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Marten Falls First Nation

Draft Terms of Reference
Marten Falls Community Access Road – Environmental Assessment

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SECTION: 7

Date: November, 2019

Project #: 60593122

7. Existing Environment and Potential Environmental Effects

7.1 Description of the Environment

The EAA requires a description of the environment that may be affected or reasonably expected to be affected, directly or indirectly, by the alternatives and the undertaking. This section provides a preliminary description of the existing environmental conditions that may be potentially affected by the Project. The description of the environment will address components of the environment that are included in the EAA definition, which includes a general description of the social, cultural, economic, built and natural environments.

7.1.1 Study Area

The description of the environment provided in **Section 7.1.4** is for the general area of the Project, which includes the area encompassing the alternative routes shown on **Figure 6-1**. However, the Code of Practice requires the study area for the EA be identified in the ToR (MECP 2019a). A study area is the area within which activities associated with an undertaking will occur and where potential environmental effects will be studied.

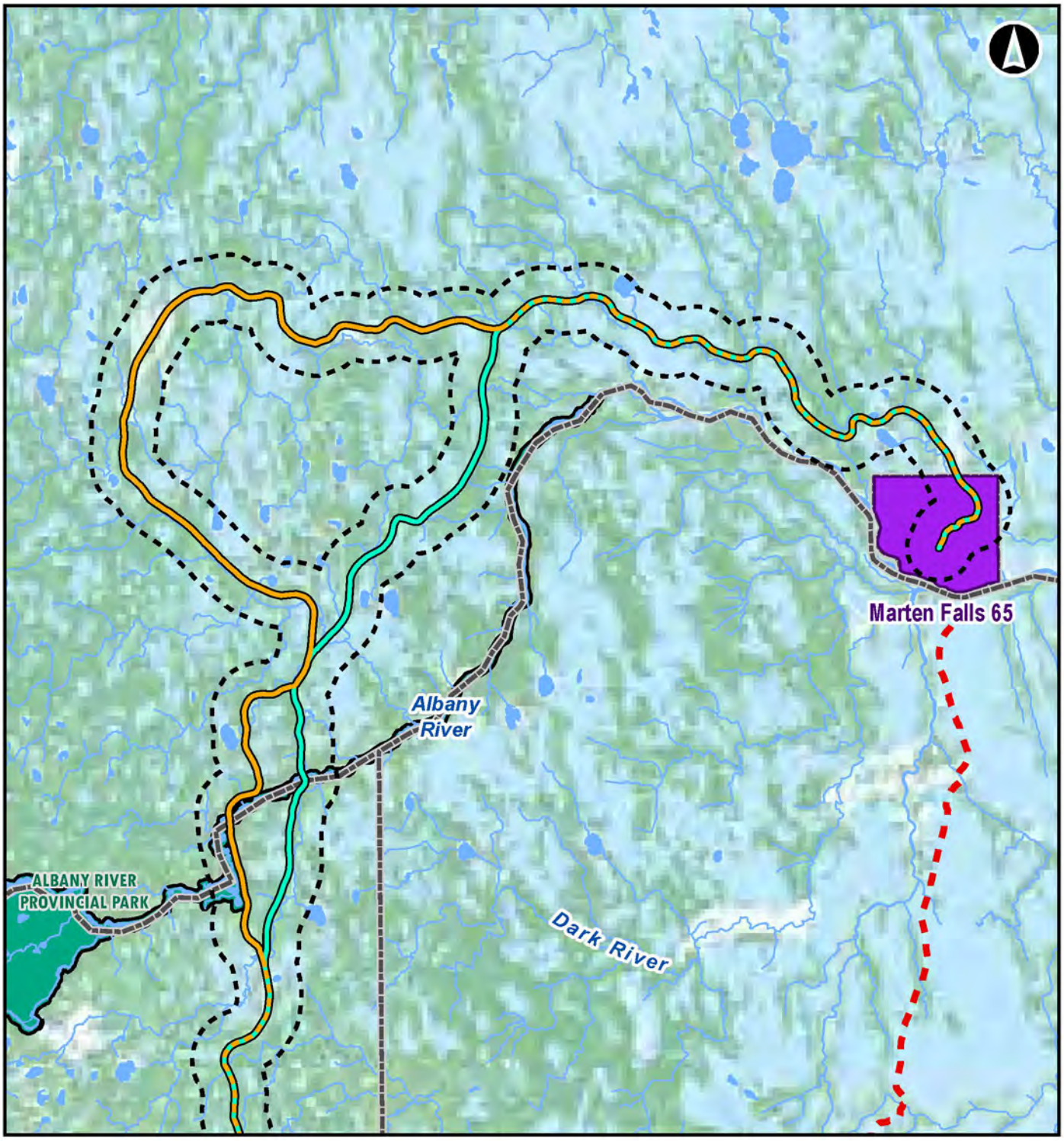
The preliminary study area identified for the EA is shown on **Figure 7-1**. The study area includes the area within 2.5 km of the centreline of each alternative route. The study area generally allows for the documentation of existing conditions and prediction of potential environmental effects for the Project. A 5 km wide study area also allows for route refinements during development of Project design (e.g., adjustment of the alignment to avoid features). The study area will be refined in the EA through the identification of discipline-specific local and regional study areas.

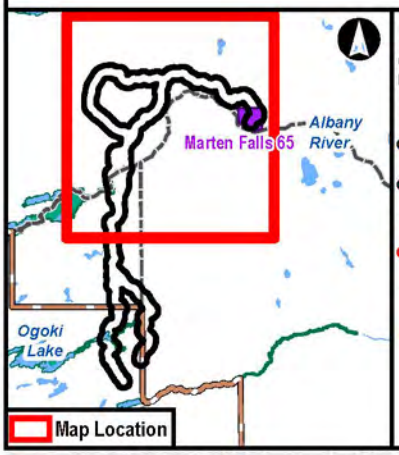
7.1.2 Environmental Features

The MECP's Code of Practice states that the description of the environment provided in a ToR is intended to be an overview of the existing conditions and address the features of the environment as defined in the EAA:

a) "air, land or water;
b) plant and animal life, including human life;
c) the social, economic and cultural conditions that influence the life of humans or a community;
d) any building, structure, machine or other device or thing made by humans;
e) any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or,
f) any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario."

The ToR provides a general description of the environment based on features that may be affected by the Project. Similar environmental features are grouped into environmental disciplines for characterization and assessment of effects. The ToR includes a description of each environmental discipline listed in **Table 7-1** based on readily available existing information and documented for the general vicinity of the Project. The information included in the ToR will be augmented by field investigations and input from government agencies, Indigenous communities, and other stakeholders. A more detailed description of the environment will be provided in the EA.





Legend

- Study Area
- **Route Label**
  - Alternative 1
  - Alternative 4
- **General Features**
  - Highway
  - Local Road
  - Resource / Recreation Road
- MFFN Existing Winter Access Road
- Railway
- Provincial Park
- Woodlands
- Wetlands
- Far North Boundary
- First Nation Reserve
- District Municipal Boundary

Marten Falls First Nation
All Season Community Access

Study Area

0 2.5 5 10 15 20
Kilometres
Datum: GCS North American 1983 UTM Zone 16U (Calculated)

Data Sources:
MNRF, MMAH, NRCAN

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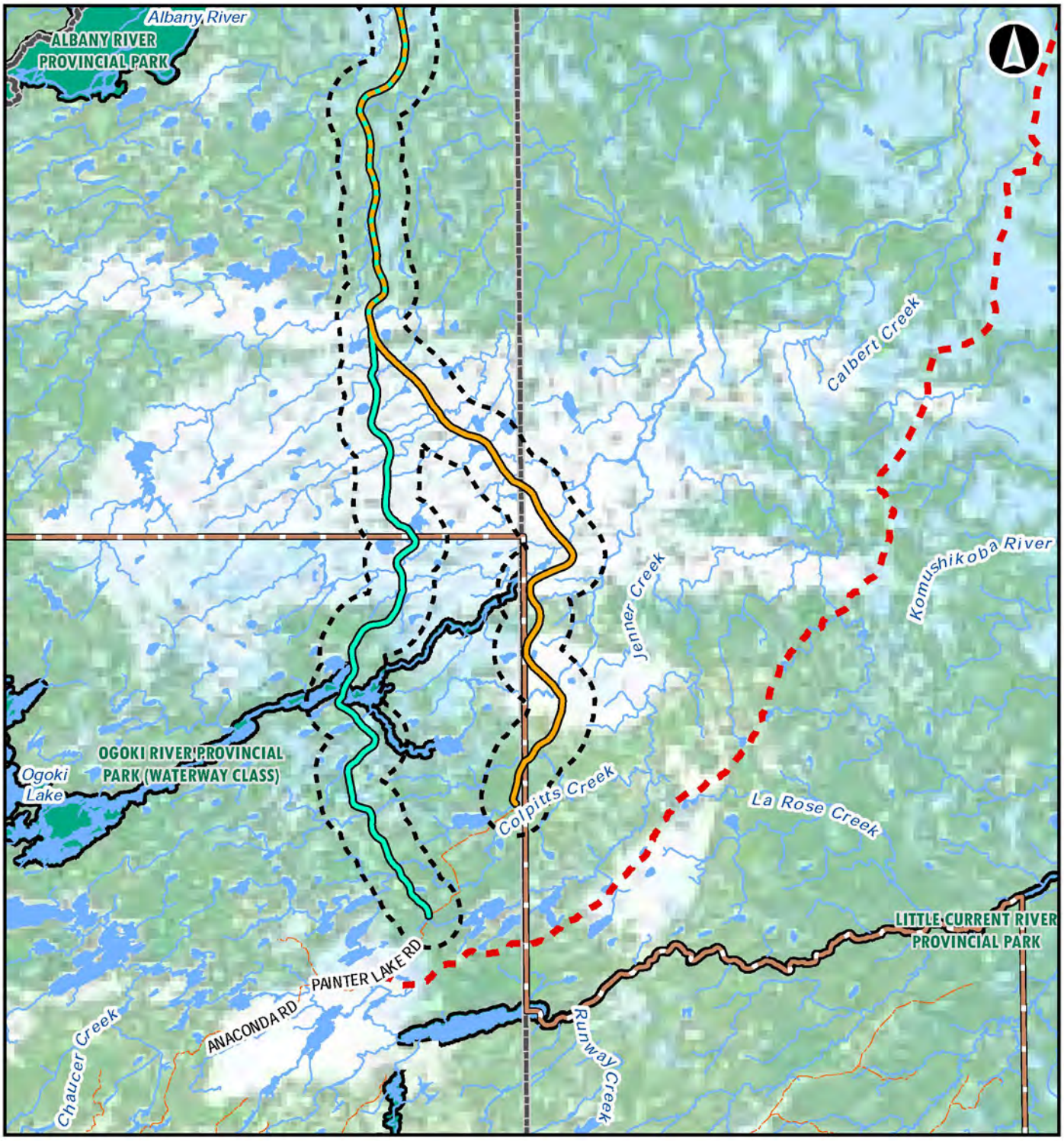
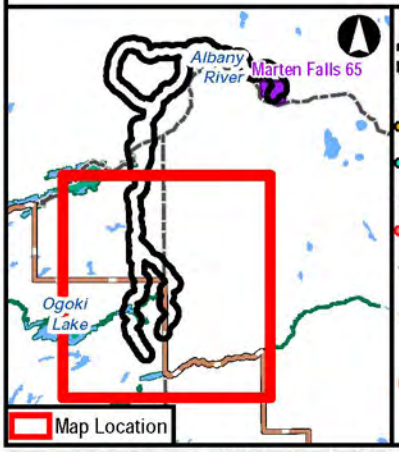
Figure 7-1A





Legend

- Study Area
- Route Label
- Alternative 1
- Alternative 4
- General Features
- Highway
- Local Road
- Resource / Recreation Road
- MFFN Existing Winter Access Road
- Railway
- Provincial Park
- Woodlands
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- Far North Boundary
- First Nation Reserve
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Marten Falls First Nation
All Season Community Access

Study Area

0 2.5 5 10 15 20
Kilometres
Datum: GCS North American 1983 UTM Zone 16U (Calculated)

Data Sources:
MNRF, MMAH, NRCAN

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Figure 7-1B

Table 7-1: Environmental Disciplines to be Considered during the Environmental Assessment

Environment	Discipline	
Natural (Physical and Biophysical) Environment	▪ Atmospheric Environment ▪ Acoustic Environment ▪ Physiography, Geology, Terrain and Soils ▪ Surface Water ▪ Groundwater	▪ Vegetation ▪ Wildlife ▪ Fish and Fish Habitat ▪ Species at Risk
Indigenous Knowledge	▪ Indigenous Knowledge and Land Use	
Social, Economic and Built Environment	▪ Social ▪ Economy ▪ Land and Resource Use	▪ Recreation and Tourism ▪ Human Health ▪ Visual Aesthetics
Cultural Environment	▪ Cultural Heritage Resources[1]	

Note: 1. Cultural heritage resources include archaeological and built heritage sites, and cultural heritage landscapes.

7.1.3 Methods to Characterize the Environment during the Environmental Assessment

The existing environment that may be affected by the alternative routes will be described in greater detail in the EA. Additional information that is planned to be used to further describe the environment within the EA include, but are not limited to the following:

- Review of available data and information;
- Data collected through field investigations;
- High resolution imagery obtained from Light Detection and Ranging (LiDAR) data;
- Geographic Information System (GIS) data analysis;
- Modelling, where applicable;
- Input from government and other interested persons; and
- Indigenous Knowledge shared by Indigenous communities.

The EA will document the results of field investigations that are available at the time of preparing the report. Project-specific field investigations will be undertaken for input into the assessment and evaluation of effects of the alternative routes and to support other permits and approvals required for the Project (**Section 13**). The field investigations currently planned are summarized in **Section 7.1.4** but may change based on the results of ongoing consultation with agencies, Indigenous communities and other stakeholders, including the review of the ToR. Generally, the field investigations target the study area defined in Section 7.1.1

7.1.4 Description of the Existing Environment

The following sections provide a brief description of the existing environment within the study area based on readily available data. Information was sourced from:

- records published through secondary sources;
- previous studies;
- government agencies; and
- Indigenous Knowledge, where provided by Indigenous communities at the time of preparing the ToR.

The area of the Project spans the Big Trout Lake Ecoregion within the Ontario Shield Ecozone and the James Bay Ecoregion within the Hudson Bay Lowlands Ecozone. The Ontario Shield Ecozone is characterized largely by forest, followed by treed bogs and fens, open water, and other wetlands. There is an abundance of black spruce and fire

plays an important ecological role in the ecoregion. The Hudson Bay Lowlands Ecozone forms the core of the third largest wetland in the world. This area is characterized largely by treed bogs and fens, followed by forest, other wetlands, and open water. Given the abundance of wet organic substrates and a cool humid climate within the Hudson Bay Lowlands Ecozone, fire plays a less significant role in this area, compared to the Ontario Shield Ecozone.

Marten Falls is located in a northern temperature zone characterized by short warm summers and long cold winters. Air quality and noise levels are affected primarily by natural sources (such as wind, forest cover and occasional forest fires) and to a much lesser extent, by limited development in the general area.

The general area of the Project is dominated by wetlands (i.e., bogs, fens, swamps and marshes) of the Albany River watershed and several of its subwatersheds. Surface water moves generally in a north direction, towards James Bay. The Albany and Ogoki river systems have both been altered from their original state by hydroelectric development activity in the region between 1943 and 1950 respectively (MFFN 2017).

The fish community composition and use of these waterbodies will vary because of factors such as availability of suitable habitat (spawning, overwintering, rearing, and feeding) and connectivity to other waterbodies. Over 20 species of fish, primarily of cool and cold-water thermal regimes, are known to inhabit the waters in the area.

The area of the Project provides suitable habitat for a variety of small and large mammals, as well as various amphibians, reptiles, birds and insects that are found in the boreal forest. The area is characterized by i) open and treed wetlands dominated by species such as black spruce, mosses and shrubs and ii) upland terrestrial habitat comprised of mixed forests with species such as jack pine, white spruce, and several poplar species. These areas also host wildlife species of conservation concern.

Further details are provided in the following sections.

7.1.4.1 Atmospheric Environment

Marten Falls is located in a northern temperature zone characterized by short warm summers and long cold winters. The nearest Environment Canada weather station is in Geraldton, Ontario, approximately 200 km away. Climate Normals at this station (Climate ID No. 6042716) include data from 1981 to 2010. Daily average temperatures ranged from -1.4 degrees Celsius to -25.1 degrees Celsius during the winter, with average monthly precipitation ranging from 23.8 mm to 38.0 mm (Government of Canada 2018a). Average temperatures between 1967 and 2015 at the Geraldton, Ontario weather station were 15.2 degrees Celsius during summer and -16.2 degrees Celsius during winter. Average monthly precipitation in the winter was 38.9 mm and in the summer was 89 mm (Government of Canada 2018b).[3]

Existing air quality conditions are determined by both regional and local source influences. Regional air quality is affected mainly by a combination of long-range pollutant transport and meteorological conditions. With the exception of emissions related to point sources such as vehicles, wood or fuel burning furnaces, and diesel generators at MFFN, local air quality influences are similar to regional influences.

Limited information on local air quality is available to characterize the study area and surrounding region. Therefore, the Project will undertake an atmospheric environment field program to better understand the existing local and regional air quality. A one-year air quality monitoring program is planned that will measure the compounds most commonly associated with roadway emissions, including the following constituents:

- nitrogen oxides (NO_x);
- particulate matter (e.g., $PM_{2.5}$, PM_{10}, total suspended particulate);

3. Note that data between 1967 and 2015 is sourced from both the Geraldton and the Geraldton A weather stations.

- carbon monoxide (CO);
- sulphur dioxide (SO_2); and
- and total benzene, toluene, ethylbenzene, and xylene (BTX).

Provincial MECP air quality standards (Government of Ontario 2019d), Ontario Ambient Air Quality Criteria (MECP 2018) and Canadian Ambient Air Quality (CCME 2014) Standards provide acceptable values for air pollutants both federally and provincially based on health and other risk assessments. The measured air pollutant levels can be assessed using these values to determine potential existing air quality issues.

The proposed field investigation was developed to collect data that will allow for the assessment of effects to be conducted following guidance from MECP and the "Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects" (MTO 2012) document.

The greenhouse gas (GHG) emissions from the Project will be estimated, based on industry standards and other publicly-available information and compared to the provincial, national and industry profile GHG emissions. Desktop information regarding the extent that peatlands and other landcover types that are within the study area act as carbon sinks will also be compiled.

7.1.4.2 Acoustic Environment

Noise sources in the area of the Project are ambient, natural noises of wildlife present in the forest and vegetated areas that surround the Project. A majority of the lands are traditionally used for hunting, fishing, trapping and canoeing. Industrial and transportation noise sources are limited within the study area. There is no commercial forestry or large industrial activities within much of the area surrounding the Project. The exception would be that of the Ogoki and Kenogami forests that include active commercial forestry operations, which are located along the southern border of the study area and a considerable distance from MFFN. Current access to the area is limited and transportation activities likely have little influence on existing ambient sound levels.

The expected existing ambient sound levels are not anticipated to exceed the MECP sound level limit of 40 A-weighted decibels (dBA) for outdoor locations in rural areas (Government of Ontario 2013a). Based on this information, existing ambient sound levels of 30 to 40 dBA may occur in the area of the Project and are mainly due to wildlife and other natural sources (e.g., rustling vegetation).

Limited information is available to characterize noise levels within and surrounding the study area. Therefore, the Project will undertake a field program to better understand the existing local and regional ambient noise levels. Noise measurement and monitoring will be completed in general accordance with guidelines provided by the MECP including the methodology outlined in NPC 300 "*Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning*" (NPC 300), and internationally-recognized standards issued by the International Standards Organization (ISO).

The monitoring program is planned to include monitoring at locations considered to be representative of the different types of points of reception where human activity is expected to occur. 'Representative' monitoring sites will be selected to document ambient noise levels at existing or potential sensitive receptors in the vicinity of the alternative routes and will generally follow the definition of noise sensitive receptors in MECP's (formerly Ministry of the Environment, and Climate Change [MOECC]) "Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning NPC-300" (MOECC, 2013). Sensitive receptors may include occupied residences or areas identified by the community as culturally-significant sites that may be sensitive to noise disturbances, or other areas within the study Area, including vacant lots, that could accommodate the construction of sensitive land uses (such as permanent or temporary residences).

Monitoring will be conducted using sound level meters set to record 1-hour equivalent noise level (Leq) and noise level exceeding 90% of measurement period (L90). The sound level meters will record monitoring data over a period of 72 hours through unattended monitoring to document noise levels. Data will be screened to remove any abnormal noise events (e.g., birds or insects close to microphone) as well as noise data collected under unfavourable weather conditions (i.e., periods of precipitation and wind speeds exceeding 20 km/h). The daytime (7:00 to 19:00) and night-time (19:00 to 7:00) ambient noise levels will be calculated. During installation (and retrieval) of noise monitoring equipment, attended noise measurements will be taken to supplement the monitoring data.

7.1.4.3 Physiography, Geology, Terrain and Soils

The Project lies within the Hudson Bay Lowlands physiographic region, which is characterized by low lying, poorly drained terrain dominated by muskeg and bog. The thickness and distribution of unconsolidated (Quaternary) sediments are the result of extensive glacial activity which took place during the Great Ice Age (Pleistocene Epoch). This period was marked by the advance and retreat of massive, continental ice sheets. During the latter part of the Pleistocene (Late Wisconsinan Substage), the ice mass advanced, depositing till ground moraine. As the ice sheet stagnated, major sand and gravel deposits were laid down, including eskers and ice-contact deposits. Post-glacial erosional and depositional processes have been of relatively minor importance in modifying the physiography of the area (Ontario Geological Survey 1984). Glacial features such as eskers, moraines and drumlins deposits are common in the western areas of the Project.

Marten Falls is underlain by organic deposits (peat, muck and marl). MECP water well records near MFFN suggest that sand and gravel fluvial deposits range from 6 m to over 40 m in thickness. The surficial overburden geology across northern and eastern portions of the study area away from MFFN comprise mainly organic deposits (peat, muck and marl) with isolated occurrences of undifferentiated till. The till in the area is characterized as a matrix of sand to silty sand that is commonly high in clasts and low total matrix carbonate content. Instances of this till material also are identified within the southwest and southern portions of the study area.

A second, finer-grained undifferentiated till occurs along the western and southern portions of the study area. This till material is comprised of a matrix of silty clay to silt that is typically clast poor and high in matrix carbonate content. The till occurs as a discontinuous veneer atop the bedrock surface, with instances of exposed rock occurring frequently throughout the area.

In the southwestern portion of the study area, instances of glaciolacustrine deposits are noted; being representative of nearshore and beach deposits. Given their higher energy depositional processes, the deposits are coarser-grained, comprising of sand, gravelly sand and gravel.

Under the Canadian System of Soil Classification, where topsoil is present, Podzolic and Brunisolic soils are the dominant types within the area of the Project. Podzolic soils are acidic with a B horizon containing accumulations of amorphous materials composed of humified organic matter associated with aluminum and iron. They develop most commonly in sandy materials in areas of cold, humid climate under forest or shrub vegetation. Water moving downward through the relatively porous material leaches out basic elements (e.g., calcium), and acidic conditions develop. Soluble organic substances formed by decomposition of the forest litter attack soil minerals in surface horizons, and much of the iron and aluminum released combines with this organic material. Brunisolic soils include soils that do not quite meet the criteria of the other forested soil orders. Brunisolic soils can be viewed as a stage in an evolutionary sequence that begins with an unweathered parent material (Regosolic soils) and ends with development of a mature forested soil of the Podzolic or Luvisolic orders (Agriculture and Agri-Food Canada 1998).

Bedrock geology in the area of MFFN is comprised of Upper Ordovician aged shale, limestone, dolostone and / or siltstone of the Red Head Rapids Formation and Churchill River Group. Comparatively, the other portions of the study area are underlain by various bedrock types of Proterozoic and Archean age. Rock types within this area include mafic / ultramafic to intermediate metavolcanic rocks, metasedimentary rocks, foliated tonalilte, gneissic

tonalite, and massive granodiorite to granite. Mafic, ultramafic and related intrusive rocks (diabase dikes) of the Mackenzie swarm, Marathon swarm, Matachewan and Hearst swarms are also reported within the area (MNDM 2017a; MNDM 2017b).

Figure 7-2 presents potential aggregate sources in the study area.

Geotechnical engineering field work will include selective hand augering and peat probing to explore and confirm soil and rock stratigraphy, drilled boreholes and sampling for material testing at selected locations, visual assessment of major water crossing defined as crossing having a width of greater than 10 m, and site visits to potential bedrock quarry sites. The test hole drilling program will be mainly focused on investigating specific geological features that could be developed as potential borrow sources, and to verify geotechnical conditions in key areas, such as major water crossings. During site visits of potential bedrock quarry sites, the bedrock feature will be characterized with respect to rock classification, relative size and relief of the feature, and accessibility to the proposed road alignment. Samples of the bedrock will be obtained, and photographs of the feature will be taken in an effort to assess the suitability for quarry development.

7.1.4.4 Surface Water

The Project is located within the Hudson Bay Plains and Boreal Shield Ecozones, including areas of transition between the two (Natural Resources Canada 2019) and the James Bay drainage basin. Surface water moves generally in a north-easterly direction, towards James Bay.

The Project lies within two main watersheds: the Upper Albany – Makokibatan and the Lower Ogoki. The primary watercourses within the respective watersheds are the Albany River and the Ogoki River. The confluence of these two rivers is located near MFFN. The Albany River is tied for the longest river in Ontario at 982 km long and ultimately discharges into James Bay. The Albany and Ogoki River systems have both been altered from their original state by hydroelectric development activity in the region (MFFN 2017). **Table 7-2** summarizes the estimated number of major (i.e., requiring a long-span bridge construction) and minor (i.e., may require short-span bridge or culvert) crossings. The location of crossings was identified through background review, helicopter reconnaissance and review of aerial imagery.

Table 7-2: Estimated Number of Culvert and Bridge Watercourse Crossings

Description	Alternative 1	Alternative 4
Major Crossings (i.e., long-span bridges)	3	3
Minor Crossings (i.e., short-span bridges and culverts)	43	44
Total Crossings	46	47

In addition to the Albany River and Ogoki River, numerous streams and rivers of various stream orders, large and small lakes, ponds and wetlands are prevalent in the area, notably Dusey River, Gourlie Creek, Wabassi River, Buffaloskin River and their tributaries (Natural Resources Canada 2019). The Ogoki River and Albany River are Provincial Park waterways, and sections of these rivers and shorelines occur within the study area.

The general area of the Project is dominated by wetlands (i.e., bogs, fens, swamps and marshes) of the Albany River watershed and several of its sub-watersheds. The Hudson Bay Lowlands Ecozone is northernmost ecozone in Ontario and forms the core of the third largest wetland in the world (Crins *et al.* 2009), where over 68% of its land cover consist of fens, bogs or wetlands. Comparatively, approximately 22% of the land cover in the Ontario Shield Ecozone consists of treed bogs and fens and wetlands (Watkins 2011). The wetlands within the area of the Project are not designated as provincially significant. Considering the remote landscape of the Project and abundance of wetland features, it is likely that the wetlands within the area of the Project have not been evaluated.

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ALBANY RIVER PROVINCIAL PARK

OGOKI RIVER PROVINCIAL PARK (WATERWAY CLASS)

LITTLE CURRENT RIVER PROVINCIAL PARK

Buffaloskin River

Muswabik R

Albany River

Wabimeig Lake

Gourlie Creek

Dark River

Ruby Creek

Makokibatan Lake

Ogoki River

Dusey River

Little Current River

Colpitts Creek

Ogoki Lake

Reckett Creek

Papoose Creek

Ara Lake

Meta Lake

Abamasagi Lake

OGOKI RD

O'Sullivan Lake

ANACONDA RD

Esnagami Lake

Michel Creek

Legarde River

Watistiguam River

Mundino River

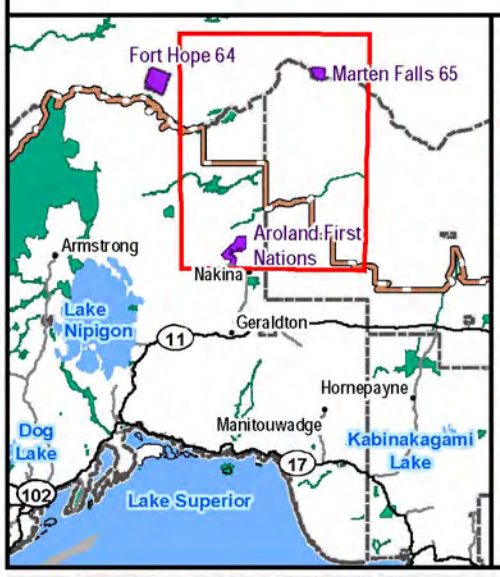
Drowning River

Singing River

Wigat Creek

Johnson Creek

643



Legend

Route Alternatives
- Alternative 1
- Alternative 4

General Features
- Highway
- Collector Road
- Residential Road
- Resource Road
- Railway
- Trail
- MFFN Existing Winter Access Road
- Painter Lake Road
- Watercourse
- Indian Reserve
- Far North Boundary
- District Municipality
- Waterbody
- Provincial Park
- Woodlands
- Wetlands
- Potential Aggregate Sources *
- Existing Aggregate Pit (Active)
- Existing Aggregate Pit (Inactive)

Note:
*Aggregate sources used for the CAR will be a minimum of 100 metres from waterbodies.

Marten Falls First Nation
All Season Community Access

Potential Aggregate Sources

0 5 10 20 30
Kilometres
Datum: NAD 1983 UTM Zone 16N

Data Sources:
Derived by KBM Resources Group n.d.
MNRF, MMAH, NRCAN, MLAS, KGS

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Figure 7-2

The field program will involve both aerial and ground-based survey approaches to characterize existing conditions at water body crossings within the study area. An aerial reconnaissance will be undertaken along the full extent of the study area to verify the location of mapped and unmapped water body crossings, and to further augment the existing environment information available through desktop analysis. At water body crossing locations (at approximately the centre-line of each corridor crossing), the water body type and coarse-level description of surface water and peatland features will be documented.

The ground-based field surveys will be used to obtain site-specific field data at a subset of water body crossings to verify or augment the results and assumptions from the desktop analysis. The site selection process will be based primarily on a 'scaled approach', with a plan to select a representative number of water body crossings under three different categories of watershed size and to get representation across the alternative routes.

Surface water field surveys will be completed along an approximate 200 m section of the selected water body (centered over the proposed crossing location). At each selected crossing, observed water body conditions will be documented to broadly define typical channel patterns and flow conditions, including bed and bank morphology, channel geometry and stability, channel substrate, streamflow, and riparian and/or shoreline vegetation. In addition, basic topographic channel surveys targeted at the proposed crossing may include collection of a few bed elevation shots at locations upstream and downstream of the crossing. The results of the basic topographic channel surveys will be used to generate coarse hydraulic calculations at the planned crossing structures. Basic water quality parameters (conductivity, pH, temperature, and dissolved oxygen) will be measured at all selected sites using a multi-parameter water quality meter (during the fish and fish habitat field program described in **Section 7.1.4.8**).

During the geotechnical field program, the depth of peat will be investigated at locations along each alternative route since a significant portion of alternative routes traverse organic terrain and will have a surficial layer of peat moss. During the vegetation field survey, discussed in **Section 7.1.4.6**, peatlands will be also examined, including peat humification and degree of surface or groundwater flow for distinction of fens and bogs.

Field crews will also document any opportunistic observations on substrate type, overburden, bedrock, and/or signs of upwelling that can be used to advance the desktop analyses for the groundwater and geology components. These observations will be supplemented by field surveys outlined in **Section 7.1.4.3**.

7.1.4.5 Groundwater

The exposed bedrock of the Canadian Shield, which extends across much of Central and Northern Ontario, typically is moderately to highly fractured within the upper 10 m to 20 m (Sykes *et al.* 2009), resulting in the bedrock commonly being considered an aquifer unit. Within the area of the Project, the pattern of fractures in the bedrock aquifer allows for the movement of groundwater; however, this secondary permeability generally decreases with depth (Sykes *et al.* 2009).

Within Marten Falls, sand and gravel fluvial deposits associated with the Albany River locally exceed 40 m in thickness (MECP Water Well Record #16003369) and are targeted for both domestic and public water supplies within the community. Groundwater resources within the upper bedrock, identified as limestone on local well records, also are targeted by public well supplies within the community.

Topographic lows, such as river valleys, will have local effects on the rate and direction of groundwater movement. Groundwater flow paths frequently bend into river valleys and isolated topographic depressions, such as the Albany River and Ogoki River, as well as numerous other higher order watercourses, water bodies (e.g., lakes, ponds), and deeper bedrock hollows and valleys within topographic lowlands. Given its remote location, groundwater use within the area of the Project is expected to be minimal.

Incidental observations during the surface water field program, that may supplement the desktop analysis of groundwater quantity or quality (e.g., signs of upwelling) will be recorded opportunistically (**Section 7.1.4.4**). Additionally, groundwater elevation will be recorded during the geotechnical drilling program (**Section 7.1.4.3**).

7.1.4.6 Vegetation

The Project spans Ecoregion 2W (Big Trout Lake Ecoregion) within the Ontario Shield Ecozone and Ecoregion 2E (James Bay Ecoregion) within the Hudson Bay Lowlands Ecozone.

The Ontario Shield Ecozone largely consists of conifer-dominated boreal forests (Crins *et al.* 2009). Ecoregion 2W is characterized largely by forest (63.6%), followed by treed bogs and fens (14.5%) open water (13%), other wetlands (7.5%) and the remaining 1.3% is classified as other (Watkins 2011). More specifically, within Ecoregion 2W, there is an abundance of black spruce (*Picea mariana*) on both upland and lowland sites. Black spruce is often associated with jack pine (*Pinus banksiana*) and white birch (*Betula papyrifera*) in upland sites. Mixed stands of black spruce, balsam fir (*Abies balsamea*) and poplar (*Populas* sp.) are typically present along the shores of lakes and rivers. In lowland areas, fens and bogs with mosses, shrubs and graminoids are predominant (Crins *et al.* 2009). It should also be noted that fire is an important force of natural change within Ecoregion 2W as large amount of forests in the ecoregion are considered recent burns (Watkins 2011).

The Hudson Bay Lowlands Ecozone is northernmost within Ontario and forms the core of the third largest wetland in the world (Crins *et al.* 2009). Ecoregion 2E is characterized largely by treed bogs and fens (43.3%), followed by forest (25.5%), other wetlands (25.3%), open water (5.6%) and the remaining 0.4% is classified as other (Watkins 2011). More specifically, Ecoregion 2E is comprised of stands of stunted black spruce and tamarack (*Larix laricina)* along with scattered fens and bogs. On well-drained soils and along the edges of streams and rivers, developed stands of coniferous and mixed wood forests are present (Crins *et al.* 2009). Given the abundance of wet organic substrates and a cool humid climate, forest fire has a less significant role in Ecoregion 2E compared to Ecoregion 2W (Crins *et al.* 2009).

Ontario's Ecological Land Classification is an integrated approach to describing the biological and physical parts of a landscape, classifying areas of similar climate, topology, soil and plant communities. Ecological Land Classification information in the Far North is far behind that available for southern portions of the province. To support the EA, desktop research will be supplemented by aerial and ground-based survey to characterize habitat and Ecological Land Classification. Preliminary locations for vegetation surveys will be selected based on a review of aerial imagery and PLC2000 landcover types. The plant community of each survey location will be classified to the ecosite level using the Ecosites of Ontario (Banton et al. 2009) protocols. A description of soil, plant species, relative abundance of plant species, and presence of invasive and Species at Risk (SAR) will be recorded for each survey plot. Plant surveys are conducted during the summer months. Results of the field investigations, combined with other data sources (e.g., MNRF 2019), will be used to describe and map the range of vegetation communities present in the study area. Detailed maps of the ecosites identified will be prepared and the variability of plant communities within and among ecosites will be described. Plant species lists (including vascular plants, lichens and byrophytes, where observed) will be provided. SAR will be identified and suitable habitat for these species will be extrapolated to include the entire study area.

7.1.4.7 Wildlife

The general area of the Project provides suitable habitat for a variety of small and large mammals, as well as various reptiles, birds and insects that are found in the boreal forest. As described in **Section 7.1.4.6**, the area is characterized by open and treed wetlands dominated by species such as black spruce, sphagnum, mosses and shrubs (MFFN 2017). Upland terrestrial vegetation communities are comprised of mixed forests with species such as jack pine, white spruce, white pine, and poplar species (MFFN 2017). The range of habitats within the study

area support the requirements for a wide range of wildlife species, such as black bear, moose, woodland caribou, wolf, wolverine, lynx, marten, fisher, muskrat, skunk, groundhog, snowshoe hare, otter, and fox. In addition, hundreds of migratory birds inhabit the Far North region. Herptile species known to occur in the area include eastern American toad, eastern garter snake, wood frog, red-sided garter snake, and leopard frog. The latter two species are considered regionally significant (MFFN 2017).

A field survey of wildlife and wildlife habitat is being conducted to supplement the existing information. The field surveys include:

- **Breeding Bird Point Surveys** at a variety of habitat types across the study area;
- **Marsh Bird Call Back Surveys** in suitable marsh habitats using protocols modified from Bird Studies Canada (2003) for marsh bird monitoring; and
- **Remote Wildlife Cameras** deployed within areas where wildlife concentration is predicted to occur (e.g., trails, cut lines, river banks, etc.). The cameras will be equipped to capture up to 10,000 images and will be deployed for approximately three months during the summer season. Images will be processed, and wildlife identified to species.

7.1.4.8 Fish and Fish Habitat

The general area of the Project includes a multitude of aquatic features throughout the landscape dominated by wetlands (i.e., bogs, fens, swamps and marshes) of the Albany River watershed and sub-watersheds.

Numerous streams and rivers, large and small lakes, ponds and wetlands that provide habitat for a variety of fish and wildlife are prevalent in the area of the Project, notably the Albany River, Ogoki River, Dusey River, Gourlie Creek, Wabassi River, Buffaloskin River and their tributaries (Natural Resources Canada 2019). Fish use of these waterbodies will vary as a result of factors such as availability of suitable habitat (spawning, overwintering, rearing, and feeding) and connectivity to other waterbodies.

Over 20 species of fish, primarily of cool and cold-water thermal regimes, are known to inhabit these waters and are part of, or support a commercial, recreational, or Aboriginal fishery and are therefore regulated by the *Fisheries Act*. Species including Northern Pike (*Esox Lucius*), Walleye (*Sander vitreus*), Lake Whitefish (*Coregonus clupeaformis*), Brook Trout (*Salvelinus fontinalis*), Yellow Perch (*Perca flavescens*), Cisco (*Coregonud artedi*) and Burbot (*Lota lota*) are target species of the communities inhabiting the region and by local and fly-in charter angling and hunting tourist outfitters. In addition to the species listed above, the following fish species, which are common and widespread throughout Ontario, have the potential to occur in the area of the Project where suitable habitat is present (Eakins 2018):

- Northern Redbelly Dace (*Chrosomus eos*);
- Finescale Dace (*Chrosomus neogaeus*);
- Lake Chub (*Couesiius plumbeus*);
- Common Shiner (*Luxilus cornutus*);
- Northern Pearl Dace (*Margariscus nachtriebi*);
- Emerald Shiner (*Notropis atherinoides*);
- Blacknose Shiner (*Notropis heterodon*);
- Spottail Shiner (*Notropis hudsonius*);
- Mimic Shiner (*Notropis volucellus*);
- Bluntnose Minnow (*Pimephales notatus*);
- Fathead Minnow (*Pimephales promelas*);
- Longnose Sucker (*Catostomus catostomus*).
- White Sucker (*Catostomus commersonii*);
- Silver Redhorse (*Moxostoma anisurum*);
- Shorthead Redhorse (*Moxostoma macrolepidotum*);
- Trout-perch (*Percopsis omiscomaycus*);
- Brook Stickleback (*Culaea inconstans*);
- Ninespine Stickleback (*Pungitius pungitius*);
- Mottled Sculpin (*Cottus bairdii*);
- Slimy Sculpin (*Cottus cognatus*);
- Iowa Darter (*Etheostoma exile*);
- Johnny Darter (*Etheostoma nigrum*);
- Logperch (*Percina caprodes*); and

The study area is large and contains a number of water features which require assessment. As a result of the broad scale, the field program will involve both an aerial and ground-based survey approach to characterize existing baseline conditions at water body crossings within the study area. The aerial and ground-based field surveys will be done in coordination with the collection of surface water information (**Section 7.1.4.4**).

The fish habitat assessment will involve the classification of instream habitat by distinct habitat units (i.e., areas of similar habitat type) and be modeled after the Ontario Stream Assessment Protocol (Stanfield 2007). Information describing the fish and aquatic communities (either based on fishing effort, habitat suitability for known or suspected SAR, or desktop information) and physical habitat parameters (including channel widths and depths, channel velocity, substrate, and instream cover). *In situ* physico-chemical parameters (e.g. pH and temperature) will be recorded at each station. Fish presence and relative abundance will be evaluated in the vicinity of the water body crossing locations using two sampling methods (backpack electrofisher and/or baited minnow traps).

The ground-based field surveys will be used to obtain site-specific field data at a subset of water body crossings (approximately 10% of the total number of mapped and unmapped waterbody crossings) to verify or augment the results and assumptions from the desktop analysis. The site selection process will be based primarily on a 'scaled approach', with a plan to select a representative number of water body crossings under three different categories of watershed size and to get representation across the alternative routes.

7.1.4.9 Species at Risk

Vegetation

A review of the Natural Heritage Information Centre *Make-a-Map: Natural Heritage Areas* (MNRF 2019) database resulted in the record of one rare plant, the Northern marsh violet (*Viola epipsila*), occurring within the Project study limits. There are no other terrestrial vegetation SAR within the Project study limits.

A description of soil, plant species, relative abundance of plant species, and presence of invasive and SAR will be recorded for each survey plot (**Section 7.1.4.6**); no specific field program targeting at-risk vegetation species is planned.

Wildlife

A preliminary review of background information suggests that several species listed as threatened, endangered or special concern under the provincial *Endangered Species Act* or the federal *Species at Risk Act, 2002* have the potential to occur in the area of the Project. These species include but are not limited to (MECP 2019b):

- Bald Eagle (*Haliaeetus leucocephalus*);
- Barn Swallow (*Hirundo rustica*);
- Black Tern (*Chlidonias niger*);
- Eastern Whip-poor-will (*Caprimulgus vociferous*);
- Peregrine Falcon (*Falco peregrinus*);
- Wolverine (*Gulo gulo*);
- Woodland Caribou (*Rangifer tarandus caribou*);
- Little Brown Myotis (*Myotis lucifugus*);
- Northern Long-eared Bat (*Myotis septentrionalis*);
- Canada Warbler (*Cardellina canadensis*);
- Chimney Swift (*Chaetura pelagica*);
- Common Nighthawk (*Chordeiles minor*);
- Olive-sided Flycatcher (*Contopus cooperi*);
- Short-eared Owl (*Asio flammeus*); and
- Yellow Rail (*Coturnicops noveboracensis*).

Woodland caribou occur extensively in peatland areas, such as black spruce bogs and treed fens, while generally avoiding upland areas throughout the year (Stuart-Smith et al. 1997). However, their habitat can vary in different landscapes depending on habitat availability (Ferguson and Elkie 2004). Telemetry data shows that in the Missisa and James Bay ranges (which comprise part of the study area) Woodland caribou were found to occur most frequently in

peatlands, followed by coniferous forest, and they avoided deciduous forest (Ferguson and Elkie 2004). The location of winter ranges may be quite variable between years (Ferguson and Elkie 2004). Determining the population size or density of a wide-ranging low-density animal such as woodland caribou is often challenging and likely to be inaccurate. Since 2009, several research studies led by independent contractors and the MNRF have investigated woodland caribou and their habitat in areas crossed by the Project. The MNRF attached radio collars to a large number of woodland caribou across northern Ontario which were tracked by satellite between 2009 and 2014, some of these individuals were found within the study area (April Mitchell, MNRF, pers. comm. 2019). Study results illustrated that individuals were nomadic and may occupy different areas from one year to another but show stronger fidelity to calving areas. Herd population estimates will be evaluated as part of the provincial EA.

Field surveys conducted in spring, for at-risk wildlife species and are focused on:

- **Bat Maternity Roost Monitoring**: A review of aerial imagery and PLC2000 landcover types conducted to identify potentially suitable habitat for SAR bats. Bat acoustic monitors deployed within the study area in suitable habitats to record the bat activity during the maternity roosting period to determine if SAR bats are present in potential maternity roost communities.
- **Bird Surveys**: Targeted surveys for bird SAR, such as Bank Swallow, Barn Swallow and Eastern Whip-poor-will will be completed. Suitable habitat is identified through a review of aerial imagery and aerial reconnaissance by helicopter. Detailed inspection of suitable habitat for Bank Swallow and Barn Swallow are conducted. Acoustic monitoring devices installed within suitable habitat for Eastern whip-poor-will.

The need for and scope of additional SAR wildlife surveys[4], including caribou, is being determined in consultation with MECP and MNRF. The results of field investigations for this Project will be documented in the EA.

Fish

The Project falls within the range of the Southern Hudson Bay-James Bay population of Lake Sturgeon (*Acipenser fulvescens*), and Lake Sturgeon is known to occur in the Albany River and its tributaries (Committee on the Status of Endangered Wildlife in Canada 2017). The Southern Hudson Bay-James Bay populations are designated as Special Concern under the provincial *Endangered Species Act* and holds no status under Schedule 1 of the federal *Species at Risk Act*. Therefore, despite differing designations and protection requirements of other populations in Ontario, the South Hudson Bay-James Bay populations of Lake Sturgeon are not afforded protection under these Acts.

Information on the distribution of at-risk fish species and their habitats will be based on readily available information; no field surveys are planned to target at-risk fish species.

7.1.4.10 Aboriginal and Treaty Rights

The Project is located within the James Bay Treaty - Treaty Number 9 (made in 1905 and1906) and Adhesions made in 1929 and 1930 areas as shown in **Figure 7-3**. Matawa Council, Shibogama Council and Mushkegowuk Council First Nations are included in the Treaty 9 area (Government of Canada 2008). MFFN is a member of the Matawa First Nations Management. Aboriginal and Treaty Rights are guaranteed under section 35 of the *Constitution Act*, which includes recognition of existing Aboriginal and Treaty Rights to hunt, trap, fish, gather and manage the lands for all First Nation, Inuit and Metis people of Canada. As part of these rights, the Government of Canada has the Duty to Consult Indigenous communities for this Project. The MECP has developed a list of communities to be consulted with, consistent with the Duty to Consult, and has provided MFFN with this information. **Table 7-3** provides brief community profiles for all Indigenous communities that MECP identified should be engaged as part of the EA process. MFFN is currently undertaking engagement with these communities (**Section 10**). The engagement will continue throughout the EA as per the interest expressed by each community.

4. Initial surveys for SAR were completed in 2018

Adhesion to Treaty, No. 9, 1929-1930

Treaty No. 9, 1905-1906

Treaty No. 60, 1850

Marten Falls 65

Aroland First Nations

ALBANY RIVER PROVINCIAL PARK

OGOKI RIVER PROVINCIAL PARK (WATERWAY CLASS)

LITTLE CURRENT RIVER PROVINCIAL PARK

Eabamet Lake
Gourlie Creek
Wabassi River
Buffaloskin River
Gander River
Muswabik River
Wabimeig Creek
Albany River
Wabimeig Lake
Chard River
Dark River
Ruby Creek
Dusey River
Makokibatan Lake
Calbert Creek
Ogoki River
Komushikoba River
Jenner Creek
Colpitts Creek
La Rose Creek
Little Current River
Britt Creek
Ogoki Lake
Reckett Creek
Brace Creek
Chaucer Creek
ANACONDA RD
Ara Lake
Meta Lake
Abamasagi Lake
OGOKI RD
O'Sullivan Lake
Blob Creek
Esnagami Lake
Wilgar Creek
Johnson Creek
643
584
Papoose Creek
Wababimiga River
Michel Creek
Legarde River
Drowning River
Watistiguam River
Mundino River
Singing River
Little Legarde River
Atikasibi River
Kenogami River

Key Map

Windsor Lake
Fort Hope 64
Marten Falls 65
Aroland First Nations
Nakina
Armstrong
Lake Nipigon
Geraldton
Hornepayne
Manitouwadge
Dog Lake
Kabinakagami Lake
Lake Superior
11
17
Map Location

Legend

Study Area

Route Label

Alternative 1

Alternative 4

General Features

Highway

Local Road

Resource / Recreation Road

MFFN Existing Winter Access Road

Railway

Provincial Park

Waterbody

Far North Boundary

First Nation Reserve

District Municipal Boundary

Treaty Boundaries

Adhesion to Treaty, No. 9, 1929-1930

Treaty No. 60, 1850

Treaty No. 9, 1905-1906

Marten Falls First Nation
All Season Community Access Road

Treaty Boundaries

0 5 10 20 30
Kilometres
Datum: NAD 1983 CSRS UTM Zone 16N

Nov, 2019	1:600,000 * when printed 11"x17"	Data Sources: MNRF, MMAH, NRCAN
P#:60593122	Rev:00	

AECOM

Figure 7-3

Table 7-3: Community Profiles of Neighbouring Indigenous Communities

Indigenous Community	Community Profile
Animbiigoo-Zaagi'igan Anishinaabek First Nation	Animbiigoo-Zaagi'igan Anishinaabek First Nation ("AZA") is signatory to the Robinson-Superior Treaty 1850 and is affiliated with the Nokiiwin Tribal Council and the Union of Ontario Indians. The AZA cultural affiliation is Ojibwa. AZA is comprised of one reserve, the Lake Nipigon Reserve (1269.9 ha), which was established in 2008. The Lake Nipigon Reserve is located 236 km southwest of MFFN along the southern shores of Partridge Lake, between Jellicoe and Geraldton. Three members live on the Lake Nipigon Reserve with the remaining approximately 500 members primarily living in other northern Ontario communities including Beardmore, Jellicoe, Geraldton, and Thunder Bay (ISC 2019). The First Nation has a custom electoral governance system with one Chief and four Councillors elected every 3 years. AZA's administrative office is located in Beardmore, Ontario (AZA 2019).
Aroland First Nation	Aroland First Nation is a signatory to Treaty 9 and is affiliated with Matawa First Nations Management and Nishnawbe Aski Nation. Aroland First Nation is comprised of an amalgamation of members with ties to Eabametoong, Marten Falls, Ginoogaming, Long Lake 58 and Fort William First Nations with cultural affiliations to Oji-Cree and Ojibway (Aroland First Nation 2019). Aroland Indian Settlement (79 ha) is the primary community for over half of the approximately 700 Aroland First Nation members (ISC 2019; Aroland First Nation 2019). The community is located 170 km southwest of Marten Falls First Nation, and 20 km west of Nakina on Hwy 643. Aroland First Nation has a custom electoral governance system with one Chief and seven Councillors elected every 2 years.
Attawapiskat First Nation	Attawapiskat First Nation is a signatory to Treaty 9 and is affiliated with the Mushkegowuk Council and Nishnawbe Aski Nation. The Attawapiskat cultural affiliation is Swampy Cree. Attawapiskat is comprised of two reserves, Attawapiskat Indian Reserve 91a (235.8 ha) and Attawapiskat Indian Reserve 91 (27040.1 ha) (ISC 2019). The Attawapiskat reserves are located at the mouth of the Attawapiskat River on James Bay, 278 km northeast of MFFN. As of July 2019, 1,981 members are listed as living on Attawapiskat reserves, with the remaining 1,677 members living elsewhere (ISC 2019). Attawapiskat First Nation has a custom electoral governance system with one Chief, one Deputy Chief and 11 Councillors elected every 3 years.
Constance Lake First Nation	Constance Lake First nation is a signatory to Treaty 9 and is affiliated with Matawa First Nation Management and the Nishnawbe Aski Nation. The Constance Lake cultural affiliation is Cree and Ojibway. Constance Lake First Nation is comprised of two reserves, Constance Lake 92 Indian Reserve on the Kabinakagami River (3,110.5 ha) and English River 66 Indian Reserve on the Kenogami River (3,108 ha) (ISC 2019). Both of the Constance Lake reserves are located 238 km southeast of Marten Fall First Nation and are accessible by way of Highway 11. The main reserve, Constance Lake 92 Indian Reserve, serves as the main reserve with 871 members of the 1,761 members living on reserve as of July 2019 (ISC 2019). Constance Lake First Nation uses the Indian Act electoral governance system with one Chief and six Councillors elected every 2 years.
Eabametoong First Nation	Eabametoong First Nation is a signatory of Treaty 9 and is affiliated with Matawa First Nations Management and Nishnawbe Aski Nation. The Eabametoong cultural affiliation is Ojibway. Eabametoong First Nation is comprised of a single reserve, Fort Hope 64 (25,900.3 ha) (ISC 2019). Fort Hope 64 is located on the north shore of Eabamet Lake, 142 km west of MFFN. As of July 2019, approximately 1,500 members live at Fort Hope 64, with the remaining approximately 1,000 members living mostly in other parts of northern Ontario (ISC 2019). Eabametoong uses the Indian Act electoral governance system with one Chief and five Councillors elected every 2 years.
Fort Albany First Nation	Fort Albany First Nation is a signatory to Treaty 9 and is affiliated with the Mushkegowuk Council and the Nishnawbe Aski Nation. The Fort Albany cultural affiliation is Mushkeowuk Cree. Fort Albany First Nation originated as a Hudson's Bay Company trading post, however during the 1950s due to religious differences, the reserve was divided into two communities (Fort Albany First Nation and Kashechewan First Nation) (Five Nations 2012). The Fort Albany 67 Indian Reserve (36,345.7 ha) is unique in that there are two First Nations residing on the land (Fort Albany First Nation and Kashechewan First Nation) (ISC 2019). Fort Albany 67 is located 300 km northeast of MFFN, with Fort Albany First Nation members residing on the south bank of the Albany River approximately 15 km upstream from James Bay (Five Nations 2012). The combined total population total of Fort Albany First Nation and Kashechewan First Nation is 5,162 members and is mutually referred to as 'Albany' in the Indigenous Services Canada First Nation Profile (ISC 2019). As of July 2019, 3,207 members of Fort Albany First Nation and Kashechewan First Nation reside on Fort Albany 67 (ISC 2019). Fort Albany First Nation and Kashechewan First Nation have a combined custom electoral governance system with one Chief, one Deputy Chief and seven Councillors elected every 3 years.

Table 7-3: Community Profiles of Neighbouring Indigenous Communities

Indigenous Community	Community Profile
Ginoogaming First Nation	Ginoogaming First Nation, formerly known as Long Lake 77, is a signatory of Treaty 9 and is affiliated with Matawa First Nations Management and Nishnawbe Aski Nation. The Ginoogaming cultural affiliation is Ojibway and Oji-Cree. Ginoogaming is comprised of one reserve, Ginoogaming (6,978 ha), located on the northern shore of Long Lake and 210 km southwest of MFFN (ISC 2019). As of July 2019, 220 members reside in Ginoogaming with 770 Ginoogaming members residing elsewhere (ISC 2019). There have been three land claims by Ginoogaming First Nation, with one settled in 2002 and the other two currently registered with the Government of Canada. The remaining land claims allege breaches of fiduciary obligations with respect to the construction of Tote Road through their reserve and unfulfilled Treaty Land Entitlement with regards to Treaty 9. Ginoogaming First Nation uses the Indian Act electoral governance system with one Chief and six Councillors elected every 2 years.
Kasabonika Lake First Nation	Kasabonika Lake First Nation is a signatory to Treaty 9 and is affiliated with the Shibogama First Nations Council and Nishnawbe Aski Nation. The Kasabonika Lake cultural affiliation is Oji-Cree. Kasabonika Lake is comprised of one reserve, Kasabonika Lake Indian Reserve (10,806.5 ha) located along the Ashweig River and is 277 km northwest of MFFN (ISC 2019). As of July 2019, there are 1,097 members residing on Kasabonika Lake reserve with less than the 100 remaining members living elsewhere (ISC 2019). Kasabonika Lake has a custom electoral governance system with one Chief, one Deputy Chief, one Head Councillor and five Councillors elected every 2 years.
Kashechewan First Nation	Kashechewan First Nation is a signatory to Treaty 9 and is affiliated with the Mushkegowuk Council and Nishnawbe Aski Nation. The Kashechewan cultural affiliation is Cree, and prior to 1950 Kashechewan was a part of the Fort Albany First Nation (Five Nations 2012). In the 1950s, Kashechewan First Nation was formed out of members from the Fort Albany First Nation that held an Anglican religious view rather than the Roman Catholic affiliation associated with Fort Albany First Nation (Five Nations 2012). With the split of Fort Albany First Nation, the single Fort Albany 67 reserve (36,345.7 ha) is shared by both Fort Albany First Nation and Kashechewan First Nation and is located 300 km northeast of MFFN (ISC 2019). The combined total population total of Kashechewan First Nation and Fort Albany First Nation is 5,162 members and is mutually referred to as 'Albany' in the Indigenous Services Canada First Nation Profile (ISC 2019). As of July 2019, 3,207 members of Kashechewan First Nation and Fort Albany First Nation reside on Fort Albany 67 (ISC 2019). Kashechewan First Nation and Fort Albany First Nation have a combined custom electoral governance system with one Chief, one Deputy Chief and 7 Councillors elected every 3 years.
Kingfisher Lake First Nation	Kingfisher Lake First Nation is a signatory to Treaty 9 and is affiliated with the Shibogama First Nations Council and Nishnawbe Aski Nation. The Kingfisher Lake cultural affiliation is Oji-Cree. Kingfisher Lake is comprised of three reserves: Kingfisher 2A (5,444.7 ha), Kingfisher 3A (921.9 ha), and Kingfisher Lake 1 (596 ha) (ISC 2019). The Kingfisher reserves are located approximately 306 km northwest of MFFN. 557 of the 621 total membership reside on reserve (ISC 2019). Kingfisher Lake First Nation has a custom electoral governance system with one Chief, one Deputy Chief, one Head Councillor and two Councillors elected every 2 years.
Kitchenuhmaykoosib Inninuwug First Nation	Kitchenuhmaykoosib Inninuwug First Nation is signatory to Treaty 9 and is affiliated with the Independent First Nations Alliance. The Kitchenuhmaykoosib cultural affiliation is Oji-Cree specifically, Anishininiimowin, Severn Cree and Northern Ojibway. The First Nation is comprised of a single reserve, Kitchenuhmaykoosib Aaki 84 (29,937.6 ha), located 361 km northwest of MFFN (ISC 2019). As of July 2019, there are 1,167 residing on Kitchenuhmaykoosib Aaki, with another approximately 550 members residing in other communities (ISC 2019). Kitchenuhmaykoosib has a custom electoral governance system for one Chief, one Deputy Chief, one Head Councillor and six Councillors to be elected.
Long Lake 58 First Nation	Long Lake 58 First Nation is a signatory to Treaty 9 and is affiliated with Matawa First Nations Management and the Nishnawbe Aski Nation. The Long Lake 58 cultural affiliation is Ojibwa and Oji-Cree. Lake 58 is comprised of a single reserve, Long Lake 58 (232.3 ha) located on the northern shore of Long Lake and 207 km southwest of MFFN (ISC 2019). As of July 2019, the population of Long Lake 58 is 1,616 with 528 members residing on Long Lake 58 (ISC 2019). Long Lake 58 First Nation uses the Indian Act electoral governance system with one Chief and 12 Councillors elected every 2 years.

Table 7-3: Community Profiles of Neighbouring Indigenous Communities

Indigenous Community	Community Profile
MNO Greenstone Métis Council	The Métis Nation of Ontario (MNO) was established in 1993 to represent communities that are a part of the Métis Nation (MNO 2019). Today there are over 20,000 registered Métis citizens and approximately 30 Chartered Community Councils across Ontario that represent Métis citizens at the local level. The MNO has a provincial governing body that is elected every 4 years. The MNO hosts an Annual General Assembly where regional and provincial Métis leaders are required to report back to Métis citizens yearly between elections. The MNO also maintains a charitable foundation, the Métis Nation of Ontario Cultural Commission, which promotes and supports Métis culture and heritage and an economic development arm, the Métis Nation of Ontario Development Corporation (MNO 2019). Through the MNO, Ontario Métis have established a governance structure that represents the Métis citizens and rights-bearing Métis communities at the local, regional and provincial levels. The Greenstone Métis Council forms a part of this governance structure as a local level council based out of Geraldton. Geraldton is located approximately 230 km southwest of MFFN.
Neskantaga First Nation	Neskantaga First Nation is a signatory to Treaty 9 and is affiliated with Matawa First Nations Management and Nishnawbe Aski Nation. The Neskantaga cultural affiliation is Ojibway and Oji-Cree. The Neskantaga Indian Reserve (831.5 ha) is Neskantaga's only reserve, located on Attawapiskat Lake 157 km northwest of MFFN (ISC 2019). 348 of the 483 members of Neskantaga reside on Neskantaga reserve (ISC 2019). Neskantaga First Nation has a custom electoral system with one Chief and four Councillors elected every 2 years.
Nibinamik First Nation	Nibinamik First Nation, known as the Summer Beaver, is a signatory to Treaty 9 and is affiliated with Matawa First Nations Management and Nishnawbe Aski Nation. The Nibinamik cultural affiliation is Ojibwe. Nibinamik First Nation resides on the recently recognized reserve of the Summer Beaver Settlement which is located on Nibinamik Lake, 215 km northwest of MFFN (ISC 2019). As of July 2019, there are 62 Nibinamik members residing on the Summer Beaver Settlement, with approximately 500 members living elsewhere (ISC 2019). Nibinamik has a custom electoral governance system with one Chief, one Head Councillor and three Councillors elected every 2 years.
Red Sky Métis Independent Nation	Red Sky Métis Independent Nation (RSMIN) is comprised of descendants of the 84 Metis who were beneficiaries and annuitants under the Robinson-Superior Treaty 1850. As of August 2014, RSMIN is recognized as a non-status Nation (RSMIN 2019). The administrative office for RSMIN is located in Thunder Bay approximately 435 km southwest of MFFN. There are approximately 8,000 members with an elected Chief (RSMIN 2019).
Wapekeka First Nation	Wapekeka First Nation is a signatory to Treaty 9 and is affiliated with the Shibogama First Nations Council and Nishnawbe Aski Nation. The Wapekeka cultural affiliation is Oji-Cree. The First Nation is comprised of two reserves: Wapekeka 1 (3,605 ha) and Wapekeka 2 (2,026.5 ha). The reserves are located approximately 350 km northwest of MFFN (ISC 2019). As of July 2019, nearly all members (483 of the 496), reside on Wapekeka reserve land (ISC 2019). Wapekeka has a custom electoral system for one Chief and five Councillors to be elected.
Wawakapewin First Nation	Wawakapewin First Nation is a signatory to Treaty 9 and is affiliated with the Shibogama First Nations Council and Nishnawbe Aski Nation. The Wawakapewin cultural affiliation is Oji-Cree. The First Nation is comprised of a single reserve, self-named Wawakapewin (5,221 ha), which is located 300 km northwest of MFFN (ISC 2019). Approximately half of the 74 members reside on Wawakapewin as of July 2019 (ISC 2019). Wawakapewin First Nation has a custom electoral governance system with one Chief and two Councillors elected every 3 years.
Webequie First Nation	Webequie First Nation is a signatory to Treaty 9 and is affiliated with Matawa First Nations Management and Nishnawbe Aski Nation. The Webequie cultural affiliation is Ojibwe. The First Nation is comprised of one self-named reserve (34,279 ha) that is located on the northern peninsula of Eastwood Island on Winisk Lake and 178 km northwest of MFFN (ISC 2019). Approximately one-third of the 933 members reside on the Webequie reserve as of July 2019 (ISC 2019). Webequie First Nation has a custom electoral system with one Chief, one Head Councillor and five Councillors elected every 2 years.

Table 7-3: Community Profiles of Neighbouring Indigenous Communities

Indigenous Community	Community Profile
Weenusk First Nation	Weenusk First Nation is a signatory to Treaty 9 and is affiliated with the Mushkegowuk Council and Nishnawbe Aski Nation. The Weenusk cultural affiliation is Cree in the n-dialect. Anishininiimowin and Ojibwemowin are also spoken. Weenusk used to live in the community of Winisk near the mouth of the Winisk River, but after a flood occurred the community moved to Peawanuck. Peawanuck is located 30 km up river from Winisk located near the confluence of the Winisk and Shamattawa Rivers. Weenusk First Nation is comprised of the single Winisk 90 reserve (5,310 ha) and the Winisk Indian Settlement, both are located approximately 375 km north of MFFN (ISC 2019). As of July 2019, there were less than 20 members living on Winisk 90, with the majority of the approximately 600 members living elsewhere (ISC 2019). Weenusk has a custom electoral governance system with one Chief and three Councillors elected every 2 years.
Wunnumin Lake First Nation	Wunnumin Lake First Nation is a signatory to Treaty 9 and is affiliated with the Shibogama First Nations Council and Nishnawbe Aski Nation. The Wunnumin cultural affiliation is Oji-Cree. The First Nation is comprised of two reserves, Wunnumin 1 (5,855.1 ha) and Wunnumin 2 (3,794.4 ha), both are located 270 km northwest of MFFN (ISC 2019). As of July 2019, 577 of the 712 members reside on the Wunnumin reserves (ISC 2019). The First Nation has a custom electoral system with one Chief, one Head Councillor and five Councillors elected every 2 years.

Reserve lands were granted to Indigenous communities in the area of the Project under Treaty 9 (Government of Canada 2008). There is one First Nation Reserve area that will be transected by the Project. The reserve belongs to MFFN. Reserve lands of neighbouring Indigenous communities are located beyond the area of the Project.

Contrary to the Crown, the Matawa First Nations note:

> *"[t]he Cree and Ojibway firmly believed that they signed treaties that afforded them protection and assistance from a benevolent king as well as a land sharing and resource sharing arrangement. The First Nations assert that they never gave up their land or their right to govern themselves. Matawa leaders assert that the act of entering treaty represented recognition of their nationhood. They state that they agreed to oral promises when they signed their treaties, many of which do not find expression in the Treaty text. This treaty understanding is passed down through the Elders in the oral transmission and tradition (Matawa First Nations Management 2019)."*

Ontario land claims consider land claims related to Indigenous communities' rights to land and to the use of land. Claims can consider size and location of reserves or improper use of reserve lands by government (Government of Ontario 2019a). Currently, no land claims with the government of Ontario are occurring within the area of the Project (Government of Ontario 2019b).

MFFN has initiated a Community Based Land Use Plan (CBLUP) with the MNRF (MFFN and MNR 2013) under the *Far North Act* (Government of Ontario 2014b). The *Far North Act* is the legislative foundation of land use planning for an Indigenous community's defined area of interest in the Far North of Ontario. Far North land use planning is about working with Indigenous communities to identify where development can occur and where land is dedicated to protection in the Far North, which covers 42% of Ontario's land mass (Government of Ontario 2012). Other communities that have undertaken CBLUP, which may include the area of the Project, are Eabametoong (Taashikaywin CBLUP), Constance Lake First Nation and Webequie First Nation (Government of Ontario 2014b). Aroland First Nation and MFFN have undertaken work together to collect Anishinabek Knowledge within the territory they share. CBLUPs incorporate traditional territory where Indigenous communities undertake activities and practices related to their Indigenous and Treaty Rights.

7.1.4.11 Indigenous Knowledge and Land Use

MFFN and other Matawa First Nation communities share traditional lands in the area of the Project and over a vast territory in northern Ontario. The Project falls mostly within the traditional territory of MFFN and shared territory with Aroland First Nation in the southern end of the Project. "[MFFN's] traditional territory extends from the Current River and Ogoki Lake in the south, Makokibaton Lake in the west, Jasper Lake and Muketei Rivers to the north and the Albany Forks to the east" (MFFN 2014). The traditional territory has been used by Indigenous people for trapping, hunting, trade and socializing preceding European contact (MFFN 2014).

Common land use activities include resource harvesting that are protected under Aboriginal and Treaty Rights under section 35 of the *Constitution Act*. Common harvesting activities undertaken by Indigenous communities in the area of the Project include: hunting, fishing, trapping and gathering. These activities may take place throughout the year and are not bound by the provincial harvest seasons and regulations. Ecologically important area such as moose calving areas or fish spawning areas are important to traditional land and resource use due their role in producing the harvested resources. These harvested resources are also used for cultural practices.

Transportation pathways and features may be used to support traditional use of the land. Trails and paths within the area of the Project may be used to access hunting, trapping, fishing and gathering areas by Indigenous community members within and beyond the area of the Project. Trails may be accessed on foot, using all-terrain vehicles, trucks or snowmobiles depending on the physical characteristics of the trail and season. In addition, waterways are used as linear access features to travel between harvest areas and other communities. The Albany River is an important waterway due to its frequent use by MFFN and other communities.

Specific sites such as cabins and camps may also be used to contribute to resource harvesting. These features are likely connected to communities by transportation features. Camps and cabins may provide locations important for resource harvesting or travel throughout and beyond the traditional territory. For example, trappers will often have a trapping cabin used for servicing their trapline.

Cultural activities and practices may occur at specific sites or independent of a specific location. The traditional use of the land and socio-community characteristics of the Indigenous communities, including MFFN, facilitates cultural practices in the area of the Project. Cultural practices that are not associated with a specific site are practices that can be undertaken anywhere with other members of the community and facilitate community well-being and cultural strength. These cultural practices may include crafting, language, and food consumption.

Communities identifying traditional territory within the area of the Project, including MFFN, may have known and unknown cultural sites. Cultural sites include land uses such as ceremonial, grave, sacred, gathering and worship areas. Linear features such as trails and waterways are used by Indigenous peoples to access cultural sites within and beyond the area of the Project.

Cultural activities, in this case, refers to cultural events that may occur in the community during specific periods. Some of these cultural activities may be associated with specific sites. Within the MFFN community, a community feast and a pow-wow are held annually (MFFN 2014). These activities are important to the health and well-being of individuals and communities having cultural and spiritual significance. Cultural activities may also interact closely with traditional harvesting including large hunting or fishing events. The social value of these events is important to the sense of community within many Indigenous communities.

Indigenous landscape features such as Place Names, Boundary Markers and Orientation Points contribute to the orientation of Indigenous peoples on the land. Natural Boundary markers such as rivers or mountains indicated to Indigenous peoples which territory they were passing through (Manuel 2019).

MFFN will also work with communities to collect Indigenous Knowledge to incorporate into the EA information regarding traditional land and resource use and cultural practices (**Section 7.1.4.11**). As part of the Indigenous

Knowledge and traditional land and resource use data collection, there will also be questions posed that seek to gain information on historical species observations (presence / location). MFFN respects the significance of Indigenous Knowledge and will utilize the following principles for the Project-specific Indigenous Knowledge Studies:

- Knowledge Holders will be identified by the community to participate in the studies;
- Consultation and Indigenous Knowledge protocols will be defined prior to commencing studies and utilizing Indigenous Knowledge;
- A collaborative approach will be used that follows the customs and culture of each Indigenous community;
- Traditional channels of authority and levels of approval within each member community will be respected;
- Indigenous Knowledge workshops and interviews will be facilitated at sites within the Traditional Territory of each Indigenous community;
- Engagement and communication with Knowledge Holders through workshops and/or interviews will be respectful; and
- Indigenous communities will own and control their Indigenous Knowledge information.

MFFN will collaborate with each Indigenous community to develop the Indigenous Knowledge collection methodology. MFFN supports each interested Indigenous community conducting their own Indigenous Knowledge Study or utilizing Project consultants to assist them in this undertaking. It is anticipated that the Project-specific Indigenous Knowledge Studies will be governed by Indigenous Knowledge Sharing Agreements and could involve the following tasks:

- Literature review (i.e., discussion on existing data, etc.);
- Confirmation of the Indigenous Knowledge Study Area;
- Establishing Indigenous Knowledge categories (e.g., Animal Harvest, Spiritual/Sacred, Habitation, Travel, etc.);
- Indigenous Knowledge gathering workshops and/or one-on-one interviews;
- Validation session; and
- Report preparation including Indigenous Knowledge baseline information, Indigenous Knowledge impact assessment, and proposed mitigation.

7.1.4.12 Socio-Economic and Built Environment

The socio-economic assessment will consider six subcomponents including socio-community (social), economy, land and resource use, recreation and tourism, human health and visual aesthetics. Primary data collection programs will support all components of the socio-economic assessment.

Social

The closest populated areas to the Project are the Indigenous communities of MFFN and Aroland First Nation. The Marten Falls Ogoki Post settlement is located in the study area and is inhabited by members of MFFN. MFFN has a population of 794 registered band members with roughly half (325) of community members. Additional community members (469) live in urban centres such Thunder Bay and urban centres in Greenstone (e.g., Geraldton). The population is steadily increasing, which is anticipated to continue in the future (MFFN 2014). Languages within the community include English and Ojibway. The designated service centre for the community is Greenstone (MFFN 2014).

MFFN is also a member of the Matawa First Nations Management Inc., a regional tribal council consisting of nine Ojibway and Cree First Nations communities in the Nishnawbe Aski Territory of Northern Ontario. Nishnawbe Aski

Nation, the Political Territorial Organization provides political, social and economic support for all First Nation communities in the Treaty #9 geographic area (MFFN n.d.).

Matawa First Nations Management, which includes Aroland First Nation, Constance Lake First Nation, Eabametoong First Nation, Ginoogaming First Nation, Long Lake #58 First Nation, MFFN, Neskantaga First Nation, Nibinamik First Nation and Webequie First Nation, provides advisory and /or program services to member First Nations when requested.

MFFN is governed by a Chief and up to seven councillors with elections held once every two years (MFFN 2014). Under the *Indian Act*, MFFN has the power to establish by-laws governing health, traffic and other areas. Federal statutes apply on reserve land while provincial statutes may apply if there is no existing by-law (MFFN 2014).

Marten Falls has approximately 65 houses (Statistics Canada 2017a). Most housing is classified as band housing with approximately two-thirds of housing defined as suitable (Statistics Canada 2017a). Housing is predominantly in two subdivisions. One is older along the west shoreline of the Albany River. The second is a newer subdivision built parallel to the older subdivision (MFFN 2014).

Marten Falls has an airport 5 km from the community, which is maintained by the MTO. The only scheduled all-season access to the community is a three times per week air service from an airport operated by Zam Air Service from Nakina, Ontario and, by a three times per week air service from Thunder Bay by North Star Air. Both airlines offer passenger and freight services. Seasonal access is also provided by the winter road (MFFN 2014). Electricity is provided to Marten Falls through Ontario Hydro Remote Services (MFFN 2014). Heating primarily occurs through wood burning for homes and oil furnaces for commercial properties. Despite having a water treatment plant, water and sewer infrastructure, a boil advisory is currently in place as the water treatment plant undergoes service (MFFN 2017). The community has a landfill 3.5 km north of the community where residents can deposit their waste (MFFN 2014). Bell Canada provides telephone service while K-Net provides limited broadband internet services. Television is available through satellite. News to the community is provided by Wawatay bi-weekly and the Chronicle Journal daily (MFFN 2014).

To the south of the proposed Project is Aroland First Nation. The community has approximately 110 houses with 86% classified as suitable (Statistics Canada 2017b). Aroland First Nation is a road accessible community connected to Highway 643. The road is available in all seasons. Community infrastructure in the Aroland First Nation community includes electricity (Ontario Hydro), water, sewage, and solid waste disposal (MNRF disposal site). Communication services include phone and television service provided by Bell; the Chronicle Journal newspaper, and radio provided by the Canadian Broadcasting Corporation. Transportation services in the community include a bus and taxi service. Bus service is provided by the First Nation (Matawa First Nations Management, n.d.).

Economy

Economic development in the area of the Project is undertaken predominantly by MFFN in partnerships with adjacent First Nations and industry. When requested, Matawa Economic Development Advisory Services will assist member First Nations to promote and foster sustainable economic development through the delivery of quality information products, capacity-building initiatives, and collaborative working projects (Matawa First Nations Management 2019). The closest Indigenous communities to the Project are MFFN and Aroland First Nation. These communities are likely to have the most economic interest in the Project. The Municipality of Greenstone is also likely to have economic interest in the Project due to its position as the primary service centre for these communities and its population of MFFN community members.

The primary economic activities in the region include mining, forestry and resource-based tourism. Mining exploration and development is expanding. The Agoke Development Corporation includes MFFN, Eabametoong and Aroland and was formed to manage the Ogoke Forest Management Unit. The Agoke Development Corporation Limited has a partnership with Nakina Lumber Incorporated – the Agoke Lumber Limited Partnership. This

Partnership and other Matawa communities have pursued the forestry industry, although the forestry industry in this region has been economically limited due to the downturn in the industry (MFFN 2014). A prohibitive factor to large development projects such as mining and forestry is transportation costs and infrastructure access. The lack of electricity and a reliable transportation network increase costs undermining the feasibility of enterprises.

Economic opportunity is limited within the MFFN. The unemployment rate is high at 18.8% with a low labour participation rate of 50% (Statistics Canada 2017a). Median income is also low at $14,944, which is well below the provincial average (Statistics Canada 2017a). Within the MFFN community there are a number of small private businesses including a convenience store, a grocery store, a fuel supply business and a lodging business. Resource based tourism operations are also operated by community members. The cost of living in the community is high due to the lack of access resulting in high costs for electricity and goods due to the transportation costs of fuel and goods.

Currently, small businesses operate within Aroland including a gas bar, convenience store, taxi company and tourist outfitters (Matawa First Nations Management n.d.). Aroland First Nation has similar labour market conditions to MFFN with low labour participation and high unemployment (Statistics Canada 2017b). Similar to MFFN, economic opportunity is limited in Aroland. The median income of $13,920 is low relative to the province (Statistics Canada 2017b). Aroland First Nation's primary employment sectors include primary industries, retail, administration, education, health care, recreation, accommodation and food services (Statistics Canada 2017b).

Greenstone has a more diversified economy than MFFN with a greater variety of people employed in different sectors (Municipality of Greenstone 2015). Greenstone has an unemployment rate of 10.6% with a labour force participation rate of 57.4%**.** The unemployment is 3.2% higher than the provincial averages while the labour force participation is 7.3% lower than the provincial average (Statistics Canada 2017c). Forestry, tourism and mining are key components of the Greenstone economy with Long Lake Logging and Premier Gold as major private sector employers (Municipality of Greenstone 2015).

Land and Resource Use

The area of the Project has a remote wilderness character, with most land used for resource harvesting and tourism. Major economic activities near the Project include forestry and mining exploration. A majority of the Project is expected to occur on lands regulated under the *Far North Act, 2010*. The *Far North Act* is the legislative foundation of land use planning in the Far North of Ontario (Government of Ontario 2014b). Far North land use planning is a joint planning process with the Ontario Government and Indigenous communities to identify where development can occur and where land is dedicated to protection in the Far North, which covers 42% of Ontario's land mass (Government of Ontario 2012). The purpose of the Act is to provide for CBLUP in the Far North of Ontario. The Project is expected to occur entirely in the area that will be covered by the MFFN CBLUP that has not yet been finalized.

A small portion of the Project to the south is located on Crown land designated as General Use Area. The Crown land under this designation is subject to Crown Land Use Policy Report G2697: Geraldton Area. This policy provides direction for the management of lands within General Use Area designation, permits, road development and maintenance (MNRF 2005).

The Albany River Provincial Park is located to the west of MFFN, along the Albany River and subject to Crown Land Use Policy Report P2657: Albany River Provincial Park (MNRF 2006). The Ogoki River Provincial Park is located to the southwest of MFFN. The Little Current River Provincial Park is located to the south of the existing winter access road. The Park is along the Little Current River and Percy Lake, which the winter access road was moved from as the Park was developed (MFFN 2017). Provincial parks are regulated under the *Provincial Parks and Conservation Reserve Act, 2006*, which provides the framework for the creation, removal and alteration of provincial parks (Government of Ontario 2014a). The Albany River Provincial Park is a waterway class park with

important fish harvesting and wilderness canoeing operations. MFFN, Eabametoong First Nation and Mishkeegogamang First Nation have traditional interest in this Park for transportation, recreation and harvesting (Golder Associates Ltd. 2018a). While these communities may have traditional interests in the Park, their interest may not overlap with the Project due to the area the Park covers extending far west of the Project. The Ontario Parks Planning Management Policies (1992 Update) aims to protect the natural, cultural and recreational values for which provincial parks are regulated (Golder Associates Ltd. 2018a).

Industries such as mining, aggregate production and forestry are important to this Project and the overall land use in northern Ontario. The region has a high degree of mining interests related to the Ring of Fire chromite deposits as well as other mining claims. Both alternatives overlap a high number of mining claims belonging to multiple mining companies. Currently, no all-season ground access exists to these claims or claims of interest north of the community. Aggregate resources are available near both alternatives, and towards the southern portion of the study area. Aggregate resource development is required for road projects as it is required for construction. Two Forest Management Units may overlap the Project: Ogoki Forest and Kenogami Forest. Forest Management Units are a geographic planning area setting boundaries for wood harvesting under a Sustainable Forest Licence (Government of Ontario 2013b).

Currently, a winter road is constructed annually to provide access to the community and to bring in goods such as heavy equipment, supplies and construction materials. The road is available from January to March if conditions are favourable (MFFN 2014).

Recreation and Tourism

Resource harvesting is a common practice for Indigenous and non-Indigenous peoples in the region. Common resource harvesting practices in northern Ontario include fishing, gathering hunting and trapping. Ontario regulates these activities under the *Fish and Wildlife Conservation Act,* 1997. The Act outlines restrictions on hunting and fishing, presents licensing and safety requirements and defines permitted methods. However, this provincial legislation does not affect Indigenous rights regarding these activities considering the existing Aboriginal and Treaty Rights of the Indigenous peoples of Canada are recognized and affirmed in section 35 of the *Constitution Act, 1982*. Access for these activities is available through boat launches and float planes access. Recreational fishing and hunting are popular activities in northern Ontario, drawing in tourists and local harvesters. Common target species for locals and tourists include moose, deer, black bear, pike, walleye, bass, trout and muskie (Golder Associates Ltd. 2018b).

Additional non-consumptive tourism also occurs in the region including hiking, canoeing and snowmobiling. These activities rely on waterways and trails. Formal Ontario Federation of Snowmobile Club snowmobile trails are not within the area of the Project but snowmobiling still likely takes place within the region (Ontario Federation of Snowmobile Clubs 2019). The Project likely transects a variety of trails and waterways used for recreation and tourism in the region. The Albany River Provincial Park is also identified as used for recreation activities in the region (Golder Associates Ltd. 2018a).

The Project occurs within Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI) Tourism Region 13c where $108 million was spent in 2013 on pleasure tourism (MTCS 2017). Tourism in the region is generally resource based with outfitting as the primary tourism activity with 661,000 tourists identifying participating in an outdoor activity as the main purpose of their trip (MTCS 2017). Most of these tourists come from within Ontario. Outfitting involves hunting, fishing or canoeing in remote locations with or without a guide. These tourist activities rely on their remote setting and wilderness setting to attract clients. The Albany River is an important tourism feature in the region with canoeing, hunting and fishing opportunities available through guided outfitting services (KBM Resources Group 2014; Golder Associates Ltd. 2018a). Approximately ten tourism operators have been identified as potentially having overlapping operating areas within 2.5 km of the centreline of each alternative route.

Human Health

Marten Falls is policed by the Nishnawbe-Aski Police Service. Tactical and emergency response are managed jointly with the Ontario Provincial Police. Provincial court services are operated within the community regularly. Legal representation is provided by Nishnawbe-Aski Nation legal services. The MNRF provides forest fire protection services starting 16 km outside of MFFN. No fire trucks are present within the community.

Health Canada funds the Muskeg Thunder Clinic, located in Ogoki Post, which operates 5 days per week. Health staff provide nursing services, health promotion and community health programs. Emergency medical services are provided in Greenstone with medivac aircraft utilized for transportation. Specialized medical services are provided in Thunder Bay at the Thunder Bay Regional Health Centre. Community health programs focus on mental health, addiction, prenatal and maternal health. Matawa First Nations Management, Nishnawbe-Aski Nation and the Ontario government provide family support, prevention and intervention programs within the community. Child welfare and family services programs are provided based out of Aroland First Nation with one person being employed by the MFFN community, but not based in the community.

Within Aroland, health services include the Aroland Health Centre and Tikanangan Child and Family Services Centre. Emergency services in the community include the Aroland First Nation Fire Department. Emergency medical services are provided by the Township of Nakina and, if unavailable, the Township of Geraldton. Aroland First Nation has a Crisis Team Co-ordinator who provides support to communities, families and individuals; referral services; family violence prevention; and access to ongoing healing programs.

The diet in the region relies on traditional subsistence harvesting with limited access to modern foods (Gamble 2017). The high cost of living and transportation likely contributes to this as goods are expensive and in short supply relative to communities with road access.

Visual Aesthetics

The remote wilderness aesthetics are important components of the visual environment in the area of the Project as related to the tourism industry, and residents of the local communities. Visual aesthetics of the Project region are largely influenced by natural processes such as wildfires, and limited human influences such as the existing local communities and winter roads.

Socio-economic Data Collection Methods

The following describes socio-economic data collection activities to further document the baseline condition, support the Project effects assessment work and route selection decisions for all criteria and indicators included in the socio-economy and land use assessments (**Appendix A**).

Data will be obtained from a variety of existing sources as further detailed in **Appendix A** including, but will not be limited to:

- Statistics Canada Community profiles;
- First Nation government information;
- Spatial Data;
- Municipal reports and plans;
- Provincial reports and plans;
- Non-Government Organization and academic reports;
- Community land use planning; and
- Regional industry sector reports.

Are review of available desktop information will be completed to identify information gaps and inform data collection for the Project. This will allow for more focused questioning targeted at specific data gaps and relevant items for each community. Desktop information will also be reviewed following the data collection for the Project to reaffirm and expand upon any new insights gained.

The purpose of data collection for the Project is to confirm and update data obtained from existing information sources, and to obtain additional information on the socio-economic and land use activities undertaken within the potentially affected communities and area of the Project. Data collection will be focused on the socio-economic criteria and indicators included in **Appendix A**. Interviews with relevant key contacts will be a key form of primary data collection. In some cases, it may be desirable to undertake focus-groups sessions. Interviews are expected to be undertaken with representatives of Indigenous communities, municipal governments, and land users. Where possible, in-person interviews will be conducted, otherwise representatives will be interviewed by phone. When applicable, interviews with vulnerable persons will also be conducted in a manner that is consistent with a Gender Based Analysis Plus approach. Interviews will be guided by a survey instrument (e.g. interview guide, survey, questionnaire) to ensure that consistent input is requested. Within Indigenous communities, the MFFN will attempt to interview members of Chief and Council, elders and youth.

Interviews (either in-person or by phone) will be undertaken with tourism operators, recreation club leaders, industry groups and/or other land users where stakeholders are willing. A request to complete a written questionnaire may be requested if an interview is not possible with the identified representative.

To support the interviews, relevant background information will be provided including mapping and an option to keep all information shared during the interview confidential. An opportunity for the interview subject to ask questions regarding the Project will also be provided.

The Socio-economic Assessment will integrate information from the Indigenous Knowledge primary data collection program to inform general components of the human environment whenever relevant. As an example, the total removal of current and traditional harvesting land would be considered to assess changes to a community's diet and well-being. The Socio-economic Assessment will only consider information from the Indigenous Knowledge program which is to become publicly available such as summaries and general commentary. The Socio-economic Assessment will not reference sensitive material, which is not fitting for the public forum, such as the location of important cultural sites.

7.1.4.13 Cultural Heritage Resources

Cultural heritage resources include archaeological and built heritage sites, and cultural heritage landscapes. Existing cultural heritage resources will be identified and described within the EA.

The Project is located in the Ontario Shield and Hudson Bay Lowlands Ecozones, covering Ecoregions 2W and 2E, which are comprised of upland boreal forest and lowland forest and extensive lowlands, respectively. The tertiary watershed systems in the area include the Albany-Makokibatan, Lower Ogoki, Little Current and Upper Albany-Muswabik, which would have provided important historical travel routes. Distance to modern or ancient water sources is one of the most important determinants of past human settlement patterns, along with drainage, glacial geomorphology and the general topographic variability of the area.

While no other archaeological assessments are known to have been completed within the current study area, some archaeological assessment has been undertaken in the broader region. Previous Stage 1 archaeological assessments have been completed in and near the western edge of the Project for pits and quarries proposed by mining industry. Previous archaeological surveys along the Albany River (Julig 1982) have demonstrated the rich archaeological record of the region, including several thousand years of Anishnaabe occupation. The area has been noted to have been occupied for thousands of years, including 20th century mining exploration in the region.

There are four registered archaeological sites within 50 km of the Project (**Figure 7-4**), including the Marten (Martin) Falls House (EjIp-1), which is found on the southern bank of the Albany River, approximately 12km east of the westernmost proposed route, two sites of unknown cultural affiliation and site type (Baxter site (Eilr-1) and Twin Point site (Eilr-2)), and one pre-contact indigenous camp (Feldbruegge site [Eglk-1]).

The Albany River was one of the first interior waterways west of James Bay to be explored by Europeans, beginning with the French between 1657 and 1751. During this time, they established interior posts which included The Marten Falls House, Henley House, and Gloucester House which are in proximity to the Study Area.

A Stage 1 archaeological assessment to identify areas of archaeological potential within the study area will be undertaken. The assessment will document the archaeological, land use history and existing conditions within the study area through a review of recent and historical maps; previous archaeological assessments in proximity to the study area; the MHSTCI Archaeological Sites Database for a listing of registered archaeological sites; and will also consider Indigenous Knowledge and related Indigenous land use information from both the pre- and post-contact periods to determine areas of archaeological potential. This information will be used to support recommendations regarding cultural heritage values or interests as well as assessment and mitigation strategies.

Should results of the Stage 1 archaeological assessment confirm archaeological potential within the study area, a Stage 2 archaeological assessment will be undertaken prior to construction for areas that are identified as part of the final Project footprint. Areas that cannot be visually determined to be permanently wet, and are not sloped, will be subject to Stage 2 test pit survey using the alternative strategies for special survey conditions in northern Ontario and on Canadian Shield terrain, as per Section 2.1.5 of the Standards and Guidelines for Consultant Archaeologists (MTCS 2011). Site selection will be completed through consideration of a number of factors, including but not limited to:

- desktop mapping exercises, including detailed stream ordering and removal of physical landscape features of low archaeological potential (i.e., bog, wetlands);
- proximity to historic water sources or other areas identified as having archeological potential (based on the results of the Stage 1 archaeological assessment);
- professional judgement by a licensed archaeologist;
- incorporation of available Indigenous Knowledge;
- consultation with MHSTCI; and
- aerial reconnaissance via helicopter.

The Stage 2 archaeological assessment will be conducted to meet the requirements of the *Standards and Guidelines for Consultant Archaeologists* (MTCS 2011). The results of the Stage 2 archeological assessment will inform the need for further archaeological investigation where effects to identified archaeological resources cannot be avoided through detailed design.

In addition to archaeological resources, which focus on specific localities and material remains of past occupation, there are also Cultural Landscapes that are of strong cultural heritage value. A Cultural Landscape is geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including Indigenous communities. The landscape may include features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association (Government of Ontario 2014c). The Cultural Landscapes within the study area will be identified and characterized following the process set out in the MHSTCI document *Heritage Resources in the Land-use Planning Process; Info Sheet #2, Cultural Heritage Landscapes* (MTCS 2005). Since the Landscapes to be addressed are largely Associative (i.e., they do not consist of formal built structures or “neighbourhoods”), the key information sources will be Indigenous Knowledge and discussions with knowledgeable community members.

Wabassi River

Marten Falls 65

Albany River

Gloucester House

Marten Falls House

Dark River

Henley House

Baxter

Washi Lake

Twin Point

Ogoki River

Feldbruegge

Marten Falls Winter Road

Painter Lake Road

Legend

- Marten Falls First Nation
- Phase 1 Study Area - Western Routes
- Phase 1 Route Alternatives - Western Routes
- Existing Road
- Archaeological Site

Marten Falls First Nation Community Access Road

Registered Archaeological Sites

0 5 10 20
Kilometers

Oct 03, 2019	1:380,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 16N Source: Data Sources Image: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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AECOM

Figure: 7- 4

Map location: E:\AECOM_BACKUPS\60593122_MFFNCAR\Design\03_Working\Registered Archaeology Sites - TOR - Sept 23 2019\RegisteredArchSites_Portrait.mxd
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7.2 Potential Environmental Effects

A preliminary identification of potential environmental effects associated with the undertaking during the construction and operations phases is provided in **Table 7-4.** As part of the EA, the potential environmental effects will be evaluated using applicable effects assessment criteria developed during the EA that will be based on standards, guidelines, objectives or other accepted ecological thresholds. As part of the assessment, consideration will be given to confirming whether environmental effects of the undertaking could combine with effects of other past, present, and reasonably foreseeable projects (cumulative effects).

Table 7-4: Preliminary Identification of Potential Environmental Effects

Environment	Discipline	Potential Effect
Natural Environment	*Atmospheric Environment*	▪ Changes to air quality ▪ Change in GHGs
	Acoustic Environment	▪ Increase in noise levels at sensitive receptors ▪ Increase in vibration at sensitive receptors
	Physiography, Geology, Terrain and Soils	▪ Changes to topography and ground stability ▪ Changes to soil quality ▪ Changes to soil quantity
	Surface Water	▪ Changes to surface water quality ▪ Changes to surface water quantity and flow
	Groundwater	▪ Changes to groundwater quality ▪ Changes to groundwater quantity and flow
	Vegetation	▪ Loss and alteration of vegetation communities, including wetlands ▪ Changes to species diversity
	Wildlife	▪ Loss and alteration of wildlife habitat (availability, use, connectivity) ▪ Change in wildlife population (abundance and displacement)
	Fish and Fish Habitat	▪ Loss and alternation of fish habitat (riparian, instream) ▪ Change in fish population (injury and mortality)
	Species at Risk	▪ Refer to potential effects identified for wildlife and wildlife habitat, and fish and fish habitat
Indigenous Knowledge	*Indigenous and Treaty Rights*	▪ Change to reserve lands ▪ Change in ability to access land and resources used for traditional purposes ▪ Changes to subsistence resource and activities including hunting, fishing, gathering and trapping
	Traditional Use of Land and Resources	▪ Change to cabins or camps and other resource use sites ▪ Changes to Indigenous landscape features ▪ Changes to the environmental conditions effecting traditional land and resource use ▪ Compatibility with land use planning
	Cultural Sites and Practices	▪ Change to cultural sites including ceremonial, grave, sacred, gathering and worship areas ▪ Change to access to cultural sites
Social, Economic and Built Environment	*Social*	▪ Change in population and demographics ▪ Change in availability and use of public services and infrastructure ▪ Changes to housing ▪ Changes to community well-being ▪ Changes to cultural activities and sites
	Economy	▪ Change in employment and income ▪ Change to the regional economy ▪ Change to government finances ▪ Change to industrial opportunities

Table 7-4: Preliminary Identification of Potential Environmental Effects

Environment	Discipline	Potential Effect
	Land and Resource Use	▪ Changes to provincial parks and protected area lands ▪ Changes to existing industrial uses
	Recreation and Tourism	▪ Changes to recreational and commercial lands used for trapping, hunting, fishing and other activities
	Human Health	▪ Changes in air quality, noise levels and water quality ▪ Changes to public health and safety ▪ Changes to diet ▪ Changes to access to health and emergency facilities and care
	Visual Aesthetics	▪ Alteration of existing landscape and visual character of the area (i.e., scenic values and viewpoints)
Cultural Environment	*Cultural Heritage Resources*	▪ Damage to, or the loss of, archaeological or other heritage sites

The potential environmental effects identified below are based on the environmental features that may be affected by the proposed undertaking. This list is preliminary and will be further developed during the EA. The EA will also recommend impact management measures to avoid, eliminate or minimize potential environmental effects.

The potential effect of the environment (i.e., climate change) on the undertaking will be addressed through a climate change risk assessment of the preferred route, based on the principles of the Engineers' Canada Public Infrastructure Engineering Vulnerability Committee protocol and ISO 31000. Current conditions and future conditions will feed into a climate change risk assessment of the preferred route. Indigenous Knowledge compiled through the Project will be used to guide and inform the climate change risk assessment.

7.2.1 Atmospheric Environment

Construction and operation of the CAR has the potential to affect local air quality. Effects to the atmospheric environment from construction would be temporary and result from emissions of combustion products such as nitrogen oxides and carbon monoxide, and suspended particulate from the operation of machinery and equipment. Emissions from construction would be highly localized to the area of work during the specific time-frames planned for each section of road development.

Following construction, the operation of the CAR would also contribute changes in the local air quality from the likely increase in vehicular traffic volume (i.e., all-season availability compared to current use of winter road only) and likely reduction in air traffic volume as a result of the all-season road access. Vehicular exhaust emissions consist primarily of nitrogen oxides, carbon monoxide, sulphur dioxides, suspended particulates, and volatile organic compounds, as well as GHG emissions. The regeneration of suspended particulates from vehicle movement along the gravel roadway would also contribute to local air quality. In general, effects of vehicular traffic emissions tend to be localized to approximately 500 m on either side of a roadway.

In the EA, dispersion modelling for the construction and operation of the alternative routes will be performed using the US EPA's AERMOD (version 16216r). Multiple modeling scenarios will be run to characterize the potential impacts from the development. Model results will be considered in conjunction with the monitoring results (monitoring planned is described in **Section 7.1.4.1**) to evaluate air quality. The 90th percentile of background concentrations will be combined with the modelling concentrations and compared against the standards under Ontario Regulation 419/05 (O. Reg. 419/05).

7.2.2 Acoustic Environment

Project construction activities, including equipment and machinery use, have the potential to cause temporary noise and vibration effects at sensitive receptors. These effects are not anticipated to be long-term due to the temporary nature of construction activities. However, once constructed, the CAR will provide a route for the transportation of people and supplies, and potentially industrial, forestry and mining traffic as well. Therefore, the CAR will be designed to accommodate a range of heavy and light vehicle types. These types of vehicles do not typically generate significant vibration levels, and it is expected that the CAR has a low potential for producing vibration effects. Given the rural nature of the area surrounding the Project, it is expected that ambient sound levels will be low and that traffic along the CAR has the potential to cause a perceptible change in the acoustic environment at nearby sensitive receptors. Potential noise effects of the alternative routes will be assessed quantitatively a noise prediction model in general accordance with the "Environmental Guide for Noise" (MTO 2006), the "Guidance for Evaluating Human Health Impacts in Environmental Assessment: *NOISE"* (Health Canada 2017), and the "Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning" (MOECC 2013).

7.2.3 Physiography, Geology, Terrain and Soils

Potential effects of road construction include changes to topography due to cut and fill for grading, blasting of bedrock and removal of overburden needed for the CAR, construction access roads and structure foundations. Aggregate is likely to be sourced locally, which will create pits and quarries (depressions where materials have been extracted) in the area of the Project. Changes to topography as a result of the Project may cause indirect effects, such as changes to surface water drainage and sub-catchment areas.

Blasting may result in areas of slope instability. Where unstable rock structures are encountered, design modifications (e.g., minor refinements to the route) may be implemented to minimize potential effects from erosion, settlement, slope instability, foundation failure or rock fall hazards that could occur as a result of construction.

Changes in soil quality and quantity may occur during construction due to increased potential for erosion, sedimentation, mixing and compaction resulting from vegetation clearing, excavation, use of heavy equipment and stockpiling of cleared materials. Changes in soil quality may also occur due to accidental release of contaminants during construction from the use of equipment and machinery (e.g., use of chemicals, explosives and fuel, equipment washing) and from vehicles during operation of the CAR (e.g., leaks and spills from road users). Maintenance activities during operations of a roadway do not typically involve the use, storage or handling of large quantities of potential contaminants other than equipment fuels and / or lubricants.

7.2.4 Surface Water

Construction and operation of the Project will require permanent infrastructure crossings of watercourses along the CAR and temporary crossings along construction access roads. Watercourse crossings may include bridges, culverts, fords, corduroy, swamp mats, ice and snow crossings, which may result in changes to surface water quality and quantity. Equalization culverts will also be installed at locations where it is determined that spring-melt or storm runoff needs to pass from one side of the CAR to the other.

It is expected that effects to surface water would be primarily related to sediment and erosion, and potential introduction of contaminants from accidental releases. Changes to surface water quality and quantity can cause indirect effects to other environmental components (e.g., fish and fish habitat, wetlands).

Activities during construction, such as vegetation clearing, grading, excavation, equipment and machinery use, and stockpiling of materials may result in sedimentation into nearby waterbodies due to the creation of exposed and unstable soils. Erosion into surface water may result in changes to concentrations of sediment, baseflows and

water temperatures. These activities may also affect surface water quality through the introduction of contaminants from blasting activities and equipment used during construction, and from maintenance activities (e.g., salt and sand application) and accidental releases from vehicles during the operation of the CAR.

Placement of stockpiles, soil compaction and impervious surfaces may change surface drainage patterns as well, which may result in effects to surface water quantity and quality. The placement of temporary and permanent structures in watercourses has the potential to change stream dynamics and morphology, and cause erosion and sediment issues.

7.2.5 Groundwater

Construction activities such as dewatering, water use, and the creation of impervious surfaces have the potential to result in effects to groundwater. Where dewatering occurs, there may be a temporary lowering of the local water table. A lowering of the water table may result in changes in groundwater quantity, which could decrease baseflow to watercourses, groundwater discharge to wetlands and groundwater flow patterns. These effects are typically confined to the zone of influence from dewatering activities and are temporary in nature. In addition, any private water wells located within the dewatering zone of influence may be temporarily affected by lower well yields and / or changes in water quality.

Blasting of bedrock also has the potential to change groundwater quantity. In rare cases, vibrations from blasting in bedrock can alter the fracture geometry, open new fractures, change the aperture of existing fractures, or permanently change local groundwater flow patterns. Groundwater quality may also be affected through agitation of subsurface conditions and the potential release of fine particulate and / or soluble substances. In the event a groundwater supply well is located within the area where ground vibration results from blasting activities, groundwater supply wells may become physically damaged and result in a reduction in well yield and / or water quality.

Construction dewatering has the potential to change groundwater quality in areas of substantial groundwater recharge through the release of contaminated construction dewatering discharge. When not mitigated effectively, groundwater discharges may also result in erosion and deposition of soils along the discharge path, elevated suspended solids and potential release of contaminants to receiving waterbodies. Groundwater quality may also be affected by leaks and accidental releases of contaminants during construction and operations.

7.2.6 Vegetation

Potential effects on vegetation and ecological communities include changes to community diversity (including community loss), changes to wetland quantity and function, and changes to species diversity.

Activities related to construction, such as vegetation clearing, stockpiling of materials, laydown areas, and excavation could result in the removal and degradation of vegetation, including forested and wetland areas. Direct (i.e., permanent vegetation removal) and indirect (e.g., changes to vegetation from erosion and sedimentation, dewatering, water-taking or water discharging activities and accidental release of contaminants) disturbances have the potential to change the form and function of the vegetation communities. Fragmentation of vegetation communities may also occur as a result of the construction of temporary and permanent components of the Project.

Dust resulting from construction activities and vehicle use of the gravel CAR may damage vegetation primarily through physical effects such as cell destruction and blocked stomata (Spellerberg 1998). Dust accumulation on plants may also affect photosynthesis, respiration and transpiration, which are important processes required for plant survival (Farmer 1993).

Spread of invasive plant species may also occur during vegetation clearing and be introduced on equipment and machinery containing seeds of invasive species.

7.2.7 Wildlife

Potential effects on wildlife and wildlife habitat during construction and operation of the CAR include habitat alteration and / or loss, change in wildlife mortality risk and change in wildlife behaviour.

The potential effects to vegetation (**Section 7.2.6**) may result in effects to wildlife where vegetation that provides suitable habitat will be lost or altered by the Project. This includes direct habitat loss, habitat degradation, and fragmentation during site preparation (e.g., vegetation clearing and site grading), stockpiling of materials, transportation of equipment and materials, and excavation activities. These activities may negatively affect wildlife habitat through increased erosion and sedimentation, soil removal, disturbance and compaction, and accidental release of contaminants. Wildlife may also be displaced during construction when habitat is removed (e.g., clearing and grubbing). Forested habitats are generally associated with a higher number of bird nests per hectare; therefore, the removal of these habitats would result in the displacement of more breeding pairs per hectare compared to other habitats such as grasslands or agricultural fields (Calvert et al. 2013). Also, the effects of dewatering, water-taking or water discharging activities, may negatively affect wildlife and wildlife habitat, particularly for species habitat dependant on surface water or groundwater (e.g., turtle overwintering habitat).

The Project construction and operation phases may result in a higher potential for accidental wildlife mortality through collisions with vehicles, equipment and machinery. Increased mortality risk is of concern during sensitive life stages (e.g., nesting / breeding season).

Noise, lights, and human presence have the potential to change wildlife behaviour through disturbance of wildlife. Disturbance to wildlife during site preparation (e.g., vegetation clearing) and other construction activities, may result in long-term effects (e.g., a decreased breeding success for nesting birds [Environment Canada 2014]). Operation of the CAR may result in continued disturbance and increased risk of mortality of wildlife species through vehicular collisions. The CAR will provide year-round access to the Far North, which is likely to increase access for recreational use. This has the potential to result in an increase in hunting pressure to wildlife populations, higher risk of the introduction of invasive species, parasites and disease, and the accidental release of contaminants to waterbodies.

7.2.8 Fish and Fish Habitat

Project-related effects on surface water quality and quantity (**Section 7.2.4**) may result in indirect effects on fish and fish habitat. Deposition of sediment in a waterbody can result in the loss of or alteration to habitat, alteration to baseflows or water temperatures, disruption of fish life processes, and fish and egg mortality.

The construction of temporary (e.g., bridges, cofferdams, fords, corduroy, swamp mats, culverts, ice and snow crossings) and permanent (e.g., bridges, culverts) watercourse crossings, and blasting as required, have the potential to result in adverse effects to fish and fish habitat. The potential effects associated with placement of structures in water includes disruption of life processes such as migration and spawning due to fish passage issues, fish mortality due to equipment and machinery, dewatering, water-taking or water discharging activities, changes in water quality (accidental release of contaminates), and the degradation, alteration or loss of fish habitat and function. To mitigate potential adverse effects on fish and fish habitat, waterbody crossings and culvert installations will be designed and installed in accordance with applicable federal and provincial guidelines and standards to avoid serious harm to fish that are part of a commercial, recreational or Indigenous fishery, or to fish that support such a fishery.

Blasting near waterbodies may cause the release of blast residues, particles at high velocity, instant and significant pressure changes and exposed soils. This may result in fish and egg mortality and degradation, alteration or loss of habitat.

The CAR will provide year-round access to the Far North, which is likely to increase access to waterbodies for recreational use. This has the potential to result in an increase in angling pressure to fish populations, higher risk of the introduction of invasive aquatic species, parasites and disease, and the accidental release of contaminants to waterbodies.

7.2.9 Species at Risk

Potential effects to SAR include those applicable to vegetation (**Section 7.2.6**), wildlife (**Section 7.2.7**) and fish and fish habitat (**Section 7.2.8**).

7.2.10 Indigenous Knowledge and Land Use

The Project may raise concerns of interested persons for potential effects to the natural environment including wildlife, vegetation and water resources. Potential effects to the environment may affect the Indigenous and Treaty Rights of communities. The potential effects to Indigenous and Treaty Rights include, but are not limited to the following:

- Change to the amount of available reserve lands for MFFN;
- Compatibility of the Project with CBLUP undertaken by Indigenous communities with traditional territory in the area of the Project;
- Changes to access to resource harvesting and cultural sites within and beyond the area of the Project through effects on linear features such as trails and waterways and camps / cabins;
- Changes to subsistence hunting, trapping, fishing and gathering as protected under Indigenous and Treaty Rights;
- Changes to Indigenous landscape features such as Place Names, Boundary Markers and Orientation Points through disturbances to the land within the area of the Project;
- Changes to the environmental conditions such as vegetation, wildlife, fish and water resources that may influence traditional activities within the area of the Project; and
- Change to spiritual and cultural sites such as ceremonial, grave, sacred, gathering and worship areas that may occur in the area of the Project.

7.2.11 Socio-Economic and Built Environment

The Project may alter the demographics, population, regional economy, labour market and public services of communities within or near the Project. These changes may result in a different socio-economic environment within communities, including differing socio-economic structures such as systems and institutions based on the construction and operation of the CAR. The extent of these changes will be based on the land users in the vicinity of the Project, the location of members of MFFN and Project procurement. For example, the location of the CAR relative to trapping area may impact the livelihood of trappers using those areas or the presence of the road may alter the economic makeup of the community. Regarding land use, the Project will disturb lands affecting wildlife, vegetation and water resources. These changes may affect human activities including resource harvesting, existing land uses and industrial uses of the land. Potential effects of the Project are likely to include, but are not limited to:

- Potential changes to the community (e.g., easier access to goods) may entice members of MFFN to return to or exit the community. Changes to population may impact the availability of housing for community members. If population increases or demographics change, strain on public safety services may also occur. These changes may also affect the well-being of the community.

- Changes to diet may also occur if members of MFFN return to live with the community on the reserve. Increased population and access to the Far North for recreational activities (e.g., fishing and hunting) may alter the ability of current MFFN community members to access traditional foods.
- The Project may result in effects to human health by altering public safety, public health, diet and mental health. These changes may be facilitated by additional access to and from southern communities year-round.
- Potential changes to provincial parks and protected area lands that may affect their values.
- Potential changes to recreation and commercial land uses due to changes to wildlife, vegetation or water resources. These changes may affect the enjoyment of these activities, which may negatively impact the tourism sector.
- Changes to industry and resource extraction activities such as mining, aggregate, forestry, linear infrastructure and energy projects. New access may allow industry opportunities to become more feasible thereby allowing for an increase in new development.
- Changes to the regional economy including the labour market. Additional access may affect the local economy through new opportunities for businesses, a lower price of goods and new development.
- Changes to visual aesthetics of the visual landscape through the introduction of a CAR within a primarily undisturbed environment.

Improved access to MFFN may also provide benefits in the form of skill development, training and job creation. Predicted benefits also include, but are not limited to:

- Reduced cost of living in the community;
- Opportunities for employment;
- Improved access to goods and services, such as education and training and health services;
- Increase of band members living year-round in the community; and
- Access to improved health services.

7.2.12 Cultural Heritage Resources

Should any archaeological or built heritage and cultural landscapes be identified in the area of the Project, there is a potential for damage to, or the loss of the cultural heritage resources through ground disturbance activities (e.g., blasting, grading). Any activity with the potential to cause ground disturbance may also inadvertently discover and / or disturb previously unknown resources. Vibration generated by heavy equipment may also damage buried artifacts of archaeological interest in areas where they are operated.