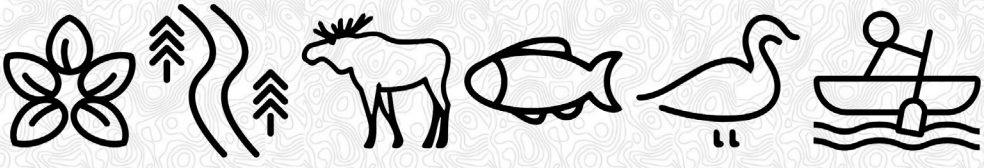
MARTEN FALLS FIRST NATION
ALL SEASON COMMUNITY ACCESS ROAD

FINAL

Atmospheric Environment and Greenhouse Gases (GHG) Study Plan

June 2021



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Revision History

Rev #	Date	Revision Description
Draft	*May* 2020	Submitted “\DRAFT Study Plan – Atmospheric Environment” to the Agency.
Final	May 2021	Revised to address federal and provincial agency comments.

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Acronyms

Agency, the ... Impact Assessment Agency of Canada
CAR ..... Community Access Road
CAAQS ..... Canadian Ambient Air Quality Standards
BTEX ..... Benzene, Toluene, Ethylbenzene, and Xylene

CO ..... Carbon Monoxide
DPM ..... Diesel Particulate Matter
EA..... Environmental Assessment
ECCC ..... Environment and Climate Change Canada
GHG ..... Greenhouse Gases
IA ..... Impact Assessment
IAA..... Impact Assessment Act
IAAC ..... Impact Assessment Agency of Canada
IS ..... Impact Statement
km..... kilometre
LSA..... Local Study Area
MECP ..... Ontario Ministry of the Environment, Conservation and Parks
MFFN ..... Marten Falls First Nation
MOVES ..... Motor Vehicle Emission Simulator
NAPS..... National Air Pollution Surveillance Program
NIR ..... National Inventory Report
NOx ..... Nitrogen Oxides
O3..... Ozone
PDA ..... Project Development Area
PM ..... Particulate Matter
ROW..... Right of Way
RSA ..... Regional Study Area
SAR ..... Species at Risk
SO2 ..... Sulphur Dioxide
TISG ..... Tailored Impact Statement Guidelines
ToR..... Terms of Reference
TSP ..... Total Suspended Particulate Matter
US EPA ..... United Stated Environmental Protection Agency
VC ..... Valued Component
VOC..... Volatile Organic Compounds
WRF ..... Weather Research and Forecasting model

1. Introduction

The Proponent of the Community Access Road (CAR or the Project) is Marten Falls First Nation (MFFN), a remote First Nation community in northern Ontario located at the junction of the Albany and Ogoki rivers, approximately 430 kilometres (km) from Thunder Bay, Ontario. The MFFN community is proposing an all-season Community Access Road that will connect the MFFN community to Ontario's provincial highway network (Highway 643) to the south via the existing Painter Lake Road. MFFN, as the Proponent of the Project, has formed a MFFN CAR Project Team that includes MFFN CAR Community Member Advisors and MFFN CAR Project Consultants who act with input, guidance and direction from the MFFN Chief and Council.

This document outlines the study plan for the Atmospheric Environment and Greenhouse Gases (GHGs) discipline to support a co-ordinated Impact Assessment (IA) required for Project review by the Impact Assessment Agency of Canada (the Agency) under the federal *Impact Assessment Act* (IAA) and Environmental Assessment (EA) required for Project review by the Ontario Ministry of the Environment, Conservation and Parks (MECP) under the Ontario *Environmental Assessment Act*.

1.1 Federal and Provincial Terminology

The study plans have been prepared using federal terminology, however, the respective provincial terminology has been provided in **Table 1-1** for reference. The terms can be used interchangeably.

Table 1-1: Equivalent Federal and Provincial Terms

Provincial Term	Federal Term
Criteria	Valued Component
Impact Management Measure	Mitigation Measure
Net Effects	Residual Effects
Record of Consultation	Record of Engagement

1.2 Project Study Plans

This Study Plan is one of a group of study plans created for the Project. **Table 1-2** includes the study plans for each environmental[1] discipline currently planned for the Project and the valued components (VCs) covered by the study plans where applicable.

Table 1-2: Project Study Plans and Valued Components

Environmental Discipline	Study Plan Name	Valued Component(s)
Aboriginal and Treaty Rights and Interests	■ Aboriginal and Treaty Rights and Interests Study Plan	■ Indigenous Current Use of Lands and Resources for Traditional Purposes ■ Cultural Continuity (ability to practice and transmit cultural traditions)
Atmospheric Environment	■ Atmospheric Environment and Greenhouse Gases Study Plan	■ Air Quality ■ Greenhouse Gas Emissions
Climate Change	■ Climate Adaptation and Resiliency Study Plan	■ Climate Change
Acoustic and Vibration Environment	■ Acoustic and Vibration Environment Study Plan	■ Noise ■ Vibration
Physiography, Geology, Terrain and Soils	■ Physiography, Terrain and Soils Study Plan	■ Physiography, Terrain and Soils
Surface Water	■ Surface Water Study Plan	■ Surface Water
Groundwater and Geochemistry	■ Groundwater and Geochemistry Study Plan	■ Groundwater
Vegetation	■ Vegetation Study Plan	■ Wetland and Riparian Ecosystems ■ Upland Ecosystems ■ Designated Areas (Areas of Natural and Scientific Interest, Environmentally Significant Areas, Significant Woodlands, Critical Landform / Vegetation Associations) ■ Traditional Use Plants and SAR Plant Populations (including species with special conservation status or rarity in the province)
	■ Peatlands Study Plan	■ Peatland Ecosystems (bogs and fens)

1. *The use of the term environment in this document is inclusive of the components of the environment that are included in the Ontario Environmental Assessment Act definition, which includes a general description of the social, cultural, built and natural environments.*

Environmental Discipline	Study Plan Name	Valued Component(s)
Wildlife	■ Wildlife Study Plan	■ Bats (including SAR-bats such as: Little Brown Myotis [*Myotis lucifugus*], Northern Myotis [*Myotis septentrionalis*] and Tricolored Bat [*Perimyotis subflavus*]) ■ Fur Bearers (proxy VC[2] American Marten [*Martes americana*], Beaver [*Castor canadensis*] and Wolverine [*Gulo gulo*]) ■ Amphibians and Reptiles ■ Pollinating Insects
	■ Ungulates (Moose and Caribou) Study Plan	■ Moose (*Alces alces*) ■ Caribou, boreal population (*Rangifer tarandus*)
	■ Bird Study Plan	■ Forest Birds (proxy VC of Red-eyed Vireo [*Vireo olivaceus*] for deciduous forest, Ovenbird [*Seirus aurocapilla*] for mixedwood forest, Dark-eyed Junco [*Junco hyemalis*] for coniferous forest and disturbed forest ■ Raptors (proxy VC of Osprey [*Pandion haliaetus*] for diurnal raptors and Boreal Owl [*Aegolius funereus*] for nocturnal raptors ■ Shorebirds (proxy VC of Wilson's Snipe [*Gallingo delicata*]) ■ Waterfowl (proxy VC of Mallard [*Anas* platyrhynchos]) ■ Bog / Fen Birds and Other Wetland Birds (proxy VC of Palm Warbler [*Setophaga palmarum*] for bogs, Common Yellowthroat [*Geothlypis trichas*] for fens; and Northern Waterthrush [*Parkesia noveboracensis*] for swamps . ■ SAR birds: Canada Warbler (*Cardellina canadensis*), Chimney Swift (*Chaetura pelagica*), Common Nighthawk (*Chordeiles minor*), Eastern Whip-poor-will (*Antrostomus vociferous*), Eastern Wood-Pewee (*Contopus virens*), Evening Grosbeak (*Coccothraustes vespertinus*), Olive-sided Flycatcher (*Contopus cooperi*), Bald Eagle (*Haliaeetus leucocephalus)*, Peregrine Falcon (*Falco peregrinus*), Short-eared Owl (*Asio flammeus)*, Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundo rustica*), Black Tern (*Childonias niger*), Rusty Blackbird (*Euphagus carolinus*), Yellow Rail (*Coturnicops noveboracensis*)
Fish and Fish Habitat	■ Fish and Fish Habitat Study Plan	■ Lake Sturgeon (*Acipenser fulvescens*) ■ Walleye (*Sander vitreus*) ■ Brook Trout (*Salvelinus fontinalis*) ■ Northern Pike (*Esox lucius*) ■ Lake Whitefish (*Coregonus clupeaformis*) ■ Chain Pickerel (*Esox niger*) ■ Yellow Perch (*Perca flavescens*) ■ Cisco (*Coregonus artedii*)

2. *A proxy VC is used when looking at the effects of one species that represents many others.*

Environmental Discipline	Study Plan Name	Valued Component(s)
		■ Burbot (*Lota lota*) ■ Longnose Sucker (*Catostomus catostomus*) ■ White Sucker (*Catostomus commersonii*) ■ Forage / Prey Species (including species such as Lake Chub [*Couesius plumbeus*]) ■ Lower Trophic Organisms (e.g., benthic invertebrates)
Social	■ Social Study Plan	■ Housing and Accommodation ■ Community Service and Infrastructure ■ Transportation ■ Community Well-being ■ Populations and Demographics
Economy	■ Economic Study Plan	■ Regional Economy ■ Labour Force and Employment ■ Government Finances
Land and Resource Use	■ Land and Resource Use Study Plan	■ Land Use Compatibility ■ Parks and Protected Areas ■ Extractive Industry ■ Forestry Industry ■ Energy and Linear Infrastructure ■ Recreation and Tourism
Human Health and Community Safety	■ Human Health and Community Safety Study Plan	■ Public Safety ■ Public Health ■ Diet ■ Environmental Factors Influencing Health
Visual Aesthetics	■ Visual Aesthetics Study Plan	■ Visual Contrast / Character ■ Visibility ■ Visual Sensitivity
Archaeological and Cultural Heritage	■ Cultural Heritage Study Plan	■ Archaeological Sites and Resources ■ Built Heritage Resources and Cultural Heritage Landscapes

It should be noted that while there is not a consultation study plan, the Project has developed the *Consultation and Engagement Plan to Support the Environmental Assessment / Impact Statement* (AECOM 2020) (referred to as the Impact Statement [IS] / EA Consultation Plan).

2. Purpose and Objectives

The key objectives of conducting an IA / EA are to describe the existing environment, gather sufficient information to predict Project-related effects (positive and negative, direct and indirect) of the Project and alternatives on the environment, determine measures needed to avoid or minimize adverse Project effects, and enhance beneficial Project effects where feasible, and to undertake consultation and engagement throughout. The purpose of this Study Plan is to explain:

- A baseline[3] study methodology that will result in a comprehensive description of the existing environment potentially impacted by the Project;
- How efficient and transparent data management and analysis will be undertaken;
- Effects assessment scoping inputs specific to the atmospheric environment that will allow for potential effects of the Project on the existing environment to be appropriately assessed in the IS / EA Report; and
- How the study plan aligns with federal and provincial requirements and guidance, including the Agency's Tailored Impact Statement Guidelines (TISG), dated February 24, 2020 (the Agency 2020c), for this Project and applicable provincial agency comments on the Draft Terms of Reference (ToR)4.

As required by the IAA and referenced in TISG Section 7.3, work plans will also be developed for disciplines as required. It is anticipated the work plans will include further details on how to action the study plans; for example they would contain such information as location of sampling sites, scheduling, and sequencing.

For the purposes of establishing appropriate context, the Study Plan begins with background and relevant information on:

- Study Plan related discussions with the Agency, the MECP and applicable agencies to date (**Section 3**);
- The approach to Project consultation and engagement (**Section 4)**;
- How Indigenous Knowledge will be collected and used in the IA / EA (**Section 5**); and
- The spatial and temporal boundaries that will be used for the IA / EA (**Section 6**).

3. *Baseline refers to the current conditions of the environment potentially impacted by the Project. Baseline conditions serve as a reference against which changes due the Project are measured.*
4. *If necessary, the Study Plan will be updated to reflect the approved ToR if approval is obtained.*

2.1 Approach to Handling Confidential Information

2.1.1 Indigenous Knowledge

Permission from the Indigenous community will be sought before including Indigenous Knowledge in the IS / EA Report, regardless of the source of the Indigenous Knowledge. Sensitive and / or confidential information will be specifically collected through the Indigenous Knowledge Program to inform the IS / EA Report, and its use and publication will be governed by Indigenous community-specific Indigenous Knowledge Sharing Agreements. Sensitive and / or confidential information collected through Indigenous Knowledge Sharing Agreements will be protected from public or third-party disclosure and will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information. Instances where Indigenous Knowledge sharing has taken place during consultation activities (e.g., meetings) will be recorded in the Record of Consultation and Engagement, including where Indigenous Knowledge was incorporated into Project decisions and into the IS / EA Report (i.e., specifics will not be included in the Record of Consultation and Engagement given the potential sensitivity and / or confidentiality of the information shared).

3. Study Plan Technical Discussions

To facilitate the development of satisfactory study plans and eventually a satisfactory IS / EA Report, MFFN held technical discussions with the Agency, the MECP and applicable agencies on the content of the study plans. A summary of technical discussions and correspondence held to date on this Study Plan has been provided in **Table 3-1**.

Table 3-1: Summary of Study Plan Technical Discussions

Attendees / Responsible Party	Correspondence Date(s)	Discussion Points	Solution
■ **MECP** ■ **The Agency** ■ **Health Canada (HC)** ■ **Environment and Climate Change Canada (ECCC)** ■ **MFFN CAR Project Team**	Meeting - July, 2020	■ Types of monitoring equipment to be used for monitoring program ■ Compounds to be monitored ■ Approach to estimating baseline conditions for compounds that cannot be monitored ■ Siting of monitoring equipment in the community ■ Technical discussion with the MECP regarding general approach of monitoring plan and conformance to the MECP Operations Manual for Air Quality Monitoring (MECP, 2019)	■ There was agreement on the proposed monitoring, as detailed in the Study Plan
■ **MECP** ■ **The Agency** ■ **Health Canada (HC)** ■ **Environment and Climate Change Canada (ECCC)** ■ **Northern Development and Mines (ENDM)** ■ **NRCan** ■ **MFFN CAR Project Team**	Meeting - September 2020	■ Discuss comments submitted by the FRT on the draft atmospheric environment study plan. ■ Key receptors and establishing representative background concentrations ■ Model inputs / model design within the study plan ■ Discussion on applicable atmospheric phenomena ■ Relevant assessment standards and guidelines ■ Technical challenges with monitoring for PAHs	■ There was agreement on the proposed monitoring, as detailed in the Study Plan ■ Methodology for estimating baseline PAHs to be refined and discussed with agencies
■ **MECP** ■ **The Agency, Health Canada (HC)** ■ **Environment and Climate Change Canada (ECCC)** ■ **Ministry of Energy, Northern Development and Mines (ENDM)** ■ **MFFN CAR Project Team**	Meeting - December 2020	■ Changes to equipment to be used based on emerging technical (equipment) limitations and cellular network access within the community ■ Revised equipment and compounds to be monitored	■ There was agreement on the proposed monitoring, as detailed in the Study Plan

4. IS / EA Report Consultation and Engagement Process

4.1 Interested Persons and Government Agencies

The Proponent will provide Project notices and advise of opportunities for consultation and engagement with interested persons[5] which includes, at a minimum members of the public outlined in the *Public Participation Plan for the Marten Falls Community Access Road Project Impact Assessment* (the Agency 2020) (referred to as the Public Participation Plan). This will include the opportunity to provide input on the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures as applicable. A variety of activities will be offered so that members of the public are informed of the IS / EA Report as it progresses and are aware of the opportunities and means to provide their input. The study plans have recognized public and agency input received on the Project to date. Government agencies and interested persons will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process. The Project's approach to handling confidential and sensitive information is outlined in **Section 2.1**.

4.2 Indigenous Communities

The Proponent will provide Project notices and opportunities for consultation and engagement with Indigenous communities identified in **Table 4-1**, which is inclusive of all Indigenous communities identified in the *Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment* (the Agency 2020a) (referred to as the Indigenous Engagement and Partnership Plan).

Indigenous communities will be provided the opportunity to be involved at critical decision-making points throughout the IS / EA Report so that the Proponent can consider and incorporate, where appropriate Indigenous Knowledge and Indigenous land and resource use information into the Project as it pertains to the existing environment, VCs, effects assessment methods, effects assessment results, and mitigation and follow-up program measures. A variety of activities will be offered so that Indigenous communities are informed of the IS / EA Report as it progresses and are aware of the opportunities, means and timelines to

5. *Interested persons, as defined in the IS / EA Consultation Plan, are individuals and groups (e.g., associations, non-governmental organizations, industry and academia) who could have an interest in the Project, including but not limited to communities in the region, those with commercial interests (e.g., forestry, trappers, outfitters, other mineral tenure holders in the area) and recreational users or those with recreational interest (e.g., campers, hunters and environmental groups).*

provide their input. The study plans have recognized Indigenous community input received on the Project to date. Indigenous communities will have the opportunity to comment on components of the study plans throughout the IS / EA Report consultation and engagement process.

Table 4-1: Identified Neighbouring Indigenous Communities, including their Provincial Territorial Organizations and / or Tribal Council Affiliations

Tribal Council Affiliation	Indigenous Community or Organization
Matawa First Nations Management *(Nishnawbe Aski Nation)*	■ **Marten Falls First Nation** (Proponent and potentially affected Indigenous community) ■ Aroland First Nation ■ Constance Lake First Nation ■ Eabametoong First Nation ■ Ginoogaming First Nation ■ Neskantaga First Nation ■ Nibinamik First Nation ■ Webequie First Nation
Matawa First Nation and the Union of Ontario Indians / Nishnawbe Aski Nation	■ Long Lake #58 First Nation**
Mushkegowuk Council *(Nishnawbe Aski Nation)*	■ Attawapiskat First Nation ■ Fort Albany First Nation ■ Kashechewan First Nation
Shibogama First Nations Council *(Nishnawbe Aski Nation)*	■ Kasabonika Lake First Nation ■ Kingfisher Lake First Nation ■ Wapekeka First Nation ■ Wawakapewin First Nation ■ Wunnumin Lake First Nation
Independent First Nations Alliance *(Nishnawbe Aski Nation)*	■ Kitchenuhmaykoosib Inninuwug First Nation
Independent First Nations *(Nishnawbe Aski Nation)*	■ Mishkeegogamang First Nation ■ Weenusk First Nation
Nokiiwin Tribal Council	■ Animbiigoo Zaagi'igan Anishinaabek First Nation*
Métis Nation of Ontario	■ Métis Nation of Ontario; Region 2*
Independent Métis Nation	■ Red Sky Independent Métis Nation*

*Notes: * Indigenous communities or organizations identified by the MECP who should be consulted on the basis that they may be interested in the Community Access Road.*
*** The MECP indicated in a letter to MFFN that Long Lake #58 First Nation was moved from interest-based to rights-based.*

4.3 Consideration of Identity and Gender-Based Analysis Plus in Engagement

To fulfill requirements of the IAA, the Consultation and Engagement Program will consider a diverse range of perspectives from interested persons and interested Indigenous communities and their members identified in the Agency's Indigenous Engagement and Partnership Plan and the Public Participation Plan. This will include at a minimum providing ongoing opportunities for engagement to:

- **Neighbouring Indigenous communities, including relevant subpopulations:**
  - Women;
  - Youth; and
  - Elders.
- **Non-Indigenous communities including:**
  - Women;
  - Youth; and
  - Activity-based subgroups (e.g., recreationalists, snowmobilers, tourism establishment operators).

The Proponent will also consult and engage with other subpopulations identified by communities during consultation and engagement. The information from these activities and any additional identity groups identified by communities through consultation and engagement will be considered by applicable environmental disciplines for the purposes of data collection and considering disproportionate effects.

During consultation and engagement, these aforementioned groups will be consulted and engaged with on targeted input**.**

When feedback is received from interested persons and Indigenous communities, issues, comments and questions will be tracked, which is consistent with the process described in the IS / EA Consultation Plan. Specific to Gender-Based Analysis Plus objectives, this will include efforts to engage with diverse populations. It is expected this will include activities specific to subgroups and tabulation of consultation and engagement participation with respect to identity factors. This will provide summary statistics to demonstrate the diversity achieved in consultation and engagement.

5. Consideration of Indigenous Knowledge in the IS / EA Report

The following provides a general description of how Indigenous Knowledge will be considered in the IA / EA process. The extent to which Indigenous Knowledge is considered by each specific VC will vary depending on the nature of the VC, the potential for Project effects on the VC and whether Indigenous knowledge that relates to a VC is provided / obtained. As such, not all aspects of the general approach described below may apply to all VCs / study plans.

There are two concurrent and complementary avenues for Indigenous communities and groups to be engaged with and provide input on the Project: the Indigenous Knowledge Program and the Consultation and Engagement Program. Both programs serve to support the collection of Indigenous perspectives, values, and input on the Project, including Aboriginal and Treaty Rights and how they may be impacted by the Project, to be integrated throughout the IA / EA process. However, the Indigenous Knowledge Program specifically aims to solicit and incorporate information that is considered sensitive and may have confidentiality requirements, including Indigenous Knowledge and information on Indigenous land and resource use. Indigenous Knowledge Sharing Agreements will be established between the Proponent and Indigenous communities participating in the Indigenous Knowledge Program prior to the sharing and use of any sensitive information.

All Indigenous communities and groups identified by the MECP and the Agency through the Indigenous Engagement and Partnership Plan have the opportunity to participate in the Indigenous Knowledge Program. The Indigenous Knowledge Program provides interested Indigenous communities an opportunity to: share existing Indigenous Knowledge and information on Indigenous land and resource use and cultural values that may be relevant to the Project, and / or complete Project-specific studies to collect and share Indigenous Knowledge and information on Indigenous land and resource use and cultural values. The Indigenous Knowledge Program includes opportunities for Indigenous communities and groups to meet with the Proponent to discuss the program, ask questions, and share concerns and interests. In support of this, the Proponent has created an Indigenous Knowledge Program Guidance Document (the Guidance Document) that provides:

- An overview of the Indigenous Knowledge Program and information on how Indigenous Knowledge, Indigenous land and resource use and cultural values and practices can be collected and / or shared;

- Information on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values and practices may be used in the planning and design processes; and
- A suite of guidance materials that were developed based on the information requirements of both the federal and provincial assessment processes, including: question guides to support the collection of information on historical and current community context; Indigenous Knowledge that may be relevant to the various technical disciplines; information on Indigenous land and resource use, cultural values and practices and associated spatial data; and perspective on potential Project-related effects and associated mitigation and / or enhancement measures.

The Guidance Document will also support participating Indigenous communities in providing Project-specific information in a manner that facilitates meaningful incorporation into the IS / EA Report.

The IS / EA Consultation Plan outlines the process for obtaining information and feedback about the Project from Indigenous communities (i.e., the Consultation and Engagement Program). All Indigenous communities identified by the MECP and the Agency have the opportunity to participate in the Consultation and Engagement Program through community-specific meetings, Public Information Centres, web conferences, and other formats. All Indigenous communities identified by the MECP and the Agency will be provided information related to the Project and invited to participate at various points throughout the IA / EA process.

There are also opportunities for technical teams to engage with Indigenous communities to solicit perspectives and information relevant to the Project, including information related to collection of existing information and the development of the IS / EA Report. The Proponent also invites feedback and inputs throughout the Project via the Project website and ongoing communications with the Proponent.

The Indigenous Knowledge and Consultation and Engagement programs are designed to be complementary and provide multiple opportunities for communities to offer feedback and information, including perspectives on Aboriginal and Treaty Rights and interests and how these may be impacted by the proposed Project. Relevant information collected through both the Indigenous Knowledge and Consultation and Engagement programs, including potential effect pathways on Aboriginal and Treaty Rights and interests, will be shared with each of the relevant disciplines throughout the IA / EA to: guide and inform VCs; support characterization of the existing environment; identify the potential effects of the Project on VCs; help identify mitigation measures and potential monitoring programs; and ultimately guide Project planning. The nature of how the Indigenous Knowledge becomes integrated into the IS / EA Report will be dictated by the specific information provided by each Indigenous community and the parameters set out in

the Indigenous Knowledge Sharing Agreements. A description of how Indigenous Knowledge was considered in the IA / EA and in each of the technical discipline areas will be included in the IS / EA Report.

It is also important to note that information collected through the various activities (e.g., field studies and programs, effects assessments) of each discipline area (e.g., wildlife, vegetation, cultural heritage) will be shared with the Indigenous Knowledge Program leads. This will support the establishment of the existing environment and the effects assessment for the Aboriginal and Treaty Rights and Interests discipline, as well as the identification of potential mitigation measures and monitoring programs, given the interrelated nature of Indigenous peoples and other environmental disciplines.

The Proponent will strive to respectfully collaborate with Indigenous communities on how Indigenous Knowledge and information on Indigenous land and resource use and cultural values will become part of the IS / EA Report, and how potential effects to Aboriginal and Treaty Rights and interests will be assessed. It is expected that measures to support this may include but are not limited to: engaging Indigenous communities to solicit information on Indigenous Knowledge and Indigenous land and resource use and cultural values to inform baseline conditions, providing Indigenous communities with draft sections of the IS / EA Report to illustrate how Indigenous Knowledge and information on Indigenous land and resource use and cultural values has been integrated and to confirm it has been presented appropriately, and completing collaborative working sessions with Indigenous communities for the effects assessment on Aboriginal and Treaty Rights and Interests. Further information on how potential effects on Indigenous rights will be assessed is provided in the Aboriginal and Treaty Rights and Interests Study Plan.

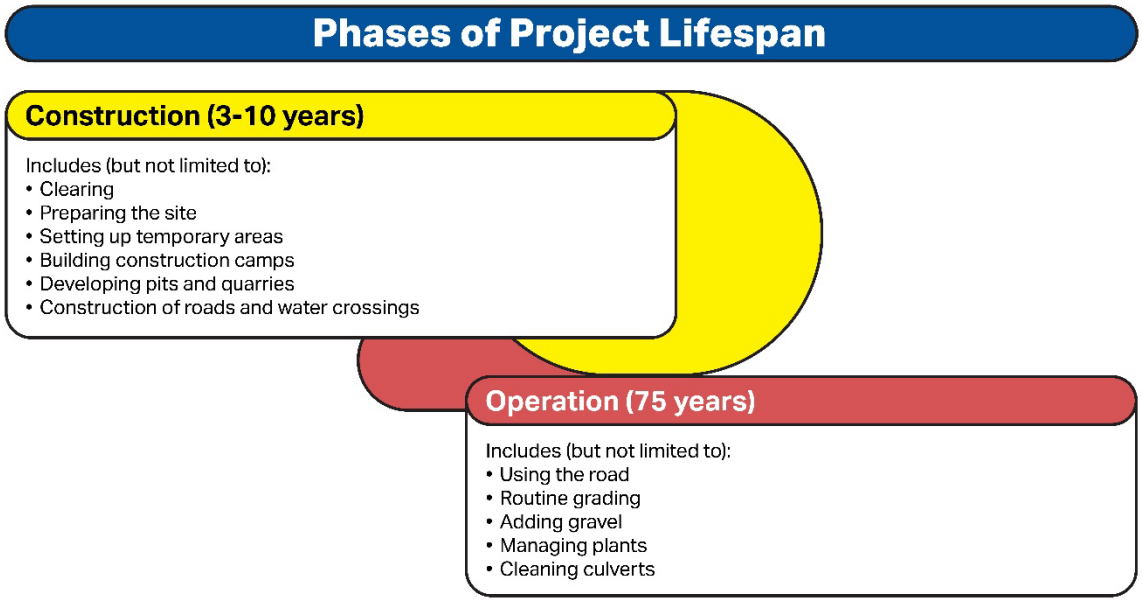
6. Assessment Boundaries

6.1 Temporal Boundaries: Project Phases

Project phases, which are temporal boundaries, are developed to establish the timeframes within which potential effects of the Project will be considered in the IS / EA Report. The Project is planned to occur in two phases, which are briefly described below and shown in **Figure 6-1**.

- **Construction Phase:**
  The time from start of construction, including site preparation activities, to the start of operations and maintenance of the CAR. Decommissioning of construction works is included in the construction phase. The construction phase is anticipated to take approximately 3 to 10 years to complete.
- **Operations and Maintenance Phase:**
  The operations and maintenance phase starts once construction activities are complete and lasts for the life of the Project. The operations and maintenance phase of the Project is considered to be 75 years based on the expected timeline for when major refurbishment of road components (e.g., bridges), is anticipated.

Figure 6-1: Project Schedule



There are currently no plans to decommission the CAR as there is no expected / known end date for its need. Therefore, future suspension, decommissioning and eventual abandonment of the CAR will not be considered in the IS / EA Report. It will be considered if and when a decommissioning or abandonment application is made for the road.

In determining the temporal boundaries, in particular the long operations and maintenance phase, consideration was given to the long-term effects on the well-being of present and future generations (Sustainability Principle #2). The final temporal boundaries to be used in the IS / EA Report will be based on regulatory agency guidance, professional judgement and input received through the Project consultation process.

6.2 Spatial Boundaries: Study Areas

Study areas identify the geographic extents within which potential effects of the Project are likely to occur and will be considered in the IS / EA Report. The existing conditions and potential effects are documented for three study areas selected for the Project:

- **Project Development Area (PDA):** area of direct disturbance;
- **Local Study Area (LSA):** the area where most of the direct effects of the Project are likely to occur; and
- **Regional Study Area (RSA):** the area where indirect effects of the Project are likely to occur.

The PDA encompasses the 100 metre-wide CAR right-of-way (ROW), temporary construction access roads, work areas, worker camps, and pits, quarries and associated access roads. The preliminary LSA currently being considered within the scope of the ongoing provincial regulatory review process generally includes the area within 2.5 km of the centreline of Alternative 1 and Alternative 4. The preliminary study area generally allows for the documentation of existing conditions and prediction of potential environmental effects for the Project. A 5 km wide study area also allows for route refinements during development of Project design (e.g., adjustment of the alignment to avoid sensitive features).

The specific location of Project components, including the roadway, quarries, pits and temporary infrastructure, are not yet known and will be included in the IS / EA Report. While most of the Project components are expected to be located within the preliminary 5 km wide study area, benefits (e.g., reduced environmental disturbance, avoidance of sensitive features, technical considerations, concerns received through consultation) for locating Project components on lands outside of the 5 km wide study area may

become known during the IA / EA process. If the need to locate Project components outside the 5 km wide study area is determined to be required or of benefit to the Project, the study area would be adjusted.

The study area for each environmental discipline may vary from the above-described general study area based on the potential for the Project to directly or indirectly affect each environmental discipline; therefore, discipline-specific LSAs and RSAs have been defined for the Project. In defining the final LSAs and RSAs, each environmental discipline will consider:

- Location and other characteristics of the environmental discipline relative to the Project;
- The anticipated extent of the potential Project effects;
- Federal, provincial, regional, and local government administrative boundaries;
- Indigenous groups listed in **Table 4-1**;
- Community knowledge and Indigenous Knowledge;
- Current or traditional land and resource use by Indigenous communities;
- Exercise of Aboriginal and Treaty Rights of Indigenous peoples, including cultural and spiritual practices; and
- Physical, ecological, technical, social, health, economic and cultural considerations.

The study areas included in this document are preliminary, covering the extent to which readily available information suggests the Project may have noticeable effects on the environment. The size, nature and location of past, present and reasonably foreseeable projects will be taken into consideration in the development of the cumulative effects assessment study area(s). The appropriate study area(s) to assess cumulative effects are dependent on the VCs predicted to have direct residual adverse effects as a result of the Project, and therefore, cannot to defined until the IS / EA Report has sufficiently advanced.

For an activity to be considered foreseeable and included in the cumulative effects assessment, the activity will have to be known at the time of preparing the IS / EA Report. That is, sufficient information about the activity must be available to make a reasonable assessment of its potential effects. This will include development that is certain or reasonably foreseeable and activities with additive effects where appropriate (Canadian Environmental Assessment Agency 2018). Reasonably foreseeable activities that will not be considered are those for which formal plans have not been publicly disclosed and information is not available. If sufficient information is not available about a potential future activity to be able to include it within the Project cumulative effects assessment, it is anticipated that should that activity proceed, the proponent of that activity would consider the cumulative effects of their activity with the CAR as appropriate.

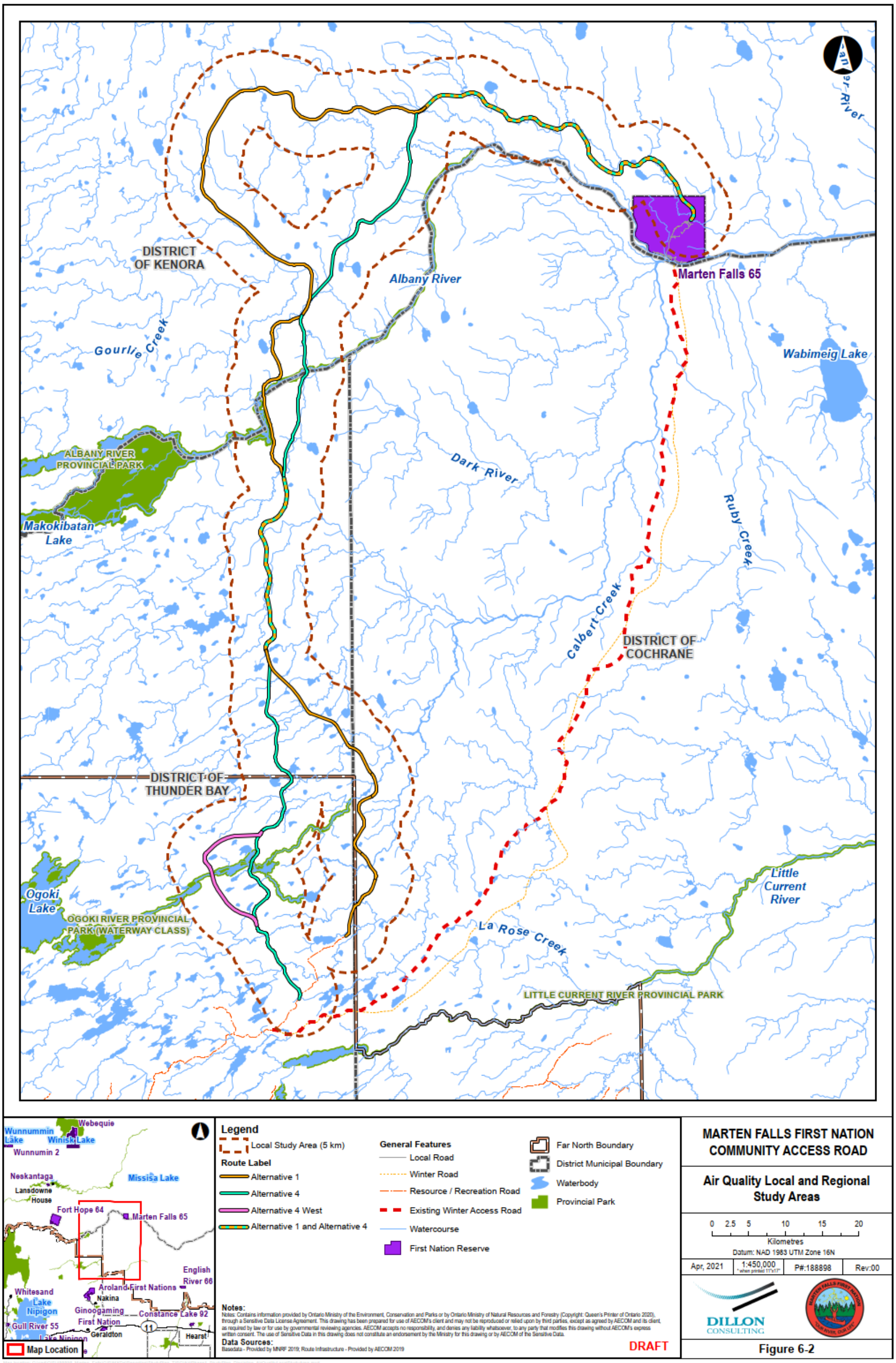
As further detailed in **Section 4**, the Proponent will continue to provide opportunities for neighbouring Indigenous communities and interested persons to provide input and inform the effects assessment, including the LSAs and RSAs.

The LSA and RSA boundaries for the Atmospheric Environment are detailed in **Table 6-1** and on **Figure 6-2.**

Table 6-1: Atmospheric Environment Study Areas

Study Area	Geographic Extent	Rationale
Local Study Area	■ Air Quality: PDA plus a 5 km buffer that extends from the perimeter of the PDA ■ GHGs: Physical footprint of the project during construction and operations, which is equal to the PDA	■ Air Quality: Local study area has been selected to align with the Ontario MECP recommendations for local dispersion modelling, which is that effects be assessed up to 5 km from a source (MECP, 2019). ■ GHGs: Direct GHG emissions impacts of the project will be limited to the PDA.
Regional Study Area	■ Air Quality: Not applicable ■ GHGs: Province (Ontario)	■ Air Quality: Not Applicable as effects are not expected beyond the Local Study Area. ■ GHGs: Will be assessed against provincial-scale emissions as well as federal and sectoral totals documented within the 2020 (or most current) National Inventory Report (NIR) by Environment and Climate Change Canada (ECCC, 2020a).

Figure 6-2: Atmospheric Environment Local and Regional Study Areas



7. Baseline Study Design

7.1 Desktop Assessment

A desktop review of existing information sources will be completed to identify information gaps that will need to be addressed through further study. A preliminary list of applicable information sources has been included in **Appendix A** and reflects federal and provincial guidance received to date. This Study Plan focuses on the additional studies that are anticipated to be required to gather information beyond what is currently available through existing information sources, including those as described in Section 7.2 'Sources of baseline information' in the Agency's TISG for this Project.

7.2 Study Methods

The following sections summarize the approaches to be deployed for development of baseline GHGs and Air Quality.

7.2.1 Air Quality Baseline

To characterize baseline Air Quality within the LSA a field monitoring program will be deployed. Up to one year of ambient air quality data will be collected within the community of Marten Falls to characterize baseline air quality.

Within the LSA, the community of Marten Falls is the primary area of human settlement and is the only location with sufficient power and serviceability access to support air quality monitoring equipment. The measured values in the community are a reasonably conservative characterization of baseline ambient air quality across the LSA. Concentrations of indicator compounds within Marten Falls are expected to be elevated in comparison with the remainder of the LSA due to the presence of sustained human activity (e.g., power generation, airport). Therefore, using background data collected from within Marten Falls is expected to result in a conservative characterization of baseline conditions.

The intention of the air quality assessment is to provide a realistic worst-case estimate of the cumulative[6] air quality as a result of the Project. The air quality assessment will add background concentrations to the

6. *The cumulative impacts discussed here are distinct from the cumulative effects assessment, which will assess the effects of the Project with the effects of past, present and reasonably foreseeable projects.*

predicted Project emissions to determine cumulative air quality within the LSA. Therefore, using the maximum background concentrations which would reasonably be expected within the LSA will result in a conservative air quality assessment.

Ambient air quality monitoring equipment will be deployed in the MFFN community to monitor the following indictor compounds:

- Particulate matter ($PM_{2.5}$);
- Ozone;
- Nitrogen oxides (NO_x);
- Sulphur dioxide (SO_2), and;
- BTEX (benzene, toluene, ethylbenzene, and xylene)

Meteorological parameters (wind speed, wind direction, temperature, relative humidity, barometric pressure, and precipitation) will also be measured. These contaminants are selected as they are commonly associated with transportation and construction activities, as prescribed by the Ontario Ministry of Transportation (MTO, 2020).Some of these indicator compounds may be monitored non-continuously, based on equipment limitations. Meteorological parameters that are not utilized in dispersion modelling (e.g., pan evaporation, extreme weather events) will not be monitored.

Other particulate matter size fractions (TSP and PM_{10}) will be determined by using measured $PM_{2.5}$ data to calculate TSP and PM_{10} background data. As $PM_{2.5}$ is a size fraction subset of PM_{10}, and PM_{10} is a size fraction subset of TSP, the PM_{10} and TSP background concentrations can be estimated based on the $PM_{2.5}$ background concentration. A literature review will be completed to gather representative particulate ratios that are considered to be reflective of the study area. This literature review may include an analysis of historical data collected at representative monitoring stations such as those included within the Environment and Climate Change Canada National Air Pollution Surveillance Program (NAPS), and a review of the United States Environmental Protection Agency (US EPA) studies and supporting documentation.

The ambient air quality monitoring equipment will be deployed for up to one year to address seasonal variations in baseline concentration. Collection of one full year of data may not be possible due to unforeseen circumstances such as power outages or equipment failure. BTEX and particulate matter will be used as surrogates for polycyclic aromatic hydrocarbons and diesel particulate matter which cannot be sampled for due to equipment limitations coupled with serviceability challenges given the remote location of the community. Concentrations of specific relevant contaminants such as acetaldehyde, formaldehyde, 1,3-

butadiene, and acrolein will be estimated based on monitored BTEX concentrations and published emission factors, such as the United Stated Environmental Protection Agency's (US EPA) AP-42 emissions database.

Diesel particulate matter (DPM) emissions as a result of the Project will be included in the air quality assessment. Due to the technical limitations of measuring DPM in the community, background DPM concentrations will be estimated based on the relative magnitude of emissions in the community. A cursory emission inventory will be developed for the community based on available data. This inventory will be used to speciate measured particulate concentrations.

The ambient air quality monitoring equipment is proposed to be located near the MFFN community's nursing station. Attempts will be made to adhere to station and probe siting criteria documented in the MECP Operations Manual for Air Quality Monitoring in Ontario (MECP, 2019) (hereafter referred to as the MECP Manual), however due to the location of project and limited power supply options, not all criteria may be met. If deviations from the MECP Manual (MECP, 2019) occur they will be documented and justified in the final baseline report. An Air Quality Monitoring Plan will be submitted to the MECP and IAAC prior to conducting the program to document alignment with the MECP Manual, as applicable.

The results will be statistically summarized based on the averaging period of the applicable standards and criteria. The Canadian Council of Ministers of the Environment Canadian Ambient Air Quality Standards (CAAQS) (CCME, 2021) and the MECP Ontario's Ambient Air Quality Criteria (AAQC) (MECP, 2020) will be considered in this assessment.

Monitored concentrations collected within the Community will be considered to be representative of all locations within the community and will be used as background concentrations within the LSA.

7.2.2 GHG Baseline

Releases of GHGs and their accumulation in the atmosphere influence provincial and national climate and may affect emission reduction targets for GHGs that have been set or are being developed federally and provincially. As such, GHGs will be presented in context relative to provincial, federal, and sectoral totals for comparison. The most current provincial, federal, and sectoral totals from the NIR (ECCC, 2020a) will be documented to contextualize project emissions within the effects assessment.

Baseline GHG emissions as a result of existing activities, such as air travel, will be quantified. GHG sinks such as forest sequestration along the proposed CAR will be considered in total GHG quantification. GHG emissions will be calculated using Environment and Climate Change (ECCC) guidance and emission

factors from the appropriate United States Environmental Protection Agency AP-42: Complication of Air Emission Factors (US AP-42) resources, along with the most current NIR (ECCC, 2020a).

7.2.3 Reporting

The findings of the Baseline Study will be summarized in a Baseline Study Report which will support the development of the IS / EA Report. In addition to the monitoring data and baseline GHGs, the Baseline Study Report will include a description of the types of emissions that were identified within the Study Area.

8. Data Management and Analysis

Data management including quality assurance / quality control (QA / QC) will be deployed to minimize the potential for data entry and analysis errors, prepare data sets for analysis and limit sensitive data distribution in accordance with established agreements. Modelled and monitored data will be evaluated using method-specific quality assurance / quality control procedures.

8.1 Field Data Collection

Quality assurance measures will be implemented to manage data integrity. The operation, service and maintenance of the station and sampling equipment would be in accordance with both the manufacturers' operating manuals and the protocols outlined in the MECP's Operations Manual for Air Quality Monitoring in Ontario (MECP, 2019). Where the remote nature of the site requires deviations from these, those deviations will be documented.

The following quality control measures will be implemented to help ensure consistent data capture to meet the MECP protocols:

- The station installation will be best sited to meet criteria as outlined in the MECP Operation Manual for Air Quality Monitoring in Ontario (MECP, 2019);
- Selected monitoring equipment will be EPA designated and verified prior to use with NIST traceable calibration standards;
- Station temperature will be monitored and reported to help ensure adequate control of interior temperature;
- Gaseous analysers will include Internal Zero / Span options so that automatic instrument response checks can be conducted nightly to assess ongoing performance such as zero / span drift, repeatability and response time to adhere to the MECP reporting practices;
- VOC sampling will be conducted on a 6 day schedule (NAPS) using a Xontech 910 canister sampler. The sampler will be audited quarterly. Exposed samples will be shipped to the laboratory on a schedule not to jeopardize sample integrity;
- VOC analysis will be conducted by an accredited laboratory as per the MECP protocols;
- Instrument status and operation checks will be conducted and logged weekly by field monitors;

- Monitoring instrumentation will be audited at quarterly intervals using NIST certified standards;
- Meteorological instrumentation will be audited upon installation and annually as per the MECP protocols;
- Back-up or duplicate instrumentation will be made available to minimize data loss or if reported data are questionable;
- Data will be transmitted daily from the station via satellite communications. Manual download protocol available if needed;
- Data will be reviewed daily and quality assured by experienced and qualified analysts. Data will be subjected to various QA / QC tests prior to release;
- A Data Edit log will be implemented and retained for the data set. Data reports will be submitted monthly, and;
- Data will be compared to all applicable AAQCs, Standards and Guidelines.

8.2 Desktop Analysis

The desktop analysis (emissions quantification, modelling and reporting) will be subject to primary and secondary review processes in accordance with MFFN CAR Project Consultant protocols. Each task will have an assigned primary analyst, and work product will be reviewed at key steps in the overall analysis (e.g., calculation of emissions, setup of models, execution of models, draft report, final report). In addition to this ongoing review process, there will be an independent review of analysis conducted by an individual who did not generate content or conduct earlier reviews.

9. Effects Assessment

The following sections provide discipline-specific input and considerations as they pertain to the methodology for effects assessment. The Project is in the early stage of the IS / EA Report preparation and it is expected that the effects assessment methodology will be refined iteratively based on regulatory agency guidance, professional judgment and input received through the Project consultation and engagement process.

9.1 Project-Environment Interactions

The Project activities that may result in changes to the environment are described within the identified temporal and spatial boundaries. This includes identification of both direct and indirect changes by comparing the existing setting to the conditions anticipated to occur as a result of the Project. For each environmental discipline, the likely Project-environment interactions will be identified based on professional judgment, activities listed in TISG Section 3.2 as well as projects of similar magnitude and / or location.

A preliminary analysis of Project-environment interactions with the atmospheric environment is provided in **Table 9-1** and will be confirmed during the IA / EA process to identify the Project-environment interactions that are likely to have a potential effect, and to identify measures to avoid or minimize potential negative effects and enhance benefits.

Table 9-1: Project – Environment Interactions

Project Phases	Project Activities	Atmospheric Environment
Construction Phase	*Mobilization of Equipment and Supplies*	**X**
	Temporary Construction Staging Areas[1]	**X**
	Temporary Access Roads and Trails[1]	**X**
	Temporary Construction Camps[1]	**X**
	ROW Clearing and Grubbing	**X**
	Brush and Timber Disposal	
	Pits and Quarries[1]	**X**
	Drilling / Blasting / Aggregate Production	**X**
	Road Construction (stripping, subgrade excavation, embankment fill placement, grading, ditching)	**X**
	Bridge and Culvert Installation (approach embankments, foundations, substructures, superstructures, traffic protection, erosion controls)	**X**
	Construction Site Restoration	**X**

Project Phases	Project Activities	Atmospheric Environment
Construction Phase: Decommissioning	*Pits and Quarries*	**X**
	Temporary Camps, Roads / Trails and Staging Areas	**X**
Operations Phase	*Road Usage*	**X**
	Maintenance[2]	**x**

Notes: 1. Includes construction and use of
2. Includes General Maintenance (e.g., grading, erosion control, quarrying, pits), Seasonal Maintenance (e.g., snow clearing, bridge and culvert maintenance), and Special Maintenance (e.g., slope failures, road settlement / break-up.).

9.2 Valued Components and Indicators

VCs are the environmental, health, social, economic or additional elements or conditions of the natural and human environment that may be impacted by a proposed project and are of concern or value to the public, Indigenous peoples, federal authorities and interested parties (the Agency 2020b). Indicators represent the resource, feature, or issue related to the VC that, if changed, may demonstrate an effect on the environment. The indicators and rationale for selection and measurement of potential effects, to be used to assess and evaluate the alternative routes in the IS / EA Report are provided in **Table 9-2**. The table includes both quantitative and qualitative indicators. The final list of VCs and indicators to be used in the IS / EA Report will be based on regulatory agency guidance, professional judgement and input received through the Project consultation and engagement process.

The VCs for Atmospheric Environment and GHGs discipline have been determined through consideration of the following factors listed in the TISG[7]:

- VC presence in the study area;
- the extent to which the VC is linked to the interests or exercise of Aboriginal and Treaty Rights of Indigenous peoples, and whether an Indigenous group has requested the VC;
- the extent to which the effects (real or perceived) of the Project and related activities have the potential to interact with the VC;
- the extent to which the VC may be under cumulative stress from other past, existing or future undertakings in combination with other human activities and natural processes;

7. *The TISG also states that information from ongoing and completed regional assessments in the proposed area of the Project should be used to inform VCs for the Project. In February 2020 a regional assessment of the Ring of Fire region commenced; however, it is not sufficiently advanced at this time to inform the Project VCs. The VCs will be consulted and engaged on early in the IA/ EA process and finalized taking into consideration the input received. Therefore, only information relevant to the Project that arises from the regional assessment of the Ring of Fire within an appropriate timeline will inform the VCs for the Project.*

- the extent to which the VC is linked to federal, provincial, territorial or municipal government priorities (e.g., legislation, programs, policies);
- the possibility that adverse or positive effects on the VC would be of particular concern to Indigenous groups, the public, or federal, provincial, territorial, municipal or Indigenous governments; and
- whether the potential effects of the Project on the VC can be measured and / or monitored or would be better ascertained through the analysis of a proxy VC.

As well as consideration of:

- Industry standards and best practice;
- Provincial and federal guidance for assessments of Air Quality and GHG Emissions; and
- Other relevant and credible sources, such as scientific or academic publications or input from the public.

Inputs received to date from Indigenous communities, agencies and interested persons through the Consultation and Engagement Program, including inputs received on the Draft ToR, have also been used to inform the selection of the VCs and indicators for the Atmospheric Environment.

Table 9-2: Atmospheric Environment Indicators

Valued Component	Indicators	Rationale for Selection
Air Quality	■ Change in concentration of Air Contaminants : – NO_x – CO – SO – TSP – PM_{10} – $PM_{2.5}$ – Selected VOCs (acrolein, acetaldehyde, benzene, formaldehyde, 1,3-butadiene, toluene, ethylbenzene and xylene) – PAHs (benzo(a)pyrene)	■ The contaminants chosen for the indicators are based on those commonly associated with transportation and construction activities, as prescribed by the Ontario Ministry of Transportation (MTO, 2020).
Greenhouse Gases	■ Quantification of GHG emissions (CO_2, CH_4, N_2O) expressed as CO_2e	■ The contaminants chosen for the indicators are those prescribed by The Ontario Ministry of Transportation (MTO, 2020)

9.3 Indirect Effects

A direct effect occurs through the direct interaction of an activity with an environmental discipline. The Project-environment interactions currently anticipated, based upon preliminary analysis, to result in direct effects to the Atmospheric Environment Discipline have been identified in **Table 9-1**. The potential direct effects resulting from the Project-environment interactions will be confirmed during the IA / EA process and will be based on input received through the Indigenous Knowledge Program and Consultation and Engagement Program, regulatory agency guidance, and professional judgement.

An indirect effect occurs when a change to one environmental discipline resulting from a Project activity causes a change to another environmental discipline (e.g., changes in vegetation could indirectly affect wildlife). **Table 9-3** provides a preliminary identification of how changes to the atmospheric environment may result in indirect effects to other environmental disciplines.

Changes occurring in the following disciplines may result in a change to the Atmospheric Environment: Vegetation, Social and Land and Resource Use. Details are provided below that provide some examples of potential changes that may occur.

Vegetation

- Increases or decreases in quantity, or changes to vegetation type may affect the quantity of carbon sinks which can result in changes to GHG emissions and capture.

Social

- Changes in housing and accommodation types may result in changes in fuel consumption (heating fuel, wood burning), this can result in either an increase or decrease in community emissions of indicator compounds and GHGs.
- Changes in community services and infrastructure may result in changes in energy input method and consumption (switch from heating fuel to electricity), this can result in either an increase or decrease in community emissions of indicator compounds and GHGs.
- Changes in transportation mode (vehicle type) and volume (traffic loading) will result in either an increase or decrease in community emissions of indicator compounds and GHGs.
- Changes in population and demographics can result in either an increase or decrease in fuel usage for transportation, heating and community services. This change in fuel usage may result in either an increase or decrease in community emissions of indicator compounds and GHGs.

Land and Resource Use

- Changes in land use compatibility, parks and protected areas, local industries and linear infrastructure may have an effect on emission sources and quantities that may result in either an increase or decrease in community emissions of indicator compounds and GHGs.
- Changes to linear infrastructure may result in changes in fuel type and usage quantities that may result in either an increase or decrease in community emissions of indicator compounds and GHGs.
- Changes in recreation and tourism quantities can affect traffic loading and energy consumption within the community and may result in either an increase or decrease in community emissions of indicator compounds and GHGs.

Table 9-3: Potential Discipline Interactions

Discipline and Associated Valued Components	Aboriginal Treaty Rights and Interests	Atmospheric Environment and GHG	Acoustic and Vibration	Physiography, Geology, Terrain and Soils	Surface Water	Groundwater and Geochemistry	Vegetation	Wildlife	Fish and Fish Habitat	Social	Economy	Land and Resource Use	Human Health and Community Safety	Visual Aesthetics	Archaeological and Cultural Heritage
Atmospheric Environment ■ **Air Quality** ■ **GHG Emissions**	-	[redacted]	-	-	X	-	X	X	-	X	-	-	X	-	-

Notes: X = Potential pathway for indirect effect as a result of the Project.
- = No pathway for indirect effect is anticipated as a result of the Project.

9.4 Methods for Predicting Future Conditions

With respect to quantitative models and predictions, the IS / EA Report must detail the model assumptions, parameters, the quality of the data and the degree of certainty of the predictions obtained.

The following sub-sections describe the methods which will be used to predict future conditions associated with the indicators for the Project. In general, the assessment will involve quantifying emissions of selected contaminants from project activities, dispersion modelling to predict effects within the LSA, recommendation of mitigation measures to avoid or minimize identified effects, as well as identify opportunities to enhance benefits to the environment, and the prediction and assessment of potential environmental effects remaining after taking into consideration the recommended mitigation measures (i.e., residual effects).

9.4.1 Air Quality Emissions

As described earlier, a conservative air quality assessment is one which describes the reasonable worst-case impact of the Project. Background concentrations within Marten Falls are expected to be higher than the rest of the LSA. Therefore, using measured concentrations in the LSA will result in a conservative air quality assessment. The air quality assessment will include two bounding scenarios: roadway construction and roadway operation.

9.4.1.1 Construction Phase

Emissions will be estimated for the construction phase based on the projected types of activity and duration. Anticipated construction activity, such as land clearing, blasting, pit and quarry development, material hauling, road construction, and equipment and vehicle operation will be included in the estimate of emissions. Emissions will be estimated based on published emission factors, such as those found in the US EPA's AP-42 (US EPA, 2021), those generated in the most current version of US EPA Motor Vehicle Emissions Simulator (MOVES) (US EPA, 2020), or engineering principles, as applicable. Fugitive emissions such as wind erosion from uncovered soil or stockpiles will be estimated based on the size of the projected working area. A bounding scenario for construction activities will be developed (i.e., a scenario describing the maximum simultaneous construction activities) and will be used for the emission calculations.

9.4.1.2 Operation Phase

Emissions due to the operation phase will include vehicle emissions as well as roadway emissions of re-suspended particulate matter due to vehicle travel on the roadway. Routine road maintenance activities

such as snow clearing are expected to be captured in the roadway vehicle data (traffic volumes and vehicle types) within the roadway operation scenario, and therefore will be included in the air quality assessment. Minor roadway maintenance activities, such as re-grading, are expected to have a lower impact than the initial construction bounding scenario, therefore the impact of these activities would have been assessed within that bounding scenario. Where applicable and available Canadian emission factors from NIR (ECCC, 2020a) will be used in lieu of US EPA emission factors. Within the MOVES (US EPA, 2020) emission model, meteorological and fuel composition data reflective of the study area will be used as inputs to generate emission factors.

Vehicle fleet information such as vehicle volumes will be based on the CAR design criteria. Vehicles will be assumed to travel at the posted speed limit. Fuel formulation will be based on the nearest available representative data source. Vehicle classification and traffic volume will be incorporated in emission calculations (i.e., light duty, heavy duty) if available as different vehicle classifications will have different traffic loadings and emission factors.

Re-suspended road dust will be estimated based on emission factors included in the US EPA's AP-42 (US EPA, 2021) emission factor database.

9.4.1.3 Meteorology

Project-specific meteorological data will be developed for the LSA to be used in the dispersion modelling assessments detailed in **Section 9.4.3**. Prognostic data using the Weather Research and Forecasting model (WRF) will be purchased.

Data will be processed for use with the most currently approved version of the US EPA AERMOD (US EPA, 2019) dispersion modelling software, and CAL3QHCR (US EPA, 1995) models (as described in the following sections) using US EPA AERMET (US EPA, 2019) and RAMMET (US EPA, 1999) respectively. The meteorological dataset will include 5-years of data for the entire project, including the required AERMOD (US EPA, 2019) parameters: wind speed and direction, air temperature, net radiation, turbulence and precipitation data. Meteorological parameters such as pan evaporation and evapotranspiration, and climate data such as extreme weather events, are not considered in air dispersion modelling. Parameters not used as direct inputs into the air dispersion modelling software will have no influence on the model results and therefore the impact assessment. As such they will not be monitored nor documented in the AQIA Report.

9.4.1.4 Dispersion Modelling

Dispersion modelling will be conducted to assess Project effects. Modelling will be conducted following published guidance, as applicable, such as the MECPs' Guideline A-11 Air Dispersion Modelling Guideline for Ontario (MECP, 2017). The models selected for use in this assessment are ideally suited for near-field effects (i.e., on the scale of metres to <50 kilometres). Models that will be utilized within this assessment include the US EPA AERMOD (US EPA, 2019), US EPA's CAL3QHCR / CALINE (US EPA, 1995), and US EPA MOVES (US EPA, 2020). These models were selected as both construction and roadway activity will have the highest potential contaminant concentrations in the near-field immediately adjacent to activity, which disperse rapidly with downwind distance. Given the low projected traffic volumes on the roadway and the primarily near-field effects from roadways, secondary formation will not be included in the assessments.

9.4.1.5 Construction Phase

Air quality effects within the LSA from roadway construction will be assessed for the selected alternatives. Dispersion modelling will be performed using the MECPs' regulatory version of the US EPA's AERMOD (US EPA, 2019) dispersion model (version 19191 or newer at the time of modelling). AERMOD (US EPA, 2019) is the recognized model for regulatory purposes and is appropriate for assessing contaminant dispersion in the near-field to 5 km from the road with a higher degree of resolution. Modelling the full Project in one domain will not provide the resolution nor capture the localized effects of emissions at ground-level in the near-field based on the geography covered by the full length of the road and the predominance of near-field effects. Therefore, modelling utilizing AERMOD (US EPA, 2019) will be performed for an estimated representative construction area (physical size and level of activity). The representative area will be selected based on a review of the construction program for the entire CAR, identification of activities that represent a maximum operating condition, and proximity to receptors. Modelling results from the representative scenario will be extrapolated to predict the effects at sensitive receptors within the LSA. Additionally, a model representative of the community will be developed to assess the Project effects within the MFFN community. This model will include the CAR segments closest to the community of MFFN, and receptors specific to the MFFN community.

9.4.1.6 Operations Phase

Air quality effects within the LSA from roadway operations will be assessed for the selected alternatives. Project emissions will be modelled using the US EPA's CAL3QHCR / CALINE (US EPA, 1995) transportation source model, or equivalent, following modelling guidance from the MTO's *Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects (MTO, 2020)* as well as the MECP Guideline A-11: Air Dispersion Modelling

Guideline for Ontario (ADMGO) (MECP, 2017). As outlined in the Construction Phase, the modelling will be performed for a representative section of roadway in order to capture effects at a resolution appropriate for the Local Study Area (i.e., within 5 km of the roadway). The representative area will be selected based on a review of the operations phase for the entire CAR, identification of activities that represent a maximum operating condition, and proximity to receptors. The results of the modelling for the representative section of roadway will be extrapolated along the entire corridor to predict effects at sensitive receptors within the LSA. Additionally, a model representative of the community will be developed to assess the Project effects within the MFFN community.

One modelling scenario will be developed which considers the projected vehicle fleet (i.e., vehicle age, fuel type, and vehicle type), driving cycles, and roadway configuration. One future-build scenario will be assessed (i.e., build year plus 20 years as recommended by the Ontario Ministry of Transportation (MTO, 2020). The future-build scenario is aligned with MTO guidance to allow for predictability of key inputs to relevant models (e.g., vehicle fleet composition, vehicle age, fuel type). Selection of timelines beyond this may reduce the accuracy of model outputs. The results of the modelling will be extrapolated along the corridor to determine local air quality effects. Design case vehicle fleet information and published default vehicle fleet information (e.g., US EPA defaults) will be used as applicable.

9.4.1.7 Ground-Level Ozone

In the Ministry of Transportation's *Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects (MTO, 2020)*, the MTO states that with respect to the formation of ground-level ozone, "ground-level ozone O_3 is typically formed many kilometres downwind of the source of its precursors" and "concentrations are usually depressed around highways since NO emissions react relatively rapidly to convert O_3 into oxygen gas." The MTO also states that "For major roads, the collective experience of the scientific community suggests that the affected immediate vicinity is limited to the area within approximately 500 metres of the road". Based on this, the contribution of the Project to ground-level ozone is likely to be minor in comparison to the near-field concentration of precursors (i.e., NO_x.

The potential for the Project to contribute to ground-level ozone will be qualitatively assessed for both the construction and operation phases. This qualitative analysis will focus on the predicted increase in NO_x and Volatile Organic Compounds around the PDA which will provide an indication of the potential for ground-level ozone formation. Ozone formation will not be quantitatively assessed as the potential for ground level ozone formation is negligible.

9.4.1.8 Acid Deposition

The potential for the Project to contribute to acid deposition will be qualitatively assessed for both the construction and operation phases. Potential for acid formation will be evaluated based on the predicted increase in NO_x and SO_x to the airshed[8] and subsequent potential nitrate and sulphate formation. Acid deposition will not be quantitatively assessed as the magnitude of effects is expected to be negligible. Acid deposition is a regional effect, meaning that the potential of formation is minimal in close proximity to the roadway when compared to the larger airshed. It is estimated that the Project will partially displace air travel with road vehicle traffic. The impact of this modal shift on the contribution of NO_x and SO_x to the airshed will be assessed and a qualitative statement regarding the potential for acid deposition will be provided in IS / EA Report.

9.4.1.9 Secondary Transformation

Formation of secondary contaminants (fine particulate matter) through chemical and physical transformation is expected to be low-level based on the predicted roadway volumes. While some formation of secondary particulate is expected, the Project is in a pristine setting without large industrial or transportation sources. Secondary formation is dependent on the presence of precursor species[9] which will be limited because of the nature of the environment. Based on a low number of projected vehicles per day, the emissions of precursor species are expected to be relatively dilute in the atmosphere.

Additionally, the formation of secondary contaminants is not instantaneous, and happens downwind of the source at which point the initial precursor contaminants have begun to disperse. In consideration of these factors, it is expected that assessing the near-road impacts of primary contaminants will result in a reasonably conservative air quality assessment.

One exception to the above is the conversion of NO to NO_2. It will be conservatively assumed that 100% of all NO emitted from the Project will be converted to NO_2.

9.4.2 Air Quality Analysis

The predicted at-receptor concentrations of the indicator compounds will be statistically summarized based on the applicable standards and criteria (i.e., AAQC (MECP, 2020) and CAAQS (CCME, 2021)) for each sensitive receptor. 90th percentile monitored or calculated baseline concentrations of the contaminants will

8. Geographically defined area of the atmosphere.
9. Contaminants that are required to be present and to react to form a secondary contaminant

be added to the modelled concentrations to conservatively predict the cumulative effects at each sensitive receptor. Sensitive receptors include areas where occupants may be more susceptible to adverse effects. Sensitive receptors include but are not limited to hospitals, schools, child care facilities and elderly housing. A detailed listed of sensitive receptors will be provided in the IS / EA Report. The selection of sensitive receptors will be done in collaboration with other disciplines and incorporate Indigenous Knowledge. Where exceedances of the standards or criteria are predicted (based on dispersion modelling), frequency analysis will be performed.

Differential effects will not be considered within the air quality assessment. The air quality assessment will consider the previously mentioned provincial and federal criteria and standards (AAQC (MECP, 2020) and CAAQS (CCME, 2021)) to evaluate the Project impacts on air quality. The results of the air quality dispersion modelling assessment will be used to inform air quality related human health effects in the Human Health and Community Safety Assessment. It is expected that the studies listed in **Table 9-3** will use evaluation criteria specific to each study's individual receptor types.

9.4.3 GHG Emissions

Net GHG emission related to the Project will be calculated based on the Strategic Assessment on Climate Change (SACC) (ECCC, 2020b) Equation 1 below:

Net GHG = Direct GHG emissions + Acquired energy GHG emissions
CO2 captured and stored - Avoided domestic GHG emissions - Offset credits.

It should be noted that not all components of this equation are relevant to the Project; only direct and avoided GHG emissions are relevant.

9.4.3.1 Construction Phase

GHG emissions will be estimated for the construction phase based on the projected types of activity and duration. Anticipated construction activity (direct GHG emissions), such as land clearing, blasting, pit and quarry development, material hauling, and road construction will be included in the estimate of emissions. Emissions will be estimated based on published emission factors, such as those found in the US EPA's AP-42 (US EPA, 2021) emission factor database, those generated with the US EPA Motor Vehicle Emission Simulator (MOVES) (ES EPA, 2020), or engineering principles, as applicable. A bounding scenario for construction activities will be developed (i.e., a scenario describing the maximum simultaneous construction activities) and will be used for the emission calculations.

GHG emissions will be estimated for vehicle and equipment activity as well as land use changes (direct GHG emissions), i.e., those associated with land use changes, including peatlands, and the removal of sources, sinks, and reservoirs).

9.4.3.2 Operation Phase

The GHG assessment will include two bounding scenarios, these being roadway construction (described above, and comprising direct emissions) and roadway operation (comprising direct emissions). Routine road maintenance activities such as snow clearing are expected to be captured in the roadway vehicle data (traffic volumes and vehicle types) within the roadway operation scenario, and therefore will be included in the GHG assessment. Minor roadway maintenance activities, such as re-grading, are expected to have a lower impact than the roadway construction scenario, therefore the impact of these activities would have been assessed within that bounding scenario. Where applicable and available, Canadian emission factors from ECCC NIR Reports (ECCC, 2020a) will be used in lieu of US EPA emission factors (US EPA, 2021). Vehicle emission factors, including GHGs, will be estimated using the most current approved version of the US EPA's MOVES (US EPA, 2020) emissions database which considers factors such as: vehicle type, vehicle age, road type, fuel formulation, ambient conditions, and vehicle speed to develop vehicle fleet emission factors per kilometre travelled.

As with the air quality assessment, vehicle fleet information such as vehicle volumes will be based on the CAR design criteria. Vehicles will be assumed to travel at the posted speed limit. Fuel formulation will be based on the nearest available representative data source. Vehicle classification and traffic volume will be incorporated in emission calculations (i.e., light duty, heavy duty) as different vehicle classifications will have different traffic loadings and emission factors.

The assessment of GHG emissions will also consider the potential change in emissions from existing sources (e.g., aircraft, winter road usage) as a result of the Project (avoided domestic GHG emissions).

9.4.4 GHG Analysis

Releases of GHGs and their accumulation in the atmosphere influence provincial and national climate and may affect emission reduction targets for GHGs that have been set or are being developed federally and provincially. As such, GHGs will be assessed relative to provincial totals for comparison. Net GHG emissions will be evaluated in terms of overall contribution over the life of the Project, which will be assumed to be 20 years starting from the initial phases of construction. This will provide consistency with the future-build scenario as prescribed by the Ontario Ministry of Transportation (MTO, 2020). The average

per-annum GHG contribution as a result of the Project will be compared to provincial, federal, and sectoral totals where applicable.

Net GHG emissions as a result of the Project will be calculated using ECCC and SACC (ECCC, 2020b) guidance. The modal shift analysis identified in the Study Plan will be conducted based on the guidelines identified by IAAC (e.g., ECCC guidance, Infrastructure Canada's Climate Lens guidance), and will consider partial or full displacement of current forms of travel (e.g., winter road travel, air travel) with on-road vehicular traffic. The level of modal shift for each mode of transportation will be documented as part of the assessment. The Project is not anticipated to displace international emissions, and therefore this aspect will not be addressed within the analysis.

Emission factors for mobile and stationary equipment used during construction and operation phases will be gathered from the appropriate US EPA AP-42 (US EPA, 2021) resources, those generated from the most current approved version of MOVES (ES EPA, 2020), along with the most current NIR. Vehicle emissions will be estimated using the US EPA's Motor Vehicle Emission Simulator emissions database.

A qualitative description of the Project's net effects on Climate Change will include consideration of the requirements of the SACC guidance (ECCC, 2020). It is expected that in following the SAAC guidance (ECCC, 2020), Section 15.5 of the TISG will be met.

The impact assessment will not include a plan to achieve net zero by 2050 because the majority of the Project's emissions would arise from fuel consumption by third party users of the CAR. These emissions would not be owned by the Proponent and further policies to reduce or fully mitigate those emissions would fall under the jurisdiction of the federal and / or provincial governments. Additionally, emissions from fuel associated with vehicular travel on the CAR would have been subject to Government of Canada carbon price.

9.5 Mitigation and Enhancement Measures

Once potential effects have been identified, the effects assessment will explore technically and economically feasible mitigation measures to avoid or minimize the identified negative effects and enhancement measures to increase positive effects beyond those that are already inherent to the design. These measures will consist of industry-standard practices, federal and provincial standard specifications, regulator-mandated measures, best management practices, Indigenous and community recommendations and recommendations from industry and environmental professionals based on expertise, scientific publications, experience and judgement.

It is important that mitigation and enhancement measures are achievable, measurable and verifiable and monitored for compliance and effectiveness during all temporal phases as part of the Project follow-up monitoring plan. Required environmental monitoring will verify the potential environmental effects predicted in the IS / EA Report, evaluate the effectiveness of mitigation and enhancement measures, and identify the process the Proponent will follow if mitigation and enhancement measures are not effective.

9.5.1 TISG Section 20 Requirements

TISG section 20 includes the following requirements related to the atmospherics discipline. For each, the corresponding approach to fulfilling the requirement is documented.

- Identify and describe the use and application of best available technology and best environmental practice, including its effectiveness on the contaminants of concern, to prevent adverse effects on the receiving environment other than for GHG reduction purposes;
  - Following the ambient background air quality monitoring, a review of monitoring results in combination with an analysis of dispersion modelling outputs will be completed and used to provide input on what or if any mitigation and enhancement measures should be implemented. These mitigation and enhancement measures will be documented. During initial emission calculations select mitigation measures such as road watering will be taken into consideration when developing emissions rates for both mobile and stationary sources.
- Information on any offset credits that have been or will be obtained, including the offset regime that issued the credits, project type, project start date and vintage year. Proponents may also provide information on their intent to acquire or generate international offset credits;
  - It is not anticipated that the Project will generate any GHG offsets. However, as project activities are detailed through the EA process, these activities will be reviewed to gauge their alignment with typical GHG offset project types. The Project scope does not include the acquisition of offsets.
- To inform potential mitigation measures, a comparison of the Project's projected GHG emission intensity of similar projects in Canada and internationally that are a good example of energy efficiency or low emissions intensity projects. The comparison should explain why the emissions intensity may be different;
  - Where emissions intensity data exists in the public domain for comparable new road construction, this information will be used to compare the Project's projected emission intensity. A literature review will be conducted to identify potential data points for comparison, and intensity data captured in this review (if any) will be used as comparison

points. The focus of this assessment will be on the construction of the Project, as emissions from the Project's operations phase would be outside of the control of the Proponent. Specifically, the types of vehicles and resulting energy forms (fossil fuel or electricity) used within vehicles accessing the Project during operations would be outside of the scope of management of the Proponent. Further, the management of the types of vehicles and resulting energy forms used within vehicles would be within the purview of the Government of Canada and Government of Ontario.

9.6 Residual Effects

Residual effects are the effects remaining after the application of mitigation measures. The IS / EA Report will describe the potential adverse and positive residual effects in relation to each temporal phase of the Project (e.g., construction, operation). Residual effects will be described using criteria to quantify or qualify adverse and positive effects, taking into account important contextual factors. The residual effects will be described in terms of the direction, magnitude, geographic extent, duration, frequency, likelihood, and whether effects are reversible or irreversible[10]. For magnitude, environmental discipline-specific definitions are required and are proposed below in **Table 9-4**. Ecological and socio-economic context may also be relevant when describing a residual effect. Context relates to the existing setting, its level of disturbance and resilience to adverse effects. Context can also relate to timing as it applies to assessing the worst-case scenario (e.g., effect during migratory or calving season for wildlife). Where appropriate, information regarding residual effects will be disaggregated by sex, gender, age and other community relevant identify factors to identify disproportionate residual effects for diverse subgroups. For magnitude, VC-specific definitions are required and are proposed below in **Table 9-4** for Air Quality and **Table 9-5** for GHGs. The adverse effects magnitude criteria are intended to assess the ability of the Project to meet provincial and federal air quality criteria and standards. The air quality criteria and standards were developed to be protective of human health. Additionally, the results of the air quality assessment will be considered within the Human Health and Community Safety Study Plan.

10. TISG Section 13.1 identifies additional effects characteristics for certain disciplines (e.g., wetlands, birds, terrestrial wildlife, species at risk). These additional effects characteristics are described in the respective discipline-specific study plans.

Table 9-4: Atmospheric Environment – Air Quality Magnitude Definition

Magnitude Level	Definition	Rationale
Negligible	■ Cumulative concentrations are below Air Quality criteria and an increase of < 50% of baseline values at sensitive receptors	■ Magnitude definitions consider compliance with air quality criteria (AAQC (MECP, 2020) and CAAQS (CCME, 2021)) and changes from baseline conditions
Low	■ Cumulative concentrations are below Air Quality criteria and an increase of >50% of baseline values at sensitive receptors	
Medium	■ Cumulative concentrations exceed Air Quality criteria, and an increase of < 50% of baseline values at sensitive receptors	
High	■ Cumulative concentrations exceed Air Quality criteria, and an increase of > 50% of baseline values at sensitive receptors	

Table 9-5: Atmospheric Environment - Greenhouse Gas Magnitude Definition

Magnitude Level	Definition	Rationale
Negligible	■ Up to 0.1% of provincial totals[11]	■ Releases of GHGs and their accumulation in the atmosphere influence regional, national and global climate and may affect emission reduction targets for GHGs that have been set or are being developed federally and provincially. As there is no provincial or federal guidance to establish magnitude level of GHGs, the magnitude has been established as a percent contribution to provincial totals to assess the significance of Project emissions and hence potential effect on provincial reduction targets that may exist.
Low	■ 0.1%-0.5% of provincial totals	
Medium	■ 0.5%-1% of provincial totals	
High	■ >1% of provincial totals	

9.7 Consideration of Sustainability Principles

The sustainability assessment for the Project will be undertaken on the preferred alternative and will characterize the Project's contribution to sustainability incorporating the requirements set out in Section 25 of the TISG.

One aspect of the sustainability assessment is describing the process in selecting the preferred alternative to the Project and how the sustainability principles were considered. The effects assessment approach for the Project has included the consideration of the sustainability principles outlined in the Project TISG and the Agency's guidance on sustainability. The sustainability principles that have been considered include:

1. Consider the interconnectedness and interdependence of human-ecological systems;
2. Consider the well-being of present and future generations;
3. Consider positive effects and reduce adverse effects of the Project; and
4. Apply the precautionary principle by considering uncertainty and risk of irreversible harm.

11. Provincial totals refer to Provincial Transportation GHG Totals

The interconnectedness and interdependence of human-ecological systems will be considered through the assessment of potential indirect effects of each alternative. An indirect effect occurs when a change to one environmental discipline resulting from a Project activity causes a change to another environmental discipline (e.g., changes in vegetation could indirectly affect wildlife). A preliminary assessment of indirect effects has been included in **Section 9.3**.

The well-being of present and future generations will be considered in the effects assessment through the application of the long-term operations phase temporal boundary of 75 years (**Section 6.1**) and through the effects characteristics description of duration and reversibility for each residual effect predicted.

The consideration of positive effects and reducing adverse effects of the Project is fundamental to the effects assessment methodology through the identification of mitigation measures to reduce potential adverse effects and the identification of the preferred alternative through the evaluation of advantages (e.g., positive effects) and disadvantages (e.g., adverse effects).

The effects assessment will apply the precautionary principle by clearly describing and documenting all uncertainties and assumptions underpinning the analysis and identifying information sources. The effects assessment will consider risk of irreversible harm through the effects characteristics description of reversibility for each residual effect predicted and will describe any uncertainty associated with the assessment of residual effects.

The scope of the sustainability assessment will be defined by issues of importance identified by Indigenous communities and interested persons through consultation and engagement activities, while also ensuring to be inclusive of the diversity of views expressed. The selection of VCs that will be the focus of the sustainability assessment will be aligned with the issues of importance identified by Indigenous communities and interested persons, as well as residual effects identified through the effects assessment process. The sustainability assessment will describe how the planning and design of the Project, in all phases including follow-up monitoring, considered the sustainability principles.

9.8 Consideration of Identity and Gender-Based Analysis Plus in Effects Assessment

The Proponent recognizes that communities and sub-populations within those communities may be impacted differently by the Project with respect to VCs and indicators. As such, the Project aims to collect baseline information for the purpose of assessing differential effects and establishing relevant mitigation measures, as further elaborated on in **Section 4.3**. Gender-Based Analysis Plus will not be limited to

community feedback, when offered or discussed in secondary texts, additional sub-population information as is applicable to the relevant assessment will be incorporated.

9.9 Follow-up Programs

A follow-up program verifies the accuracy of the effects assessment and evaluates the effectiveness of mitigation measures. Identification of follow-up programs for the Project are not described in this Study Plan as the information needed to determine environmental monitoring requirements is dependent on the outcome of the effects assessment and consultation with Indigenous communities, agencies and interested persons. Therefore, the Proponent will include information on follow-up programs, that address the requirements outlined in Section 26 of the TISG, in the IS / EA Report and will identify the compliance and effects monitoring activities to be undertaken during all phases of the Project, as required.

9.9.1 TISG Section 26 Requirements

Results of the air quality assessment will aid in determining if there is a need for follow-up monitoring programs described in TISG Section 26. The requirements of TISG section 26 will be considered when evaluating the air quality assessment results. The need for potential follow-up, such as additional monitoring, will be considered based on the air quality impact assessment results.

10. Assumptions

Any assumption used in the effects assessment will be clearly identified and a rationale provided in the IS / EA Report.

Examples of assumptions that will be used include but are not limited to:

- The average annual daily traffic on the CAR is considered to be a low traffic volume;
- Human settlement areas which will be assessed are assumed to be representative of all potential settlement areas over the lifespan of the Project;
- A worst-case year of vehicle emission rates will be used within modelling. Year over year improvements in vehicle fuel efficiency will not be considered;
- Specific inputs to the analysis will be selected based on currently available information (e.g., land use along the corridor, fuel type and composition). Changes to these types of parameters over the life of the Project cannot be accurately predicted, and;
- Vehicles will travel along the roadway at the posted speed limit.

11. Concordance with Federal and Provincial Guidance

This section provides the best information currently available on how federal and provincial requirements identified for the Project to date will be addressed. The final concordance with federal and provincial requirements will be included in the IS / EA Report, and will be based on regulatory agency guidance, professional judgement and input received through the Project consultation and engagement process.

Table 11-1: Study Plan Federal Concordance – Conformance with Requirements

ID #	Federal TISG Reference[12]	Requirement / Comment / Concern	Response	Study Plan Reference
1	TISG Section 1.1, page 4	■ The Guidelines correspond to factors to be considered in the impact assessment. These factors are listed in subsection 22(1) of IAAC and prescribe that the impact assessment of a designated project must take into account any change to the designated project that may be caused by the environment;	■ The potential effects of the Project on the atmospheric environment and the potential effects of the environment on the Project will be assessed in accordance with applicable standards and guidance.	■ Section 9
2	TISG Section 14.1, page 84	■ The Impact Statement must include an atmospheric dispersion model of the common air pollutants in order to estimate the contaminant concentrations present in the entire area that could potentially be affected by atmospheric emissions resulting from project activities (air pollutant emission sources);	■ AERMOD and CAL3QHCR modelling will be performed to assess atmospheric dispersion of pollutants within the LSA as a result of the Project.	■ Section 9.4.1
3	TISG Section 14.1, page 84	■ The Impact Statement must provide a comprehensive list of project activities (air pollutant emission sources) that may affect ambient air quality, such as, but not limited to: – the use of heavy machinery such as construction equipment; – vehicles and diesel generators during construction; – blasting activities; – exhaust emissions due to increased vehicular traffic during construction and operations; and – dust generation from material stockpiles, transportation and road maintenance during construction and operation.	■ All Project activities expected to contribute air pollutant emissions will be described in the Impact Statement.	■ Section 9.4
4	TISG Section 14.1, page 84	■ The Impact Statement must provide appropriately scaled contour map(s) plotting the predicted emission concentrations (isopleths). The choice of air quality model must be appropriate for the complexity of sources, terrain and meteorology;	■ Results will be presented for the LSA in scaled contour maps. The air quality models which have been selected (AERMOD, CAL3QHCR) are appropriate for the source types and nature of dispersion within the LSA.	■ Section 9.4.4
5	TISG Section 14.1, page 84	■ The Impact Statement must provide a quantitative assessment of common air pollutants (total particulate matter, fine particulate matter (PM2.5), respirable particulate matter with a diameter less than 10 microns (PM10), sulphur oxides, nitrogen oxides, volatile organic compounds polycyclic aromatic hydrocarbons, diesel particulate matter, and carbon monoxide), as well as any air contaminants potentially associated with the Project such as dust resulting from construction activities and ongoing vehicle use during operations or maintenance of the gravel road bed;	■ The Project will be assessed following the MECP dispersion modelling guidance and the MTO guidance for transportation air quality assessments for the requested contaminants. The contaminants assessed will be those required by the MTO guidance (i.e., NOx, CO, PM2.5, PM10, formaldehyde, acetaldehyde, benzene, 1,3-butadiene, and acrolein). Additionally, toluene, ethylbenzene, and xylene will be considered based on inclusion in the human health risk assessment.	■ Section 9.2
6	TISG Section 14.1, page 85	■ for air pollutants with numerical standards and/or established air quality criteria [e.g., Canadian Ambient Air Quality Standards (CAAQS), or Ontario Ambient Air Quality Criteria (AAQC)], observe the averaging time period and the statistical form associated with each numerical standard;	■ Predicted contaminant concentrations will be compared against applicable standards and / or criteria following the averaging time and statistical form associated with each standard and/or criteria.	■ Section 9.4.2
7	TISG Section 14.1, page 85	■ provide a description of all methods and practices (e.g., dust suppression strategies and guidelines, control equipment) to be implemented to reduce and control emissions. If the best available technologies are not included in the Project design, the proponent needs to provide a rationale for the technologies selected;	■ A description of the applicable control methods and practices will be included where applicable.	■ Section 9.4.1
8	TISG Section 14.1, page 85	■ provide justification for all control efficiencies used to reduce emission rates of sources within the model, including details of all assumptions associated with the related mitigation measures, and their achievability;	■ All modelling inputs and assumptions will be documented in the Impact Statement.	■ Section 9.4
9	TISG Section 14.1, page 85	■ The Impact Statement must describe the source characteristics (e.g., point emissions, area sources, incineration emissions, and fugitive sources, including dust generated by exposed soils that are cleared and stockpiled);	■ Each source included within the modelling will be described in the Impact Statement.	■ Section 9.4
10	TISG Section 14.1, page 85	■ The Impact Statement must use established methods for estimating emissions from on-road and off-road activities;	■ Emission rates will be estimated using the US EPA's Motor Vehicle Emission Simulator as well as established methods from ECCC and the US EPA.	■ Section 9.4
11	TISG Section 14.1, page 86	■ In regard to changes to the atmospheric, acoustic, and visual environment, the Impact Statement must describe any positive changes.	■ The Atmospheric and GHG effects assessment will identify positive and adverse effects that may be caused by the Project, on the environment.	■ Section 9.6

12. Federal TISG Reference should be the Section or subsection, page etc. that clearly identifies where comment/issue we are addressing can be found (ex. Section 8.1 of TISG)

ID #	Federal TISG Reference[12]	Requirement / Comment / Concern	Response	Study Plan Reference
12	TISG Section 14.1, page 86	■ describe consultation with regulators, stakeholders, community groups, landowners and Indigenous groups about potential effects to the atmospheric, acoustic, and visual environment	■ All consultation will be described in the Impact Statement.	■ Section 4
13	TISG Section 15.5, page 100	■ provide a description of each of the Project's main sources of GHG emissions	■ The Impact Statement will include a description and assessment of the total net GHG emissions associated with the Project, including each of the main sources. This assessment will include consideration of land use changes, such as the removal or alteration of existing peatlands.	■ Section 9.4.4
14	TISG Section 15.5, page 100	■ provide the estimated annual GHG emissions from each source, including calculation methods, assumptions and related parameters that would enable calculations to be reproduced	■ The Impact Statement will include a description and assessment of the total net GHG emissions associated with the Project.	■ Section 9.4.4
17	TISG Section 15.5, page 100	■ provide an estimate of yearly net GHG emissions for each year of the project lifetime, , including an uncertainty assessment, as per section 3 of the draft Strategic Assessment of Climate Change;"	■ The Impact Statement will provide an estimate of the annual net GHG emissions for each year of the Project. An uncertainty assessment will be conducted following guidance from section 3.3 of the SACC (2020). Assumptions that may result in variance to calculated GHG levels will be discussed relating both to data and methods used.	■ Section 9.4.4
18	TISG Section 15.5, page 100	■ provide a description of large sources of GHG emissions that may be the consequence of accidents or malfunctions	■ Where reasonable, the Impact Statement will provide an estimate of GHG emissions associated with accidents or malfunctions.	■ Section 9.4.4
19	TISG Section 15.5, page 100	■ provide a qualitative description of the Project's positive or negative effects on carbon sinks, including from the removal and alteration of wetlands	■ The Impact Statement will include an assessment of land use changes (e.g., wetlands or peatlands) and the resultant net GHG emissions.	■ Section 9.4.4
20	TISG Section 15.5, page 100	■ describe how the Project may contribute to Canada's efforts to reduce GHG emissions, if applicable (e.g., the Impact Statement could explain how the Project would result in emission reductions in Canada by avoiding emissions from another source)	■ The Impact Statement will present the predicted net change in GHG emissions.	■ Section 9.4.4
21	TISG Section 16.1, Page 103	■ With respect to biophysical determinants of health, the Impact Statement must provide an assessment of adverse and positive effects on human health in consideration of, but not limited to, potential changes in air quality.	■ The effects assessment will identify positive and adverse effects that may be caused by the Project, on the environment, related to the atmospheric environment. Refer to the Human Health and Community Safety Study Plan for more information on human health effects.	■ Human Health and Community Safety Study Plan
22	TISG Section 2.3, pages 6-7	■ The description should focus on aspects of the Project and its setting that are important in order to understand the potential environmental, health, social and economic effects and impacts of the Project. The following information must be included and, where appropriate, located on map(s): – geographic co-ordinates (i.e., longitude/latitude using international standard representation in degrees, minutes, seconds) for the beginning and end points of the proposed road; – current land and/or aquatic uses within the study areas; – distance of the project components to any federal lands and the location of any federal lands within the study areas; – all waterbodies and their location on a map; – navigable waterways; – the environmental significance and value of the geographical setting in which the Project will take place and the study areas; – environmentally sensitive areas, such as national, provincial, territorial and regional parks, UNESCO World Heritage Sites, geological heritage sites, ecological reserves, ecologically and biologically sensitive areas, wetlands, and habitats of federally or provincially listed species at risk and other sensitive areas; – Dedicated Protected Areas and any other areas of ecological and social significance identified by the community during the community-based land use planning processes with the Province of Ontario (e.g., Enhanced Management Areas; see Section 6.1 for requirements related to confidentiality); – lands subject to conservation agreements; – current mineral development proposals, and areas of early and advanced mineral exploration in the study areas;	■ The information related to landscape features, sensitive or protected areas and select others listed in the TISG will be illustrated on maps and / or described within the IS / EA Report, where appropriate.	■ Section 7

ID #	Federal TISG Reference[12]	Requirement / Comment / Concern	Response	Study Plan Reference
		– current areas of aggregate extraction; – description and locations of all potable drinking water sources (i.e., municipal or private), including spring water sources; – description of local communities and Indigenous groups that is culturally relevant and gender sensitive; – if the information is not confidential, provide a description and location of Indigenous traditional territories and/or consultation areas, Treaty and/or Title lands, Indian Reserve lands, Indigenous harvesting regions (with permission of Indigenous groups), Métis settlements; and – culturally important features of the landscape.		
22	TISG Section 20, page 119-128	■ Section 20 of the TISG describes the requirements around mitigation and enhancement measures that must be considered in the Impact Statement.	■ Identification of and assessment of effectiveness of impact management measures will be done as a discipline or VC-specific exercise where mitigation is required, and will be done as part of the IA / EA.	■ Section 9.5
23	TISG Section 21, pages 129-130	■ Section 21 of the TISG describes the requirements and guidance associated with determining residual effects.	■ Residual effects will be assessed in the IA / EA.	■ Section 9
24	TISG Section 26, Page 141	■ Section 26 of the TISG includes a description of the considerations for developing a follow-up program for environmental, health, social or economic effects, as applicable.	■ The IS / EA Report will include descriptions of follow-up programs, as required by VC.	■ Section 9
25	TISG Section 7.1, page 30	■ The Impact Statement must establish appropriate study area boundaries to describe the baseline conditions. The study area boundaries need to encompass the spatial boundaries of the Project, including any associated project components or activities, and the anticipated boundaries of the Project effects, including all potentially impacted local communities, municipalities and Indigenous groups. Considerations in assigning appropriate study areas or boundaries would include, but not be limited to: – areas potentially effected by changes to water quality and quantity or changes in flow in the watershed and hydrologically connected waters; – areas potentially effected by airborne emissions or odours; – areas determined by dispersion and deposition modelling; – areas within the range of vision, light and sound and the locations and characteristics of the most sensitive receptors; – species habitat areas, usage timing and migratory patterns; – emergency planning and emergency response zones; – the geographic extent of local and regional services; – any impacted local communities, including municipalities; – all potentially impacted Indigenous groups; – areas of known Indigenous land, cultural, spiritual and resource use; and – existing effected infrastructure.	■ The Study Areas are defined and described in this Study Plan, in Section 3.	■ Section 3
26	TISG Section 7.1, page 30	■ If the baseline data have been extrapolated or otherwise manipulated to depict environmental, health, social and/or economic conditions within the study area, modelling methods must be described and must include assumptions, calculations of margins of error and other relevant statistical information. Models that are developed should be validated using field data from the appropriate local and regional study areas. Ensure baseline data are representative of project site conditions. If surrogate data from reference sites are used rather than site-specific surveys, the proponent should demonstrate that the data are representative of project site conditions.	■ Baseline air quality monitoring will be collected at one location so will be considered representative of the entire study area, as described in the Study Plan.	■ Section 4
27	TISG Section 7.1, page 31	■ Where baseline data are available in geographic information system (GIS) format, this information is to be provided to the Agency as electronic geospatial data file(s) compliant with the ISO 19115 standard. This would support the Government of Canada's commitment to Open Science and Data and would facilitate the sharing of information with the public through the Canadian Impact Assessment Registry Internet Site	■ Complete data sets from all survey sites will be provided. They will be in the form of complete and quality assured relational databases, with precisely georeferenced site information, precise observation / visit information and with observations and measurements in un-summarized form. Databases and GIS files will be accompanied by detailed metadata that meets ISO 19115 standards (or equivalent). Documentation	■ Section 5.1

ID #	Federal TISG Reference[12]	Requirement / Comment / Concern	Response	Study Plan Reference
		and the Government's Open Science and Data Platform. The Agency intends to make the geospatial data files available to the public under the terms of the Open Government License – Canada.	and digital files will be provided for all results of analyses that allow for a clear understanding of the methods and a replication of the results.	
28	TISG Section 7.2, page 32	■ The Impact Statement must provide detailed descriptions of specific data sources, data collection, sampling, survey and research protocols and methods followed for each baseline environmental, health, social and economic condition that is described, in order to corroborate the validity and accuracy of the baseline information collected.	■ Descriptions of specific data sources, data collection, sampling, survey and research protocols and methods followed for each baseline environmental condition will be provided in the IS / EA Report and are summarized in this Study Plan.	■ Section 4
29	TISG Section 7.2, page 33	■ If using existing data sources, the Impact Statement must provide justification to show that the data sources are relevant in spatial and temporal coverage to the Project. Some data sources may have good coverage in Southern Ontario or existing road networks but be unsuitable as a baseline for these northern areas where there are not roads.	■ Justification for using existing data sources will be provided in the IS / EA Report	■ Section 7 ■ Appendix A
30	TISG Section 7.2, page 33	■ Existing data should be considered as a limited augmentation of this new data. See the "Establishing Baseline Conditions" (sections 8.5, 8.9, 8.10, 8.11) in this Tailored Impact Statement Guidelines for recommendations on survey design and methodology. Surveys and analyses should be conducted by qualified experts. Baseline data must be collected in a manner that enables reliable analysis, extrapolations and predictions. Resulting data should be suitable for analyses to estimate pre-project baseline conditions, derive predictions of impacts, and evaluate and compare post-project conditions and at scales of within and across the Project, Local and Regional Assessment areas. Modelling methods, error estimates and assumptions should be reported (as per section 7.1). Modelling and simulations should be used early in the planning phase to estimate the necessary sampling intensity and to quantitatively evaluate the effectiveness of design options. Ethical guidelines and relevant cultural protocols governing research, data collection and confidentiality must be adhered to.	■ Descriptions of specific data sources, data collection, sampling, survey and research protocols and methods followed for each baseline environmental condition will be provided in the IS / EA Report and are summarized in this Study Plan.	■ Section 4
31	TISG Section 7.2, page 33	■ Baseline data must be collected in a manner that enables reliable analysis, extrapolations and predictions. Resulting data should be suitable for analyses to estimate pre-project baseline conditions, derive predictions of impacts, and evaluate and compare post-project conditions and at scales of within and across the Project, Local and Regional Assessment areas. Modelling methods, error estimates and assumptions should be reported (as per section 7.1). Modelling and simulations should be used early in the planning phase to estimate the necessary sampling intensity and to quantitatively evaluate the effectiveness of design options. Ethical guidelines and relevant cultural protocols governing research, data collection and confidentiality must be adhered to.	■ Descriptions of specific data sources, data collection, sampling, survey and research protocols and methods followed for each baseline environmental condition will be provided in the IS / EA Report and are summarized in this Study Plan.	■ Section 4
32	TISG Section 7.2, pages 31-33	■ Information sources and data collection methods used for describing the baseline environmental, health, social and economic setting may consist of the following sources of information. For specific sources of baseline information, see Appendix 1. – Federal government (e.g., Environment and Climate Change Canada, Health Canada, Indigenous Services Canada, Statistics Canada, Women and Gender Equality Canada); – Ontario provincial government (e.g., Ministry of Environment, Conservation, and Parks, Ministry of Natural Resources and Forestry; – Bird Conservation Region plans; – academic institutions; – field studies, including site-specific survey methods; – database searches, including: – federal, provincial, territorial, municipal and local data banks; – Breeding Bird Atlas - Ontario (2001-2005) – monitoring program databases protected areas, watershed or coastal management plans; – natural resource management plans; – species recovery and restoration plans;	■ Data sources are being reviewed for their appropriateness and will be included in Study Plans where applicable. Information on specific data sources and their relevance to the Project will be included in the IS / EA Report.	■ Section 7 ■ Appendix A

ID #	Federal TISG Reference[12]	Requirement / Comment / Concern	Response	Study Plan Reference
		– field measurements to gather data on ambient or background levels for air, water, soil and sediment quality, light levels or acoustic environment (soundscape); – land cover data, including: • terrestrial ecosystem mapping products; • forest cover maps; • remote sensing resources; • important habitats and features to include: ○ water bodies, wetlands, watercourses; ○ riparian habitat; ○ river banks or other eroded habitats; ○ artificial water sources; ○ forest, tree patches, solitary trees (especially old decaying trees); ○ forest edges and tree rows; ○ ridges, including eskers; ○ caves and mines; ○ cliffs, rock outcrops, exposed bedrock, talus, and other karst topography; ○ buildings, bridges, and other anthropogenic features, including linear features; ○ sources of artificial lighting attracting insects; ○ critical habitat; and ○ and any other habitat features known to be important in the area. – Published literature, such as peer reviewed journals, reports by think tanks, non-government organizations and government reports; – environmental assessment documentation, including monitoring reports, from prior projects in the area and similar projects outside the area; – regional studies, project assessments and strategic assessments; – renewable harvest data; – Indigenous knowledge, including oral histories and knowledge gathered by spending time on the land with knowledge holders; – community based monitoring and studies conducted by Indigenous communities; – expert, community, public and Indigenous engagement and consultation activities, including workshops, meetings, open houses, surveys; – qualitative information gathered from interviews, focus groups or observation; – census data; – baseline human health risk assessments; – community and regional economic profiles; – community well-being studies; and – statistical surveys, as applicable.		
33	TISG Section 7.3, page 34	■ The list of valued components must be informed, validated and finalized through engagement with the public, Indigenous groups, lifecycle regulators, jurisdictions, federal authorities, and other interested parties. The Impact Statement must describe valued components, processes, and interactions that are identified to be of concern or that the Agency considers likely to be impacted by the Project and are included in the Guidelines.	■ A summary of the consultation plan for Indigenous communities, government agencies, and interested persons has been provided in Section 4 of the Study Plan; further details can be found in the IS / EA Consultation Plan included as Appendix B of the Proposed ToR. Specific consultation and engagement activities and schedules are currently in development and will be shared with the MECP and the Agency once available.	■ Section 4

ID #	Federal TISG Reference[12]	Requirement / Comment / Concern	Response	Study Plan Reference
34	TISG Section 7.4.1, page 36	■ For valued components establish three study area spatial boundaries to assess impacts to each valued component: 1) Project Study Area: defined as the project footprint for each alternative route; " 2) Local Study Area: defined for each valued component – see below; 3) Regional Study Area: defined for each valued component – see below ■ Provide a rationale for boundaries of the project study area, local study area, and regional study area for each valued component and indicate how the above objectives were met in establishing the boundaries.	■ Geographic extant, and the extant rationale, of the Project, Local, and Regional Study Areas for this VC are provided in this Study Plan.	■ Section 6
35	TISG Section 7.4.1, pages 35-36	■ The Impact Statement must describe the spatial boundaries, including project, local and regional study areas, for each valued component included in assessing the potential adverse and positive environmental, health, social and economic effects of the Project and provide a rationale for each boundary. Spatial boundaries are defined taking into account the appropriate scale and spatial extent of potential effects and impacts of the Project; community knowledge and Indigenous knowledge; current or traditional land and resource use by Indigenous groups; exercise of Aboriginal and Treaty rights of Indigenous peoples, including cultural and spiritual practices; and physical, ecological, technical, social, health, economic and cultural considerations. The size, nature and location of past, present and foreseeable future projects and activities are factors that should be included in the definition of spatial boundaries. It should be noted that in some cases, spatial boundaries might extend to areas outside of Canada. These transboundary spatial boundaries should be identified where transboundary effects are expected.	■ Geographic extant, and the extant rationale, of the Project, Local, and Regional Study Areas for this VC are provided in this Study Plan.	■ Section 6
36	TISG Section 8.1, page 39	■ The Impact Statement must provide the approximate number, distance and identity factors of likely human receptors, including any foreseeable future receptors, that may be impacted by changes in air, water, country food quality (e.g., dust deposition on vegetation), and noise levels. At minimum, provide a map showing approximate locations of permanent residences, temporary land uses (e.g., cabins and traditional sites) and known locations of sensitive human receptors (e.g., schools, hospitals, community centres, retirement complexes or assisted care homes).	■ Identified receptor locations will be described in the IS / EA Report. The sensitive receptors described in this TISG requirement are captured by other disciplines (e.g., Human Health and Community Safety and Aboriginal and Treaty Rights and Interests). Results from the Atmospheric Environment and GHG assessment will be used by other disciplines in assessing impacts to receptors. The relevant criteria (AAQC, CAAQS) have been developed in consideration of effects at any applicable receptor type.	■ Section 9.4
37	TISG Section 8.1, pages 38-39	■ The Impact Statement must: – provide the results of a baseline survey of ambient air quality by identifying and describing emission sources for the following contaminants: total suspended particulates, fine particulates smaller than 2.5 microns (PM2.5), respirable particulates of less than 10 microns (PM10), carbon monoxide (CO), ozone, sulphur oxides (SOx), nitrogen oxides (NOx), volatile organic compounds (VOCs)25, polycyclic aromatic hydrocarbons (PAHs), diesel particulate matter (DPM), and any other toxic air pollutants (mobile and stationary sources); " – "for air pollutants with numerical standards and/or established air quality criteria, [e.g., Canadian Ambient Air Quality Standards (CAAQS), or Ontario Ambient Air Quality Criteria (AAQC)], observe the averaging time period and the statistical form associated with each numerical standard; " – "address seasonal variability in the baseline survey and include a determination of background or ambient contaminant concentrations at key receptor points (e.g., traditional land users, sensitive human receptors such as daycares, schools, hospitals, community centres, retirement complexes or assisted care homes) with monitoring data of appropriate duration, representativeness, data completeness, data validation and quality control, baseline air quality monitoring is to be provided for a minimum of one year to represent seasonal variability; – provide dispersion modelling of a base case to account for existing pollutant sources and to determine the spatial distribution of pollutants within the study area; – describe all direct and indirect sources of baseline air emissions, including mobile, stationary and fugitive;	■ These items are addressed in our study plan. Brief summary: – we will use monitoring to develop baseline concentrations of PM10, PM2.5, NOx, acetaldehyde, formaldehyde, benzene, acrolein, and 1,3-butadiene. – addressed above. Included within scope – we will use monitoring to represent baseline. No modelling of baseline concentrations will be performed to predict concentrations at specific receptor locations. – monitoring will be used to address base case. Dispersion modelling is not practical to quantify base case. – a description of general sources in the area will be included, but no quantification of emissions or modelling is included.	■ Section 7

ID #	Federal TISG Reference[12]	Requirement / Comment / Concern	Response	Study Plan Reference
38	TISG Section 8.2, page 40	■ The Impact Statement must: – describe the local and regional climate including historical records of relevant meteorological information (e.g., total precipitation (rain and snow)); – provide mean, maximum and minimum temperatures; – provide typical wind speed and direction; – identify the potential for extreme weather events such as, wind, precipitation and temperature extremes;	■ The IS / EA Report will describe local and regional climate, based on data availability. Up to one-year of meteorological data will be developed from prognostic data and will be provided, including: wind speed and direction, temperature, and precipitation.	■ Section 7.2
39	TISG Section 8.6, page 44	■ The Impact Statement must provide complete hydrometeorological (temperature, precipitation, evapotranspiration) information based on data from nearby weather stations or from a weather station on site;	■ Weather parameters will be summarized for the area and presented in the IS / EA Report.	■ Section 7.2
40	TISG Section 7.3, page 35	■ For each of the valued components that will be assessed in the Impact Statement, the proponent must create a study plan and a work plan to be validated by the Agency. Upon receipt of a study plan, the Agency may request that the proponent present and discuss the study plan at technical meetings, which will be scheduled during the impact statement phase.	■ The Study Plan meets this requirement. A summary of the technical discussions with agencies have been provided in Section 3 of the Study Plan.	■ Section 3
41	TISG Section 7.3, page 35	■ The valued components must be described in sufficient detail to allow the reviewer to understand their importance and to assess the potential adverse and positive environmental, health, social and economic effects and impacts arising from the Project activities.	■ The IS / EA Report will include detailed descriptions of the VCs and the rationale for their inclusion to describe their importance and the predicted residual effects (adverse and positive) as a result of the Project.	■ Section 9
42	TISG Section 7.4.2, page 37	■ The temporal boundaries of the impact assessment span all phases of the Project determined to be within the impact assessment. If potential effects are predicted after project decommissioning or abandonment, this should be taken into consideration in defining specific boundaries. In order to assess a project's contribution to sustainability, consideration should be given to the long-term effects on the well-being of present and future generations. When defining temporal boundaries, the proponent should consider how elements of environmental, health, social and economic well-being that local communities, including municipalities, and Indigenous groups identify as being valuable could change over time.	■ Modelling scenarios based on the MTO guidance (i.e., build year plus 20 years in future). The future-build scenario is aligned with MTO guidance to allow for predictability of key inputs to relevant models (e.g., vehicle fleet composition, vehicle age, fuel type). Selection of timelines beyond this may reduce the accuracy of model outputs.	■ Section 9.4.1
43	TISG Section 7.3, pages 34-35	■ In selecting a valued component to be included, the following factors should be considered: – valued component presence in the study area; " – "the extent to which the valued component is linked to the interests or exercise of Aboriginal and Treaty rights of Indigenous peoples, and whether an Indigenous group has requested the valued component; – "the extent to which the effects (real or perceived) of the Project and related activities have the potential to interact with the valued component; – "the extent to which the valued component may be under cumulative stress from other past, existing or future undertakings in combination with other human activities and natural processes; – "the extent to which the valued component is linked to federal, provincial, territorial or municipal government priorities (e.g., legislation, programs, policies); – "the extent to which the valued component is being addressed through any ongoing or completed regional assessment processes; – "the possibility that adverse or positive effects on the valued component would be of particular concern to Indigenous groups, the public, or federal, provincial, territorial, municipal or Indigenous governments; and – whether the potential effects of the Project on the valued component can be measured and/or monitored or would be better ascertained through the analysis of a proxy valued component.	■ The IS / EA Report will include detailed descriptions of the VCs and the rationale for their inclusion to describe their importance and the predicted residual effects (adverse and positive) as a result of the Project.	■ Section 9

Table 11-2: Study Plan Provincial Concordance – Conformance with Requirements

ID	Comment From Regulatory Agency	Comment Type	Requirement / Comment / Concern	Response	Study Plan Reference
1	MECP	■ Email from Agni Papageorgiou & Sasha McLeod, Special Project Officer Environmental Assessment Services Section, Ministry of the Environment, Conservation and Parks with comments of the Draft ToR	■ #17 Section 8 Page 54 – Consultation on Assessment Methodology - MFFN acknowledges that the proposed methodology will be open to input during the draft ToR review, but also says a more detailed method will be presented in the EA. Page 47 indicates the effects assessment criteria will be developed during the EA. While it is appropriate to defer some detailed work planning to the EA phase, the ToR should include commitments for how technical reviewers, and other interested persons, will be consulted during the development of specific evaluation methodologies or technical work plans. It is strongly recommended that those opportunities for review occur prior to the completion of studies (e.g., prior to the submission of a draft or final EA document).It is not clear whether MFFN plans to consult on the more detailed methodology and criteria during the EA phase or if the ToR phase is the main opportunity to provide input. – Please indicate how consultation on the ToR has informed the preliminary criteria and indicators. Please clarify when MFFN will consult and provide opportunity for input on the detailed assessment method, including criteria and indicators (and work plans as MECP has proposed), with agencies, communities and stakeholders during the EA phase in order to finalize the methodologies before EA studies get advanced.	■ The Study Plan meets this requirement. ■ As identified in Section 4.2 of the Study Plan, the Proponent will provide opportunities for consultation and engagement with Indigenous communities identified in Table 4-1, which is inclusive of all Indigenous communities identified in the Indigenous Partnership and Engagement Plan for the Marten Falls Community Access Road Project Impact Assessment (The Agency 2020a). ■ Further information on how Indigenous Knowledge will be considered in the IS / EA Report has been included in Section 5 of the Study Plan. Section 5 of the Study Plan provides further details on the two concurrent and complementary avenues for Indigenous communities and groups to be engaged with and provide input on the Project: the Indigenous Knowledge Program and the Consultation and Engagement Program.	■ Section 4 ■ Section 5
2	MECP	■ Email from Agni Papageorgiou & Sasha McLeod, Special Project Officer Environmental, MECP Assessment Services Section, Ministry of the Environment, Conservation and Parks with comments of the Draft ToR	■ Assessment Methods – For the most part, section 7.2 provides a description of potential environmental effects for each discipline. However this section also includes assessment methodologies for some subsections (7.2.1 and 7.2.2 AERMOD modelling, quantitative noise assessment) while the majority do not (7.2.3 – 12). The level of detail in the ToR about assessment methods should be consistent for all environmental components. – It is strongly recommended to include commitments to develop work plans at the outset of the EA phase, including opportunities for technical review by agencies and others. The work plans should include assessment methodology appropriate for each environmental component. The ToR could include a high level summary table for each environmental discipline listing data collection and assessment methods, with a commitment to develop the work plans at the outset of the EA phase to provide more details. Consider where the information about air and noise modelling is best placed.	■ The Study Plan meets this requirement.	■ Section 7 ■ Section 8
3	MECP	■ Email from Agni Papageorgiou & Sasha McLeod, Special Project Officer Environmental, MECP Assessment Services Section, Ministry of the Environment, Conservation and Parks with comments of the Draft ToR	■ #16 Section 8 Page 54 – Work Plans - Section 8 describes the approach that will be taken to evaluate alternative methods during the EA, including proposed criteria and indicators (presented in Appendix A). The information presented is high level and does not provide an opportunity for technical review of the methodologies that will be applied to evaluate those specific criteria and indicators. It is strongly recommended to include commitments to develop work plans at the outset of the EA phase, including opportunities for technical review by agencies and others.	■ This Study Plan will be reviewed by relevant federal and provincial agencies.	■ Section 9

ID	Comment From Regulatory Agency	Comment Type	Requirement / Comment / Concern	Response	Study Plan Reference
4	MECP	■ Email from Guowang Qiu, Air Quality Analyst Technical Support, Northern Region, Ministry of the Environment, Conservation and Parks with comments of the Draft ToR	■ #1 Section 7.1.4.1 – The Draft ToR indicates that a one-year air quality monitoring program is planned to measure concentrations of nitrogen oxides, particulate matter (e.g., PM2.5, PM10, total suspended particulate), carbon monoxide, sulphur dioxide, benzene, toluene, ethylbenzene, and xylene, which will be used to establish baseline air quality for the project. It is recommended that the proponent consult the ministry as early as possible to ensure that the proposed ambient air monitoring program will meet requirements as specified in the Operations Manual for Air Quality Monitoring in Ontario (2018 revised version).Section 7.1.4.1 should include a discussion on how the planned air quality monitoring program will meet the requirements of the Operations Manual for Air Quality Monitoring in Ontario to ensure the collection of accurate air monitoring data.	■ MECP will be consulted regarding the implementation of the monitoring program. Note: consultation is underway.	■ Section 7.2.1
5	MECP	■ Email from Guowang Qiu, Air Quality Analyst Technical Support, Northern Region, Ministry of the Environment, Conservation and Parks with comments of the Draft ToR	■ #3 Appendix A – Ambient Air Quality Criteria should be added into the Appendix A – Draft Criteria & Indicators for Alternatives Evaluation as one of the Potential Data Sources. – Please add Ontario's Ambient Air Quality Criteria into the Appendix A as one of the Potential Data Sources for Atmospheric Environment.	■ This source has been included in our provided Study Plan.	■ Appendix A
6	MECP	■ Completeness Review Memorandum compiled from MECP emails and August 2019 meetings with MECP and ENDM	■ Study areas are missing and lack clarity – maps show study area for 4 routes even though only 2 (or 1?) routes are proposed to be assessed; no indication of local and regional study areas for each environmental component (e.g., groundwater, surface water, caribou, etc.).	■ The Study Areas are defined and described in the Study Plan.	■ Section 6
7	MNRF	■ Letter received from Dave Barker, Resources Management Supervisor, Nipigon District, MNRF on the Draft Terms of Reference	■ Sec. 7 pg. 19 – Nearly one-half of the 190 to 230 km proposed road is through the James Bay Lowlands. Road construction through landscapes dominated by wetlands has a potential to significantly alter watershed hydrology, with changes in greenhouse gases (GHG) a likely outcome. This can have negative implications on GHG production, possibly altering carbon balances well beyond the 35-m width of the corridor. Retaining background carbon and GHG balances in response to land development remain national and international priorities. We strongly recommend that a carbon and GHG evaluation be completed as part of the EA so that these effects can be considered. At minimum, the review of literature on road construction effects on carbon should be undertaken for this EA. Data exists for the study region that the client should review and evaluate. These include government and conservation society reports, peer-reviewed manuscripts, and databases of carbon/GHG, weather, geology, vegetation, etc. The client is encouraged to apply the carbon/GHG calculations provided in 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands. It is further recommended the project test the IPCC calculations against data collected along the length of road network.	■ The potential GHG emissions resulting from the Project will be assessed in accordance with applicable standards and guidance. As an example, IPCC resources may be used in the estimation of greenhouse gas emissions as a result of land use changes.	■ Section 9.4.8

Table 11-3: Study Plan Federal and Provincial Concordance – Requirement Deviations

ID #	Federal TISG Reference[13] or Provincial Draft ToR Comment Reference[14]	Requirement / Comment / Concern	Response (Rationale for not meeting requirement)	Justification (for not complying with requirement including for example scientific research, precedence)	Proposed TISG Amendment
1	TISG Section 7.2, page 33	■ With regard to field studies, survey work must be planned to include multiple sampling locations and multiple visits to each location to support all required assessment analyses.	■ The Atmospherics and Greenhouse Study Plan does not include multiple locations for survey work.	■ Within the LSA the community of Marten Falls is the primary area of human settlement and is the only location with sufficient power and serviceability access to support air quality monitoring equipment. The measured values in the community are a reasonably conservative characterization of baseline ambient air quality across the LSA. Concentrations within Marten Falls are expected to be elevated in comparison with the remainder of the LSA due to the presence of sustained human activity (e.g., power generation, airport). Therefore, using background data collected from within Marten Falls is expected to result in a conservative characterization of baseline conditions.	■ TISG should be updated to remove the requirement to include multiple sampling locations for the Atmospherics and Greenhouse Gasses Study Plan.
2	TISG Section 8.2, page 40	■ The Impact Statement must: – provide hourly meteorological data (wind speed and direction, air temperature, net radiation, turbulence and precipitation data) from a minimum of one year to support dispersion modelling that captures the normal variability of meteorological conditions; and – provide pan evaporation measurements or estimates of monthly (or daily) evapotranspiration.	■ Parameters not directly used within dispersion modelling will not be included within the Atmospheric and GHG Study Plan.	■ The Potential for extreme weather events and pan evaporation measurements are not relevant to the air quality study and will not be provided. These values are not included within dispersion modelling.	■ TISG should be updated to remove the requirement to include extreme weather events, and pan evaporation measurements , as well as parameters not directly used within dispersion modelling,
3	TISG Section 14.1, page 84	■ "provide an assessment of the Project's emissions potentially contributing or adding to existing ground ozone levels;"	■ The potential for the Project to contribute to ground-level ozone will be qualitatively assessed for both the construction and operation phases. Potential for the generation of ground-level ozone will be evaluated based on the predicted increase in NOx and Volatile Organic Compounds around the Project area. Ozone formation will not be quantitatively assessed as the magnitude of effects is expected to be negligible.	■ In the Ministry of Transportation's Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects, the MTO states that, with respect to the formation of ground-level ozone, "ground-level ozone O3 is typically formed many kilometres downwind of the source of its precursors" and "concentrations are usually depressed around highways since NO emissions react relatively rapidly to convert O3 into oxygen gas." The MTO also states that "For major roads, the collective experience of the scientific community suggests that the affected immediate vicinity is limited to the area within approximately 500 metres of the road". Based on this, the contribution of the Project to ground-level ozone is likely to be minor in comparison to the near-field concentration of precursor species (i.e., NOx).	■ TISG should be updated to remove the requirement to evaluate ground level ozone

13. Federal TISG Reference should be the Section or subsection, page etc. that clearly identifies where comment/issue we are addressing can be found (ex. Section 8.1 of TISG)
14. This should include ID # reference (from excel table you were provided with all Draft ToR comments) and commenter.

ID #	Federal TISG Reference[13] or Provincial Draft ToR Comment Reference[14]	Requirement / Comment / Concern	Response (Rationale for not meeting requirement)	Justification (for not complying with requirement including for example scientific research, precedence)	Proposed TISG Amendment
4	TISG Section 14.1, page 85	■ The Impact Statement must provide details of all air quality model configuration, including meteorology, land use, gridded and sensitive receptors and chemical and physical transformation settings	■ The air quality modelling will be described in detail within the Impact Statement. No chemical or physical transformation will be included in the modelling as the dispersion of emissions are expected to be generally low-level and near-field with respect to the Project.	■ The Study Plan intended to communicate that the formation of secondary contaminants through chemical and physical transformation is expected to be low-level based on the predicted roadway volumes. While some formation of secondary particulate is expected, the Project is in a pristine setting without large industrial or transportation sources. Secondary formation is dependent on the presence of precursor species which will be limited because of the pristine nature of the environment. Based on a projected AADT of 400 vehicles per day, the emissions of precursor species are expected to be relatively dilute in the atmosphere. ■ Additionally, the formation of secondary contaminants is not instantaneous, and occurs downwind of the source at which point the initial precursor contaminants have begun to disperse. In consideration of these factors, it is expected that assessing the near-road impacts of primary contaminants will result in a reasonably conservative Air Quality Assessment ■ One exception to the above is the conversion of NO to NO2. It will be conservatively assumed that 100% of all NO emitted from the Project will be converted to NO2.	■ TISG should be updated to remove the requirement to evaluate secondary transformation
5	TISG Section 14.1, page 85	■ The Impact Statement must assess the potential for emissions from the Project to contribute to acid deposition and exceedances of critical loads for terrestrial and aquatic ecosystems;	■ The potential for the Project to contribute to acid deposition will be qualitatively assessed for both the construction and operation phases. Potential for acid formation will be evaluated based on the predicted increase in NOx and SOx to the airshed and subsequent potential nitrate and sulphate formation. Acid deposition will not be quantitatively assessed as the magnitude of effects is expected to be negligible.	■ Acid deposition is a regional effect, meaning that near-roadway concentrations are not as important as airshed concentrations. It is estimated that the Project will partially displace air travel with road vehicle traffic. The impact of this modal shift on the contribution of NOx and SO2 to the airshed will be assessed and a qualitative statement regarding the implications for acid deposition will be provided.	■ TISG should be updated to remove requirement for quantitative analysis of acid deposition
6	TISG Section 14.1, page 85	■ The Impact Statement must provide emission rates for all project and regional sources within the study area, including emission factors (with methodology, uncertainty assessment and references) and all assumptions and related parameters that would enable calculations to be reproduced”	■ Baseline air quality monitoring will be used to represent the Project Area and is assumed to include in the effect of any relevant regional sources. Therefore, regional source emissions will not be quantified or included in the dispersion modelling.	■ The majority of sources are expected to be personal vehicles, residential heating, and other miscellaneous activities. There are no significant sources (e.g., large industries) which would contribute to emissions in the Study Area. ■ As described earlier, a conservative Air Quality Assessment is one which describes the reasonable worst-case impact of the Project. Background concentrations within Marten Falls are expected to be higher than the rest of the Study Area. Therefore, using measured concentrations in the Study Area will result in a conservative Air Quality Assessment.	■ TISG updated to remove requirement of providing emission rates for all Project and regional sources

ID #	Federal TISG Reference[13] or Provincial Draft ToR Comment Reference[14]	Requirement / Comment / Concern	Response (Rationale for not meeting requirement)	Justification (for not complying with requirement including for example scientific research, precedence)	Proposed TISG Amendment
7	TISG Section 14.1, page 85	■ The Impact Statement must provide a comparison of predicted air quality concentration against the Canadian Ambient Air Quality Standards (CAAQS) for fine particulate matter (PM2.5), sulphur dioxide (SO2) and nitrogen dioxide (NO2), and ozone (O3)."	■ Ozone is not a primary contaminant related to the Project.	■ Considering the projected roadway volumes (200-300 vehicles per day), an assessment of the formation of ozone is not warranted. Ozone formation will be qualitatively assessed.	■ TISG should be updated to remove requirement to provide comparison of ozone (O3) against CAAQS
8	TISG Section 14.1, page 85	■ "provide details of the achievement of emission standards for all mobile and stationary engines used in the Project;"	■ The Project is a public roadway. Ongoing operation of the roadway is not controlled by the project team. The project team cannot guarantee the types of vehicles that drive on the road.	■ The Project is a public roadway. Ongoing operation of the roadway is not controlled by the MFFN CAR Project Team. The MFFN CAR Project Team cannot guarantee the types of vehicles that drive on the road.	■ TISG should be updated to remove requirement to provide details of the achievement of emission standards for all mobile and stationary engines used in the Project
9	TISG Section 14.1, page 86	■ "describe the locations and characteristics of the most sensitive receptors including species at risk and differential effects for sensitive receptors;"	■ Identified receptor locations will be described in the Impact Statement. Differential effects will not be considered in the Atmospheric Environment assessment. Results from the Atmospheric Environment will be used by individual disciplines in assessing impacts to receptors.	■ The relevant criteria (AAQC, CAAQS) have been developed in consideration of effects at any applicable receptor type.	■ TISG should be updated to remove requirement of assessing differential effects for sensitive receptors
10	TISG Section 15.5, page 100	■ “describe how the Project could impact global GHG emissions, including if the Project is expected to displace emissions internationally. The Impact Statement should describe how the Project is likely to result in global emission reductions. For example, a Project that enables the displacement of high-emitting energy abroad with lower emitting energy produced in Canada could be considered as having a positive impact."	■ The Project will not displace international GHG emissions. GHG emissions will be assessed against provincial, federal and sector GHG totals.	■ Due to the size and nature of the Project the Project is not expected to displace international GHG emissions.	■ TISG should be updated to remove requirement to describe impact on global GHG emissions

12. References

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AERMET. Retrieved from https://www.epa.gov/scram/air-quality-dispersion-modelling-preferred-and-recommended-models#aermod

United States Environmental Protection Agency. 2020:
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Appendix A

Preliminary List of Data Sources

Environment and Climate Change Canada:
Historical Weather Data, https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

Environment and Climate Change Canada:
Greenhouse Gas Reporting Program, https://open.canada.ca/data/en/dataset/a8ba14b7-7f23-462a-bdbb-83b0ef629823

Environment and Climate Change Canada:
National Air Pollution Surveillance Program, https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b

Ontario GeoHub:
Ontario Provincial Digital Elevation Model data,
https://geohub.lio.gov.on.ca/datasets/882a9059ec7c4881abbdb6afa0ae73e6

Appendix B

Agency Comments on the Draft Study Plan

Draft Study Plan Comments – Federal

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
GC	■ General Comment	■ Sections 5, 6, 7, 13, 19.2 and 25	The Agency	■ In addition to the required actions detailed below, other required actions to be addressed in the update to this study plan are detailed in a separate table titled "2020-07-02 – IAAC to MFCAR - General Comments on MFCAR Draft Study Plans". The Agency has provided these other required actions to highlight common sections of the Guidelines where requirements were not met in the draft study plans submitted to the Agency. These additional actions must be addressed in the updated study plans.	■ Please see Comment / Context	■ We have reviewed the relevant comments and incorporated where appropriate. Please refer to the General Comments Table Response submitted separately to the Agency for specific responses.	■ Various Sections
GC	■ General Comment	■ Section 15.5	The Agency	■ It is unclear whether all requirements related to the Project's impact on climate change were integrated into the atmospheric environment study plan. The climate change study plan only addresses requirements related to the effects of climate change on the Project. The Impact Statement must address all requirements related to the Project's impact on climate change that are outlined in Section 15.5 of the Guidelines and the study plan should demonstrate clear approaches to meet those requirements.	■ Provide detail in the atmospheric environment study plan to explain the proposed approaches and methods used to integrate all of the requirements in the Guidelines related to the Project's impact on climate change, particularly Section 15.5.	■ The Project's impact on climate change is addressed in this Study Plan, and the impact of climate change on the Project is addressed in the Climate Adaptation and Resiliency Study Plan.	■ Section 9.4
AQ-01	■ Section 4.2 Study Methods – "The baseline Atmospheric Environment study will characterize the existing conditions for air quality. The study will involve a year-long field monitoring program. Quantifying existing emission sources for the Community as well as the remainder of the project footprint is not practical nor could it be completed to a degree that would produce reliable model results as a basis for establishing background."	■ Section 8.1 – "address seasonal variability in the baseline survey and include a determination of background or ambient contaminant concentrations at key receptor points (e.g., traditional land users, sensitive human receptors such as daycares, schools, hospitals, community centres, retirement complexes or assisted care homes) with monitoring data of appropriate duration, representativeness, data completeness, data validation and quality control… provide the	The Agency	■ Section 8.1 of the Guidelines outlines the type of receptors and key receptor location points to be considered for baseline studies (e.g., traditional land users, sensitive human receptors such as daycares, schools, hospitals, community centres, retirement complexes or assisted care homes). The only reference to key receptors in the study plan is in Table 7-1. The study plan does not provide any details about the applicable receptor types and their potential locations. It is unclear whether the requirements of Section 8.1 of the Guidelines will	■ Provide details to demonstrate that key receptor points have been or will be identified and include details on how monitoring data of background or ambient contaminant concentrations will be collected for all key receptor points. ■ Explain how the selection of sensitive receptors will take into account the views of all Indigenous groups listed in the IEPP. This includes incorporating into the plan where Indigenous groups will be provided with opportunities to:	■ Sensitive receptor locations within the study area will be identified and evaluated in the IS / EA Report. Sensitive receptors will include the typical receptor types used in atmospheric assessments: residences, schools, healthcare facilities, daycares. In addition to the typical receptor types, indigenous receptor locations will be included in the assessment based on engagement completed as part of the project. ■ Background concentrations will be collected in the community of Marten Falls for a period of up to	■ Section 9.4

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
	■ Section 7 Conformance with Federal and Provincial Guidance – "Identified receptor locations will be described in the Impact Statement. Differential effects will not be considered in the Atmospheric Environment assessment. The relevant criteria (AAQC, CAAQS) have been developed in consideration of effects at any applicable receptor type".	approximate number, distance and identity factors of likely human receptors, including any foreseeable future receptors, that may be impacted by changes in air, water, country food quality (e.g., dust deposition on vegetation), and noise levels. At minimum, provide a map showing approximate locations of permanent residences, temporary land uses (e.g., cabins and traditional sites) and known locations of sensitive human receptors (e.g., schools, hospitals, community centres, retirement complexes or assisted care homes)."		be met by the study plan. It is also unclear how the views of the Indigenous groups identified in the Indigenous Engagement and Partnership Plan (IEPP) would be included in the selection of key receptors and receptor locations.	– provide Indigenous knowledge during baseline data collection; – comment on the list of valued components and indicators; – inform the effects assessment and review its conclusions; and – inform the development of mitigation measures and follow-up programs.	one year. The data collected within the community will be conservatively assumed to represent the entire study area. It is expected that baseline concentrations within Marten Falls will be higher than the remainder of the Study Area. As a result, the use of data collected within Marten Falls will provide a more conservative assessment of impacts (based on cumulative impacts being defined as background concentrations plus predicted Project impacts), and will result in an assessment which is more protective of receptors. ■ Additionally, the logistics of collecting reference-level data in the remote wilderness of Northern Ontario is prohibitive to deploying any additional monitoring. Monitoring equipment requires a reliable power source and routine maintenance (e.g., snow cleared from around the inlet ports, filter changes) which are not feasible outside of a community. It is important to note that reference-level data are not practical using solely solar powered equipment.	
AQ-02	■ Section 4.2 Study Methods – "Quantifying existing emission sources for the Community as well as the remainder of the project footprint is not practical nor could it be completed to a degree that would produce reliable model results as a basis for establishing background. Therefore, modelling is not proposed for this aspect."	■ Section 8.2 – "provide hourly meteorological data (wind speed and direction, air temperature, net radiation, turbulence and precipitation data) from a minimum of one year to support dispersion modelling that captures the normal variability of meteorological conditions"	The Agency	■ It is unclear how the requirements from Section 8.2 of the Guidelines will be collected to support dispersion modelling that captures the normal variability of meteorological conditions.	■ Provide details on how the requirements of Section 8.2 of the Guidelines for hourly meteorological data to support dispersion modelling will be met in the Impact Statement.	■ A 5-year hourly meteorological data to support dispersion modelling will be developed. Environment and Climate Change Canada measured data from stations in proximity to the study area and prognostic data (e.g., WRF data) for the study area will be used.	■ Section 9.4

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
AQ-03	■ Section 4.2.1 Ambient Air Quality Monitoring – "An airpointer(2) will be deployed in the Community to monitor…as well as meteorological parameters including: wind speed, wind direction, temperature, relative humidity, barometric pressure, and precipitation."	■ Section 8.2 – "describe the local and regional climate including historical records of relevant meteorological information (e.g., total precipitation (rain and snow)); provide mean, maximum and minimum temperatures; provide typical wind speed and direction; identify the potential for extreme weather events such as, wind, precipitation and temperature extremes; provide hourly meteorological data (wind speed and direction, air temperature, net radiation, turbulence and precipitation data) from a minimum of one year to support dispersion modelling that captures the normal variability of meteorological conditions; and provide pan evaporation measurements or estimates of monthly (or daily) evapotranspiration."	The Agency	■ Section 4.2.1 of the study plan provides a list of meteorological parameters for the proposed ambient air quality monitoring that does not include all parameters outlined in Section 8.2 of the Guidelines. The Impact Statement must include all the requirements found in Section 8.2 of the Guidelines, and the study plan must describe a clear approach to meeting those requirements.	■ Provide details on how all requirements of Section 8.2 of the Guidelines will be included in the Impact Statement.	■ Meteorological parameters such as pan evaporation and evapotranspiration, and climate data such as extreme weather events, are not considered in air dispersion modelling. Any parameter not used as an input into the air dispersion modelling assessment will have no influence on the impact assessment and will therefore not be provided in the Air Quality Assessment Report.	■ Section 9.4
AQ-04	■ Section 4.2.1 Ambient Air Quality Monitoring – "Monitored concentrations collected within the Community will be considered to be representative of all locations within the community and will be used to help establish background concentrations within the PSA. – Baseline monitoring for the remainder of the PSA is not feasible given the remote nature of the Project corridor and lack of practical power and serviceability access. Therefore, monitoring at the Community will have to serve as the basis for establishing baseline and background values."	■ Section 7.1 – "Ensure baseline data are representative of project site conditions."	The Agency	■ It is unclear how it was determined that monitored concentrations from the monitoring station within the community will be representative of all receptor locations within the project study area (PSA).	■ Provide details and rationale for how data collected from the monitoring station located at the community nursing station will be representative of baseline emissions at all receptor locations within the PSA.	■ The intention of the Air Quality Assessment is to provide a realistic worst-case estimate of the impact on air quality as a result of the Project. The air quality assessment will add background concentrations to the predicted Project emissions to determine cumulative impacts within the PSA. Therefore, using the maximum background concentrations which would reasonably expected within the PSA will result in a conservative Air Quality Assessment. ■ Concentrations within Marten Falls are expected to be elevated in comparison with the remainder of the study area due to the presence of sustained human activity (e.g., power generation, airport, and heating fuel use). Therefore, using background data collected from within Marten Falls is expected to result in a conservative Air Quality Assessment.	■ Section 7.2.1

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
AQ-05	■ Section 4.2.1 Ambient Air Quality Monitoring – "….An airpointer2 will be deployed in the Community to monitor particulate matter (PM2.5), ozone, nitrogen oxides (NOx), sulphur dioxide (SO2), carbon monoxide (CO), and BTEX (benzene, toluene, ethylbenzene, and xylene) (…). BTEX and particulate matter will be used as surrogates for polycyclic aromatic hydrocarbons and diesel particulate matter which cannot be sampled for due to equipment limitations coupled with serviceability challenges given the relatively remote location. Concentrations of specific relevant contaminants such as acetaldehyde, formaldehyde, 1,3-butadiene, and acrolein will be estimated based on monitored BTEX concentrations and published emission factors, such as the United States Environmental Protection Agency's (US EPA) AP-42 emissions database." – (Note 2: Health Canada. 2016. Guidance for Evaluating Human Health Impacts in Environmental Assessment: AIR QUALITY.)	■ Section 8.1 – "• provide the results of a baseline survey of ambient air quality by identifying and describing emission sources for the following contaminants: total suspended particulates, fine particulates smaller than 2.5 microns (PM2.5), respirable particulates of less than 10 microns (PM10), carbon monoxide (CO), ozone, sulphur oxides (SOx), nitrogen oxides (NOx), volatile organic compounds (VOCs)(25), polycyclic aromatic hydrocarbons (PAHs), diesel particulate matter (DPM), and any other toxic air pollutants (mobile and stationary sources); – (Note 25: It is recommended to assess specific aldehydes that are associated with diesel exhaust (DE), such as acetaldehyde, formaldehyde, 1,3-butadiene and acrolein, as well as benzene, for the evaluation of VOCs.)"	The Agency	■ The study plan suggests that levels of PAHs and VOCs will be estimated based on measured surrogate (i.e., BTEX) levels. Most PAHs are toxic (and carcinogenic) at very low concentrations. To ensure that PAH emissions during the different phases of the project are not underestimated, it is preferable to use benzo(a)pyrene [BaP] as a surrogate to assess the total PAHs. A less resource-intensive measurement method may be available for this approach. Alternately, a qualitative assessment based on reliable and verifiable information may be proposed. ■ BTEX analysis generally provides a good indication of the concentration of the total VOCs in the air. However, as the approach is limited to four substances (i.e., BTEX), the use of emission factors combined with air dispersion modelling to predict the concentrations of the target VOCs (i.e., acetaldehyde, formaldehyde, 1,3-butadiene and acrolein) is necessary to fully assess human health risks of exposure to these air pollutants during the different phases of the project. It is not clear whether the recommended approach is adequately considered in the Study Plan.	■ Describe any on-site sampling and quantitative analyses of common air pollutants (including SO2, PAHs, and DPM) listed in Section 8.1 and 14.1 of the Guidelines that is being considered to help assess the project impacts on contaminant levels with confidence. ■ Should other assessment approaches, including the use of surrogates and/or a qualitative assessment, be deemed more appropriate, or should an assessment be deemed unnecessary for any air pollutants, provide a detailed rationale for any deviation from recommended characterization/assessment approaches, as well as an estimate of the uncertainty associated with the use of the alternative approaches.	■ Background SO2 concentrations will be measured in the community. ■ Background concentrations of PAHs will be estimated based on monitoring data collected within the community. The monitoring program includes an assessment of up to 1-year of data for benzene, toluene, ethylbenzene, and xylenes (i.e., BTEX). ■ DPM emissions as a result of the Project will be included in the Air Quality Assessment. Due to the technical limitations of measuring DPM in the community, background DPM concentrations will be estimated based on the breakdown of fuel sources in the community. ■ The Air Quality Assessment will include quantitative assessments (numerical estimates or monitoring of background concentrations and numerical modelling of Project impacts) of the following contaminants: – NOx, PM2.5, PM10, Diesel Particulate Matter (DPM), SO2, CO, Formaldehyde, Acetaldehyde, Acrolein, Benzene, 1,3-Butadiene, Total PAHs, Total VOCs	■ Section 7.2.1
AQ-06	■ Section 6.1 Indicators and Expression of Change – "The indicators and rationale for selection and measurement of potential effects, to be used to assess and evaluate the alternative routes in the IA/EA are provided in Table 6-1. The table includes both quantitative and qualitative indicators. The final list of indicators to be used in the IA/EA will be based on regulatory	■ Section 14.1 – "provide a quantitative assessment of common air pollutants (total particulate matter, fine particulate matter (PM2.5), respirable particulate matter with a diameter less than 10 microns (PM10), sulphur oxides, nitrogen oxides, volatile organic compounds, polycyclic aromatic hydrocarbons, diesel particulate matter, and carbon monoxide), as	The Agency	■ It is unclear which air quality parameters will be assessed quantitatively (or qualitatively). It is also unclear why sulfur oxide (SO) is selected for the effect assessment, when SO2 is used in the baseline study. ■ Additionally, the assessment plan does not include some of the common air pollutants (e.g., PAHs, DPM, Carbon Monoxide), which is inconsistent with the baseline study	■ Provide details to demonstrate which air quality parameters will be assessed quantitatively and which will be assessed qualitatively. Clarify why sulfur oxide (SO) is selected for the effect assessment when SO2 is used in the baseline study. Resolve inconsistencies between lists of air contaminants to be assessed during the baseline and the effects assessment.	■ The following compounds will be quantitatively assessed within the Air Quality Assessment: – NOx, PM2.5, PM10, Diesel Particulate Matter (DPM), SO2, CO, Formaldehyde, Acetaldehyde, Acrolein, Benzene, 1,3-Butadiene, Total PAHs, Total VOCs ■ The following will be monitored during the baseline program:	■ Section 7.2.1

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
	agency guidance, professional judgement and input received through the Project consultation process…." ■ Table 6-1: Atmospheric Environment Indicators – "Expression of Change: NOx, CO, SO, TSP, PM10, PM2.5, Selected Volatile Organic Compounds (acrolein, acetaldehyde, benzene, formaldehyde, 1,3-butadiene, toluene, ethylbenzene and xylene) ■ Rationale for Selection: – The contaminants chosen for the expression of change are based on those commonly associated with transportation and construction activities, as prescribed by the Ontario Ministry of Transportation (MTO, 2012)." ■ Section 7 Conformance with Federal and Provincial Guidelines – "The Project will be assessed following MECP and MTO guidance for the requested contaminants. The contaminants assessed will be those required by MTO guidance (i.e., NOx, CO, PM2.5, PM10, formaldehyde, acetaldehyde, benzene, 1,3-butadiene, and acrolein). Additionally, toluene, ethylbenzene, and xylene will be consider based on inclusion in the human health risk assessment."	well as any air contaminants potentially associated with the Project such as dust resulting from construction activities and ongoing vehicle use during operations or maintenance of the gravel road bed;"		plan and also deviates from the Guidelines requirement. Given the extensive use of heavy-duty diesel vehicles during project construction, DPM should be added to the list of contaminants selected for the expression of change.	■ Provide details to demonstrate that all common air pollutants listed in Section 14.1 of the Guidelines will be included in the effects assessment, including DPM.	– NOx, PM2.5, PM10, SO2, , BTEX (benzene, toluene, ethylbenzene, and xylene) ■ Baseline concentrations for the following compounds will be calculated from results of the monitoring program: – TSP, PAHs, DPM, Formaldehyde, Acetaldehyde, Acrolein, 1,3-Butadiene ■ Relevant literature, emission factors, referenced methods and other representative stations will be utilized to estimate baseline concentrations for compounds that are not monitored.	
AQ-07	■ Section 6.2.1 Emissions – "GHG emissions will be estimated using published emission factors, approved estimation guidance, or engineering calculations as applicable."	■ Section 15.5 – "provide the estimated annual GHG emissions from each source, including calculation methods, assumptions and related parameters that would enable calculations to be reproduced" ■ Section 20 – "describe measures included in the design of the Project to	The Agency	■ The study plan does not describe the approach proposed to calculate GHG emissions, including calculation methods, assumptions and related parameters that would enable calculations to be reproduced, as required in Section 15.5 of the Guidelines. ■ The study plan also does not link and describe the measures and practices	■ Provide details on how GHG emissions will be calculated and the measures to mitigate the Project's GHG emissions, as required in Sections 15.5 and 20 of the Guidelines. ■ Provide details to demonstrate how the measures and practices proposed to mitigate the Project's GHG emissions, as required in	■ The GHG analysis will include mitigative measures as part of the quantification of emissions. As part of the impact assessment, an analysis will be conducted to identify if additional mitigative measures are required for GHG emissions. All mitigative measures identified will be documented and	

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
		mitigate its greenhouse gas emissions. These could include design decisions such as the use of low-emitting technologies, the use of low-carbon or renewable fuel or carbon capture and storage; describe practices that will be taken to mitigate the Project's greenhouse gas emissions, such as anti-idling practices for mobile equipment, or continuous monitoring systems".		proposed to mitigate the Project's GHG emissions, as required in Section 20 of the Guidelines or how those measures and practices will be factored into the GHG estimates in Section 15.5 of the Guidelines.	Section 20 of the Guidelines, will be factored into the GHG estimates in Section 15.5 of the Guidelines.	reported on as part of the IS / EA Report.	
AQ-08	■ 6.2.1.1 Construction Phase – "Emissions will be estimated for the construction phase based on the projected types of activity and duration. All anticipated construction activity, such as land clearing, blasting, aggregate extraction, material hauling, and road construction will be included in the estimate of emissions. Emissions will be estimated based on published emission factors, such as those found in the US EPA's AP-42 emission factor database, or engineering principles, as applicable. …)". ■ 6.2.1.2 Operation Phase – "The assessment of the operations phase will not include any ongoing road maintenance activities such as road repairs as they are considered short-term and insignificant".	■ Section 13.1 – "The Impact Statement must describe in detail the project's potential adverse and positive effects in relation to each phase of the Project (construction, operation, maintenance, suspension, decommissioning, and abandonment)." ■ Section 14.1 – "provide a quantitative assessment of common air pollutants …., as well as any air contaminants potentially associated with the Project such as dust resulting from construction activities and ongoing vehicle use during operations or maintenance of the gravel road bed;". – "provide a comprehensive list of project activities (air pollutant emission sources) that may affect ambient air quality, such as, but not limited to: dust generation from material stockpiles, transportation and road maintenance during construction and operation." ■ Section 15.5 – "provide the estimated annual GHG emissions from each source, including calculation methods, assumptions and related parameters that would enable calculations to be reproduced"	The Agency	■ Road maintenance activities are not included in the proposed assessment however these activities include the use of heavy machinery, result in vehicle emissions, and generate dust from vehicular travel and other activities. It is unclear how these activities are going to be included in the assessment, as per Section 14.1 of the Guidelines. ■ In addition to the proposed emission predictions during the construction and operation phases, an on-site monitoring at sensitive receptor locations (e.g., children or seniors) near the Project sites as per Section 6.8 of Health Canada's guidance (2016)2 is recommended. ■ Canadian-specific emission factors would be preferable to use over the proposed U.S. emission factors.	■ Provide details on the assessment of short-term effects, inclusive of road maintenance activities, during the operation phase relative to the applicable standards and/or criteria. Describe any on-site monitoring that is being considered during the construction and operation phases where sensitive receptors are identified near the project sites. ■ Use Canadian-specific emission factors where possible, and provide justification if Canadian data sources are not used in the estimation of GHG emissions.	■ The Air Quality Assessment will include two bounding scenarios: roadway construction and roadway operation. Routine road maintenance activities such as snow clearing are expected to be captured in the roadway vehicle data (traffic volumes and vehicle types) within the roadway operation scenario, and therefore will be included in the Air Quality Assessment. ■ Minor roadway maintenance activities, such as re-grading, are expected to have a lower impact than the initial construction bounding scenario, therefore the impact of these activities would have been assessed within that bounding scenario. ■ Where applicable and available Canadian emission factors will be used in lieu of US EPA emission factors. Within the MOVES emission model, meteorological conditions reflective of the study area and Canadian fuel composition data will be used as inputs, where possible.	■ Section 9.4

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
AQ-09	■ Section 6.2.1.2 Operations Phase – "The assessment of GHG emissions will also consider the potential change in emissions from existing sources (e.g., aircraft, winter road usage) as a result of the project."	■ Section 15.5 – "describe how the Project may contribute to Canada's efforts to reduce GHG emissions, if applicable (e.g., the Impact Statement could explain how the Project would result in emission reductions in Canada by avoiding emissions from another source)"	The Agency	■ It appears that a modal shift analysis would be conducted to justify that GHG emissions would be avoided with this project. ■ Environment and Climate Change Canada provides the following guidance for the development of scenarios to demonstrate avoided GHG emissions with the operation of this project: – Only avoided domestic GHG emissions may be subtracted from the project's net GHG emissions. Avoided domestic GHG emissions are GHG emissions that are reduced or eliminated in Canada as a result of the project. – Infrastructure Canada's Climate Lens General Guidance3 provides general guidance on how to quantify avoided emissions. The proponent must select the appropriate "total net baseline scenario emissions" and the "total net baseline scenario removals", and provide the rationale for those scenarios. The scenarios must consider new measures (e.g., policies, regulations, plans and programs) applicable to the project put in place by provincial, territorial and federal governments, be realistic, conservative and take into account market conditions and feasibility. – The quantification approach should ensure that the avoided emissions represent reductions or removals that are real, additional, quantified, verifiable, unique, and permanent. Avoided foreign emissions should not be quantified in the avoided domestic GHG emissions.	■ Provide details on how the "potential change in emissions from existing sources" will be determined, and explain if and how the change in emissions would be calculated as part of the net GHG emissions of the project, in order to meet the requirements of Section 15.5 of the Guidelines.	■ Net GHG emissions as a result of the Project will be calculated using ECCC guidance. The modal shift analysis identified in the Study Plan will rely on the guidelines identified by The Agency (e.g., ECCC guidance, Infrastructure Canada's Climate Lens guidance), and will consider partial or full displacement of current forms of travel (e.g., winter road travel, air travel) with on-road vehicular traffic. The level of modal shift for each mode of transportation will be determined and documented as part of the assessment. ■ Foreign emissions will not be considered in the analysis.	■ Section 9.4

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
AQ-10	■ Table 6-2: Air Quality Magnitude Definition – Low: Up to 10% above applicable Criteria. – Medium: 11%-30% above applicable Criteria – High: 31%-70% above applicable Criteria – Very High: >70% above applicable Criteria ■ Rationale: – To align with IAAC evaluation criteria presented in the Tailored Impact Statement Guidelines.	■ Section 13.1 – "The effects to each valued component outlined in sub-sections 14.3, 15.2, 15.3, 15.4 must be described using the following criteria:" ■ 21. Residual effects – "Proponents must describe the extent to which residual effects are adverse. Where relevant, or where best practice or evidence-based thresholds exist, effects should be described using criteria to quantify adverse effects. (…) Where the potential for human health effects exist due to exposure to a particular contaminant at any level (e.g., non-threshold air pollutants, including particulate matter and nitrogen dioxide, and water pollutants, such as but not limited to arsenic and lead) mitigation measures should aim to reduce the residual effects to as low as reasonably achievable…. – The Impact Statement must: • characterize the residual effects using criteria most appropriate for the effect; • characterize residual effects for human health using human health-related criteria most appropriate for the carcinogenic and non-carcinogenic health effects of non-threshold contaminants;" • provide the rationale for the choice of criteria used to determine the extent to which the predicted effects are adverse. The information provided must be clear and sufficient to enable the Agency, review panel, technical and regulatory agencies, Indigenous	The Agency	■ The definition of the magnitude criteria for adverse effects proposed in Section 13.1 of the Guidelines are provided specifically for the ecological valued components described in Sections 14.3, 15.2, 15.3, and 15.4 of the Guidelines. A rationale is not provided for the use of the magnitude ranges provided in Table 6.2 for the evaluation of potential changes to air quality and associated potential for human health risks. It is noted that a change of "up to 10% above the applicable Criteria" would be considered "low" magnitude, yet there is a risk to human health any time pollutant levels are above the applicable criteria. ■ Furthermore, the proposed ranges do not consider residual effects from pollutant levels below the applicable criteria. For example, the Canadian Air Quality Management System (AQMS) explicitly recognizes that health effects occur below the maximum thresholds (i.e., the Canadian Ambient Air Quality Standards, or CAAQS), and proposes additional management levels in recognition of the health and environmental benefits that can be realized by taking actions to decrease or maintain background levels of air pollution. ■ Health Canada recommends the use of the AQMS approach, under which the CAAQS were developed, to inform the magnitude criteria definitions. The AQMS sets achievable air quality management targets (or thresholds) based on the fundamental principles of Keeping Clean Areas Clean, and Preventing Air Quality ■ Deterioration. More information on air quality management threshold values is available (Canadian Council of	■ Clarify how the proposed adverse effects magnitude criteria definitions are relevant to the protection of human health in relation to air quality.	■ The Air Quality magnitude criteria have been updated. These criteria will characterize impacts on Air Quality using Air Quality criteria that are protective of human health. More specific analysis of Human Health impacts will be conducted within the Human Health assessment as is described within the Human Health and Community Safety Study Plan	■ Section 9.6

Comment # / Ref #	Study Plan Section	TISG Section	Agency/ Regulatory Body Comments Received From	Comment / Context	Action Item	Response	Study Plan Reference
		groups, and the public to review the proponent's analysis of effects;"		Ministers of the Environment. 2012)-(Note 4: Canadian Council of Ministers of the Environment. 2012. Guidance Document on Air Zone Management. Available at : http://www.ccme.ca/files/Resources/air/aqms/pn_1481_gdazm_e.pdf). Health Canada also encourages the proponent to use all available technologies to reduce their emissions as low as reasonably achievable (ALARA) and beyond those required to achieve maximum AQMS thresholds (i.e., CAAQS levels), in order to reduce the burden of air pollution on the population.			
AQ-11	■ Section 6.3 Magnitude of Effect. Table 6-3 – "Releases of GHGs and their accumulation in the atmosphere influence regional, national and global climate and may affect emission reduction targets for GHGs that have been set or are being developed federally and provincially. The magnitude is therefore established as a percent contribution to provincial totals to assess the significance of Project emissions and hence potential effect on provincial reduction targets that may exist."	■ Section 15.5 – "describe how the Project may contribute to Canada's efforts to reduce GHG emissions, if applicable (e.g., the Impact Statement could explain how the Project would result in emission reductions in Canada by avoiding emissions from another source)".	The Agency	■ The study plan should not be making a determination of the magnitude of the project's GHG emissions against national or provincial emissions or emissions targets. When compared to provincial and national GHG emissions, the project's GHG emissions will often be considered as low which does not help to contextualize the project's emissions against Canada's emissions targets.	■ Update the study plan to reflect that the requirement to describe the residual environmental, health, social or economic effects of the project does not extend to discussing the magnitude of the Project's GHG emissions against national and provincial emissions and emissions targets.	■ The Study Plan identifies the sources of GHGs and limits the assessment of GHGs to the specified magnitude criteria.	■ Section 9.4.3
AQ-12	■ Section 7 Conformance with Federal and Provincial Guidance – "….will be described in the Impact Statement. – The Impact statement will include…. – The Impact Statement will provide…. "	■ Section 14.1 and Section 15.5 [Relevant to many requirements]	The Agency	■ It is unclear if all requirements of Sections 14.1 and 15.5 of the Guidelines will be met. Table 7.1 provides general statements that the requirements will be included in the Impact Statement, but there is not enough information to determine how the requirements will be met. The Impact Statement must address all requirements outlined in the Guidelines and the study plan should demonstrate a clear approach to meet those requirements.	■ Provide details on the proposed approaches and methods used to ensure that all requirements of Sections 14.1 and 15.5 of the Guidelines are met in the Impact Statement. ■ Provide details to demonstrate that the effects assessment will consider the effects of each of the project components and physical activities, in all phases, and be based on a comparison to the proposed baseline work.	■ Traffic levels defined within the Project scope will be used for the Air Quality and GHG Assessment.	■ Section 9.4

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				■ The effects assessment must consider the effects of each of the project components and physical activities, in all phases, and be based on a comparison to the proposed baseline work. The effects assessment for the operation phase must include the effect cause by all different users (traffic volume, type of vehicles, etc.), including Indigenous groups, the general public, and mining proponents of reasonably foreseeable future projects ((e.g., Eagle's Nest, Blackbird, Black Thor, Black Label, Big Daddy, anticipated future community access roads);".	■ Provide details to demonstrate that the effects assessment for the operation phase will include the effect cause by all different users (traffic volume, type of vehicles, etc.), including Indigenous groups, the general public, and mining proponents of reasonably foreseeable future projects ((e.g., Eagle's Nest, Blackbird, Black Thor, Black Label, Big Daddy, anticipated future community access roads);".		
AQ-13	■ Section 7.0 Conformance with Federal and Provincial Guidance – "The Impact Statement will include an assessment of land use changes (e.g., wetlands or peatlands) and the resultant net GHG emissions."	■ Section 15.5 – "provide a qualitative description of the Project's positive or negative effects on carbon sinks, including from the removal and alteration of wetlands"	The Agency	■ Environment and Climate Change Canada concurs with the study plan to quantify land use change emissions and that these are estimated with the net GHG emissions of the Project. However, they note that the qualitative description of the Project's effects on carbon sinks goes beyond estimating land use change emissions. This is because some projects may improve or reduce the ability of an ecosystem, land area or ocean to absorb carbon dioxide from the atmosphere. An impact on a carbon sink implies the interruption or alteration of a natural continual process that removes carbon from the atmosphere. The qualitative description of the project's positive or negative effects on carbon sinks should include: – Description of project activities in relation to significant landscape features such as topography, hydrology and regionally dominant ecosystems. – Land areas directly impacted by the project, by ecosystem type (forests, cropland, grassland,	■ Provide details to demonstrate that a qualitative description of the Project's positive or negative effects on carbon sinks will include consideration of the guidance provided by ECCC in the context column, in order to meet the requirements of Section 15.5 of the Guidelines.	■ The qualitative description of the Project's net effects on Climate Change will include consideration of the requirements of the Government of Canada's Strategic Assessment of Climate Change (SACC) guidance document (2020, and the guidance provided by ECCC). It is expected that in following the SAAC guidance, Section 15.5 of the Guidelines will be met.	■ Section 9.4

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				wetlands, built-up land) over the course of the project lifetime; this includes the areas of restored or reclaimed ecosystem(s). – Initial carbon stocks in living biomass, dead biomass and soils (by ecosystem type) on land directly impacted by the project over the course of the project lifetime. – Fate of carbon stocks on directly impacted land, by ecosystem type: immediate emissions, delayed emissions (timeframe), storage (e.g., in wood products). – Anticipated land cover on the impacted land areas after the project is in place. ■ The above guidance was not included in the August 2019 draft SACC but provides more clarity on what information the study plan could provide to fulfill this requirement. This guidance, however, will be published in the forthcoming publication of the SACC (tentative publication in July 2020).			
AQ-14	■ Section 7 Conformance with Federal and Provincial Guidance – "Considering the projected roadway volumes (200-300 vehicles per day), an assessment of the formation of ozone is not warranted."		The Agency	■ The Marten Falls Community Access Road Detailed Project Description states that the road "will be designed using an Annual Average Daily Traffic amount of up to 400…". It is unclear why Table 7-1 provides a different average daily traffic amount.	■ Clarify why Table 7-1 has a different average daily traffic amount than what was described in the Detailed Project Description. Provide details to demonstrate that the effects assessment will consider the highest annual average daily traffic amount of vehicles the road is designed for, which was described as 400.	■ The effects assessment will consider the highest AADT over the life of the Project.	■ Section 9.4
AQ-15	■ Section 7 Conformance with Federal Guidance – "The air quality modelling will be described in detail within the Impact Statement. No chemical or physical transformation will be included in the modelling as the dispersion of emissions are	■ Section 13.1 – "Predictions must be made on clearly stated assumptions and the Impact Statement must clearly describe how it has tested each assumption." ■ Section 14.1	The Agency	■ It is unclear how the requirements of Section 14.1 of the Guidelines will be met if modelling of chemical and physical transformation is not proposed. It is also unclear how it was determined that the dispersion of emissions are "generally expected to be generally low-level."	■ Provide further detail on proposed methodologies, including the rationale, to meet the requirements of Section 14.1 of the Guidelines, including chemical and physical transformation. Provide details and rationale for describing the dispersion of emissions are	■ Any reference to the "dispersion of emissions" being low-level within the Study Plan is unintentional. The Study Plan intended to communicate that the formation of secondary contaminants through chemical and physical transformation is expected to be	■ Section 9.4

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	generally expected to be generally low-level and near-field with respect to the Project."	– "provide details of all air quality model configuration ,including meteorology, land use, gridded and sensitive receptors and chemical and physical transformation settings;"			expected to be "generally low-level".	low-level based on the predicted roadway volumes. While some formation of secondary particulate is expected, the Project is in a pristine setting without large industrial or transportation sources. Secondary formation is dependent on the presence of precursor species which will be limited because of the pristine nature of the environment. Based on a projected low AADT, the emissions of precursor species are expected to be relatively dilute in the atmosphere. ■ Additionally, the formation of secondary contaminants is not instantaneous, and happens downwind of the source at which point the initial precursor contaminants have begun to disperse. In consideration of these factors, it is expected that assessing the near-road impacts of primary contaminants will result in a reasonably conservative Air Quality Assessment ■ One exception to the above is the conversion of NO to NO2. It will be conservatively assumed that 100% of all NO emitted from the Project will be converted to NO2.	
AQ-16	■ Section 7 Conformance with Federal Guidance – "The potential for the Project to contribute to acid deposition will be qualitatively assessed for both the construction and operation phases. Potential for acid formation will be evaluated based on the predicted increase in NOx and SOx to the airshed and subsequent potential nitrate and sulphate formation. Acid deposition will not be	■ Section 13.1 – "Predictions must be made on clearly stated assumptions and the Impact Statement must clearly describe how it has tested each assumption." ■ Section 14.1 – "assess the potential for emissions from the Project to contribute to acid deposition and exceedances of critical loads for terrestrial and aquatic ecosystems;"	The Agency	■ It is unclear if the potential for exceedances of critical loads for terrestrial and aquatic ecosystems will be assessed, as required in Section 14.1 of the Guidelines. It is also unclear how it was determined that the magnitude of effects related to acid deposition is expected to be negligible.	■ Provide details on how the potential for emissions from the Project to contribute to exceedances of critical loads for terrestrial and aquatic ecosystems will be assessed, to meet the requirements of Section 14.1 of the Guidelines. ■ Provide a rationale for determining that the magnitude of effects related to acid deposition is expected to be "negligible".	■ Acid deposition is a regional effect, meaning that near-roadway concentrations are not as important as airshed concentrations. It is estimated that the Project will partially displace air travel with road vehicle traffic. The impact of this modal shift on the contribution of NOx and SO2 to the airshed will be assessed and a qualitative statement regarding the implications for acid deposition will be provided in the IS / EA Report.	■ Section 9.4

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	quantitatively assessed as the magnitude of effects is expected to be negligible."					■ There will be no assessment of emissions from the Project to contribute exceedances of critical loads for terrestrial and aquatic ecosystems. There is no threshold established to determine that a specific concentration of NOX and SO2 would be detrimental to the terrestrial and aquatic valued components.	
AQ-17	■ Section 7 Conformance with Federal Guidance – "The potential for the Project to contribute to ground-level ozone will be qualitatively assessed for both the construction and operation phases. Potential for the generation of ground-level ozone will be evaluated based on the predicted increase in NOx and Volatile Organic Compounds around the Project area. Ozone formation will not be quantitatively assessed as the magnitude of effects is expected to be negligible."	■ Section 13.1 – "Predictions must be made on clearly stated assumptions and the Impact Statement must clearly describe how it has tested each assumption." ■ Section 14.1 – "provide an assessment of the Project's emissions potentially contributing or adding to existing ground ozone levels;"	The Agency	■ It is unclear how it was determined that the magnitude of effects for ozone formation is expected to be negligible.	■ Provide a rationale for determining that the magnitude of effects for ozone formation is expected to be "negligible".	■ In the Ministry of Transportation's Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects, the MTO states that, with respect to the formation of ground-level ozone, "ground-level ozone O3 is typically formed many kilometres downwind of the source of its precursors" and "concentrations are usually depressed around highways since NO emissions react relatively rapidly to convert O3 into oxygen gas." The MTO also states that "For major roads, the collective experience of the scientific community suggests that the affected immediate vicinity is limited to the area within approximately 500 metres of the road". Based on this, the contribution of the Project to ground-level ozone is likely to be minor in comparison to the near-field concentration of precursor species (i.e., NOx).	■ Section 9.4

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AQ-18	■ Section 7 Conformance with Federal Guidance – “Baseline air quality monitoring will be used to represent the Project Area and is assumed to include in the effect of any relevant regional sources. Therefore, regional source emissions will not be quantified or included in the dispersion modelling.”	■ Section 13.1 – “Predictions must be made on clearly stated assumptions and the Impact Statement must clearly describe how it has tested each assumption.” ■ Section 14.1 – "provide emission rates for all project and regional sources within the study area, including emission factors(with methodology, uncertainty assessment and references) and all assumptions and related parameters that would enable calculations to be reproduced;"	The Agency	■ It is unclear how the requirements of Section 14.1 of the Guidelines will be met if emission rates for regional sources will not be included in the dispersion modelling. It is also unclear how it was determined that baseline air quality monitoring will include the effect of regional sources.	■ Provide details on proposed methodologies, including rationales, to demonstrate how the studies described in the study plan will meet all requirements of Section 14.1 of the Guidelines, including emission rates for all regional sources within the study area. ■ Provide a rationale for how it was determined that baseline air quality monitoring will include the effect of regional sources.	■ Baseline air quality monitoring will be used to represent the Project Area and is assumed to include in the effect of any relevant regional sources. Therefore, regional source emissions will not be quantified or included in the dispersion modelling. ■ The majority of sources are expected to be personal vehicles, residential heating, and other miscellaneous activities. There are no significant sources (e.g., large industries) which would contribute to emissions in the Study Area. ■ A conservative Air Quality Assessment is one which describes the reasonable worst-case impact of the Project. Background concentrations within Marten Falls are expected to be higher than the rest of the Study Area. Therefore, using measured concentrations in the Study Area will result in a conservative Air Quality Assessment.	■ Section 7
AQ-19	■ Section 7 Conformance with Federal Guidance – “Identified receptor locations will be described in the Impact Statement. Differential effects will not be considered in the Atmospheric Environment assessment. The relevant criteria (AAQC, CAAQS) have been developed in consideration of effects at any applicable receptor type.”	■ Section 14.1 – “describe the locations and characteristics of the most sensitive receptors including species at risk and differential effects for sensitive receptors;”	The Agency	■ It is unclear how the locations and characteristics of sensitive receptors, including species at risk, will be identified. It is also unclear how the requirement of Section 14.1 of the Guidelines will be met if differential effects will not be considered.	■ Provide details on how the locations and characteristics of sensitive receptors, including species at risk, will be identified. ■ Provide details on how the requirement in Section 14.1 of the Guidelines will be met, including differential effects for sensitive receptors.	■ Differential effects will not be considered within the air quality assessment. The air quality assessment will consider provincial and federal criteria and standards to evaluate the Project impacts on air quality. The results of the air quality dispersion modelling assessment will be used in subsequent assessments, such as the human health assessment and ecological assessments, which will form a part of the IA / EA. It is expected that the subsequent studies will use evaluation criteria specific to the receptor types. Locations of sensitive receptors, including species at risk, will be identified in various other study plans.	■ Fish and Fish Habitat Study Plan ■ Wildlife Study Plan ■ Vegetation Study Plan ■ Ungulates Study Plan ■ Bird Study Plan ■ Human Health and Community Safety Study Plan ■ Aboriginal and Treaty Rights and Interest Study Plan

Draft Study Plan Comments – Provincial

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1	N/A	■ MECP, Environmental Assessment Branch	■ Please review EAB comments on the Wildlife, Ungulates and Vegetation work plans that may apply to this work plan.	■ Please review EAB comments on the Wildlife, Ungulates and Vegetation work plans that may apply to this work plan	■ We have reviewed the relevant comments and incorporated where appropriate. Please refer to the Comment Tables appended to the Wildlife, Ungulates and Vegetation Study Plans for specific responses.	■ Wildlife Study Plan ■ Ungulates Study Plan ■ Vegetation Study Plan
2	General	■ MECP, Environmental Assessment Branch	■ Ontario's Guide for Considering Climate Change in the Environmental Assessment Process (MOECC, 2017) was not included in the draft work plan.	■ Please indicate that Ontario's Guide for Considering Climate Change in the Environmental Assessment Process (MOECC, 2017) will be considered and applied in this work plan as it pertains to climate change	■ Ontario's Guide for Considering Climate Change in the Environmental Process (MOECC, 2017) will be considered in the atmospheric and climate change components of the Project.	■ Section 9.4
1	Section 4.2.1	■ MECP, Air Quality Analyst	■ One year of ambient air quality data will be collected within the Community to characterize baseline air quality as stated in the Draft Work Plan, and an airpointer is proposed to be located at the community's nursing station. Please ensure that the proposed ambient air quality monitoring will meet the minimum requirements specified in the Operations Manual for Air Quality Monitoring in Ontario. The Draft Work Plan states that the collection of one full year of data may not be possible due to unforeseen circumstances such as power outages or equipment failure. For continuous air monitoring, a minimum target of 90% valid data collection per quarter per parameter can be routinely attained, and at least 75% of valid data are required to calculate the valid mean. Please ensure enough valid data to be obtained from the proposed air monitoring program to establish baseline air quality for the project site. ■ The work plan provides approaches that will be used to estimate baseline air quality for some contaminants if these contaminants cannot be sampled for due to equipment limitations, i.e., PAH, diesel PM, and some VOC compounds, etc. How about TSP and PM10?	■ To ensure that the data collected is accurate and acceptable to the MECP, please include a discussion on how the proposed air quality monitoring activities will meet the requirements of the Operations Manual for Air Quality Monitoring in Ontario. ■ Describe how the baseline concentrations of TSP and PM10 will be estimated for the proposed project site if these contaminants will not be monitored.	■ MECP will be consulted regarding the implementation of the monitoring program. An Air Quality Monitoring Plan that conforms with the requirements of the MECP Operations Manual for Air Quality Monitoring in Ontario will be developed. Deviations from the manual may be required due to the location of the Project. Deviations will be reviewed with the MECP and documented in the Air Quality Monitoring Plan.	■ Section 3 and Section 7.2.1
2	Section 6.1	■ MECP, Air Quality Analyst	■ There is a typo in Table 6-1: Atmospheric Environment Indicator. It should be SO2 instead of SO.	■ Please correct the typo in Table 6-1.	■ This has been corrected	■ N/A
3	Section 6.2.2	■ MECP, Air Quality Analyst	■ Project-specific meteorological data, generated from US Weather Research and Forecasting Model (WRF), will be used in the air dispersion modelling assessments as indicated in the Draft Work Plan. Air Dispersion Modelling Guideline for Ontario (ADMGO) states that if data other than the ministry's Regional Meteorological data sets are used in air dispersion modelling assessments, careful quality control must be used throughout the entire processing phase to ensure that the data set is complete and representative of the site being modelled. Section 6.4.1 of the ADMGO also lists the ministry's expectations for local meteorological data use, and there are different expectations for raw data obtained from Environment Canada, on-site meteorological stations, or data generated by advanced meteorological models.	■ It is strongly recommended that the modeller consult with Environmental Monitoring and Reporting Branch (EMRB) for guidance in advance of running the meteorological model. Please copy Sasha McLeod and Shannon Gauthier on this outreach, and please contact us if you need a contact name.	■ EMRB will be consulted in the selection and use of meteorological data for the air quality assessment	■ Section 9.4

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4	Section 6.3	■ MECP, Air Quality Analyst	■ Air quality magnitude definition is proposed and listed in Table 6-2. The draft work plan indicates that the air quality magnitude definition is aligned with the IAAC evaluation criteria presented in the Tailored Impact Statement Guidelines. It should be noted that these criteria are used for evaluating species and ecosystem risk. ■ It may be more appropriate to describe the definition of air quality magnitude using the general approach as follows, i.e., the magnitude is low if the air quality level is well below the applicable criteria, and moderate if the air quality level is close to the criteria, but still below the criteria, and high if the air quality level is well above the criteria. In addition, the frequency of exceedances should also be included to assess the residue effects if the air quality level is well above the criteria	■ Please describe the air quality magnitude definition using an appropriate approach.	■ The magnitude definitions have been updated within the Study Plan.	■ Section 9.6
1	Section 4.2.1, page 6	■ MTO, Transportation Infrastructure Management Division	■ The list of contaminants to be monitored is appropriate. The study plan notes that diesel particulate matter is of interest. Please clarify how results related to diesel particulate matter will be interpreted given that there are no provincial or federal ambient air quality standards.	■ The Near-Road Air Pollution Pilot Study by the University of Toronto includes a discussion on potential standards for diesel exhaust. Consider consulting this or any other relevant documents.	■ Appropriate toxicological literature and studies will be consulted when interpreting results related to DPM.	■ Section 7.2
2	Section 6.2.1.2, Page 8	■ MTO, Transportation Infrastructure Management Division	■ It is recommended that non-tailpipe emissions such as brake and tire wear are also included.	■ Include non-tailpipe emissions into the air quality analysis. These are readily available through the MOVES model.	■ Non-tailpipe emissions will be included with emission calculations/quantification.	■ Section 9.4

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