# Webequie Supply Road

## Groundwater and Surface Water Work Plan

Webequie First Nation

June 23, 2020

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# 1. Introduction

The proposed Webequie Supply Road Project is a new all-season road of approximately 107 km in length from Webequie First Nation to the mineral deposit area near McFaulds Lake (also referred to as the Ring of Fire). A Location Plan for the Project is shown on **Figure 1.** The preliminary corridor for the road consists of a northwest-southeast segment running 51 km from Webequie First Nation to a 56 km segment running east before terminating near McFaulds Lake. A total of 17 km of the corridor is within Webequie First Nation Reserve lands.

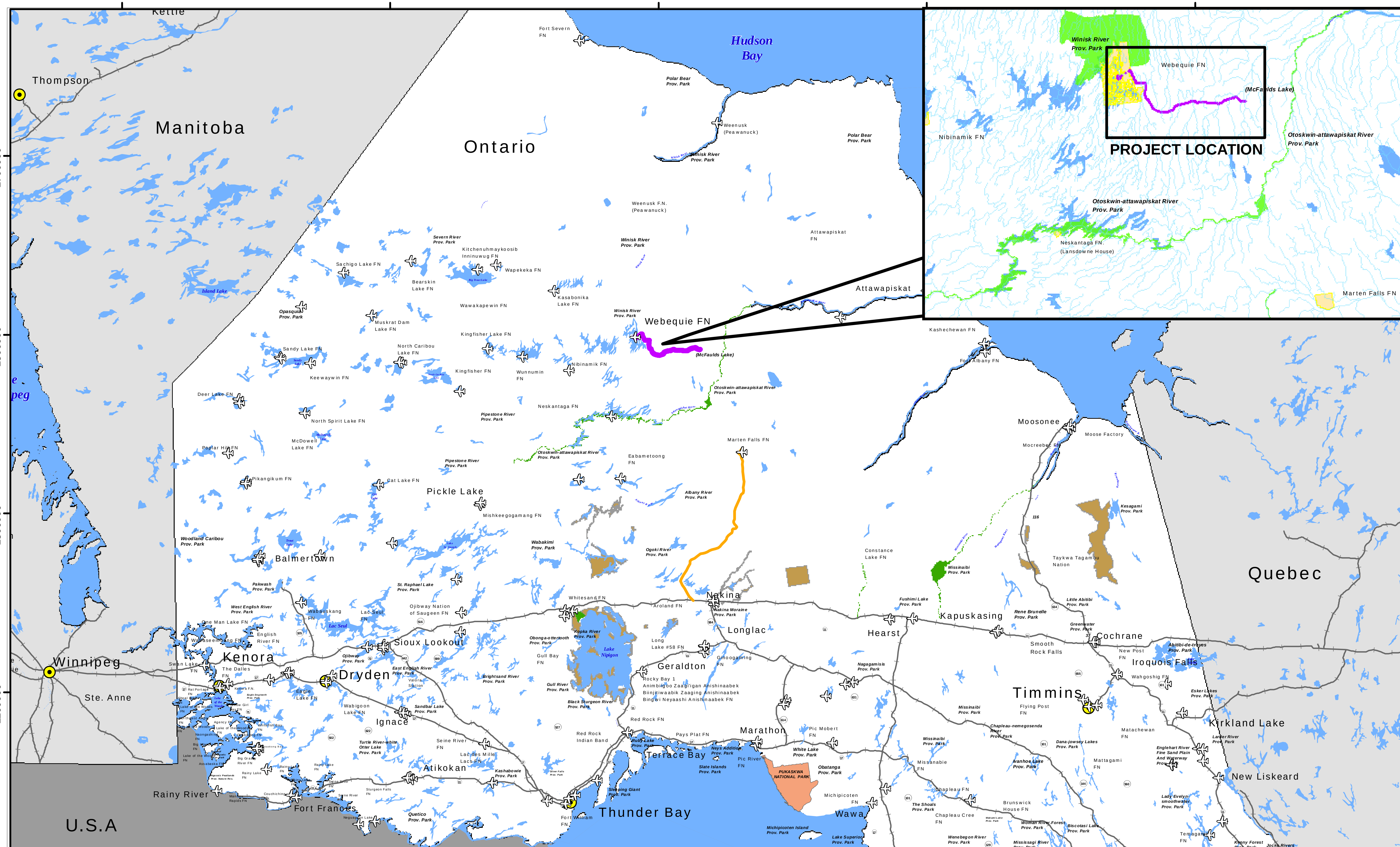
The goals and objectives of the Webequie Supply Road Project are as follows:

- To facilitate the movement of materials, supplies and people from the Webequie Airport to the area of existing mineral exploration activities and proposed mine developments in the McFaulds Lake area;
- To provide employment and other economic development opportunities to WFN community members and businesses that reside in or around the community's reserve and traditional territory, while preserving their language and culture; and
- To provide experience/training opportunities for youth to help encourage pursuit of additional skills through post-secondary education.

On May 3, 2018, the Ontario Ministry of the Environment, Conservation and Parks (then Ministry of the Environment and Climate Change) signed a voluntary agreement with Webequie First Nation to make the Webequie Supply Road Project subject to an Individual Environmental Assessment under Ontario's *Environmental Assessment Act.* The Project is also subject to meeting the requirements of the federal *Impact Assessment Act.* For the purposes of this work plan, the term "EA" is meant to include both the provincial environmental assessment and the federal impact assessment.

The purpose of this document is to present the work plan developed to assess the impact of the Webequie Supply Road Project (WSR, the Project) on groundwater and surface water. It describes the general approach that will be applied during the impact assessment process to address the requirements of the Impact Assessment Agency of Canada (IAAC) laid out in the February 2020 *Tailored Impact Statement Guidelines* (TISG), and meet the expectations of the Ontario Ministry of the Environment, Conservation and Parks (MECP) in the context of established groundwater and surface water considerations governing environmental assessments for road projects.

The Groundwater and Surface Water Work Plan ("the Work Plan)" is being submitted to the IAAC and the MECP requesting that a coordinated review be undertaken with the objective to provide Webequie with technical guidance in meeting the requirements of the federal Tailored Impact Statement Guidelines (TISG) and provincial Terms of Reference (ToR) for the Project, which is pending approval by Ontario. It should be noted that Ontario's review of the work plan is preliminary and secondary to any further review and decisions related to a final approved ToR.




Legend

- Proposed Preliminary Corridor for the Webequie Supply Road
- City/Town
- Winter Roads
- All-Season Roads
- Rail
- First Nation Reserve
- Federal National Park
- Provincial Park
- Conservation Reserve
- Waterbody
- Airports

WSR WEBEQUIE SUPPLY ROAD

Km 0 50 100

N

Canada Lambert Conformal Conic Projection

Webequie Supply Road
*Project Location*

| Date: 2020-03-13 | File Number: 649920 | Sub Code: 0000 |
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| Figure Number: 1 | | Rev. 0 |

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## 1.1. Defining Spatial and Temporal Boundaries

### 1.1.1. Spatial Boundaries

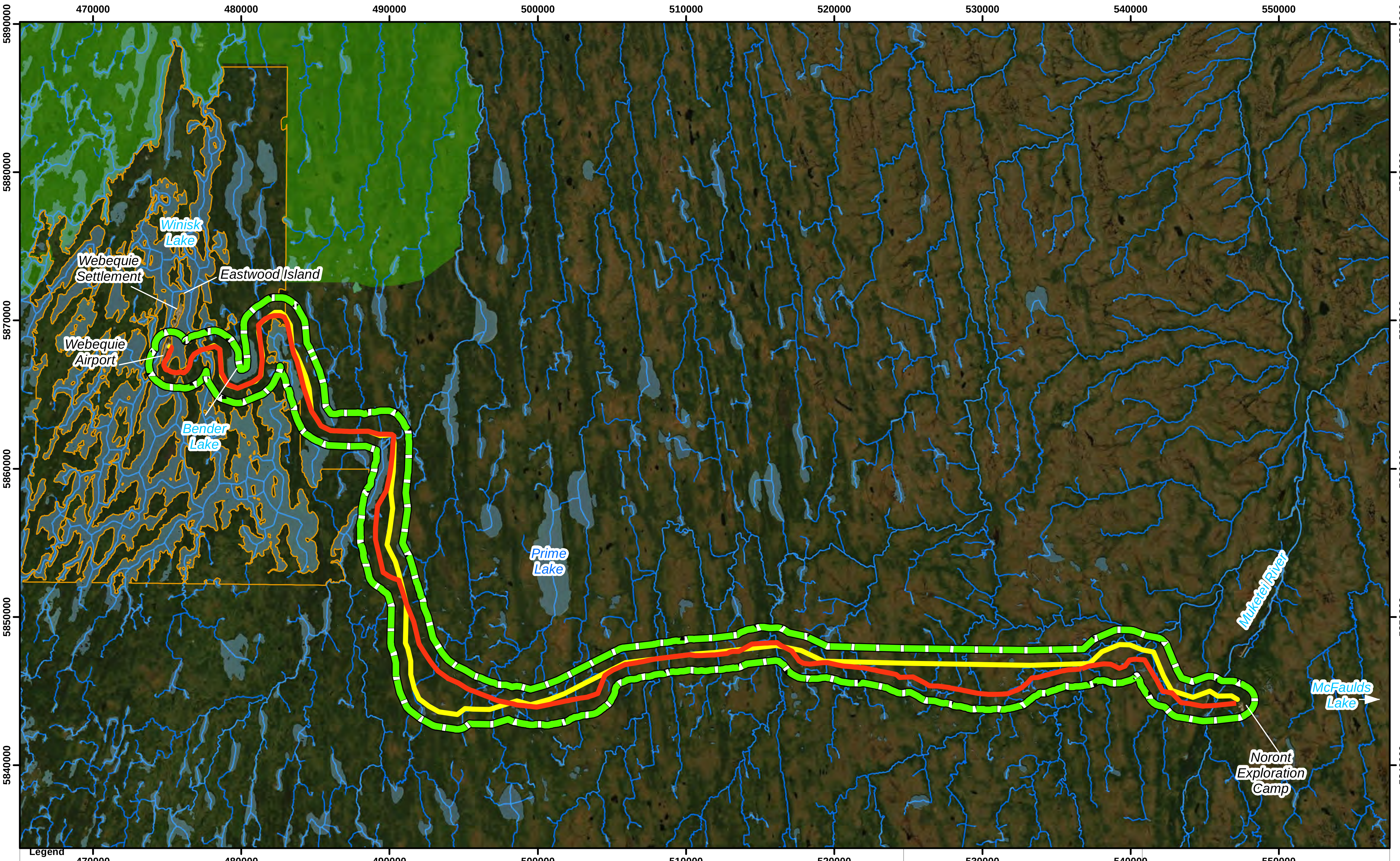
Spatial boundaries define the geographic extent within which the potential environmental effects of the Project are considered. As such, these spatial boundaries define the study areas for the effects assessment. Spatial boundaries to be established for the EA will vary depending on the valued component and will be considered separately for each. The spatial boundaries to be used in the EA will be refined and validated through input from federal and provincial government departments and ministries, Indigenous groups, the public and other interested parties.

Spatial boundaries will be defined taking into account the appropriate scale and spatial extent of potential effects of the Project; 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.

At this stage in the EA process, the spatial boundaries for the EA will include the following three (3) study areas to capture the potential direct and indirect effects of the Project for each valued component, and are described below specifically for groundwater and surface water:

- **Project Footprint (PF)** – is the identified areas of direct disturbance (i.e., the physical area required for Project construction and operation). The PF is defined as the 35 m right-of-way (ROW) width for the WSR and temporary or permanent areas needed to support the Project, including laydown/storage yards, construction camps, access roads and aggregate extraction sites.
- **Local Study Area (LSA) -** is identified as the area where most effects of the Project are likely to be measurable; therefore, along the PF, the LSA will be the focus of data collection to characterize existing environmental conditions. The LSA for most valued components will extend or buffer approximately 1 km from the supply road ROW boundary, and 500 metres (m) from the temporary or permanent supportive infrastructure.
- **Regional Study Area (RSA)** – encompasses the area outside of the LSA used to measure broader-scale existing environment conditions and provide regional context for the maximum predicted geographic extent of direct and indirect effects of the Project (e.g., changes to downstream surface water quality, caribou, or changes to socio-economic conditions such as regional employment and incomes). Cumulative effects of the Project in combination with past, present, and reasonably foreseeable developments are typically assessed at this larger spatial scale. The RSA for surface water is considered to encompass the catchment areas (as defined on a tertiary watershed scale) of each water body crossed by the Project Footprint, upstream to the headwaters and downstream to James Bay or Hudson Bay. At this stage in the EA, the predicted radius of influence from groundwater dewatering from construction activities or effect from development of the supply road and supportive infrastructure on groundwater is not fully known but is not anticipated to extend beyond 150 m. The LSA is considered large enough to capture predicated changes in groundwater and therefore no Regional Study Area (RSA) is required.

**Figures 2 and 3** present the spatial boundaries for the subject valued components.




**Legend**

- Optimal Geotechnical Route
- Community Preferred Route
- Local Study Area (LSA 1km From Alternative Footprints)
- Webequie First Nation Reserve
- Waterbody
- Watercourse
- Winisk River Provincial Park

WSR WEBEQUIE SUPPLY ROAD

Km: 0 5 10

N

NAD 83
UTM Zone 16N

**Webequie Supply Road**

*Preliminary Route Alternatives and Groundwater Combined Study Areas*

| Date: 2020/06/11 | File Number: 649920 | Sub Code: 0000 |
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| Figure Number: 2 | | Rev. 0 |

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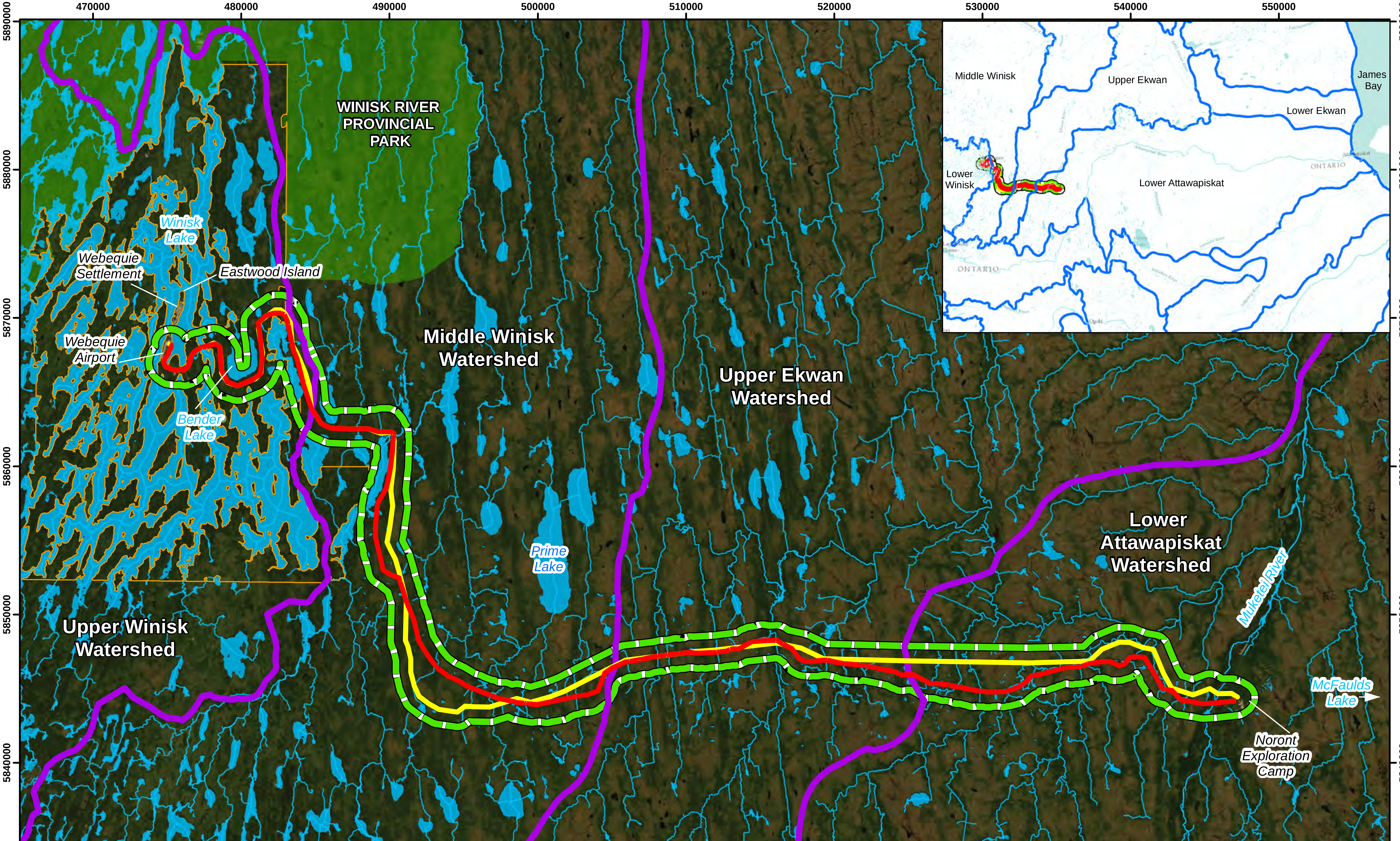


**Legend**

- Optimal Geotechnical Route
- Community Preferred Route
- Local Study Area (LSA 1km From Alternative Footprints)
- Tertiary Watershed (Aquatic RSA)
- Webequie First Nation Reserve
- Waterbody
- Watercourse
- Winisk River Provincial Park

WSR
WEBEQUIE
SUPPLY ROAD

Km
0 5 10

N

NAD 83
UTM Zone 16N

Webequie Supply Road

*Preliminary Route Alternatives and Surface Water Combined Study Areas*

| Date: 2020/06/10 | File Number: 649920 | Sub Code: 0000 |
|---|---|---|
| Figure Number: 3 | | Rev. 0 |

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The study areas were selected to characterize existing environmental conditions and predict the direct and indirect changes from the Project on the subject valued component on a continuum of increasing spatial scales from the Project Footprint to broader, regional levels. The preliminary selection of study areas also considered the physical and biological properties of the valued component and related evaluation criteria.

The baseline data collection and effects assessment relative to the spatial boundaries will focus on the set of supply road conceptual alternatives within the preliminary proposed corridor, as identified in the federal Impact Assessment Detailed Project Description (November 2019) and the provincial Environmental Assessment draft Terms of Reference (September 2019). The alternatives include the Webequie First Nation community's preferred route for the supply road (35 m right-of-way width) along the centreline of an approximately 2 km wide preliminary proposed corridor and the optimal geotechnical route within the same corridor. The route alternatives are shown in **Figures 2 and 3** with the LSA and RSA boundaries for each route alternative combined to reflect the study area for the Project. At this stage of the EA process the supportive infrastructure components have yet to be determined. It is anticipated that additional alternative routes may be developed during the EA. For example, a route that may be based on optimizing the geometric design of the community preferred route or optimal geotechnical route may be included. Where such additional alternatives are identified, the study area will be adjusted.

### 1.1.2. Temporal Boundaries

The EA process was designed to evaluate the short-term and long-term changes resulting from the implementation of the Project and associated effects on the environment, including where project activities may overlap such as the restoration (e.g., revegetation) of temporary access roads that could occur during the operation.

Implementation of the Project will occur in phases (refer to Section 4.3.4 of the ToR). The potential interactions with the natural, cultural and socio-economic environments and the potential occurrence of residual impacts are anticipated to be different in each phase. In order to focus the assessment, the key activities can be divided into the three main phases:

- **Construction Phase**: All the activities associated with the initial development of the road and supportive infrastructure;
- **Operations Phase**: All activities associated with operation and maintenance of the road and any other permanent supportive infrastructure (e.g., operations and maintenance yard, aggregate pits) that will start after construction and continue indefinitely; and
- **Decommissioning/Abandonment/Closure Phase**: The Project will be operated for an indeterminate time period; therefore, retirement (decommissioning/abandonment/closure) is not anticipated and will not be addressed in the EA. Note that clean-up and site restoration, including the decommissioning and removal of temporary infrastructure (e.g., access roads) will be addressed in the construction phase.

Although generally based on the planned stages described above, the final selection of temporal boundaries is criteria-specific and further detail will be provided in the discipline-specific assessment sections of the EAR/IS. Baseline data collection for groundwater and surface water are described in **Section 2.1.1**.

Temporal variation or patterns in potential effects associated with different criteria will also be considered (e.g., differential water quality and related effects of the supply road versus aggregate extraction areas during the construction and operation period). In general, baseline data collection for all biophysical valued components will be provided for a minimum of two years, unless specified otherwise. Temporal boundaries spanning more than one year will enable accounting for annual or seasonal variations (e.g., groundwater levels, surface water quality).

# 2. Work Plan

## 2.1. Methodology

The following sections describes the planned approach to baseline data collection and the assessment of the potential impacts on groundwater and surface water within the study area for the Project in order to address the requirements in Sections 8.6 and 14.2 of the TISG and, where applicable, meet the expectations of the MECP and other provincial ministries (i.e. Ministry of Natural Resources and Forestry) as identified in the ToR.

### 2.1.1. Background Data Review and Field Surveys

Information to characterize existing groundwater and surface water conditions for the Project will draw upon the following secondary sources:

#### Groundwater

- Geological Survey of Canada physiographic regions map (Bostock 1970);
- Ontario Geological Survey (OGS) Bedrock and Quaternary Geology maps (Barnett et al.1991a, b);
- An Assessment of the Groundwater Resources of Northern Ontario, Hydrogeology of Ontario Series- Report 2, Ministry of the Environment (S.N. Singer and C.K Cheng, 2002);
- Provincial Groundwater Monitoring Network database and online map (https://www.ontario.ca/environment-and-energy/map-provincial-groundwater-monitoring-network);
- MECP water well record and Permit to Take Water (PTTW) databases;
- Groundwater field studies proposed to be completed for the Project (refer to section 2.1.1.2);
- Geotechnical investigations for the Project (refer to Geology, Terrain and Soils Work Plan for details):
  - Soil and Terrain Investigations (JD Mollard & Associates);
  - Peat Thickness and Aggregate Source Investigations (JD Mollard & Associates); and
  - Geotechnical Investigations (SNC-Lavalin); and
- Review of other EAs and studies in broader study area (e.g., Baseline Hydrogeology Report, Noront Resources Ltd. Eagle’s Nest Project. November 15, 2013;
- Ring of Fire Baseline Environmental Monitoring Program: Preliminary Report, Ministry of Environment, Conservation, and Parks, 2019).

#### Surface Water

- Ontario Flow Assessment Tool (MNRF, 2019) developed by the MNRF and powered by Land Information Ontario;
- Geotechnical aquatic field investigations an aerial (helicopter) reconnaissance undertaken by SNC-Lavalin for the Project (refer to Geology, Terrain and Soils Work Plan and Aquatic Work Plan);
- Webequie monitoring and water quality data from community water supply (Winisk Lake), as well other potable wells, where applicable;
- Environment Canada, Water Survey of Canada Monitoring Stations;
- Ring of Fire Baseline Environmental Monitoring Program (Preliminary Report; MECP October 2019);
- Water Level and Flow – Environment and Natural Resources – Government of Canada - https://wateroffice.ec.gc.ca/;
- MNRF Land Information Ontario (MNR 2002, 2013a; MNRF 2015a) - tertiary watersheds; Ontario Integrated Hydrology Data; ArcGIS World Imagery (satellite and aerial imagery);

- Archived and updated hydrometric data, Water Survey of Canada (WSC) and Environment and Climate Change Canada;
- Environment and Climate Change Canada, meteorological stations - Lansdowne House AUT (6014353, 6014350) and Big Trout Lake (6010735, 6010738, 6010739);
- Provincial (Stream) Water Quality Monitoring Network (PWQMN) Data Catalogue, MECP;
- National Atlas of Canada, Natural Resources Canada, 4th Edition, 1978; and
- Hydrological Atlas of Canada, Fisheries and Environment Canada, January 1978.

#### Common to Groundwater and Surface Water

- Indigenous Knowledge and community information, where provided, with respect to the identification of domestic or communal water wells and springs within the LSA, including their current use, potential for future use, and whether their consumption has any Indigenous cultural importance by communities;
- Understanding of similar construction activities in similar environments;
- Project Team experience working on other EAs for similar projects; and
- Reviewing other literature related to potential effects of highway/all-season road construction on groundwater and surface water quantity and quality.

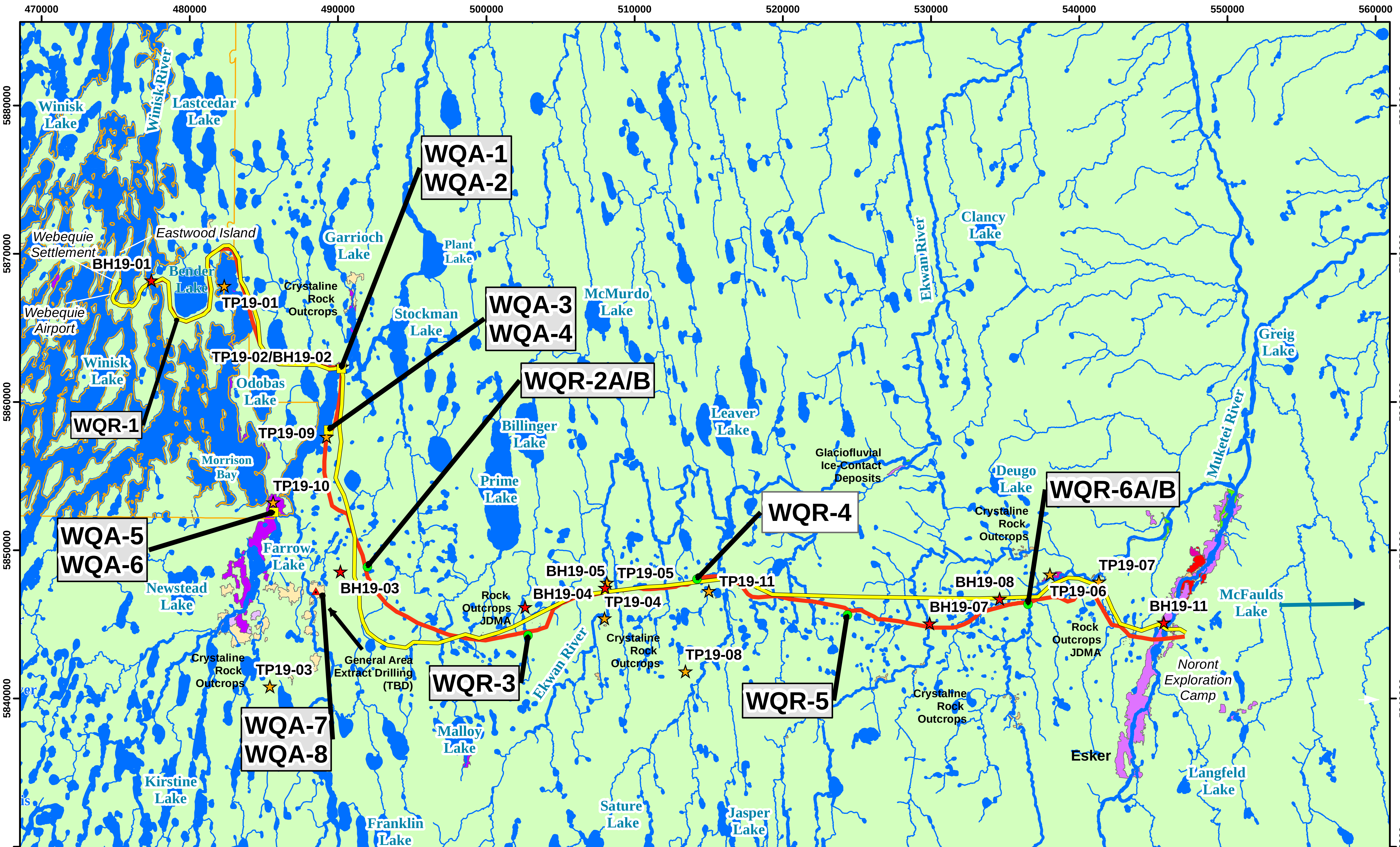
A full list of secondary sources reviewed will be documented in the Environmental Assessment Report/Impact Statement (EAR/IS).

### 2.1.1.1. Groundwater Field Program

#### Proposed Monitoring Wells

Based on the review of the above documents and background information, a total of sixteen (16) groundwater monitoring wells are proposed along the preliminary proposed corridor for the Webequie Supply Road and in the vicinity of the potential aggregate extraction areas. The well locations are presented in **Figure 4.** Among them, eight (8) wells are to be installed along the preliminary proposed corridor, including two (2) clustered wells with different well screen depths; and two (2) wells will be installed at each of aggregate and quarry sites, which are spread out at four (4) locations. The wells will be installed either entirely in overburden or in bedrock. No wells will be installed striding both overburden and bedrock. The overburden wells will be constructed with 2-inch diameter PVC pipes and screens; while the bedrock wells will be constructed with 1-inch pipe and pre-packed screens. In addition, piezometers will be installed at locations where peat/organic materials are encountered during drilling (anticipated at 2 to 3 locations). Each well will be finished with an above ground protective casing. If it is not practical, the well will be finished with the above ground pipe/riser and flagged, at a minimum.

Based on engagement and consultation with communities, domestic or communal water wells and springs that provide consumable water or that have Indigenous cultural importance will also be identified including the collection of background information where available, or potential sampling of these sources to characterize existing conditions. Methods to seek this input from communities will include surveys, community meetings and formal requests for land use data and Indigenous Knowledge.




**Proposed Monitoring Wells**

- Single Well At Each Rock Source
- Single Well or Well Cluster Along Road
- Two Wells At Each Granular Pit
- 2019 Borehole
- 2019 Test Pit
- Community Preferred Route
- Preferred Geotechnical Alignment

**Aggregate Resources**

- Rock (JDMA)
- Metamorphic and Igneous Rocks
- Metamorphic and Igneous Rocks
- Glacial Deposits and Bedrock
- Glaciofluvial Ice-contact Deposits
- Glaciofluvial Ice-contact Deposits
- Glacial Deposits and Bedrock
- Fluvial Deposits (recent)
- Fluvial Deposits (abandoned)
- Marine Beach and Near-shore Deposits
- First_Nations_Reseve
- Waterbody
- Watercourse

WSR WEBEQUIE SUPPLY ROAD

Km 0 5 10

N

NAD 83
UTM Zone 16N

Webequie Supply Road
*Proposed Groundwater Monitoring Wells and Aggregate Site Locations*

| Date: 2020/06/19 | File Number: 649920 | Sub Code: 0000 |
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| Figure Number: 4 | | Rev. 0 |

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Construction details and rationales for the wells are presented in **Tables 1** and **2.**

**Table 1: Proposed Groundwater Monitoring Wells – Proposed Preliminary Corridor**

| Well ID | Depth (m bgs) | Screen (m bgs) | Strata | location | Expected Water Level (m bgs) | Notes |
|---|---|---|---|---|---|---|
| **WQR-1** | 6.5 | 3.5 to 6.5 | Bedrock | Between BH19-01 and TP19-01 | 0.3 | Overburden is too shallow to install a well. The well needs to be completed installed and sealed in bedrock. |
| **WQR-2A** | 4.5 | 1.5 to 4.5 | Overburden | NE of BH19-03 | 1.67 | Well cluster (within 2 m) to test vertical hydraulic gradient. |
| **WQR-2B** | 7.5 | 4.5 to 7.5 | Overburden | | | |
| **WQR-3** | 6.0 | 3.0 to 6.0 | Bedrock | South of BH19-04 | 0.3 | Slightly fractured |
| **WQR-4** | 4.5 | 1.5 to 4.5 | Overburden | Near TP19-06 and TP19-11 | 0.46 | |
| **WQR-5** | 4.5 | 1.5 to 4.5 | Overburden | Between BH19-06 and BH19-07 | 1.22 | |
| **WQR-6A** | 4.5 | 1.5 to 4.5 | Overburden | Near BH19-08 | 1.5 | Well cluster (within 2 m) to test vertical hydraulic gradient. |
| **WQR-6B** | 7.5 | 4.5 to 5.5 | Overburden | | | |

**Table 2: Proposed Groundwater Monitoring Wells – within the Aggregate Extraction Areas**

| Well ID | Depth (m bgs) | Screen (m bgs) | Strata | Borehole Locations (2019) | Proposed Borehole Locations (2020) |
|---|---|---|---|---|---|
| **WQA-1** | 6.5 | 3.5 to 6.5 | Bedrock | Near TP19-02 and BH19-02 | TP19-02-i |
| **WQA-2** | 6.5 | 3.5 to 6.5 | Bedrock | | TP19-02-iv |
| **WQA-3** | 4.5 | 1.5 to 4.5 | Overburden | Near TP19-09 | TP19-09-ii |
| **WQA-4** | 4.5 | 1.5 to 4.5 | Overburden | | TP19-09-iii |
| **WQA-5** | 4.5 | 1.5 to 4.5 | Overburden | Near TP19-10 | TP19-10-iii |
| **WQA-6** | 4.5 | 1.5 to 4.5 | Overburden | | TP19-10-iv |
| **WQA-7** | 4.5 | 1.5 to 4.5 | Bedrock | Between TP19-03 and BH19-03 | TP19-03-i |
| **WQA-8** | 4.5 | 1.5 to 4.5 | Bedrock | | TP19-03-ii |

## Drilling and Well Installation

A local drilling company will be contracted to provide the drilling and well installation services including crews, equipment, well materials and supplies. The field works will be supervised by SNC-Lavalin personnel (Engineer), on behalf of Webequie First Nation, and a sub-consultant (Engineer/Geologist). Soil logging (description) and groundwater observation will be conducted during the drilling. The field work program will be combined with the proposed additional geotechnical investigation program. SNC-Lavalin will have an in-house hydrogeologist to design the work plan and provide office support during the execution of the field work program.

### Well Development and Survey

All newly installed wells will be developed using designated tubing and foot valves or disposable bailers upon completion of drilling and well installation. If elevation survey is possible, the top of well casing and/or pipe will be surveyed.

### Groundwater Monitoring and Sampling

Groundwater level monitoring and quality sampling will be conducted in all the newly installed wells at least 24 hours after the well development. Groundwater levels will be measured using an electrical water level meter, and sampling will be completed by using conventional tubing and foot valves or disposable bailers – one sample from each well.

To capture seasonal and inter annual changes, the monitoring and sampling will be conducted in summer and fall of 2020 and spring/summer and fall of 2021 for the purposes of informing the EA.

Water bottles to be used in the groundwater sampling program will be supplied by a licensed environmental laboratory. Collected water samples will be directly transferred into the laboratory provided water bottles and packed in coolers with ice and shipped through air from the site to the laboratory along with a chain of custody. A quality assurance and quality control (QA/QC) program including field duplicates (i.e., one duplicate for every ten samples), field blanks and trip blanks (one per submission/shipping) will be implemented during the sampling event.

The parameters to be analyzed for groundwater samples in the laboratory include the following:

- General chemistry and inorganics including:
  - Alkalinity;
  - Hardness;
  - pH;
  - Conductivity;
  - Turbidity;
  - total suspended solids;
  - total dissolved solids;
  - cations (i.e. $H^+$, $Mg^{2+}$, $Na^+$, $Ca^{2+}$, $K^+$, $NH^{4+}$);
  - anions (i.e. $Cl^-$, $SO_4^{2-}$, $F^-$, $NO^{3-}$, $HCO^{3-}$, $CO_3^{2-}$, $PO_4^{3-}$);
  - dissolved organic carbon;
  - ammonia.
- Metals (total and dissolved): including full metal scan, plus hexavalent chromium and mercury (total mercury and methyl mercury);
- Radionuclides: radium 226;
- Nutrients: including total organic carbon (TOC), total kjeldahl nitrogen (TKN) and total phosphorus (TP); and
- Organic compounds: polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (PHCs) including benzene, toluene, ethylbenzene and xylene (BTEX) and PHC F1 to F4.

Where drinking water sources are identified, including water supply wells, springs and surface water intakes within the study area, the analytical results for those groundwater samples collected near the source areas will be compared to and assessed against the most stringent values of the following criteria; Canadian Drinking Water Quality Guidelines (CDWQG), Ontario Drinking Water Quality Standards (ODWQS), or Ontario Soil, Groundwater and Sediment Standards (SGSS).

### Hydraulic Conductivity

In-situ hydraulic conductivity tests (i.e., single well response test) will be conducted during the fall 2020 water sampling program in select monitoring wells representative of different hydro-stratigraphic units (different formations in overburden and bedrock). Upon completion of drilling and well installation, borehole logs and initial groundwater level measurements will be reviewed to determine the wells in which the hydraulic conductivity tests will be conducted. The hydraulic conductivities will also be estimated using the grain size analysis results. Some of the hydraulic conductivities at the site to be used for baseline hydrogeological conditions and groundwater effects assessment will also be referenced from the Noront Resources Hydrogeological Report (Knight Piesold, 2013).

## 2.1.2. Surface Water Field Program

### 2.1.2.1. Surface Water Sampling

Twenty-six (26) waterbody crossings were identified along the proposed preliminary preferred corridor during the previous desktop studies and field investigations. Surface water samples were collected from nineteen (19) locations/crossings in the summer of 2019, as some water crossings were not accessible (i.e., could not safely approach the rivers banks) during the field investigation. This work plan is aiming to collect at least one sample from each of the identified twenty-six (26) waterbody crossings in 2020 (refer to **Figure 5**). Similar to the groundwater sampling, a QA/QC program including field duplicates, field blanks and trip blanks will be implemented during the sampling event. The parameters, sample handling and laboratory analysis are the same as those described in the groundwater sampling protocols, plus in-situ field parameters including pH, temperature, dissolved oxygen, turbidity and conductivity.

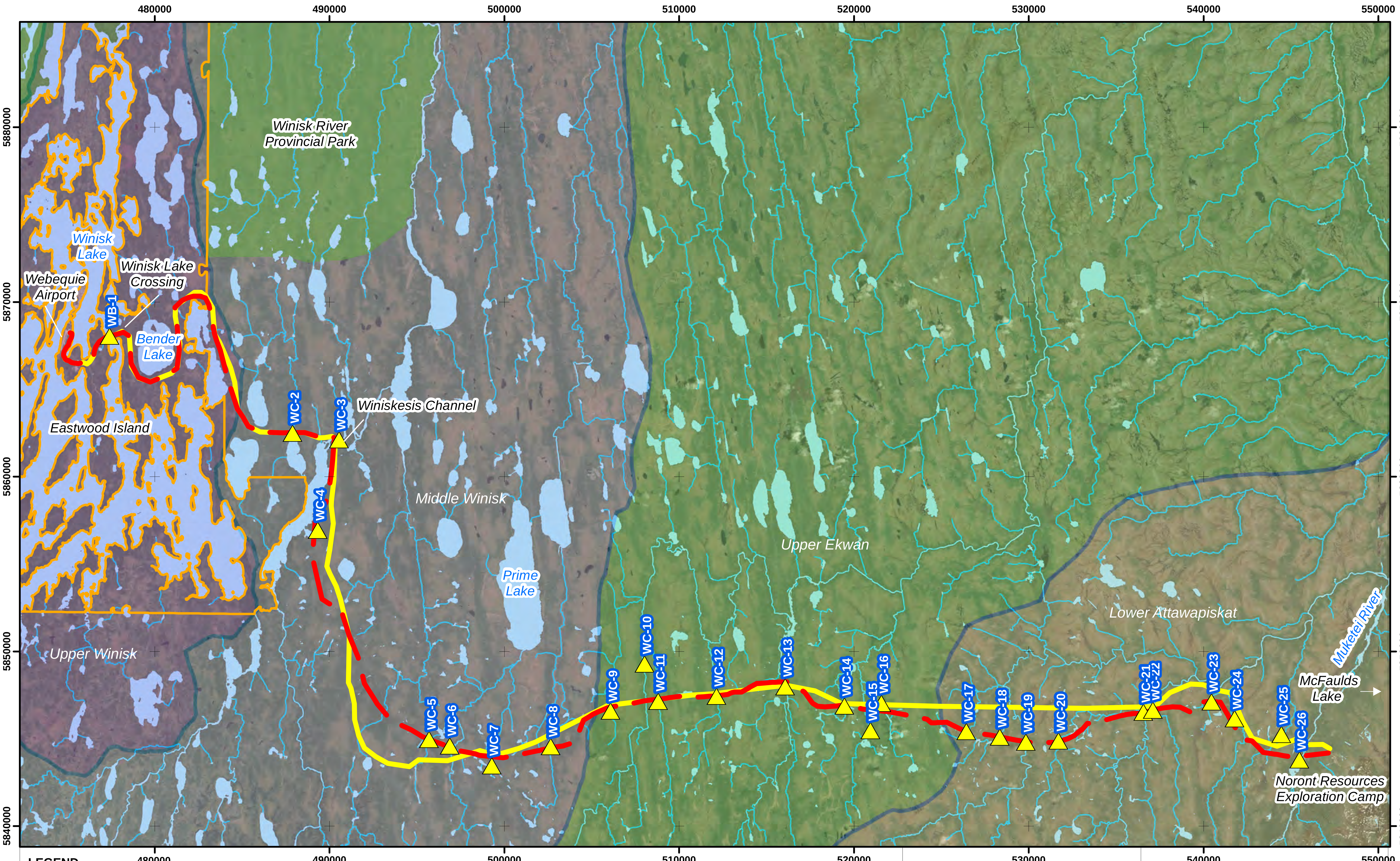
To capture seasonal and annual variability in baseline surface water quality, surface water sampling will be conducted as follows:

- 2020 summer period (typically July, August);
- 2020 fall period (typically October); and
- 2021 spring period (typically April and May).

No winter sampling is proposed due to health and safety and inability to access the sampling locations.

The surface water program will include collecting data related to bathymetry and flows at waterbodies, where it is safe to access according to site locations at the time of site visit. Field measurements for maximum and mean surface water flows are not proposed but the baseline will be determined based on data from existing flow stations in the project area and hydrology/hydraulic modelling to be used to asses waterbody crossings.

Where there is no flow-related information available, flow may have to be estimated based entirely on flows from adjacent areas. Regional methods for pro-rating flow data are published in hydrological textbooks for low flows as well as for other flow regimes. The methods are commonly known as: isoline, graphical index, statistical index and regression. The use of these methods is generally qualified based on the transferability of the data.




**LEGEND**

- Surface Water Sampling Locations
- Geotechnically Preferred Route
- Community Preferred Route
- Webequie First Nation
- LIOWaterbody_AttawapiskatWSHD_Revised
- LIOWatercourse_AttawapiskatWSHD_Revised
- Winisk River Provincial Park

WSR WEBEQUIE SUPPLY ROAD

0 2.5 5 10 Km

N

NAD 83
UTM Zone 16N

Webequie Supply Road
*Surface Water Survey Locations*

| Date: 2020/06/03 | File Number: 649920 | Sub Code: 0000 |
|---|---|---|
| Figure Number: 5 | | Rev. 0 |

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Transferability of flow data to an ungauged watershed depends on several factors: type and characteristics of the system, proximity, drainage area, water use requirements and in-stream flow methods used. The potential to transfer approaches across watersheds is increased where common characteristics can be identified, such as physiography, stream order, groundwater regime, regulated versus unregulated flows, availability of historic information.

Water quality parameters for the surface water sampling program will be the same as those identified for groundwater. Note that methyl mercury will be included in the surface water sampling program in all watercourses where elevated mercury is detected during metal scan. In-situ field measurements will also be measured during the surface water sampling event using a multi-parameter probe (i.e., YSI Proplus meter). Field turbidity water samples will be collected and tested using a turbidity meter.

The results of the baseline surface water sampling will be compared and assessed against the most stringent values of the following criteria; CDWQG, ODWQS, or SGSS. As well as Water Quality Guidelines for the Protection of Aquatic Life, and CCME Canadian Environmental Quality Guidelines.

It is expected that the surface water monitoring and sampling program will be conducted by SNC-Lavalin personnel and Webequie community members and will be combined with the benthic surveys in the aquatic program. Any springs observed at the waterbody sites during the surface water monitoring and aquatic survey program will be documented in the field, including locations and estimated flows. These programs are to be completed in August 2020.

Note that details on surface water sampling at the outlet of any temporary sediment settling areas used during construction for dewatering activities, or for surface runoff treatment (e.g. stockpiles, aggregate sites), will be examined during the EA process and subsequent phases (i.e., detail design) of the Project. It is anticipated that detailed discharge and sampling plans will be developed to secure provincial Permit's to Take Water application (PTTW) or Environmental Activity and Sector Registry (EASR) processes, as well as the project dewatering and contingency management plans. In general, prior to and during construction water quality sampling will be conducted at planned dewatering discharge points or surface runoff outlet locations to ensure the water quality meets applicable federal and provincial standards.

#### 2.1.2.2. Sediment Sampling

Sediment samples will be taken at each waterbody and analysed using the following procedure:

- The sample will be taken from the bed of the waterbody using the ponar sampler; The sample aliquot will be transferred to the appropriate laboratory-supplied container;
- Ensure that the spatula material is selected appropriately for the target analyze (i.e., plastic spatula not used for sediments to be analyzed for organics);
- Place the samples in a cooler with ice and adhere to applicable sampling standards regarding sample handling/preservation/submission;
- Record observations pertaining to the sediment (i.e., the location of the sample, the amount of sample obtained, texture, colour, odour, the presence of foreign material), and take a photograph of the sample, if necessary;
- Decontaminate the container and sampling equipment between sample stations, as per applicable sampling standards regarding field equipment decontamination; and
- Parameters for analysis will include pH, nutrients (TOC, TKN and TP) and metals.

Results from the sediment quality sampling will be evaluated and compared to the O*ntario Provincial Sediment Quality Guidelines* and *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life* to characterize baseline conditions.

### 2.1.3. Acid Rock Drainage

Acid rock drainage (ARD) and metal leaching (ML) of construction materials used to build the WSR may create a potential pathway for impacts to surface water and groundwater quality. Details of the approach for baseline characterization of the geochemical composition of expected construction materials (i.e., aggregate extraction areas, etc.), in order to predict metal leaching and/or assess the potential risk for ARD/ML is presented in the Geology, Terrain and Soils Work Plan to address the requirements in Sections 8.3 and 14.2 of the TISG. Should potential risk be determined based on the analytical results, mitigation and monitoring strategies to prevent or control acid rock drainage and metal leaching during construction and operation will be developed, described and documented in the EAR/IS.

Soil and rock samples will be collected during the 2020 drilling program and submitted to an environmental lab for acid-base accounting (ABA) and metal leaching (ML) testing. The samples will be collected from the boreholes along the proposed road and aggregate and quarry sites, representing of various types of soils and rocks.

### 2.1.4. Schedule and Reporting

The following groundwater and surface water field studies are currently planned for 2020/2021:

- Drilling, well installation, and groundwater monitoring and sampling (summer/fall 2020) combined with geotechnical investigations;
- Surface water sampling, flow measurements and sediment sampling (summer/fall 2020); and
- Groundwater monitoring and sampling in spring/summer 2021.

Where potable water sources (water supply wells and springs) are identified through review of background information and/or consultation with communities, water sampling of these sources may be incorporated in the above program.

Baseline data collected from the groundwater and surface water work programs, including laboratory results, will be processed and reported using EQuIS software, which is a widely used application for uploading, checking, editing, reporting and visualizing environmental and sampling data.

The water balance analysis to characterize existing conditions will be completed using a monthly accounting procedure based on the methodology referenced from the U.S. Department of the Interior, U.S. Geological Survey (Gregory J. McCabe and Steven L. Markstrom, 2007). The water-balance model is referred to as the Thornthwaite model. Inputs to the model include monthly mean temperature, monthly total precipitation, and the latitude of the location of interest. Inputs to the model include mean monthly temperature, monthly total precipitation, and the latitude of the location of interest. The model has other seven (7) input parameters that are modified through the graphical user interface. The range and default values for these parameters are set by the model. Annual precipitation and surplus are among the outcomes/results of the model.  Evapotranspiration will be calculated using the annual precipitation minus the surplus. The model uses historical data to calculate the surplus, not for forecasting, therefore no calibration is required. The water balance method developed by Thornthwaite and Mather (1957) determines the potential and actual amounts of evapotranspiration and water surplus. Infiltration factors will be used to determine the fraction of water surplus that infiltrates into the ground (to recharge groundwater) and the fraction that runs off to nearby streams. The Stormwater Planning and Design Manual (MOE, 2003) provides a method to estimate the infiltration amount based on the infiltration factor (i). The factor “i” is applied to the water surplus to estimate the infiltration for a given area with pervious cover. As recommended by Environment and Climate Change Canada, the meteorological stations and data from Lansdowne House (6014353, 6014350) and Big Trout Lake (6010735, 6010738, 6010739) will be utilized.

Baseline information from the review of secondary sources and collection of field data for groundwater and surface water, including any Indigenous Knowledge provided by communities, will be incorporated into a Natural Environment Existing Conditions Report. All groundwater and surface water related baseline information requirements as listed in sections 8.6 of the TISG will be addressed and included in the report.

## 2.2. Criteria and Indicators

Criteria are components of the environment that are considered to have economic, social, biological, conservation, aesthetic or cultural value (Beanlands and Duinker 1983). The assessment will focus on valued components, and applicable specific criteria, that have physical, biological, social, economic or health importance to the public, Indigenous groups, federal and provincial authorities and interested parties, and have the potential for change as a result of the Project. Valued components, including groundwater and surface water, have been identified in the federal TISG and by the Project Team and are, in part, based on what Indigenous communities and groups, the public and stakeholders identify as valuable to them in the EA process to date.

The groundwater and surface water valued components will be informed, validated and finalized through engagement and consultation process, including those to whom these concerns are important and the reasons why, such as environmental, cultural, spiritual, historical, health, social, economic and their relation to the exercise of Aboriginal and Treaty rights. Both groundwater and surface water play an important role in hydrologic cycle, fauna and flora abundance and diversity, and provide drinking water supply to local communities within the project area.

The groundwater and surface water valued components and associated criteria and indicators will be validated and finalized by the Project Team through a variety of means and consideration of factors that include, but are not limited to the following:

- Engagement with Indigenous communities and groups and the extent to which the valued component is linked to the interests or exercise of Aboriginal and Treaty rights of Indigenous peoples;
- Stakeholder engagement, including discussions with interest holders, and government authorities;
- Presence, abundance and locations of waterbodies, springs, domestic/communal wells within the LSA, or of cultural relevance/importance to the area associated with the Project;
- Extent to which the effects (real or perceived) of the Project and related activities have the potential to interact with the valued component(s);
- Uniqueness, rarity or culturally important feature in the study area, as identified by communities;

- Likelihood of an indirect effect on an associated criterion (i.e., a link exists between the affected valued and another, such as water quality affecting fish habitat);
- Ecological, social and economic value to Indigenous communities, municipalities, stakeholders, government authorities, and the public; and
- Traditional, cultural and heritage importance to Indigenous peoples.

In order to evaluate the effects of the WSR and alternatives, each criterion (i.e. groundwater and surface water) may have one or more indicators that will identify how the potential environmental effects will be measured. In general, indicators represent attributes that can be used to characterize changes to criteria as a result of the Project that may demonstrate a physical, biological or socio-economic effect. As indicators represent an expression of change this may be characterized quantitatively or qualitatively to compare predicted environmental effects to existing baseline conditions.

The rationale for selection of the criteria and indicators for groundwater and surface water in Sections 2.2.1 and 2.2.2 are based on the engagement and consultation completed to date for the Project. For groundwater this reflects the importance it plays in the hydrologic cycle and importance to human use and health and well-being. For surface water this reflects and represents: habitat for fish and other aquatic organisms; exercise of Aboriginal and treaty rights (i.e., use of resources for traditional purposes); importance to vegetation and wildlife abundance and diversity; and importance to human use (drinking water or other consumption). In addition, it is recognized that Indigenous peoples have a special relationship with water, built on our subsistence ways of life that extends back thousands of years. Many traditional land use and resource activities depend on water for transportation, for drinking, cleaning, purification, and provides habitat for the plants and animals they gather as medicines and foods. The ability to access and use clean drinking water is also fundamental to the health and well of Indigenous communities. As well, Indigenous peoples recognize the sacredness of water, the interconnectedness to all life and the importance of protecting water from pollution. The EAR/IS will further describe the criteria and indicators for groundwater and surface water, including how each indicator will be measured, along with data sources and rationale for selection. This will be presented in tabular format and will build on the preliminary criteria and indicators included in Appendix B to the ToR.

### 2.2.1. Groundwater

Groundwater is water found underground in the cracks and spaces in soil, sand and rock and is important in the hydrologic cycle and for human use and well-being (drinking water).

The proposed preliminary indicators for groundwater include the following:

**Groundwater quantity**: the groundwater quantity indicator refers to changes to groundwater recharge, groundwater level (including seasonal fluctuations), groundwater flow/movement, and groundwater discharge. A quantitative and qualitative assessment will be conducted. Groundwater features potentially affected by the Project will be quantitatively assessed by determining the number of wells in the Project Footprint and LSA using a Geographic Information System (GIS), and by calculation of the potential groundwater radius or influence (e.g., area - $m^2$ ) from the supply road and supportive infrastructure (e.g., construction camps, aggregate extraction sites) including any groundwater taking activities related to the Project such as dewatering. Prediction of potential effects to groundwater quantity will also be determined qualitatively by understanding the soil and bedrock geology, soil thickness, and location of the groundwater table. Data sources to be used will include, but not limited to, those identified in Section 2.1.1 of the work plan.

**Groundwater quality:** The groundwater quality indicator refers to the physical, chemical and biological properties of groundwater that can change as result of the Project. Groundwater features potentially affected by the Project will be qualitatively assessed by understanding the location of the sensitive or valued features (e.g. wells, springs, aquifer) in the Project Footprint and LSA using a GIS, relative to the Project activities (e.g., dewatering) and components (e.g., supply road, aggregate sites) that could affect groundwater quality. Prediction of potential effects will also be determined qualitatively from the MECP groundwater water well records and field monitoring wells installed for the Project to understand water quality. Data sources to be used will include, but not limited to, those identified in Section 2.1.1 of the work plan.

It should be noted there are a number of different methods to measure the groundwater indicators, including groundwater level monitoring, hydraulic conductivity (K) testing (K is a key element to measure how fast groundwater moves within the saturated/water bearing zones), modelling or calculation of groundwater infiltration rates through different formations, water balance analysis and groundwater quality sampling.

### 2.2.2. Surface Water

Surface water is a criterion because it is important to the exercise of Aboriginal and treaty rights, important to fauna and flora abundance and diversity, and important to human use (e.g., drinking water).

The proposed preliminary indicators for surface water include the following:

**Surface water quantity**: the surface water quantity indicator reflects potential changes to stream flows, water levels, cross-section hydraulics and erosion and sedimentation processes at waterbody crossings, as well as overall drainage patterns within the surrounding areas. Both quantitative and qualitative assessment methods will be used to assess potential effects on surface water. Surface water will be quantitatively assessed by determining the number of and type of waterbody crossings affected by the Project, the magnitude of changes to stream flow, water levels (modelling and field measurements), runoff rates and portion of catchment area for a given waterbody disturbed by a specific activity. Potential effects to surface water quantity will also be determined qualitatively by understanding and describing changes to drainage patterns and land cover as a proxy for potential erosion and sedimentation. Data sources to be used will include, but not limited to, those identified in Section 2.1.1 of the work plan.

**Surface water quality**: the surface water quality indicator reflects potential changes to biological or chemical properties of surface water. Potential effects will be measured qualitatively and quantitatively with respect to increase in concentrations of suspended solids or chemical constituents in receiving water bodies as a result of the Project and any associated discharges that may occur during construction and/or operations (e.g., accidental spills, road runoff, constituents from blasting, etc.). Data sources to be used will include, but not limited to, those identified in Section 2.1.1 of the work plan.

## 2.3. Effects Assessment Approach

The approach for the assessment has been developed to satisfy regulatory requirements under the *Environmental Assessment Act* and is based on the MECP *Code of Practice: Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (MOECC 2014), and the Terms of Reference for the Project that is currently pending approval from the MECP. The approach for the assessment has also been developed to meet the requirements of the federal TISG and specifically

Section 13 – Effects Assessment. The approach has also taken into consideration the Ministry of Natural Resources and Forestry (MNRF) Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects (MNRF, 2003).

### 2.3.1. Consideration and Evaluation of Alternatives

The EA process requires that two types of project alternatives be considered: “alternatives to” the Undertaking (i.e., functionally different ways of addressing an identified problem or opportunity to arrive at the preferred planning solution) and “alternative methods” of carrying out the Undertaking (options for implementing the preferred planning solution). The consideration and evaluation of alternatives to the Undertaking were documented in the federal Impact Assessment Detailed Project Description (November 2019) and the provincial Environmental Assessment draft Terms of Reference (September 2019) and concluded that developing a new all-season road between Webequie and the McFaulds Lake area is the preferred alternative. This analysis and conclusion are not proposed be re-examined as part of the EA process but will be documented in the EAR/IS. Therefore, in keeping with the focussed approach the preferred planning alternative (developing a new all-season road) has been carried forward to the initial consideration of alternative methods of carrying out the Undertaking.

The consideration of alternatives methods will focus on the supply road conceptual alternatives within the proposed preliminary corridor, as identified in the Detailed Project Description (November 2019) and the draft Terms of Reference (September 2019). These alternatives include the Webequie First Nation community’s preferred route for the supply road along the centreline of an approximately 2 km wide preliminary preferred corridor and the optimal geotechnical route within the same corridor (Refer to Figure 2). In addition, the following alternative methods related to supportive infrastructure and the preferred supply route will be examined.

- Alternative sites for temporary and/or permanent aggregate extraction pits and production facilities needed for construction and operation of the road, including access roads to these sites;
- Alternative sites for supportive infrastructure (i.e., temporary laydown and storage areas, construction camps, including access roads to these areas);
- Watercourse crossing structure types (i.e., culverts, bridges), span length, lifecycle, and construction staging methods at waterbody crossings; and
- Road attributes, including roadbed foundation; horizontal alignment, vertical alignment (elevation/profile), and adjustments to the cross-section and right-of-way (ROW) width of the corridor.

The assessment of alternatives will include environmental, socio-economic, cultural and technical factors using criteria and indicators for the comparative analysis. This will also include specific consideration of community based Indigenous land and resource uses (e.g., fishing, hunting) and cultural (e.g., built; sacred or spiritual sites) criteria of value to Indigenous communities within the broader factors. As noted previously the criteria and indicators will be developed in detail as part of the EA through input from the engagement and consultation activities with Indigenous communities, the public and stakeholders. Both a quantitative and/or qualitative assessment of alternatives for each criterion will be conducted to allow for a comparison of the advantages and disadvantages and selection of a preliminary recommended route for the WSR and the sites/access routes for supportive infrastructure.

### 2.3.2. Assessment of Net Effects

A step-wise process will be used to assess the environmental effects of the Project in a systematic and transparent manner once the relevant project elements and activities and their interactions, assessment boundaries, and relevant environmental criteria and indicators are identified and finalized through the engagement and consultation process. The net effects assessment method will include the following primary steps:

- Identification of potential environmental effects;
- Identification of technically and economically feasible impact management measures;
- Prediction of net effects following implementation of impact management measures; and
- Evaluation of the predicted net effects (i.e., describe and determine the magnitude, duration, extent, frequency, and significance of the predicted net effects).

#### 2.3.2.1. Identification of Potential Environmental Effects

The net effects assessment will consider the potential interactions between the project components and activities and the criteria within the identified spatial boundaries and phases of the Project (i.e., construction and operation). Potential effects of the Project on valued components (VC) will be determined by comparing baseline conditions to those expected to result from the construction and operation and maintenance of the Project. Potential effects will be described for each assessment criterion, including an indication of whether they are expected to be direct (i.e., as a result of a project component or activity affecting a valued component), or indirect (i.e., as a result of a change to one VC affecting another VC). Relevant project works and activities will be analysed individually to determine if there is a plausible pathway for an effect on VC.

The assessment of potential effects to groundwater and surface water will include the characterization of baseline conditions in the project study area using both publicly available information on a regional scale and data obtained in the field or via desktop review on a local scale or site-specific basis. As potential effects from the development of the supply road and supportive infrastructure could affect groundwater and surface water including interconnection between these two components within the PF and LSA we will also assess specific potential effects that could have lingering detrimental effects such as temporal and spatial changes in groundwater quantity, quality and flow (e.g., long-term changes in water levels) on potential receptor locations (e.g., existing or future drinking water wells and spring water sources); or effects to surface water quantity (e.g., increase or decrease of flow, water levels) and/or water quality (e.g., physicochemical parameters, chemical constituents, risk of ARD/ML), including consideration of surface runoff from the road, aggregate and overburden stockpiles, and dewatering discharge.

Potential effects to groundwater and surface water as a result of the Project will consider the specific items contained in Sections 14.2 of the TISG, as well as the interaction and interconnectedness with other select valued components (e.g., geology, terrain and soils, human health) and traditional land users.

#### 2.3.2.2. Identification of Impact Management Measures

Once potential effects are identified, technically and economically feasible impact management measures (or “mitigation measures”) to avoid and minimize potential adverse effects will be identified for each phase of the Project. Design considerations and impact management measures for groundwater and surface water will be identified to offset or eliminate potential adverse effects (e.g., surface runoff management and erosion and sediment controls measures; treatment of dewatering effluent; ARD mitigation/ management strategies; spill contingency plan, etc.,) and will be described in the EAR/IS. Refinements to these measures may also be made in the future detail design phase of the Project. Impact management measures will be developed for the Project based on:

- Knowledge and experience of the Project Team with linear infrastructure developments;
- Industry best management practices and applicable agency requirements and guidance; and
- Measures identified by Indigenous communities, the public and stakeholders through feedback received as part of the engagement and consultation program.

It is understood that impact management measures are not always fully effective, therefore, WFN will identify a compliance monitoring and effects monitoring program as part of the EA for implementation during the project phases (refer to Section 2.3.2.6).

#### 2.3.2.3. Prediction of Net Effects

A net effect, or the alternative term residual effect, is considered an environmental (biophysical), social, economic or health effect from the Project and its related activities that is predicted to remain after the implementation of impact management measures. A potential effect is considered to occur where anticipated future conditions resulting from the Project differ from the conditions otherwise expected from natural change without the Project. In some situations, the recommended impact management measures will eliminate a potential adverse effect, while in other situations impact management measures may reduce, but not eliminate the effect. Impact management measures may also enhance positive effects. A potential effect that will be eliminated, or considered unlikely after impact management measures, will be identified as not resulting in a net effect (i.e., no net effect) and will not be considered further in the net effects assessment. An effect that may remain after the application of impact management measures will be identified as a net effect (e.g., changes to groundwater levels or functional changes to recharge and discharge areas) and will be further considered in the effects assessment. Positive effects will also be considered further in the effects assessment, including means of enhancing benefits of the Project. Neutral changes will not be carried forward for the characterization of net effects, but where identified will be characterized in terms of the confidence in the predictions and the likelihood of the effect.

#### 2.3.2.4. Characterizing the Net Effects

The characterization of net effects will provide the foundation for determining the significance of incremental and cumulative effects from the Project for each assessment criterion. The objective of the method is to identify and predict net adverse and positive effects that have sufficient magnitude, duration, and geographic extent to cause fundamental changes to the self-sustainability or ecological function of a valued component, and therefore, result in significant combined effects.

Using groundwater and surface water as an example, the magnitude of the potential effect will be qualitatively assessed by inferring the anticipated changes relative to baseline conditions using the identified preliminary criteria and indicators related to groundwater quantity and quality and surface water quantity and quality. In general, the magnitude is the intensity of the effect or a measure of the degree of change from existing conditions and will be defined by each discipline assessment. If a significant effect is identified, the contribution of the Project to the combined effect will be described. The assessment of significance of the net effects of the Project on groundwater and surface water and other valued components will be informed by the interaction between significance factors (as defined below), in addition to those concerns raised by Indigenous groups, interested agencies, and individuals during the consultation and engagement for the EA. Therefore, predicted net effects, where identified, will be described in terms of the following significance factors (MNRF 2003), with integration of the assessment methodology identified in the federal TISG, as required.

- **Direction** – The direction of change in effect relative to the current value, state or condition, described in terms of Positive, Neutral, or Negative.

- **Magnitude** - The measure of the degree of change from existing (baseline) conditions predicted to occur in the criterion.

- **Geographic Extent -** The spatial extent of which an effect is expected to occur/can be detected and described in terms of the PF, LSA and RSA.

- **Severity** - The level of damage to the valued component from the effect that can reasonably be expected; typically measured as the degree of destruction or degradation within the spatial area of the PF, LSA and RSA. Severity would be characterized as: Extreme; Serious, Moderate or Slight.

- **Duration/Reversibility** - Duration is the period of time over which the effect will be present between the start and end of an activity or stressor, plus the time required for the effect to be reversed. Duration and reversibility are functions of the length of time a valued component is exposed to activities. Reversibility is an indicator of the degree to which potential effects can be reversed and the valued component restored at a future predicted time. For effects that are permanent, the effect is deemed to be irreversible. Duration/Reversibility would be characterized for each adverse effect as: Short-Term (0- 5 years), Medium-Term (6-20 years), Long-Term (21 to 100 years) or Permanent (>100 years).

- **Frequency** – Is the rate of occurrence of an effect over the duration of the Project, including any seasonal or annual considerations. Frequency would be characterized as: Infrequent; Frequent or Continuous.

- **Probability or Likelihood of Occurrence** – Is a measure of the probability or likelihood an activity will result in an environmental effect. Probability or likelihood of occurrence would be characterized as: Unlikely, Possible; Probable and Certain.

The definitions and description of the above factors will be described in detail in the EAR/IS. An effort will be made to express expected changes quantitatively / numerically. For example, the magnitude (intensity) of the effect may be expressed in absolute (changes to groundwater levels at receptor wells, groundwater flow, changes to recharge and discharge areas (ha) or water bearing zone or aquifer characteristics, including thickness, type/confined or unconfined and hydraulic conductivity) or percentage values above (or below) baseline conditions or a guideline (e.g. groundwater and surface water quality). Additionally, the definition of effect levels may vary from one valued component or criterion to another, recognizing that the units and range of measurement are distinct for each. Lastly, effects may impact communities, Indigenous groups and stakeholders in different ways, including through a gender-based lens (refer to Section 2.3.3) and they may respond differently to them. Therefore, determining and characterizing effects will be based largely on the level of concern expressed through engagement with the Indigenous groups and community members.

#### 2.3.2.5. Assessment of Significance

MNRF's Class Environmental Assessment for MNR Resource Stewardship and Facility Development Projects (MNRF 2003) require the assessment of significance of environmental effects and provides guidance for assessing the significance of potential environmental effects under individual criteria, for a project as a whole, and for alternatives.

In addition to the Class EA guidance, the determination of significance of net effects and cumulative effects from the Project and other previous, existing, and reasonably foreseeable developments will generally follow the guidelines and principles of the *Draft Technical Guidance Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act* (CEA Agency, 2017) and the *Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act*, 2012 (CEA Agency 2015).

In general, the assessment of significance of net effects will be applied to each valued component for which net effects are predicted, and net adverse effects or positive effects will be classified as significant or not significant (i.e., binary response). Additional details on the application of biophysical, cultural, socio-economic and health criteria and definitions that would describe "significant" and "not significant" will be provided in the EAR/IS.

#### 2.3.2.6. Identification of a Monitoring Framework

Webequie First Nation will develop a monitoring framework during the EA process for each project phase (construction and operation and maintenance). The two primary types of monitoring to be developed will include:

- Compliance monitoring; and
- Effects monitoring.

The compliance monitoring will assess and evaluate whether the Project has been constructed, implemented and/or operated in accordance with commitments made during the EA process, and any conditions of the federal IA and provincial EA approval and other approvals required to implement the Project.

The effects monitoring will be designed to verify the prediction of the effects assessment, and to verity the effectiveness of the impact management measures. This would include construction and operational monitoring that would identify actual effects, assess the effectiveness of the measures to minimize or eliminate adverse effects, and evaluate the need for any additional action to ensure that environmental commitments and obligations are fulfilled and mitigation measures are effective.

For example, specific to groundwater this would likely involve monitoring of groundwater wells throughout the construction and operation phases of the WSR. Annual groundwater sampling is considered a common practice. For groundwater level measurements, electrical level loggers can be installed in wells to record water level on a daily basis or at other preferred intervals. An annual surface water monitoring and sampling program during and after construction may also be recommended as future monitoring commitments in the EAR/IS. The parameters for groundwater and surface water quality sampling would be the same as those used in the baseline investigations to allow for a comparison and assessment of predicted effects, or to validate compliance with regulatory water quality standards for groundwater and surface water.

### 2.3.3. Gender Based Analysis Plus (GBA+)

Information and data collected will be disaggregated by diverse subgroups (women, youth, elders, etc.), as part of applying a Gender Based Analysis Plus (GBA+) lens. For groundwater and surface water, the baseline information will focus on land and resource use activities and spring or domestic/communal wells users that are interconnected to groundwater and surface and will be obtained through such methods as socio-economic and health surveys, key informant interviews with community members (gender, youth, elders) who use surface water or groundwater (.e.g., navigation, source of drinking water), desktop research and Indigenous Knowledge where provided. This will include qualitative and quantitative data that help to characterize and describe the importance of groundwater or surface waters of cultural significance to Indigenous communities through a GBA+ lens, including where feasible the data disaggregated by sex, age, and other identity factors. Through Survey Monkey the data will be filtered and disaggregated based on the demographic questions answered (i.e., gender, age, Indigenous community membership of, etc).

The Project Team will work with the Indigenous communities to identify the appropriate participants for each of the subgroups that are willing to contribute to the baseline data collection through surveys and key informant interviews. The Project Team will tailor how they engage with these groups based on community protocols (i.e., it is expected that elders would prefer in-person dialogue and will require a community translator vs. youth who would participate in online survey).

# 3. Consideration of Input from the Public and Indigenous Peoples

## 3.1. Public Participation

EA study participants as identified in the Agency *Public Participation Plan* dated February 24, 2020 for the WSR Project will be engaged and consulted. The Public Participation Plan was developed by the Agency to set out proposed opportunities for participation during the impact assessment process for Agency-led activities. The proponent, or its subject matter experts, may participate in activities as requested by the Agency.

The ToR provides a plan for engaging and consulting government ministries and agencies, the public and stakeholders based on EA study milestones similar to those for Indigenous communities.

All identified affected and/or interested stakeholders and members of the public will be notified at the EA study milestones. The public and stakeholders will have the opportunity to attend two (2) open house sessions that will be held in the City of Thunder Bay, focussing on:

1. Project and EA process overview; baseline data collection; spatial and temporal boundaries for assessment; criteria and indicators; and identification and preliminary evaluation of alternatives; and
2. Presentation of the selected preferred alternatives/the Project, including potential effects, mitigation, net effects and their significance and follow-up monitoring.

The open houses will include display materials and handouts containing information on the Project, the EA study process, known existing environmental conditions, the results of studies that have been conducted to date; the development and evaluation of alternatives, including the rationale for use of criteria and indicators; the project schedule; and the results of the consultation program. The Webequie Project Team will be available to receive and respond to questions and have an open dialogue regarding the EA process. Written comments may be prepared and left at the open house venue or sent to the Project Team within a specified period following the event.

The public and stakeholders will be notified regarding the commencement of the EA and submission of the Draft and Final EAR/IS. The EAR/IS will be available for review on the Project Website, and at municipal offices or nearby public libraries in:

- City of Thunder Bay
- Municipality of Greenstone
- Township of Pickle Lake
- City of Timmins
- Municipality of Sioux Lookout

In summary, the methods and activities for engagement and consultation with the public will include:

- Notification letters;
- Public notices and newspaper advertising at key EA milestones – Notice of Commencement; Notice of Open Houses; Notices for Draft and Final EAR/IS;
- Open houses;
- Communication materials for use at meetings such as slide decks, project fact sheets, handouts, etc.;
- Project Website; and
- Opportunities to review and provide comments on the Draft and Final EAR/IS.

All comments received from the public engagement and consultation activities will be tracked (i.e., Record of Consultation) and considered by the Project Team with the objective that the public be provided meaningful opportunities to participate, including in meaningful discussions in the EA process.

## 3.2. Indigenous Engagement and Consultation

### 3.2.1. Communities to be Included in the Assessment

The assessment of fish and fish habitat component will include the 22 identified Indigenous communities that are to be consulted as part of the EA process, as shown in **Table 1** below. These communities have been identified by the MECP and Agency as communities whose established or asserted Aboriginal and/or treaty rights may be adversely affected by the Project and/or may have interests in the project. Communities marked with an asterisk are those whose Aboriginal and Treaty rights may be affected by the Project.

The table also includes those communities that have been identified by Webequie First Nation based on Elders' guiding principles and Webequie's Three-Tier approach to Indigenous consultation and engagement. WFN identified communities and assessed them based on the following criteria:

- Geographically closer to the project area than others;
- Known to have traditionally used some of the potentially affected lands in the past, or currently;
- Downstream of the Project and may experience impacts as a result of effects to waterways;
- Considered to have closer familial/clan connections to the members of WFN; and/or
- Have been involved in all-season road planning in the Region, either directly with the WFN, or in consideration of all-season road planning that the WFN has been involved with in recent years.

Based on these factors, the communities identified by WFN will be offered the deepest or intensive consultation/engagement.

**Table 3: Indigenous Communities to be Consulted**

| Indigenous Community | Identified by WFN | Identified by MECP | Identified by IAAC |
|---|---|---|---|
| Webequie First Nation | ✓ | ✓ * | ✓ * |
| Aroland First Nation | | ✓ * | ✓ * |
| Attawapiskat First Nation | ✓ | ✓ * | ✓ * |
| Constance Lake First Nation | | ✓ * | ✓ |
| Eabametoong First Nation | ✓ | ✓ | ✓ * |
| Fort Albany First Nation | | ✓ * | ✓ * |
| Ginoogaming First Nation | | ✓ | ✓ |
| Kasabonika First Nation | ✓ | ✓ * | ✓ * |
| Kaschechewan First Nation | | ✓ * | |
| Kitchenuhmaykoosib Inninuwug | | ✓ * | ✓ |
| Kingfisher Lake First Nation | | ✓ * | |
| Long Lake #58 First Nation | | ✓ | ✓ |
| Marten Falls First Nation | ✓ | ✓ * | ✓ * |
| Mishkeegogamang First Nation | | ✓ | |
| Neskantaga First Nation | ✓ | ✓ * | ✓ * |
| Nibinamik First Nation | ✓ | ✓ * | ✓ * |
| North Caribou Lake First Nation | | ✓ | |
| Wapekeka First Nation | | ✓ * | |
| Wawakapewin First Nation | | ✓ * | |
| Weenusk (Peawanuck) First Nation | ✓ | ✓ * | ✓ * |
| Wunnumin Lake First Nation | | ✓ * | |
| Metis Nation of Ontario – Region 2 | | ✓ | |

## 3.2.2. Approach and Methods

The Project Team will consult and engage with Indigenous communities throughout the assessment process. It is the Project Team's objective that the EA capture Indigenous Knowledge and any issues, concerns or other information being provided by Indigenous communities accurately and appropriately. As such, Indigenous communities will have the opportunity to provide input and feedback during the following steps of the EA and more specifically the assessment of terrain and soils as outlined in this work plan:

- Provide input to defining areas such as areas with known use, sensitivity or cultural importance (e.g., wells, springs, or waterbodies used to carry out land use activities, etc.) for the purposes of the baseline data collection and effects assessment;
- Provide input on the criteria and indicators for groundwater and surface waters;
- Provide input on methods and types of baseline data and information to be collected, including opportunity to provide Indigenous knowledge;
- Validate how baseline information is captured and used in the EA;
- Provide input on the effects assessment methodology, including alternatives;
- Discuss potential effects based on predicted changes to groundwater or surface water quantity or quality (e.g., ability to navigate waterbodies, changes to groundwater/surface water quality, movement and flow); and,

- Provide input to identify mitigation measures and any follow-up monitoring programs during the construction and/or operation phases of the Project, including predicted overall net effects and significance, including those that may interfere with the exercise of rights of Indigenous peoples.

A variety of activities and materials will be used to provide information and receive input from Indigenous communities during the EA process. These are outlined and detailed in the provincial ToR which includes the mechanisms, activities and events that are planned for various stages throughout the EA process and will be used at milestone points to ensure optimal engagement with Indigenous communities. In summary this includes the following:

- Notification letters sent by registered mail to all of the identified Indigenous communities and groups (i.e., Tribal Councils inform them at key milestone (e.g., Commencement of provincial EA; Submission Draft EAR/IS and Submission of Final EAR/IS;
- Community visits throughout for those communities identified by IACC and MECP whose established or asserted Aboriginal and/or treaty rights may be adversely affected by the Project;
- Meetings (2) with off-reserve community members of the 22 Indigenous communities to be consulted as part of the EA;
- Information meetings with Métis Nation of Ontario;
- Engagement with Tribal Councils and Nishnawbe Aski Nation, with meetings held upon request;
- Communication materials for use at meetings such as slide decks, project fact sheets, handouts, etc., including where requested translation to native language;
- Audio and visual products for those Indigenous communities that have the capability, community meetings and presentations will be live-streamed through local community media to allow for a wider audience to participate in the meetings;
- Use of surveys (e.g., “Survey Monkey”) or focused community-based meetings to obtain information (e.g., socio-economic, human health, etc.) and identify concerns from Indigenous people;
- Project Website (www.supplyroad.ca) for the public to review project related information and documents, including informative video tutorials (e.g. EA studies); and
- Project Newsletter letters.

Engagement with Indigenous groups has been undertaken as part of the ToR phase and included components of the work plan (e.g., baseline studies for valued components, spatial and temporal boundaries, criteria and indicators, EA alternatives, etc.) and will continue as part of the planned EA engagement activities for the Project.

All outreach efforts and consultation activities will be recorded as part of the Record of Consultation to allow for validation by the Agency and the MECP. The EAR/IS will describe how input from Indigenous communities and public was incorporated into the groundwater and surface water assessment and other valued components.

### 3.2.3. Indigenous Knowledge

Through engagement activities, the Project Team will also collect Indigenous Knowledge relevant to the WSR study area and specific valued components, where available, from the 16 Indigenous communities identified by Ontario and the 10 Indigenous communities identified by the Agency. Indigenous Knowledge will assist in describing existing conditions (e.g. characterizing the study area, natural environment conditions, social and economic conditions, cultural characteristics, community characteristics, past and current land uses and other values of importance. Indigenous Knowledge will be used to assist in developing mitigation measures, monitoring commitments and accommodation measures, where necessary. The Project Team will document efforts to obtain Indigenous Knowledge. It is recognized that each community may have its own protocols and procedures to be followed in transferring Indigenous Knowledge to outside parties such as WFN and the Project Team. The Project Team will ensure that related protocols are respected and will work with each community to understand how the information will be transferred, securely stored, and applied. Additionally, the Project Team will ensure that the Indigenous Knowledge provided will be protected and kept confidential. The Project Team will seek guidance from the community as to how the information will be used and published.

As Indigenous Knowledge is holistic it can provide insights related to interrelationships between the natural, social, cultural, and economic environments, community health and will being, Indigenous governance and resource use. Therefore, Indigenous Knowledge, where provided, will be included in all of aspects of the technical assessments of potential impacts of the Project on Indigenous peoples, or, given is holistic nature, may be presented in one section of the EAR/IS. It will also be considered in technical sections or chapters of the documents (e.g., baseline data on springs or waterbodies used most intensively for travel and land use activities gathered through collection of Indigenous Knowledge). It is recognized that it is important to capture the context in which Indigenous groups provide their Indigenous Knowledge and to convey it in a culturally appropriate manner. Indigenous Knowledge will only be will be incorporated in the EAR/IS where written consent has been granted.

### 3.2.4. Aboriginal and Treaty Rights

The Webequie Project Team will be engaging with Indigenous communities regarding potential impacts of the Project on the exercise of rights, and where possible, the project's interference with the exercise of rights. Potential effects to be considered will include both adverse and positive effects on the current use of land and resources for traditional purposes, physical and cultural heritage, and environmental, health, social and economic conditions of Indigenous peoples impacted by the Project. For example, this will include such effects as reductions in the quantity and quality of resources available for harvesting (e.g., species of cultural importance, including traditional and medicinal plants; or interference with the current and future availability and quality of country foods (traditional foods). Webequie First Nation and the Project Team will discuss with Indigenous communities their views on how best to reflect and capture impacts on the exercise of rights in the EAR/IS. Should impacts on the exercise of Aboriginal and Treaty rights be identified, Webequie First Nation and the Project Team will work with Indigenous communities to determine appropriate mitigation measures to reduce or eliminate such impacts. Where no mitigation measures are proposed or mitigation is not possible, the Project Team will identify the adverse impacts or interference to the exercise of Aboriginal and Treaty rights and this will be described (e.g., level of severity) and documented in the EAR/IS. Webequie First Nation and the Project Team will advise Ontario and the Government of Canada on concerns Indigenous communities may have in relation to their exercise of Aboriginal and Treaty rights and whether their concerns cannot be addressed or mitigated by the Project Team.

# 4. Contribution to Sustainability

## 4.1. Overarching Approach

As recognized in the Agency's current guides to considering how a project will contribute to sustainability, it is not until baseline information has been collected and the potential effects of the Project are assessed that a full understanding or determination of the project's contribution(s) can be achieved/made. However, information and data requirements for sustainability have been considered from the outset of the WSR Project for planning purposes. In the absence of the potential effects assessment, this section outlines the general approach to determining sustainability contributions for this valued component.

The approach is based on the goal of providing a broad or holistic description of the project's potential positive and negative effects, including the interactions among those effects and the long-term consequences of the effects. In the context of the IAA requirements, sustainability means "the ability to protect the environment, contribute to the social and economic well-being of the people of Canada and preserve their health in a manner that benefits present and future generations", with the aim of "protecting the components of the environment and the health, social and economic conditions that are within the legislative authority of Parliament from adverse effects caused by a designated project", recognizing that the Minister's or the Governor in Council's public interest determination must include sustainability as one of five factors to be considered in rendering a final decision.

The approach also considers the level of effort required to assess a project's contribution to sustainability to be scalable, depending on the phase of the process and the context of the project, and can/will be adjusted/scoped as the impact assessment proceeds. For example, effects on future generations requires temporal scoping (i.e., consideration of next generation to "seventh generation"), based on expectations as to how many generations it will take for effects to become fully apparent, including return to VC baseline conditions; resilience of the VC; and whether a VC is expected to recover from effects.

As part of the public participation and Indigenous peoples engagement programs described in Section 3.2.2, the Project Team has (and will continue to) facilitate early identification of values and issues to better inform the assessment of the project's contribution to sustainability; and identify VCs that should be carried forward into that assessment, scoping related criteria and indicators to reflect the project context. As part of sustainability considerations, this information has also been used (with regard to which VCs are considered most important to Webequie First Nation) to identify alternative means of carrying out the Project and select alternatives to be carried forward for an assessment of sustainability contributions. Ultimately, with the appropriate input from the engagement and consultation program, the sustainability assessment will culminate with the development of commitments to ensuring the sustainability of Indigenous livelihood, traditional use, culture and well-being.

In identifying and scoping key VCs for sustainability contributions, the Project Team will consider VCs that:

- could experience long-term effects, including how those effects could change over time, and how they could affect future generations;
- may interact with other VCs;

- may interact with potential effects of the designated project; and/or
- may interact with project activities.

## 4.2. Assessment of Contribution to Sustainability

During preparation of the Impact Statement, the four (4) Sustainability Principles identified in the Agency's guides and the TISG will be applied as follows:

**Principle 1 - Consider the interconnectedness and interdependence of human-ecological systems**

A systems approach will be used to determine/express VC interconnectedness. The degree of interconnectedness within systems and/or subsystems may vary greatly (may be characterized as very intricate and tight/direct, or quite loose and indirect). The focus will be on those aspects that are most important to communities, the social-ecological system and to the context of a project. All interactions, pathways and connections among effects to the environment, and to health, economic and social conditions will be described, as will how these interactions may change over time. The Project Team will ensure that the description of systems and the direct and indirect relationships are guided by input from Indigenous Knowledge. It is expected that a graphic with simple pictorial images will be developed to visually represent the connections between human and ecological systems to facilitate comprehension and encourage input/feedback.

**Principle 2 - Consider the well-being of present and future generations**

The long-term effects on the well-being of present and future generations will be assessed. To conduct an analysis on future generations, the Project Team will first determine the potential long-term effects on well-being. This will entail consideration of the elements of environmental, health, social and economic well-being, across a spectrum of VCs, that communities identified as being valuable to them. In the context of subject VC (aquatic environment), well-being could include community cohesion, protection of the environment, culture, stress, or livelihoods. Available Comprehensive Community Plans (CCP) will be consulted to determine whether sustainability is a CCP central theme. How the environmental, health, social and economic effects on well-being could change over time will also be assessed, as information permits. Although effects on future generations could include effects beyond the lifecycle of a project, this is not expected to be major consideration for the WSR Project, as no expected decommissioning or abandonment timeframe has been identified. With respect to temporal scoping, there is still a need to determine what the "future generation" is (i.e., how far into the future the project effects will be considered). Predicted potential effects on future generations will be assessed based on the supporting data or uncertainty; any uncertainty will be documented.

**Principle 3 - Maximize overall positive benefits and minimize adverse effects of the designated project**

The Impact Statement will include a consideration of ways to maximize the positive benefits of the Project and consider mitigation measures that are technically and economically feasible and would mitigate any adverse effects of the Project. Sustainability considerations will include: whether additional mitigation measures are required; have additional benefits been identified and, if so, how can they be maximized; does the direction of the impact (i.e., positive or negative) shift between different groups and sub-populations; are there particular strengths or vulnerabilities in the potentially affected communities that may influence impacts; do the impacts cause regional inequities; and do the near term benefits come at the expense of disadvantages for future generations.

**Principle 4 - Apply the precautionary principle and consider uncertainty and risk of irreversible harm**

The precautionary principle states that “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”. All uncertainties and assumptions underpinning an analysis will be described. A precautionary approach will be applied in cases where there is risk of irreversible harm (irreversible harm refers to project-related effects from which a VC is not expected to recover; reversibility is influenced by the resilience of the VC). Taking such a conservative approach may include setting out worst-case scenarios for decision-makers to consider, particularly when there is uncertainty about the significance or irreversibility of potential effects. As appropriate, the precautionary approach may be extended to commitments regarding the project’s design (to prevent adverse effects, prevent pollution, deal with unplanned events) and the development of monitoring and follow-up programs to verify effects predictions, or gauge the effectiveness of mitigation measures. Uncertainty may be characterized quantitatively (e.g., description of confidence levels of modelled predictions) or qualitatively (e.g., through descriptors such as “high”, “medium”, and “low”). Qualitative descriptions of uncertainty will explain how the level of uncertainty was determined, identify sources of uncertainty and data gaps, and describe where and how professional judgment was used.

# 5. Closure

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