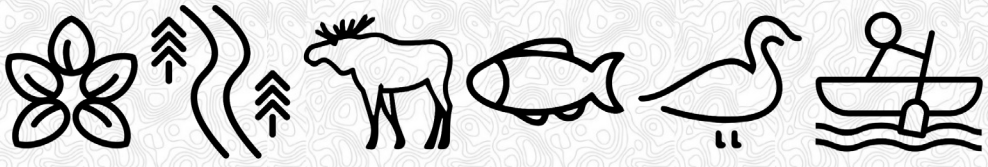
Appendix AB

Preliminary Biodiversity Offset Plan



MARTEN FALLS FIRST NATION
COMMUNITY ACCESS ROAD

Preliminary Biodiversity Offset Plan for the Marten Falls Community Access Road, Ontario

February 2026

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The Client required that the work be completed on an accelerated schedule. As a result, all activities were carried out within a compressed timeframe. WSP Canada Inc. expressly disclaims responsibility for any omissions, inaccuracies, or impacts that arise from the shortened schedule.

WSP Canada Inc. further advises that the accelerated schedule limited the time available for data review, analysis, and internal quality assurance. Accordingly, the Information may contain a degree of uncertainty that would not typically be expected for work of this nature performed under a standard schedule. WSP Canada Inc. makes no representations pertaining to the completeness of information made available for review considering the accelerated schedule required by the Client and other third parties.

This limitations statement is considered an integral part of this report.

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Revision History

Report	Date	Revised By:	Revision Description
Preliminary Version	February 20, 2026	WSP Canada Inc.	Preliminary Report for inclusion with Final EA/IS Report

Executive Summary

The Marten Falls First Nation Community Access Road (MFCAR) Project is a proposed all-season road that will connect the remote Oji-Cree community of Marten Falls First Nation to the provincial highway network. The Project requires both a federal Impact Assessment under the *Impact Assessment Act* and a provincial Environmental Assessment under the *Environmental Assessment Act*. This Preliminary Biodiversity Offset Plan has been developed to support these processes by outlining how residual effects on Key Biodiversity Components: will be offset following the mitigation hierarchy.

This Plan responds to federal and provincial legislative requirements, including the Marten Falls Community Access Road Project: Tailored Impact Statement Guidelines (Impact Assessment Agency of Canada, 2020a), Environment and Climate Change Canada's draft *Offsetting Policy for Biodiversity*, the *Species at Risk Act*, the amended *Endangered Species Act, 2007*, and anticipated requirements under the forthcoming *Species Conservation Act, 2025*. It is informed by technical baseline and effects assessments for peatlands, wildlife, birds, and ungulates, as well as engagement with Marten Falls First Nation and other Indigenous communities.

Project Overview

The Project involves construction of approximately 184 km of two-lane gravel road within a cleared 100 m right-of-way, with bridges and culverts constructed according to site-specific waterbody characteristics and climate-resilient design criteria. Supporting components include pits and quarries, temporary access roads, construction camps, and staging areas.

Peatlands, permafrost, species at risk, and intact boreal ecosystems are key environmental features in the Project area. Extensive mitigation measures are planned, including permeable "floating road" designs through peatlands, wildlife-friendly crossing structures, vegetation management, and progressive rehabilitation of temporary disturbances.

Ecological Risk Ranking of Residual Effects on Key Biodiversity Components

Despite mitigation, residual effects are expected on Key Biodiversity Components:

- **Peatlands**: Direct habitat loss (<1% regionally) and potential changes to groundwater or drainage patterns. Effect severity is moderate due to vulnerability (ecosystem of conservation concern) and irreplaceability (common in this landscape, but limited ability to restore functional peatland ecosystems).

- **Boreal Caribou**: Loss of Category 1 habitat, sensory disturbance, linear barrier effects, increased access-related mortality risk, and potential collisions with vehicles. Effect severity is high because of vulnerability (Threatened species) and irreplaceability.
- **Wolverine**: Habitat removal, sensory disturbance, incidental take, increased access, and potential collisions with vehicles. Effect severity is high because of vulnerability (Threatened species) and irreplaceability.
- **Little Brown Myotis and Northern Myotis**: Removal of roost habitat, sensory disturbance, potential collisions with vehicles. Effect severity is high because of vulnerability (Threatened species) and irreplaceability.
- **Migratory Birds (including SAR)**: Habitat loss, sensory disturbance, and increased edge habitat. Effect severity ranges from low (for non-SAR species), moderate for Special Concern species, and high for Threatened/Endangered species.
- **Raptor Species at Risk**: Habitat loss and sensory disturbance. Effect severity is high for Short-eared Owl (Threatened species) and moderate for Bald Eagle (Special Concern species).

A precautionary ecological risk ranking approach identified Boreal Caribou, Wolverine, SAR bats, and Threatened/Endangered migratory birds as high-priority components requiring offsetting. Peatlands, bald eagle, and special concern migratory birds were considered to have a moderate ecological risk ranking and will benefit from offsetting approaches implemented for the high-priority Key Biodiversity Components.

Offsetting Aproach

Offsets are applied as the final step in the mitigation hierarchy and must aim for no net loss, or preferably a net positive impact, on biodiversity. Offset planning considers equivalency, additionality, timing, duration, location, and accountability, which are consistent with federal policy, provincial requirements, and international Business and Biodiversity Offsets Program (BBOP) principles.

Preliminary Offset Options Considered

Protected Areas

- Creation of a protected area(s) in locations such as in the region around Pym Island, which holds cultural significance, provides important peatland and wildlife habitat, lies within known and potential new Caribou Category 1 habitat areas (nursery areas, winter use, and travel corridors) and encompasses the ecotone between ecozones and thereby provides diverse habitats and crucial connectivity for Key Biodiversity Components.

- Potential partnerships with non-governmental organizations such as the Jocotoco Foundation, a subsidiary of Bird Life International, to secure and protect overwintering habitat for migratory birds in Central/South America.

Habitat Restoration and Enhancement

- Restoration of degraded Caribou habitat, particularly legacy linear disturbances in more southern caribou ranges where habitat alteration is the dominant threat.
- Restoration of disturbed peatlands.
- Installation of artificial bat roost structures to replace lost maternity roosts.
- Construction of Wolverine denning slash piles in suitable mature forest areas >4 km from the road.
- Installation of duck nest boxes and man-made nesting platforms for raptors.

Long-Term Monitoring

- Monitoring Caribou and Wolverine movement and habitat use responses to the new linear disturbance.
- Monitoring artificial bat roost and denning slash pile occupancy.
- Noise monitoring to evaluate effects on wildlife behaviour.
- Marsh monitoring in accordance with survey standards by Birds Canada and/or Environment and Climate Change Canada.
- Autonomous recording unit and point count surveys to monitor birds.
- Monitoring of groundwater levels to assess the effectiveness of floating road in maintaining groundwater flow.
- Monitoring of net carbon uptake at peatlands affected by the Project, at control sites, and at restoration sites.

Financial Compensation (In-Lieu Fees)

- Funding targeted research, conservation programs, and Indigenous-led initiatives addressing key species and ecosystems where other offsets approaches are less feasible to address residual effects and/or where filling knowledge gaps is considered a priority.

Feasibility and Limitations

Offset feasibility depends on ecological suitability, land tenure, Indigenous governance considerations, provincial and federal regulator considerations, and stakeholder support. Limitations include:

- Long recovery timelines for peatlands
- Uncertainties in artificial habitat effectiveness
- Limited ability to directly offset wildlife mortality
- The complementary (not substitutive) nature of research-based offsets
- Potential constraints in securing and managing protected lands

Despite these limitations, residual effects on Key Biodiversity Components are considered offsetable using a combination of measures, with protected areas offering the strongest pathway to achieving no net loss or net positive outcomes.

Next Steps

This preliminary Plan will be refined through:

- Ongoing consultation with Marten Falls First Nation and other Indigenous communities
- Engagement with provincial and federal regulators
- Technical refinement of offset locations, design, scale, and implementation mechanisms
- Development of monitoring programs, formal agreements, timelines, and governance structures

The final Biodiversity Offset Plan will identify a preferred offset package that is ecologically sound, culturally appropriate, and feasible to implement and maintain over the long term.

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1. Introduction

This Report was prepared in response to federal and provincial legislative requirements for the Final *Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report*. It presents a preliminary proposed approach to biodiversity offsetting and is being prepared in support of the *Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report*. Initial engagement with the Marten Falls First Nation Community Access Road Project Team about the Preliminary Offset Plan occurred in 2024 and 2025. This Preliminary Offset Plan is expected to be finalized following additional engagement and consultation with Marten Falls First Nation and other Indigenous communities, and engagement with federal and provincial regulators, during subsequent phases of the Project.

Marten Falls First Nation (Oji-Cree translation, *Wegwajihwana*) is a remote First Nation community in northern Ontario, approximately 430 km from Thunder Bay, Ontario, located at the junction of the Albany River (Oji-Cree translation, *Keshijih'wano Wih Ziibih*) and the Ogoki Rivers (Oji-Cree translation, *Zakamosgwanih' Ziibih)*. Marten Falls First Nation is proposing a multi-purpose Community Access Road (the Project) that will connect the community to the Ontario provincial highway network. The Project includes the construction and operation of a road with the following key characteristics:

- Approximately 184 km of two-lane gravel road on a new right-of-way;
- Approximately 100 m wide right-of-way cleared; and
- Proposed designated speed limit of 80 kilometres per hour (km / hr).

Marten Falls First Nation is currently accessible year-round by air transportation out of Thunder Bay, Ontario and Nakina, Ontario, and by a winter access road constructed annually, if winter conditions permit. Since the 1990s, Marten Falls First Nation has received provincial funding to maintain the 140 km of winter road to the community.

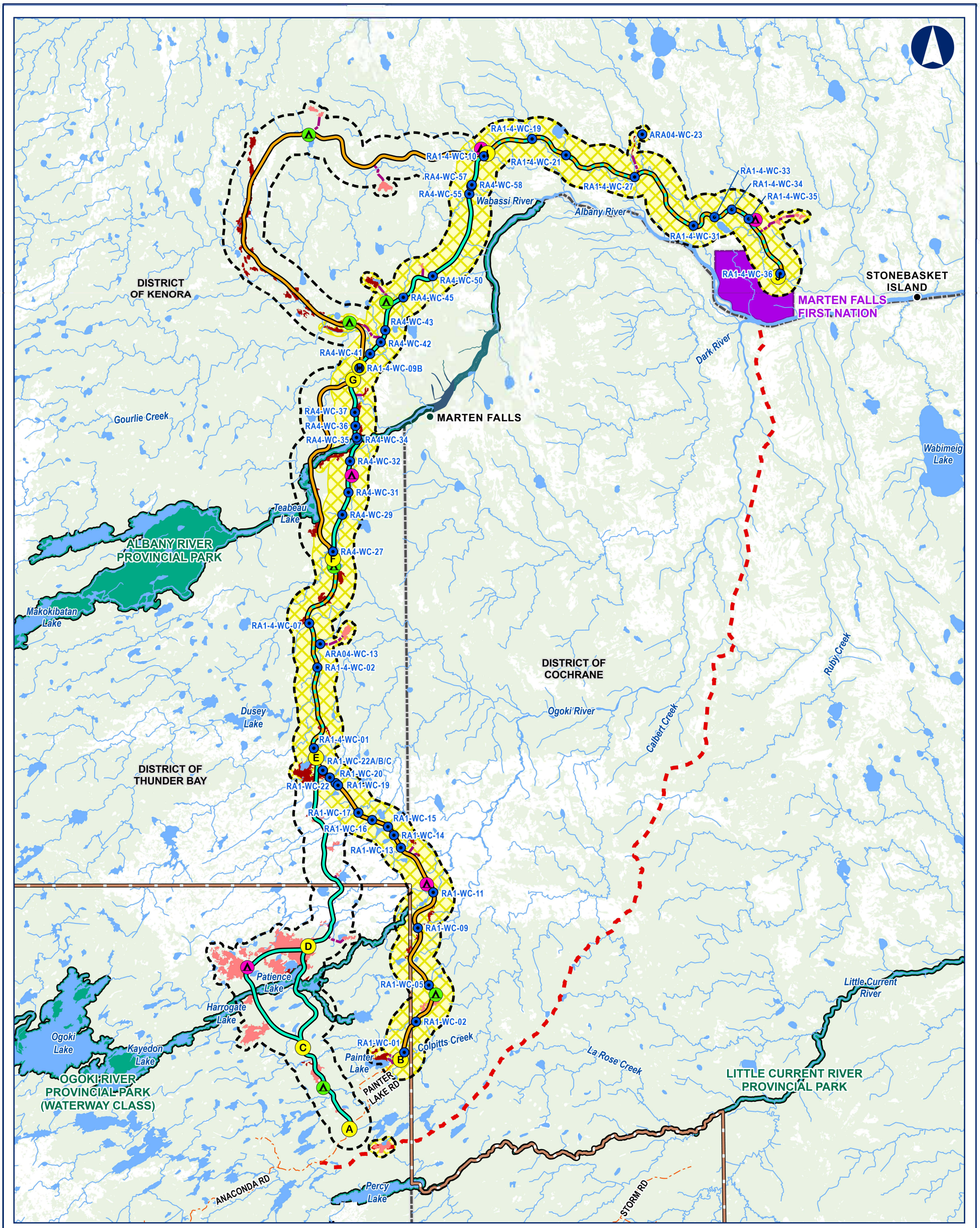
1.1 Project Overview

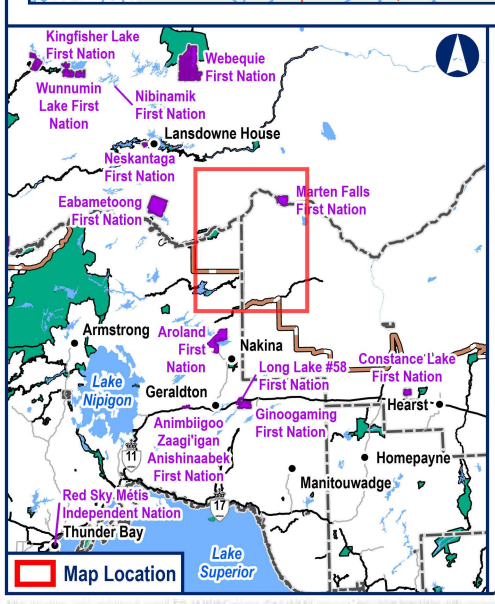
The Project consists of a Community Access Road from Painter Lake Road, located approximately 57 km north of Nakina, Ontario, to the community of Marten Falls First Nation (**Figure 1-1**). The Community Access Road will serve community access and industrial supply needs for both the community (e.g., fuel, construction supplies, and water treatment supplies) and industrial proponents (e.g., mining and forestry). Therefore, to minimize infrastructure corridors in the Far north, the Project will be for a multi-purpose road built to meet industrial use specifications.

In April 2018, Marten Falls First Nation signed an agreement with the Ministry of the Environment, Conservation and Parks to prepare an Environmental Assessment under the *Ontario Environmental Assessment Act* (1990), to support the development of the Community Access Road. A study under the *Ontario Environmental Assessment Act* was formally initiated by Marten Falls First Nation in March 2019 when the *Notice of Commencement for a Terms of Reference* for the Project was published.

All-season public roads that require 75 km or more of new right-of-way, as per Schedule 1 (51) of the Physical Activities Regulations under the *Impact Assessment Act*, may be subject to the Act (Government of Canada, 2019). After considering the detailed Project Description, the Agency determined that a federal impact assessment is required for the Community Access Road and an Impact Statement needs to be submitted to the Agency for review and approval. The Agency prepared and released the Marten Falls Community Access Road Project: Tailored Impact Statement Guidelines in February 2020 (Impact Assessment Agency of Canada, 2020a) to outline the information and studies necessary to conduct the impact assessment.

The federal and provincial governments are cooperating on the assessment of the Community Access Road, in accordance with the Cooperation Plan (Impact Assessment Agency of Canada, 2020). The Cooperation Plan allows Marten Falls First Nation to prepare one single *Environmental Assessment / Impact Statement Report* submission to satisfy both the federal and provincial processes (Government of Canada).





Legend

- Water Crossing
- Segment Node
- Project Study Area
- Final Route Recommendation

Construction Disturbance Area

Route Alternatives (100 m Right-of-Way)

- Alternative 1
- Alternative 4

N/A

- Alternative 1 and Alternative 4

Potential Camp Site

- 50 Persons (108 m x 150 m)
- 200 Persons (108 m x 150 m)

Potential Aggregate Source

- Bedrock
- Sand and gravel
- Approximate Access Road to Potential Aggregate Site (10 m Width)

General Features

- Resource / Recreation Road
- MFFN Existing Winter Access Road
- Watercourse
- Waterbody
- First Nation Reserve
- District Municipal Boundary
- Far North Boundary
- Provincial Park

Data Source:
Base Data: Provided by MNRF 2023; Route Infrastructure - Provided by AECOM 2021. Contains Information licensed under the Government Licence Ontario.
Notes:
First Nation Reserves of MFFN CAR Neighboring Indigenous Communities are shown within the inset extent.

MARTEN FALLS FIRST NATION COMMUNITY ACCESS ROAD

Final Route Recommendation

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

January 2026 | 1:450,000 * when printed 11"x17"
Rev:00

Figure 1-1

1.2 Report Overview

This Report summarizes the results of the residual effects assessment and presents biodiversity offset options for provincially and federally mandated terrestrial Key Biodiversity Components for the Project.

1.3 Qualifications of Individuals

A list of names and qualifications of the authors and technical reviewers of this Report is presented in **Table 1-1**.

Table 1-1: Qualifications of Individuals

Name	Title / Role	Years of Experience	Qualifications
Lynnette Dagenais	Lead Wildlife Biologist	17	B.Sc.
Michelle Bacon	Lead Wildlife Biologist	18	M.Sc., R.P.Bio.
Luke Owens	Lead Ecologist	18	B.A Hons.
John Virgl	Senior Principal Ecologist	30	Ph.D.
Erin Greenaway	Senior Principal Ecologist	27	B.Sc.

2. Project Description

2.1 Project Components

2.1.1 Community Access Road

The Project consists of an approximately 184 km all-season road within a 100 m wide right-of-way, 60 m of which will be cleared of vegetation. The road will be approximately 11 m in width to accommodate a two-lane gravel road with culverts and two-lane bridges at water crossing locations. Traffic levels for the Project have been estimated at 700 vehicles a day for the north–south section and 100 vehicles a day for the east–west section of the Community Access Road. These volumes are reflective of the anticipated peak traffic in 2046.

Road embankment design mitigations are being further considered in high-suitability habitat for caribou where feasible. Operational mitigations such as lower speed limits, signage about wildlife risks, roadside vegetation management, and snow berm height management will be further planned and implemented to facilitate safe wildlife crossing of the road.

The predominant building materials used to construct the Community Access Road will be blasted rockfill and composite excavation material capped with granular surface material. The majority of blasted rockfill will be obtained from rock outcrops within and / or adjacent to the right-of-way. Building materials will be primarily obtained through the pits and quarries developed specifically to support construction of the Project.

Early investigations on permafrost have shown the Project is located within the isolated patches permafrost zone (Heginbottom et al., 1995), with some possible locations identified in test holes and helicopter reconnaissance by KGS Group (2019a,b). Excavation within identified permafrost areas will be avoided, whenever possible, as cutting into surface vegetation can disturb the permafrost regime resulting in thaw and unstable ground. As a precaution, the design will primarily use fill to minimize any permafrost degradation and will follow the recommendations outlined in a Permafrost Management Plan.

The proposed approach to road construction through peatlands endeavours to keep peat in place while promoting natural water flow. A permeable embankment made of quarried rock or selected granular material will be placed over the peat, supported by heavy geogrid to prevent clogging and allow settlement. To preserve peatland hydrogeology, 900-mm equalization culverts will be installed at appropriate intervals, informed by additional field

programs and studies (i.e., peatlands hydrogeological monitoring, water budget study, and a field program to develop a detailed map of peat thickness), to be carried out during subsequent design phases of the Project.

2.1.2 Bridges and Culverts

Permanent bridges will be required for the various waterbodies to be crossed by the Community Access Road. Based on initial design and planning, the proposed waterbody crossing structures were initially determined based on bankfull width for each waterbody identified in the crossing list as follows:

- For waterbody crossings with bankfull widths less than 5 m, it was assumed that culverts would be used (requiring in-water work);
- For waterbody crossings with bankfull widths greater than 5 m and less than 30 m, it was assumed that clear span bridges would be used (no in-water work);
- For waterbody crossings greater than 30 m, it was assumed that bridges with piers and abutments would be used (requiring in-water work); and
- For waterbody crossings in flooded / impounded wetlands where wetted widths were greater than bankfull width at the time of the assessment, it was assumed that in-water work would be required.

The type of crossing structure for individual waterbodies may change during detailed design based on site-specific conditions.

The bridges will range in size from clear span to multi-span bridges and will accommodate two lanes of traffic with appropriate shoulder widths. The foundation supports for the bridge abutments are expected to consist of driven steel piles, drilled concrete piles or concrete spread footings. Bridges will be designed to meet the one in 100-year flood scenario design, fish passage requirements, and navigation requirements, as required, based on federal and provincial regulations. Where feasible, bridges will be installed above the high-water mark; however, abutments and / or reinforcement material may be installed below the high-water mark. Permanent bridges along the Community Access Road will be designed to accommodate increased flooding and rainfall under expected and anticipated climate change conditions.

For certain waterbody crossings, culverts will be constructed using either corrugated steel pipe culverts or box culverts with minimum culvert diameters of 900 mm. The culverts will either be closed or open bottom depending on fisheries sensitivities and soil conditions. The culverts will be designed to accommodate fish passage, where appropriate. Permanent culverts along the Community Access Road will be designed to withstand expected and anticipated climate change conditions, such as increased rainfall, higher temperatures, frequent freeze-thaw cycles, and heightened flooding risks.

Equalization culverts will be installed at locations where it is determined that spring-melt or storm runoff needs to pass from one side of the Project to the other to prevent flooding and / or erosion. The purpose of equalization culverts is to maintain the existing surface water drainage patterns in the area. Culverts will be put in place as construction progresses along the Project.

Additional design measures and wildlife crossing mitigation options will be incorporated on select bridges and culverts located in high-suitability habitat for Species at Risk and road mortality vulnerable species (i.e., amphibians and reptiles). These measures will be further considered during detailed design and implemented during construction at prioritized locations to facilitate safe wildlife passage above or below the Community Access Road and reduce the risk of barriers to movement across the Project area during operations.

The type of crossing structure for individual waterbodies may change during Detailed Design based on site-specific conditions.

2.1.3 Pits and Quarries

Pits and quarries will be developed to provide crushed rock and granular materials for the construction of the Project and temporary access roads. Most of the rock required for construction is expected to come from quarry sites adjacent to the Project. Temporary access roads will be established to connect the various Project components, as required, and will be limited in length to the extent feasible. The pits and quarries may require dewatering, with an associated discharge to land or nearby watercourses (if water quality is suitable).

All materials will be subject to a geotechnical verification process to confirm they possess the desired physical properties for use in construction. The development and operation of all pits and quarries will be subject to the aggregate permitting process under the *Aggregate Resources Act* (Aggregate Resources of Ontario: Site Plan [2020] Standards and Technical Reports and Information [2023]). Permitted pits and quarries will follow the progressive and final rehabilitation requirements outlined in the approved site plans under the Act.

Only material that has been cleared through a geochemical verification process will be used for the permanent and temporary road surface to avoid acid rock drainage or metal leaching. Monitoring of runoff will be conducted; further details about this specific type of monitoring will be available in the Surface Water Management Plan of which the Contractor will be responsible to follow all applicable Ontario permitting guidelines.

2.1.4 Temporary Infrastructure for Construction

The temporary infrastructure for the Project includes temporary access roads, staging areas, camps, and debris and / or timber stockpiles. Temporary infrastructure will seek to avoid disturbing peatlands, given their vulnerability and irreplaceable nature. Temporary access roads will be required to access the right-of-way during construction. The purpose of the temporary access roads is to facilitate emergency, equipment, and personnel access, and to provide access to and from pits and quarries, staging areas, camps, and debris and / or timber stockpiles. The temporary access roads will be cleared, but not grubbed, to approximately ten metres wide to accommodate equipment movement. The temporary access roads will be limited in length to the extent feasible. Temporary bridges and culverts will be required to cross the various waterbodies along the temporary access roads. Existing access roads will be used where possible; however, access is limited in the area.

Bridges and culverts will be required to cross the various waterbodies along the access roads. Based on initial design and planning, the proposed waterbody crossing structures for the *Environmental Assessment / Impact Statement Report* were initially determined based on bankfull width for each waterbody identified in the crossing list as follows:

- For waterbody crossings with bankfull widths less than 5 m, it was assumed that culverts would be used (requiring in-water work);
- For waterbody crossings with bankfull widths greater than 5 m and less than 30 m, it was assumed that clear span bridges would be used (no in-water work);
- For waterbody crossings greater than 30 m, it was assumed that bridges with piers and abutments would be used (requiring in-water work); and
- For waterbody crossings in flooded / impounded wetlands where wetted widths were greater than bankfull width at the time of the assessment, it was assumed that in-water work would be required.

Temporary construction camps, staging areas, and stockpile areas are anticipated to be established at various locations along the right-of-way and / or near other Project components. These components are proposed to support crews and to store equipment, vehicles, materials, and supplies.

Temporary access roads leading to temporary quarry areas will also be rehabilitated (progressive and final rehabilitation) and surrendered in accordance with the *Aggregate Resources Act*. Vegetation will be established, as outlined on the required Rehabilitation Plan to align with the *Aggregate Resources of Ontario: Site Plan (2020) Standards.* Access roads to quarries maintained for operations will be blocked to discourage public use.

2.2 Project Activities

The Project is planned to occur in two phases: Construction, and Operation and Maintenance. The following Project activities will occur over in each phase, including:

- Construction Phase Project activities:
  - Clearing of the right-of-way for the Community Access Road (e.g., remove and dispose of trees, shrubs, fallen timber, and surface litter, strip organic materials, grub);
  - Blasting rock (e.g., remove rock at quarries, and as required, at specific locations in association with road and bridge construction);
  - Constructing the Community Access Road (e.g., overburden excavation and removal, excavation of granular material at pits, remove unsuitable soil, place and compact rock and granular material, trim and shape the road, stockpiling of mineral soil and leaf litter (organic material), and soil handling and replacement from stockpiles at decommissioning);
  - Constructing bridges and installing culverts (e.g., surface water management and erosion control, dewatering of the watercourses to create ice bridges, alteration of natural drainage systems, and watercourse bank grading to improve approaches if required);
  - Constructing and operating temporary infrastructure (e.g., access roads, construction camps, laydown areas, and staging areas);
  - Decommissioning temporary infrastructure (e.g., remove temporary culverts and bridges and remediate channels); and
  - Mobilizing equipment, supplies, and personnel (e.g., haulage of materials, soil and liquid waste management, fuel storage, hazardous materials handling, sewage and effluent treatment and water storage and effluent monitoring for temporary construction camps).
- Operation and Maintenance Phase Project activities:
  - Operating the Preferred Route.
  - Maintaining the Preferred Route, including:
    - Excavation at pits, and excavations and / or blasting at quarry sites;
    - Dewatering within pits and quarry sites;
    - Grading road surfaces (e.g., washout repair, correct grade);
    - Conducting erosion control (e.g., apply native seed mix);
    - Conducting dust suppression (e.g., apply environmentally friendly dust control products);
    - Clearing vegetation on road shoulders (e.g., mow grass, remove brush and small trees);

- Removing snow (e.g., plow);
- Conducting bridge and culvert maintenance (e.g., seasonal inspections debris removal);
- Conducting ditch maintenance (e.g., maintain drainage to design standard by excavating, filling, trimming, and shaping ditches); and
- Conducting road maintenance (e.g., fix settlement, break-up of road surface, slope failures).

3. Project Environmental Assessment / Impact Assessment Report and Offset Requirements

The *Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report* and supporting Technical Appendices have been prepared according to the requirements of the *Tailored Impact Statement Guidelines* (IAAC, 2020) and the approved provincial Terms of Reference for review and approvals. The Technical Appendices contain the assessment of residual Project and cumulative effects on a variety of Key Biodiversity Components. The Technical Appendices relevant for this Biodiversity Offset Plan are:

- Appendix I – Peatlands Technical Support Document: Existing Conditions & Effects Assessment.
- Appendix J – Vegetation Technical Support Document: Existing Conditions & Effects Assessment.
- Appendix K – Wildlife Technical Support Document: Existing Conditions & Effects Assessment.
- Appendix L – Birds Technical Support Document: Existing Conditions & Effects Assessment.
- Appendix M – Ungulates Technical Support Document: Existing Conditions & Effects Assessment.

3.1 Objective of the Preliminary Biodiversity Offset Plan

This Preliminary Biodiversity Offset Plan (or Preliminary Offset Plan) was prepared in response to federal and provincial legislative requirements for the Final *Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report*. It summarizes the results of the residual effects assessment and presents biodiversity offset options for provincially and federally mandated Key Biodiversity Components for the Project.

Initial engagement with the Marten Falls First Nation Community Access Road Project team about the Preliminary Offset Plan occurred in 2024 and 2025 (**Section 5, Preliminary Engagement and Partnerships**). This Preliminary Offset Plan is expected to be finalized following additional engagement and consultation with Marten Falls First Nation and other Indigenous communities, the owner/operator of the Community Access Road and engagement with federal and provincial regulators, during subsequent phases of the Project.

3.2 Federal and Provincial Legislative Requirements Related to Offsets

3.2.1 Federal Legislative Requirements

Biodiversity offsets are part of the mitigation hierarchy, which is an internationally recognized approach for reducing risk to biodiversity through Project design. Offsets are the last step to address residual effects remaining after efforts to avoid, minimize, and restore have been implemented.

Section 20 (Mitigation and enhancement measures) of the *Tailored Impact Statement Guidelines* for the Project, developed by the Impact Assessment Agency of Canada under the *Impact Assessment Act* (IAAC, 2020), identify that offsetting or compensation plans are required to address residual effects for federally managed biodiversity components, which are federal species at risk (i.e., Threatened and Endangered species under Schedule 1 of the *Species at Risk Act*) and their critical habitat, migratory birds (as defined under the *Migratory Birds Convention Act, 1994*), fish and fish habitat, and wetlands (IAAC, 2020).

The "*Operational Framework for the Use of Conservation Allowances*" (EC, 2012) and draft "*Offsetting Policy for Biodiversity*" (ECCC, 2020) outline the Government of Canada's approach to offset residual and cumulative effects where Environment and Climate Change Canada have a regulatory or expert role within its mandate, including on projects regulated under the *Impact Assessment Act*.

Compensation plans or offset projects for residual effects on fish and fish habitat will be addressed through the Fisheries and Oceans Canada *Fisheries Act* process. Based on Fisheries and Oceans Canada's review of the Project, an application for authorization under the *Fisheries Act* will be prepared and it is assumed to include a compensation plan to account for the loss of fish habitat by the Project. If required, the fish and fish habitat compensation plan is likely to include habitat enhancement measures or habitat creation to offset losses associated with the Project.

3.2.2 Provincial Legislative Requirements

The Province of Ontario has passed the *Protect Ontario by Unleashing our Economy Act, 2025*, which makes amendments to the existing *Endangered Species Act, 2007*, and enacts the *Species Conservation Act, 2025*, which will come into force on a future date (Government of Ontario, 2025a). The *Protect Ontario by Unleashing our Economy Act, 2025* created a new definition of habitat that applies to the amended *Endangered Species Act, 2007* / future *Species Conservation Act, 2025*. Under the old *Endangered Species Act, 2007*, habitat was defined as all areas that a species at risk relies on for life processes. Under the amended *Endangered Species Act, 2007*, and, eventually, the

Species Conservation Act, 2025, habitat is defined as physical dwellings (e.g., dens, nests) and the immediate surrounding area that is essential for breeding, rearing, or wintering/hibernation. As such, these amendments have resulted in changes to the authorization process under the amended *Endangered Species Act, 2007* (e.g., references to overall benefit permit are understood to be replaced by a "permit issued under subsection 17[1] [Government of Ontario, 2025b]). Similarly, once the *Species Conservation Act, 2025* is in force and supporting regulations are created, authorizations for impacts to protected species and their habitat are expected to be processed though the new Species Conservation Registry, a fast, online registration process, instead of the former authorization process under the *Endangered Species Act, 2007* (Government of Ontario, 2025b).

It is anticipated that the new regulations may include conditions to develop beneficial actions or habitat compensation activities, as was required for the *Endangered Species Act, 2007* authorizations in the past. In previous experience, beneficial actions are similar in nature to offsetting activities. These beneficial activities vary according to the expected effects to protected species and their habitat, and have included contributions to relevant conservation organizations, funding for relevant research to support affected species, and plans to create or enhance habitat elsewhere in place of any damaged or destroyed habitat (Government of Ontario, 2025b).

3.3 Key Biodiversity Components

As stated in the Project *Tailored Impact Statement Guidelines* (IAAC, 2020), offsetting or compensation plans are required to address residual effects for federally managed biodiversity components, which are federal species at risk (i.e., Threatened and Endangered species under Schedule 1 of the *Species at Risk Act*) and their critical habitat, migratory birds (as defined under the *Migratory Birds Convention Act, 1994*), fish and fish habitat, and wetlands (IAAC, 2020). Offset Plans or activities that benefit provincial species at risk are also required under the *Endangered Species Act, 2007* and will continue to be required, once the *Species Conservation Act, 2025* is in force.

The Project occurs in a region of northern Ontario where numerous species at risk (provincially and / or federally listed) and important biodiversity features are located. Of the species and environmental features that were assessed as Valued Components for the *Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report*, the following are being considered as Key Biodiversity Components upon which to build an offset plan:

- Peatland Ecosystems [Oji-Cree translation, *maashkiigwabo*] ecosystems);
- Boreal Caribou (Oji-Cree translation, *atik*) (*Rangifer tarandus*);
- Wolverine (Oji-Cree translation, *wishkobish, wiingwa'waake*) (*Gulo gulo*);

- Little Brown Myotis (Oji-Cree translation, *gaa'osaawisich obikwaanaachiis*) (*Myotis lucifugus*) and Northern Myotis (Oji-Cree translation, *gaaginogitawagech obikwaanaachiis*) (*Myotis septentrionalis*);
- Migratory bird species at risk (including forest birds, shorebirds, waterfowl and waterbirds, bog / fen birds, and other wetland birds); and
- Raptor species at risk (bald eagle [Oji-Cree translation, *mikisi*] [*Haliaeetus leucocephalus*] and short-eared owl [Oji-Cree translation, *gaayaagaachitawaagech kookookohoo*] [*Asio flammeus*]).

4. Overview of Effects Assessment and Offset Planning

Key Biodiversity Components are environmental, health, social, economic, or additional elements or conditions of the natural and human environment that may be affected by a proposed project and are of concern or value to the public, Indigenous Peoples, federal authorities, and interested parties (IAAC, 2021). Effects on Key Biodiversity Components will be mitigated by implementing the mitigation hierarchy to work towards, at a minimum, "No Net Loss", or, preferably, a "Net Positive Impact" to biodiversity (ECCC, 2020).

4.1 Mitigation Hierarchy

Following the mitigation hierarchy (**Figure 4-1**) allows a project to work towards, at a minimum, No Net Loss or a Net Positive Impact to biodiversity (ECCC, 2020). Mitigation should be achievable, measurable, and verifiable – as well as monitored for compliance and effectiveness during all phases of a Project.

The steps of the mitigation hierarchy are:

1. **Avoidance**: The first action of the mitigation hierarchy is composed of measures taken to avoid creating effects from the outset, such as careful placement of infrastructure to avoid sensitive habitat or areas (e.g., wetlands, cultural sites) or timing construction activities to avoid disturbing wildlife during sensitive periods (e.g., breeding).
2. **Minimization:** These are measures implemented to reduce the intensity, duration, and / or spatial extent of effects through best management practices (e.g., actions to reduce noise and air emissions, sediment and erosion control), which could not be avoided with the use of available technology or were not economically feasible.
3. **Reclamation (Restore On-Site):** The objective of this action is to improve degraded or removed ecosystems following exposure to effects that cannot be completely avoided or minimized. Reclamation returns the land to a useful and productive state (e.g., covering and revegetating a surface facility) following disturbance and use of the land for the Project. Rehabilitation aims to restore basic ecological functions and / or ecosystem services (e.g., providing erosion protection), while restoration attempts to return an area to the original ecosystem that occurred before the effects from a project. Most reclamation, rehabilitation, and restoration actions typically take place towards the end of a project's lifespan or when temporary use areas are no longer required during construction, and when there is usually uncertainty in the timelines for the effects to be reversed, which requires monitoring to verify performance criteria are trending towards targets and objectives.

4. **Offsetting:** Offsetting actions compensate or counterbalance effects that cannot be fully mitigated through avoidance, minimization, and reclamation / restoration measures. Offsetting measures typically counterbalance this loss through positive contributions to the ecosystem. Offsets may include habitat enhancement, compensation, or community enhancement. Offsetting requirements are determined through regulatory processes and engagement, where monitoring is needed to determine effectiveness.

Although not recognized as part of the mitigation hierarchy by international standards, monetary compensation (e.g., financial contributions and in-kind contributions) may be allowed as a form of mitigation under certain circumstances in Canada. Compensation is considered a complementary measure to the mitigation hierarchy as it will not directly avoid, minimize, reclaim, or offset project impacts (ECCC, 2020). Financial contributions can be towards scientific research, data collection, outreach, and other measures that do not directly result in on-the-ground conservation but, instead, address identified knowledge gaps (ECCC, 2020).

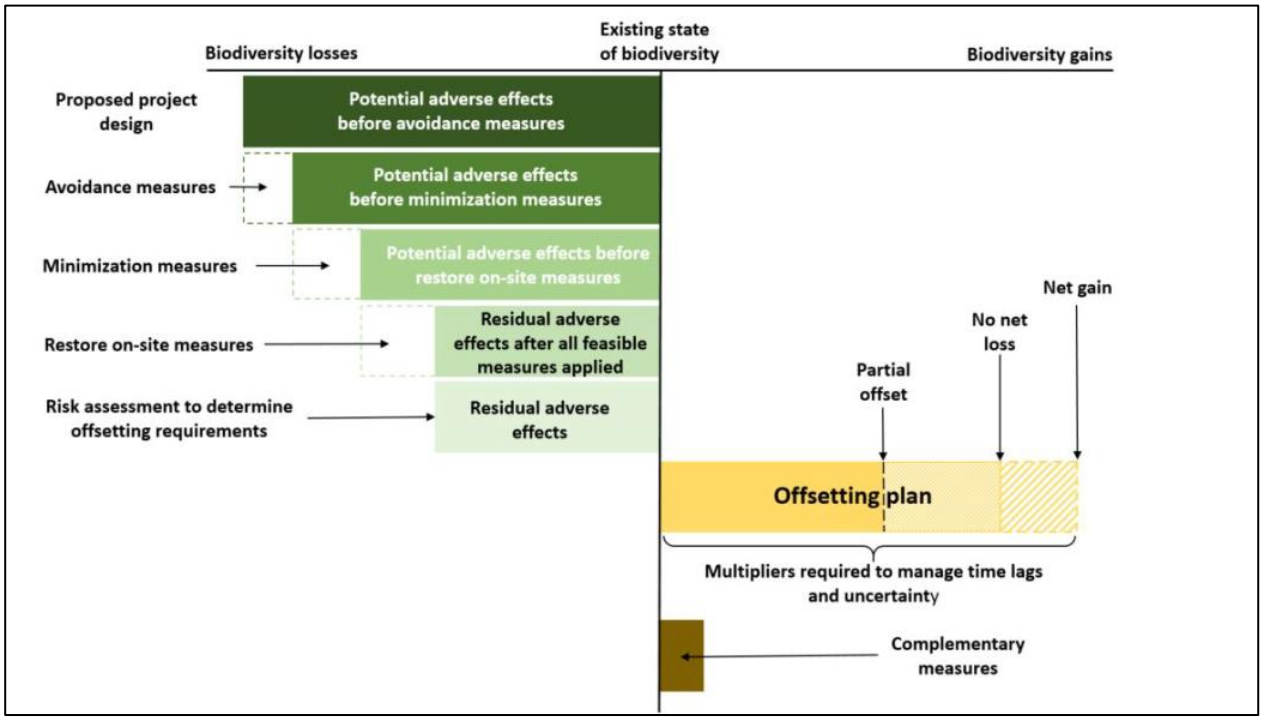


Figure 4-1: Mitigation Hierarchy, from ECCC Draft Offsetting Policy for Biodiversity (ECCC, 2020)

4.2 Methods for Ranking Residual Effects on Key Biodiversity Components

Residual effects are the effects that are predicted to remain after the application of mitigation measures. Residual effects are characterized by context, direction, magnitude, geographic extent, duration, frequency, reversibility, likelihood, and uncertainty as well as discipline-specific characteristics, if applicable.

4.2.1 Ecological Risk Ranking

Residual effects are evaluated to determine the severity of potential ecological risk and the probability that Project effects on Key Biodiversity Components can be offset. This risk is assessed based on the vulnerability and irreplaceability of Key Biodiversity Components (**Table 4-1**).

Table 4-1: Severity Assessment Matrix for Residual Effects

Irreplaceability[a]	Vulnerability			
	Threatened or Endangered Species or Ecosystem	Special Concern Species or Ecosystem of Conservation Concern	Data Deficient for Species or Ecosystem	Not-at-Risk Species or Ecosystem
High	High	High	Moderate	Moderate
Moderate High	High	Moderate	Moderate	Low
Moderate Low	Moderate	Moderate	Low	Low
Low	Moderate	Low	Low	Low

Notes:
(a) Irreplaceability is defined as:
High – Key Biodiversity Component is rare, or the size of effect is proportionally large when measured at an appropriate scale or there are few or no viable offset options beyond the area affected by the Project.
Moderate High – Key Biodiversity Component is uncommon but viable offset options exist.
Moderate Low – Key Biodiversity Component is common but viable offset options are limited.
Low – Key Biodiversity Component is common and there are ample opportunities to conserve this component elsewhere.

After a severity ranking is assigned to a Key Biodiversity Component, an Ecological Risk Ranking is assigned based on the severity and likelihood of an effect (**Table 4-2**).

Table 4-2: Ecological Risk Ranking Matrix for Key Biodiversity Components

Likelihood[a]	Severity[b]		
	High	Moderate	Low
Certain	High	High	Moderate
Probable	High	Moderate	Moderate
Possible	Moderate	Moderate	Low
Unlikely	Moderate	Low	Low

Notes:
(a) Likelihood is defined as:
Certain – residual effect will occur
Probable – residual effect is likely to occur, but uncertain
Possible – residual effect may occur, but is not likely
Unlikely – residual effect is not expected to occur, but not impossible
(b) Severity was ranked in **Table 4-1**.

4.3 Offset Planning

4.3.1 Principles of Offsetting

According to the "*Operational Framework for the Use of Conservation Allowances"* (EC, 2012) and draft "*Offsetting Policy for Biodiversity*" (ECCC, 2020), the Government of Canada outlines an approach to offset residual and cumulative adverse effects. As the last step in the mitigation hierarchy, offsets are only applied after all alternatives of avoidance, minimization, and reclamation / restoration of the adverse effects are considered.

The factors that are key to developing a tailored offset plan for a project are (McKenney and Kiesecker, 2010; ECCC, 2020):

- **Equivalency**: Both quality and quantity of ecological functions at the offset site should be at least equivalent to that which is being adversely affected;
- **Additionality**: The biodiversity protection or improvement provided by the offset should be beyond what would be provided under a business-as-usual scenario;
- **Location**: The offset site should be located as close as possible to the affected site; however, if a more distant site is deemed more appropriate under the context of broader, regional management objectives, it should still have comparative biodiversity values and support comparable ecosystem function as the affected site;
- **Timing**: An offset agreement should be established ideally before the effects of development occur, or at least at the same time. The time lag between project effects and offset maturity should be considered;
- **Duration**: The offset site should be maintained until it is self-sustaining or has met predetermined standards deemed appropriate to compensate for the biodiversity loss; and
- **Accountability**: Offsets should be formalized, such as through a permit condition.

The Business and Biodiversity Offsets Programme is a collaborative initiative among businesses, governments, conservation organizations, and financial institutions, which was established in 2004 as an initiative to include environmental conservation in economic activities. Since establishment, the Business and Biodiversity Offsets Programme has released several guidance and policy documents to standardize the language and approach to biodiversity offsetting. The Business and Biodiversity Offsets Programme has identified ten principles that establish a framework for designing and implementing biodiversity offsets (Business and Biodiversity Offsets Programme, 2018).

1. **Adherence to the mitigation hierarchy**: Offsets are commitments to compensate for residual adverse effects on biodiversity that occur after appropriate avoidance, minimization, and on-site rehabilitation measures are implemented, as per the mitigation hierarchy;

2. **Limits to what can be offset**: Some residual effects cannot be fully compensated for by an offset because of the irreplaceability or vulnerability of the component affected;
3. **Landscape context**: To achieve measurable conservation outcomes, biodiversity offsets should be designed and implemented in a landscape context;
4. **No net loss**: Offsets should be designed and implemented to achieve measurable conservation outcomes that can be reasonably expected to result in no net loss, and preferably a net positive impact, on biodiversity;
5. **Additional conservation outcomes**: An offset should achieve conservation outcomes above and beyond results that would have occurred if the offset did not take place;
6. **Stakeholder participation:** Effective participation of stakeholders should be considered in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation, and monitoring;
7. **Equity**: Offsets should be designed and implemented in an equitable manner and special consideration should be given to respecting Indigenous and local community rights;
8. **Long-term outcomes**: Offsets should be designed and implemented with the objective of securing outcomes that last at least as long as a project's effects, and preferably in perpetuity. Offsets should be based on an adaptive management approach that incorporate monitoring and evaluation;
9. **Transparency:** The design and implementation of biodiversity offsets and communication of results to the public should be undertaken in a transparent and timely manner; and
10. **Science and traditional knowledge:** Offsets should be designed and implemented using a process informed by sound science and should also include an appropriate consideration of traditional knowledge.

4.3.2 Offset Mechanisms

Offsets are achieved through one or a combination of the following mechanisms, in order of priority:

- **Improving existing biodiversity** through management actions through restoration or enhancement, typically habitat of a target species or an ecosystem.
- **Creating new biodiversity sources;** this can be habitat or population based (e.g., direct management to increase the number of individuals in a target population).

- **Protecting existing biodiversity** that would otherwise be lost in the reasonably foreseeable future; and
- **Financial contributions** ("in-lieu fees") are an option if the abovementioned mechanisms are not available, or where financial contribution to an external offsetting initiative is likely to lead to a better outcome for biodiversity than the abovementioned mechanisms.

4.3.3 Engagement and Consultation

Following the development of preliminary offset approaches (presented in **Section 6**), engagement and consultation with Indigenous communities and federal and provincial regulators is necessary to determine an appropriate compensation ratio and select an offset mechanism or combination of mechanisms that would meet the objectives.

4.3.4 Final Offset Plan

Following engagement and consultation, a final offset plan will be developed to describe the selected offset approach(es) and outline how the offset will meet targets to address residual effects to species at risk and their critical habitat, migratory birds, and wetland functions. In addition, the final offset plan will include details requested in Section 20 (Mitigation and enhancement measures) of the *Tailored Impact Statement Guidelines* (IAAC, 2020), including:

- Identify and describe habitat and non-habitat measures;
- Describe how the proposed measures align with published provincial and federal recovery, management or action plans and strategies for species at risk;
- Identify the location and timing of implementation of compensation projects;
- Identify and describe the success criteria for the selected offset approach(es);
- Identify the parties responsible for implementation, including monitoring and review;
- Describe the functions gained at the compensation site(s);
- Provide evidence that functions can be replaced by the proposed offset activities;
- Describe the process of selecting proposed compensation site(s) and associated baseline condition(s); and
- Provide a description of the monitoring schedule and activities to be completed to monitor the success of compensation activities.

It is anticipated that the process to finalize the offset plan would include multiple versions of the plan and additional engagement and consultation with regulators and Indigenous communities.

4.4 Implementation and Monitoring Plans

Following the selection of an offset approach or combination of approaches and the development of a Final Offset Plan, an implementation plan will be developed. An offset implementation plan should outline specific measures that will be carried out to execute the approach selected in the final offset plan. This includes a detailed list of steps to develop the final plan, a schedule for its completion, financial commitments to implement the offset(s), and a summary of permits that are necessary to implement the offset.

Depending on the selected offset approach, a monitoring program to evaluate compliance and effectiveness of the offset implementation may be required. This should be detailed in a final offset plan once the approach has been selected.

5. Residual Project Effects for Key Biodiversity Components

In the technical assessments that support the *Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report*, the effects on Valued Components are mitigated by implementing measures to avoid, minimize, reclaim / restore, and offset (i.e., the mitigation hierarchy; **Section 2.2**) throughout the Construction Phase and Operation and Maintenance Phase of the Project. For reference, mitigation and enhancement measures for each Key Biodiversity Component are described in detail in the respective Technical Support Document: Existing Environment & Effects Assessment (Appendix I – Peatlands, Appendix K – Wildlife, Appendix L – Birds, and Appendix M – Ungulates).

The following Project–environment interactions were predicted to result in measurable residual effects on terrestrial key biodiversity components:

- Habitat loss and alteration (all wildlife, peatlands);
- Sensory disturbance (all wildlife);
- Linear barriers (ungulates);
- Collisions with vehicles and equipment (ungulates, wolverine, bats, large carnivores);
- Increase in public access (ungulates, wolverine);
- Incidental take (bats, birds); and
- Increased edge habitat (ground-nesting birds).

Residual effects of the Project for Key Biodiversity Components are described below.

5.1 Peatlands

Residual effects on peatlands from direct habitat loss and alteration and changes to drainage patterns or groundwater (Oji-Cree translation, *anamakamigwabo*) regimes remain after implementation of mitigations.

The Project will directly remove or alter <1% of peatland ecosystems in the peatlands effects assessment Regional Study Area (i.e., the quaternary watersheds that overlap the peatlands Local Study Area). Effects from habitat loss on peatland abundance, distribution, and composition are considered certain to occur – and there is a moderate degree of confidence that these effects are not underestimated. Uncertainty was managed by assuming the entire Construction Disturbance Area will be permanently disturbed

(i.e., habitat loss numbers do not account for reclamation of temporary disturbances), and by rolling-up the peatland mapping from ecosites to peatland community groupings and completing the effects assessment on these groupings.

Measurable changes to groundwater levels could result in changes to peatland ecosystem availability, distribution, composition, and function in the effects assessment Local and Regional Study Areas. The peatlands Local Study Area is defined as a 3 km buffer on either side of the centreline of the Community Access Road Preferred Route and a 500 m buffer around areas of the Preferred Route associated infrastructure that are outside of the original Local Study Area defined in the Peatlands Study Plan. There is uncertainty about the effectiveness of the “floating road” method to limit changes to drainage patterns and groundwater regimes. Effects from changes to groundwater are conservatively considered probable to occur (i.e., a precautionary approach was applied).

The irreplaceability ranking (**Table 4-1**) for peatlands is considered moderate low because peatlands are common in the Local and Regional Study Areas but are vulnerable to disturbance and take a long time to restore to functional ecosystems (i.e., peatlands are carbon sinks and difficult to offset). Based on the assessment of vulnerability (ecosystem of conservation concern) and irreplaceability (moderate low) of peatlands, the severity of residual effects from the Project on peatlands is moderate (**Table 4-1**).

The ecological risk to peatlands is based on severity and likelihood of effects (**Table 4-2**). Following a precautionary approach, the likelihood of effects was considered probable to occur and the severity is moderate; as such, the ecological risk is moderate (**Table 5-1**).

5.2 Boreal Caribou

Residual effects on Boreal Caribou from direct habitat loss and alteration, sensory disturbance, linear barriers, increased public access, and collisions with vehicles and equipment remain after implementation of mitigations.

Habitat loss from the Project will occur in the Missisa and Nipigon ranges, and the addition of the Project disturbance will increase the total cumulative disturbance (buffered anthropogenic disturbances and natural disturbances) in these ranges to 6.5% and 45.8%, respectively. The Nipigon range already exceeds the disturbance threshold established by Environment and Climate Change Canada. No habitat will be lost or altered in the Ozhiski or Pagwachuan ranges.

The construction of the Project will directly remove 17,514 hectare (ha) of known and potential new Category 1 habitat, a change of -6.7% relative to the available Category 1 habitat in the ungulate effects assessment Local Study Area (i.e., the Construction Disturbance Area plus a 10 km buffer on either side) in the existing environment and -0.2% relative to the available Category 1 habitat in the Ungulate effects assessment Regional Study Area in the existing environment. The Caribou effects Regional Study Area is

defined as the Caribou ranges that are intersected by the Ungulate Local Study Area (Missisa range, Nipigon range) and adjacent Caribou ranges that may be affected by indirect habitat loss (Ozhiski range, Pagwachuan range). The loss of Category 1 habitat occurs in the Missisa range (16,308 ha) and in the Nipigon range (1,205 ha).

Effects from habitat loss are considered certain to occur and there is a high degree of confidence that these effects are not underestimated. Uncertainty was managed by assuming the entire Construction Disturbance Area will be permanently disturbed (i.e., habitat loss numbers do not account for reclamation of temporary disturbances).

The 500 m buffer around the effects assessment Construction Disturbance Area results in an additional 27,017 ha of (indirectly) disturbed habitat during construction which is no longer considered functional. Effects on Caribou survival and reproduction from sensory disturbance is predicted to be strongest in proximity to Category 1 areas. The loss of Category 1 habitat occurs in the Missisa range (16,308 ha) and in the Nipigon range (1,205 ha). Effects from sensory disturbance are considered certain to occur and there is a moderate degree of confidence that these effects are not underestimated. Uncertainty was managed by applying Environment and Climate Change Canada's Boreal Caribou habitat disturbance buffer (i.e., 500 m) as a sensory disturbance zone of influence for Boreal Caribou.

The effects of linear barriers introduced by the Project on Caribou, such as altered movements, distribution, and reduced habitat connectivity, are expected to extend into the Caribou Regional Study Area but will be concentrated within and near the Ungulate Local Study Area. This effect is likely to primarily influence Caribou that move east-west across the Local Study Area between the Missisa and Ozhiski ranges, as well as individuals that demonstrate migratory behaviour and move north-south between wintering areas in the Missisa range and calving ranges on the coast of Hudson Bay. In addition, individuals that move north-south between Nipigon and Missisa may also be affected from reduced gene flow. Effects to linear barriers are considered probable to occur, but certainty is low.

The construction of the Project will introduce roads (i.e., the Community Access Road, as well as temporary and permanent access roads), which are expected to increase public access into areas that are less accessible in the existing environment. Although most of the Project access roads will be decommissioned following the Construction Phase to reduce public access, they will likely continue to be used opportunistically during the Operation and Maintenance phase. As a result, an increase in Indigenous hunting pressures and illegal harvest by non-Indigenous hunters of caribou may occur because of increased human access. Effects from increased mortality are considered possible to occur. The isolation of the Project from urban centres and the general lack of trails in the effects Local Study Areas are likely to limit the increase in public access, but certainty is low.

The construction of the Project may result in a small decrease in Boreal Caribou survival and reproduction relative to existing conditions through collisions with vehicles during Project operation. Effects from increased mortality are considered probable to occur. There is a moderate degree of confidence effects from collisions with vehicles are not underestimated; mitigation effectiveness during road operation is more uncertain given that mitigations (e.g., speed limits) are less enforceable during road operations than during road construction.

The irreplaceability ranking (**Table 4-1**) for Boreal Caribou is considered moderate high because this species is a Threatened species under the *Species at Risk Act* and the *Endangered Species Act, 2007*, but effects from the Project are small and viable offset options exist for this species.

Based on the assessment of vulnerability (Threatened species) and irreplaceability (moderate high) of Caribou, the severity of residual effects from habitat loss, sensory disturbance, linear disturbance, increased mortality risk from increased public access, and potential for collisions with vehicles during Project operation on Boreal Caribou is high (**Table 4-1**).

The ecological risk to caribou is based on severity and likelihood of effects (**Table 4-2**). Following a precautionary approach, the likelihood of effects was considered probable or certain to occur and the severity is high; as such, the ecological risk is high (**Table 5-1**).

5.3 Wolverine

Residual effects on Wolverine from direct habitat loss and alteration, sensory disturbance, incidental take, collisions with vehicles and equipment, and increased public access remain after implementation of mitigations.

The Project is assumed to conservatively remove or alter habitat from the entire Project footprint. As such, it is estimated that 4,700 ha of available habitat for Wolverine will be removed by the Project footprint. Effects from habitat loss are considered certain to occur and there is a high degree of confidence that these effects are not underestimated. Uncertainty was managed by assuming the entire Construction Disturbance Area will be permanently disturbed (i.e., habitat loss numbers do not account for reclamation of temporary disturbances).

Sensory disturbance from the Project may indirectly affect 189,145 ha of suitable Wolverine habitat within 4 km of the Project. Effects from sensory disturbance are considered certain to occur and there is a high degree of confidence that these effects are not underestimated. Uncertainty was managed by applying conservative sensory disturbance zones of influence for wolverine that would not underestimate effects.

The construction of the Project may result in a small decrease in Wolverine survival and reproduction, relative to existing conditions through inadvertent disturbance of maternal dens (incidental take) or collisions with vehicles. Effects from increased mortality are considered possible to occur after implementation of appropriate mitigation. There is a moderate degree of confidence effects from collisions with vehicles are not underestimated; mitigation effectiveness during road operation is more uncertain given that mitigations (e.g., speed limits) are less enforceable during road operations than during road construction. It is anticipated that one Wolverine mortality per year could occur along the Project during operations.

The irreplaceability ranking for Wolverine is considered moderate high because this species is a Threatened species under the *Endangered Species Act, 2007* (high vulnerability) and the species is uncommon, but viable offset options exist for this species.

Based on the assessment of vulnerability (Threatened Species = high) and irreplaceability (moderate high) of Wolverine as it is an uncommon species and the residual effects of the project on this species were predicted to be of low to moderate magnitude, but viable offset options exist for this species the severity ranking of residual effects from habitat loss, sensory disturbance, increased mortality risk from increased public access, and potential for collisions with vehicles during Project operation on Wolverine is high (**Table 4-1**).

The ecological risk to wolverine is based on severity and likelihood of effects (**Table 4-2**). Following a precautionary approach, the likelihood of effects was considered probable or certain to occur and the severity is high; as such, the ecological risk is high (**Table 5-1**).

5.4 Little Brown Myotis and Northern Myotis

The Project is expected to result in effects on Little Brown Myotis and Northern Myotis from habitat loss and alteration, sensory disturbance, incidental take, and collisions with vehicles relative to existing conditions and after Project mitigation measures are considered. Mitigation measures are expected to minimize the effects of habitat loss, alteration and sensory disturbance during Construction, but direct and indirect permanent habitat loss from the Project will physically occur. The magnitude of effects for the interactions is predicted to range from negligible to low.

Habitat loss or alteration of hibernacula are not expected as there were no features with potential to support overwintering identified in the study areas. The Project is predicted to remove 694 ha of suitable maternity roost habitat for Little Brown Myotis and Northern Myotis.

Sensory disturbance (e.g., presence of workers, artificial lights and noise from construction equipment) during Project Construction could result in the indirect loss or degradation of suitable bat habitat as these types of disturbance may cause Little Brown Myotis and Northern Myotis to avoid otherwise suitable roosting and foraging habitat. Sensory

disturbance during the Operation and Maintenance Phase may be related to vehicular traffic on the Community Access Road as the produced noise can impair echolocation efficiency. As a precise threshold of avoidance by little brown myotis and northern myotis is not known, habitat that was within 100 m of the Project was assumed to be negatively affected by sensory disturbance as a precautionary approach. The effects of sensory disturbance on bats are predicted to be greatest during foraging, and all terrestrial, wetland and open water habitats may provide foraging habitat (Environment Canada, 2015). Therefore, the areas of bat habitat that may be indirectly affected by sensory disturbance include all areas within 100 m of the effects assessment Construction Disturbance Area. A total of 236 ha of potential bat foraging habitat may be indirectly affected within 100 m of the effects assessment Construction Disturbance Area. This represents 0.16% and 0.05% of the effects assessment Local Study Area and effects assessment Regional Study Area, respectively.

Incidental take of Little Brown Myotis or Northern Myotis may occur during the Construction Phase if roost habitat is destroyed during the roosting period or if hibernacula are disturbed during the winter. Pups could be lost if clearing and grubbing removes roost habitat during the maternity roosting period, posing the highest risk of incidental take in the Project if insufficiently mitigated. As stated, there was no evidence of a bat hibernaculum found in the study area during existing conditions field surveys and as such hibernacula are not expected to be disturbed during the construction of the Project.

Bat mortalities from collisions with vehicles and equipment are most likely to happen during the Operation and Maintenance Phase when public vehicles are travelling along the Community Access Road. Areas where canopy heights adjacent to the road are lower may have a higher risk of bat mortality due to bats flying lower to the ground.

The irreplaceability ranking (**Table 4-1**) for Little Brown Myotis and Northern Myotis is considered moderate high because these species are Endangered species under the *Endangered Species Act, 2007* (high vulnerability) and the species are uncommon, but viable offset options exist for this species.

Based on the assessment of vulnerability (Endangered species) and irreplaceability (moderate high) of Little Brown Myotis and Northern Myotis as they are uncommon species and the residual effects of the project on these species were predicted to low magnitude, but viable offset options exist for this species the severity of residual effects from habitat loss, sensory disturbance, incidental take, and potential for collisions with vehicles during Project operation on Little Brown Myotis and Northern Myotis is high (**Table 4-1**).

The ecological risk to Little Brown Myotis and Northern Myotis is based on severity and likelihood of effects (**Table 4-2**). Following a precautionary approach, the likelihood of effects was considered probable or certain to occur and the severity is high; as such, the ecological risk is high (**Table 5-1**).

5.5 Migratory Birds

Residual effects on migratory birds from direct habitat loss and alteration, sensory disturbance, and increased edge effect remain after implementation of mitigations.

The Project will directly remove or alter from 0.5% to 2.8% of available high and moderate quality for migratory birds in the birds effects assessment Regional Study Area (i.e., 11 km buffer on either side of the centreline of the preferred Project route), including migratory bird species at risk. Effects from habitat loss are considered certain to occur and there is a high degree of confidence that these effects are not underestimated. Uncertainty was managed by assuming the entire Construction Disturbance Area will be permanently disturbed (i.e., habitat loss numbers do not account for reclamation of temporary disturbances).

Habitat loss from the Project may remove 0.5% to 2.8% of available nesting territories for migratory birds in the birds effects assessment Regional Study Area. To be conservative, effects from habitat loss are considered certain to occur (i.e., a precautionary approach was applied). There is a moderate degree of confidence that these effects are not underestimated. Uncertainty was managed by applying the best available information (i.e., density estimates for Ontario Breeding Bird Atlas regions 37 or 44 or best available home range size estimates). However, information in the Far North region of Ontario is lacking, and density and home range estimates may not be accurate.

Sensory disturbance from the Project may indirectly influence 2.5% to 6.3% of available high and moderate quality for migratory birds in the birds effects assessment Regional Study Area, including bird species at risk. Exceptions are mallard (Oji-Cree translation, *ininiship*) (*Anas platyrhynchos*), chimney swift (Oji-Cree translation, *gondaaganaabikoong gaadashiiyayaach binechiinch*) (*Chaetura pelagica*), barn swallow (Oji-Cree translation, *gaanawachwebamaach manichooshan binechiinch*) (*Hirundo rustica*), and bank swallow (Oji-Cree translation, *gaa'osaaw bebeshi aakiganech binechiinchechench*) (*Riparia riparia*), which are not anticipated to be negatively affected by sensory disturbance due to their noted tolerance to nesting on or near human settlements and other anthropogenic disturbances (e.g., bridges). Effects from sensory disturbance are considered probable to occur and there is a high degree of confidence that these effects are not underestimated. Uncertainty was managed by applying conservative sensory disturbance zones of influence for migratory bird Valued Components.

The construction of the Project will result in a small increase in the amount of edge habitat, relative to existing conditions, which may increase predation risk for ground-nesting migratory birds. Effects from increased edge are considered probable to occur. There is a moderate degree of confidence that these effects are not underestimated. It is anticipated that changes will be small because there is limited existing linear disturbance at existing conditions.

A ranking of high severity (**Table 4-1**) for migratory bird species that are listed as Threatened or Endangered under the *Species at Risk Act* and / or the *Endangered Species Act, 2007* (high vulnerability) and moderate high irreplaceability because these species are uncommon, but viable offset options exist for these species. A moderate severity ranking for migratory bird species that are listed as Special Concern under the *Species at Risk Act* and / or the *Endangered Species Act, 2007* with moderate low irreplaceability because these species are common, but viable offset options exist for these species. The severity ranking for all other migratory bird species that are not at risk is considered low because species are common, and there are ample opportunities to conserve this species elsewhere (**Table 4-1**).

The ecological risk to migratory birds is based on severity and likelihood of effects (**Table 4-2**). Following a precautionary approach, the likelihood of effects was considered possible to certain to occur and the severity is low to high; as such, the ecological risk is high (for species at risk), moderate (for species of concern) and low (for non-species at risk migratory birds; **Table 5-1**).

5.6 Raptor Species at Risk

Residual effects on raptor species at risk (i.e., bald eagle [Oji-Cree translation, *mikisi*] [*Haliaeetus leucocephalus*] and short-eared owl [Oji-Cree translation, *gaayaagaachitawaagech kookookohoo*] [*Asio flammeus*]) from direct habitat loss and alteration, and sensory disturbances remain after implementation of mitigations.

The Project will directly remove or alter 0.4% to 3.7% of available high and moderate quality for short-eared owl and bald eagle, respectively, in the birds effects assessment Regional Study Area. Effects from habitat loss are considered certain to occur and there is a high degree of confidence that these effects are not underestimated. Uncertainty was managed by assuming the entire Construction Disturbance Area will be permanently disturbed (i.e., habitat loss numbers do not account for reclamation of temporary disturbances).

Habitat loss from the Project may remove 0.4% to 3.7% of available nesting territories for owl and bald eagle, respectively, in the birds effects assessment Regional Study Area. To be conservative, effects from habitat loss are considered certain to occur. There is a moderate degree of confidence that these effects are not underestimated. Uncertainty was managed by applying the best available information (i.e., density estimates for Ontario Breeding Bird Atlas regions 37 or 44 or best available home range size estimates). However, information in the Far North region of Ontario is lacking, and density and home range estimates may not be accurate.

Sensory disturbance from the Project may indirectly influence from 5.0% of available high and moderate quality habitat for short-eared owl in the birds effects assessment Regional Study Area. Effects on bald eagle are predicted to be larger, with sensory disturbance potentially disturbing 31.3% of high and moderate quality habitat that is available in the birds effects assessment Regional Study Area at existing conditions. Effects from sensory disturbance are considered probable to occur and there is a high degree of confidence that these effects are not underestimated. Uncertainty was managed by applying conservative sensory disturbance zones of influence for raptor species at risk Valued Components.

For the assessment of vulnerability (**Table 4-1**), short-eared owl is a Special Concern species under the *Species at Risk Act* and a Threatened species under the *Endangered Species Act, 2007*, as amended. Bald eagle is listed as Special Concern species under the *Endangered Species Act, 2007*, as amended; this species is not listed under the *Species at Risk Act*.

The irreplaceability ranking (**Table 4-1**) for short-eared owl is considered moderate high because this species is uncommon in Ontario, but viable offset options exist. The irreplaceability ranking for bald eagle is moderate low because this species is common but viable offset options may not exist.

Based on the vulnerability and irreplaceability of species discussed above the severity of residual effects from habitat loss and sensory disturbance is high for short-eared owl (moderate high irreplaceability and threatened species), and moderate for bald eagle (moderate low irreplaceability and special concern species; **Table 4-1**).

The ecological risk to short-eared owl and bald eagle is based on severity and likelihood of effects (**Table 4-2**). Following a precautionary approach, the likelihood of effects was considered probable to certain to occur and the severity is moderate to high; as such, the ecological risk is high for short-eared owl and moderate for bald eagle (**Table 5-1**).

5.7 Ecological Risk Rankings

To be precautionary, measurable residual effects on Key Biodiversity Components were considered certain to occur, even though some effects (e.g., sensory disturbance effects on wildlife) were assessed as having unlikely to probable effects on terrestrial biodiversity Valued Components. Given this likelihood, the ecological risk ranking (described in **Table 4-2**) for each Key Biodiversity Component is provided in **Table 5-1**.

Table 5-1: Ecological Risk Rankings for Key Biodiversity Components

High Ecological Risk Ranking	Moderate Ecological Risk Ranking	Low Ecological Risk Ranking
■ Boreal Caribou ■ Wolverine ■ Little Brown Myotis and Northern Myotis ■ Migratory birds[(a)] Bank Swallow Canada Warbler (Oji-Cree translation, *gaamakatew bebeshisich binechiinch*) (*Cardellina canadensis*) Chimney Swift Eastern Whip-poor-will (Oji-Cree translation, *gaamajaachimoch binechinch*) (*Antrostomus vociferus*) Lesser Yellowlegs (Oji-Cree translation, *gaa'osaaw gaatech binechiinch*) (*Tringa flavipes*) ■ Short-eared Owl	■ Peatlands ■ Bald Eagle ■ Migratory birds[(b)]	■ Migratory birds[(c)]

Notes:
(a) Species are listed as Threatened under the *Species at Risk Act* and / or the *Endangered Species Act, 2007*.
(b) Species that are listed as Special Concern under the *Species at Risk Act* and / or the *Endangered Species Act, 2007*
(c) All non-SAR migratory bird species.

6. Preliminary Offset Approaches for the Project

6.1 Objectives

The following preliminary offset concepts were developed to:

- Result in no net loss of functional Caribou habitat; and
- Result in no net loss of habitat, distribution, and survival and reproduction for wildlife Key Biodiversity Components that have a high ecological risk ranking (**Table 5-1**).

Achieve offsetting principles and mechanisms for Key Biodiversity Components that have a high ecological risk ranking that are also applicable and beneficial to Key Biodiversity Components that are considered to have a moderate and low ecological risk ranking (**Table 5-1**).

6.2 Description of Preliminary Offset Options

As described in **Section 4.1**, offsetting actions compensate or counterbalance effects that cannot be fully mitigated through avoidance, minimization, and reclamation / restoration measures. Below, preliminary offset options for the Project are presented.

Offset approaches that have been considered to date for this Project includes habitat protection, habitat restoration / enhancement, long-term monitoring to address knowledge gaps, and financial compensation. These options were developed based on a review of offset programs implemented in support of species at risk in Ontario and elsewhere in Canada. For each option, the concept and how it meets offsetting principles (**Section 4.4**) is described; the feasibility and limits associated with each offsetting approach are also presented. Feasibility of offsetting a project's residual effects is dependent on ecological, socio-political, cultural, financial and legal factors (BBOP 2012). In some cases, there are limits to what can be offset, because of technical, biological or ecological constraints (ECCC 2020).

These are preliminary concepts and final offsetting projects will be determined through further Project planning stages and regulatory processes and engagement.

6.2.1 Protected Area

The creation of a protected area that includes habitat for Key Biodiversity Components is considered the most effective offset approach to achieve No Net Loss at minimum, and ideally a Net Positive Impact. Although some Key Biodiversity Components have a high ecological risk ranking (**Table 5-1**), the residual effects are considered offsetable. Given

the potential future developments in the Regional Study Areas, a protected area would provide the greatest benefit to address residual effects of habitat loss and increased mortality, which have been predicted to influence the sustainability and ecological stability of Key Biodiversity Components, specifically vulnerable species such as caribou, wolverine and species at risk birds as well as vulnerable ecosystems such as peatlands.

Several environmental and social values were considered in determining a preliminary option for a protected area. Marten Falls First Nation draft Community-Based Land Use Plan (MFFN, 2020) outlines some areas that are being considered for protection. While there are numerous options for potential protected areas in proximity to the Project, the area surrounding and east of Pym Island on the Attawapiskat River would provide good options for biodiversity offsetting. The area is of cultural importance and traditional use to Marten Falls First Nation community members. The Pym Island Region also contains a portion of the Attawapiskat River and is within known and potential new Boreal Caribou Category 1 Areas (nursery, winter and travel corridors) identified in the Final *Marten Falls First Nation Community Access Road Environmental Assessment / Impact Statement Report*.

The Pym Island Region is located at the ecotone between the Hudson Plain and Boreal Shield ecozones, similar to the location of the proposed Community Access Road. This was determined to be important for offsetting not only the habitat loss but the loss of connectivity for Key Biodiversity Components. Ecotones are transition zones that are particularly important habitat for fish and wildlife because they offer diverse habitats for a range of species from both ecozones and often serve as important connectivity and migratory corridors. Additionally, the Northern Road Link Project is proposing a major crossing of the Attawapiskat River near Pym Island Region, therefore having a protected area in the vicinity of this crossing would contribute to mitigating effects from increased public access leading to potential overfishing. A protected area or areas in the region surrounding and east of Pym Island could be designed to avoid mineral claims, thereby improving the opportunity for protection from future industrial disturbances.

The land re-zoning options that could be considered to protect an area such as the Pym Island Region include designating the area as a Dedicated Protected Area or an *Indigenous Protected and Conserved Area* through the draft Community-Based Land Use Plan process, or designating the area as a Provincial Park or an Enhanced Management Area through the Crown land use planning process. These are preliminary concepts; final offsetting projects will be determined through regulatory processes and engagement.

The creation of a protected area near the Project (e.g., Pym Island region), which encompasses a diversity of habitats and ecosystems, would be an offset for the Key Biodiversity Components: caribou, wolverine, species at risk bats and migratory birds and peatlands (**Table 6-1**).

As an additional preliminary protected area concept, the protection of migratory bird overwintering habitat is proposed. Some of the largest threats to migratory birds are habitat loss and alteration in overwintering areas (e.g., Central and South America). As such, the protection of habitat in overwintering ranges for the migratory bird species that breed in areas such as the Project area may have benefits for migratory bird population sustainability and ecological stability (**Table 6-1**). Protection of habitat in overwintering ranges could be implemented by funding a conservation nongovernmental organization to purchase and protect land in an area that provides overwintering habitat for migratory bird species that occur near the Project during the nesting season. This approach would also align with recovery goals outlined by Environment and Climate Change Canada in many birds species at risk Recovery Strategies. An example of this approach is supporting overwintering habitat through Bird Life International, which is a global partnership conserving birds across the planet. Bird Life International created Fundacion de Conservacion Jocotoco (the Jocotoco Foundation), a non-governmental organization in Ecuador that protects areas of critical importance to bird species by acquiring and managing land as biological reserves. These reserves in Ecuador coincide with areas wherein migratory birds that breed within the Project study areas, overwinter.

Table 6-1: Offset Principles Considered for Habitat Protection

Applicable Valued Components	Equivalency	Additionality	Location	Timing	Duration	Accountability
■ **Peatlands** ■ **Migratory Birds** ■ **Non-migratory Birds** ■ **Boreal Caribou** ■ **Little Brown Myotis** ■ **Wolverine**	Protect an equivalent or greater amount and diversity of habitat removed and indirectly affected by the Project, at another site.	Protection that does not exist at baseline.	Ontario	Implemented before the Project Construction Phase is complete.	Protected for perpetuity.	Formalized agreement (e.g., between Indigenous governments and federal / provincial government).
■ **Peatlands**	Protect equivalent ecological function at another site.	Protection that does not exist at baseline.	Ontario	Implemented before the Project Construction Phase is complete.	Protected for perpetuity.	Formalized agreement (e.g., between Indigenous governments and federal / provincial government).
■ **Boreal Caribou** ■ **Wolverine**	Protect habitat connectivity at another site. Protect survival and reproduction at another site.	Protection that does not exist at baseline.	Ontario	Implemented before the Project Construction Phase is complete.	Protected for perpetuity.	Formalized agreement (e.g., between Indigenous governments and federal / provincial government).
■ **Migratory Birds**	Protect habitat at another site to increase survival and reproduction.	Protection that does not exist at baseline.	Overwintering areas (e.g., Central and South America)	Implemented before the Project Construction Phase is complete.	Protected for perpetuity.	Formalized agreement (e.g., between Jocotoco Foundation and nongovernmental organizations in Central or South America).

6.2.1.1 Feasibility

Factors that affect the feasibility of protecting an area in perpetuity include but are not limited to:

- Significance of the area for the exercise of Indigenous and treaty rights;
- Level of stakeholder support for a protected area;
- Legal ability to secure offsets (land tenure) for conservation purposes;
- Governance structures; and
- Capacity to support development of protected area.

6.2.1.2 Limits to Offsetting

Social concerns are the primary factors that could decrease the effectiveness of a protected area to offset residual effects (i.e., is there interest and willingness from Indigenous communities, stakeholders, and government to legally secure and rezone Crown land into a protected area). The amount of time required to consult and engage with Indigenous communities and regulators about where a protected area would occur will limit the ability to implement this approach prior to start of Construction.

6.2.2 Habitat Restoration or Enhancement

Another offset option is to improve existing biodiversity through management actions such as restoration or enhancement (**Table 6-2**). This type of offset typically occurs for a target species or ecosystem. For the Project, habitat restoration or enhancement may have the largest positive effect if applied to the habitat of Boreal Caribou, which is a wide-ranging species that may act as an umbrella species for other Key Biodiversity Components that share similar complex habitat requirements. Given their need for large tracts of undisturbed, connected habitat, the most beneficial focus for habitat restoration for this species is in more southern parts of the Caribou effects assessment Regional Study Area that are highly disturbed (e.g., areas of historical disturbance from industrial land use), particularly linear features such as cut lines and roads (**Table 6-1**). Wolverines and other smaller species at risk (i.e., bats and birds) are also likely to benefit from restoration of habitat for Caribou in Ontario (Hohnen et al. 2025).

Peatland restoration and enhancement opportunities may include the restoration of disturbed peatlands (e.g., along cut lines and forestry roads) within the Local and Regional Study Areas and should be prioritized in the same Ecoregions as the Project (i.e., Ecoregions 2W and 2E), followed by opportunities available in adjacent Ecoregions (e.g., Ecoregions 1E, 3W, and 3E). Opportunities to restore or enhance peatlands in other Ecoregions in southern Ontario where peatlands are rare (e.g., Ecoregions 6E and 7E) may also be considered. Consideration should be given to the type of peatland community

being restored. For example, the Moss Layer Transfer Technique is one method generally used for the re-establishment of bog and poor fen systems (Quinty et al., 2019). However, new methods or adjustments to existing techniques may be required for other peatland community types given the differences in species presence and hydrological conditions (e.g., best practices for bog restoration may not be applicable to fen community types) (Quinty et al., 2019).

Habitat enhancement for Little Brown Myotis and Northern Myotis may include the installation of artificial bat roost structures within temporary disturbance areas and other appropriate areas of the Local Study Area to offset the removal of tree roosts. As both suitable natural and anthropogenic roosting habitat are uncommon in the Local Study Area, artificial bat roost structures may be an effective habitat enhancement option in this area.

Habitat enhancement for Wolverine could include the creation of slash piles using timbers felled for the construction of the Project. Slash piles left after forestry activity provide excellent structure for maternal dens. Wolverines have been observed using slash piles as den sites both in Rainbow Lake, Alberta and Red Lake, Ontario (Scrafford and Ray 2022). Slash piles containing larger logs provide open pockets that the wolverine can use for denning. Slash piles used by wolverine for denning have been near regenerating roads and in regenerating cutblocks harvested decades prior. Wolverines have not been observed using newer slash piles in fresh clear cuts along active or newer roads. Therefore, slash piles should not be created near the Community Access Road or active aggregate extraction sites. Wolverine den sites could be created by building slash piles in areas of the wolverine Local Study Area a minimum of four kilometers from the Community Access Road. Slash piles should be located in close proximity to mature forest that is not scheduled for disturbance. Small and large logs and tree tops, which will provide both insulation and open space within the piles should be used for the construction of slash piles. Slash piles should be in a well-drained area (e.g., avoid pooling of water within and around slash pile; Scrafford and Ray 2022).

Habitat enhancement for migrating waterfowl could entail the installation of duck nest boxes. Duck nest boxes are effective in attracting cavity nesting waterfowl and can help to improve duck populations in suitable habitats of the Bird Local Study Area to offset for the removal of existing habitats. Ducks Unlimited has guidance regarding the design and placement of these types of nest boxes.

Bald eagles and osprey are known to have adapted to using man-made nesting platforms in areas where large canopy trees have been removed or are lacking. These types of structures can be built near watercourses or waterbodies in proximity to the Project right-of-way disturbances within the Bird Local Study Area.

Table 6-2: Offset Principles Considered for Habitat Restoration or Enhancement

Applicable Valued Components	Equivalency	Additionality	Location	Timing	Duration	Accountability
■ **Migratory Birds** ■ **Non-migratory Birds** ■ **Boreal Caribou** ■ **Little Brown Myotis** ■ **Wolverine** ■ **Peatlands**	Restore an equivalent or greater amount of habitat removed by the Project, at another site.	Restoration of habitat that does not exist at baseline.	Ontario	Implemented/ commenced before the Project construction Phase is complete.	Protected in perpetuity.	Formalized agreement (e.g., between Indigenous governments and federal / provincial government). Provincial Species at Risk permitting or registration (i.e. permit holder)
■ **Little Brown Myotis and Northern Myotis**	Create potential roost sites by installing artificial bat roosts.	Potential roost sites that do not exist at baseline.	Wildlife Local Study Area	Implemented/ commenced before the Project construction Phase is complete.	Maintained for the duration stipulated in Provincial Permitting or Registration.	Provincial Species at Risk permitting or registration (i.e. permit holder)
■ **Migratory waterfowl**	Create cavity nesting habitat with artificial duck nesting boxes.	Potential nest sites that do not exist at baseline.	Bird Local Study Area	Installed before the Project construction Phase is complete.	Maintained or replaced in the post-construction period as feasible	Owner/operator
■ **Migratory raptors**	Create raptor stick nest habitat with man-made nesting platforms.	Potential nest sites that do not exist at baseline.	Bird Local Study Area	Installed before the Project construction Phase is complete.	Maintained or replaced in the post-construction period	Owner/operator

Applicable Valued Components	Equivalency	Additionality	Location	Timing	Duration	Accountability
■ **Wolverine**	Create potential denning sites by building slash piles suitable for wolverine denning.	Potential den sites that do not exist at baseline.	Within the Wolverine Local Study Area greater than 4 km from the Community Access Road.	Implemented before the Project construction Phase is complete.	Maintained or replaced for the duration stipulated in Provincial Permitting or Registration.	Provincial Species at Risk permitting or registration (i.e. permit holder)

6.2.2.1 Feasibility

Factors that affect the feasibility of habitat restoration include but are not limited to:

- Significance of the area for the exercise of Indigenous and treaty rights;
- Availability of sites within an ecologically-meaningful distance to the Project where habitat restoration could occur and benefit the Key Biodiversity Components;
- Technical ability to successfully restore habitat;
- Economic feasibility of habitat restoration;
- Capacity to support planning and implementation of habitat restoration; and
- Accessibility of habitat restoration areas (e.g., artificial dens/slash piles, nest boxes and platforms) for installation and maintenance.

6.2.2.2 Limits to Offsetting

Factors that affect the limits to the effectiveness of habitat restoration and enhancement include but are not limited to:

- The number of potential bat roosts and the roosting capacity (i.e., the number of bats each roost provides habitat for) removed for the Project is unknown, therefore the number of artificial bat roosts required to offset this effect cannot be determined with precision.
- The success rate (occupancy) of artificial bat roosts is not possible to predict with precision.
- The success rate (occupancy) of slash pile wolverine den sites is not possible to predict with precision.
- The success rate (occupancy) of duck nesting boxes and raptor nesting platforms is not possible to predict with precision.
- The ability to identify sufficient disturbed caribou habitat to restore in the southern ranges (Pagwachuan, Nipigon) that is not already under regulatory requirement to restore / reclaim by forestry operators or currently under existing tenure.
- The limited legacy disturbances in Missisa and Ozhiski ranges to restore.
- The ability to identify a sufficient area of disturbed peatland or other suitable areas to restore to a peatland ecosystem within the Local or Regional Study Areas.

6.2.3 Long-Term Monitoring

Long-term monitoring can provide information to fill current knowledge gaps that exist about the effects of new permanent linear disturbances on Key Biodiversity Components in areas with limited existing anthropogenic disturbance. Consultation with Indigenous Groups and government biologists has identified terrestrial biodiversity data gaps that could be filled using long-term monitoring for the Project (**Table 6-3**).

Given the duration and intensity of the Project's Construction period (three to 10 years), a Before-After Control-Impact study which begins during Construction and continues during Operation and Maintenance would allow for a quantitative assessment of potential effects of each phase of the Project. Data from Construction monitoring could be compared to data collected prior to Construction and data from reference sites (i.e., sites not affected by Construction disturbance) to determine if predictions made in the Environmental Assessment / Impact Statement are valid and to monitor changes in population trends, habitat use, and abundance and distribution of species at risk though time. Before-After Control-Impact monitoring programs can be targeted for species at risk or other species of interest to Indigenous communities (e.g., moose). Species at risk monitoring requirements would be included in future Project authorizations.

Long-term monitoring program approaches that could be evaluated as options include:

- Winter track count aerial survey transects that would be completed adjacent to and parallel to the road at a predetermined distance (**Table 6-3**). The survey design for the winter track count aerial surveys would be developed following the recommendations and protocols described in Surveying and Monitoring Wolverines in Ontario and Other Lowland, Boreal Forest Habitats (Koen et al., 2008).
- Deploying and maintaining Global Positioning System collars on adult female caribou for comparison of seasonal movement patterns, habitat use and mortality in the vicinity of the Project with historical Ministry of Natural Resources collar data and collar data collected during baseline studies (2021-2024).
- Deploying and maintaining Global Positioning System collars on adult female moose for comparison of seasonal movement patterns, habitat use and mortality with moose collars deployed by Ministry of Natural Resources in the moose Wildlife Management Units during pre-construction.
- Remote camera monitoring at selected reference sites (i.e., locations surveyed in the alternative Project route Local Study Area during baseline surveys from 2021 to 2023 and on undisturbed sites) and within the vicinity of the Project.
- Sensory disturbance monitoring program aimed to detect changes in wildlife Key Biodiversity Components in response to noise during Construction and Operation and Maintenance phases of the Project (**Table 6-3**).

- Marsh Monitoring Program survey stations at select stations along the Project in accordance with survey standards established by Birds Canada and / or Environment and Climate Change Canada. Each survey station to be surveyed annually with the goal for the routes to be completed by the same observer for a period of five years; the need for surveys beyond five years to be determined in consultation with Environment and Climate Change Canada.
- Annual surveys for Short-eared Owl, over a period of three years along the Project, stations to be spread throughout the Project to allow for greater spatial coverage. The placement of each station will be chosen to align with the species breeding habitat requirements. Additional detail is included in Appendix L - Birds Technical Support Document: Existing Conditions & Effects Assessment.
- Autonomous recording unit and point count surveys at selected reference sites (i.e., locations surveyed during baseline surveys from 2018 to 2022), completed every two years for a period of six years. Additional detail is included in Appendix L– Birds Technical Support Document: Existing Conditions & Effects Assessment.
- Long-term monitoring of groundwater levels on opposite sides of “floating road” segments to assess the effectiveness of the “floating road” in maintaining groundwater flow across this linear disturbance. Additional detail is included in Appendix I – Peatlands Technical Support Document: Existing Conditions & Effects Assessment.
- Long-term monitoring of net carbon uptake (i.e., carbon sink) in peatland ecosystems to detect differences in net carbon uptake in peatlands affected by the Project, peatlands at control sites and at peatland restoration sites within the Project vicinity.

These programs are an applicable subset of long-term monitoring programs that could be implemented for the project. Other programs could be developed as further engagement with Marten Falls First Nation and other Indigenous communities occurs. Partnerships with academia or Indigenous-led organizations should be explored further.

Execution of these programs should explore the involvement of Indigenous-led monitoring groups, training programs and capacity building opportunities.

Table 6-3: Offset Principles Considered for Long-term Monitoring

Applicable Valued Components	Equivalency	Additionality	Location	Timing	Duration	Accountability
■ **Peatlands**	Research to determine the effects of a new linear disturbance on previously undisturbed peatland ecosystems (e.g., groundwater and net carbon uptake monitoring).	Will fill a current data gap in knowledge about the long-term effectiveness of the "floating road" construction technique and about the net carbon uptake of disturbed and restored peatland ecosystems.	Along either side of the "floating road", at control site and at peatland restoration sites.	Implemented before the Project Construction Phase begins.	Annually until 10 years following completion of construction, then every five years for an additional twenty years.	Funded agency (e.g. university)
■ **Boreal Caribou** ■ **Wolverine**	Research to determine the effects of a new linear disturbance in a previously undisturbed area on the movements of Caribou and Wolverine (e.g., winter track count aerial surveys).	Will fill a current data gap given the low level of linear disturbance in northern Ontario. Addresses concerns raised during public and Indigenous consultation.	Along and parallel to the Project right-of-way.	Implemented before the Project Construction Phase begins.	Annually until ten years following construction of the Project, unless otherwise stipulated in Provincial Species at Risk Permits or Authorization.	Funded agency (e.g., university).
■ **Wolverine** ■ **Little Brown Myotis and Northern Myotis**	Research to determine the occupancy rate of artificial habitat (i.e., artificial bat roosts, slash piles for wolverine denning)	Will fill a current data gap given the lack of studies on artificial habitat structures in the Project Region	At all artificial bat roost structures and slash piles created for offsetting.	Implemented following installation of artificial bat roosts and slash piles (i.e., prior to the completion of Project construction).	Annually until 10 years following construction of the Project unless otherwise stipulated in Provincial Species at Risk Permits or Authorization.	Provincial Species at Risk permitting or registration.

Applicable Valued Components	Equivalency	Additionality	Location	Timing	Duration	Accountability
■ **Migratory Birds**	Continue monitoring trends in migratory bird populations in the Project Study Areas.	Addition of new monitoring of breeding birds	Along the Project right-of-way.	Implemented after the Project Construction Phase is complete.	Completed every two years for a period of six years following construction of the Project unless otherwise stipulated.	Funded agency (e.g., university)
■ **Migratory Birds**	Continue monitoring trends in migratory bird populations in Ontario (e.g., Marsh Monitoring Program).	Addition of new Marsh Monitoring Program survey locations.	Along the Project right-of-way.	Implemented after the Project Construction Phase is complete.	Annually for 5 years following construction of the Project unless otherwise stipulated.	Funded agency (e.g., Birds Canada)
■ **Short-eared Owl**	Research to determine the effects of a new linear disturbance in a previously undisturbed area on Short-eared owl	Will fill a current data gap given the low level of linear disturbance in northern Ontario.	Along the Project right-of-way; equal or be greater than 60 survey stations.	Implemented after the Project Construction Phase is complete.	Annually for 3 years following construction of the Project unless otherwise stipulated.	Funded agency (e.g., university)
■ **All Wildlife Key Biodiversity Components**	Research to determine effects from noise in a previously undisturbed area on wildlife abundance and distribution (i.e., noise monitoring).	Will fill a current data gap given the low level of disturbance in northern Ontario. Addresses concerns raised during public and Indigenous consultation.	Along and parallel to the Project right-of-way.	Implemented once the Project Construction phase begins and continues into the Operations and Maintenance Phase.	Details to be determined based on the study design. Suggest the study begin during construction and continue 5 years post construction unless otherwise stipulated.	Funded agency (e.g., university).

6.2.3.1 Feasibility

Factors that affect the feasibility of long-term monitoring include but are not limited to:

- Significance of the area for the exercise of Indigenous and treaty rights;
- Level of stakeholder support for long-term monitoring;
- Consensus on information gaps to be filled by long-term monitoring;
- Technical ability to implement long-term monitoring programs;
- Economic feasibility of long-term monitoring; and
- Capacity to support planning and implementation of long-term monitoring.

6.2.3.2 Limits to Offsetting

Long-term monitoring is considered a complementary measure to the mitigation hierarchy as it will not directly avoid, minimize, reclaim, or offset Project effects (ECCC, 2020). Scientific research, data collection, outreach, and other measures do not directly result in on-the-ground conservation but, instead, address identified knowledge gaps (ECCC, 2020). Long-term monitoring programs still benefit biodiversity even if they do not directly contribute to No Net Loss or a Net Positive Impact; as such, in most cases, long-term monitoring could be considered a partial offset and could be implemented in addition to other conservation measures.

6.2.4 Financial Compensation

Financial contributions (in-lieu fees) are an option if restoring, enhancing, or protecting areas are not feasible, or where financial contribution to an external offsetting initiative is likely to lead to a better outcome for biodiversity than directly implementing actions for restoring, enhancing, or protecting areas. Financial compensation is allowed under the amended *Endangered Species Act, 2007* as a mitigation action to counterbalance some or all of the long-term adverse effects from a development.

Some examples for financial contributions to offset effects from the Project are to fund ongoing research programs that are completed by government organizations, nongovernmental organizations, and universities or support long-term monitoring programs such as those identified in **Section 6.2.3** (**Table 6-4**).

Examples of funding arrangements applicable to the Project and recommended for migratory birds (refer to Appendix L– Birds Technical Support Document: Existing Conditions & Effects Assessment for more detail):

- North American Breeding Bird Survey routes to be initiated along the Project as negotiated with Environment and Climate Change Canada. Each route to be surveyed annually with the goal for the routes to be completed by the same observer for a period

of five years; the need for surveys beyond five years to be determined by Environment and Climate Change Canada. Surveys will be completed in accordance with Environment and Climate Change Canada and United States Geological Survey standards.

- Canadian Nightjar Survey routes will be initiated along the Project, focussed on the detection of Common Nighthawk and Eastern Whip-poor-will. The placement of each route to be negotiated with Birds Canada and / or Environment and Climate Change Canada. Each route will be surveyed annually with the goal for the routes to be completed by the same observer for a period of five years; the need for surveys beyond five years will be determined in consultation with Environment and Climate Change Canada.

Table 6-4: Offset Principles Considered for Financial Compensation

Applicable Key Biodiversity Component	Equivalency	Additionality	Location	Timing	Duration	Accountability
■ **Peatlands**	Continue research on peatland reclamation in Ontario.	Additional funding for research.	Ontario	Implemented before the Project Construction Phase begins.	For duration of research study.	Funded agency (e.g., university).
■ **Migratory Birds**	Continue monitoring trends in migratory bird populations in Ontario (e.g., Breeding Bird Survey, Canadian Nightjar Survey).	Additional funding for new survey locations.	Along the Project right-of-way	Implemented after the Project Construction Phase is complete.	Annually for 5 years following construction of the Project unless otherwise stipulated.	Funded agency (e.g., Birds Canada)
■ **Raptors**	Continue research on raptor populations in Ontario.	Additional funding for research.	Ontario	Implemented before the Project Construction Phase begins.	For duration of research study.	Funded agency (e.g., Canadian Raptor Conservancy).
■ **Little Brown Myotis**	Continue developing and implementing strategies to help bats survive white nose syndrome.	Additional funding for research.	North America	Implemented before the Project Construction Phase begins.	For duration of research study.	Funded agency (e.g., Bat Conservation International).
■ **Boreal Caribou**	Continue research on how to best maintain, recover, or adaptively manage Caribou populations in Ontario.	Additional funding for research.	Ontario	Implemented before the Project Construction Phase begins.	For duration of research study.	Funded agency (e.g., Ontario Ministry of Environment, Conservation and Parks).
■ **Wolverine**	Continue research on Wolverine populations in Ontario.	Additional funding for research.	Ontario	Implemented before the Project Construction Phase begins.	For duration of research study.	Funded agency (e.g., Wildlife Conservation Society of Canada).

6.2.4.1 Feasibility

Factors that affect the feasibility of financial compensation include but are not limited to:

- Determination of approach to calculate amount of financial compensation;
- Economic feasibility;
- Governance structure to manage funds; and
- Capacity to support planning and implementation of funds received.

6.2.4.2 Limits to Offsetting

Compensation is considered a complementary measure to the mitigation hierarchy as it will not directly avoid, minimize, reclaim, or offset Project effects (ECCC, 2020). Financial contributions can be towards scientific research, data collection, outreach, and other measures that do not directly result in on-the-ground conservation but, instead, address identified knowledge gaps (ECCC, 2020). In some cases, compensation may be approved as a partial offset or as the entire offset, if the funds are used to support other measures that achieve No Net Loss or a Net Positive Impact for the Key Biodiversity Components.

7. Preliminary Engagement and Partnerships

Engagement with the Marten Falls First Nation Community Access Road Project team about the Preliminary Offset Plan occurred in 2024, 2025 and early 2026. Further, engagement on offsetting occurred during Project Community Meetings in October 2024. This Preliminary Offset Plan is expected to be finalized following additional engagement and consultation with Marten Falls First Nation and other Indigenous communities, and engagement with federal and provincial regulators, during subsequent phases of the Project.

Bird Life International partner, Jocotoco Foundation is supportive of receiving funding to protect overwintering areas of migratory birds.

8. Summary and Next Steps

The Marten Falls First Nation Community Access Road Project is expected to result in residual effects on several terrestrial Key Biodiversity Components, even after avoidance, minimization, and reclamation measures. Residual effects are anticipated for peatlands, Boreal Caribou, Wolverine, Little Brown Myotis, Northern Myotis, migratory bird species, and raptor species at risk. These residual effects, which are primarily related to habitat loss and alteration, sensory disturbance, increased mortality risk, and reduced habitat function or connectivity, require offsetting.

The Preliminary Offset Plan presents several options for offsetting residual effects of the Project on Key Biodiversity Components. The selected offset approach and design should be socially, culturally, legally, and economically feasible while ultimately achieving the biodiversity offsetting goals for the Project.

Offsetting options considered in this Preliminary Offset Plan include establishing a protected area, habitat restoration and enhancement, long-term monitoring, and financial compensation. Protected areas, particularly within the Pym Island region, have the potential to offset effects across multiple Key Biodiversity Components. Restoration of disturbed areas can support Caribou, Wolverine, bats, migratory birds, and peatlands while monitoring and financial contributions provide complementary offsetting value. Overall, residual effects can be offset with properly scaled and collaboratively implemented measures to achieve a net positive impact.

The following offsetting measures are recommended for consideration in the development of the final Offset Plan.

- Establish a protected area in proximity to the Project such as in the Pym Island region. This region provides high ecological value, cultural significance, and alignment with Caribou movement routes. Early coordination with Indigenous governments and regulatory agencies is essential.
- Implement targeted habitat restoration for Boreal Caribou.
  Focus on restoring legacy linear disturbances to reduce predator efficiency and improve habitat connectivity. Restoration should also benefit Wolverine, migratory birds, Little Brown Myotis and Northern Myotis and peatlands due to overlapping habitat requirements.
- Apply enhancement measures for bats, wolverine, migratory waterfowl and raptors. Install artificial bat roosts near areas of bat habitat loss and construct slash piles suitable for wolverine denning in areas well away from the road. Incorporate traditional ecological knowledge in design and siting.

- Develop long-term monitoring programs.
  Conduct winter track count aerial surveys for Caribou and Wolverine, monitor enhancement structures for at least 10 years, implement seasonal noise monitoring, and include peatland hydrological and carbon-uptake monitoring where appropriate.
- Financial contributions as supplementary offsetting measures.
  Direct funding toward research, Indigenous-led monitoring, and conservation programs.

Offset commitments should be formalized through agreements and permitting. The use of formal instruments such as permit conditions or conservation covenants to confirm accountability and long-term durability. Offsetting measures should be initiated prior to or during Project construction to minimize temporal lag.

The next steps for determining the preferred offset options and finalizing the Offset Plan are to complete additional engagement and consultation with Marten Falls First Nation and other Indigenous communities, and engagement with federal and provincial regulators, during subsequent phases of the Project. Marten Falls First Nation looks forward to future discussions with interested parties to determine the preferred offset options.

9. References

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