Mineral Thicket Swamp	4	<1	31	<1
	B135	Organic Thicket Swamp	933	11	2,001	5
	B222	Mineral Poor Conifer swamp	177	2	334	<1
	B223	Mineral Intermediate Conifer Swamp	<1	<1	192	<1
Subtotal Wetland - Swamp			4,768	55	25,290	65
Total Wetlands			8,667	100	39,175	100

Wetlands in the PA and LSA contain large, estimated volumes of peat. Within the PA a minimum of 33.9 Mm³ of peat is present, while in the LSA a minimum of 99.7 Mm³ is present. Bogs and Swamps contain the largest amounts of peat, accounting for 28% and 54%, in the PA and 20% and 64% in the LSA, respectively (Table 9.16).

Table 9.16 Summary of Estimated Peat Volumes in the Project Area and Local Study Area

Land Cover Class	Ecosite Code	Ecosite Name	Project Area			Local Study Area		
			Area (ha)	Peat Volume		Area (ha)	Peat Volume	
				m ³	%		m ³	%
Wetland - Bog	B126	Treed Bog	2,353	9,411,032	28	7,662	30,646,896	20
	B137	Sparse Treed Bog	-	-	-	198	793,098	1
	B138	Open Bog	5	20,720	<1	32	126,444	<1
Subtotal Wetland -Bog			2,358	9,431,752	28	7,892	31,566,437	20
Wetland - Fen	B136	Sparse Treed Fen	781	3,125,380	9	4,465	17,861,585	12
	B139	Poor Fen	7	28,850	<1	143	570,987	<1
	B140	Open Moderately Rich Fen	<1	770	<1	52	207,008	<1
	B141	Open Extremely Rich Fen	-	-	-	16	65,249	<1
	B146	Open Shore Fen	-	-	-	22	88,448	<1
Subtotal Wetland - Fen			789	3,155,000	9	4,698	18,793,277	12
Wetland - Marsh	B144	Organic Meadow Marsh	740	2,960,381	9	1,152	4,608,002	3
Subtotal Wetland - Marsh			740	2,960,381	9	1,152	4,608,002	3
Wetland - Swamp	B127	Poor Conifer Swamp	95	380,998	1	1,249	4,996,879	3
	B128	Intermediate Conifer Swamp	2,931	11,723,785	35	19,938	79,750,633	52
	B129	Rich Conifer Swamp	625	2,498,748	7	1,538	6,152,127	4
	B133	Hardwood Swamp	3	12,059	<1	7	29,388	<1
	B135	Organic Thicket Swamp	933	3,731,844	11	2,001	8,004,222	5
	B223	Mineral Intermediate Conifer Swamp	<1	814	<1	192	766,393	<1
Subtotal Wetland - Swamp			4,587	18,348,249	54	24,925	99,699,642	64
Total Wetlands			8,474	33,895,382	100	38,667	154,667,359	100

9.8.4 Plant Species of Management Concern

9.8.4.1 Plant SAR and SOCC

A total of 238 species or genera of vascular plants were identified in the LSA. Of the 18 plant and lichen Species at Risk (SAR) and SOCC identified in the Terrestrial Supplemental Baseline Report (Appendix B.7 of the Impact Statement) as having potential to occur in the RSA, only black ash (*Fraxinus nigra*) was recorded within the LSA. Black ash is listed as endangered in Ontario under the ESA and as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (Figure 16.5 of Chapter 16 of the Impact Statement). One occurrence of black ash has been mapped in the LSA and another immediately west of the LSA. Both occurrences were in ecosite B119 (moist fine aspen-birch hardwood). Ecosite B119 is the most common upland deciduous forest community and occurs in small stands throughout the LSA and PA (Table 9.10).

No other plant SAR or SOCC have been documented in the LSA. No plant SAR or SOCC occur within the PA.

9.8.5 Invasive Plant Species

Three noxious weed species (designated by the *Weed Control Act* and associated regulations) were documented in the LSA (Table 9.17) and include wild parsnip (*Pastinaca sativa*), bull thistle (*Cirsium vulgare*), and Canada thistle (*Cirsium arvense*), with bull thistle and Canada thistle also documented in the PA. Thirty-one additional exotic vascular plant species were also identified within the LSA (Appendix B.7.1 of the Impact Statement [Vegetation, Riparian and Wetland Environments Supplemental Baseline Report]).

Table 9.17 Invasive Plant Species Occurring in the Local Study Area

Common Name	Scientific Name	Documented within PA	Documented within LSA
Wild parsnip	<i>Pastinaca sativa</i>	N	Y
Bull thistle	<i>Cirsium vulgare</i>	Y	Y
Canada thistle	<i>Cirsium arvense</i>	Y	Y
Notes: N – No Y – Yes			

9.9 Fish and Fish Habitat

This section provides an overview of the baseline conditions for fish and fish habitat, including a summary of the Fish and Fish Habitat Supplemental Baseline Report (Appendix B.8.1 of the Impact Statement). This report summarizes information compiled from a desktop review of existing reports, provincial and federal datasets, Indigenous knowledge provided by potentially affected Indigenous nations, and a three-year field program conducted by WSP between 2021 and 2023 (Appendix B.8.2 of the Impact Statement).

The PA is located within the headwater areas of the North Driftwood River, West Buskegau River, and Jocko Creek watersheds. The North Driftwood River flows into the Abitibi River approximately 60 km downstream from the Project. The West Buskegau River flows into the Frederick House River approximately 47 km downstream of the Project. Jocko Creek is a tributary of the Mattagami River with its confluence upstream of the Lower Sturgeon Generating Station, due west of the Project.

Fish habitat in the mainstem channels of the North Driftwood River and West Buskegau River within the PA are generally wide (10 m to 20 m) with broad floodplains and fine substrates. The smaller streams draining to these mainstem channels are low gradient, low energy depositional environments with fine grained organic substrates. Beaver dams and ponds are frequent in these smaller, headwater tributaries. Small headwater lakes near the Project (i.e., Martin, Jerry, Mel, Sutherland, Davis) were created for the concrete needed for construction of the Lower Sturgeon Generating Station in the 1920s. These lakes have naturalized, and been colonized by fish, over the last century.

The fish communities in the North Driftwood River, West Buskegau River, and Mattagami River watersheds are represented by a mix of cool and cold-water fish species typical of northeastern Ontario. They include a variety of small-bodied (e.g., minnows) and large-bodied (e.g., northern pike) species. A total of 28 fish species were identified during baseline surveys (Appendix B.8.2 of the Impact Statement). Common large-bodied fish species in streams include northern pike, white sucker, yellow perch, and burbot. Brook stickleback, fathead minnow, finescale dace, northern pearl dace, northern redbelly dace, and common shiner were the most common small-bodied fish species in the lakes and ponds. Lake sturgeon is the only aquatic SAR in the vicinity of the Project; lake sturgeon are known to inhabit the Mattagami River, the Abitibi River, and the Frederick House River.

The benthic invertebrate communities in the North Driftwood River and West Buskegau River watersheds show a taxa richness, diversity and density typical of those observed in northeastern Ontario. One or two species of chironomids (i.e., midge larvae) dominates the benthic invertebrate community in slow-flowing depositional habitats (i.e., beaver ponds and impounded headwater streams) with fine organic substrates, habitats that dominate the headwater areas of the North Driftwood River and West Buskegau River watersheds near the Project.

Fish tissue data shows naturally elevated concentrations of total mercury and methylmercury in northern pike, with exceedances of the provincial and federal guidelines for mercury and methylmercury for the protection of human health and wildlife consumers of aquatic biota, respectively. Elevated mercury concentrations in large-bodied fish have been observed elsewhere in northern Ontario and is not unique to the site (Pirkle et al. 2016; Fimreite and Reynolds 1973). Methylmercury concentrations in small-bodied fish samples from all three watersheds also exceeded the Canadian Council of Ministers of the Environment (guideline for the protection of wildlife consumers of aquatic biota (33 micrograms per kilogram [$\mu\text{g}/\text{kg}$] wet weight tissue [wwt])).

9.10 Birds and Bird Habitat

An overview of the baseline conditions for birds and bird habitat is provided in Appendix B.7.2 (Bird and Bird habitat Supplemental Baseline Report) with additional details, including summaries of field work in Appendix B7.4. The baseline information presented herein provides an overview of the birds and bird habitat for reference.

The Project falls within Bird Conservation Region 8 (BCR 8) – the Boreal Softwood Shield. BCR 8 is more than 1,470,000 km² and spans six provinces; 30% of BCR 8 is within Ontario (Environment Canada [EC] 2014). BCR 8 covers approximately 48% of the province (EC 2014). The Boreal Softwood Shield is dominated by coniferous forest interspersed with numerous lakes, rivers and wetlands. Tree species diversity in BCR 8 is low, and bird diversity is also lower compared to more southerly BCRs in Ontario (EC 2014). However, BCR 8 supports a high abundance of birds; more than 10% of the global population of at least 20 species are present in Ontario's BCR 8 (BCR 8 ON) during the breeding season (EC 2014).

There are 71 bird species identified as priorities in Ontario's BCR 8. Sixty-five percent of the priority species are landbirds, followed by waterfowl (17%), waterbirds (12%), and shorebirds (6%). Priority species in Ontario's BCR 8 are associated with 10 habitat types. Forested habitat is associated with more than 60% of the priority species; 31% use coniferous, and 32% use mixed wood. Wetlands are also important and are used by 31% of priority species (EC 2014). Shrub and early successional habitats as well as riparian habitats are used by 14% and 13% of priority species respectively (EC 2014). The RSA and LSA support a variety of bird groups including forest birds, waterfowl, waterbirds, shorebirds, raptors, upland gamebirds, and other landbirds. Forest landbirds are the most common and abundant species group present within the RSA and LSA. A total of 128 bird species have been documented within the LSA incidentally or during bird surveys.

The number and diversity of bird species that are present in the LSA and RSA varies according to season. Species diversity and abundance is highest during the breeding season, followed by spring and fall migration seasons. Many species that winter in the southern US, Mexico, Central or South America return to boreal forests in Ontario to breed (EC 2014). Many of the bird species that breed in the LSA may also be present during migration, while species that breed in areas further north (e.g., Long-tailed Duck [*Clangula hyemalis*], Semipalmated Plover [*Charadrius semipalmatus*]) may only be present during migration (Nola and Blanken 2020, Robertson and Savard 2020). During bird migration/waterfowl surveys, 66 bird species were observed, most of which were believed to be migrating through the area (Appendix B.7.4 of the Impact Statement).

The winter season has the lowest bird species abundance and diversity. Birds present in the RSA in winter includes year-round residents such as Black-capped Chickadee (*Poecile atricapillus*), Ruffed Grouse (*Bonasa umbellus*) and Evening Grosbeak (Foote et al. 2020; Rusch et al. 2020, eBird 2024). One species (Rough-legged Hawk [*Buteo lagopus*]) is only present in the LSA during the winter; this species breeds in the Arctic (Bechard et al. 2020).

Data from the Christmas Bird Count (CBC) were used to assess which bird species are present during winter. Between 2003 and 2023, a total of 51 species of birds have been observed in the Timmins CBC, and 52 species have been observed at the Iroquois Falls CBC (National Audubon Society 2023). Some of the species that were most commonly recorded in both count circles include Common Raven, Black-capped Chickadee, Rock Pigeon, Evening Grosbeak, European Starling, Pine Grosbeak, Common Redpoll, Snow Bunting, American Crow and Blue Jay. Species observed during CBC surveys that only occur during winter include Snowy Owl, Snow Bunting, and Rough-legged Hawk.

9.10.1 Forest Birds

A total of 70 species of forest birds have been observed in the LSA (Appendix B.7.2 of the Impact Statement). This group includes a variety of species that inhabit forested habitats, including warblers, flycatchers, woodpeckers, sparrows, kinglets, thrushes, vireos, jays, nuthatches, finches, mockingbird and thrashers. Forest birds are abundant throughout the RSA in all forest types (hardwood, softwood and mixed wood) and ages.

Based on results of field surveys, the most common forest birds within the LSA were White-throated Sparrow, Ruby-crowned Kinglet (*Corthylio calendula*), Swainson's Thrush (*Catharus ustulatus*), Tennessee Warbler (*Leiothlypis peregrina*), Common Yellowthroat (*Geothlypis trichas*), Magnolia Warbler, Red-eyed Vireo (*Vireo olivaceus*), and American Robin (Appendix B.7.4 of the Impact Statement). Species that were not commonly observed included Rusty Blackbird, Brown Thrasher (*Toxostoma rufum*), Rose-breasted Grosbeak (*Pheucticus ludovicianus*) and Canada Jay.

Most forest birds present in the LSA and RSA are migrants and are only present during the breeding season. For example, all warblers, vireos, and flycatchers migrate to warmer, more southern locations during the winter, and are present in the LSA only from spring to late summer or fall. However, some forest birds are present in the LSA year-round, including Black-capped Chickadee, Black-backed Woodpecker (*Picoides arcticus*), Red-breasted Nuthatch (*Sitta canadensis*), Pine Siskin (*Spinus pinus*), Evening Grosbeak (*Coccothraustes vespertinus*), Blue Jay and Canada Jay.

The forest bird group includes three SOCC: Common Nighthawk, Evening Grosbeak, and Olive-sided Flycatcher and two SAR: Canada Warbler, Eastern Whip-poor-will. These birds are discussed in further detail in Sections 18.2.2.10 and 18.2.2.11 of Chapter 18 of the Impact Statement. This group also contains 21 BCR 8 Priority Species.

9.10.2 Other Landbirds

Seventeen bird species reported within the LSA were classified as other landbirds (Appendix B.7.2 of the Impact Statement). This group is a diverse mix of landbirds that are mostly found outside of forested habitats. Some of these such as American Crow (*Corvus brachyrhynchos*), Common Grackle (*Quiscalus quiscula*), and Common Raven (*Corvus corax*) are habitat generalists that occupy a wide variety of habitat types (Boarman and Heinrich 2020, Peer and Bollinger 2020, Verbeek and Caffrey 2021). Many of the species in this group use shrub or early successional habitats, including Alder Flycatcher (*Empidonax alnorum*), American Goldfinch (*Spinus tristis*), and Lincoln's Sparrow (*Melospiza lincolni*) (Lowther 2020a, McGraw and Middleton 2020, Pandolfino et al. 2023). Alder Flycatcher and Red-winged Blackbirds

(*Agelaius phoeniceus*) are often found in wet thickets and riparian areas, or around wetland habitats (Lowther 2020a, Yasukawa and Searcy 2020). Belted Kingfisher (*Megaceryle alcyon*) and Tree Swallows (*Tachycineta bicolor*) are also found near water, including lakes, ponds, streams and rivers (Kelly et al. 2020, Winkler 2020). Tree Swallows can also be found in fields or marshes (Winkler 2020). Open habitats are important for many of the other landbird species, including Eastern Bluebird (*Sialia sialis*), LeConte's Sparrow (*Ammodramus leconteii*), Savannah Sparrow (*Passerculus sandwichensis*), Eastern Kingbird (*Tyrannus tyrannus*) and Mourning Dove (*Zenaidura macroura*). These species use grasslands, open pasture and in some cases, open woodland habitats (Gowaty and Plissner 2020, Lowther 2020b, Murphy and Pyle 2020, Otis et al. 2020, Wheelwright and Rising 2020).

During field surveys, American Goldfinch, Alder Flycatcher, Common Raven, Red-winged Blackbird, and American Crow were the most common bird species in the other landbird group (Appendix B.7.4 of the Impact Statement). American Pipit (*Anthus rubescens*) was commonly observed during the migration surveys.

Most species in the other landbirds group are present only during the breeding season. However, American Pipit is only present during migration because it breeds in northern and western Canada, and overwinters in the southern US, Mexico and Central America. Common Raven is a year-round resident.

Two other landbird species are SAR - Barn Swallow and Chimney Swift. These species are discussed in Section 18.2.2.10 of Chapter 18 of the Impact Statement. Five other landbird species are BCR 8 Priority Species: Alder Flycatcher, Barn Swallow, Chimney Swift, Eastern Kingbird, and Tree Swallow.

9.10.2.1 Raptors

Thirteen species of raptors have been observed in the LSA, including hawks, falcons, owls, Bald Eagle (*Haliaeetus leucocephalus*), Northern Harrier (*Circus hudsonius*) and Osprey (*Pandion haliaetus*) (Appendix B.7.2 of the Impact Statement). The habitat requirements for these raptors vary by species. American Goshawk (*Accipiter gentilis*), Barred Owl (*Strix varia*), Boreal Owl (*Aegolius funereus*), and Broad-winged Hawk (*Buteo platypterus*) are interior forest species that prefer older forests with large trees (Goodrich et al. 2020, Hayward and Hayward 2020, Mazur and James 2021, Squires and Reynolds 2023). Sharp-shinned Hawk (*Accipiter striatus*) and Cooper's Hawk (*Accipiter cooperii*) also use forests but are also be found along forest edges or in suburban areas (Bildstein et al. 2020, Rosenfield et al. 2020). Merlin (*Falco columbarius*) prefers open and semi-open forest habitat (Warkentin et al. 2020). Northern Harrier, Rough-legged Hawk and American Kestrel (*Falco sparverius*) all prefer open habitats, including grasslands and farm fields (Bechard et al. 2020, Smallwood and Bird 2020, Smith et al. 2020b). Northern Harrier often occurs in large open wetlands (Smith et al. 2020b). Red-tailed Hawks (*Buteo jamaicensis*) occupy both open and forest habitats, including pastures and parks (Preston and Beane 2020). All the raptor species except for Northern Harrier, nest in trees. Northern Harrier is a ground nester and typically build nests in dense vegetation in a field or marsh (Smith et al. 2020b).

Osprey and Bald Eagle are species of Indigenous importance, which are typically found near water, as they feed on fish (Bierregaard et al. 2020, Buehler 2022). Bald Eagle nests in forests relatively close (usually <2 km) to large waterbodies or rivers with suitable foraging resources. Osprey also nest near water, including lakes or coastlines. Large stick nests are built in the tops of trees, rocky cliffs, or on artificial structures such as utility lines and nesting platforms (Bierregaard et al. 2020).

Two Bald Eagle nests and two adult eagles were recorded during aerial surveys in 2021 and 2022, only one of which was in the LSA ([Appendix B.7.4 of the Impact Statement; Figure 18.2 of Chapter 18 of the Impact Statement). Osprey was only detected on ARUs; no evidence of nesting has been noted in the LSA.

Most species of raptors that occur in the LSA occur during the breeding season. The exception is Rough-legged Hawk, which occurs only in the winter, and breeds in the Arctic (Bechard et al. 2020). Four of the species observed in the LSA, are present year-round: American Goshawk, Bald Eagle, Barred Owl, and Boreal Owl (Buehler 2022, Hayward and Hayward 2020, Mazur and James 2021, Squires and Reynolds 2023).

Northern Harrier, Broad-winged hawk, American Kestrel and Boreal Owl are relatively common in the RSA and were each observed several times during field surveys. American Goshawk appear to be relatively uncommon and was only observed during the 2021 aerial surveys (Appendix B.7.4 of the Impact Statement). Osprey and Barred Owl were only detected on ARUs (Appendix B.7.4 of the Impact Statement).

There is one raptor SAR (Short-eared Owl), which is discussed in Section 18.2.2.10.7 of Chapter 18 of the Impact Statement. In addition, three raptor species are BCR 8 Priority Species: Bald Eagle, Boreal Owl and Sharp-shinned Hawk.

9.10.3 Upland Gamebirds

Three upland gamebird species were recorded in the LSA - Ruffed Grouse (*Bonasa umbellus*), Sharp-tailed Grouse (*Tympanuchus phasianellus*) and Spruce Grouse (*Canachites canadensis*) (Appendix B.7.2 of the Impact Statement). These species are year-round residents that likely nest in the LSA. Ruffed Grouse and Spruce Grouse are both forest species, but Spruce Grouse is only found in coniferous forests, whereas Ruffed Grouse prefers mixed-aged mixed wood forests (Rusch et al. 2020, Schroeder et al. 2021).

Sharp-tailed Grouse are typically found in grasslands or bogs with shrubby areas present to provide cover. In winter, Sharp-tailed Grouse use woodlands more, because they provide greater protection from the elements (Connelly et al. 2020). All three upland gamebird species are ground nesters (Connelly et al. 2020, Rusch et al. 2020, Schroeder et al. 2021). A total of 13,022 ha of candidate Sharp-tailed Grouse habitat was identified in the LSA following Significant Wildlife Habitat (SWH) criteria (Table 9.18; Figure 18.2.4 of Chapter 18 of the Impact Statement). During aerial surveys, Sharp-tailed Grouse were observed in six locations within the LSA, including potential lek sites.

Ruffed Grouse was frequently observed during breeding bird and bird migration surveys and the most common of the three upland gamebird species (Appendix B.7.4 of the Impact Statement). Ruffed Grouse is a BCR 8 Priority Species; there are no upland gamebird species SAR or SOCC. Grouse species were identified as species of Indigenous importance.

Table 9.18 Area of Each Bird Significant Wildlife Habitat Feature in the Project Area and Local Study Area

Significant Wildlife Habitat Features	Area (ha)	
	Project Area	Local Study Area
Candidate Waterfowl Nesting Area	3,186	7,880
Candidate Woodland Raptor Nesting Habitat	2,837	14,273
Candidate Sharp-tailed Grouse Habitat	3,246	13,021
Candidate Marsh Breeding Bird Habitat	2,483	8,256
Candidate Shrub/Early Successional Bird Breeding Habitat	936	2,032
Confirmed Bald Eagle Nesting Habitat	149	201
Confirmed Habitat for Special Concern and Rare Species	350	937

9.10.4 Marsh Birds

Six marsh bird species have been observed in the LSA (Appendix B.7.2 of the Impact Statement [Birds and Bird Habitat Supplemental Baseline Report]), all of which breed in freshwater marsh habitats. American Bittern (*Botaurus lentiginosus*), Sora (*Porzana carolina*), Yellow Rail (*Coturnicops noveboracensis*) and Virginia Rail (*Rallus limicola*) prefer marshes with cattails, bulrushes and sedges (Conway 2020, Leston and Bookhout 2020, Lowther et al. 2020c, Melvin and Gibbs 2020). Swamp Sparrow (*Melospiza georgiana*) and Sandhill Crane (*Antigone canadensis*) use cattail marshes but will also nest in fens and bogs with open water (Gerber et al. 2020, Herbert and Mowbray 2020).

Swamp Sparrow is very common throughout the LSA and Sandhill Cranes are also relatively common. Swamp Sparrow was frequently recorded during breeding and migration surveys (Appendix B.7.4 of the Impact Statement). Sandhill Crane and American Bittern were both recorded numerous times during breeding bird surveys; American Bittern are present in low abundance where suitable habitat exists. Sora, Yellow Rail, and Virginia Rail are uncommon within the RSA. Sandhill Crane, American Bittern, Yellow Rail, and Virginia Rail are ground nesters, whereas Swamp Sparrow nests in shrubs (Conway 2020, Gerber et al. 2020, Herbert and Mowbray 2020, Leston and Bookhout 2020, Lowther et al. 2020c). Sora typically builds nests a few inches above water in dense vegetation or attached to plant stems (Melvin and Gibbs 2020).

All six marsh bird species are present in the LSA only during breeding season. These species migrate to warmer, more southern areas to over-winter. Yellow Rail is a SOCC and is discussed further in Section 18.2.2.11 of Chapter 18 of the Impact Statement. Three marsh bird species are BCR 8 Priority Species: American Bittern, Yellow Rail, and Swamp Sparrow.

9.10.5 Shorebirds

Eight shorebird species were recorded during field surveys, seven of which breed in the LSA: American Woodcock (*Scolopax minor*), Killdeer (*Charadrius vociferus*), Solitary Sandpiper (*Tringa solitaria*), Spotted Sandpiper (*Actitis macularius*), Wilson's Snipe (*Gallinago delicata*), Greater Yellowlegs (*Tringa melanoleuca*) and Lesser Yellowlegs (*Tringa flavipes*). All these species are ground nesters but have different habitat requirements. American Woodcock nest in young forests, shrubby areas, or old fields (McAuley et al. 2020). Killdeer nest in open areas, such as grazed fields, lawns, parking lots, airports, or mudflats (Jackson and Jackson 2020). Spotted Sandpiper and Solitary Sandpiper typically nest along freshwater waterbodies or watercourses, and Solitary Sandpiper also nest in areas with bogs and spruce trees (Moskoff 2020, Reed et al. 2020). Wilson's Snipe, Lesser and Greater Yellowlegs typically nest in wetlands such as peatlands (bogs and fens), marshes or wet meadows, or near ponds (Elphick and Tibbitts 2020; Mueller 2020; Tibbitts and Moskoff 2020). Except for Lesser Yellowlegs, all these species are relatively common breeders in the LSA and occur where suitable habitat exists

One additional shorebird species (Semipalmated Plover) is only present during migration. Semipalmated Plovers breed in subarctic and arctic regions but may stopover in the LSA or RSA during the spring and fall migration (Nol and Blanken 2020).

Wilson's Snipe and Spotted Sandpiper were most common during field surveys. Greater Yellowlegs and Killdeer were all observed at multiple survey stations whereas Semipalmated Plover and Solitary Sandpiper were uncommon. Lesser Yellowlegs are also relatively uncommon, but were recorded during breeding bird surveys in 2021, and on ARU in 2023 (Appendix B.7.4 of the Impact Statement]).

Lesser Yellowlegs is a SAR and is discussed in further detail in Section 18.2.2.10 of Chapter 18 of the Impact Statement. Four species of shorebirds are BCR 8 priority species: Greater Yellowlegs, Lesser Yellowlegs, Solitary Sandpiper, and Wilson's Snipe.

9.10.6 Waterbirds

Five waterbird species were recorded in the LSA, including two gulls, one heron, one loon, and one grebe (Appendix B.7.2 of the Impact Statement). All species require open water habitat. Common Loon (*Gavia immer*) is the only waterbird that was confirmed as breeding during field surveys but all others except Herring Gull are likely nesting within the LSA.

Bonaparte's Gull (*Chroicocephalus philadelphia*) breeding habitat is found in the boreal forest near lakes, ponds or marshy areas, where they nest in conifer trees (Burger and Gochfeld 2020). Great Blue Heron (*Ardea herodias*) nest colonially, and typically make their nests in trees, although they sometimes nest in bushes or on the ground (Vennesland and Butler 2020). Common Loons nests are built on islands or along the shoreline adjacent to the water (Paruk et al. 2021). Pied-billed Grebe (*Podilymbus podiceps*) occur on lakes or ponds, where they construct floating nests among emergent vegetation (Muller and Storer 2020). Herring Gulls (*Larus argentatus*) are widespread through North America and occur in the LSA only during migration.

Of the waterbirds, Common Loon was most common during field surveys and was present during both breeding and migration surveys. Great Blue Heron was observed several times during the breeding season and the remaining species were all relatively uncommon (Appendix B.7.4 of the Impact Statement).

Two waterbird species (Common Loon and Herring Gull) are BCR 8 priority species; there are no waterbird SAR or SOCC.

9.10.7 Waterfowl

Thirteen waterfowl species have been observed in the LSA. All these species require open water habitats such as ponds and lakes. Three of the species are only present during migration, and do not breed in the LSA: Gadwall (*Mareca strepera*), Long-tailed Duck (*Clangula hyemalis*) and Redhead (*Aythya americana*) (Leschack et al. 2020, Robertson and Savard 2020, Woodin and Michot 2020). The remaining species are present during the breeding season, however not all have been confirmed breeding. For example, American Wigeon (*Mareca americana*) and Gadwall were observed during the breeding season, but no evidence of breeding was observed.

Most waterfowl are ground nesters and build their nests near water or in wetlands. However, there are some exceptions, including Hooded Merganser (*Lophodytes cucullatus*) and Wood Duck (*Aix sponsa*), which nest in tree cavities near water (Dugger et al. 2020, Hepp and Bellrose 2020).

Although there is some suitable habitat for aquatic or terrestrial waterfowl stopover and staging areas in the LSA, field surveys found only small numbers of waterfowl using these, and thus the habitats did not qualify as SWH (Appendix B.7.4 of the Impact Statement).

Six waterfowl species are BCR 8 Priority Species: American Black Duck, American Wigeon, Green-winged Teal, Long-tailed Duck, Mallard, and Ring-necked Duck; Redhead is a SOCC and is discussed in Section 18.2.2.11 of Chapter 18 of the Impact Statement.

9.10.8 Species at Risk

Six bird SAR have the potential to occur, or have been confirmed as occurring, in the LSA and/or PA (Table 9.19; Figure 18.2.7; Figure 18.3.1 to 18.3.10 of Chapter 18 of the Impact Statement).

Table 9.19 Bird Species at Risk Observed or Potentially Present in the Local Study Area.

Species / Conservation Status	Habitat Description	Presence in LSA
Bank Swallow <i>(Riparia riparia)</i> SARA: THR ESA: THR COSEWIC: THR S-Rank: S4B Source: NHIC, eBird	An aerial insectivore that constructs nests in vertical banks, typically along watercourses and in coastal areas. Forages in open habitats including open water, wetlands, grasslands, agricultural areas, shrublands, and occasionally over wooded areas (COSEWIC 2013).	Potential – Bank Swallow was not confirmed in the PA or LSA during field surveys and no suitable habitat was documented during field surveys (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]). However, there are eBird records of the species within the LSA and RSA (eBird 2024) (Figure 18.3.1-18.3.10 of Chapter 18 of the Impact Statement).
Barn Swallow <i>(Hirundo rustica)</i> SARA: THR ESA: SC COSEWIC: SC S-Rank: S4B Source: field observations	The Barn Swallow is an aerial insectivore that attaches its nests to structures such as barns, bridges and culverts. Before European colonization of North America, Barn Swallows nested on cliffs, rock overhangs, and caves (COSEWIC 2021a). They forage over open areas.	Confirmed –There are numerous background records of Barn Swallow in the LSA (eBird 2024), and this species was documented during field surveys in the PA (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]; Figure 18.3.1-18.3.10 of Chapter 18 of the Impact Statement).
Canada Warbler <i>(Cardellina canadensis)</i> SARA: THR ESA: SC COSEWIC: SC S-Rank: S5B Source: field observations	The Canada Warbler is usually found in moist mixed deciduous-coniferous forests with a well-developed understorey. It may also occur in shrub marshes, red maple stands, coniferous riparian woodlands, ravines and steep brushy slopes, and regenerating forests (COSEWIC 2008).	Confirmed –Canada Warbler was observed during breeding bird surveys at two stations and was recorded on seven ARUs in the PA and LSA (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]; Figure 18.3.1-18.3.10 of Chapter 18 of the Impact Statement).

Species / Conservation Status	Habitat Description	Presence in LSA
<p>Chimney Swift (<i>Chaetura pelagica</i>) SARA: THR ESA: THR COSEWIC: THR S-Rank: S3B Source: ARU field recordings</p>	<p>Chimney Swift use chimneys for roosting and breeding, as well as walls, rafters, or gables of buildings and, less frequently, natural structures such as hollow trees, tree cavities and cracks in cliffs (MECP 2022).</p>	<p>Absent– Chimney Swift was initially identified as present based on analysis of ARU recordings using artificial intelligence software BirdNET version 2.2 (BirdNET_GLOBAL_3K_V2.2_Model_FP32.tflite), but the species was not visually confirmed (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]). In 2024, the recordings were run through a newer version of BirdNET (version 2.4, BirdNET_GLOBAL_6K_V2.4), and Chimney Swift was not detected (Appendix B.7.4 of the Impact Statement). Stantec biologists with experience identifying Chimney Swift also listened to a subset of recordings that were identified by BirdNET as Chimney Swifts and none of the calls that were examined further were confirmed as Chimney Swifts. For these reasons, Chimney Swift is unlikely to be present as a breeding bird in the LSA so is not discussed further in this assessment.</p> <p>This species is uncommon in this part of Ontario, there is one record of the species within the RSA at the Timmins Airport (eBird 2024).</p>
<p>Eastern Whip-poor-will (<i>Antrostomus vociferus</i>) SARA: THR ESA: THR COSEWIC: SC S-Rank: S4B Source: background information</p>	<p>The Eastern Whip-poor-will is typically found in areas with a mixture of open and forested habitats such as savannahs, open woodlands or openings in mature forests (COSEWIC 2022). Semi-open and patchy forests are preferred, as are areas with little ground cover such as rock barrens (COSEWIC 2022b)</p>	<p>Potential – This species was not recorded during targeted surveys, but the LSA is within the species’ range and suitable habitat may be present (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]).</p>
<p>Lesser Yellowlegs (<i>Tringa flavipes</i>) SARA: Not listed ESA: THR COSEWIC: THR S-Rank: S3S4B, S5M Source: field observations</p>	<p>Lesser Yellowlegs is a medium sized shorebird that breeds primarily in boreal and taiga wetlands. Its breeding range in Canada extends from northern Yukon to western Labrador and it winters in South America (COSEWIC 2020).</p>	<p>Confirmed - This species may be found in the PA and LSA during the breeding season and during migration. Four Lesser Yellowlegs were observed during breeding bird surveys in June 2021, and the species was recorded at three ARU stations (one in 2023, and three in 2022; 2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]). The observations were within the PA and LSA. There are also eBird records of this species in the RSA (eBird 2024; Figure 18.3.1-18.3.10 of Chapter 18 of the Impact Statement).</p>

Species / Conservation Status	Habitat Description	Presence in LSA
Short-eared Owl <i>(Asio flammeus)</i> SARA: SC ESA: THR COSEWIC: THR S-Rank: S4?B,S2S3N Source: eBird 2024	Short-eared Owls are medium sized owls that are most often active at dawn and dusk. They are found in open habitats including tundra, grasslands, wetlands and pastures (COSEWIC 2021b).	Potential - Targeted surveys for Short-eared Owl were conducted in suitable habitat during the 2023 breeding season and the species was not observed (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]). However, this species is nomadic, moving large distances between years in response to changing prey abundance (COSEWIC 2021c). There are eBird records for Short-eared Owl from within the RSA and suitable habitat is present within the LSA (eBird 2024; Figure 18.3.1-18.3.10 of Chapter 18 of the Impact Statement).
<p>Notes:</p> <p>SC – Special Concern THR – Threatened END – Endangered</p> <p>S-ranks:</p> <p>S1 – Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province. S2 – Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province. S3 – Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation. S4 – Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.</p> <p>S#S# Range Rank – A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).</p> <p>Qualifiers:</p> <p>B – Breeding – Conservation status refers to the breeding population of the species in the province. SU – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. N – Conservation status refers to the non-breeding population of the species in the province. M – Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province. ? – Denotes inexact or uncertain numeric rank (? Qualifies the character immediately preceding it in the S-rank).</p>		

9.10.9 Species of Conservation Concern

Six bird SOCC have the potential to occur or have been confirmed present in the LSA (Table 9.20; Figure 18.2.7; 18.3.1 to Figure 18.3.10 of Chapter 18 of the Impact Statement).

Table 9.20 Bird Species of Conservation Concern Observed or Potentially Present in the Local Study Area

Species / Conservation Status	Habitat Description	Presence in LSA
<p>Common Nighthawk <i>(Chordeiles minor)</i> SARA: SC ESA: SC COSEWIC: SC S-Rank: S4B Source: eBird, Field observations</p>	<p>Common Nighthawk breeds in a wide range of open habitats, such as recently logged or burned-over areas, beaches, forest clearings, short-grass prairies, pastures, open forests, marshes, lakeshores, gravel roads, riverbanks, rocky outcrops or barrens, railways, and urban parks. Common Nighthawks may forage in most habitat types (COSEWIC 2018a).</p>	<p>Confirmed – During field surveys, Common Nighthawk was recorded on 28 ARUs in the PA and LSA and was also recorded incidentally (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]; Figures 18.3.1-18.3.10 of Chapter 18 of the Impact Statement). There are also many eBird records of Common Nighthawk within the LSA and RSA (Figure 18.3.1-18.3.10).</p>
<p>Evening Grosbeak <i>(Coccothraustes vespertinus)</i> SARA: SC ESA: SC COSEWIC: SC S-Rank: S4 Source: field observations</p>	<p>Evening Grosbeak breeding habitat generally includes open, mature mixedwood forests, where fir species and/or white spruce are dominant, and Spruce Budworm is abundant. Outside the breeding season, the species depends on seed crops from trees such as firs and spruces in the boreal forest but is also attracted to ornamental trees that produce seeds or fruit, and bird feeders stocked with sunflower seeds (COSEWIC 2016).</p> <p>Evening Grosbeaks are found in a variety of forested areas, most typically mature mixed forests with an open canopy and high proportions of Balsam Fir, White Spruce and/or Trembling Aspen (COSEWIC 2016).</p>	<p>Confirmed – Evening Grosbeaks were documented two times during breeding bird surveys, at one survey station in the LSA (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]). This species is a year-round resident; there are many eBird records of this species throughout the RSA (Figure 18.3.1-18.3.10 of Chapter 18 of the Impact Statement).</p>
<p>Olive-sided Flycatcher <i>(Contopus cooperi)</i> SARA: SC ESA: SC COSEWIC: SC S-Rank: S4B Source: field observations, NHIC</p>	<p>Olive-sided Flycatcher is a medium sized migratory songbird that breeds throughout most of forested Canada (COSEWIC 2018b). Olive-sided Flycatchers breed in edge habitats, such as coniferous forests with open habitats, wetlands or disturbed forest (COSEWIC 2018b).</p>	<p>Confirmed – Olive-sided Flycatcher was observed incidentally during field studies and was identified on nine (9) ARUs in the PA and LSA using automated identification software (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]; Figure 18.3.1-18.3.10 of Chapter 18 of the Impact Statement). There are also many eBird records of this species within the RSA and LSA (Figures 18.3.1-18.3.10)</p>

Species / Conservation Status	Habitat Description	Presence in LSA
<p>Redhead (<i>Aythya americana</i>) SARA: Not listed ESA: Not listed Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Not listed S-Rank: S2B,S4N Source: eBird, field observations</p>	<p>Redhead is a diving duck that feeds on marshy freshwater ponds and lakes and winters in flocks on any large body of water, often mixed with other diving ducks. Redheads mainly breed in seasonal ponds and other wetlands in the prairies.</p>	<p>Confirmed – There are a small number of eBird records for this species within the LSA and a single individual was observed in the PA during field surveys (eBird 2024, 2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]; Figure 18.3.3). The LSA is located outside of the main breeding range and not within suitable habitat. Therefore, it is likely that the individual was using the area for resting or moulting. For these reasons, Redhead is not discussed further in this assessment.</p>
<p>Rusty Blackbird (<i>Euphagus carolinus</i>) SARA: SC ESA: SC COSEWIC: SC S-Rank: S4B,S3N Source: field observations</p>	<p>The Rusty Blackbird breeds in habitats that are dominated by coniferous forests with wetlands nearby including bogs, marshes and beaver ponds. The Rusty Blackbird is only found in North America. It breeds in every province and territory in Canada and migrates to most of the central and eastern United States for winter. In Ontario, the breeding range is found in the Hudson Bay Lowlands and northern Boreal Shield ecosites (MECP 2021).</p>	<p>Confirmed – During field surveys, Rusty Blackbird was confirmed at two ARU stations in 2023, one in 2022, and two in 2021. One Rusty Blackbird was also documented during breeding bird point count surveys and eight were observed during fall migration surveys. Observations were recorded in both the PA and LSA.</p>
<p>Yellow Rail (<i>Coturnicops noveboracensis</i>) SARA: SC ESA: SC COSEWIC: SC S-Rank: S4 Source: field observations</p>	<p>Nesting Yellow Rails are typically found in marshes dominated by sedges, true grasses, and rushes, where there is little or no standing water (generally 0-12 cm water depth), and where the substrate remains saturated throughout the summer. They can be found in damp fields and meadows, on the floodplains of rivers and streams, in the herbaceous vegetation of bogs, and at the upper levels (drier margins) of estuarine and salt marshes. Nesting habitats usually have a dry mat of dead vegetation from previous growing seasons. A greater diversity of habitat types is used during migration and winter than during the breeding season. In winter, the rails are known to use coastal wetlands and rice fields (COSEWIC 2009). In Ontario, it is mainly found in the Hudson Bay Lowlands. The breeding status of Yellow Rail in boreal regions south of the Hudson Bay Lowlands is uncertain (MECP 2024b).</p>	<p>Potential – There is suitable Yellow Rail habitat in wetlands within the LSA. A possible Yellow Rail was heard in 2021 at one marsh bird station in the PA but could not be confirmed (2023 Terrestrial Ecology Baseline Study [Appendix B.7.4 of the Impact Statement]).</p>

Species / Conservation Status	Habitat Description	Presence in LSA
Notes: SC – Special Concern S-ranks: S2 – Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province. S3 – Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation. S4 – Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors. Qualifiers: B – Breeding – Conservation status refers to the breeding population of the species in the province. N – Conservation status refers to the non-breeding population of the species in the province.		

9.10.10 Bird Habitat

Within the RSA, upland treed habitat covers 39% (169,993 ha); mixed forests and coniferous treed forests are the most common upland forest types (Table 9.9). Wetlands are the largest ecosystem category in the RSA, covering 49% (217,459 ha) of the RSA. Swamps are the most common wetland class in the RSA (167,358 ha, 38%), followed by fens (21,978 ha, 5%). Open water, such as lakes, rivers, and ponds, covers a relatively small area of the RSA (12,427.8 ha, 3%). The RSA is in a relatively undisturbed state; anthropogenic and sparsely vegetated areas cover 9% (38,681 ha) of the RSA. Cuts (harvested areas) are the largest anthropogenic or sparsely vegetated areas, reflecting the history of logging in the RSA, followed closely by settlement and infrastructure areas.

Table 9.21 Summary of Land Cover in the Regional Study Area

Ecosystem Category	Land Cover Class	RSA	
		Area (ha)	Area ¹ (%)
Upland - Treed	Coniferous Forest	49,883	11
	Deciduous Forest	10,485	2
	Mixed Forest	86,740	20
	Sparse Forest	22,885	5
	Total Upland - Treed	169,993	38
Wetland	Unclassified Bog	15,218	3
	Open Bog	500	0.1
	Treed Bog	2,906	1
	Subtotal Bog	18,624	4
	Unclassified Fen	21,037	5
	Open Fen	71	0.0
	Treed Fen	870	0.2
	Subtotal Fen	21,978	5

Ecosystem Category	Land Cover Class	RSA	
		Area (ha)	Area ¹ (%)
	Unclassified Marsh	4,760	1
	Swamp	167,358	38
	Other Wetland	4,739	1
	Total Wetland	217,459	49
Water	Water - Deep or Clear	12,428	3
Sparsely Vegetated or Anthropogenic	Bedrock	115	0.0
	Cropland	794	0.2
	Cuts	18,280	4
	Pasture	5,756	1
	Sand/Gravel/Mine Tailings	5,603	1
	Settlement, Infrastructure	8,133	2
	Total Sparsely Vegetated or Anthropogenic	38,681	8
	Grand Total	438,561	103
Note:			
1. Total exceeds 100% due to rounding.			

Most of the LSA and PA are in a relatively natural condition. Wetlands cover most of the LSA and PA, occupying 71% (39,175 ha) and 73% (8,667 ha), respectively (Table 9.22). Upland forests cover 24% (2,837 ha) of the PA and 26% (14,273 ha) of the LSA (Table 9.22). Conifer forests are the dominant upland forest type, covering 21% (2,521 ha) of the PA and 23% (12,386 ha) of the LSA (Table 9.22). Open water is relatively uncommon in the LSA (288 ha, <1%) and occurs as scattered ponds, small lakes, rivers and (Table 9.22).

Anthropogenic and other poorly vegetated areas cover 2% (254 ha) of the PA and 1% (576 ha) of the LSA (Table 9.22). Utility corridors account for the largest anthropogenic areas, covering 1% (167 ha) of the PA and 1% (360 ha) of the LSA (Table 9.22). A total of 50 ecosites and mapping units were identified in the LSA and 42 in the PA (see Chapter 16 of the Impact Statement).

The PA represents 22% of the LSA and 2.7% of the RSA.

Table 9.22 Summary of Habitat Categories within the Project Area and Local Study Area

Land Cover Class	PA		LSA	
	Area (ha)	Area ¹ (%)	Area (ha)	Area ¹ (%)
Upland - Treed				
Coniferous Forest	2,521	21	12,386	23
Deciduous Forest	316	3	1,887	3
Total Upland - Treed	2,837	24	14,273	26
Wetland				
Open Bog	5	0	32	0.1
Treed Bog	2,353	20	7,860	14
Subtotal Bog	2,358.0	20.0	7,892	14
Open Fen	7	0.1	233	0.4
Treed Fen	781	7	4,465	8
Subtotal Fen	788	7	4,698	8
Marsh	752	6	1,295	2
Swamp	4,768	40	25,290	47
Total Wetland	8,666	73	39,175	71
Barren				
Active Mineral Barren	0.4	0.0	12	0.0
Water				
Lakes, Rivers, Ponds	26	0.2	288	0.5
Anthropogenic				
Commercial/Residential	13	0.1	20	0.0
Utilities	167	1	360	1
Pavement/Concrete	74	1	196	0.4
Total Anthropogenic	254	2	577	1
Grand Total	11,783	106	54,324	107¹
Note:				
1. Total exceeds 100% due to rounding.				

The following bird habitat features of conservation interest were identified and mapped following Significant Wildlife Habitat Criteria for Ecoregion 3E (Ministry of Natural Resources and Forestry [MNR] 2015) during baseline studies (Appendix B.7.4 of the Impact Statement):

- Waterfowl Nesting Area
- Bald Eagle and Osprey Nesting Habitat
- Woodland Raptor Nesting Habitat
- Sharp-tailed Grouse Lek Habitat
- Marsh Breeding Bird Habitat

- Shrub/Early Successional Breeding Bird Habitat
- Habitat for Special Concern and Rare Species

A description of each bird SWH, including the ecosites included, can be found in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement). The area of each SWH feature in the PA and LSA is presented in Table 9.23, and is shown on Figure 18.2 to 18.2.7 of Chapter 18 of the Impact Statement.

Bald Eagle nesting habitat was confirmed, and a Bald Eagle nest was observed in the southeast corner of the PA (Figure 18.2.3 of Chapter 18 of the Impact Statement). Habitat for Special Concern and Rare Species were also confirmed, based on the presence of SAR and SOCC (including Barn Swallow, Canada Warbler, Common Nighthawk, Evening Grosbeak, Olive-sided Flycatcher and Rusty Blackbird). The remaining identified SWH are considered candidate, which means that suitable habitat is present, but field studies to determine whether the SWH ecoregion criteria have been met were not completed (MNR 2015).

Table 9.23 Area of Each Bird Significant Wildlife Habitat Feature in the Project Area and Local Study Area

Significant Wildlife Habitat Features	Area (ha)	
	Project Area	Local Study Area
Candidate Waterfowl Nesting Area	3,186	7,880
Candidate Woodland Raptor Nesting Habitat	2,837	14,273
Candidate Sharp-tailed Grouse Habitat	3,246	13,021
Candidate Marsh Breeding Bird Habitat	2,483	8,256
Candidate Shrub/Early Successional Bird Breeding Habitat	936	2,032
Confirmed Bald Eagle Nesting Habitat	149	201
Confirmed Habitat for Special Concern and Rare Species	350	937

9.11 Wildlife and Wildlife Habitat

An overview of the baseline conditions for wildlife and wildlife habitat is provided in Appendix B.7.3 (Terrestrial Wildlife and Wildlife Habitat Supplemental Baseline Report) with additional details, including summaries of field work in Appendix B7.4. The baseline information presented herein provides an overview of the birds and bird habitat for reference.

The Project is located within the Abitibi Ecoregion (Ecoregion 3E) in northeastern Ontario within the Ontario Shield Ecozone (Crins et al. 2009). Wildlife within the Ecoregion is typical of the boreal forest, which comprises moose, northern gray wolf, Canada lynx, American black bear, American marten, beaver, snowshoe hare and red squirrel. Representative species of amphibians and reptiles include blue-spotted salamander, boreal chorus frog, wood frog, mink frog, midland painted turtle, and eastern gartersnake.

9.11.1 Amphibians and Reptiles

This Section summarizes the amphibians and one reptile recorded within the LSA, as detailed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement)

Seven species of toads and frogs were detected during the 2021 and 2022 amphibian call surveys and incidental observations. This included: American toad, boreal chorus frog, green frog, mink frog, northern leopard frog, spring peeper, and wood frog. Spring peeper was the most common species recorded during all field studies (42 locations), followed by wood frog (25 locations), American toad (17 locations), mink frog (10 locations), and boreal chorus frog (7 locations). The least common species was green frog, which was only detected at two locations.

Two incidental records of salamanders were documented in the western portion of the PA at two separate locations on May 14, 2022. An unidentified salamander (believed to be an *Ambystomid*) was found in a pond at amphibian calling point CL-AM-15, located on the east side of Camp 40 Road, near the intersection of Lower Sturgeon Dam Road and Camp 40 Road. A blue-spotted salamander was observed crossing Camp 40 Road at CL-OW-15.

One eastern gartersnake was incidentally recorded while assessing rocky slopes and rock barrens for bat hibernaculum candidacy in 2022. Suitable habitat is present throughout the RSA, LSA, and PA, with potential hibernaculum identified for the following ecosites: B012, B024, B128, B129, B133, B134, B135, B136, B137, B138, B139, and B164. Given the expanse of indicator ecosite types across the Assessment Areas, suitable snake hibernacula features are considered common and widespread.

9.11.2 Moose

Evidence of moose was observed throughout the RSA, LSA, and PA in relatively high density. As detailed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), moose observations included 27 individual sightings during the 2021 (n=15) and 2022 (n=12) winter aerial surveys. These sightings were primarily recorded within the RSA near the south, east and northern limits. Moose were also recorded within the LSA near the north and south limits and a portion of the PA near the southern portion associated with the transmission line. Moose sightings and tracks were typically associated with clearcuts, regenerating forest, and riparian areas, particularly those dominated by aspen and abundant young hardwood saplings and shrubs that provide a browse forage source to moose. Moose are anticipated to occur throughout the Assessment Areas. Actual moose numbers will vary due to other factors such as disease, parasites (e.g., winter tick, brainworm), road/railway mortality, and predation by wolves, bears, and humans (e.g., hunters). As of 2023, MNR (Ministry of Natural Resources) estimates the population size to be 288 individuals in Wildlife Management Unit 30 (MNR 2024) which overlaps the PA and LSA.

9.11.3 Furbearers

Several furbearers were recorded during surveys completed between 2021 and 2023. Furbearer abundance is regulated by factors other than habitat availability, such as disease, predation (e.g., wolves), and trapping. As detailed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4

of the Impact Statement), the majority of species were recorded incidentally, with the following seven (7) species detected during aerial surveys.

- Evidence of snowshoe hare (i.e., tracks) was prevalent throughout the aerial surveys in high density and not individually recorded
- Red fox was recorded at 179 locations, followed by Canada Lynx (n=91) and American marten (n=70). Records of these species were found throughout the RSA, LSA, and PA
- North American river otter was recorded at 56 locations throughout the RSA and LSA and within the central-east limits of the PA. The greatest densities were documented at Kamiskotia Lake and along the Mattagami River
- Beaver was recorded at 28 locations, the majority of which are within the RSA and a few records within the central-east limits of the PA. Three lodges and two dams were also recorded in the southern portion of the RSA
- Northern gray wolf was recorded at 21 locations, the majority of which are located within the RSA, with the exception of one area near the Mattagami River that extends into the LSA and is identified as high density based on the 2021 surveys. Several areas within the 2022 aerial survey area exhibited sufficient evidence of northern gray wolf sign to be classified as medium-high to high relative northern gray wolf density; these areas were located near the northwest, northeast, and southwest extents of the RSA

9.11.4 Species of Conservation Concern

As detailed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), targeted surveys for turtles were completed between May 13 and 17, 2022. No turtles were recorded across the 17 locations surveyed. However, there are two (2) SOCC turtle species with the potential to occur within the LSA based on the background review and presence of suitable habitat. In addition, there are two SOCC insects that have the potential to occur in the LSA. None of these species were recorded during field studies completed between 2021 and 2023 (Table 9.24).

Table 9.24 Species of Conservation Concern Assessed within the Local Study Area

Species / Conservation Status	Habitat Description	LSA
Midland Painted Turtle <i>(Chrysemys picta marginata)</i> SARA: SC ESA: Not listed COSEWIC: SC COSSARO: Not at risk S-Rank: S5 Source: ORAA	Inhabits waterbodies, such as ponds, marshes, lakes, and slow-moving creeks, with a soft bottom and provide abundant basking sites and aquatic vegetation. This species often basks on shorelines or on logs and rocks that protrude from the water. Overwintering occurs on the bottom of waterbodies (ORAA 2023).	High Potential – Habitat is abundant throughout the LSA within lakes, marshes, ponds, and creeks. This species was not recorded during turtle basking surveys or other field studies for the Project.
Snapping Turtle <i>(Chelydra serpentina)</i> SARA: SC ESA: SC COSEWIC: SC COSSARO: No schedule, no status S-Rank: S4 Source: ORAA	Snapping turtles prefer slow-moving waters with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs, shallow bays or river edges and slow streams and wetlands. Individuals can also exist in developed areas (e.g., golf course ponds, irrigation canals); however, it is unlikely that populations persist in such habitats. Snapping Turtles can occur in highly polluted waterways, but environmental contamination is known to limit reproductive success (COSEWIC 2008).	High Potential – Habitat is abundant in the LSA within lakes, marshes, and rivers. This species was not recorded during turtle basking surveys or other field studies for the Project.
Monarch <i>(Danaus plexippus)</i> SARA: END ESA: SC COSEWIC: END COSSARO: SC S-Rank: S2N, S4B Source: OBA	Monarch is very widely distributed across North America and found in a wide variety of habitats. Monarch require milkweeds (<i>Asclepias</i> sp.) as a larval host plant and will use a variety of other flowers for adult food. Different milkweed species grow in a variety of environments which include fields, roadsides, open areas, wet areas, and urban gardens (COSEWIC 2016a).	Moderate Potential – Host plants (milkweed) were not recorded during vegetation surveys conducted for the Project; however, it may be present in open habitats, particularly anthropogenic influenced habitats. Monarch may use milkweed where present.

Species / Conservation Status	Habitat Description	LSA
Yellow-banded Bumble Bee <i>(Bombus terricola)</i> SARA: SC ESA: SC COSEWIC: SC COSSARO: SC S-Rank: S4 Source: NHIC	This species is a forage and habitat generalist, able to use a variety of nectaring plants and environmental conditions. The yellow-banded bumble bee has a large range throughout much of Canada and parts of the United States. It can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands, and urban areas. Nest sites are often underground in abandoned rodent burrows or decomposing logs (COSSARO 2016).	Moderate Potential – Potentially suitable habitat is present where there are a variety of nectaring plants available to support feeding throughout the active season.

9.11.5 Species at Risk

As detailed in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), there are eight SAR that have been confirmed or have the potential to occur within the LSA based on the background review and presence of suitable habitat (Table 9.25). Of these species, there are three bat species that were recently assessed as endangered in 2023, both federally (COSEWIC) and provincially (COSSARO): eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*).

Table 9.25 Species at Risk Assessed within the Local Study Area

Species / Conservation Status	Habitat Description	LSA (see Appendix B.7.4 of the Impact Statement)
Blanding’s Turtle (<i>Emyonia blandingii</i>) SARA: END ESA: THR COSEWIC: END S-Rank: S3 Source: Community Record	Blanding’s turtles are found in a variety of productive wetlands, occurring primarily in shallow-water habitats- shallow lakes, ponds, and wetlands with mucky bottoms. This species hibernates in the soft bottoms of water bodies. Other habitat features include rocks, logs or substrates in sunny locations that provide basking opportunities (COSEWIC 2016b). Females nest on various substrates on land, while overwintering occurs underwater in permanent pools (COSEWIC 2016b).	Confirmed – There are historical records of Blanding’s turtle in the LSA and suitable habitat present, although this species was not observed during field studies or through eDNA sampling. There are two community records within the LSA (east of the PA) and one in the RSA (west the LSA). Habitat Suitability Index mapping shows suitable nesting, overwintering and functional habitat throughout the LSA.
Boreal Caribou (Boreal population) (<i>Rangifer tarandus</i> pop. 14) SARA: THR ESA: THR COSEWIC: THR S-Rank: S4 Source: Ontario Mammal Atlas	At the broad landscape scale, boreal caribou require large, undisturbed areas of old or mature conifer upland forest and lowlands dominated by jack pine and/or black spruce. These areas allow boreal caribou to effectively separate themselves from higher densities of moose, white-tailed deer, northern gray wolf, and American black bear which tend to be associated with younger mixed or deciduous forest. At smaller scales, boreal caribou seasonally select specific habitat features and areas that support successful reproduction and calf rearing, provide summer and/or winter forage, and/or facilitate movement between discrete areas of use. Boreal caribou require large un-fragmented habitats for security from predators to space apart from other ungulate species, to distribute themselves over the landscape at naturally low population density, and to avoid disturbance from human activities that may increase mortality risk (COSEWIC 2002; ECCC 2020). Lichen species preferred by boreal caribou are a consistent feature of winter and summer home ranges. Lichens tend to be most abundant in mature and old forests, consequently fire, logging, and mining and sensory disturbance from linear anthropogenic disturbances can displace boreal caribou for decades (COSEWIC 2002; ECCC 2020).	Low Potential – There were no boreal caribou observed during field studies. The southern limit of the Range (ON8; ECCC, 2020) begins within the central portion of the LSA with limited suitable habitat present. This Range was last assessed provincially in 2010 (MNRF 2014) and was characterized at the time as 43.8% disturbed, with a minimum animal count of 178 boreal caribou and a declining population trend (low calf recruitment). Habitat in the LSA is characterized as Category 3: Remaining Areas. Within the RSA, Category 1: Nursery Areas, Winter Use Areas, Travel Corridors is present near the northern limits and Category 2: Seasonal Ranges is present in the north, south and east limits. The habitat configuration is conducive to increased numbers of alternate prey (moose) and associated predators (wolves) which represent a local landscape with high mortality risk to boreal caribou and has substantial anthropogenic disturbance; therefore, it currently has low habitat suitability. Boreal caribou are disturbance-sensitive with life history limitations (low reproductive output, low annual calf survival), resulting in sensitivity to minor changes in mortality risk. They naturally occur at low spatial density (typically 0.02 to 0.03 boreal caribou/km ²) but have large spatial home range requirements for well-connected old-growth boreal forest and lichen-rich peatlands. These large home ranges allow boreal caribou to spatially separate from predators and alternative prey and avoid disturbance (ECCC 2020).

Species / Conservation Status	Habitat Description	LSA (see Appendix B.7.4 of the Impact Statement)
Eastern Red Bat (<i>Lasiurus borealis</i>) SARA: Not listed, under consideration ESA: END (January 31, 2025) COSEWIC: END COSSARO: END S-Rank: S4 Source: ARU	Forage in open areas, forested and non-forested habitats, including both deciduous and coniferous forests. Maternity roosts tend to be large diameter and tall, exceeding the forest canopy. Saplings have been used for roosting by males. Roosts by hanging from branches and using several trees during the breeding season with high inter-annual roosting area fidelity. Migratory species that overwinter in the southern United States. (COSEWIC 2023).	Confirmed – Eastern red bat was recorded in the PA and LSA at two locations in 2021 and 2022: CL-DET-ET-G2-2, CL-DET-CBM-12. Several locations throughout the Assessment Areas were classified as high frequency bat species which could be eastern red bat, were also identified: 2021: CL-DET-ET-G2-1, CL-DET-ET-G2-2, CL-DET-EXTRA-03, CL-DET-G1-07, CL-DET-G1-10, CL-DET-WT-G2-02, CL-DET-WT-G2-02b 2022: CL-DET-CBM-11, 13, 14, 17, 18, 19, CL-DET-EXTRA-01, CL-DET-G2-01 2023: CL-DET-23-6, CL-DET-23-8 and CL-DET-23-9
Hoary Bat (<i>Lasiurus cinereus</i>) SARA: Not listed, under consideration ESA: END (January 31, 2025) COSEWIC: END COSSARO: END S-Rank: S4 Source: ARU	Forage in open areas, wetlands, open/patchy treed areas, open fields and grasslands. This species will use both deciduous and coniferous forests, with maternity roosts tending to be large diameter and tall, exceeding the forest canopy. Roosts by hanging from branches and using several trees during the breeding season with high inter-annual roosting area fidelity. Migratory species that overwinter in the southern United States. (COSEWIC 2023).	Confirmed – Hoary bat was recorded throughout the Assessment Areas at all locations in 2022 and 2023 and most locations in 2021, except CL-DET-G1-02 and CL-DET-G2-11.

Species / Conservation Status	Habitat Description	LSA (see Appendix B.7.4 of the Impact Statement)
<p>Little Brown Myotis (<i>Myotis lucifugus</i>) SARA: END ESA: END COSEWIC: END S-Rank: S3 Source: ARU</p>	<p>Roosts in tree cavities, including small spaces or crevices found in loose bark, hollow trees, rock faces and is widespread throughout the southern half of Canada and is especially associated with human structures often forming nursery colonies in buildings, attics, walls, and bat boxes. Hibernates in caves and abandoned mines during the winter months. Typically forages over water (MECP 2021) where their diet consists of aquatic insects, mainly midges, mosquitoes, mayflies, and caddisflies. They also feed over forest trails, cliff faces, meadows, and farmland where they consume a wide variety of insects, from moths and beetles to crane flies. Maternity roosts are primarily live deciduous trees and males, juveniles, and non-reproductive females can be found in dead trees, on average all trees are over 20 cm diameter at breast height (Humphrey and Fotherby 2019). Maternity sites typically have sufficient protection from predators, an abundance of roosting locations, and adequate solar exposure (Humphrey and Fotherby 2019).</p>	<p>Confirmed – Little brown myotis was recorded throughout the Assessment Areas at the following locations during 2021 and 2022 acoustic surveys: CL-DET-G2-04, CL-DET-CBM-11, CL-DET-CBM-12, CL-DET-CBM-19. There were several locations only classified to myotis species: 2021: CL-DET-ET-G2-1, CL-DET-ET-G2-2, CL-DET-EXTRA-03, CL-DET-G1-07, CL-DET-G1-10, CL-DET-G2-01, CL-DET-G2-04, CL-DET-WT-G2-02 2022: CL DET-CBM-2, 11, 12, 13, 14, 17, 18, 19, CL-DET-G1-04, CL-DET-G2-01 2023: CL-DET-23-1, CL-DET-23-6 and CL-DET-23-7. Suitable overwintering habitat was identified at seven locations (Rock Barren 6-3, 6-5, 6-8, 6-9, 6-12 and 8), although acoustic surveys concluded they were not being used.</p>
<p>Northern Myotis (<i>Myotis septentrionalis</i>) SARA: END ESA: END COSEWIC: END S-Rank: S3 Source: BCI, SARO List</p>	<p>Roosts in canopies of deciduous trees, including small spaces or crevices found in loose bark, hollow trees. Rock faces and human structures can also be used though less frequently than little brown myotis. Hibernates in caves and abandoned mines during the winter months. Maternity sites typically have sufficient protection from predators, an abundance of roosting locations, and adequate solar exposure (Humphrey and Fotherby 2019). The northern myotis is one of the less common species found to hibernate in Ontario. This species is closely associated with woodlands and uses trees as maternity sites (COSEWIC 2013).</p>	<p>High Potential - Although the presence of northern myotis was not confirmed, presence of this species cannot be ruled out in the Assessment Areas. In most instances, the northern myotis emits echolocation calls that resemble those of the little brown myotis. The northern myotis can, however, emit calls of much higher maximum frequency than the little brown myotis in highly cluttered habitat. Unfortunately, recordings made in high clutter are of poor quality and higher frequencies attenuate much more quickly making recordings of calls identifiable as northern myotis exceedingly rare. There were several locations only classified to Myotis species throughout the PA, LSA and RSA: 2021: CL-DET-ET-G2-1, CL-DET-ET-G2-2, CL-DET-EXTRA-03, CL-DET-G1-07, CL-DET-G1-10, CL-DET-G2-01, CL-DET-G2-04, CL-DET-WT-G2-02 2022: CL DET-CBM-2, 11, 12, 13, 14, 17, 18, 19, CL-DET-G1-04, CL-DET-G2-01 2023: CL-DET-23-1, CL-DET-23-6 and CL-DET-23-7</p>

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Species / Conservation Status	Habitat Description	LSA (see Appendix B.7.4 of the Impact Statement)
<p>Silver-Haired Bat (<i>Lasionycteris noctivagans</i>) SARA: Not listed, under consideration ESA: END (January 31, 2025) COSEWIC: END COSSARO: END S-Rank: S4 Source: ARU</p>	<p>Forage along the edge of forests, forest openings, including young and old forests and edge of forests. Roost in tree cavities or under exfoliating bark. Migratory species that overwinters in the United States, southeastern British Columbia and occasionally the Great Lakes region (COSEWIC 2023).</p>	<p>Confirmed – Silver-haired bat was recorded throughout the Assessment Areas at all locations in 2022 and 2023 and most locations in 2021, except CL-DET-G1-02.</p>
<p>Tri-colored Bat (<i>Perimyotis subflavus</i>) SARA: END ESA: END COSEWIC: END S-Rank: S3? Source: Ontario Mammal Atlas</p>	<p>Within treed habitats, tri-colored bat primarily roosts in tree foliage (mainly within oak leaves). Leaf roosts are shaped like umbrellas with a "roof" and a hollow core where bats rest. Studies have shown that oak leaves are a preferred roost site. Maple leaves are also selected, although less commonly. It is thought that tri-colored bat may prefer roost trees in more open woodlands, as opposed to deep woods. Roosts in tree cavity are used less frequently than Myotis species (Humphrey and Fotherby 2019).</p>	<p>Low Potential – Tri-colored bat was not identified in the PA. Published results from a comprehensive bat monitoring program across northern Ontario (Layng et al. 2019) have led to speculation that tri-colored bats may occur further west than originally thought. No tri-colored bat was identified by automated or manual methods in either survey period, providing strong evidence that this species does not occur in the Assessment Areas.</p>
<p>Wolverine (<i>Gulo gulo</i>) SARA: SC ESA: THR COSEWIC: SC S-Rank: S2S3 Source: MECP</p>	<p>Wolverines use a wide variety of boreal habitats and are typically distributed relative to the availability of a diverse prey base that includes small mammals and large ungulates, although they are most dependent on upland forested habitats (COSEWIC 2014a). Wolverine occupy large home ranges and are sparsely dispersed on the landscape, with boreal densities ranging from 0.7-4.8 individuals per 1,000 km² (COSEWIC 2014a).</p>	<p>Low Potential – Unlikely present due to lack records south of Highway 11.</p>

9.12 Climate Change

The environmental effects associated with climate change are a global phenomenon, effects are not localized, and there are no existing material sources of GHG emissions identified in the PA, therefore no baseline report on the existing conditions of the PA has been prepared. Existing climatic conditions are summarized in Section 9.4.1.

9.13 Social Conditions

An overview of the baseline conditions for social conditions is provided in Appendix B.9 (Social and Economic Conditions Baseline Report). The baseline information presented herein provides an overview of the social conditions for reference.

9.13.1 Overview of Services and Infrastructure

9.13.1.1 Housing and Temporary Accommodations

In 2021, there were 23,839 occupied private dwellings in the LSA/RSA (Statistics Canada 2022). The majority (75.0 percent [%]) of occupied private dwellings were located in Timmins. Most (74.8%) homes in the LSA/RSA were owned in 2021, rather than rented (Statistics Canada 2022).

High construction costs attributed partly to the cost of transporting materials and a shortage of trained tradespeople, have resulted in a decrease in housing starts and northern Ontario having a limited supply of new housing (Canada Mortgage Housing Corporation [CMHC] 2021).

Home ownership remains relatively affordable in northern Ontario, including Timmins, compared to the rest of the province (The Advocacy Centre for Tenants Ontario and Advocacy North 2021). In 2021, the average price of a home in the LSA/RSA, according to Statistics Canada, was \$195,775. This is up from an average price of \$165,955 in 2016 (Statistics Canada 2022). Average rents in northern Ontario urban centres are also lower than average for the province (The Advocacy Centre for Tenants Ontario and Advocacy North 2021). While the number of rental units in Timmins increased slightly between 2020 and 2022, the vacancy rate decreased from 5.5% in October 2020 to 3.9% in October 2022 (CMHC 2023).

Results of a housing needs assessment indicate that there is sufficient supply of home ownership housing (as opposed to rentals) in the District of Cochrane (Housing Services Corporation and CDSSAB 2019). Single detached homes made up the largest share of the current housing supply in the District in 2019 however, there is a lack of smaller housing options, for which demand is increasing (Housing Services Corporation and CDSSAB 2019).

There is an inadequate supply of housing for individuals with physical disabilities and those with mental health concerns. (Housing Services Corporation and CDSSAB 2019). Seniors are also challenged to find adequate housing because many units are not designed to accommodate the needs of seniors and tenants with mobility issues. While all communities in the LSA/RSA had lower instances of core housing need (housing that falls below indicator thresholds for housing adequacy, affordability, or suitability, and would have to spend 30% or more of its total before-tax income to pay the median rent of alternative local

housing that is acceptable) than the provincial average, inadequate housing is an issue in northern Ontario (Statistics Canada 2022).

In summary, the District of Cochrane sees a need for a greater supply of affordable housing options, including transitional housing, supportive housing, social housing units, and affordable private rental and homeownership accommodations.

Municipalities are taking steps to increase the supply of appropriate housing. For instance, the Town of Smooth Rock Falls is encouraging lot development through its Municipal Property Acquisition and Sale Program, which reimburses purchasers by up to 90% below market value after the home is built (Town of Smooth Rock Falls 2024). The Town's Waterfront 20-year Master Plan highlights the development of 140 acres of waterfront land through the construction of 435 residential units. Some lots will begin to be serviced in 2024 (Town of Smooth Rock Falls 2023a).

The City of Timmins is exploring the cost of expanding two existing subdivisions, which could generate up to 150 new homes. The City has also been increasing land for new residential development through the demolition of derelict properties (City of Timmins 2024). As part of its strategy to expand the community, the Town of Cochrane is working on a plan to sell residential lots for as low as \$10 (Lentz-McGrath 2024a). Municipal authorities state that the Town has a surplus of lots available that can be easily serviced, and they are hoping the plan will encourage regional employers to relocate their workforces to the Town of Cochrane (Lentz-McGrath 2024a).

Recognizing the need for more affordable housing in Timmins, the City Council created a Housing Task Force in 2022 to be led by the Timmins Economic Development Corporation (TEDC 2021; Grech 2023a). The purpose of the Task Force is to identify challenges to affordable housing and to explore and develop strategies to address the City's current and future housing needs.

In July 2023, the Government of Canada and the Province of Ontario announced an investment of nearly \$2 million to help create six supportive housing units that will support youth aged 16 to 21 in Timmins. An old school was acquired by the North Eastern Ontario Family and Children's Services to be transformed into four one-bedroom apartments, a barrier-free/accessible one-bedroom apartment and a three-bedroom unit. This project will provide supportive housing, on-site services, and help teens successfully transition to independent living in their home community (North Eastern Ontario Family and Children's Services 2023).

9.13.1.1.1 Indigenous Housing

Ontario Aboriginal Housing Services (OAHS) is a corporation with a mandate to provide safe and affordable housing to urban and rural First Nation, Inuit, and Métis people living off-Reserve in Ontario. OAHS provides a variety of housing options along the housing continuum starting at rent geared-to-income units and currently ending with assisted homeownership and home repair assistance. Rents are set at rates ranging from 25% of gross income (core need) to 80% of market (affordable) (OAHS 2021). OAHS is the largest Indigenous non-profit housing provider in Ontario with 2,700 homes throughout the province (Grech 2023b). In 2020, CDSSAB and OAHS established a partnership to reduce

homelessness, increase options for housing Indigenous populations, and reduce housing waitlist managed by CDSSAB (CDSSAB 2021a).

In September 2023, the Timmins City Council donated 2.9 ha of City-owned land to OAHS so it can build two three-storey 62-unit affordable housing complexes for a total of 124 units. Construction on the housing complexes is expected to begin in July 2026 (Grech 2023b).

The Timmins Native Non-Profit Housing Corporation aims to provide quality affordable housing to families of Indigenous descent in Timmins. It is overseen by a volunteer Board of Directors and managed by two staff: an Operations Coordinator and an Administrative Clerk. The Timmins Native Non-Profit Housing Corporation is funded by the Government of Canada through the CMHC. It manages 36 housing units made up of two-, three- and four-bedroom units. There are 20 individual and semi-detached units and 16 row housing units in Timmins (Timmins Native Non-Profit Housing Corporation 2015).

Through Indigenous Services Canada, the Government of Canada provides funding to First Nations for housing in their communities. A description of on-reserve housing in each community is provided in Chapters 25-28.

9.13.1.1.2 Temporary Accommodations

As of October 2023, there are 30 hotels, motels, bed and breakfasts, and inns in the LSA/RSA with a total of 1,418 rooms (TripAdvisor 2023). The communities of Timmins and Cochrane have the highest number of temporary accommodations (15 and 12, respectively), with limited options in Iroquois Falls and Smooth Rock Falls. There are also a number of outfitters, campgrounds, and RV parks (Tourism Timmins 2023; Town of Cochrane 2024). Other project specific temporary accommodations occur (or have occurred) within the area based on the short-term needs of specific projects and activities, such as the former Atco camp built along Highway 655 during the construction of the Detour Gold mine that houses 100-200 workers.

The communities in the LSA/RSA belong to the Northeastern Ontario Tourism Region, which had a temporary accommodation occupancy rate of 59.5% from January to July 2023. This is a 1.5% decrease from the same period in 2022, which had an occupancy rate of 58% (CBRE Ltd. 2023).

9.13.1.1.3 Social Housing

Homelessness has existed in the District of Cochrane for many years. It was exacerbated by the Covid-19 pandemic and is currently at critical levels (CDSSAB 2021a). According to a point-in-time count (a tool used to count the number of people experiencing homelessness on a given day/night) of those without a permanent home in the Cochrane District completed in April 2021 found that 142 (58.6%) of the 242 people counted were experiencing chronic homelessness. In June 2023, of the 276 people counted as homeless, 100 (36.2%) were chronically homeless. This refers to those who have been without a home for six months out of the past year (CDSSAB 2021b).

There is evidence that homelessness in the District of Cochrane is more likely to be experienced by members of vulnerable groups, such as youth, seniors, Indigenous peoples, visible minorities, persons

with disabilities, and low-income families (Housing Services Corporation and CDSSAB 2019; CDSSAB 2021a, b). A disproportionate number of youth and Indigenous peoples in the District of Cochrane are experiencing, or are at risk, of homelessness. It has been suggested that this is part of the legacy of residential school abuses and the discrimination encountered when seeking rental housing. According to the results of a survey completed during the April 2021 point-in-time count of homelessness, people of Indigenous ancestry are over-represented among the population of unhoused residents (CDSSAB 2021b).

The CDSSAB is responsible for the administration and funding of social housing and homelessness programs in the District of Cochrane (CDSSAB 2022a). The CDSSAB acknowledges that the supply of subsidized and/or financially assisted housing in the District of Cochrane is not keeping up with the demand. The number of individuals and families on the waitlist for subsidized housing units demonstrates the need for more affordable housing options (Housing Services Corporation and CDSSAB 2019).

There is also a limited supply of supportive and transitional housing in the District of Cochrane and the number of people accessing these supports is increasing (Housing Services Corporation and CDSSAB 2019). Results from a housing needs assessment for the District of Cochrane indicate that additional emergency shelter beds or transitional housing units are needed. In addition to this requirement, there is an insufficient supply of emergency housing for men, youth, and victims of family violence (Housing Services Corporation and CDSSAB 2019). There are four supportive and transitional housing options in the LSA/RSA n (Living Space 2023).

A new multi-family affordable housing complex is under construction in Iroquois Falls that will feature about 150 mixed-use units, public recreation green space and a playground, an early childhood education space and an Indigenous culture centre. A modular housing factory is also under development in Iroquois Falls which will have the capacity to build up to 300 modular homes each year. As part of this plan, the operating company, Due North Homes, will build a subdivision with 150 new homes in Iroquois Falls (CBC News 2022).

9.13.1.2 Utilities

Water distribution and treatment services in the LSA/RSA, including sewage treatment, are provided by the towns and communities of Cochrane, Timmins, Iroquois Falls, and Smooth Rock Falls. All the facilities are operating below their capacity, with the exception of the Whitney and Tisdale Wastewater Treatment Plant in Timmins, which is operating slightly beyond its capacity of 20,457 cubic metres per day (m³/day).

The Deloro Landfill Site is located in Deloro Township, within the limits of the City of Timmins, Ontario. The site is approved for the use and operation of a 40-hectare (ha) landfill site within a total area of 375.2 ha. The Fournier Landfill is owned and operated by the Town of Cochrane. An expansion has been proposed so that it will accommodate the waste disposal needs until 2044 (Government of Ontario 2023a). The Nellie Lake Landfill is operated by the Town of Iroquois Falls. It was developed with a proposed capacity of 315,000 m³ (Ontario 2021a). The Smooth Rock Falls landfill was recently proposed to be expanded to 172,500 m³ (Smooth Rock Falls 2018).

9.13.1.3 Health Services and Infrastructure

9.13.1.3.1 Health Facilities

Ontario Health has six health regions to lead the local health systems, fund health care providers, and monitor health care performance (Ontario Health 2023). The Porcupine Health Unit (PHU) is a public health unit serving Cochrane District. Its head office is in Timmins, and it has a staff of 120 in nine offices throughout the region (PHU 2023). Data for the North East Region indicate that in 2022, it had 723 family medicine physicians, up 1.1% from 2018 when it had 715. In 2022, the North East Region had 124 physicians per 100,000 population compared to 115 physicians per 100,000 population in the province (CIHI 2022). There were 455 specialists in the North East Region in 2022, an increase of 1.8% from 2018. In 2022, there were 78 specialists per 100,000 population in the North East Region versus 118 per 100,000 population in the province (CIHI 2022).

Despite these data, there appears to be a shortage of family doctors in the Cochrane District (The Daily Press 2022). The Northern Ontario School of Medicine has suggested that the city will need to recruit 17 new physicians to replace the larger practices that closed since 2020 (The Daily Press 2022).

Some recent initiatives have been established to recruit doctors to Northern Ontario communities, including Frontier Spirit Physician Recruitment, a not-for-profit corporation created by the municipalities of Cochrane, Iroquois Falls, and Matheson. It consists of representatives from each of the three municipalities, a representative from two family health teams, as well as three skills-based individuals (Lentz-McGrath 2024b).

The Timmins and District Hospital is located within Timmins and serves the Cochrane District, as well as the Temiskaming, Sudbury, and Algoma Districts (Timmins and District Hospital 2023a). The 184-bed hospital has 850 staff and 74 physicians and offers services ranging from medical, surgical, critical care, maternity, newborn, pediatric, long-term care, and mental health services.

The Lady Minto Hospital in Cochrane provides in-patient, complex ongoing care, emergency, outpatient, ambulatory care, general surgery, and long-term care. It has 25 acute, eight continuing care, and 37 long term care beds. Cochrane and Iroquois Falls are members of the Matheson, Iroquois Falls, and Cochrane Groups network of three hospitals, consisting of both emergency and long-term care services.

The Anson General Hospital in Iroquois Falls is a 34-bed hospital: 19 acute and 15 continuing care beds. Visiting speciality clinics provided for: general surgery, internal medicine, urology, gynecology, neurology. Through the PHU, Iroquois Falls is also provided with regularly scheduled clinical appointments which offer the same range of routine and emergency care services (MICS Group of Health Services 2021).

Smooth Rock Falls Hospital has one full-time physician and three part-time physicians. Emergency services are available 24-hours per day, including patient medical, palliative care, chronic care, long-term care, laboratory, and radiology services (Town of Smooth Rock Falls 2022). The Falls Medical Clinic focuses on family and community health by appointment only and provides care for minor illnesses and injuries. There is a full-time nurse on staff at the Smooth Rock Falls PHU.

9.13.1.3.2 Mental Health and Addictions Services and Infrastructure

The Canadian Mental Health Association Cochrane-Timiskaming (CMHA-CT) branch provides supports and services to people dealing with mental health challenges. It provides addictions services, including individualized assessment and treatment planning, referral to in-patient substance abuse programs, family support and education, among other services. The Timmins CMHA-CT branch location offers walk-in/call-in mental health and addictions clinics (CMHA-CT 2023).

The Timmins and District Hospital provides addictions services, including the Addiction Medicine Consult Service and the Community Withdrawal Management Service to provide treatment for substance and/or opioid use disorders and for acute withdrawal. The Timmins and District Hospital has two inpatient acute withdrawal management beds, providing a location where people can safely withdraw from substances with medical support (Timmins and District Hospital 2023b).

The Cochrane District Detox Centre in Smooth Rock Falls provides detoxification services, as well as physical and psychological stabilization to individuals struggling with substance abuse. The Centre is housed in the Mattagami Centre and has 27 beds, six of which are designated for women only (HSRFH 2021).

Women and children seeking aid from domestic violence and abuse can access provincial aid, including emergency shelter, by calling the provincial Crisis Line, Assaulted Women's Hotline, Victim Support Line, or Fem'Aide (francophone) telephone numbers (MCCSS 2023). The Ontario Network of Sexual Assault/Domestic Violence Treatment Centres (ONSA/DVTC) operates 37 facilities within the province, though none within the RSA. The nearest ONSA/DVTC facility to the RSA is in North Bay, 373 km south of Cochrane.

The Timmins & Area Women in Crisis centre assists women experiencing violence and abuse and offers services for Indigenous women (TAWC 2018).

9.13.1.3.3 Indigenous Health

Community-led health programs and services for First Nations, Inuit, and Métis communities in Ontario include Aboriginal Health Access Centres, which are Indigenous community-led, primary health care organizations. They provide a combination of traditional healing, primary care, cultural programs, health promotion programs, community development initiatives, and social support services to First Nations, Métis, and Inuit communities in rural, northern, and urban locations (North East Healthline 2023).

There are several Aboriginal Health Access Centres in the LSA/RSA, including:

- Misiway Milopemahteseewin Community Health Centre (Timmins)
- Timmins Native Friendship Centre (Timmins)
- Aboriginal Peoples' Alliance Northern Ontario (Cochrane)
- Métis Nation of Ontario (MNO) - Healing and Wellness (Cochrane)
- Sweetgrass Health Centre (Cochrane)
- Taykwa Tagamou First Nation - Health Centre (Cochrane)
- Mushkegowuk Health (Timmins)

The CMHA-CT has an Indigenous Committee that acts as an advisory body to consider the needs of Indigenous Peoples in CMHA-CT decision making and to improve the health outcomes for Indigenous residents in the area.

Indigenous women facing domestic or family abuse in Ontario can seek counselling and assistance through several help lines, including Talk4Healing, Hope for Wellness 24/7 Help Line, and NAN Hope helpline.

The Ontario Native Women's Association (ONWA) operates a facility in Timmins which offers services for Indigenous women, including trauma-informed care, family violence services, and community health outreach (ONWA n.d.).

More detail on health services and infrastructure in Indigenous nations can be found in Chapters 25-28 (Indigenous Interests) of the Impact Statement.

9.13.1.3.4 Senior Services and Long-term Care Homes

Services for seniors within the LSA/RSA can be sought online through Home and Community Care Support Services North East (Ontario 2023c). There are five provincially listed long-term care homes within the LSA/RSA; two in Timmins, and one each in Cochrane, Smooth Rock Falls, and Iroquois Falls (Ontario 2023d). There are an additional two private long-term care homes in Timmins (Autumnwood 2023; Chartwell 2023).

Golden Manor in Timmins is currently being redeveloped to replace the existing 177-bed long-term care facility. The new building will have 192 beds and will be more accessible. It is expected to be complete in May 2026 (Timmins 2023).

There are also plans to build a six-storey long-term care home in the Town of Cochrane. The facility would have approximately 270 beds and would include a medical clinic, diagnostics centre, pharmacy, and retail stores. Construction is expected to start in 2024 and be complete in 2026 (Arangio 2023).

9.13.1.4 Emergency Services

The City of Timmins is served by the Timmins Fire Department, which includes one primary fire station and six volunteer fire stations throughout the community. This department employs 28 full-time firefighters and a number of volunteer members and provides service to several surrounding areas (Timmins 2018a).

The Cochrane Volunteer Fire Department provides emergency services to Cochrane and includes 38 trained members. Iroquois Falls is served by one volunteer fire department. The Smooth Rock Falls Fire Department is staffed by volunteer firefighters and has a fleet consisting of two pumper trucks, a rescue van, a side-by-side all-terrain vehicle (ATV), and a pickup truck.

All communities in the LSA/RSA are within the Ontario Provincial Police (OPP) Force – North East Region. Timmins is the only community within the LSA/RSA with its own municipal police force. The Timmins Police Service (TPS) is composed of 146 staff members, divided between 82 sworn police officers and 61 civilian staff members/auxiliaries (TPS n.d.). The TPS is approved for 96 officers but at its peak, it had 88 officers (Hoggitt 2023). Cochrane, Iroquois Falls, and Smooth Rock Falls are part of the James Bay Detachment of the OPP.

Crime severity index (CSI) is a measure of the level of crime severity in a jurisdiction and includes all Criminal Code violations, including traffic and drug violations (Statistics Canada 2023). The CSI for Timmins decreased by 8.4% in 2022 (e.g., the most recently available data) to 148.5, from 162.1 in 2021, which recorded the highest CSI from 2018-2022 (Statistics Canada 2023). In 2021 (the most recently available data; OPP 2023), the total number of violent crimes in the James Bay detachment was 707, an increase of 13.1% from 2020.

The Nishnawbe Aski Police Service (NAPS) is the largest Indigenous police service in Canada and provides service to more than 60% of Ontario through its Northeast Region, Northwest Region, and Central Region (NAPS 2023). The Northeast Regional Office is located in Cochrane, with detachments in numerous surrounding Indigenous nations. The Northeast Region is overseen by a Regional Commander, under whom is a Staff Sergeant responsible for up to 13 sergeants, 49 constables, and numerous administrative staff. In 2022, approximately 14 of the officer positions were vacant due to staff shortages, and an additional 13 were vacant due to leave. From March 2021 to March 2022, there were 11,863 calls for service and 4,419 charges laid (NAPS 2023).

The District of Cochrane provides direct delivery of 20 ambulances across the communities of Cochrane, Iroquois Falls, Smooth Rock Falls, and Black River-Matheson through Cochrane District Social Services Administration Board (CDSSAB 2022a; CDSSAB 2022c). There are 92 full-, part-time, and contracted paramedics employed by CDSSAB in the LSA/RSA.

In 2021, there were 20,403 calls for ambulance service across the District of Cochrane, which includes Timmins, Cochrane, Iroquois Falls, Smooth Rock Falls as well as 11 other communities (TPS 2021). The average response time in 2021 was seven minutes and eight seconds, which increased in 2022 (the most recently available data) to seven minutes and 27 seconds (MOH 2022).

The District of Cochrane has seen a progressive increase in total ambulance call numbers from 2018 to 2022 (the most recently available data; CDSSAB 2022b). Smooth Rock Falls is the only community within the LSA/RSA that has experienced a decrease (-14%) in ambulance calls from 2018 to 2022. Cochrane is the community with the largest change in the number of calls (+43%).

9.13.1.5 Education and Childcare

There are four school boards which administer education across the LSA/RSA communities: District School Board Ontario North East (DSB1), Northeastern Catholic School Board, Conseil Scolaire Catholique de District des Grandes Rivières, and Conseil Scolaire Public de Nord Est de L'Ontario.

In the 2021-22 school year, there were 44 elementary and secondary schools in the LSA/RSA communities. Between the 2017-2018 and 2021-2022 academic years, the total enrolment in the four school districts in the LSA/RSA increased 6.6%, from 16,947 to 18,060 (Government of Ontario 2023a).

For decades, Northern Ontario schools have been experiencing a decline in student enrolment (White 2023). However, some northern school districts are now experiencing modest increases in the student population because of newcomers to Canada who are settling in the region. This has created a need for more teachers and renovations to some schools (White 2023).

There are 44 universities and colleges across Northern Ontario (NOL n.d.), with several located within the LSA/RSA. There are two adult based education centres in the District of Cochrane which provide literacy, numeracy, and essential skills for further adult education and training; Adult Learning Centre and Centre D'alphabétisation au Pied de la Lettre.

There are 14 childcare centres in the LSA/RSA. In addition to private childcare centres, some of the school districts in the District of Cochrane have partnered with licensed childcare operators to provide before and after school care and early learning school readiness programs at several schools throughout the District of Cochrane (DSBONE n.d.).

The Timmins Native Friendship Centre has been operating the Oppekehawaso Wekamik program since 2005, which offers childcare for children 0-12 years of age. It is staffed by Registered Early Childhood Educators (ECEs), Early Childhood Education Assistants, and a Resource Teacher and it is licensed for 76 children (Timmins Native Friendship Centre 2023).

In 2023, the Mayor of Timmins spoke on childcare during the 2023 State of the City Address (Timmins 2023). They indicated that there is a shortage of ECEs in the region, with an estimated 80 ECEs required to meet the present demand. The mayor discussed the need for provincial recruitment and retention strategies for ECEs, as well as the possibility of developing regions-specific strategies. According to the Director of Children's Services for the CDSSAB, as of July 2023, 96% of available childcare spaces in the District had been filled and some spaces had been closed due to a lack of early childhood educators (S. Costello, pers. comm. 2023).

In October 2023, the Ontario Minister of Education announced that 189 new licensed childcare spaces will be created in the District of Cochrane. These additional spaces would represent an 11.7% increase in

the number available within the District of Cochrane (Ontario 2023b). There are staffing concerns associated with this increase, however; the current capacity of childcare centres in the CDSSAB requires 110 educators, and the additional 189 childcare spaces opening in the District of Cochrane will require an additional 56 educators (CTV News 2023).

9.13.1.6 Transportation

The Victor M. Power Airport in Timmins is the largest municipal airport in the LSA/RSA. It serves more than 200,000 passengers annually. Between 2020 and 2022, aircraft movements at the Timmins airport increased from 13,866 to 16,863 (Statistics Canada 2023). There is speculation that the airport terminal may need to be expanded if there is an increase in the movement of mine workers in and out of the area (Stoffman 2023). A Master Plan is being developed for the airport that will act as a blueprint for future airport operations and development. The plan will address airport infrastructure needs, identify economic opportunities, and provide guidelines for development in the short (5 years), medium (10 years) and long (20 years) term (TEDC 2021).

The Cochrane Airport is located 5 km north of Cochrane and has one runway. It serves private charters, air cargo, and medevac flights (CYCN 2023). The Iroquois Falls Airport is a small aerodrome located 9 km west of Iroquois Falls. It is in the process of being renovated, including development of a new industrial park (Iroquois Falls 2023).

Ontario Northland Transportation Commission (ONTC) is a provincial agency operating bus and railway services in northern Ontario. There are ONTC stations in Timmins, Cochrane, Iroquois Falls, and Smooth Rock Falls. However, only the Cochrane Railway Station is connected to the passenger railway system; the other stations are only serviced by ONTC bus service. The Cochrane Railway Station is also the southernmost stop of the Polar Bear Express, a passenger train operated by ONTC in Northern Ontario.

The ONTC is presently working on increasing passenger rail service in Northern Ontario with the Northlander Passenger Train, which will connect Toronto to several Northern Ontario communities, including Timmins, before terminating in Cochrane, where it will connect to the Polar Bear Express line. The ONTC also operates a freight rail system in Northern Ontario, including providing service to Timmins, Iroquois Falls, and Cochrane (ONTC 2023).

Highway 655 runs north south through the PA connecting to Highway 11, the Trans-Canada Highway located north of the PA, to Highway 101 located south of the PA. The PA is readily accessible from both Timmins and South Porcupine from the south, as well as the communities of Smooth Rock Falls and Cochrane to the north on Highway 11.

Highway 655 is a two-lane highway with a design speed of 110 kilometres per hour (km/hour) and is posted with a regulatory speed limit of 90 km/hr. The Annual Average Daily Traffic (AADT) for Highway 655, north of Kidd Creek Mine Road and Highway 11 is 1,200. Forecast AADT for 2030 is 1,300 vehicles per day. The Level of Service for Highway 655 is 'A'.

9.13.2 Overview of Land and Resource Use

9.13.2.1 Land Use Designations and Private Property

Parts of the Project are located on provincial Crown lands, and reservations to the Crown exists on privately held lands. The Project RSA consists of lands made up of patented¹ lands (i.e., privately owned), provincial parks, conservation reserves, and First Nation Reserves, totaling 312,327 ha. Unpatented² Crown land in the RSA totals 688,253 ha. These lands are located within surveyed municipal boundaries and unorganized areas in the Cochrane District community planning area of northeastern Ontario (Figure 22.3 Chapter 22 of the Impact Statement). The PA is comprised mostly of privately held surface rights. The Project is defined by a combination of 162 mining patents and 161 mining claims. Canada Nickel holds or is in the process of acquiring a 100% interest in the mining rights under the future mine infrastructures and is working with landowners to obtain surface rights in the PA.

The PA is not located near any federal lands. The closest lands under federal jurisdiction are Taykwa Tagamou Nation's Reserve lands located approximately 45 km away (straight line) from the Project site (14 km southeast of Cochrane). The New Post 69A Reserve totals 116 ha in the RSA.

There are one residential and four camp/cottage properties near the PA.

The Project is in the geographic townships of Crawford, Carnegie, Kidd, Lucas, Beck, Nesbitt, Wark and Prosser within the Cochrane District in northeastern Ontario (Figure 22.4 Chapter 22 of the Impact Statement). The Project RSA encompasses the City of Timmins, Town of Cochrane, Town of Iroquois Falls, and Town of Smooth Rock Falls. The following municipal Official Plans (OPs) and Zoning By-laws apply to the Project:

- City of Timmins Official Plan – Only a small portion of the PA, the southern portion associated with the Highway 655 re-alignment and rail spur line falls within the City of Timmins Official Plan area.
- City of Timmins Zoning By-law No. 2011-7100 – Outside of the urban portion of Timmins, lands within the PA (only the southern portion) are zoned primarily as “RD-RU Rural” and “EA-IM – Mining (Class III)”. Numerous Crown Land Parcels are included in the municipal boundary.

There are no provincial parks, conservation reserves, Areas of Natural and Scientific Interest (ANSI) sites, or provincially significant wetlands in the PA. There are five Provincial Parks in the RSA (Figure 22.5 of Chapter 22 of the Impact Statement). No provincial parks are in the LSA. There are five Conservation Reserves in the RSA (Ontario GeoHub 2023b). Five ANSIs occur within the RSA. There are six provincially significant wetlands in the RSA, and one provincially significant wetland in the LSA, Kraft

¹ Patented land from mining land tenure and non-mining tenure was used as a proxy approximation for private land. Patented land represents land transferred from the Crown into private ownership. Fee simple represents the broadest private property interest in law.

² Assumed unpatented Crown land refers to what is left over after removing patent land, First Nation Reserve, provincial parks, and conservation reserves. It is an estimate only as a separate Crown land data set is not available.

Creek/Murphy Creek. There are four Conservation Areas within the Mattagami Region Conservation Authority (Conservation Ontario Website 2023). All are concentrated in and around the City of Timmins.

Land use designations for Crown land are established by the Crown Land Use Policy Atlas (MNRF 2023a). Crown lands within the land and resource use LSA, including the PA, are designated as 'General Use', which encourages mineral exploration and development activities. Other recreation activities related to Crown land recreation, hunting, sport fishing and road use are permitted/managed by the MNRF in these areas (MNRF 2023a).

9.13.2.2 Outdoor Recreation/Tourism

9.13.2.2.1 Recreation Activities

Tourism opportunities in Northeastern Ontario (Tourism Region 13a) are numerous and diverse. Existing tourism offerings include licensed guide-outfitters, licensed fishing guides, cabins, lodges, resorts, scenic touring, and cultural/historical attractions and sites. Visitors to Northeastern Ontario in 2021 participated in numerous outdoor activities, including boating/canoeing, golfing, fishing, hunting, ATVing, cycling, hiking, camping, visiting beaches, and wildlife/bird watching (Ministry Tourism, Culture and Sport 2021). Winter activities include snowmobiling, downhill skiing, cross-country skiing, and snowshoeing (The Seven Northeastern Ontario Canada n.d.).

Three trails cross through the PA, associated with the Arctic Riders and Timmins Snowmobile Clubs, and Polar Bear Riders Trail 'A' (Figure 22.6 of Chapter 22 of the Impact Statement). The total intersect length is approximately 10 km. Five trails cross through the LSA for a total intersect length of approximately 45 km, including the three trails referenced above plus the Ontario Federation of Snowmobile Clubs (OFSC) official trail and Polar Bear Riders Snowmobile Club. An additional 36 trails (e.g., canoe, hiking, cross-country ski, ATV), identified through baseline studies (see Appendix B.9 of the Impact Assessment), cross through the RSA totalling a linear distance of approximately 1,460 km (Ontario GeoHub 2023c). ATV trails in the RSA includes a loop trail from Cochrane that is part of the Gateway to the North ATV route (Adventure North Ontario 2023b).

The Town of Cochrane offers a gateway to Greenwater Provincial Park. Abitibi Campground offers campsites along the Abitibi River. Good Time Outfitters offers a drive-in and fly-in hunting and fishing destination at their lodge on Silver Queen Lake (Tourism Cochrane 2023).

The Timmins area offers numerous recreational areas from provincial parks to private campgrounds and Recreation Vehicle sites. Boating, canoeing, kayaking, and fishing are available on the many lakes and rivers in the area. Located east of Highway 655 north of Timmins, the Big Water Campground is open from May 15th to October 15th, and offers 300 campsites, with both serviced and un-serviced lots. Additional amenities include walking and running trails, ATV trails, two beaches, two boat launches, and opportunities for fishing, canoeing, and kayaking on Big Water Lake (Big Water Campgrounds Inc. 2023).

The Project RSA encompasses Fisheries Management Zone (FMZ) 8 (MNRF 2023b). Fish species found in FMZ 8 that have seasons and limits include trout and salmon combined (including splake), brook trout, lake sturgeon, lake trout, lake whitefish, largemouth and smallmouth bass (combined), northern pike,

rainbow trout, sunfish, and walleye and sauger or any combination, and yellow perch (Government of Ontario 2023b). Six spawning areas have been identified in the RSA, including the Mattagami River, for brook trout, lake trout, lake whitefish, smallmouth bass, walleye, and white sucker. One spawning area falls within the LSA near Bigwater Lake, for brook trout. Fish species that are stocked in FMZ 8 waterbodies consist of aurora trout, brook trout, lake trout, rainbow trout, and splake (MNR 2023c).

Preliminary evaluation of the potential for navigable watercourses within the PA, LSA and RSA was conducted. The Government of Ontario identifies the canoeing and kayaking season as being from May to October with the peak season between July and August (Government of Ontario 2024a, b). Although navigation was not observed as part of other baseline field studies, navigation is possible throughout the entire open water season, or high-water season only, with obstacles on the following watercourses/waterbodies: Mattagami River, Trapper's Creek, Jocko Creek, Esker Lakes, North Driftwood River, Prosser Lake, and West Buskegau River. Several lakes (Martin Lake, Gerry Lake, Jack Lake, Davis Lake, and Zed Lake) in the LSA are connected by tributaries of Jocko Creek that are overlapped by the PA.

9.13.2.3 Resource Use

9.13.2.3.1 Land and Water

There are 5.6 ha of agricultural land within the LSA, but no agricultural properties within the PA (Figure 22.7 of Chapter 22 of the Impact Statement). The RSA includes 13,878 ha of agricultural land.

The RSA overlaps with one Source Protection Area (SPA), the Mattagami Region SPA. This SPA is for the City of Timmins sole municipal drinking water source, the Mattagami River. Residents in areas without access to the municipal drinking water supply obtain drinking water by other means (e.g., private wells). There are three recorded wells located within the PA, one of which is abandoned, and the other two wells are registered as commercial and domestic supply wells. An additional five unrecorded water supply wells have also been identified – one drilled well and four suspected surface water supply (Chapter 14 of the Impact Statement). There are 61 Ministry of Environment, Conservation and Parks (MECP) water well records for water supply wells located outside of the PA but within the LSA/RSA, of which 38 are associated with a water supply well. There are two active Permits to Take Water within the LSA/RSA, one for a water supply well and for dewatering from a mine sump, and the other for dewatering of groundwater and surface water at a quarry (MECP 2023).

9.13.2.3.2 Mining and Aggregate

The Cochrane District contains numerous mining claims, including mining claims and patent claims (Ontario Ministry of Mines 2022). Lease and patent lands comprising mining and surface rights total 938 ha in the PA and 4,064 ha in the LSA. Patent lands with mining rights only in the PA total 7,088 ha; lease and patent lands in the LSA with mining rights only totals 13,301 ha. Lease lands within the LSA with surface rights only totals 509 ha. There are 2,780 ha of active operational claims in the PA, and 9,803 ha of operational claims in the LSA.

The PA consists primarily of patented mining claims with surface and mining rights, mineral leases with surface and mining rights, and operational cell mining claims with mining rights only (Figure 22.8 of Chapter 22 of the Impact Statement). The PA encompasses 24 ha of lease land and 8,002 ha of patent land. Most of the Project mining facilities will be located on patent mining lands, although some infrastructure may be located on unpatented lands (e.g., provincial Crown lands).

Within the LSA, there is one active mine, the Hoyle Pond Mine (gold). In addition, four other base metal and gold mines are in the RSA beyond the LSA: Kidd Creek Mine, Bell Creek Mine, Hollinger Mine, and Timmins West Mine.

There are 57 active aggregate sites in the RSA and one active aggregate site is in the LSA (along Highway 655. In the Smooth Rock Falls Area, there are five sand and gravel deposits, three of which are the most important natural aggregate deposits in the area (Ontario Geological Survey 1984). In the central part of the City of Timmins, there are five substantial sand and gravel deposits (Ontario Geological Survey 1983a). Four areas with substantial sand and gravel deposits were noted in the eastern part of the City of Timmins (Ontario Geological Survey 1983b). Within the broader Cochrane District (unorganized), there are some 333 authorized aggregate sites, consisting of licensed and permitted pits and quarries (Figure 22.8 of Chapter 22 of the Impact Statement). There is one active aggregate pit operating in the PA, the Carnegie Pit.

9.13.2.3.3 Forestry

Most of the RSA is located within Abitibi River Forest Management Unit (FMU) 110. The FMU area within the PA, LSA and RSA totals 11,785 ha, 34,162 ha, and 807,326 ha respectively (Figure 22.9 of Chapter 22 of the Impact Statement). The current licensee for this FMU is Abitibi River Forest Management Inc., held under the Abitibi River Forest Sustainable Forest License (SFL) No. 551832 (Ontario Ministry of Natural Resources and Forestry 2023; Ontario GeoHub 2023d; Abitibi River Forest Management Inc. 2022). Crown managed productive forest in FMU 110 constitutes 69% or 2.1 million ha of the land area in the Abitibi River Forest, while non-productive Crown Forest consists of 275,925 ha. A substantial part of the forest in the RSA is comprised of private land which is not managed under the FMP. Crown timber on private land is managed by MNR Districts under the Management of Crown Trees on Patent Land program and is excluded from the Forest Management Plan. Currently there are 4,575 ha of Crown timber on patent land, of which 824 ha is forested.

Abitibi River Forest Management Inc. current plan shows no proposed forest harvest areas within the PA in FMU 110 (Figure 22.10 of Chapter 22 of the Impact Statement). Blocks of proposed harvest areas are situated in the LSA south and southeast of the Project, east of Highway 655 and along the existing railway line from Kidd Creek. Additional areas identified as Forecast Depletion (Harvest) Areas (areas not yet harvested under the previous plan) occur within the LSA southeast of Big Water Lake along the existing railway line from Kidd Creek. Most of the proposed harvest areas within FMU 110 are situated east of the PA in the RSA. Segments of existing roads that may be used for forestry exist in the PA west of existing Highway 655 and in the LSA at Kidd Creek (Figure 22.10 of Chapter 22 of the Impact Statement).

A portion of the Romeo Malette Forest (FMU 930) encompasses the area west of Timmins in the Project RSA (Figure 22.9 of Chapter 22 of the Impact Statement). The current licensee is GreenFirst Forest Products (QC) Inc., held under SFL No. 550398 (Ontario GeoHub 2023d; RYAM Forest Management 2018). Crown managed productive forest in FMU 930 consists of 498,526 ha or 93% of the land area in the Romeo Malette Forest; non-productive forest constitutes approximately 35,531 ha. Patent land (3%), largely made up of mining claims and is concentrated to the east of the Romeo Malette Forest along highways (e.g., Highway 655).

The total managed Crown productive forest land area on the Timiskaming Forest (FMU 280) is approximately 1.0 million ha or 85% of the land area; non-productive forest constitutes 74,456 ha. A portion of FMU 280 overlaps with the RSA.

9.13.2.3.4 Hunting/Outfitting and Trapping

In Ontario, big game species hunted through a licence includes white-tailed deer, moose, elk, American black bear, northern grey wolf, coyote, wild turkey, small game and furbearers, bullfrogs, and game birds. Migratory game birds hunted include waterfowl, common snipe, woodcock, and mourning dove (Government of Ontario 2023b). The regulated hunting season generally begins in early September, though specific hunting seasons vary by species and Wildlife Management Units (WMUs). Methods of hunting also vary depending on game hunted and season (Government of Ontario 2023b).

The Project RSA encompasses portions of seven WMUs in Northeastern Ontario – #24, 26, #27, #28, #29, #30, and #31. The LSA encompasses two WMUs – #29 and #30; the PA includes one WMU – #30 (Figure 22.11 of Chapter 22 of the Impact Statement). WMUs #24, #26 and #27 fall within Cervid Ecological Zone A (with woodland caribou and low densities of moose and white-tailed deer). Tourist operators offering moose hunting services provide those services in the WMU where they have moose licence tags. Tourist operators providing American black bear hunting services are required to be licensed for a particular Bear Management Area (BMA). There are 43 BMAs in the Project RSA; three in the LSA (Figure 22.11 of Chapter 22 of the Impact Statement). Two BMAs (e.g., CC-30-015, TI-30-048) are within the PA (Ontario GeoHub 2023f). The Social and Economic Conditions Baseline Report provides information on hunting activity and harvests by WMU (Appendix B.9 of the Impact Statement). There is one tourist operator business in the RSA, Good Time Outfitters, operating out of Cochrane. This operator offers hunting services in two BMAs and has four camps, all of which are located to the north of the RSA (Northern Ontario Tourist Outfitters Association 2024).

Trapping occurs within WMUs #24, #26, #27, #28, #29, #30, and #31 (see Figure 22.11 of Chapter 22 of the Impact Statement). There are 90 traplines (all or partial) within the Project RSA and nine within the LSA (Ontario GeoHub 2023g). Five trapping areas cross the PA. Trapping harvest activity of furbearers is not broken down by WMUs. Furbearer species trapped include beaver, North American river otter, bobcat/lynx, American mink, muskrat, fisher and American marten, coloured fox, wolf, coyote, opossum and racoon, arctic fox, red squirrel, weasel, and skunk (Government of Ontario 2023e).

9.13.2.3.5 Commercial Fishing

The Project RSA overlaps 148 bait harvest block areas, of which 16 are overlapped by the LSA (Figure 22.12 of Chapter 22 of the Impact Statement; Ontario GeoHub 2023h). Nine bait harvest block areas fall within the PA. Permitted baitfish species include darters, minnows, sculpins, sticklebacks, suckers, central mudminnow, lake herring (cisco), and trout perch. Crayfish, subject to certain restrictions, and northern leopard frogs may be captured and used as bait (Government of Ontario 2023d). During fish surveys conducted in 2021, 2022, and 2023, fourteen baitfish species were recorded in the PA and LSA including shiners, stickleback, minnow, dace, darters, perch, and sucker (Appendix B.8.2 of the Impact Statement). Watercourses and waterbodies where baitfish species were found in and adjacent to the PA include an unnamed pond, unnamed streams and tributaries to the North Driftwood River, Gerry Lake, an unnamed stream and tributary to the West Buskegau River, and the West Buskegau River (Wood Canada Limited 2022). There are no other commercial fisheries other than baitfish in the RSA.

9.13.3 Gender Based Analysis Plus Summary

As required by the TIS Guidelines (Appendix A.1), the assessment of Social Conditions considers the potential effects on sub-populations and sub-groups of the LSA/RSA population who may experience disproportionate effects from the Project. For this assessment, these include women, Indigenous nations, low-income families, visible minorities, persons with disabilities, youth, and older adults.

As described in the existing conditions for services and infrastructure, access to suitable housing presents the greatest challenge for members of vulnerable groups in the LSA/RSA. Data suggests that while the average purchase price of a house and average monthly rent within LSA/RSA communities is lower than provincial averages, affordability is still an issue for sub-populations of the population. Single detached homes account for the largest share of the current housing supply in the Cochrane District and there is a recognized need for more diversified housing stock, including smaller housing options, affordable housing options, including transitional housing, supportive housing, social housing units, and rental units.

There is an inadequate supply of housing for individuals with physical disabilities and those with mental health concerns. As a result, members of these populations in the District of Cochrane are increasingly challenged to find and maintain appropriate housing without the specialized supports they require (Housing Services Corporation and CDSSAB 2019). Seniors are challenged to find suitable housing because of the high percentage of older housing that requires major repairs in the District. For seniors, it becomes more difficult to remain in their own home due to mobility and health challenges, and many units are not designed to accommodate the needs of seniors and tenants with mobility issues.

There is evidence that homelessness in the District of Cochrane is likely to be experienced by members of vulnerable groups, such as youth, seniors, Indigenous peoples, visible minorities, persons with disabilities, and low-income families, more often than other members of the population (Housing Services Corporation and CDSSAB 2019; CDSSAB 2021a, b). A disproportionate number of youth and Indigenous peoples in the District are experiencing, or are at risk, of homelessness. According to the results of a survey completed during the April 2021 point-in-time count of homelessness, people of Indigenous ancestry are over-represented among the population of residents with no home (CDSSAB 2021b).

There is a limited supply of supportive and transitional housing in the District of Cochrane and the number of people accessing these supports is increasing (Housing Services Corporation and CDSSAB 2019). There is also an insufficient supply of emergency housing for men, youth, and victims of family violence (Housing Services Corporation and CDSSAB 2019).

9.14 Economic Conditions

An overview of the baseline conditions for economic conditions is provided in Appendix B.9 (Social and Economic Conditions Baseline Report). The baseline information presented herein provides an overview of the economic conditions for reference.

9.14.1 Population

In 2021, the total population of the LSA was 52,710 (evenly split between men+³ and women+⁴), a 1.4% decrease since 2016 (Table 9.26) (Statistics Canada 2017, 2022). All First Nations communities, where data was available, experienced population increases between 2016 and 2021. For the RSA, total population was 109,590 (50.2% women+) in 2021, a decrease of 2.3% over 2016. In comparison, the provincial population of 14,223,940 (51.0% women+) experienced a 5.5% increase from 2016 to 2021. Approximately 16% of persons within both the LSA (8,410, of which 50.9% are women+) and RSA (17,600, of which 50.3% are women+) identified as Indigenous. Indigenous populations increased from 2016 to 2021 in the province (7.9% increase), the RSA (11.6%) and the LSA (18.4%).

Table 9.26 Population Change – 2016 to 2021

Location	Total	Men+ ¹	Women+ ²	% Change (Total)	% Change (Men+)	% Change (Women+)
Total Population						
Mattagami First Nation (2023) ⁴	43	6	37	9.5%	14.3%	4.8%
Matachewan First Nation (2023)	66	33	33	7.7%	14.3%	14.3%
City of Timmins	41,145	20,555	20,590	-1.6%	-0.6%	-2.5%
Town of Iroquois Falls	4420	2210	2210	-2.7%	-1.1%	-4.3%
Apitipi Anicinapek Nation	155	85	70	6.5%	0.0%	14.3%
Town of Cochrane	5395	2695	2700	1.2%	2.6%	0.4%
Town of Smooth Rock Falls	1200	610	590	-10.8%	-11.5%	-10.2%
Flying Post First Nation (2023)	258	X	X	X	X	X
Taykwa Tagamou First Nation	130	70	60	28.0%	28.6%	25.0%
LSA	52,710	26,360	26,360	-1.4%	-0.4%	-2.4%
Timiskaming Census Division	31,420	15,510	15,910	-2.6%	-3.1%	-2.2%
Cochrane Census Division	77,960	38,985	38,975	-2.2%	-1.5%	-2.9%

³ This category includes men (and/or boys), as well as some non-binary persons.

⁴ This category includes women (and/or girls), as well as some non-binary persons.

Location	Total	Men+ ¹	Women+ ²	% Change (Total)	% Change (Men+)	% Change (Women+)
RSA	109,590	54,600	54,990	-2.3%	-1.9%	-2.7%
Ontario	14,223,940	6,970,855	7,253,085	5.5%	5.9%	5.0%
Indigenous Populations³						
Mattagami First Nation (2023)	43	6	37	8.1%	-5.9%	15.0%
Matachewan First Nation	50	25	25	9.1%	0.0%	20.0%
City of Timmins	5995	2955	3,040	21.4%	23.4%	19.4%
Town of Iroquois Falls	570	295	275	3.5%	6.8%	0.0%
Apitipi Anicinapek Nation	140	70	70	0.0%	-14.3%	14.3%
Town of Cochrane	1275	610	670	18.0%	9.8%	26.1%
Town of Smooth Rock Falls	55	20	35	-75.0%	-125.0%	-71.4%
Flying Post First Nation	X	X	X	X	X	X
Taykwa Tagamou First Nation	135	70	65	30.8%	28.6%	30.8%
LSA	8410	4130	4280	18.4%	18.2%	18.5%
Timiskaming Census Division	2865	1415	1450	10.8%	9.5%	12.1%
Cochrane Census Division	14,550	7245	7,305	11.8%	12.3%	11.4%
RSA	17,600	8745	8855	11.6%	11.7%	11.5%
Ontario	406,595	195,100	211,495	7.9%	7.8%	8.1%
Notes: 1 This category includes men (and/or boys), as well as some non-binary persons. 2 This category includes women (and/or girls), as well as some non-binary persons. 3 Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size. X no information available. 2021 'Total Population' and 'Indigenous Populations' data from 2021 Census of the Population – Census Profile. Values shown in "Total" columns are the sum of male and female Census Subdivision (CSD) subsets taken from Statistics Canada's 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables. Source: Statistics Canada 2022, Mattagami First Nation 2023, Matachewan First Nation 2023, Flying Post First Nation 2023						

9.14.2 Educational Attainment

Educational attainment levels for residents of the LSA and RSA in 2021 are summarized in Table 9.27. Within the LSA, 48.0% of the total population had completed post-secondary education compared to the RSA average of 47.4% (Statistics Canada 2022). Women+ within both the LSA (60.7%) and RSA (62.3%) accounted for a greater proportion of the total population with a college or university certificate, diploma or degree at bachelor level or above, while men+ accounted for a greater proportion of the population with an apprenticeship or trades certificate or diploma (79.9% in the LSA and 78.1% in the RSA). Similar to the general population, Indigenous where women+ account for a greater proportion of the total Indigenous populations with a college or university certificate, diploma or degree at bachelor level or above (69.6% of the LSA and 76.0% of the RSA), while men+ accounted for a greater proportion of the Indigenous populations with an apprenticeship or trades certificate or diploma (80.9% in the LSA and 77.0% in the RSA).

Table 9.27 Education Attainment in LSA and RSA – 2021

Educational Attainment	LSA				RSA			
	Total	Percent	Men+ ¹ (%)	Women+ ² (%)	Total	Percent	Men+ (%)	Women+ (%)
Total Population								
No certificate, diploma or degree	9,625	22.4%	51.5%	48.5%	21,650	24.1%	52.5%	47.5%
High (secondary) school diploma or equivalency certificate	12,740	29.6%	50.7%	49.6%	25,520	28.5%	50.9%	49.1%
Apprenticeship or trades certificate or diploma	3,435	8.0%	79.9%	19.8%	7,385	8.2%	78.1%	21.7%
College, CEGEP or other non-university certificate or diploma	11,605	27.0%	44.1%	56.0%	23,850	26.6%	43.3%	56.7%
University certificate or diploma below bachelor level	475	1.1%	43.2%	60.0%	1,090	1.2%	36.7%	64.2%
Bachelor's degree or higher	5,140	11.9%	38.9%	60.7%	10,200	11.4%	37.5%	62.3%
Indigenous Populations³								
No certificate, diploma or degree	1,760	27.8%	49.4%	51.4%	4,080	31.1%	54.2%	45.7%
High (secondary) school diploma or equivalency certificate	1,830	28.9%	49.7%	50.5%	3,645	27.8%	50.1%	49.9%
Apprenticeship or trades certificate or diploma	470	7.4%	80.9%	21.3%	980	7.5%	77.0%	23.5%
College, CEGEP or other non-university certificate or diploma	1,755	27.7%	43.0%	58.1%	3,400	25.9%	41.2%	58.5%

Educational Attainment	LSA				RSA			
	Total	Percent	Men+ ¹ (%)	Women+ ² (%)	Total	Percent	Men+ (%)	Women+ (%)
University certificate or diploma below bachelor level	55	0.9%	36.4%	81.8%	195	1.5%	25.6%	79.5%
Bachelor's degree or higher	460	7.3%	26.1%	69.6%	835	6.4%	24.0%	76.0%
Notes:								
1 This category includes men (and/or boys), as well as some non-binary persons.								
2 This category includes women (and/or girls), as well as some non-binary persons.								
3 Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.								
2021 'Total Population' and 'Indigenous Populations' data from 2021 Census of the Population – Census Profile.								
Values shown in "Total" columns are the sum of male and female CSD subsets taken from Statistics Canada's 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables.								
Source: Statistics Canada 2022								

9.14.3 Labour Force

Labour force indicators for the LSA and RSA are summarized in Table 9.28. In 2021, the total size of the LSA labour force was 43,050 persons, of which 50.1% were women+, while the RSA labour force was 89,700 persons, of which 50.2% were women+ (Statistics Canada 2022). The total size of the LSA labour force for the Indigenous populations was 6,345 persons, of which 51.9% were women+, while the RSA labour force was 13,120 persons, of which 50.9% were women+ (Statistics Canada 2022). In 2021, the LSA total labour force participation rate⁵ of 60.1% was lower than the RSA average (58.0%) (Statistics Canada 2022). The participation among the Indigenous populations was higher in the LSA and RSA compared to the total population, as was the unemployment rate. There were minor variations in labour force participation rates observed between men+ and women+ within the LSA and RSA and overall men+ had a higher participation rate.

Table 9.28 Labour Force Indicators – 2021

Topic	LSA			RSA		
	Total	Men+ ¹	Women+ ²	Total	Men+	Women+
Total Population						
Population aged 15+	43,050	21,470	21,580	89,700	44,690	45,010
In the labour force	25,865	13,670	12,195	51,985	27,470	24,515
Employed	23,595	12,595	11,000	47,350	25,085	22,265
Unemployed	2,270	1,080	1,190	4,635	2,395	2,240
Employment rate	54.8%	58.7%	51.0%	52.8%	56.1%	49.5%

⁵ The participation rate is the total labour force (employed and unemployed, combined) relative to the working-age population.

Topic	LSA			RSA		
	Total	Men+ ¹	Women+ ²	Total	Men+	Women+
Participation rate	60.1%	63.7%	56.5%	58.0%	61.5%	54.5%
Unemployment rate	8.8%	7.9%	9.8%	8.9%	8.7%	9.1%
Indigenous Populations ³						
Population aged 15+	6,345	3,055	3,290	13,120	6,440	6,680
In the labour force	3,915	1,925	1,980	7,755	3,875	3,880
Employed	3,455	1,725	1,730	6,850	3,400	3,450
Unemployed	445	195	250	910	485	425
Employment rate	54.6%	56.5%	52.6%	52.2%	52.8%	51.6%
Participation rate	61.7%	63.0%	60.2%	59.2%	60.2%	58.1%
Unemployment rate	11.4%	10.1%	12.6%	11.6%	12.5%	11.0%
Notes:						
1. This category includes men (and/or boys), as well as some non-binary persons.						
2. This category includes women (and/or girls), as well as some non-binary persons.						
3. Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.						
2021 'Total Population' and 'Indigenous Population' data from 2021 Census of the Population – Census Profile.						
Values shown in "Total" columns are the sum of male and female CSD subsets taken from Statistics Canada's 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables.						
Source: Statistics Canada 2022						

9.14.4 Employment by Industry

Table 9.29 presents employment by industry in the LSA and RSA. Individuals working in industries that are most likely to provide employment to the Project include mining, quarrying, and oil and gas extraction; construction; manufacturing; transportation and warehousing; and professional, scientific, and technical services. The sectors most likely to supply direct labour to the Project employ a higher proportion of men+ for both the total and Indigenous populations.

Table 9.29 Employment by Industry – 2021

Employment by Industry	LSA			RSA		
	Total	Men+ ¹ (%)	Women+ ² (%)	Total	Men+ (%)	Women+ (%)
Total Population						
Health care and social assistance	4,000	15.6%	85.0%	8,370	15.9%	84.2%
Mining, quarrying, and oil and gas extraction	3,670	88.7%	10.5%	6,250	89.5%	10.6%
Retail trade	2,920	45.0%	55.1%	5,905	45.9%	54.1%
Educational services	2,150	24.2%	76.0%	4,385	23.6%	76.3%
Public administration	1,860	46.2%	53.5%	3,415	45.8%	53.7%

Employment by Industry	LSA			RSA		
	Total	Men+ ¹ (%)	Women+ ² (%)	Total	Men+ (%)	Women+ (%)
Construction	1,690	88.5%	11.5%	3,575	88.3%	11.3%
Accommodation and food services	1,300	37.7%	61.9%	2,460	39.4%	60.8%
Transportation and warehousing	1,265	70.8%	29.2%	2,510	71.5%	28.3%
Professional, scientific and technical services	1,105	52.9%	47.1%	1,835	49.3%	51.2%
Other services (except public administration)	1,080	57.4%	42.6%	2,230	54.9%	45.3%
Administrative and support, waste management and remediation services	920	54.9%	44.0%	1,575	54.3%	46.3%
Manufacturing	910	78.0%	21.4%	2,835	80.1%	19.9%
Wholesale trade	590	75.4%	23.7%	930	76.3%	24.2%
Finance and insurance	485	25.8%	73.2%	910	24.2%	75.8%
Agriculture, forestry, fishing and hunting	405	75.3%	23.5%	1570	70.4%	29.9%
Utilities	315	84.1%	7.9%	685	89.8%	8.8%
Real estate and rental and leasing	255	56.9%	45.1%	435	57.5%	43.7%
Information and cultural industries	240	58.3%	39.6%	500	54.0%	47.0%
Arts, entertainment and recreation	190	57.9%	44.7%	440	54.5%	45.5%
Management of companies and enterprises	30	33.3%	33.3%	50	20.0%	60.0%
Indigenous Populations ³						
Health care and social assistance	545	14.7%	85.3%	1390	19.8%	80.2%
Mining, quarrying, and oil and gas extraction	530	80.2%	19.8%	825	85.5%	14.5%
Retail trade	435	48.3%	51.7%	830	47.0%	53.0%
Public administration	390	39.7%	60.3%	770	44.2%	55.8%
Construction	255	86.3%	13.7%	480	90.6%	9.4%
Educational services	220	25.0%	75.0%	650	23.1%	76.9%
Accommodation and food services	215	32.6%	67.4%	350	30.0%	70.0%
Other services (except public administration)	215	44.2%	55.8%	355	45.1%	54.9%
Transportation and warehousing	190	65.8%	34.2%	355	64.8%	35.2%
Administrative and support, waste management and remediation services	160	62.5%	37.5%	260	61.5%	38.5%
Manufacturing	155	67.7%	32.3%	315	76.2%	23.8%
Professional, scientific and technical services	145	44.8%	55.2%	210	38.1%	61.9%
Finance and insurance	80	0.0%	100.0%	120	8.3%	91.7%
Wholesale trade	60	66.7%	33.3%	95	84.2%	15.8%
Utilities	50	50.0%	50.0%	120	83.3%	16.7%
Agriculture, forestry, fishing and hunting	45	88.9%	11.1%	115	82.6%	17.4%
Arts, entertainment and recreation	25	60.0%	40.0%	70	71.4%	28.6%
Information and cultural industries	20	50.0%	50.0%	55	54.5%	45.5%

Employment by Industry	LSA			RSA		
	Total	Men+ ¹ (%)	Women+ ² (%)	Total	Men+ (%)	Women+ (%)
Real estate and rental and leasing	15	0.0%	100.0%	45	44.4%	55.6%
Management of companies and enterprises	0	0.0%	0.0%	0	0.0%	0.0%
Notes: 1 This category includes men (and/or boys), as well as some non-binary persons. 2 This category includes women (and/or girls), as well as some non-binary persons. 3 Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size. 2021 'Total Population' and 'Indigenous Populations' data from 2021 Census of the Population – Census Profile. Values shown in "Total" columns are the sum of male and female CSD subsets taken from Statistics Canada's 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables. Source: Statistics Canada 2022						

9.14.5 Employment by Occupation

Table 9.30 summarizes employment by occupation in the LSA and RSA. Sales and service occupations, which are predominantly worked by women+, account for the highest number of labour force workers, in both for the general population and Indigenous populations. This is followed by trades, transport and equipment operators (and related) which is predominantly worked by men+ across the LSA and RSA in both the total) and Indigenous populations.

Table 9.30 Employment by Occupation – 2021

Employment by Occupation	LSA			RSA		
	Total	Men+ ¹ (%)	Women+ ² (%)	Total	Men+ (%)	Women+ (%)
Total Population						
Sales and service occupations	6,025	38.9%	61.0%	11,550	39.1%	60.9%
Trades, transport and equipment operators and related occupations	5,660	90.9%	8.9%	11,510	91.8%	8.1%
Occupations in education, law and social, community and government services	3,575	27.6%	72.9%	6,995	25.5%	74.6%
Business, finance and administration occupations	3,260	21.2%	78.7%	6,560	20.2%	79.8%
Health occupations	2,160	15.5%	84.5%	4,470	15.8%	84.2%
Natural resources, agriculture and related production occupations	2,055	92.2%	8.0%	4,210	89.4%	10.3%
Natural and applied sciences and related occupations	1,390	78.4%	21.9%	2,540	77.2%	23.0%
Occupations in manufacturing and utilities	830	88.0%	13.3%	2,055	85.2%	14.6%

Employment by Occupation	LSA			RSA		
	Total	Men+ ¹ (%)	Women+ ² (%)	Total	Men+ (%)	Women+ (%)
Occupations in art, culture, recreation and sport	255	37.3%	64.7%	590	36.4%	64.4%
Legislative and senior management occupations	155	67.7%	32.3%	380	57.9%	42.1%
Indigenous Populations³						
Sales and service occupations	985	37.1%	62.9%	1,780	40.4%	59.6%
Trades, transport and equipment operators and related occupations	885	86.4%	13.6%	1,685	87.8%	12.2%
Business, finance and administration occupations	535	13.1%	86.9%	1,080	18.5%	81.5%
Occupations in education, law and social, community and government services	515	29.1%	70.9%	1,225	24.5%	75.5%
Natural resources, agriculture and related production occupations	260	96.2%	3.8%	445	95.5%	4.5%
Health occupations	255	7.8%	92.2%	595	15.1%	84.9%
Natural and applied sciences and related occupations	155	80.6%	19.4%	250	80.0%	20.0%
Occupations in manufacturing and utilities	135	88.9%	11.1%	240	87.5%	12.5%
Legislative and senior management occupations	30	33.3%	66.7%	65	53.8%	46.2%
Occupations in art, culture, recreation and sport	15	0.0%	100.0%	60	41.7%	58.3%
Notes: 1 This category includes men (and/or boys), as well as some non-binary persons. 2 This category includes women (and/or girls), as well as some non-binary persons. 3 Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size. 2021 'Total Population' and 'Indigenous Populations' data from 2021 Census of the Population – Census Profile. Values shown in "Total" columns are the sum of male and female CSD subsets taken from Statistics Canada's 2021 Census Profile (Census of the Population). Due to Statistics Canada rounding (Statistics Canada 2022) totals may not exactly align with those shown on CSD Census Profiles and may not sum across tables. Source: Statistics Canada 2022						

9.14.6 Labour Capacity

The Far Northeast Training Board (FNETB) encompasses a geographic area similar to the Project's RSA and has developed sector-specific labour forecasts for northeastern Ontario to better understand the labour capacity for current and projected mining projects.

Based on its 2017 assessment of northern Ontario's mining workforce, and accounting for the active, inactive, and prospective projects at the time, the FNETB predicted that the mining workforce would expand by 14% by 2027 (FNETB 2018c). However, the FNETB also predicted that approximately 30% of

the current mining workforce will be retired by 2027, leaving a 44% vacancy rate of positions needing replacements. Based on the decline of overall population in the LSA and RSA from 2016 to 2021, and the establishment of new projects not initially envisioned when the FNETB study was undertaken, the vacancy rate within northern Ontario’s mining sector could exceed that predicted by the FNETB.

As of 2017, 14% of the mining workforce permanently resided outside of northeastern Ontario. Predominant occupations of mobile mining workers included professional and physical science occupations, such as metallurgical and materials engineers (39% of the total occupational workforce), geologists, geochemists and geophysicists (26% of the total occupational workforce), and mining engineers (25% of the total occupational workforce), as well as a variety of trades and production occupations such as truck drivers (25% of the total occupational workforce) and drillers and blasters (21% of the total occupational workforce). Table 9.31 provides a breakdown of all out of region workers.

Table 9.31 Mobile Mining Workers, RSA

Occupation	2017 Workforce (#)	Out of Region Workforce (#)	Out of Region Workforce (%)
Trades and Production Occupations			
Underground production and development miners	1,358	215	16%
Heavy equipment operations (except crane)	357	61	17%
Heavy-duty equipment mechanics	359	47	13%
Truck drivers	498	126	25%
Welders and related machine operators	250	45	18%
Drillers and blasters – surface mining, quarrying and construction	273	57	21%
Professional And Physical Science Occupations			
Geologist, geochemists and geophysicists	105	27	26%
Mining engineers	83	21	25%
Metallurgical and materials engineers	18	7	39%
Support Workers			
Asset Protection	91	39	43%
Technical Occupations			
Geological and mineral technologists and technicians	136	16	12%
Supervisors, Coordinators, Foremen			
Supervisors, mining and quarrying	212	43	20%
Source: FNETB (2018c)			

Table 9.32 identifies the projected workforce in the mining industry in occupations of interest by 2027. Occupations of interest are occupations that are in high demand, are mining industry specific, or have a high level of impact on the mining industry.

Table 9.32 Occupations of Interest Projections, RSA

Occupation	2017 Workforce	2027 Required Workforce	Net Change 2017-2027	Cumulative Retirements 2017-2027	2027 Workforce Deficit
Trades and Production Occupations					
Underground production and development miners	1,358	1,486	128	269	(397)
Construction millwrights and industrial mechanics (except textile)	374	727	353	86	(439)
Heavy equipment operations (except crane)	357	376	19	193	(212)
Industrial electricians	169	209	40	58	(98)
Central control and process operators, mineral and metal processing	133	129	(4)	25	(21)
Heavy-duty equipment mechanics	359	459	100	129	(229)
Truck drivers	498	655	157	179	(336)
Welders and related machine operators	250	290	40	97	(137)
Drillers and blasters – surface mining, quarrying and construction	273	305	32	66	(98)
Professional And Physical Science Occupations					
Geologist, geochemists and geophysicists	105	132	27	17	(54)
Metallurgical and materials engineers	18	15	(3)	4	(1)
Chemists	5	18	13	1	(14)
Support Workers					
Asset Protection	91	220	129	0	(129)
Supervisors, Coordinators, Foremen					
Supervisors, mineral and metal processing	80	56	(24)	34	(10)
Supervisors, mining and quarrying	212	226	14	88	(102)
Contractors and supervisors, mechanic trades	93	86	(7)	19	(12)
Source: FNETB (2018c)					

Following up to these mining workforce projections, FNETB compiled workforce projections across all sectors by Community Futures Development Corporation (CFDC) area from 2016 to 2036 (FNETB 2018a; 2018b). The geographic area of the Venture Centre CFDC and the North Claybelt CFDC aligns with the LSA of the Project.

A combination of retirement of current workers as well as the outmigration of younger workers and their pursuit of different occupations impacts the capacity of local labour for the Project. Between 47% and 53% of current workers residing within the LSA employed in occupations of interest for the Project will be of retirement age within the next 20 years. In addition, the workforce aged 15-24 and 25-39 are predominantly employed in occupations outside of the mining industry and/or relocating outside the LSA (FNETB 2018a). This reflects a potential shortfall of 23% to 30% vacancy rates in the mining industry within the LSA by 2037.

FNETB's workforce projections were completed in 2017 and may not represent the labour capacity at the time of the Project. As an example, it did not consider Canada Nickel's Project, nor did it account for potential forthcoming mine closures in the area. As such, the availability of labour to supply the demands of the Project will differ from what is provided in these reports based on the current mining activity in the LSA and RSA.

While youth outmigration may impact the labour capacity in the region, a recent report focused on youth outmigration in northern Ontario has suggested this trend may change (Ouellet and Lefebvre 2022). Survey respondents indicated the value they have on the north, highlighting the nature and nature-based activities in particular. As such, the research suggests that youth outmigration will likely experience a boomerang concept, where youth will move out of their communities after graduating high school for different experiences but have a desire to settle in northern Ontario (Ouellet and Lefebvre 2022).

Respecting working conditions in mining in Ontario, the industry predominantly employs males (up to 84%). The average wage of workers in the mining sector was \$42.65 in 2022 compared to the average wage of all industries which was \$27.30. Approximately 9.0% of the total mining workforce identifies as Indigenous, compared 2.3% of individuals that identify as Indigenous across all industries (Department of Natural Resources 2022).

The Government of Ontario recognizes the role of working conditions for the recruitment and retention of mining workers. In 2015, the Government of Ontario released a plan to address the health and safety concerns associated with the working conditions in Ontario. This included releasing a risk assessment tool for workers to determine their level of risk on a work site, as well as strategies to mitigate risks, such as enhanced engineering controls, industrial hygiene practices, and investments in personal protective equipment (OMLITSD 2022).

9.14.7 Location Quotient

Location quotients (LQ) provide a measure of the intensity of employment in a given sector in a region (i.e., the LSA or RSA) relative to the level of employment in that sector to a reference region (i.e., the province), and are commonly used to assess the labour capacity and concentration of economic activities in a smaller area relative to an overarching region. Critical values for the LQ analysis are as follows:

- LQ > 1.0 – the LSA or RSA has a higher intensity of employment in the given sector relative to Ontario
- LQ = 1.0 – the LSA or RSA has the same intensity of employment in the given sector relative to Ontario

- LQ < 1.0 – the LSA or RSA has a lower intensity of employment in the given sector relative to Ontario

Where the LQ is greater than 1.25, the LSA can be considered to have a concentration of economic activity in the specific sector relative to the RSA and may be an indication that the local economy is specialized in this sector and/or has capacity to support development in this sector. Conversely, an LQ of less than 1.0 may suggest that the LSA does not have the capacity to support development in this sector.

Table 9.33 provides the LQ for the LSA and RSA for both the total and Indigenous populations relative to Ontario in sectors areas related to the Project (using information provided by Statistics Canada).

Table 9.33 Labour Force Population Aged 15 Years and Over by Sector, Location Quotients, 2021

Sector	Total Population		Indigenous Population	
	LSA	RSA	LSA	RSA
Forestry, fishing, mining, quarrying, oil and gas	43.81	25.89	7.32	5.74
Construction	1.29	0.95	0.75	0.71
Manufacturing	0.57	0.62	0.55	0.56
Transportation and Warehousing	1.37	0.94	1.18	1.11
Professional, scientific and technical services	0.67	0.38	0.81	0.59

Source: Labour information from Statistics Canada 2022

For the LSA and RSA in both the total and Indigenous populations, there is a much higher proportion of workers employed in the forestry, fishing, mining, quarrying, oil and gas sectors compared to Ontario overall. Northern Ontario accounts for most of the mining activity in the province, and the makeup of the workforce is reflected of the concentration of this sector within these geographies. For the LSA, transportation and warehousing (LQ value of 1.37) and construction (LQ value of 1.29) has a higher-than-average intensity of employment relative to Ontario. In addition, the Indigenous population in the LSA and RSA has a higher intensity of employment in transportation and warehousing, compared to Ontario, with LQ values of 1.18 and 1.11, respectively. In all other sectors in the LSA and RSA for both the total and Indigenous populations, the workforce would not be considered specialized, and that the labour capacity for these sectors would be considered low.

9.14.8 Average Wages for Select Sectors

Table 9.34 provides a summary of average gross hourly wages in 2022 for Ontario workers in sectors likely to supply direct labour to the Project. Average annual wages were applied to three work schedule/shift scenarios to estimate average annual wages. As calculated, estimated annual wages under Scenario 1 is based on full-time employment and 2,100 person-hours per year (no overtime); Scenario 2 is based on 12-hour workdays and a two-week on / two-week off work schedule (overtime after 40 hours per week); and Scenario 3 is based on 10-hour workdays and a three-week on/one-week off work schedule (overtime after 40 hours per week).

Table 9.34 Provincial Wages in Select Sectors, Average – 2022

Industry	Average Hourly Wage	Scenario 1 – Annual Wage (based on 2,100 hrs/year)	Scenario 2 – Annual Wage (based on 12-hour 2x2 work schedule) ¹	Scenario 3 – Annual Wage (based on 10-hour 3x1 work schedule) ¹
Forestry, fishing, mining, quarrying, oil and gas	\$42.65	\$89,565	\$117,866	\$152,893
Construction	\$30.71	\$64,491	\$84,869	\$110,090
Manufacturing	\$28.55	\$59,955	\$78,900	\$102,347
Transportation and Warehousing	\$27.82	\$58,422	\$76,883	\$99,730
Professional, scientific and technical services	\$28.52	\$59,892	\$78,817	\$102,239

Note:
 1 Assumes overtime payments beyond 40 hours per week; rounded down to nearest thousand.
 Source: Statistics Canada 2023

9.14.9 Individual Income and Income Inequality

Income information for the LSA and RSA is summarized in Table 9.35. Total income is presented for persons aged 15 years and older and is the sum of regular and recurring monetary receipts from part-time and full-time employment income (e.g., wages, tips, and commissions), income from investment sources (e.g., dividends, guaranteed investment certificates, and mutual funds), income from employer and personal pension sources (e.g., private pensions and payments from annuities and registered retirement income funds), other regular cash income (e.g., child support payments and spousal support payments), and income from government sources (e.g., social assistance, Employment Insurance benefits, Old Age Security benefits, and Canada Pension Plan benefits and disability income).

The mean total income and mean employment income in the LSA and RSA are less for Indigenous than non-Indigenous persons and lower for women+ than men+ with Indigenous women+ earning the lowest average income. Disparities in income also exist within each category (total and employment income) among both men+ and women+ as illustrated through differences in mean and median total and employment incomes within the LSA and RSA (Table 9.35). In particular, while the total population overall receives higher income than the Indigenous population, the disparity between men+ and women+ across all categories is more pronounced.

In 2021, the mean total income in the LSA was \$50,345 (\$36,533 among the Indigenous populations) with men+ earning an average of \$59,488 (\$50,800 among Indigenous men+) and women+ \$41,360 (\$28,200 among Indigenous women+). Mean employment income was higher for the total population (\$48,150) than the Indigenous population (\$44,480), with men+ earning an average of \$57,750 (\$52,800 among Indigenous men+) and women+ earning an average of \$37,550 (\$37,440 among Indigenous women+). For both the total and Indigenous populations (male and female), mean total incomes in the LSA were less than provincial means.

In the RSA, the mean individual income was \$51,115 (\$38,400 among the Indigenous populations), with men+ earning \$59,875 (\$43,00 among Indigenous men+) and women+ \$42,420 (\$34,800 among Indigenous women+). The mean employment income was higher among the total population (\$49,380) and lower among the Indigenous populations (\$45,760), with men+ earning \$58,225 (\$43,000 among Indigenous men+) and women+ \$39,320 (\$34,800 among Indigenous women+). For the men+ and women+ total and Indigenous populations, mean employment incomes in the RSA were less than provincial averages.

Table 9.35 2021 Individual Income (Annual – Before Tax)

Topic	LSA			RSA		
	Total	Men+ ¹	Women+ ²	Total	Men+	Women+
Total Population						
Weighted median total income (\$) (2021)	41,500	50,200	34,500	40,400	48,200	34,800
Weighted median employment income (\$) (2021)	37,500	49,200	30,500	39,800	50,400	32,100
Mean total income (\$) (2021)	50,345	59,488	41,360	51,115	59,875	42,420
Mean employment income (\$) (2021)	48,150	57,750	37,550	49,380	58,225	39,320
Indigenous Populations³						
Weighted median total income (\$) (2021)	38,300	48,667	35,050	38,400	39,600	36,800
Weighted median employment income (\$) (2021)	49,145	55,013	43,060	47,320	52,600	42,300
Mean total income (\$) (2021)	36,533	50,800	28,200	38,400	43,000	34,800
Mean employment income (\$) (2021)	44,480	52,800	37,440	45,760	52,700	38,870
Notes:						
1 This category includes men (and/or boys), as well as some non-binary persons.						
2 This category includes women (and/or girls), as well as some non-binary persons.						
3 Indigenous and non-Indigenous totals may not sum to equal total population counts as they are based on a 25% population sample size.						
Total income is presented for persons aged 15 years and older and is the sum of regular and recurring monetary receipts from part-time and full-time employment income (e.g., wages, tips, and commissions), income from investment sources (e.g., dividends, guaranteed investment certificates, and mutual funds), income from employer and personal pension sources (e.g., private pensions and payments from annuities and registered retirement income funds), other regular cash income (e.g., child support payments and spousal support payments), and income from government sources (e.g., social assistance, Employment Insurance benefits, Old Age Security benefits, and Canada Pension Plan benefits and disability income).						
Employment income is the sum of wages, salaries, tips, commissions, and net income from self-employment.						
Values shown in "Total" columns are the sum of male and female census subdivision subsets taken from Statistics Canada's 2021 Census. Due to Statistics Canada rounding (Statistics Canada 2019b) totals may not exactly align with those shown on census subdivision Census Profiles and may not sum across tables.						
Totals may not sum across tables due to Statistics Canada data suppression.						
Source: Statistics Canada 2022						

Total incomes (mean and median) and employment incomes (mean and median) of the LSA were lower than RSA incomes in 2021. In each case (e.g., LSA and RSA averages), total incomes and employment incomes (mean and median) were higher among men+ than women+. Overall, income among the total population is higher than the Indigenous populations, however, the weighted median employment income was higher among Indigenous populations compared to the total population.

9.14.10 Summary of Existing Conditions on Sub-Populations for Gender Based Analysis Plus

Within the LSA, men+ account for the largest proportion of the employed labour force in most occupations likely to provide the goods, services, and labour to the Project (see Section 23.2.2.4 of Chapter 23 of the Impact Statement). Men+ also account for the greatest proportion of the population with an apprenticeship or trades certificate or diploma (see Section 23.2.2.1 of Chapter 23 of the Impact Statement), education required for occupations with the most demand during all Project phases. Average employment income (both mean and median) earned by men+ is greater than that earned by women+ within the LSA and is greater among the non-Indigenous population than the Indigenous populations. Further, women+ are disproportionately under-represented in the mining labour force (see Sections 23.2.2.4 and 23.2.2.5 of Chapter 23 of the Impact Statement).

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