Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

Draft Environmental Assessment Report

Rainy River Project

CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY

Draft: October 2014

Canada

Executive Summary

Rainy River Resources Ltd. (the proponent) is proposing the construction, operation, decommissioning and abandonment of an open-pit and underground gold mine and an onsite metal mill (the Project) located approximately 65 kilometres northwest of Fort Frances in the Township of Chapple, Ontario. Mining would occur for 15 to 20 years, with an ore production capacity of 27 000 tonnes per day (tpd). The onsite metal mill is proposed to have an ore input capacity of 21 000 tpd. The Project also involves the realignment of a portion of Highway 600 and the construction of a 230 kilovolt transmission line. The proponent is 100 percent owned by New Gold Inc.

The Project is subject to an environmental assessment (EA) under the *Canadian Environmental Assessment Act, 2012* (the Act), by the Canadian Environmental Assessment Agency (the Agency), as it exceeds the following thresholds of the *Regulations Designating Physical Activities*:

- 16 (b) the construction, operation, decommissioning, and abandonment of a new metal mill with an ore input capacity of 4000 tpd or more; and
- 16 (c) the construction, operation, decommissioning, and abandonment of a new rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 tpd or more.

A provincial Individual EA was conducted under the Ontario *Environmental Assessment Act*. The proponent volunteered to participate in this process as a means of simultaneously meeting both federal and provincial EA requirements. Federal and provincial agencies worked to coordinate activities under the two EA processes to avoid unnecessary duplication of effort.

The Agency prepared this draft EA report in consultation with Environment Canada, Fisheries and Oceans Canada, Health Canada, Natural Resources Canada, and Transport Canada following a technical review of the proponent's Environmental Impact Statement and an evaluation of the potential environmental effects of the Project.

In conducting this EA, the Agency considered effects that the Project may have on the following components of the environment:

- those which fall within federal jurisdiction, as described in section 5(1) of the Act;
- wildlife species listed under the *Species at Risk Act* or designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- those directly linked or incidental to federal decisions that enable the project to be carried out, as described in section 5(2)(a) of the Act; and
- those which have an effect on health, socio-economic conditions, matters of historical, archaeological, paleontological or architectural interest, or other matters of physical or cultural heritage, as described in section 5(2)(b) of the Act.

Valued components are notable features of the natural and human environment that have the potential to be impacted by the Project. The EA focused on the following valued components which fall within the categories described above:

- section 5(1) of the Act: fish and fish habitat; migratory birds; and with respect to Aboriginal peoples, current use of lands and resources for traditional purposes, health and socio-economic conditions, physical and cultural heritage, and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.
- numerous wildlife species listed under the *Species at Risk Act* or designated by COSEWIC.
- section 5(2) of the Act: recreation and commercial use; amphibians and reptiles; and furbearing animals.

Other components such as the atmospheric environment, water quality and quantity and terrestrial landscape were also considered from a perspective of changes to the environment that can potentially affect the valued components described above.

The Agency assessed the potential for the Project to have significant adverse effects on the valued components. These evaluations were completed based on the Environmental Impact Statement provided by the proponent, advice from federal and provincial experts, independent reviews and comments provided by Aboriginal communities, and comments provided by the public through various consultation activities. Key comments from Aboriginal communities related to changes to water quality and quantity; heavy metal contamination of country foods, including wild plants and game; and reduced access to hunting, fishing, and plant harvesting. Key comments from the public related to water contamination and the potential for bioaccumulation of contaminants in wildlife.

Potential environmental effects in relation to section 5 of the Act include:

- alteration and disruption of fish habitat in the Minor Creek Systems, which will impact fish, the water quantity in the Pinewood River, amphibians and reptiles, furbearers, recreation and commercial use by non-Aboriginal peoples and fishing by Aboriginal peoples;
- water taking in the Pinewood River, which may affect fish and fish habitat, recreation and commercial use by non-Aboriginal peoples and fishing by Aboriginal peoples;
- contamination into the Pinewood River and Minor Creek Systems from effluent discharge, which may impact fish and fish habitat, amphibians and reptiles, furbearers, recreation and commercial use by non-Aboriginal peoples, fishing by Aboriginal peoples and Aboriginal health;
- potential for acid rock drainage and metal leaching, which may impact fish and fish habitat, amphibians and reptiles, furbearers, recreation and commercial use by non-Aboriginal peoples, fishing by Aboriginal peoples and Aboriginal health;
- disturbance to migratory birds and migratory bird species at risk, their eggs and their nests;
- the removal of suitable habitat for migratory birds and species at risk;
- the removal of land and reduced access to the land currently used for hunting and plant harvesting by Aboriginal peoples; and
- reduced access to and use of the lands, waters, wildlife and vegetation for cultural practices by Aboriginal peoples.

The proponent's project planning and design incorporated mitigation measures to prevent or reduce the adverse effects of the Project. The following highlights a number of mitigation measures in relation to effects considered in this assessment, identified by the Agency:

- fish habitat offsetting and compensation plans;
- establishment of minimum flow and level requirements for the protection of fisheries in the Pinewood River;
- treatment of mine contact water prior to discharge into the receiving environment;
- subaqueous disposal of potentially acid generating tailings;
- provision of compensatory habitat for Eastern Whip-poor-will which will also provide protection and habitat for other migratory birds;
- development of habitats capable of supporting a diversity of wildlife species when restoring disturbed habitats at decommissioning;
- development and implementation of a fugitive dust best management practices plan;
- provision of private lands for hunting and plant harvesting by Aboriginal peoples; and
- provision of access to the project site for ceremonial and cultural purposes by Aboriginal peoples.

The Agency identified several potential or established Aboriginal and treaty rights held by First Nations and Métis communities that could potentially be affected by the Project, including: fishing, hunting, plant harvesting, and the use of culturally important sites for ceremonial purposes. The Agency believes that the key mitigation measures will serve as accommodation for these potential impacts.

The Agency has determined that the follow-up program should focus on confirming predictions of effects on valued components.

The Agency will propose conditions in relation to key mitigation measures for consideration by the Minister of the Environment. Such conditions would become legally binding on the proponent if the Minister of the Environment ultimately issues a decision statement indicating that the Project may proceed.

The Agency concludes that the Rainy River Project is not likely to cause significant adverse environmental effects, taking into account the implementation of the key mitigation measures. This draft EA report will be finalized following the public consultation and submitted to the federal Minister of the Environment for consideration in making a decision on whether the Project is likely to cause significant adverse environmental effects, taking into account the implementation of any mitigation measures that the Minister considers appropriate.

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List of Abbreviations and Acronyms

Abbreviation/Acronym	Definition
AAQC	Ambient Air Quality Criteria
AMP	Adaptive Management Plan
ARD/ML	Acid Rock Drainage and Metal Leaching
°C	Degrees Celsius
CEQG	Canadian Environmental Quality Guidelines
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EC	Environment Canada
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ha	Hectares
HC	Health Canada
HLSA	Human Environment Local Study Area
HRSA	Human Environment Regional Study Area
km	Kilometres
kV	Kilovolt
m	Metres
mm	Millimetres
MMER	Metal Mining Effluent Regulations
MNDM	Ministry of Northern Development and Mines
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MTO	Ministry of Transportation
Mt	Mega tonnes
NLSA	Natural Environment Local Study Area
NPAG	Non Potentially Acid Generating
NRCan	Natural Resources Canada
NRSA	Natural Environment Regional Study Area
PAG	Potentially Acid Generating
PD	Project Description
PWQO	Provincial Water Quality Objectives
SAR	Species at Risk
SARA	Species at Risk Act
TC	Transport Canada
The Agency	Canadian Environmental Assessment Agency
TMA	Tailings Management Area
tpd	Tonnes per day
VC	Valued Components

Glossary

Term	Definition
Acid Drainage	Acidic water (and possibly water that contains metal(s)) resulting from the chemical weathering of rock or soil material primarily caused by the oxidation of sulphide minerals. Also referred to as acid mine drainage or acid rock drainage (ARD).
Assimilative Capacity	The amount of pollutants that a water body may absorb while continuing to meet water quality standards.
Backfill	The soil used to refill an excavation unit at the end of the investigations; also known as backdirt.
Baseflow	The portion of the stream discharge that is derived from natural storage (i.e. groundwater outflow and the draining of large lakes and swamps or other sources outside the net rainfall that create surface runoff); discharge sustained in a stream channel, not a result of direct runoff, and without the effects of regulation, diversion, or other works of man.
Berm	A horizontal strip or shelf built into an embankment or cut to break the continuity of the slope, usually for the purpose of reducing erosion or to increase the thickness of the embankment at a point of change in a slope or define water surface elevation. A horizontal step in the sloping profile of an embankment dam. A shelf that breaks the continuity of a slope, or artificial ridge of earth. A ledge or shoulder, as along the edge of a road or canal. An artificial ridge of earth.
Channel	Natural or artificial watercourse of perceptible extent, with a definite bed and banks to confine and conduct continuously or periodically flowing water. Rivers and streams or a general term for any natural or artificial facility for conveying water.
Culvert	A conduit, usually covered by fill, whose primary function is to convey surface water through an embankment.
Cyanidation	A method of extracting exposed gold or silver grains from crushed or ground ore by dissolving it in a weak cyanide solution. May be done in tanks inside a mill or in heaps of ore out of doors.
Erosion	The wearing away of the land surface by running water, wind, ice or other geological agents, including such processes as gravitational creep. Geological erosion is natural occurring erosion over long periods of time.
Flotation	A milling process using surface active chemicals to selectively modify some mineral surfaces causing them to become attached to air bubbles and float, while others do not and sink. This process allows the selective concentration and recovery of the valuable minerals. Pre-treatments include grinding and addition of the reagents.
Fugitive Dust	Emissions that escape from industrial processes and equipment and are not controlled or collected. Stone dust, fly ash, soot, and unburned droplets of fuel oil are the main types of particulate resulting from the operation of hot-mix asphalt paving plants.
Groundwater Recharge	The inflow to a groundwater reservoir.
Hydroseeded	To sow (a field, a lawn, etc.) with seed by distribution in a stream of water propelled through a hose.
Leaching	A chemical process for the extraction of valuable minerals from ore. Also,

	a natural process by which groundwater dissolve minerals, thus leaving the rock with a smaller proportion of some of the minerals than it contained originally.
Low-grade ore	Extracted ore with a lower gold content.
Project site	The area at ground level occupied by any open pit or underground workings, mill complex or storage area for overburden, waste rock, tailings or ore.
Reverse circulation drilling	Obtains samples using two coaxial pipes and a tricone bit. Air and water are injected between the pipes to the bit and clay to pebble-sized sediment particles and cm-sized cuttings of boulders and bedrock are flushed instantly through the center pipe to surface where they are logged and bulk samples are collected.
Seepage	The appearance and disappearance of water at the ground surface. Seepage designates the type of movement of water in saturated material. It is different from percolation, which is the predominant type of movement of water in unsaturated material.
Slough	A place of deep mud or mire.
Spillway	A structure that passes normal and/or flood flows in a manner that protects the structural integrity of the dam. Overflow channel of a dam or impoundment structure. A structure over or through which flow is discharged from a reservoir. If the rate of flow is controlled by mechanical means such as gates, it is considered a controlled spillway. If the geometry of the spillway is the only control, it is considered an uncontrolled spillway. Any passageway, channel, or structure designed to discharge surplus water from a reservoir.
Stope	A usually step like excavation underground for the removal of ore that is formed as the ore is mined in successive layers.
Tailings	The waste material and water mixture that is left over after the *mill* removes the valuable rocks. The rock material in tailings is usually the size of sand grains or smaller.
Thicket	A group of bushes or small trees that grow close together.
Total Particulate Matter	Total suspended particulate matter less than 44 microns in diameter. The portion that is between 10 and 44 microns in size is too large to be inhaled; its worst effect would be soiling of materials (houses, cars, etc.) and would originate from sources such as wind-blown dust from stockpiles.
Trophic Levels	Levels of the food chain. The first trophic level includes photosynthesizers that get energy from the sun. Organisms that eat photosynthesizers make up the second trophic level. Third trophic level organisms eat those in the second level, and so on. It is a simplified way of thinking of the food web. In fact, some organisms eat members of several trophic levels.

1 Introduction

1.1 Purpose of the Environmental Assessment Report

Rainy River Resources (the proponent) is proposing the construction, operation, decommissioning and abandonment of an open-pit and underground gold mine and an onsite metal mill (the Project) located approximately 65 kilometres (km) northwest of Fort Frances in the Township of Chapple, Ontario. Mining would occur for 15 to 20 years, with an ore production capacity of 27 000 tonnes per day (tpd). The onsite metal mill is proposed to have an ore input capacity of 21 000 tpd. The Project, as proposed, also involves the realignment of a portion of Highway 600 and the construction of a 230 kilovolt (kV) transmission line. The proponent is 100 percent owned by New Gold Inc.

The purpose of this environmental assessment (EA) report is to provide a summary of information and analysis considered by the Canadian Environmental Assessment Agency (the Agency) in reaching its conclusion in accordance with the *Canadian Environmental Assessment Act,* 2012 (the Act) on whether the Project is likely to cause significant adverse environmental effects, after taking into account the proposed mitigation measures. Proposed mitigation measures and commitments made by the proponent can be found in Appendix A: Part 2.

1.2 Scope of Environmental Assessment

1.2.1 Environmental assessment requirements

The Project is subject to the Act because it involves activities that are designated by the *Regulations Designating Physical Activities* (the Regulations). Specifically, the Project includes the construction, operation and decommissioning of a new metal mill and of a gold mine that meet the descriptions and thresholds set out in items 16(b) and 16(c) of the schedule to the Regulations.

Based on the project description submitted by the proponent, the Agency initiated a screening of the designated project in accordance with sections 8 – 12 of the Act to determine if an EA was required. On September 4, 2012, the Agency posted a notice on the Canadian Environmental Assessment Registry Internet Site and invited the public to provide comments by September 24, 2012 on the designated project and its potential effects on the environment. The Agency determined on October 18, 2012, that an EA was required.

The Project was also subject to an individual EA under the Ontario *Environmental Assessment Act*. The proponent volunteered to participate in this process as a means of simultaneously meeting both federal and provincial EA requirements.

The federal and provincial governments collaborated during the technical review of the environmental impact statement (EIS) and coordinated public and Aboriginal consultation efforts to ensure an effective and efficient EA and consultation process.

1.2.2 Environmental effects assessed

As required under the Act, the federal EA has examined the significance of potential adverse environmental effects of the Project that are within federal jurisdiction, which includes:

- fish and fish habitat and other aquatic species;
- migratory birds;
- federal lands;
- effects that cross provincial or international boundaries; and
- effects that impact on Aboriginal peoples, such as their use of lands and resources for traditional purposes.

The federal EA also considered the adverse effects of the Project on wildlife species listed on the *Species and Risk Act* (SARA) and their critical habitat, as well as effects on species designated by the Committee on the Status of Endangered Wildlife (COSEWIC) in Canada.

The following decisions under other federal legislation would also be required before the Project could proceed:

- an authorization under section 35 of the *Fisheries Act* for the serious harm to fish within certain Minor Creek Systems ;
- an amendment to Schedule 2 of the *Metal Mining Effluent Regulations* (MMER) (pursuant to subsection 36(5) of the *Fisheries Act*) for the disposal of mine waste into fish frequented waters; and
- a permit under paragraph 7(1)(a) of the *Explosives Act*.

Therefore, in accordance with subsection 5(2) of the Act, the federal EA considered changes to the environment that might result from these decisions as well as any associated effects on health, socio-economic conditions, matters of historical, archaeological, paleontological or architectural interest, or other matters of physical or cultural heritage.

1.2.3 Factors considered during the assessment

In accordance with section 19 of the Act, the federal EA considered:

- changes to the Project that may be caused by the environment;
- the effects of malfunctions or accidents that may occur in connection with the Project on components of the environment within federal jurisdiction;
- any cumulative effects on components of the environment within federal jurisdiction that are likely to result from the project in combination with other physical activities that have been or will be carried out;
- the significance of the environmental effects of the project;
- comments from the public;
- technically and economically feasible measures to mitigate any significant adverse environmental effects of the project;
- the requirements of a follow-up monitoring program for the Project;
- the purpose of the Project;
- alternative means of carrying out the Project that are technically and economically feasible and the effects of these alternatives on components of the environment within federal jurisdiction; and

- any other matter that the Agency determines is relevant to the EA.

The federal EA also takes into account comments from the public, community knowledge, and Aboriginal traditional knowledge.

Expert federal departments provided specialist or expert information or knowledge relevant to the Project in accordance with section 20 of the Act. The following federal authorities provided advice in relation to the review of the proponent's Environmental Impact Statement (EIS) and the preparation of this EA report: Fisheries and Oceans Canada (DFO), Environment Canada (EC), Health Canada (HC), Natural Resources Canada (NRCan) and Transport Canada (TC).

1.2.4 Selection of valued components

The scoping process sets the limits of an EA, and focuses the study on relevant factors and concerns, which were outlined in the Environmental Impact Statement Guidelines (EIS Guidelines). http://www.ceaa.gc.ca/050/documents-eng.cfm?evaluation=80007

In determining the potential for significant environmental effects, the EA focused on those components of the environment, described under "Factors Considered" (section 1.2.3), which have particular value or significance and are likely to be impacted by the Project. Valued components (VCs) refer to components of the environment that are valued in their role in the ecosystem and have value placed on them by humans. A selection of VCs associated with the Project has been identified to be of concern to the proponent, government agencies, Aboriginal peoples and the public.

The VC selection process by the proponent included consideration of the temporal and spatial scope of the Project and anticipated project-environment interactions. It also was informed by data from environmental and socio-economic baseline studies (including personal interviews and literature sources), feedback received from the public and Aboriginal groups, and discussion with government authorities. The proponent selected VCs from the holistic perspective of assessing broad ecosystem components and species groups rather than focusing on more specific ecosystem components and species, with the exception of federally and provincially identified species-at-risk (SAR) and other rare species where individual species were assessed. The entire natural environment is assessed using this approach.

The Agency focused on VCs that pertain to the prediction of environmental effects on fish and fish habitat, migratory birds, and Aboriginal peoples (as defined in section 5(1) of the Act) in its analysis of significance (Table 1-1).

The Agency also considered VCs that pertain to the prediction of environmental effects on recreation and commercial use, amphibians and reptiles, furbearers, and migratory bird habitat (as defined in section 5(2) of the Act). These VCs were included in the analysis of significance because federal authorizations and approvals may be required for the Project. A *Fisheries Act* authorization is required for the serious harm to fish within certain Minor Creek Systems. In order to allow for the disposal of mine waste into fish frequented waters, an amendment to Schedule 2 of the *Metal Mining Effluent Regulations* (MMER) (pursuant to subsection 36(5) of the *Fisheries Act*) is also required.

The Agency also considered the prediction of environmental effects to species at risk (as defined in section 79(2) of SARA those designated by COSEWIC).

Other components identified by the proponent, (i.e. air quality, and water quality and quantity) were examined from a perspective of changes to the environment that can potentially affect the VCs listed under section 5 of the Act and section 79(2) of SARA.

The VCs analyzed by the Agency and the corresponding VCs selected by the proponent are presented in Table 1-1.

Table 1-1: Potentially Affected Valued Components

Valued Component	Selected (Yes or No)?	Rationale	Corresponding Valued Components identified by the Proponent
Effects identified under Section 5(1) of the Act			
Fish and fish habitat	Yes	Effects on water quality and quantity and removal of fish habitat.	• Pinewood River • Minor Creek Systems
Aquatic species	No	Aquatic SAR as defined under SARA not present in the project site.	
Migratory birds	Yes	Effects on migratory bird populations.	• Migratory birds
Health and socio-economic conditions of Aboriginal peoples	Yes	Changes to water and air quality causing changes to Aboriginal health. Changes to Aboriginal community activities from a commercial perspective.	• Human health • Hunting • Trapping • Fishing • Traditional plant harvesting
Current use of lands and resources for traditional purposes by Aboriginal peoples	Yes	Changes to the environment causing a change in the use of lands for traditional purposes.	• Traditional hunting • Traditional fishing • Trapping • Traditional plant harvesting
Physical or cultural heritage and effects on historical, archaeological, paleontological or architectural sites or structures of Aboriginal peoples	Yes	Changes in the environment causing changes on physical and/or cultural heritage of importance to Aboriginal communities.	• Cultural heritage resources
Effects identified under Section 5(2) of the Act			
Migratory birds	Yes	Effects on migratory bird habitat.	• Migratory birds
Recreation and commercial use	Yes	Effects on the Richardson Trail caused by the destruction of the Minor Creek Systems approved under MMER. Effects on recreational and commercial use caused by the destruction of the Minor Creek Systems authorized under the *Fisheries Act* and approved under MMER.	• Recreational uses by non-Aboriginal peoples • Trapping • Hunting • Fishing
Amphibians and reptiles	Yes	Effects on amphibians and reptiles and their habitat caused by destruction of Minor Creek Systems authorized under the *Fisheries Act* and approved under MMER.	• Minor Creek Systems • Pinewood River

Furbearers	Yes	Effects on furbearers and their habitat caused by destruction of Minor Creek Systems authorized under the *Fisheries Act* and approved under MMER.	• Minor Creek Systems • Pinewood River
Effects identified under Section 79(2) of SARA			
Federal species at risk		Effects on specific species which are federally listed under SARA.	• Ontario *Endangered Species Act* Species • Species of special concern and provincially rare species

1.2.5 Spatial and temporal boundaries by proponent

Temporal boundaries are defined based on the timing and duration of project activities that could adversely affect the environment. The purpose of the temporal boundaries is to identify when an effect may occur in relation to specific project phases and activities. In general, temporal boundaries for this assessment include the construction, operational, decommissioning, and abandonment phases of the Project.

The EIS indicates that the smaller natural environment local study area (NLSA) is nested within a larger natural environment regional study area (NRSA) (Figure 1-1). The NLSA has been defined as the Upper Pinewood River, including all lands and waters within the watershed upstream of, and including McCallum Creek and Tait Creek tributary sub-watersheds. It includes a one kilometre buffer bordering the northern margin of the watershed to account for minor road allowance excursions beyond the watershed boundary at some locations, and a four kilometre buffer of the proposed 230 kV transmission line. It measures 27 000 hectares (ha) and includes approximately 36 percent of the upper Pinewood River watershed. The NRSA includes the entire Pinewood River watershed with the corridor extension to the northeast to accommodate transmission line routing alternatives. The NRSA boundary encompasses a total area of 69 000 ha.

The proponent expects all reasonably measurable project-related effects to the terrestrial environment to occur within the NLSA, including those effects on wildlife populations related to air quality and sound emissions. Reasonably measurable project-related effects on the aquatic environment also are expected to occur mainly within the NLSA, but may extend into the NRSA. The NRSA was included as a study area as DFO and the Ontario Ministry of Natural Resources and Forestry (MNRF) requested that the effect of water taking for the onsite metal mill on aquatic habitats in the middle and lower reaches of the Pinewood River be assessed.

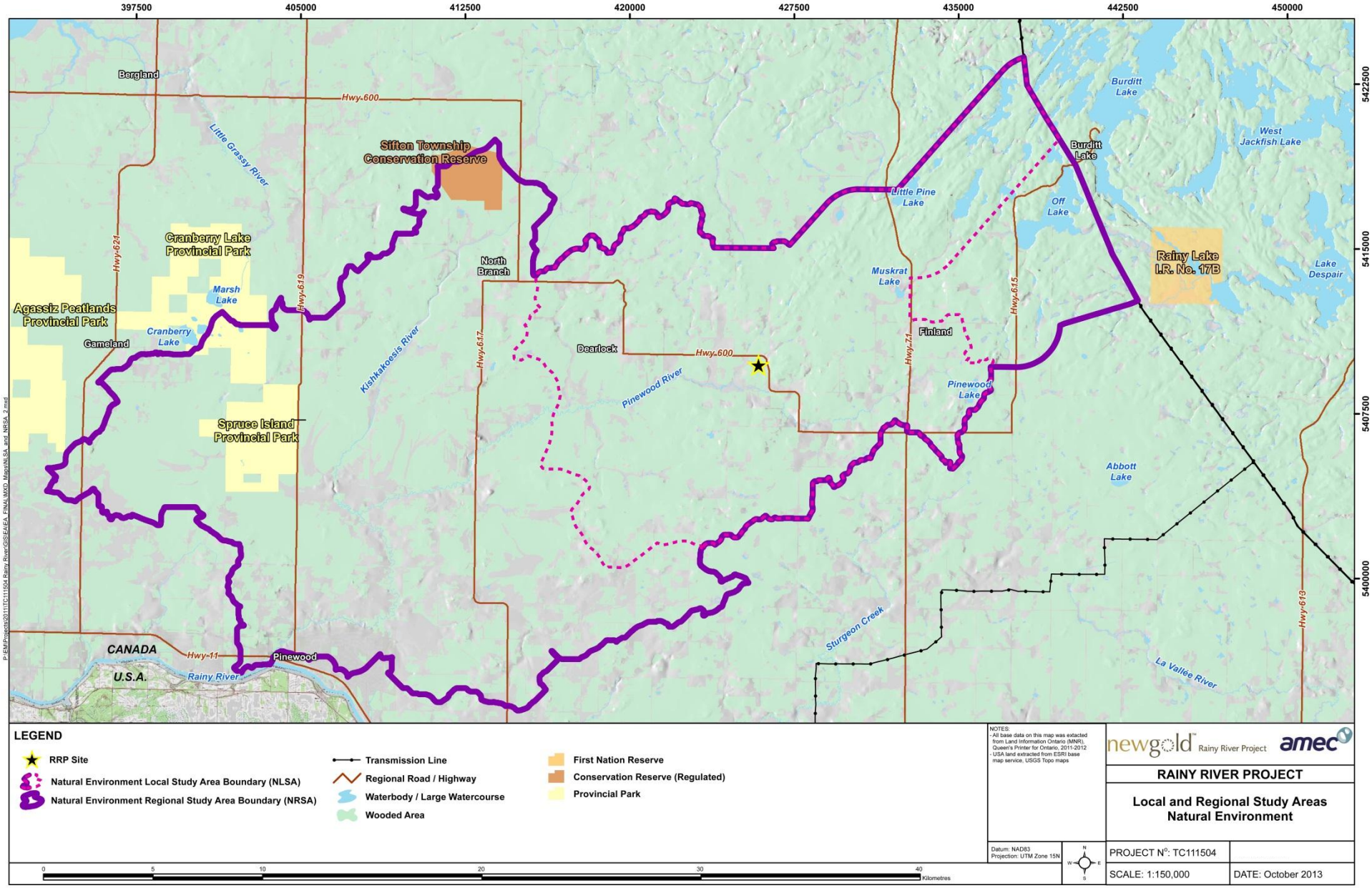

Figure 1-1: Local and Regional Natural Environment Study Areas (Source: Rainy River EIS, AMEC).

The EIS indicates that the human environment local study area (HLSA) is the area immediately surrounding the project site, set back sufficiently to include any properties, persons, and activities that could reasonably be expected to experience any environmental effect, such as those related to land use disruption, sound and air quality emissions, groundwater well function, recreation and commercial use, and traditional land use. Project effects to persons, properties, and activities outside of the HLSA are encompassed in the human environment regional study area (HRSA) (Figure 1-2). The HRSA includes Aboriginal and non-Aboriginal communities generally within a 100-km driving distance from the Project. In addition, the Lac La Croix and Seine River First Nations were included by the proponent as they have direct socio-economic interest in the Project.

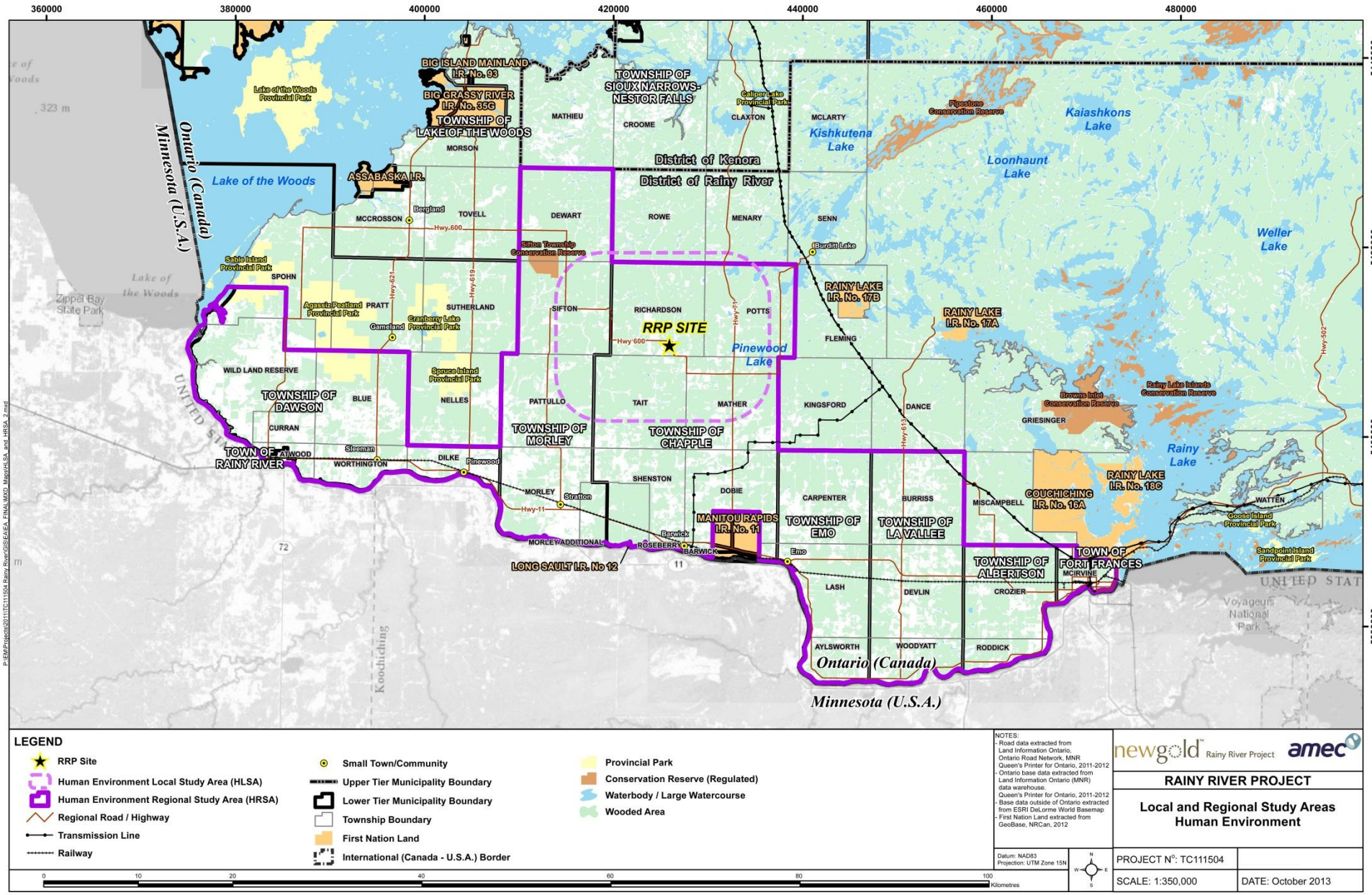

Figure 1-2: Local and Regional Human Environment Study Areas (Source: Rainy River EIS, AMEC).

1.2.6 Methodology and approach

The Agency reviewed the EIS, additional information requested from the proponent, public and aboriginal comments received, and the views of federal and other experts provided. The Agency examined the predicted changes to the physical environment. The Agency then assessed the environmental effects on chosen VCs in terms of magnitude; geographic extent; duration; frequency; and whether the environmental changes are reversible or irreversible, based on the direct effects from the Project and those effects that may result from predicted changes to the environment.

The Agency's conclusions for the assessment of key VCs are presented and based on the methodology and criteria developed by the proponent in accordance with the Agency's *Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects*.

For each VC, the following criteria were used to evaluate the predicted degree of effects after mitigation:

- Magnitude is a measure of a given key indicator representing the potential effect after mitigation relative to the baseline condition.
- Extent is the geographic area over which an effect will occur.
- Duration is the period of time over which an effect will occur.
- Frequency is how often an effect will occur within a given time period.
- Reversibility is the degree to which the effect can or will be reversed.
- Natural environment context/Socio-economic environment context.

Criteria are categorized into three levels. Level I indicates a negligible or limited potential to contribute to a significant effect, Level II represents an intermediate or moderate condition, and Level III indicates a high potential to contribute to a significant effect.

Effects are considered significant if a Level II or III rating is assigned to each of the following attributes: magnitude, geographic extent, duration, and frequency and a Level II or III rating is assigned to either natural environment or socio-economic environment context. Effects are considered insignificant if a Level I rating is assigned to any of the following attributes: magnitude, geographic extent, duration, or frequency; or if a Level I rating is assigned to both natural environment and socio-economic environment contexts. See Appendix B for a summary of the residual effects assessment. The criteria used to determine potential for an adverse environmental effect, such as magnitude; geographic extent; duration; frequency; and reversibility are described in detail in Appendix C.

2 Project Overview

2.1 Location

The Project is located in the Township of Chapple, District of Rainy River, in northwestern Ontario, approximately 65 km northwest of Fort Frances, and 420 km west of Thunder Bay (Figure 2-1).

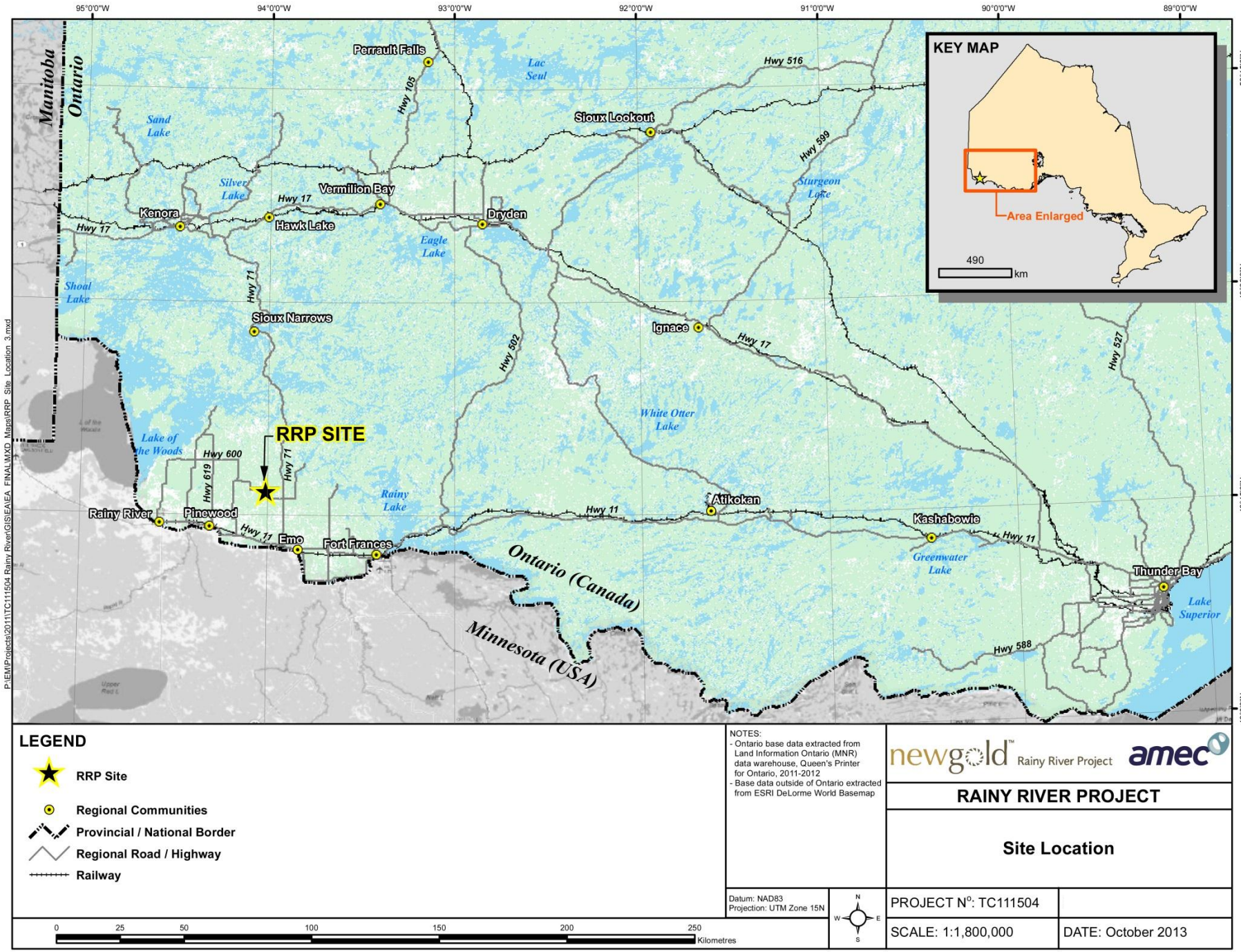

Figure 2-1: Project Location (Source: Rainy River EIS, AMEC).

2.2 Project Components

Components of the Project (Figure 2-2) include:

- **Open pit.** The open pit will be approximately 170 ha in surface area and 400 metres (m) deep. Mining is proposed to occur at an ore production capacity of up to 21 000 tpd over the life of the mine (with a contingency of up to 20 percent, the ore production capacity of the open pit will be 25 200 tpd);
- **Underground mine.** The underground mine will be approximately 800 m deep. Mining is proposed to occur at an ore production capacity of 1500 tpd (with a contingency of up to 20 percent, the ore production capacity of the underground mine will be 1800 tpd);
- **Overburden stockpile.** (approximately 70 to 80 mega tonnes (Mt)) and mine rock stockpiles (approximately 350 to 400 Mt). Low grade and high grade ore will be stockpiled during operations;
- **Primary crusher and onsite metal mill.** Ore will be crushed and processed onsite to produce doré (gold with silver) bars for shipment offsite;
- **Tailings management area (TMA).** The TMA will be approximately 800 ha to provide a storage capacity of 115 Mt for tailings over the projected mine life. The maximum projected dam heights are expected to be in the range of 20 to 25 m above grade;
- **Water collection, management, distribution, and treatment systems.** The water management plan design will rely on recycling water from various constructed ponds for process water and excess water storage uses to reduce the need for fresh water;
- **Transmission line.** The new 230 kV transmission line will connect to the existing Hydro One Networks Inc. line approximately 17 km northeast of the proposed project site;
- **Highway realignment.** Realignment of 11 km of the gravel-surfaced Highway 600 will be required, and provincial approvals needed, to fully access the ore body;
- **Road development.** The new East Access Road will provide continued access to Marr Road properties that would otherwise be disrupted by the project development;
- **Aggregate operations.** Aggregate is needed to supply construction materials for mine and road development;
- **Associate buildings, facilities, and infrastructure.** These will include a maintenance garage, a warehouse and administration complex, a fuel storage and refuelling area, laydown area(s), access roads and non-hazardous waste facilities; and
- **Explosives manufacturing and storage facilities.** Explosives will be required in order to extract rock in the open pit and underground mines, and potentially at quarries, if developed.

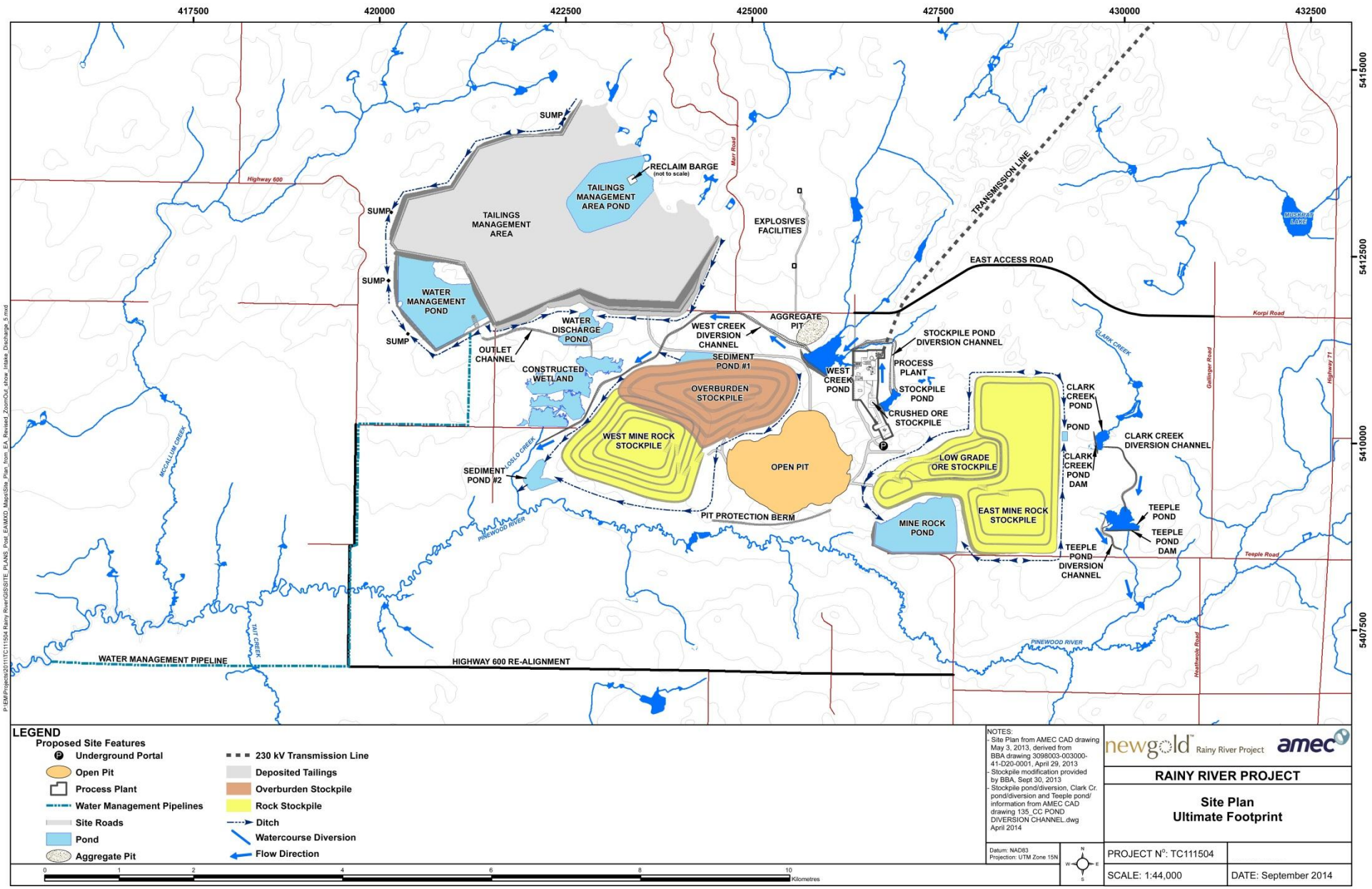

Figure 2-2: Project Components (Source: Rainy River EIS, AMEC).

2.3 Project Activities

Key activities associated with construction, operations, decommissioning, and abandonment of the Project are listed below.

Construction phase

- Procurement and movement of construction materials to identified laydown areas;
- Initiation of open pit mine development and portal development for underground mining operations;
- Preparation of onsite mineral waste handling facilities, including TMA dams;
- Establishment of watercourse diversions, intake structures, and site drainage works;
- Construction of associated buildings and facilities, and a fuel tank farm;
- Construction of explosives manufacturing and storage facilities;
- Construction of the Highway 600 realignment and Pinewood River crossing, the East Access Road, and redirection of local traffic; and
- Construction and energizing of a 230 kV transmission line.

Operations phase

- Ore and mine rock extraction;
- Ore processing;
- Mineral waste management (overburden, mine rock stockpiles, and tailings);
- Water collection, management, distribution, and treatment; and
- Progressive site reclamation where practical.

Decommissioning phase

- Project infrastructure (e.g. buildings, machinery, equipment) to be removed;
- An onsite demolition landfill for non- hazardous waste generated by mine closure;
- TMA to be saturated to reduce the potential for acid rock drainage and metal leaching (ARD/ML) by restricting oxygen contact with the tailings surface;
- Overflow spillway(s) to be developed or deepened to ensure drainage of excess runoff in the TMA;
- Natural flooding of the open pit and underground mine (potential for enhanced flooding of open pit);
- Removal of 230 kV transmission line, unless another owner requires its use;
- Closure and reclamation of the various project components (associated buildings, facilities and infrastructure such as a maintenance garage, warehouse and administration complex, fuel storage and refuelling area, laydown area(s), explosives manufacturing and storage facilities);
- Progressive rehabilitation of mine rock and overburden stockpiles where practical (overburden and vegetation for non potentially acid generating (NPAG) mine rock and multi-layered cover for east mine rock stockpile to control ARD/ML);
- Watercourse diversions and realigned Highway 600 will remain in place; and
- Ongoing environmental monitoring and site management.

Abandonment phase

- Ongoing environmental monitoring and site management until passive flooding of the open pit is complete.

2.4 Schedule

Construction, which the proponent expects to last two years, is proposed to start after completion of the federal and provincial EA processes and once applicable federal and provincial regulatory approvals and permits have been obtained. The operations phase is planned to start in 2016 and continue for 16 years. Active closure and decommissioning are therefore anticipated to begin in 2032 and continue actively for approximately two years. This will be followed by the abandonment phase of approximately 94 years while the open pit is flooding. This will include a final period of environmental monitoring and site management (of less than one year) once the pit is fully flooded in accordance with the mine closure plan filed under the Ontario *Mining Act* to return the leased lands back to the Crown.

3 Project Justification and Alternatives

3.1 Purpose of the Project

The Environmental Impact Statement (EIS) indicates that the purpose of the Project is to meet the strong demand for gold in the global marketplace and that there is a local and regional need in northwestern Ontario for economic development. The proponent expects the Project to have a positive economic influence on the region, providing construction and permanent employment opportunities for a large number of people. The region has experienced recent declines in both employment and population, in large part related to the downturn of the forestry industry.

3.2 Alternative Means of Carrying Out the Project

In accordance with paragraph 19(1)(g) of the Act, the proponent assessed alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means. The proponent considered alternative methods for construction, operations, decommissioning, and abandonment of:

- mining;
- mine water management;
- mine rock and overburden management;
- processing;
- onsite metal mill effluent management;
- tailings management;
- onsite metal mill complex;
- explosives facility;
- aggregates;
- water supply;
- Highway 600 realignment;
- power supply; and
- transmission line rerouting.

The EIS indicates the following performance objectives to distinguish between individual alternatives:

- cost-effectiveness;
- technical applicability and system integrity and reliability;
- ability to service the site effectively;
- effects to the VCs; and
- amenability to reclamation.

The EIS indicates that each performance objective was evaluated using a distinct set of criteria and indicators to help rate the predicted performance of each alternative at a level of preferred, acceptable, or unacceptable. It describes a comparative evaluation of the advantages and disadvantages of each alternative method and takes into account the relative importance of the individual performance objectives

listed above. Alternatives rated "unacceptable" in any single performance objective were rejected by the proponent.

An alternatives assessment for disposal of mine waste (i.e. effluent, tailings, waste rock, low grade ore, and overburden)also was undertaken according to Environment Canada's (EC) *Guidelines for the Assessment of Alternatives for Mine Waste Disposal*[1] (Environment Canada 2013) which involves a multi-step assessment of the mine waste disposal alternatives based on multi-criteria decision analysis to identify disposal areas for three types of mine waste (NPAG waste rock and overburden, potentially acid generating (PAG) waste rock, and tailings). This assessment was required because the proposed mine waste disposal areas would impact directly Loslo Creek and Marr Creek. In order to allow for the disposal of mine waste into fish frequented waters, an amendment to Schedule 2 of the *Metal Mining Effluent Regulations* (MMER) (pursuant to subsection 36(5) of the *Fisheries Act*) is required.

The EIS also describes the assessment of the alternative methods of decommissioning the open pit, underground mine rock stockpiles, tailings management area (TMA), buildings and equipment, and drainage.

Appendix D describes in greater detail the alternative means considered for the project components economic and technical feasibility; environmental considerations; and the preferred options in carrying out the Project.

3.2.1 Comments received

3.2.1.1 Government authorities

Ministry of Natural Resources and Forestry (MNRF) expressed concerns about the proponent's evaluation of transmission line route alternatives. It requested details about the rationale behind the proponent's selection of its preferred transmission line alternative and public consultation on the provision of any additional information. The proponent provided a supplemental report that outlined additional details and presented figures supporting the selection of its preferred alternative. In addition, the proponent conducted consultations with the public and local Aboriginal communities on the supplemental report.

3.2.1.2 Aboriginal communities

Aboriginal communities did not express any concern about the alternatives assessment.

3.2.1.3 Public

Public comments were not received in relation to the alternatives assessment.

3.2.2 Agency analysis and conclusion

The proponent's alternatives assessment considered matters such as managing the footprint of the Project, reducing the quantities of mine rock generated, eliminating or managing direct releases of effluents to the environment, and loss of fish habitat. The Agency notes that the alternatives assessment for mine waste

[1] http://www.ec.gc.ca/pollution/default.asp?lang=En&n=125349F7-1&offset=1&toc=show

disposal was undertaken according to EC's *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (Environment Canada 2013). The proponent has responded to MNRF in relation to the siting of the transmission line. The proponent committed to meeting scientifically defensible alternatives for all surface water going into the Pinewood River from the mine for the protection of aquatic life as required by EC and MOECC.

The Agency is satisfied that the proponent has sufficiently assessed alternative means of carrying out the project.

4 Consultation Activities and Advice Received

The Agency coordinated public and Aboriginal consultation opportunities, to the extent possible, with the Province of Ontario. For the purposes of the environmental assessment (EA), the Agency served as the Crown Consultation Coordinator while the Ontario Ministry of Northern Development and Mines (MNDM) was the lead for provincial Crown consultation activities.

4.1 Aboriginal Consultation

4.1.1 Aboriginal consultation in the environmental assessment process

The federal government has a duty to consult with Aboriginal groups when it proposes to take an action or make a decision that might adversely affect established or potential Aboriginal or treaty rights. Where appropriate, the federal government accommodates these interests. The Act facilitates consideration of these impacts on Aboriginal groups by requiring that all federal EAs consider the effect of any project-related effects on their health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, and changes to any structure, site or thing that is of historical, archaeological, paleontological or architectural significance to them. Aboriginal consultation is also an important part of good governance and sound policy development and decision making.

The Agency identified 16 Aboriginal groups whose potential or established Aboriginal and treaty rights could be adversely impacted by the Project:

- Rainy River First Nation
- Naicatchewenin First Nation
- Anishinaabeg of Naongashiing First Nation (Big Island)
- Big Grassy River First Nation
- Ojibways of Onigaming First Nation
- Naotkamegwanning First Nation (Whitefish Bay)
- Métis represented by the Métis Nation of Ontario Region 1 Consultation Committee
- Mitaanjigamiing (Stanjikoming) First Nation
- Couchiching First Nation
- Buffalo Point First Nation
- Northwest Angle #33
- Northwest Angle #37
- Anishinabe of Wauzhushk Onigum (Rat Portage)
- Lac La Croix First Nation
- Seine River First Nation
- Nigigoonsiminikaaning First Nation

The Agency supports Aboriginal participation through its Participant Funding Program. Funds were provided to reimburse eligible expenses of Aboriginal groups that participated in the EA. Nine identified Aboriginal groups applied for and received funding through this program (Whitefish Bay, Big Grassy River , Métis Nation of Ontario Region 1 Consultation Committee, Naicatchewenin, Rainy River, Couchiching, Mitaanjigamiing, Nigigoonsiminikaaning, and Seine River). In total, the Agency awarded $156 540.37 to support Aboriginal participation in the EA.

The Agency consulted all sixteen Aboriginal groups through a variety of methods including phone calls, emails, letters, and in-person meetings. The Agency requested written comments from Aboriginal groups on the project description (PD), the draft environmental impact statement (EIS) Guidelines, and the EIS Summary (Table 4-1). The Agency provided regular updates to the Aboriginal groups to keep them informed of key developments and to solicit feedback. The Agency is inviting Aboriginal groups to provide comments on this EA report.

Table 4-1: Aboriginal and Public Comment Opportunities during the Review of the Final EIS

Document or Subject of Consultation	Dates
Summary of the PD	September 4, 2012 to September 24, 2012
Draft EIS guidelines	October 19, 2012 to November 19, 2012
EIS/EA report summary	January 17, 2014 to February 17, 2014
Draft EA report	October 3, 2014 to November 3, 2014

The Agency held meetings during the review of the EIS with Aboriginal groups, the proponent, and representatives from the province. These sessions provided an opportunity for members of Aboriginal communities (or in some cases, Chief and Council) to hear presentations on the EA and the proponent's EIS and to provide comments. Comments and additional information provided by the proponent were considered in the Agency's analysis.

Potential effects on Aboriginal peoples are discussed in sections 7.3, 7.4 and 7.5. Appendix E contains a summary of concerns raised by the Aboriginal groups during the EA process and the proponent's and Agency's responses. All comments have been considered in developing this EA report.

4.1.2 Proponent's Aboriginal consultation and engagement activities

The EIS indicates that the proponent engaged all Aboriginal communities identified by the Agency to discuss issues and offered Aboriginal communities financial support for conducting traditional knowledge and land use studies and reviewing the EIS. The proponent conducted archeological studies and reviewed previous studies related to Aboriginal use of the project site. The proponent also presented information to Aboriginal communities on the fish habitat compensation plan for the loss of habitat resulting from the use of water bodies for mine waste disposal.

The proponent indicated that it signed agreements with some of the Aboriginal groups, including data-sharing protocols, memoranda of understanding (MOUs), and impact benefit agreements.

The EIS indicates that through funding from the proponent, Pwi-Di-Goo-Zing Ne-Yaa-Zhing Advisory Services, on behalf of Big Grassy River First Nation, Couchiching First Nation, Lac La Croix First Nation,

Mitaanjigamiing First Nation, Naicatchewenin First Nation, Rainy River First Nation, and Seine River First Nation, contracted Dillon Consulting Limited to conduct a high-level technical review of the EIS. Elders, youth, hunters, consultation coordinators, and other community knowledge holders from the above mentioned communities participated in a workshop to help identify the knowledge, values, and priorities held by these First Nations, and to discuss issues, concerns, and opportunities associated with the Project. Comments from the technical review completed on behalf of these First Nations were then considered and incorporated into the EIS and in the Agency's analysis.

4.2 Public Participation

4.2.1 Public participation in the environmental assessment process by the Agency

The Act requires that the public be provided with three formal participation opportunities. For this Project, the Agency provided four opportunities for the public to participate in the EA process:

- An opportunity to comment on the PD;
- An opportunity to comment on the draft EIS Guidelines;
- An opportunity to comment on the summary of the proponent's EIS; and
- An opportunity to comment on the draft EA report.

Notices of these opportunities to participate were posted on the Canadian Environmental Assessment Registry Internet Site (the Registry) and advertised through local media.

Groups who participated in the consultations include: the Townships of Emo, Alberton, Dawson, Lake of the Woods, La Vallee, Morley, and Chapple; the Town of Fort Frances; the Rainy River Future Development Corporation; and the United Native Friendship Centre.

The Agency supported public participation through its Participant Funding Program. A total of $9 840 was allocated to the Rainy River Soil and Crop Improvement Association.

Hardcopies of the draft EIS Guidelines and EIS Summary were made available at public viewing centres in the Towns of Barwick, Rainy River, Fort Frances, Emo and Atikokan. During the review of the EIS, the Agency conducted two open houses, one in the Town of Fort Frances and one in Emo. These open houses were held jointly with the proponent, representatives from other federal departments, and the provincial government. Over 100 members of the public attended each one. These sessions provided opportunities for members of the public to hear presentations on the EA process, review the proponent's EIS, and provide comments. Those comments were considered in the preparation of this EA report (Appendix F).

The Agency is inviting the public to provide comments on the content, conclusions and recommendations set out in this EA report. After taking into consideration the comments received from the public, the Agency will finalize and submit the report to the Minister of the Environment.

4.2.2 Public participation activities by the proponent

The proponent indicated it engaged local residents from the towns of Rainy River and Fort Frances; residents of the townships of Chapple, La Vallee, Alberton, Dawson, Lake of the Woods, and Morley; and other potentially affected or interested stakeholders, including local land owners.

The proponent stated that public consultation activities included information sharing, general consultation with community members, and key stakeholder meetings.

4.3 Participation of Federal and Other Experts

Several federal departments with specialist information or expert knowledge relevant to the Project provided advice pursuant to section 11 of the Act, to help determine whether a federal EA was required. They also participated in the review of the EIS Guidelines, the EIS and provided input into the preparation of the EA report pursuant to section 20 of the Act.

Fisheries and Oceans Canada (DFO) has regulatory and statutory responsibilities under the *Fisheries Act* and provided advice and information related to fish and fish habitat in the context of a commercial, recreational or Aboriginal fishery, and provisions for water flow and fish passage.

Environment Canada (EC) has regulatory and statutory responsibilities under the *Canadian Environmental Protection Act, 1999* (CEPA), *Migratory Birds Convention Act, 1994* (MBCA), SARA, and the pollution prevention provisions of the *Fisheries Act* including the MMER. EC provided advice related to air quality, effluent discharges related to mine waste management, geochemistry, water quality and quantity, terrestrial SAR, international boundary waters, migratory birds, meteorology, climate change, and accidents and malfunctions.

Health Canada (HC) provided advice on potential effects on Aboriginal health related to country food, water quality and air quality.

Natural Resources Canada (NRCan) has regulatory and statutory responsibilities under the *Explosives Act*, and provided advice related to groundwater quality and quantity.

At the beginning of the EA process, Transport Canada (TC) identified that a *Navigable Waters Protection Act* (NWPA) permit may be required to enable the Project to proceed. However, under the new *Navigation Protection Act* (NPA), TC determined that the Pinewood River is not navigable in the area of the proposed crossing for the re-alignment of Hwy 600. The Pinewood River is also excluded from the Schedule of the NPA and an application will not be required.

The Agency notified the Department of Foreign Affairs and International Trade due to the proximity of the project site to the Canada–United States of America border. The Agency also discussed the Project with the International Joint Commission. The International Joint Commission was interested in the Project but did not raise concerns throughout the EA process.

The Agency and Ontario conducted the federal and provincial EA process cooperatively to the fullest extent possible, which included working closely on the technical review of the EA. The following provincial ministries provided advice on the EA and have overlapping mandates with the federal authorities: The Ontario Ministry of the Environment and Climate Change (MOECC), MNDM, and Ministry of Natural Resources and Forestry (MNRF). The advice of the Ontario Ministry of Transportation (MTO) and the Ontario Ministry of Tourism, Culture, and Sport (MTCS) also were considered in the review of the environmental effects, mitigation measures and conclusions.

5 Geographical Setting

5.1 Biophysical Environment

The Project is located in the Township of Chapple, District of Rainy River, in northwestern Ontario. The area has variable, gently undulating terrain and is drained principally by the Pinewood River and its associated minor tributaries.

All aspects of drainage associated with the Project, including water taking and effluent and runoff discharges, occur within an upstream portion of the Pinewood River watershed. Specifically, the project site is drained by four minor creek systems (Clark Creek and Teeple Drain, West Creek, Marr Creek, and Loslo Creek, and Cowser Drain; henceforth referred to as the Minor Creek Systems), which flow into Pinewood River. Farther south, the Pinewood River enters Rainy River, which is an international waterway separating Canada (Ontario) from the United States of America (Minnesota).

Data used by the proponent to describe the local climate came from the EC climate station located approximately 20 km south of the project site at Barwick. Local climate conditions in the area are typical of northwestern Ontario, with a mean annual temperature of 3.2 degrees Celsius (°C), a mean summer high of 18.8°C in July, and a mean winter low of -15.9°C in January. Mean annual average precipitation is 695.7 millimetres (mm), with 80 percent falling as rain and 20 percent as snow. The maximum mean monthly precipitation is 113.8 mm in June and the minimum is 25.1 mm in February. There are no areas of natural and scientific interest or federal lands within or proximal to the general site area. Key wildlife species found within the natural environment local study area (NLSA) include White-tailed deer, Moose, and breeding birds.

The project site and surrounding areas are heavily impacted by historical farming and forestry operations. Areas of regenerating abandoned farmland are evident throughout the project site and NLSA. Most of the land is cleared, with remaining trees dominated by mixed poplar forest, which is indicative of disturbed lands recovering from past forestry and farming activities or regrowth following past fires (Figure 5-1). Potential changes to this environment as a result of project activities are assessed in sections 6 and 7.

Figure 5-1: Pinewood River and surroundings, portraying lands recovering from past forestry and farming activities in which the project site is located (Source: Rainy River EIS, AMEC).

5.2 Human Environment

The closest local municipalities are: Emo (population 1305 - 28 km to the southeast); Rainy River (population 909 – 45 km to the southwest); and Fort Frances (population 8103 – 50 km to the east-southeast). Naicatchewenin and Rainy River First Nations are the closest reserves and are located approximately 19 km east and southeast, respectively, of the site (Figure 5-2). Much of the human environment local study area (HLSA) has traditionally seen economic activities related to forestry, agriculture, recreation, and tourism. The local economy is struggling due to the decline in forestry activity. The Project is located in a low-density rural area, within which some limited agricultural (mainly cattle and fodder cropping) and logging activities occur and some private residences are found.

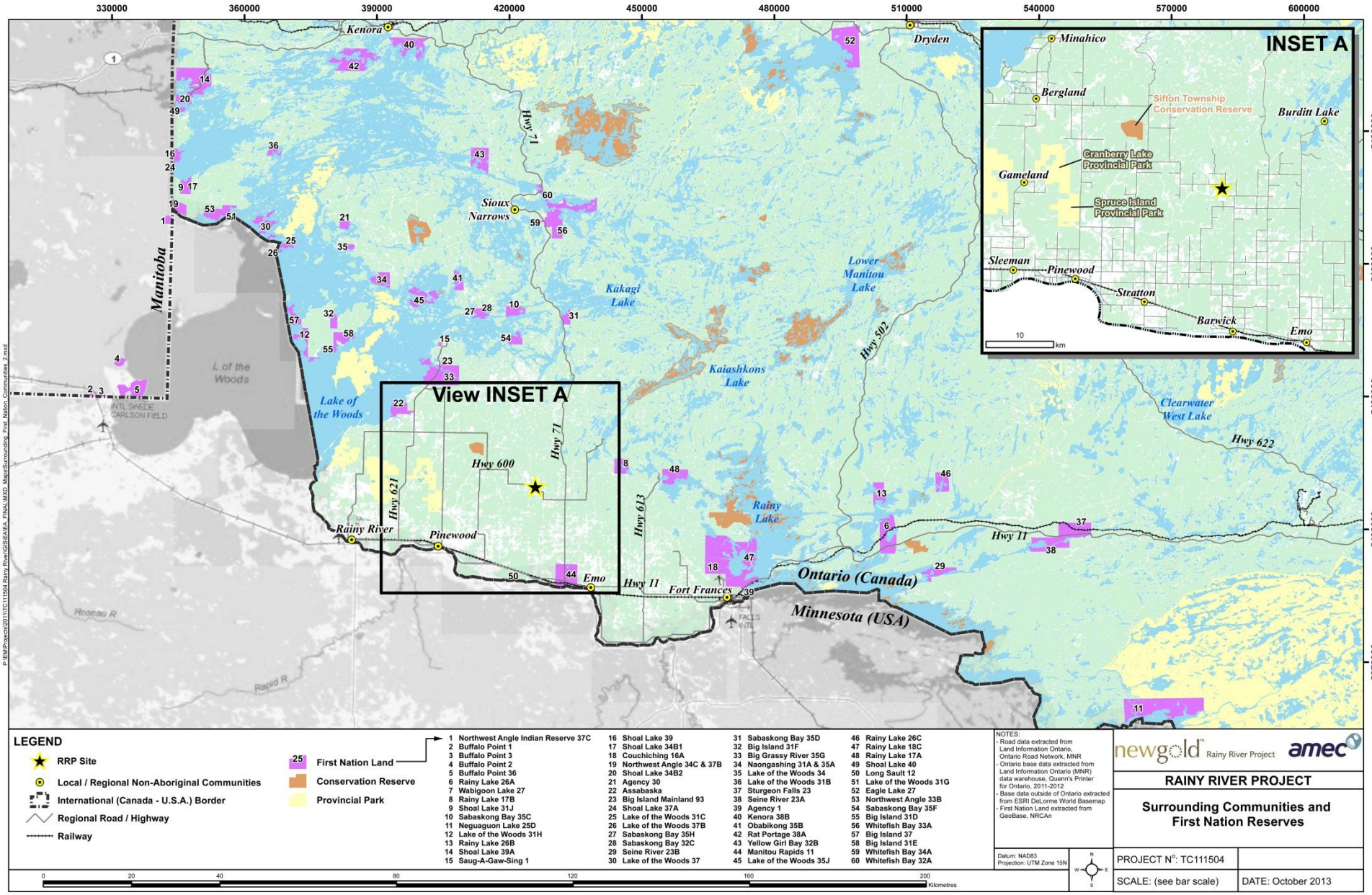

Figure 5-2: Communities and First Nation Reserves surrounding the project site (Source: Rainy River EIS, AMEC).

6 Predicted Changes to the Environment

6.1 Atmospheric Environment

6.1.1 Baseline by proponent

6.1.1.1 Air quality baseline by proponent

The atmospheric environment baseline includes a description of both air quality and the acoustic (sound) environment. The project site is in a rural area away from major industrial emission sources. Local sources of air emissions include road traffic, agriculture, an engineered wood particle board mill located 30 km away, and drilling associated with mineral exploration activities.

The baseline air quality at the Environment Canada (EC) and Ministry of the Environment and Climate Change (MOECC) monitoring stations meets the Ontario Ambient Air Quality Criteria (AAQC), which are generally more stringent than the Canadian National Ambient Air Quality Objectives. Air quality monitoring conducted at the project site focused on potential contaminants of concern, including particulate matter (PM) also known as total suspended particulate (TSP), and metals. Table 6-1 provides a baseline summary.

6.1.1.2 Acoustic environment baseline by proponent

Sound data were collected at residential sites, at locations selected for wildlife habitat sensitivity, and at monitoring stations covering a wider area around the project site. Measured baseline sound levels were indicated to be below the sound limits, as per the MOECC NPC-300 noise guidelines for Class 3[2] (rural) areas, of 45 A-weighted decibels (dBA) for daytime (7:00 to 19:00) and 40 dBA for evening and nighttime (19:00 to 7:00).

6.1.2 Changes to atmospheric environment predicted by proponent

6.1.2.1 Changes to air quality

Predicting the changes to the atmospheric environment involved evaluating the main sources of air emissions from the construction, operation, and decommissioning phases of the project. The model for air quality was based on maximum predicted ground level air concentrations in the natural environment local study area (NLSA) during operation, both before and after the application of mitigation measures. The model was based on conservative estimates (i.e. if all sources are active at their maximum output at all times). The model showed background levels of TSP and $PM_{2.5}$ may infrequently exceed AAQC at the project site boundary. Exceedances of contaminants of potential concern due to the project are predicted to be infrequent at the project site boundary during operations (Table 6-1).

Emissions sources during operation were: blasting; material handling in the open pit; dust from crushing; road dust emissions; dust from managing mine rock, ore and overburden; concrete batching; underground

[2] MOECC's NPC-300 Environmental Noise Guidelines defines a Class 3 area as a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as: a small community; agricultural area; a rural recreation area such as a cottage or a resort area; or a wilderness area.

mining activities; gold ore processing; and exhaust from back-up power generation. Fugitive dust and contaminant emissions have the highest potential for causing adverse offsite effects during operations.

Sulphur dioxide (SO_2) emissions occur primarily from the cyanide destruction system in the onsite metal mill; releases of hydrogen cyanide (HCN) will be from the leaching process; and releases of nitrogen oxides (NO_x) will be from blasting and propane combustion. Key metals were modelled with the assumption that dust is of the same composition as the ore or mine rock. The predicted concentrations at the project site boundary were all shown to be below their respective AAQC limits. Table 6-1 provides a comparison of AAQC limits, baselines and modelled impacts.

Table 6-1: Comparison of Ambient Air Quality Criteria Limits with Air Quality Background Concentrations and Modeled Impacts (Adapted from Rainy River EIS, AMEC).

	Air Quality Background Concentration (µg/m³)	**Air Quality Background + Modeled Impact Concentration (µg/m³)**	**AAQC Limits (µg/m³)**
PM as TSP	39.0	125.0	120
Fine particulate matter ($PM_{2.5}$)	9.8	33.7	30
Sulphur oxides, mainly as sulphur dioxide (SO_2)	3.0	12.3	275
Nitrogen oxides (NO_x)	11.0	37.7	200
Key Metals			
Arsenic (As)[3]	no data	0.012	0.3
Cadmium (Cd)	0.0022	0.004	0.025
Lead (Pb)	0.010	0.029	0.5
Mercury (Hg)	0.0017	0.0017	0.5
Hydrogen cyanide (HCN)[4]	no data	1.40	8

The proponent proposed mitigation measures to mitigate the effects on air quality (Appendix A). After mitigation, the residual effects on air quality were predicted to be confined to the project site; continuous through mine construction, operations, and decommissioning; and reversible following decommissioning. The proponent indicated that with mitigation, concentrations of contaminants of potential concern are predicted to be below AAQC limits for emissions during all phases of the project.

[3] The proponent cited that data was not available from the existing EC or MOECC stations so it used a concentration of 0 to represent background levels.

[4] The proponent indicated that data for existing HCN is not available so it used a concentration of 0 to represent background levels. HCN is released from milling operations and since there are no existing metal mills in the NRSA, background data for HCN is absent.

6.1.2.2 Changes to acoustic environment

Sound emissions will be greatest during operation phase and most notable in areas of concentrated heavy equipment operation associated with the open pit, stockpiling, onsite metal mill, and crusher operations. Sound disturbances will have lesser adverse effects in areas of low traffic, such as the proposed transmission line and the tailings management area (TMA). The results of the sound contour modelling indicate that the sound levels are not expected to exceed MOECC NPC-300 noise guidelines.

The proponent proposed mitigation measures to mitigate the effects on sound levels (Appendix A). After mitigation, the residual effects on noise were predicted to be confined to the project site; continuous through mine construction and operations; and reversible at decommissioning. The modelled sound contours for the project site and surrounding receptors in the NLSA for the two worst case scenarios (2015 and 2020) demonstrate compliance with applicable MOECC NPC-300 noise guidelines.

6.2 Water Quantity (levels and flows)

6.2.1 Baseline by proponent

The Minor Creek Systems, as defined in section 5.1, which drain the project site, are generally low gradient, low energy systems with wide, densely vegetated grass and sedge dominated floodplains, with frequent naturally impounded water bodies such as beaver ponds and related log jams. These Minor Creek Systems flow into the Pinewood River and make up part of the total watershed area of the Pinewood River, which is 57 550 ha. The Pinewood River has limited baseflow due to the prevalence of clay substrates in the NLSA and low groundwater recharge rates. As a result, the river can experience extreme low to zero flow conditions in the late summer and early fall during drought years and during mid to late winter.

6.2.2 Changes to water quantity predicted by proponent

Construction

Temporary Water Taking

The proponent proposes to take water from the Pinewood River watershed during construction to build an initial water inventory for project start-up. This would be achieved, in part, through the capturing and holding of site runoff from the TMA, water management pond, and mine rock pond catchments, which would otherwise enter the Pinewood River. A water intake structure would also be constructed downstream of McCallum Creek, where there is substantial increase in total river flow due to the inflow of two major tributaries.

The water taking would result in an amount not greater than 20 percent flow reduction in the Pinewood River from April to June and 15 percent reduction at other times of the year, as measured below McCallum Creek. The actual flow reduction in the Pinewood River would begin upstream of that, prior to the construction of the West Creek Diversion Channel, due to the holding of site runoff which would otherwise enter the river via the Minor Creek Systems.

Minor Creek Systems

Potential effects on creeks are limited to the Minor Creek Systems within the NLSA, where the creeks will be altered and disrupted by mine components (Figure 6-1), during all project phases including

abandonment. The effects of associated habitat loss on fish and fish habitat are discussed further in section 7.1. The upstream portions of these creeks will require flow diversion or interception to prevent upstream flows from interacting with the project site. Potential effects on creek flows, and the resulting effects on the Pinewood River, will vary from creek to creek (Table 6-2).

Table 6-2: Summary of Potential Effects on Creek Flows and Resulting Effects on Pinewood River (Adapted from Rainy River EIS, AMEC)

	Change to Creek	Redirection of Creek Flow	Effect on Pinewood River Flows
Clark Creek and Teeple Drain	A portion of the natural channel will be displaced by the east mine rock stockpile and mine rock pond. Clark Creek Pond will be constructed to receive flows upstream of the east mine rock stockpile. Clark Creek Diversion Channel will be constructed to receive flows from the Clark Creek Pond.	Drainage from the east mine rock stockpile to be captured by stockpile drainage collection ditches and diverted to the mine rock pond. Mine rock pond water will be recycled for onsite metal mill operations and not discharged to the environment. Upstream drainage will be diverted through the Clark Creek Diversion Channel to Teeple Pond.	Recycling of drainage waters for onsite metal mill operations is expected to reduce flows in Pinewood River, downstream of the existing Clark Creek outflow.
West Creek	Natural channel and flows will be redirected around the overburden and west mine rock stockpile. A West Creek Pond and West Creek Diversion Channel will be constructed for the diversion.	Flows will be diverted through the (new) West Creek Diversion Channel, to Loslo Creek at a point downstream of the constructed wetland, and subsequently into Pinewood River.	West Creek Diversion Channel is expected to reduce flows in Pinewood River between the existing West Creek outflow, and the Loslo Creek outflow.
Marr Creek	Natural channel will be removed by the TMA, overburden, and west mine rock stockpiles.	Drainage flows will be collected and managed within the TMA and stockpile drainage collection systems. Treated effluent in the water management pond will be discharged through the constructed wetland to Loslo Creek, and through a pipe directly into Pinewood	Drainage redirection is expected to reduce flows in Pinewood River, between the existing Marr Creek outflow and the Loslo Creek outflow, and to a lesser extent to the pipeline discharge point downstream of McCallum Creek.

	Change to Creek	Redirection of Creek Flow	Effect on Pinewood River Flows
		River downstream of McCallum Creek.	
Loslo Creek and Cowser Drain	Upstream portion of the natural channel will be removed by the TMA. Downstream portion of the natural channel will be altered by the water discharge pond and the constructed wetland.	Drainage flows will be collected in TMA ditches and directed either to the TMA, water management pond, or water discharge pond. Treated effluent in the water management pond will be discharged through the constructed wetland to Loslo Creek, and through a pipe directly into Pinewood River downstream of McCallum Creek.	Drainage redirection is expected to reduce flows in Pinewood River, between the existing Loslo Creek outflow and the pipeline discharge point downstream of McCallum Creek. The downstream portion of the natural channel will remain active for most of the year, receiving flows from the constructed wetland and the West Creek Diversion Channel.

Pinewood River

As a result of the changes to the Minor Creek Systems described above, the locations of creek inflows to the Pinewood River will be modified during all project phases, including abandonment. The resulting flow reduction in the Pinewood River ranges from 8.1 to 34.2 percent between Clark Creek and Loslo Creek and by 8 percent between Loslo Creek and the TMA pipeline discharge point downstream of the McCallum Creek outflow.

Below the McCallum Creek outflow, Pinewood River flow increases substantially, as the natural watershed is expanded by McCallum Creek and Tait Creek. At the pipeline discharge point, Pinewood River flow will be influenced negatively by upstream runoff losses and positively by water released back through the constructed wetland, the West Creek Diversion Channel, and the discharge pipe.

Operations

Losses from the system during operations include water stored permanently in the TMA, evaporation from the onsite metal mill, and water used for dust suppression. A small amount of water (100-200 m^3 per day) will be taken from West Creek Pond for potable water. Despite recycling and water losses to storage in the system, a surplus of treated water is expected during operations, due to additions from ground water intercepted by mine workings and the development of enhanced site runoff conditions.

The proponent owns all of the water supply wells within the zone of influence of open pit dewatering. The proponent predicted that reduction in groundwater flow is not expected to affect flows in the Pinewood River or the Minor Creek Systems.

Decommissioning and Abandonment

Modifications made to the Minor Creek Systems and the constructed diversion channels during construction will be maintained during decommissioning and abandonment, resulting in continued flow reductions in the Pinewood River between Clark and Loslo Creeks.

Additional water taking from the Pinewood River is proposed during decommissioning, including the holding of site runoff and TMA outflows, to augment the flooding of the TMA and filling of the pit. Flooding of the pit is expected to take several decades, depending on the quantity of runoff that is intercepted and held. Water management during TMA flooding and open pit filling could result in additional reductions in Pinewood River flows until the open pit is filled.

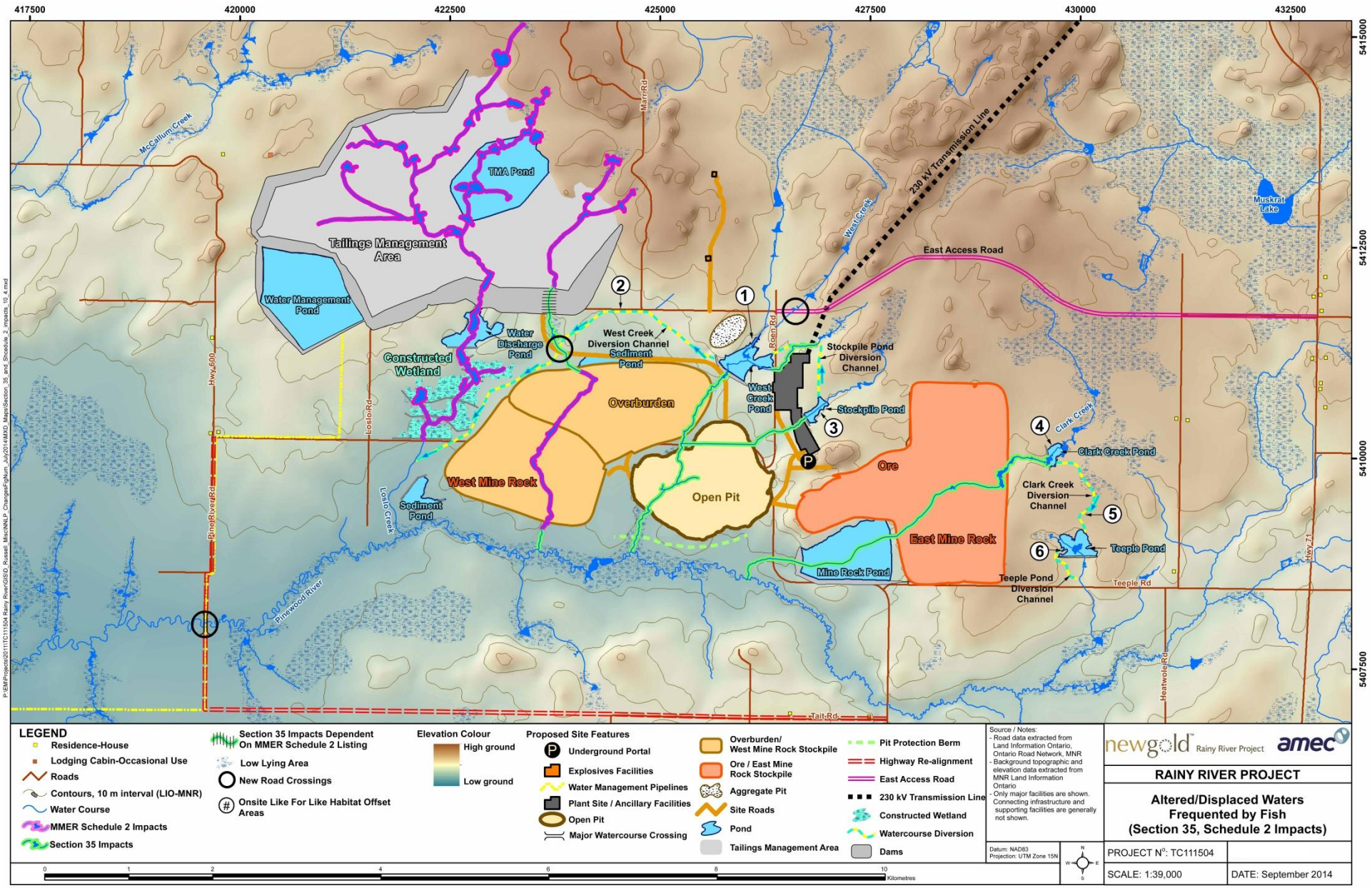

Figure 6-1: Aquatic Habitat Displaced by Mine Features (Source: Rainy River EIS, AMEC).

The proponent proposed mitigation measures to mitigate the effects on water quantity (Appendix A). After mitigation, the residual effects on water quantity were predicted to be confined to the project site; long-term; continuous through mine construction, operations, and decommissioning; and irreversible. The proponent indicated that the effects, however, will be compensated and as such, are not of concern.

6.3 Water Quality

6.3.1 Baseline by proponent

Canadian Environmental Quality Guidelines (CEQG[5]) and Provincial Water Quality Objectives (PWQO[6]) are values set by the federal and provincial governments respectively, and are considered protective of all forms of aquatic life, including the most sensitive species for an indefinite period of exposure with included safety factors. It is possible for certain parameters to exceed CEGQ and PWQO values in the background environmental baseline condition, even in areas that are completely undisturbed.

Surface water quality monitoring data for the Project indicate that the baseline exceeded levels relative to CEQG and PWQO for the following parameters: copper (mainly CEQG), arsenic, lead, nickel, and zinc. The baseline for groundwater also exceeded CEQG guidelines for arsenic, iron and cadmium and PWQO parameters for cobalt and iron. The ability of these parameters to cause a health risk to fish, wildlife, and humans is a function of release rates, exposure pathways, and organism presence and sensitivity.

The ore and a substantive portion of the waste mine rock are potentially acid generating (PAG), which creates the risk of acid rock drainage and metal leaching (ARD/ML) in the NLSA. It is estimated that approximately 44 percent of the waste material within the future pit would be PAG.

6.3.2 Changes to water quality predicted by proponent

Changes to water quality in the Pinewood River and Minor Creek Systems could arise due to contaminant sources, such as mine water from the open pit and underground mine, water associated with the treated tailings from the process plant, and runoff and seepage from the TMA and stock piles.

The proposed water management plan includes six primary constructed ponds for water management (Figure 6-2): TMA pond, water management pond, water discharge pond, mine rock pond, and sediment ponds #1 and #2.

All contact water, including mine water from the open pit and underground mine, will flow directly or indirectly to one of these ponds. The TMA and stockpiles will incorporate perimeter ditching to intercept and redirect any seepage to the water treatment systems and subsequently to the final discharge points.

Four final discharge points for the operations phase are proposed (Figure 6-2):

- the constructed wetland, which will discharge into Loslo Creek;
- the pipeline, which will discharge directly into Pinewood River downstream of the McCallum Creek outflow;

[5] http://ceqg-rcqe.ccme.ca/

[6] https://www.ontario.ca/environment-and-energy/water-management-policies-guidelines-provincial-water-quality-objectives

- sediment pond #1, which will discharge into the West Creek Diversion Channel; and
- sediment pond #2, which will discharge into Loslo Creek.

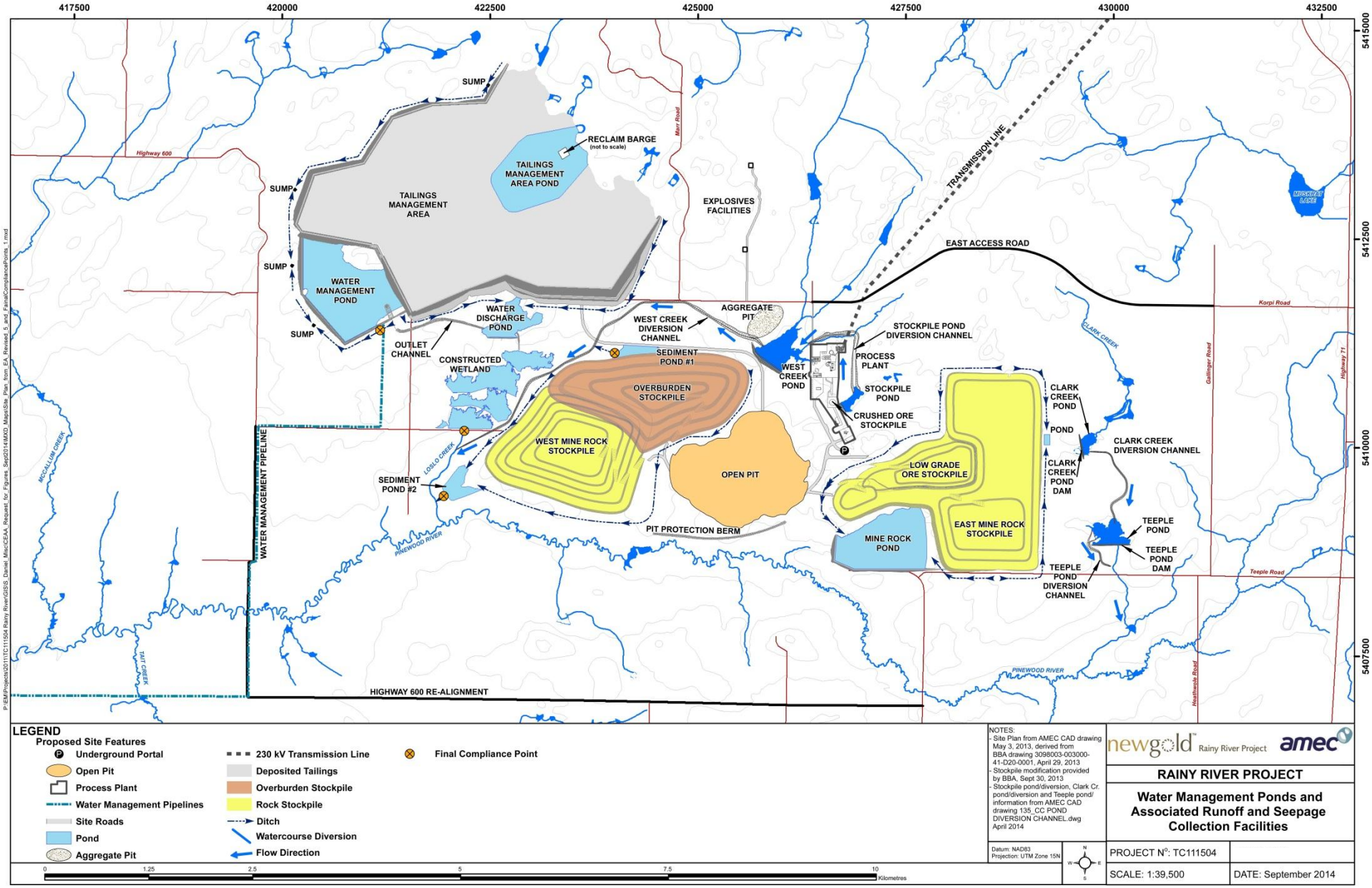

Figure 6-2: Water Management Ponds and Final Effluent Discharge Points (Source: Rainy River EIS, AMEC).

Table 6-3: Laboratory Aging of Synthetic Process Plant Discharge (after SO_2/air treatment process) Compared to Provincial and Federal Water Quality Standards (adapted from Rainy River EIS, AMEC).

Parameter	Cyanide Destruction 60-day Aging Test Results mg/L	Water Quality Standards	
		Provincial (PWQO) mg/L	Canadian (CEQG) mg/L
Cyanide (total)	<0.01	----------	----------
Cyanide (free)	<0.01	0.005	0.005
Arsenic	0.003	0.1 0.005 - interim	0.005
Copper	0.012	0.005 at hardness > 20 mg/L $CaCO_3$	0.004 at hardness > 180 mg/L $CaCO_3$
Nickel	0.003	0.025	0.150 at hardness >180 mg/L $CaCO_3$
Lead	0.0005	0.005 at hardness > 80 mg/L $CaCO_3$	0.007 at hardness >180 mg/L $CaCO_3$
Zinc	0.086	0.030 0.020 - interim	0.030
Un-ionized ammonia (NH_3-U)	0.153	0.020	0.019

Appendix G summarizes the various water bodies associated with the water management plan or project site, as described in the Environmental Impact Statement (EIS), and differentiates between those water bodies that are part of a water treatment and those forming part of a freshwater system.

The proponent proposed mitigation measures to reduce the effects on water quality (Appendix A). After mitigation, the residual effects on water quality were predicted to be confined to the project site but long-term and irreversible. The proponent indicated however, that the effects will be compensated and as such are not of concern. The EIS indicates that treated runoff and seepage discharges will be in compliance with federal *Metal Mining Effluent Regulations* (MMER) Schedule 4 limits and the MOECC Environmental Compliance Approval and PWQO or site-specific criteria at the mixing zone boundary will be met. The river system is sufficiently adaptable such that if unexpected concerns arise, adaptive management techniques will be applied to optimize the water management plan.

6.4 Terrestrial Landscape

6.4.1 Baseline by proponent

The NLSA encompasses a variety of terrestrial habitats with habitat overlap which is reflected in the areal extent coverage reported (Table 6-4). Also, many of the woodland habitat areas have been harvested in the past and are in a state of regeneration. Two provincially rare plant species, Field Sedge and New England Violet were identified in the NLSA, both within woodland habitats. Field Sedge was abundant and

widespread within hardwood forests in the NLSA. The New England Violet was identified in coniferous forests and coniferous swamps within the northern and northeastern parts of the NLSA.

6.4.2 Changes to terrestrial landscape predicted by proponent

Clearing will mostly affect vegetation community types that are common throughout the NLSA and natural environment regional study area (NRSA) (Table 6-4). Most habitat lost will be woodland (1475.3 ha, or 7.3 percent of woodland habitat within the NLSA) and will occur during construction of the TMA, overburden stockpile, open pit, and mine rock stockpiles. Most of the affected hardwood forests are relatively young due to forestry activities, and provide deer browse and habitat for woodland breeding birds, like Eastern Whip-poor-will and Golden-winged Warbler. Coniferous forests provide late winter moose habitat and also support woodland breeding bird species. The project site largely avoids more mature hardwood forests, which are the best candidate habitats for bat roosting colonies.

Loss of wetland habitat (291.8 ha, or 9.5 percent of wetland habitat within the NLSA) will occur during construction of the TMA, overburden rock stockpile, and open pit. No bog communities will be impacted directly. The removal of wetland habitat within the NLSA will also impact 19 ha of open water habitat in relation to the Minor Creek System. Wetlands in the NLSA provide habitat for Snapping Turtles (section 7.9), and waterfowl like Trumpeter Swans (section 7.2).

Open country habitat loss (399 ha, or 15.3 percent of open country habitat within the NLSA) will occur during construction of the TMA, overburden and west mine rock stockpile, open pit, east mine rock stockpile, and onsite metal mill site. Open country habitats may support area-sensitive breeding bird communities like Bobolink, and provide foraging habitat for the Barn Swallow. Typically, these sites are created by human activity, and continue to be habitually disturbed.

Rock and mineral barren habitat will be cleared (10.9 ha, or 14.2 percent of rock and mineral barren habitat within the NLSA). Rock and mineral barren habitat communities may support area sensitive breeding communities like Common Nighthawk and may provide habitat for Eastern Whip-poor-wills.

Table 6-4: Terrestrial Habitat Types Reported by the Proponent (Adapted from Rainy River EIS, AMEC).

Habitat	Sub-habitat	Dominant Species	Aerial Extent in NLSA (ha)	Loss due to Clearing (ha)
Woodland	• Hardwood forest	• Trembling Aspen • Birch	12 961.3	1133.9 (8.7%)
	• Coniferous forest	• Pine and Spruce	2637.1	118.3 (4.5%)
	• Coniferous swamp	• Tamarack • Black Spruce • White Spruce • Eastern White Cedar	4612.4	223.1 (4.8%)
	Total		**20 210.8**	**1475.3 (7.3%)**
Wetland	• Meadow and shallow marsh	• Sedge and grass	1239.7	138.8 (11.2%)

Habitat	Sub-habitat	Dominant Species	Aerial Extent in NLSA (ha)	Loss due to Clearing (ha)
	• Fen	• Tamarack • Black Spruce • Sedges, herbs, and heather shrubs • Sphagnum mosses	954.8	123.3 (12.9%)
	• Thicket Swamp	• Speckled Alder • Willow	865.2	29.7 (3.4%)
	• Bog	• Black Spruce (short and stunted) • Sedges and heather shrubs • Sphagnum mosses	2.2	0
	Total		**3061.9**	**291.8 (9.5%)**
Open country	• Cattle rangelands and agricultural land	• Grasses (Reed Canary Grass and Blue-joint Grass) • Herbs (Timothy, Smooth Brome, Alfalfa, clovers, and other gaminoids)	2044.3	286.7 (14%)
	• Cultural meadow	• Non-native grasses • Herbs (Timothy, Smooth Brome, and Red Clovers)	569.5	112.3 (19.7%)
	Total		**2613.8**	**399 (15.3%)**
Rock and Mineral Barren	• Rock and mineral barren	• Coniferous forest tracts (very shallow soils)	77	10.9 (14.2%)
	Total		**77**	**10.9 (14.2%)**

Two of three habitat locations at the project site supporting New England Violet and one of two habitat locations supporting Field Sedge will be cleared. The New England Violet and the Field Sedge are known to have medicinal value for Aboriginal communities.

An increase in vehicle traffic at the project site will result in increased dust generation and deposition on vegetation. Dust can affect photosynthesis, respiration, transpiration, allow the penetration of phytotoxic gaseous pollutants, and may result in some visible injury symptoms and generally decrease plant productivity. Vegetation communities likely to be most affected by dust deposition are located alongside the roads on which haul trucks will be travelling, i.e. between the pit, onsite metal mill, and stock pile areas. These vegetation communities are already subject to a degree of dust exposure, as the roads connecting these components are located where Roen Road and Highway 600 currently exist. A fugitive dust best management practices plan will be implemented at the start of mine construction as identified in section 7.4.

The proponent proposed mitigation measures to reduce the effects on the terrestrial landscape (Appendix A). After mitigation, the residual effects on the terrestrial landscape were predicted to be long-term continuing through mine construction and operations, however, reversible or largely reversible following mine decommissioning and confined to the project site. The proponent believed that the change to the terrestrial landscape was not a concern after mitigation was applied.

7 Predicted Effects on Valued Components

7.1 Fish and Fish Habitat

7.1.1 Baseline by proponent

The Pinewood River flows downstream to the Rainy River. The Pinewood River and the Minor Creek Systems consist of different habitats that support small- and large-bodied fish.

The Pinewood River has typical widths of 10-15 m within the general vicinity of the project area with wider sections associated with beaver impoundments and drowned oxbows. Substrates consist of clays and silt with some detritus, while gravel, rock, or cobble substrates are sparse and contribute little to no in-stream habitat or cover for fish. Turbidity is high because of erosion of the clay and silt substrates and agricultural drainage inputs. Beaver dams are frequent and present periodic obstacles to fish passage.

The Minor Creek Systems, described in section 5.1, exhibit summer widths of 0.5 to 3 m, except in locations impounded by beaver dams. They are generally low gradient, low energy systems characterized by single to braided diffuse channels with wide, densely vegetated grass and sedge dominated floodplains.

Within the NLSA, large-bodied fish (Northern Pike, Brown Bullhead, and White Sucker) were found exclusively in the Pinewood River, with the exception of White Sucker, which is also found in Loslo and Clark Creeks. Walleye and Yellow Perch occur further downstream in the Pinewood River, but not in the project site. Lake Sturgeon is known to occur in the Rainy River and three were located near the mouth of the Pinewood River, downstream of the project site. Small-bodied fish are abundant within the Pinewood River watershed. Small-bodied fish communities within the habitats of the Minor Creek Systems are typically warm water and cool water baitfish and include Brook Stickleback, Central Mudminnow, and Brassy Minnow.

7.1.2 Effects predicted by proponent

Potential adverse effects are discussed with respect to fish and fish habitat in general rather than by individual species. The Project will result in environmental effects on fish from the alteration and disruption of existing fish habitat, and from changes in water quality and quantity.

The direct loss of fish habitat in the Minor Creek Systems will occur from development of the tailings management area (TMA), open pit, overburden and mine rock stockpiles, road crossings, and pipeline crossings and outlets (Table 7-1). The Project will also result in the alteration of fish habitat in Clark Creek and West Creek, through diversion of the creeks around the mine infrastructure (Figure 6-1). The water

bodies which are altered or disrupted must be added to Schedule 2 of the *Metal Mining Effluent Regulations* (MMER) to allow their use for mine waste disposal.

Table 7-1: Summary of Creek Habitat Disturbance (Adapted from Rainy River EIS, AMEC).

Creek	Total Habitat Available (ha)	Total Area Lost (MMER, Sub-section 27.1) (ha)	Total Area Lost (*Fisheries Act*, section 35(2)) (ha)	Habitat Disturbed by the Project (ha)
Clark Creek	5.32	0	2.1582	2.1582
Loslo Creek	19.77	19.0781	0	19.0781
Marr Creek	2.71	2.2408	0.441	2.6818
West Creek	9.49	0	1.9923	1.9923
Total	**37.28**	**21.3189**	**4.5915**	**25.9104**

Note: No part of the Pinewood River will be altered or disrupted by mine facilities.

Changes to water quality could occur from tailings and rock stockpile management, and treated effluent discharge into the Pinewood River. Also, there may be effects on habitat due to flow reductions in the Pinewood River from water taking, groundwater interception, and creek runoff collection. Following decommissioning, it will be possible to direct a major portion of project site catchment flows directly to the Pinewood River, including runoff from the reclaimed TMA and portions of the reclaimed stockpiles.

The physical effects impacting the Pinewood River are minor and relate to the construction of a new crossing of the realigned Highway 600 and a flood protection berm that will protect the open pit from flooding during 100-year and greater storm events. The new crossing will consist of a multi-cell culvert or spanning structure, which was planned using the Ministry of Transportation (MTO) *Environmental Guide for Fish and Fish Habitat*. It will be designed in accordance with MTO's *Highway Drainage Design Standards*, which ensures that fish passage will not be impeded by maintaining existing velocities, depths, and gradients.

Adverse effects on fish habitat relating to site runoff capture, management, and discharge are not expected by the proponent. Some flow reductions are expected by the proponent in the Pinewood River upstream of the McCallum Creek outflow, as described in Section 6.2.

7.1.3 Comments received

7.1.3.1 Government authorities

Environment Canada (EC), Fisheries and Oceans Canada (DFO) and the Ministry of the Environment and Climate Change (MOECC) expressed concerns about the plan to reduce flow by 20 percent during the spring

and up to 15 percent during the remaining open water period to build water inventory for project start-up and how this would affect the wetted width of the river. The proponent will only take water for a maximum of two years during mine construction as this is necessary for the viability of the Project. The proponent's modelling shows that a decrease in flow of 20 percent, which is expected to occur only during the two years of construction, will result in a decrease of less than 10 percent for wetted width and depth.

DFO expressed concerns about permanent flow reduction in the Pinewood River. The proponent confirms that the West Creek and Marr Creek diversions will result in permanent flow reductions in that section of the Pinewood River. The proponent indicates that Pinewood River is a low gradient system and effectively maintains areas of fish habitat, even under very low flow conditions.

Federal and provincial authorities expressed concern about the ability of the proponent to perpetually maintain the TMA in a saturated state to prevent the generation of acid rock drainage and metal leaching (ARD/ML).

Federal and provincial authorities expressed concern about potentially acid generating (PAG) material being used for construction, especially for road construction. The proponent has committed not to use PAG for road construction. The proponent will use PAG material in a controlled manner, where saturated conditions can be maintained.

MOECC expressed concern about the modified effluent criteria proposed by the proponent. MOECC considered the fact that some provincial water quality objectives (PWQO) parameters do not take more recent toxicological information into account, and that some jurisdictions have more recently updated surface water criteria based on water hardness as a toxicity modifier. As a result, MOECC proposed site-specific effluent criteria that are achievable by the proponent after effluent treatment and extended aging processes. The proponent will adhere to MOECC site-specific criteria which will be confirmed in the final MOECC Environmental Compliance Approval for effluent from the proposed discharge points into the Pinewood River. The proponent will discharge effluents into the Pinewood River and Minor Creek Systems in a manner that will achieve rapid mixing so that site-specific criteria for water quality will be achieved at the boundary of the mixing zone. Current modelling results indicate that the mixing zone is 30 m from the discharge point. If future operational monitoring shows that effective receiver mixing is not attained, additional measures will be implemented to enhance mixing to a level which is acceptable to the MOECC.

7.1.3.2 Aboriginal communities

Aboriginal communities expressed concerns about water quality and quantity impacts on fish populations due to water treatment processes, outlet locations for water returned back to the environment, and expected flow rates.

They were concerned about effects on fish and fish habitat at the project site and downstream. A request was made to study species at various trophic levels. To better accommodate an ecosystem-based approach, the proponent selected its valued components (VCs) by focussing on habitats, features, specific species groups, and related system interactions, rather than individual species.

They expressed concerns about the possibility of ARD/ML from the TMA and waste rock stockpiles. The proponent has designed the Project and the mine closure plan with ARD prevention and mitigation measures to avoid ARD from waste rock stockpiles and the TMA during operation, decommissioning, and abandonment.

They expressed concerns about the use of site-specific water quality objectives and the ability of the constructed wetlands to accommodate the effluent discharge flows, meet water quality values, and prevent the potential for mercury pollution. The proponent has designed the constructed wetland to polish the effluent from the TMA. This effluent is anticipated to be high quality, and mercury concentrations are likely to be similar to those of Pinewood River background concentrations. No appreciable change in mercury levels is expected in the Pinewood River.

Aboriginal communities expressed concerns about the use of chemicals as a long-term water treatment option. The proponent has designed the Project without the use of long-term chemical treatment of water at decommissioning. Passive treatment measures, such as periodic fertilization of the upper pit lake water column during abandonment, may be used.

They also expressed concerns about the water quality of the pit overflow discharge during abandonment. The proponent will protect aquatic life, when taking hardness modifiers into consideration, with the open pit overflow discharge. The proponent will continue studies to optimize final pit overflow water quality.

7.1.3.3 Public

The public raised general concerns related to impacts on fish and fish habitat.

7.1.4 Residual environmental effects predicted by proponent

The proponent committed to a number of mitigation measures to mitigate the effects to fish and fish habitat, some of which were in response to comments or concerns raised (Appendix A). The Agency identified those measures required to prevent significant adverse effects (subsection 7.1.5).

Residual effects on fish and fish habitat will result from the alteration and disruption of existing fish habitat, and from changes in water quality and quantity, and are predicted to be minor in magnitude and confined to the project site. They will be long-term continuing throughout mine construction, operations, decommissioning, and abandonment and irreversible. The Project will result in the loss of 25.87 ha of creek and agricultural drain habitat. However, the fish habitat offsetting and compensation plans will offset the unavoidable effects of the Project on fish habitat. The river system is sufficiently adaptable, so that if unexpected concerns arise during mine operations or following closure, an adaptive management plan (AMP) can be implemented at the site.

The proponent considered the overall adverse effects on fish and fish habitat as not likely to be significant.

7.1.5 Mitigation measures

The Agency has identified mitigation measures required to prevent significant adverse effects on fish and fish habitat:

- *Manage fish and fish habitat by:*
    - *implementing a fish habitat compensation plan*[7], in accordance with MMER, to offset the loss of fish habitat resulting from the deposit of deleterious substances into water bodies frequented by fish. This compensation plan will involve the creation of 25.71 ha of fish habitat through the creation of the West Creek Diversion Channel, the Stockpile Pond Diversion Channel, the Clark Creek Diversion Channel, the West Creek Pond, Stockpile Pond and the Clark Creek Pond (Figure 6-1) for losses associated with the removal of creeks at the project site.
    - *implementing a fish habitat offsetting plan*[2] to offset serious harm to fish, including any permanent alteration to, or destruction of, fish habitat, in accordance with the *Fisheries Act*. This offsetting plan will involve watershed-based enhancements (fencing off cattle, offline cattle watering sources, and channel and riparian zone restoration) and the creation of 4.5915 ha of fish habitat through establishing Teeple Road Pond.
    - *designing infrastructure* (road crossings, pipeline crossings, and outfalls) to minimize disturbance to creeks.
    - *following the DFO Freshwater Intake End-of-Pipe Guidelines* for water intakes.
- *Manage flows and levels in the Pinewood River and Minor Creek Systems by*:
    - *establishing flow and level requirements* for the protection of fisheries in the Pinewood River, in consultation with the appropriate government authorities, and addressing any proposed water taking and the effects of the creek diversions.
    - *designing and implementing the water management plan* to achieve these flow and level requirements during all applicable project phases, including recycling water onsite, capturing and returning groundwater to the Pinewood River, optimizing the timing and position of final effluent discharges, and balancing water needs during open pit filling at decommissioning.
- *Manage quality of water discharged into the Pinewood River and Minor Creek Systems from the project site by:*
    - *ensuring compliance with* the MOECC Environmental Compliance Approval and federal MMER Schedule 4 limits at all times.
    - *designing and implementing the water management plan* to achieve these compliance limits during construction and operation. This includes treatment of effluent prior to discharge to the environment; treatment of tailings slurry to break down cyanide and precipitate heavy metals prior to discharge to the TMA; collection of runoff and seepage in ditches; diversion of contaminated site contact water directly or indirectly into the TMA; use of sediment ponds #1 and #2 for sedimentation of solids prior to discharge; use of a constructed wetland with a control structure for final effluent polishing of a major portion of the discharge; and placement of secondary containment at pipelines that cross West Creek Channel Diversion.
    - *covering tailings with overburden and 2 m of water*, maintaining the tailings in a perpetually saturated state, developing the margins of the tailings pond into wetland habitat, and

[7] The fish habitat compensation plan is referred to as the No Net Loss Plan in the proponent's EIS.
[2] The fish habitat offsetting plan is also referred to as the No Net Loss Plan in the proponent's EIS.

employing passive treatment (rather than chemical treatment) measures to the upper pit lake water column during decommissioning and abandonment.

- *Manage PAG rock* throughout the project lifecycle by:
    - sorting waste rock into non-PAG and PAG rock stockpiles, using PAG material for construction only where saturated conditions can be maintained, and placing an engineered cover over the east mine rock stockpile at decommissioning.

The proponent has committed to implement additional mitigation measures as identified in Appendix A.

7.1.6 Agency analysis and conclusion

The Project is predicted to cause effects on fish from the alteration and disruption of existing fish habitat, and from changes in water quality and quantity. The Project will cause direct loss and alteration of fish and fish habitat in the Minor Creek Systems. There may be changes in water levels and flow as a result of alteration and disruption of the Minor Creek Systems and water taking from the Pinewood River. Changes to water quality may occur from tailings and rock stockpile management, and treated effluent discharge into the Pinewood River. The proponent plans to mitigate the effects to fish and fish habitat by implementing fish habitat offsetting and compensation plans to offset the loss of fish habitat. The effects to water flow will be mitigated by capturing and returning groundwater to the Pinewood River to minimize potential flow effects on the river, particularly during low flow periods; restricting water taking from the Pinewood River to the first two years of the construction phase; and implementing a water management plan to reduce the effects related to water quantity and ultimately on fish habitat. Also, the proponent plans to mitigate effects to water quality by implementing the water management plan which includes using PAG material for construction only where saturated conditions can be maintained and placing an engineered cover over the east mine rock stockpile at decommissioning; recycling the treated onsite metal mill effluent discharge into the TMA; and reusing the contact water collected from the various stockpile and seepage collection systems. The Agency is satisfied that the proponent has responded to government authorities and Aboriginal comments, including by establishing minimum flow requirements for the protection of fisheries in the Pinewood River. Further discussions will occur to finalize the water management plan. The Agency considers the residual effects to be minor and localized with the implementation of the fish habitat offsetting and compensation plans, the proponent's water management plan, and the proponent's commitment to develop minimum flow thresholds to protect aquatic habitats, in consultation with MOECC and DFO.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on fish and fish habitat and water quantity, taking into account the implementation of mitigation measures.

7.2 Migratory Birds

7.2.1 Baseline by proponent

The proponent recorded 158 migratory bird species protected under Article I of the *Migratory Birds Convention Act* (MBCA) in the natural environment local study area (NLSA). Of them, the most commonly observed migratory bird species were: White-throated Sparrow, Veery, Ovenbird, Red-eyed Vireo, American Robin, Nashville Warbler, and Common Yellowthroat. Additional baseline information regarding migratory birds that are identified as species at risk (SAR) is provided in section 7.9.

The NLSA encompasses a variety of suitable breeding, foraging, and stopover migratory bird habitats (Table 7-2), including woodland habitats (coniferous forest, mixed forest, and deciduous forest), marsh habitats (swamp, meadow marsh, bog, and fen), and open country habitats (grassland, pastures, and meadow). Field studies conducted in spring and fall found low numbers of migrating waterfowl, shorebirds and songbirds, indicating that the NLSA is not an important migratory stopover location.

Table 7-2: Bird Habitat Reported by the Proponent (Adapted from Rainy River EIS, AMEC).

Habitat and Area	Diversity and Species Observed by Proponent
Woodland habitats cover 74.9 percent of the NLSA	• The greatest diversity of migratory birds occupy larger woodland areas in the NLSA; • Veery was the most abundant species, and was found throughout the NLSA; • Ovenbird, Hermit Thrush, and Black-and-white Warbler were other species found throughout the NLSA.
Wetland habitats (swamp, fen, bog, marsh) cover 11.3 percent of the NLSA **Marsh habitats** cover 4.6 percent of the NLSA with only a small amount found within the project site	• 11 waterfowl species were recorded, including Trumpeter Swan, Canada Goose, Mallard, and Wood Duck; • Four species nest in colonies on the ground (American White Pelican, Double-crested Cormorant, Herring Gull, and Ring-billed Gull); • American Bittern and Sandhill Crane were widely observed.
Open country habitats cover 9.7 percent of the NLSA, consisting primarily of agricultural habitat	• Four meadow habitat features greater than 30 ha occur in the NLSA; • Grassland bird species were widely observed (the most common species were Bobolink and Savannah Sparrow, which were observed in hay fields and pastures); • Black-billed Magpies were common in agricultural lands close to anthropogenic features across the NLSA.

7.2.2 Effects predicted by proponent

Potential adverse effects on migratory birds include direct loss of habitat, their eggs and nests, decreased reproduction rates, and mortality. These effects may occur directly or indirectly through land clearing, increased human presence, changes to habitat suitability related to light and sound, and vehicle collisions during construction and operation.

Specific effects to migratory birds that are identified as SAR are described in section 7.9.

Vegetation clearing will occur during construction of the TMA, low grade ore and east mine stockpiles, overburden and west mine rock stockpiles, open pit, realigned Highway 600 and access roads, and other mine site infrastructure. The activity of vegetation clearing can have direct impacts on birds, nests and eggs, particularly during the bird breeding season.

Vegetation clearing for the entire project will remove a total of 1475.3 ha of woodland habitat, 291.8 ha of wetland habitat, and 399 ha of open country habitat (a total of 8 percent of the NLSA). A large portion of this migratory bird habitat will result from the construction of the TMA and other project components which will destroy parts of the Minor Creek Systems. This will result in clearing of all three habitat types described above.

Loss of wetland habitat during construction will impact and displace species like Trumpeter Swans and other waterfowl, which require marsh habitat for breeding. Trumpeter Swans exhibit strong nest site fidelity, therefore breeding success may be impacted as breeding pairs will likely attempt to return to cleared breeding habitats. Historical studies indicated that this species can habituate to human presence. Loss of open country (agricultural and meadow) habitat during construction will displace Savannah Sparrows, Clay-colored Sparrows, and Song Sparrows.

There are potential impacts to migratory birds during construction and operation from light and sound emissions. Mine construction and operation will require artificial lighting both day and night. Bright artificial lights may negatively impact Common Nighthawk and other nocturnal birds by causing them to avoid habitat within or adjacent to the mine site, or by decreasing their forage efficiency. Sound emissions will be greatest in areas of concentrated heavy equipment operation, most notably with the open-pit and stockpiling operations, and with the onsite crusher and metal mill. Noise can mask important bird communication signals and behavioural triggers like the songs of territorial males, calls of females, begging calls of nestlings, approaching predators, or the presence of prey. Overly noisy habitats can result in decreased breeding success or lower bird density.

In addition, migratory birds may experience increased mortality rates from collisions with vehicles, due to increased local traffic during construction and operation.

7.2.3 Comments received

7.2.3.1 Government authorities

MOECC raised concerns with respect to noise levels during construction and operation and lack of quantitative noise modelling for the construction phase. The proponent stated that a temporary increase in sound levels during construction at the project site will be short term for any point of reception. MOECC was satisfied with the proponent's response.

7.2.3.2 Aboriginal Communities

Aboriginal communities expressed concerns about the relationship of the project site to the Mississippi Flyway, and the importance of Lake of the Woods and Rainy Lake as migratory stopover sites. The proponent responded that the natural environment regional study area (NRSA) is within this flyway, but migration surveys in 2010 did not indicate high numbers of waterfowl, or shorebirds in the area.

Concerns were expressed about the potential for birds to access the TMA. The proponent will treat the tailings slurry to a level below the cyanide threshold, as outlined by the International Cyanide Management Code. At decommissioning, the exposed tailings beach will be covered with overburden and the remaining tailings will be flooded with water to prevent oxidation of tailings during abandonment. The proponent will ensure that the tailings pond waters remain of high quality, such that they will not pose a threat to the environment, including birds. The margins of the tailings pond will be developed as wetland habitat.

7.2.3.3 Public

The public expressed general concerns about the potential impacts to migratory birds.

7.2.4 Residual environmental effects predicted by proponent

The proponent committed to a number of mitigation measures (Appendix A) to mitigate the effects on migratory birds and migratory bird habitat, some of which were in response to comments or concerns raised. The Agency identified those measures required to prevent significant adverse effects (subsection 7.2.5).

Residual effects on migratory birds resulting from vegetation clearing during construction and operation of the proposed mine infrastructure were predicted to be minor in magnitude and confined to the project site. They were predicted to be long-term, continuous through mine construction, operation and decommissioning but reversible following decommissioning and abandonment. The proponent does not expect residual adverse effects to migratory birds from changes to the atmospheric environment (air quality and noise) and from vehicle collisions after applying mitigation measures.

The proponent considered the overall effects on migratory birds as not likely to be significant.

7.2.5 Mitigation measures

The Agency has identified the following mitigation measures as necessary to prevent significant adverse effects on migratory birds.

- *Provide compensatory habitat* as an overall benefit for species listed under the Ontario *Endangered Species Act* (ESA), which will provide protection and habitat for migratory birds.
- *Restrict clearing and modification of woodland, marsh and open country breeding bird habitat* to outside of the breeding season (March 1 to August 15 for woodland bird species; March 15 to August 15 for marsh bird species; April 1 to August 15 for open country bird species).
- *Maintain forest buffers* between project components and nesting/foraging habitat.
- *Create artificial nesting structures* to encourage colonization by Barn Swallows, as per the Ontario ESA.
- *Establish zones where Barn Swallow colonization is desired, tolerated or not desired* to provide protection to swallows nesting in other locations and to not cause conflict with mine operations.
- *Manage site lighting fixtures* to reduce light pollution in surrounding environment and minimize disturbance to nocturnal species, such as Common Nighthawk.

- *Ensure sound levels do not exceed MOECC NPC-300 Guidelines* by using mining trucks and excavators with low sound power levels, and applying sound abatement measures where necessary.
- *Enforce speed limits, install warning signs for wildlife encounters, and keep a log of collisions* to help avoid the increased potential for vehicular collisions with wildlife.
- *Encourage the development of habitats capable of supporting a diversity of wildlife species* when restoring disturbed habitats at decommissioning.

Additional mitigation measures related to air quality are discussed in section 7.4. The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

7.2.6 Agency analysis and conclusion

The Project may result in decreased reproduction rates and increased mortality in migratory birds due to clearing of land and changes to the atmospheric environment. The proponent's commitments to restrict habitat clearing to outside of the breeding season, and efforts to manage light and sound emissions will reduce bird mortality and avoid breeding effects. Measures to mitigate the effects to water quality, such as treatment of the tailings slurry and covering the exposed tailings beach, will also mitigate effects to migratory birds. The proponent has responded to federal authority and Aboriginal comments, including a commitment to implement sound abatement measures to meet MOECC NPC-300 noise guidelines. The Agency considers the residual effects on migratory birds are localized and diminish in duration and frequency once operations begin. Effects to migratory birds will also be mitigated by 1000 ha of compensatory habitat, a compact project site, fugitive dust management best practices plan, and revegetation at decommissioning (sections 7.3 and 7.4).

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on migratory birds taking into account the implementation of mitigation measures.

7.3 Current Use of Lands and Resources for Traditional Purposes by Aboriginal Peoples

7.3.1 Baseline by proponent

Aboriginal communities currently use lands within the project site and the human environment regional study area (HRSA) for hunting, subsistence fishing, baitfish harvesting and plant harvesting, including for medicinal use (Field Sedge and New England Violet) (Figure 7-1). More specifically, they use the Pinewood River, the Minor Creek Systems and adjacent watersheds for fishing.

Big Grassy River First Nation and the Métis Nation of Ontario Region 1 completed their own Traditional Knowledge and Traditional Land Use (TK/TLU) studies after the final environmental impact statement (EIS) was issued by the proponent. Métis Nation of Ontario Region 1 requested that the results of its TK/TLU study be kept confidential. Generally, these studies identify a number of traditional land uses in and around the project site, including hunting, fishing and plant harvesting.

Big Grassy River First Nation actively hunts deer and small game in the project site, and generally within the human environment local study area (HLSA), while moose are occasionally hunted within the HRSA.

The studies showed that the community uses Lake of the Woods and Rainy River, located downstream of the Project, for subsistence fishing and baitfish harvesting. Harvesting berries, wild medicines, wild rice, and other plants occurs in the HRSA. Big Grassy River First Nation community members collect sage for food, healing, and ceremonial purposes, and, cedar, sweet grass, and fungus for medicinal purposes at the project site.

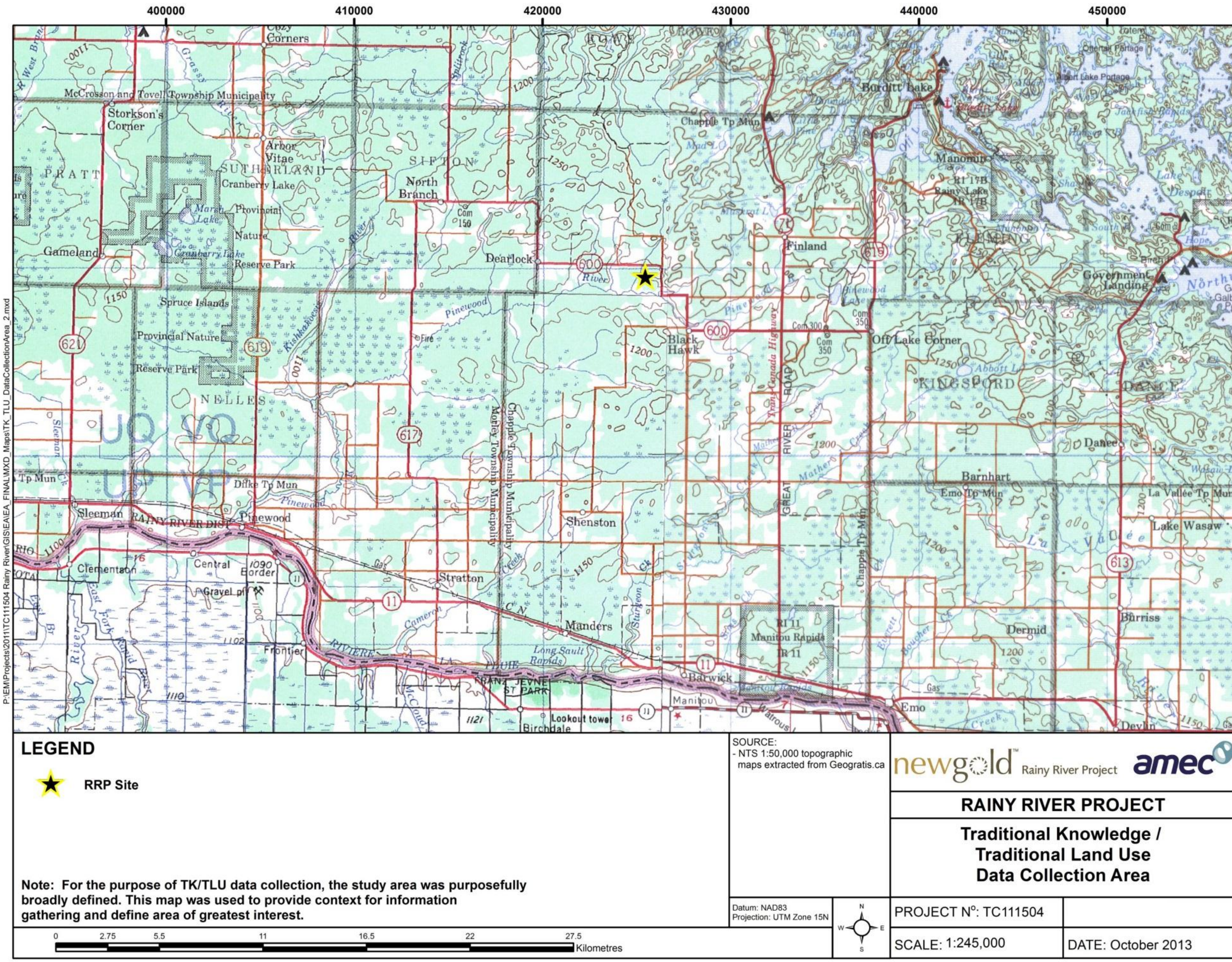

Figure 7-1: A broad view of the proponent's traditional knowledge and traditional land use data collection area, encompassing the Natural Environment Regional Study Area and Human Environment Regional Study Area (Source: Rainy River EIS, AMEC).

7.3.2 Effects predicted by proponent

The Project will cause loss and fragmentation of terrestrial wildlife habitat for hunting during construction, operation and decommissioning; loss of aquatic habitats and changes to water quality and quantity that could affect fish and fish habitat for fishing; and a loss of plants harvested for food and medicines.

Hunting activities may be affected through the direct impacts on ungulates including White-tailed Deer and Moose, furbearers, and game birds. Ungulates and furbearers also may experience increased mortality rates from collisions with vehicles due to increased local traffic during construction and operation. Noise can mask important behavioural triggers to detect predators and other environmental cues. In addition, food waste generated at the project site could attract predators to the area that prey on ungulates and furbearers. Ungulates and furbearers may bioaccumulate heavy metals from consuming vegetation contaminated by emissions and dust or water from the TMA. The predicted effects on game birds are similar to environmental effects on migratory birds discussed in section 7.2. Also, the transmission line corridor may create additional access for hunters in the region, adding pressure on resources.

Hunting activities may also be affected through the loss of access to lands within the project site. Travelling beyond the NLSA for traditional hunting becomes time and cost prohibitive for Aboriginal people. Although a small portion (1.5 percent) of the local Wildlife Management Unit will be removed for hunting, the realignment of Highway 600 and the creation of the transmission line corridor may create additional access for Aboriginal and non-Aboriginal hunters to areas south of the Pinewood River and around the transmission line corridor.

Subsistence fishing and baitfish harvesting may be affected through changes to water quantity in the Pinewood River during construction; impacts to water quality due to the TMA, overburden and east and west mine rock stockpile areas, and treated effluent discharge during operations; and the loss of fish habitat during construction and operation (section 7.1).

Plant harvesting of berries and other plants for food and medicines may be affected through the direct removal of plants during construction; replacement of native species with non-native species during habitat restoration; and contamination due to emissions and dust. The New England Violet and the Field Sedge, rare plants, are known to have medicinal value for Aboriginal communities. Wild rice also is harvested; however, it grows at Lake of the Woods, downstream of the project site, and is affected by fluctuating water levels. The proponent predicts neither adverse water quality effects downstream of the site, nor changes to water levels at Lake of the Woods or to wild rice growing areas.

7.3.3 Comments received

7.3.3.1 Government authorities

Federal authorities sought clarification on VCs linked to traditional land use, results of additional TK/TLU studies, and the likelihood these studies would modify conclusions of the environmental effects assessment. The proponent considered the additional TK/TLU studies and provided additional information during the course of the environmental assessment (EA) on predicted effects and mitigation measures to reduce effects on current use of lands and resources for traditional purposes. The proponent confirms that

Big Grassy River First Nation and the Métis Nation of Ontario Region 1 have used and continue to use the project site and surrounding lands, and desire to do so in the future.

7.3.3.2 Aboriginal communities

Aboriginal communities expressed concern about inadequate knowledge and data on traditional land use and historic changes. They also expressed concern about the loss of access for hunting, fishing, and plant harvesting for food and medicines throughout the project site and surrounding areas. Related concerns for hunting included reduced abundance of wildlife due to the loss of habitat within the project site. They asked the proponent to further study the effects on wild rice, medicines, vegetation, and wildlife habitat. They raised concerns that closure objectives do not relate to the restoration of land use that has been identified by the traditional land use studies.

They expressed concerns about the potential adverse effects of noise and vibration on wildlife, particularly during breeding and birthing seasons.

Métis Nation of Ontario Region 1 expressed concern about the use of herbicides for vegetation management along the transmission line right of way.

7.3.3.3 Public

Public comments were not received in relation to this VC.

7.3.4 Residual environmental effects predicted by proponent

The proponent committed to a number of mitigation measures (Appendix A) to mitigate the effects on current use of lands and resources for traditional purposes by Aboriginal people, some of which were in response to comments or concerns raised. The Agency identified those measures required to prevent significant adverse effects (subsection 7.3.5).

The residual effects on current use of lands and resources for traditional purposes by Aboriginal people were predicted to be minor in magnitude and confined to the project site. They are likely to be medium-term in duration continuing through mine construction, operation, and decommissioning but reversible following decommissioning and abandonment. The residual effects on hunting and plant harvesting are the loss of access to lands, including for wild medicines, berries, and other vegetation at the project site. The residual effects on fishing include changes to water quality and quantity and the loss of fish habitat within the project site.

The proponent considered the overall effects on current use of lands and resources for traditional purposes by Aboriginal people as not likely to be significant.

7.3.5 Mitigation measures

The Agency has identified the following mitigation measures as necessary to prevent significant adverse effects on current use of lands and resources for traditional purposes:

- *Develop a compact project site* to reduce overall habitat loss and to limit potential interference with wildlife movement, and reduce extent of air and noise emissions.

- *Provide 1000 ha of compensatory habitat* as an overall benefit for species listed under the Ontario ESA. This will also provide Aboriginal communities with opportunities for upland game bird and big game hunting and plant harvesting.
- *Develop strategies for relocating rare plants*, including Aboriginal medicinal plants, in consultation with Ministry of Natural Resources and Forestry (MNRF) and Aboriginal groups, along the transmission line or at the project site in advance of a possible *Ontario Public Lands Act* authorization.
- *Prohibit the use of herbicides and minimize removal of vegetation* along the transmission line corridor.
- *Revegetate and recolonize disturbed areas* as part of progressive restoration during operation and decommissioning.
- *Separate and stockpile removed organic rich material* during construction (of open pit and during tailings dam stripping) for use as topsoil during revegetation.
- *Revegetate in a manner that ensures selected native plant species recolonize easily* in the project site, such as on mine rock stockpiles, in collaboration with regulatory authorities.
- *Restore access to Aboriginal communities to the project site* following decommissioning, to the extent that such access is safe and possible.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

7.3.6 Agency analysis and conclusion

Aboriginal groups are expected to be able to continue traditional practices in the NRSA, with some modifications, after taking into account mitigation and proponent's commitments. Access to the project site for traditional uses such as hunting and gathering of traditional plants will be lost for the most part during the life of the Project. However, the project site is a small portion of the NRSA and the remainder of the regional area is expected to remain available and accessible for traditional practices. Controlled use of the project site by Aboriginal peoples may be allowed once construction is completed. Provision of 1000 ha of compensatory habitat for species at risk are expected to offset loss of access to the project site for hunting and plant harvesting. At decommissioning, access to the project site will be restored to the extent that such access is safe and possible. The proponent has committed to continue engagement with Aboriginal groups throughout the Project, including with respect to TK/TLU studies and the development of adaptive management techniques related to the mine closure plan, including the restoration of habitat for wildlife (section 10). The proponent has responded to federal authority and Aboriginal comments, with a commitment to develop strategies for relocating rare plants, including Aboriginal medicinal plants.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on the current use of lands and resources for traditional purposes by Aboriginal people, taking into account the implementation of the mitigation measures.

7.4 Health and Socio-economic Conditions of Aboriginal Peoples

7.4.1 Baseline by proponent

Wildlife, fish, and plants are important food sources for Aboriginal communities. Aboriginal communities identified the consumption of fish from the Pinewood River and of White-tailed Deer and Moose. Northern Pike and Walleye in the Pinewood River were sampled for metal concentrations of mercury, cadmium, and lead to determine baseline levels for human consumption. Mercury in both species exceeded selected human consumption guidelines in the baseline condition. Cadmium and lead concentrations were below their detection limits. No published information exists on background information on metal concentrations in ungulates (primarily cadmium, lead, and mercury).

Big Grassy River First Nation noted that it uses the Pinewood River for both commercial fishing and baitfish harvesting. Members of Big Grassy River First Nation trap baitfish in the Pinewood River watershed, which are caught and sold seasonally. Aboriginal communities may also hold commercial fishing licenses on Lake of the Woods.

Aboriginal communities use the NRSA and the Pinewood River watershed, downstream of the project site, for fishing, hunting, and plant gathering, including berries and wild rice.

7.4.2 Effects predicted by proponent

The predicted effects on Aboriginal health may result from the release of contaminants into the atmosphere, surface water, and groundwater that can bioaccumulate in the food chain during construction and operation. Possible emission sources include dust from milling operations, heavy equipment operation along site haul roads and mineral stockpiles, treated effluent release to surface waters, diesel fuel and material spills, and direct TMA discharge into the Pinewood River.

Effluent release to groundwater is expected to be negligible due to the abundance of low permeability clay and the extensive use of runoff and seepage collection systems.

Contaminants of potential concern in the atmosphere include dust and metals (total suspended particulates, particulate matter (up to 10 micrometers in size), fine particulate matter (up to 2.5 micrometers in size), mercury, arsenic, cadmium, and lead) as well as nitrogen and sulfur dioxides (section 6.1). Some are essential elements and others, such as arsenic, chromium, and nickel, have no biological function or requirement. Cadmium, lead, and mercury, in particular, show an increased tendency to bioaccumulate because organisms lack the ability to effectively excrete these metals. The ability of these parameters to cause a health risk is a function of release rates, exposure pathways, and organism presence and sensitivity.

Cadmium, lead and mercury were found in low concentrations in the ore and mine rock and were modeled at low concentrations at the project site boundary. Air emissions at the project site boundary are expected to be fully compliant with ambient air quality criteria (AAQC) for health considerations, with concentrations being considerably lower at the nearest permanent receptors. Antimony may exceed provincial and federal drinking water guidelines, although it is not known to be carcinogenic or to bioaccumulate. People are not expected to drink directly from the TMA or Pinewood River.

Releases of mercury and lead from the TMA are predicted to be below PWQO. Acceptable concentrations according to PWQO include consideration of fish tissue residue criteria. These criteria are used for assessing the significance of contaminant residues in fish tissues to fish populations and to wildlife consumers of fish. Furthermore, mercury concentrations in the TMA are expected to be similar to those in the Pinewood River and therefore the health risk from fish consumption is not expected to change as a result of the Project. Methyl mercury is the form of mercury preferentially taken up by fish. The rate of mercury methylation in the constructed wetland could increase, due to the release of sulphate from the TMA. However, the wetland area of 60 ha is too small for mercury methylation in the wetland to increase concentrations in the Pinewood River that would be distinguishable from background concentrations.

The Project will not increase heavy metal concentrations to a level that would be of concern in local country foods; however, as cadmium concentrations were found to be higher relative to PWQO limits, monitoring for metal concentrations in White-tailed Deer liver tissue is proposed.

Health risks related to potential spills of hazardous materials during operations were considered to be small. Spills are viewed as unlikely as these materials are routinely handled, transported, and highly regulated at all northern Ontario mine sites. To reduce effects from spills, cyanide will be shipped in a solid form to facilitate easy clean-up on land. The unlikely spill of cyanide into a water body would cause the cyanide to break down rapidly and could kill fish in the water body. The consumption of fish exposed to cyanide would not necessarily harm humans, as humans are able to detoxify the chemical in small doses. Ongoing presence of cyanide above PWQO in drinking water could create a health hazard, although this is extremely unlikely.

Commercial fishing activities such as licenced bait fishing in the Pinewood River watershed may be affected by the direct loss of fish habitat during construction and operation. In addition, changes in water quality and quantity may also impact commercial fishing activities in Pinewood River. Impacts on commercial fishing will have an indirect economic effect on Aboriginal peoples.

7.4.3 Comments Received

7.4.3.1 Government authorities

Health Canada (HC) provided a list of expert international sources with knowledge that could be incorporated into the human health risk assessment. HC commented about potentially carcinogenic metals and sought validation that there are no elevated health risks. The proponent calculated risk and provided an example that indicated a minimal increase in non-cancer risk and a minimal increase on the incremental lifetime cancer risk. HC was satisfied with the proponent's response. HC also commented on the monitoring of fish tissue with respect to human consumption patterns.

7.4.3.2 Aboriginal communities

Aboriginal communities expressed general concerns about monitoring, contaminants in country foods, and wells (section 10).

7.4.3.3 Public

The public was concerned about wildlife drinking potentially contaminated water from the project site, including the TMA and water management ponds. The public was also concerned with the associated potential for bioaccumulation of contaminants through the food chain, and concerns about long-term health effects on nearby residents.

7.4.4 Residual environmental effects predicted by proponent

The proponent committed to a number of mitigation measures (Appendix A) to mitigate the effects on Aboriginal health and socio-economic conditions, some of which were in response to comments or concerns raised. The Agency identified those measures required to prevent significant adverse effects (subsection 7.4.5).

The residual effects on Aboriginal health and socio-economic conditions were predicted to be short-term, infrequent and reversible at decommissioning. They are expected to be minor in magnitude and confined to the HLSA. The proponent predicted that health risks from the consumption of fish and wildlife are not likely. The residual effects on commercial fishing are the same as those described in section 7.3.4.

The proponent considered the overall effects on health and socio-economic conditions of Aboriginal people as not likely to be significant.

7.4.5 Mitigation measures

The Agency has identified the following mitigation measures as required to prevent significant adverse effects on Aboriginal health and socio-economic conditions. Additional mitigation measures related to water quality are listed in section 7.1.

- *Manage air emissions* in accordance with AAQC.
- *Develop a fugitive dust best management practices plan* for both construction and operation phases. The plan will identify all potential sources of fugitive dusts, outline mitigation measures, and detail inspection and recordkeeping requirements to demonstrate effective management;
- *Use dust control equipment* (e.g. bag houses, bin vents, surfactants, such as calcium chloride and water sprays) to control dust emissions from the crusher and onsite metal mill, provided such applications are acceptable to the MOECC;
- *Maintain site roadways to minimize silt loading*. The road maintenance and inspections procedures, including timelines, will be incorporated into the fugitive dust best management practices plan;
- *Use low-sulphur diesel equipment and pollution control equipment* to control air emissions from mobile heavy equipment operations. Meet Transport Canada's off-road vehicle emission requirements. Develop and implement preventative maintenance measures related to air quality;
- *Employ dedicated water sprays at active stockpile areas*, if further mitigation is required; and
- *Revegetate disturbed areas in a manner that eliminates all exposed dust sources*.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

7.4.6 Agency analysis and conclusion

Effects on Aboriginal health from consumption of country foods are expected to be minor as contaminant releases are expected to be within federal and provincial emission and discharge criteria. The mitigation measures for impacts to water quality and air quality will reduce the risks of bioaccumulation of contaminants in the food chain. The mitigation measures, such as working with local Aboriginal peoples to monitor metal concentrations in country foods, will ensure that real-time information on any potential changes to the EA predictions is available to Aboriginal peoples (section 10).

With respect to socio-economic conditions, Aboriginal groups would be able to continue commercial bait fishing in the NRSA, and in the Pinewood River specifically, after the development and implementation of the fish habitat offsetting and compensation plans. The proponent provided greater explanation about how the Project would result in no increased risk related to mercury concentrations to address Aboriginal concerns. The Agency expects the residual effects on Aboriginal health and socio-economic conditions are expected to be minor and localized as contaminant releases are to be within federal and provincial emission and discharge criteria.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on health and socio-economic conditions of Aboriginal people, taking into account the implementation of the mitigation measures.

7.5 Physical or Cultural Heritage, and Effects on Historical, Archaeological, Paleontological, or Architectural Sites or Structures of Aboriginal Peoples

7.5.1 Baseline by proponent

Archaeological sites in Ontario are protected under the *Ontario Heritage Act*. Sites cannot be disturbed unless clearance is obtained from the Ontario Ministry of Tourism, Culture, and Sport. Surveys and historical records identified a total of 14 archaeological sites of importance to Aboriginal peoples within the NLSA and artifacts were also identified. The TK/TLU studies reported cultural sites and historical travel routes of importance to Aboriginal peoples. No sites or structures of historical, paleontological or architectural importance that relate to Aboriginal peoples were identified in the HRSA. The focus of the effects assessment was on physical or cultural heritage and archaeological sites related to Aboriginal peoples.

Big Grassy River First Nation's TK/TLU study reported that a variety of cultural and spiritual site-specific values overlap within 250 m of the project site from the late 1970s to present day. These cultural and spiritual sites include a burial ground and several sacred and spiritual sites in the project footprint. The TK/TLU study also showed lands within the HLSA and HRSA, which were used by Big Grassy River First Nation since the 1960s and 1940s respectively, continue to be used to present day. The TK/TLU also identified historical travel routes that were used to cross what is now the Canada-US border between Ontario and Minnesota.

Other Aboriginal communities identified current cultural use within the project site. The Aboriginal communities have requested that the specific locations and details of cultural use remain confidential. Notwithstanding, the use has been taken into account in the EA.

7.5.2 Effects predicted by proponent

Aboriginal cultural heritage resources within and adjacent to the project site may be affected through displacement and the introduction of physical, visual, audible, or atmospheric elements not in keeping with their character and setting, likely during the construction and operation phases of the Project.

Vegetation clearing may affect archaeological sites through the disturbance and removal of soils during construction and operation.

7.5.3 Comments received

7.5.3.1 Government authorities

Federal and provincial authorities expressed concern about the lack of sacred burial sites as no burial or sacred sites were initially identified in the EIS. However, the TK/TLU studies did identify burial grounds.

7.5.3.2 Aboriginal communities

Big Grassy River First Nation raised concerns about maintaining a spiritual relationship with the Project and how the potential environmental effects from the Project may impact the broader cultural continuity, through reduced access to and use of the lands, waters, wildlife, and vegetation in impacted project areas. Other Aboriginal communities expressed concern over the direct loss of cultural sites on the project property.

7.5.3.3 Public

The proponent interviewed landowners as part of the impact assessment to obtain information that would contribute to understanding the existence of archaeological sites on properties but no concerns were raised.

7.5.4 Residual effects predicted by proponent

The proponent committed to a number of mitigation measures (Appendix A) to mitigate the effects on physical or cultural heritage, and effects on archaeological sites or structures of importance to Aboriginal people, some of which were in response to comments or concerns raised. The Agency identified those measures required to prevent significant adverse effects (subsection 7.5.5).

The residual effects on physical or cultural heritage, and effects on archaeological sites or structures of importance to Aboriginal people were predicted to be minor in magnitude and confined to the project site. They will, however, be permanent and irreversible. Residual effects on cultural heritage include the displacement of current cultural use, which has been kept confidential on request by Aboriginal communities. The proponent predicted that residual effects on cultural heritage, archaeological sites, or structures were not expected with the above mentioned mitigation measures in place.

The proponent considered the overall effects on physical or cultural heritage, and effects on archaeological sites or structures of importance to Aboriginal people as not likely to be significant.

7.5.5 Mitigation measures

The Agency has identified the following mitigation measures as required to prevent significant adverse effects on physical or cultural heritage, and effects on historical, archaeological, paleontological, or architectural sites or structures:

- *Manage construction and site clearance activities respectfully:*
    - *Manage site clearance* in accordance with Part VI of the Ontario *Heritage Act;*
    - *Avoid culturally significant sites* where possible;
    - *Assess additional significant sites*, should any be discovered during project development;
    - *Preserve any discovered burial sites*; and
    - *Preserve and manage artifacts* by transferring them to a facility owned by Rainy River First Nation on behalf of three other communities, namely Naicatchewenin First Nation, Anishinaabeg of Naongashiing First Nation and Pwi-Di-Goo-Zing-Ne-Yaa-Zhing Advisory Services.

- *Protect and preserve Aboriginal cultural values:*
    - *Ensure access to site for cultural and ceremonial purposes* to Aboriginal communities, including young people, to participate in ceremony and learn from elders and ceremonialists;
    - *Conduct a ceremony once the artifacts are physically returned*, and follow direction on curatorial services required from Aboriginal communities; and
    - *Provide current cultural use in nearby accessible areas.*

In addition, the Agency notes that the proponent plans to *engage and educate Aboriginal communities on identified archaeological sites*, including by sharing knowledge about the technique used to find the sites and by seeking their input on location of ancient sites and *provide training to all mine employees* to ensure that workers are respectful of indigenous ceremonies, culture, and the principles and values of the Ojibwe people. The proponent has also committed to implement additional mitigation measures as identified in Appendix A: Part 2.

7.5.6 Agency analysis and conclusion

Archaeological sites, cultural sites and historical travel routes of importance to Aboriginal peoples could be impacted by the Project through displacement and the introduction of physical, visual, audible, or atmospheric elements. These effects will be greatest during construction. It is expected the project site will be available for some controlled cultural use after construction. Effects will also be offset upon the provision of access to nearby sites and other areas of the NRSA for cultural use. The project site is expected to be available for cultural use upon decommissioning. The proponent commits to reduce the effects on physical or cultural heritage by avoiding culturally significant sites where possible and managing additional significant sites, should any be discovered during project development. Effects on archaeological sites or artifacts will be minimal as the sites will be preserved and the artifacts will be transferred to Aboriginal communities. The proponent has committed to preserving any discovered burial sites.

The Agency expects the residual effects on current cultural use to diminish in duration and frequency. The residual effects are expected to be mitigated upon the provision of access to nearby sites for cultural use and given that access to the project site to for controlled cultural use by Aboriginal peoples will likely

increase after construction. The Agency further considers the residual effects on artifacts will be minimal as they will be preserved and transferred to Aboriginal communities.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on physical or cultural heritage, or on, archaeological sites or structures, taking into account implementation of the mitigation measures.

7.6 Recreation and Commercial Use

7.6.1 Baseline by proponent

Trapping, hunting, fishing, and other recreational activities occur in the HLSA. Trapping, hunting and fishing for tourism or commercial purposes also occur.

The project site overlaps four traplines used by non-Aboriginal people. Within the HLSA, Beaver, Marten, and Weasels are frequently trapped; River Otters and Mink are less frequently trapped. Spruce Grouse, Sharp-tailed Grouse, waterfowl, bear and deer are also hunted in the HLSA. Limited bait fishing occurs within the project site, specifically within West Creek and Clark Creek, and limited fishing of Northern Pike and Brown Bullhead occurs in the Pinewood River. The project site does not support a large commercial or recreational fishery. More extensive recreational fishing opportunities are available within Off Lake, Beadle Lake, Boundary Lake, Little Pine Lake, and Burditt Lake, located northeast of the project site. The HLSA is in Ontario's Wildlife Management Unit #10 and is located in four bear management areas operated by Ontario MNRF authorized tourist outfitters.

Local residents use the 12 km Richardson Trail in the NLSA for hiking, snowmobiling, snowshoeing, and for all-terrain vehicles to access remote hunting areas. It is comprised of old logging roads, municipal and private roads, and animal trails.

7.6.2 Effects predicted by proponent

Of the four traplines, the Project will most notably overprint 38 percent of one trapline and 13.9 percent of another. Project components associated with federal authorizations will affect the land base within the first and second traplines. Construction of new fish habitat to offset effects will occur within both traplines. Persons that previously trapped and hunted wildlife on lands within the project site will no longer be granted access to that land during construction, operation and decommissioning. The proponent purchased the lands for the development of the Project, which has allowed it to limit trapping and hunting activities as the project site and associated lands are privately owned. The trapping and hunting activities will continue to decline for safety, security and liability reasons.

The loss of access and areas for trapping and hunting at the project site may have an indirect socio-economic effect on trappers and hunters. Commercial fishing activities, such as licenced bait fishing in the Pinewood River watershed, may be affected by the direct loss of fish habitat during construction of the TMA, west rock and overburden stockpiles, open pit and the east rock stockpile, and operation of the mine. In addition, changes in water quality and quantity also may impact commercial fishing activities in Pinewood River and may have an indirect socio-economic effect.

Cottaging, camping, snowmobiling, and hiking are limited activities in the HLSA, but may still be affected during construction, operation and decommissioning. The south part of Richardson Trail will be partially altered and disrupted by TMA construction, but other parts of the trail will remain accessible.

7.6.3 Comments received

7.6.3.1 Government authorities

Government authorities did not comment on recreation or commercial use.

7.6.3.2 Aboriginal communities

Aboriginal communities did not comment on non-Aboriginal recreation and commercial use. Comments on traditional use are listed in section 7.3.

7.6.3.3 Public

The public had general comments about the use of the area for trapping and hunting but did not express socio-economic concerns related to trapping, hunting or fishing for commercial purposes.

Sport fishing is the main tourist attraction for the area, but no specific concerns have been raised. Local residents indicated that fishing occurs more often in larger streams and water bodies (i.e. Rainy River, Rainy Lake, and the Lake of the Woods). The proponent indicates that more extensive recreational fishing opportunities are also available in lakes northeast and upstream of the project site (i.e. Off Lake, Beadle Lake, Boundary Lake, Little Pine Lake, and Burditt Lake).

7.6.4 Residual effects predicted by proponent

The proponent committed to a number of mitigation measures (Appendix A) to mitigate the effects on recreation and commercial use, some of which were in response to comments or concerns raised. The Agency identified those measures required to prevent significant adverse effects (subsection 7.6.5).

The residual effects on trapping, hunting and fishing were predicted to result from restricted access and loss of land for trappers and hunters, loss of fish habitat for bait fishing at the project site and removal of a portion of the Richardson Trail by the TMA. There is a negligible loss of bear management areas due to the development of the mine. The residual effects on recreation and commercial use were predicted to be minor in magnitude and confined to the HLSA. They are predicted to be medium-term in duration and continuous through mine construction, operation and decommissioning and reversible at decommissioning.

The proponent considered the overall effects on recreation and commercial use as not likely to be significant.

7.6.5 Mitigation measures

The Agency has identified the following mitigation measures as required to prevent significant adverse effects on recreation and commercial use:

- *Develop an accommodation with local trapline holders* that meets the needs of both the proponent and the trappers; and

- *Enhance components of the Richardson Trail* and mitigate the impacts in collaboration with local landowners.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

7.6.6 Agency analysis and conclusion

Indirect socio-economic effects on recreational and commercial use, such as trapping, hunting, fishing, and the enjoyment of Richardson Trail, may result from the displacement of lands for hunting and fishing, and the removal of a portion of Richardson Trail by the TMA. The proponent's commitment to restore access to the project site for trapping and hunting at decommissioning, when it is safe to do so, will mitigate effects to trapping and hunting. Measures to reduce effects on fish and fish habitat will also mitigate effects to recreation and commercial use. The proponent has indicated that it would enhance components of the Richardson Trail and mitigate the impacts by working with local landowners. The Agency considers the residual effects on recreation and commercial use are generally minor in magnitude and localized as the project site is privately owned and limited commercial use occurs at the project site.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on recreation and commercial use, taking into account the implementation of mitigation measures.

7.7 Amphibians and Reptiles

7.7.1 Baseline by proponent

Amphibians

Annual amphibian breeding surveys recorded the presence of eight frog species in the NLSA: American Toad, Boreal Chorus Frog, Mink Frog, Northern Green Frog, Northern Leopard Frog, Spring Peeper, Tetraploid Gray Treefrog, and Wood Frog. Historically, two salamander species have been recorded in the NLSA, but none were observed. Woodlands and wetlands were identified as important amphibian breeding habitat.

Woodland amphibian breeding habitats, within the NLSA, consist of vernal (permanent or ephemeral) pools, wetlands or lakes within or adjacent (120 m) to woodlands.

Wetland amphibian breeding habitat, within the NLSA, consist of vernal pools or wetlands greater than 0.05 ha. Beaver ponds and other wetlands features are numerous throughout the NLSA.

Reptiles

Three species of reptiles were observed opportunistically in the NLSA: Eastern Gartersnake, Western Painted Turtle, and Snapping Turtle. Historically, the Northern Red-bellied Snake and Red-sided Gartersnake have been recorded in the NLSA, but none were observed and few snake observations were recorded during field studies.

Reptile hibernacula consist of animal burrows, rock crevices, and other natural areas that enable hibernation below the frost line. No hibernacula features were found in the NLSA, although the NLSA may provide suitable habitat for hibernacula.

Turtle overwintering sites are described as permanent water bodies, large wetlands, and bogs or fens with dissolved oxygen. The NLSA may provide suitable turtle overwintering habitat, but no records exist for turtle wintering sites in the NLSA. Turtles generally nest in sand and gravel located in open, sunny areas where they are able to dig. Gravel pits, woodlands, and wetlands may provide suitable turtle nesting habitat. Road embankments in the NRSA have been noted as being used for turtle nesting.

Western Painted Turtles were observed near Muskrat Lake and Little Pine Lake. The lakes provide important overwintering habitat, for the species, during migration to the north. Additional baseline information regarding reptiles that are identified as SAR (i.e., Snapping Turtle) is provided in section 7.9.

7.7.2 Effects predicted by proponent

The predicted environmental effects on amphibians and reptiles will result from the alteration and removal of woodland, wetland, creek and pond habitats in relation to federal authorizations. Of the total habitat removed (section 6.4), 1475.3 ha of woodland and 291.8 ha of wetland associated with amphibian breeding will be impacted.

Treated effluent discharges from the project site into the environment are expected to meet MOECC site-specific criteria and federal MMER Schedule 4 limits. Partially treated effluent passing through the constructed wetland is expected to meet PWQO equivalent discharge limits (modified receiver targets) for the protection of aquatic life including amphibians and reptiles, prior to mixing with the Pinewood River.

Specific effects to reptiles that are identified as SAR (i.e., Snapping Turtle) are described in section 7.9.

7.7.3 Comments received

7.7.3.1 Government Authorities

MNRF expressed concerns about amphibians experiencing reduced fitness or survival if they move to the TMA, and suggested placing silt fencing in the area to discourage amphibian immigration. The proponent indicated it is neither feasible nor standard practice to attempt wildlife exclusion measures over such a large area but committed to discuss the mitigation with MNRF, if required. The proponent also noted that effluent pre-treatment in the processing plant will reduce cyanide and associated heavy metals to levels that are below wildlife toxicity thresholds (section 7.1). MNRF stressed the need to design habitat for various wildlife (e.g. amphibians) in proposed West Creek Pond and Clark Creek Ponds.

7.7.3.2 Aboriginal groups

Aboriginal communities expressed general concerns about wildlife but did not specifically comment on reptiles and amphibians.

7.7.3.3 Public

Members of the public did not comment on reptiles and amphibians.

7.7.4 Residual environmental effects predicted by proponent

The proponent committed to a number of mitigation measures (Appendix A) to mitigate the effects on amphibians and reptiles, some of which were in response to comments or concerns raised. The Agency identified those measures required to prevent significant adverse effects (subsection 7.7.5).

The residual effects on amphibians and reptiles were predicted to be minor in magnitude and confined to the project site. These effects may be long-term continuing through mine construction and operation but reversible at decommissioning. The proponent stated all amphibians observed are regionally common species and suitable frog habitat is widespread across the NLSA. The proponent considered the overall effects on amphibians and reptiles as not likely to be significant.

7.7.5 Mitigation measures

The Agency has identified the following mitigation measures as required to prevent significant adverse effects on amphibians and reptiles:

- *Restrict clearing of amphibian breeding habitats* to periods outside breeding season as directed by the MNRF.
- *Engage MNRF in the design and review of West Creek and Clark Creek Diversions* as part of the fish habitat compensation plans to ensure amphibian habitat is taken into account.
- *Modify the timing of draining of wetlands* to encourage frogs to move to other equally suitable habitat adjacent to the project site and to minimize the impact of clearing wetland habitat where frogs are likely to overwinter.
- *Use exclusion fencing for reptiles and amphibians during the construction and operation phases.* The placement of fencing will be decided upon through consultation with the MNRF and EC.
- *Capture and release reptiles and amphibians* during construction and operation, in consultation with EC and MNRF.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

7.7.6 Agency analysis and conclusion

The Agency assessed the potential impacts to amphibians and reptiles with a focus on those species that use the watercourses and wetland communities within the project site. Effects on amphibians and reptiles may result from changes to water quality, and will result from habitat loss during the construction of the west rock and overburden stockpiles and the east rock stockpile. Measures to mitigate the effects to fish and fish habitat, such as covering the exposed tailings beach to ensure that the tailings pond waters remain of high quality such that they will not pose a threat to wildlife, will also mitigate effects to amphibians and reptiles.

The Agency expects the residual effects on amphibians and reptiles to diminish in duration and frequency and to be reversible upon the establishment of fish habitat offsetting and compensation plans under the requirements of the *Fisheries Act* and the MMER respectively, in consultation with DFO, MNRF and EC. The creation of like-for-like habitat is expected to indirectly provide habitat for amphibians and reptiles.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on amphibians and reptiles, taking into account the implementation of mitigation measures.

7.8 Furbearers

7.8.1 Baseline by proponent

Beaver, Muskrat, American Mink, and River Otter species and their habitat types were identified in baseline studies. Records also noted tracks, browsing, or scat evidence within watercourses and wetland communities in the NLSA.

Beaver activity such as dams, lodges, and chewed stumps was recorded along Marr Creek, West Creek, and Clark Creek within the project site and throughout the NLSA. Aerial surveys recorded beaver lodges in most wetlands in the NLSA. High prevalence of beaver activity has naturally modified several marsh habitats and watercourses near the project site.

Furbearer dens generally occur in large, undisturbed, unfragmented, treed ecosites, although otters prefer shorelines. Suitable landscapes for furbearer dens were noted in the NLSA and include cavity trees or downed woody debris as hollowed trees, downed hollow logs, old beaver lodges, or muskrat homes. No furbearer dens were recorded in the NLSA however, as noted above active beaver dams and lodges were observed.

Furbearer movement corridors are typically found within a riparian area of a lake, river, stream, or wetland. Movement corridors are generally associated with dens. Tracks of American Mink along the banks of Marr Creek suggest that Marr Creek or the Pinewood River itself is a movement corridor.

7.8.2 Effects predicted by proponent

The predicted environmental effects to furbearers will result from the alteration and disruption of the Minor Creek Systems and wetland communities during the construction of the TMA, west rock and overburden stockpiles, open pit and the east rock stockpile. Vegetation clearing will remove 291.8 ha of wetland habitat and 28 km of river shoreline habitat. There are equally suitable habitats for furbearers adjacent to the project site.

The functionality of beaver ponds may also be affected by flow reductions in the Pinewood River, due to water taking (section 7.1).

7.8.3 Comments received

7.8.3.1 Government Authorities

MNRF expressed concerns about the impacts to wildlife including furbearers, dispersing to and colonizing new habitats (e.g. increased mortality risk). The proponent states that habitat being disturbed by the Project is abundant within the NLSA and it is predicted that displaced individuals will migrate to suitable habitat adjacent to the project site. The proponent noted that mortality of furbearers is not expected. MNRF was generally satisfied.

7.8.3.2 Aboriginal groups

Aboriginal communities expressed concerns about wildlife in general but did not specifically comment on furbearers.

7.8.3.3 Public

The public had general comments about the use of the area for trapping but did not specifically comment on furbearers.

7.8.4 Residual environmental effects predicted by proponent

The proponent committed to a number of mitigation measures (Appendix A) to mitigate the effects on furbearers, some of which were in response to comments or concerns raised. The Agency identified those measures required to prevent significant adverse effects (subsection 7.8.5).

The residual effects on furbearers result from the removal of watercourses and wetland communities during the construction of the proposed mine infrastructure. The residual effects on furbearers are predicted to be minor in magnitude and confined to the project site. They are predicted to be long-term continuing through mine construction and operation but reversible after decommissioning.

The proponent considered the overall effects on furbearers as not likely to be significant.

7.8.5 Mitigation measures

The Agency has not identified any additional mitigation measures to ensure no significant adverse effects to furbearers.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

7.8.6 Agency analysis and conclusion

The Agency assessed the potential impacts to furbearers with a focus on those species that use the watercourses and wetland communities within the project site. Effects to furbearers will result from the alteration and disruption of the Minor Creek Systems and wetland communities during the construction of the TMA, west rock and overburden stockpiles, open pit and the east rock stockpile. The proponent's commitment to restore habitat at decommissioning will encourage development of habitats capable of supporting a diversity of wildlife species, including furbearers. The proponent has indicated that the types of habitat removed from the project site are abundant within the NLSA and that displaced individuals will migrate to suitable habitat adjacent to the project site. The Agency expects the residual effects on furbearers to diminish in duration and frequency and to be reversible upon the establishment of the detailed fish habitat offsetting and compensation plans under the requirements of the *Fisheries Act* and the MMER respectively, in consultation with DFO, MNRF and EC. The creation of like-for-like habitat is expected to indirectly provide habitat for furbearers associated with watercourses.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on furbearers, taking into account the implementation of mitigation measures.

7.9 Federal Species at Risk

7.9.1 Baseline by proponent

Under section 79(2) of *Species at Risk Act* (SARA), the Agency must identify the Project's adverse effects on listed wildlife species and their critical habitats. If the Project proceeds, preventative measures must be taken in accordance with applicable recovery strategies and management plans to lessen and monitor effects.

Seven threatened species listed on Schedule 1 of SARA were identified: six migratory bird species and one mammal; Eastern Whip-poor-will, Canada Warbler, Olive-sided Flycatcher, Golden-winged Warbler, Red-headed Woodpecker, Common Nighthawk, and the grey fox. Two species of special concern listed on Schedule 1 of SARA were identified: Short-eared Owl and Snapping Turtle.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed other species as being endangered, threatened, or special concern. The following species have been included for consideration because they may eventually be scheduled under SARA: Eastern Wood-peewee (special concern), Barn Swallow (threatened), Bobolink (threatened), Lake Sturgeon (special concern), Little Brown Myotis (endangered), and Northern Myotis (endangered).

Species-specific information on species at risk (SAR) locations and habitat is confidential and under a data sharing agreement between the proponent and the MNRF. The EIS included general baseline information on these species.

General preferred habitat types in the NLSA include woodland, marsh, and open country habitats for federal SAR. Appendix H provides descriptions of the preferred habitat types and general baseline information about SAR in the NLSA.

Two adult Snapping Turtles were observed within the NLSA. No evidence of nesting was observed. The NLSA however includes rivers, creeks, ponds, and wetlands that may provide suitable habitat for these turtles.

7.9.2 Effects predicted by proponent

Potential adverse effects on SAR include habitat loss, which may occur directly or indirectly through vegetation clearing (Table 6-4) from mine infrastructure construction and atmospheric environment effects (section 6.1) involving dust and noise. Appendix H provides species-specific descriptions of effects to species listed under SARA and designated by COSEWIC.

Snapping Turtles are known to cross roads to travel between various habitat features and use roadsides as potential nesting sites. A predicted increase of vehicular traffic at the project site may result in increased collisions with Snapping Turtles. Potential for increased Snapping Turtle and turtle nest predation may result from domestic waste, produced during construction and operation activities, attracting wildlife scavengers (e.g. raccoons).

Species at Risk listed under SARA

The construction of the transmission line will have limited residual adverse effects on local Eastern Whip-poor-will population, given the extent of similar habitat within the NRSA. The Eastern Whip-poor-will may persist on the peripheries of the project site and transmission line, and displaced birds may colonize nearby tracts of identified suitable habitat.

Predicted residual effects on the Canada Warbler, Olive-sided Flycatcher, Golden-winged Warbler, and Common Nighthawk, Short-eared Owl, and Snapping Turtle include displacement of suitable habitat centered on the project site and potential exposure to noise, vehicular traffic, and site effluents. These effects are likely to occur during construction and operation of the Project.

Species designated as Endangered, Threatened or Special Concern by COSEWIC

Predicted residual effects on the Eastern Wood-pewee, Northern Myotis, and Little Brown Myotis include displacement of suitable habitat centered on the project site and potential exposure to noise, vehicular traffic, and site effluents. These effects are likely to occur during construction and operations of the Project.

Predicted residual effects on the Barn Swallow during construction include displacement of nesting structures to a new location where surrogate structures will be provided, and the loss of wetland and agricultural foraging habitats. The environmental effects of foraging habitat removal may not be adverse, depending on the proximity of surrogate nesting sites.

Predicted residual effects on the Bobolink during construction and include open country breeding habitat loss centred on the project site. Availability of similar habitat surrounding the project site will likely minimize the long-term impacts of development on local Bobolink population.

The proponent considered the overall effects on species listed under SARA and designated by COSEWIC as not likely to be significant.

7.9.3 Comments received

7.9.3.1 Government Authorities

EC expressed concerns about the potential effects of the Project on SARA-listed migratory birds due to the changes in land use at the project site. EC also expressed concern regarding increased artificial light use and insect prey species, and their effects (e.g. mortality) on Eastern Whip-poor-will and Common Nighthawk.

The project site will remove existing Common Nighthawk and Eastern Whip-poor-will habitat. The Eastern Whip-poor-will habitat can be compensated as part of the overall benefit permitting process under the Ontario ESA. Common Nighthawk is not listed under the Ontario ESA however, and is not afforded the same compensation, but will also likely benefit from the compensatory habitat. The proponent, as noted in the follow-up monitoring plan (section 10), will monitor the Common Nighthawk and Eastern Whip-poor-will.

EC expressed concern regarding the lack of mitigation measures restricting Snapping Turtles and other reptiles from entering the site, and the increased risk of mortality from construction and operation activities. EC recommended that turtles be captured onsite prior to construction and relocated to safe areas

of suitable habitat and be restricted from entering the construction site through the use of exclusion fencing. In addition, EC recommended that female turtles found along the inside edge of the roadways be captured during a two week period beginning from late May to early June, if they attempt to nest.

7.9.3.2 Aboriginal groups

Aboriginal communities expressed concerns about wildlife in general but did not specifically comment on species at risk.

7.9.3.3 Public

Members of the public commented on wildlife in general but did not specifically comment on species at risk.

7.9.4 Residual environmental effects predicted by proponent

The proponent committed to a number of mitigation measures (Appendix A) to mitigate the effects on SAR, some of which were in response to comments or concerns raised. The Agency identified those measures required to prevent significant adverse effects (subsection 7.9.5).

The residual effects on SAR were predicted to be minor in magnitude and confined to the project site. They will be long-term in duration continuing through mine construction and operations but reversible following abandonment. No residual effects were predicted for Lake Sturgeon, Grey Fox, or Red-headed Woodpecker.

7.9.5 Mitigation measures

The Agency has identified the following additional mitigation measures as required to prevent significant adverse effects on Snapping Turtles.

- *Prohibit food waste generation and disposal onsite* to avoid attracting wildlife and reduce potential predation of Snapping Turtles.
- *Use exclusion fencing for Snapping Turtle along roads.* The placement of fencing will be decided upon through consultation with the MNRF and EC.
- *Capture and release Snapping Turtle along roads*, in consultation with EC and MNRF.

Additional mitigation measures for Snapping Turtle (and other reptiles) are described in section 7.7. Mitigation measures for SAR that are migratory birds are described in section 7.2.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

7.9.6 Agency analysis and conclusion

In accordance with section 79(2) of SARA, the Agency assessed the potential impacts to federal SAR with a focus on those species that use the terrestrial landscape, watercourses and wetland communities within the project site. The Project may have adverse effects on SAR due to habitat loss and changes to light and sound emissions. No residual adverse effects were predicted for Lake Sturgeon, Grey Fox, or Red-headed

Woodpecker. The proponent's commitment to create 1000 ha compensatory habitat for Eastern Whip-poor-will and Bobolink, and to create artificial nesting structures to encourage colonization by Barn Swallows, will mitigate potential adverse effects. The proponent's commitment to maintain a minimal project site (reducing overall habitat clearance) and conduct active revegetation and recolonization of disturbed areas during operation and at decommissioning will ensure SAR are considered and managed during each phase of the Project. There may be effects on Snapping Turtles due to increased transportation at the project site (mortality and loss of nesting habitat) and increased predation by attracting predators to the area with the disposal of food wastes. The proponent committed to prohibit food waste generation and disposal onsite to reduce predation. The proponent has addressed concerns by federal authorities and Aboriginal groups by committing to consult with EC and MNRF on capturing turtles found on the project site prior to construction and safely releasing them to nearby suitable habitat, and on installing exclusion fencing for reptiles and amphibians during construction and operations. The Agency notes that the proponent has also committed to consulting EC on the capture and relocation of female Snapping Turtles found along roadways during the two week period beginning from late May to early June, if they attempt to nest. The Agency expects the residual effects on species listed under SARA and designated by COSEWIC to diminish in duration and frequency once operations begin.

The Agency concludes that the Project is not likely to cause significant adverse environmental effects on federal SAR and those species designated by COSEWIC, taking into account the implementation of mitigation measures.

8 Other Effects Considered

8.1 Effects of Malfunctions and Accidents

Pursuant to paragraph 19(1)(a) of the Act, the proponent must take into account the environmental effects of malfunctions and accidents that may occur in connection with the designated project. Malfunctions and accidents have the potential to occur from project construction through to decommissioning or abandonment. The assessment considered malfunctions and accidents that could have material environmental effects. Refer to Table 8-1 for further information.

The proponent assessed each accident and malfunction according to likelihood of occurrence and magnitude of consequence. A risk ranking between 1 (highest) and 9 (lowest) was assigned, referring to a diagonal row of cells within a risk matrix (Figure 8-1). Increased risk is associated with malfunctions and accidents having a greater likelihood of occurrence and increased level of consequence.

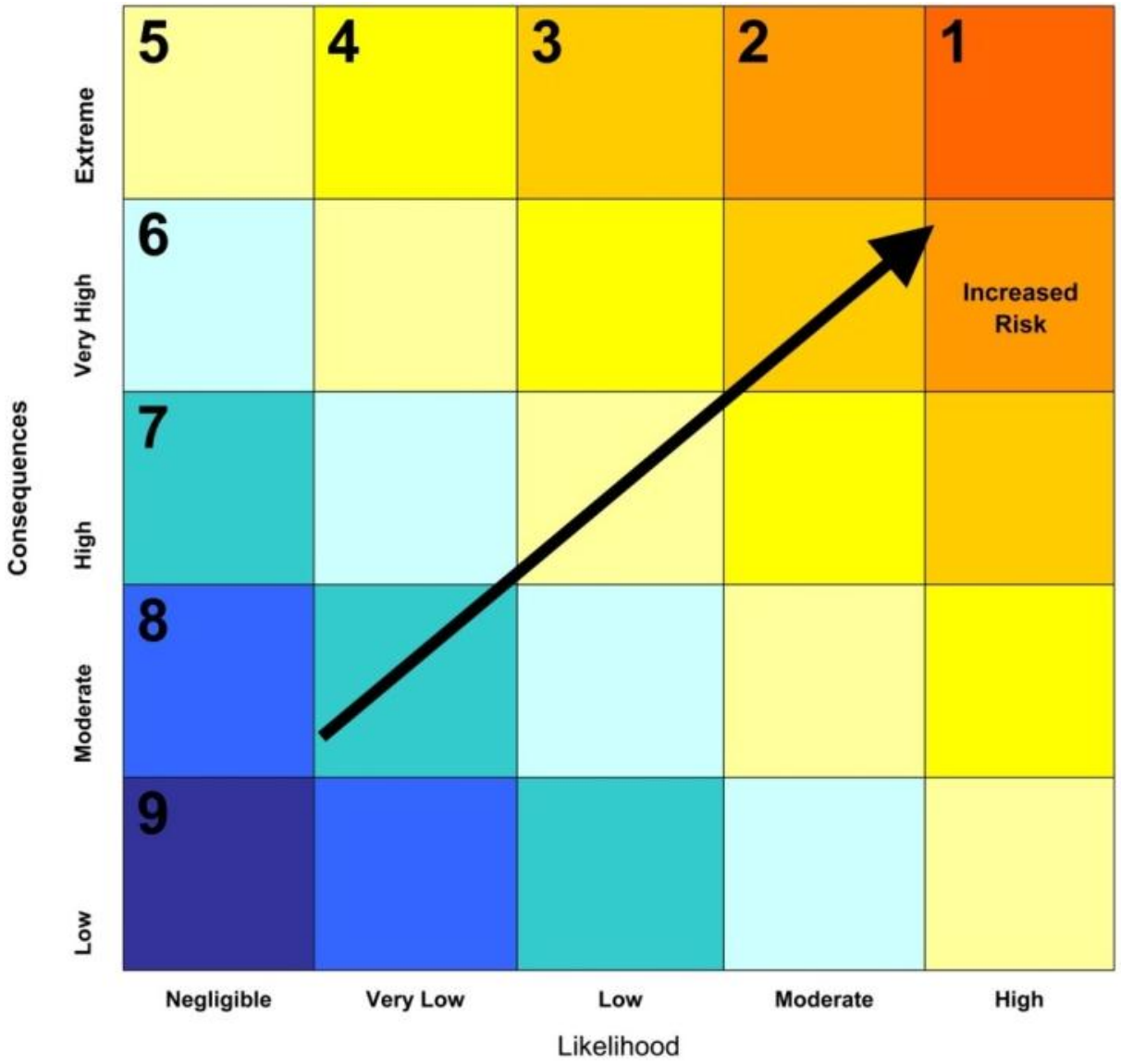

Figure 8-1: Environmental Risk Matrix (Source: Rainy River EIS, AMEC).

Table 8-1: Malfunctions and Accidents Risk Summary (Adapted from Rainy River EIS, AMEC).

Malfunction or Accident	Issue of Concern	Likelihood	Consequence	Risk (See Fig. 8-1)
Structural Failures				
Open pit slope failure	Damage to habitat; limited flooding of open pit	Low	Moderate	6
East mine rock stockpile slope failure	Damage to terrestrial habitat, aquatic life	Very low	High	6
Overburden stockpile slope failure	Damage to terrestrial habitat, aquatic life	Very low	Moderate	7
Tailings dam failure	Damage to terrestrial habitat, aquatic life	Negligible	Extreme	5
Pond dam failure	Damage to aquatic life	Negligible	Moderate	7
Creek diversion failure	Damage to aquatic and terrestrial	Negligible	Moderate to	7

	habitat, and aquatic life		high	
Accidents				
Tailings pipeline failure	Damage to habitat and aquatic life	Very Low	High	6
Water pipeline failure	Damage to aquatic life	Very Low	Low	7
Fuel release during truck transport	Damage to aquatic life and downstream human environment	Very Low	High	6
Fuel release from storage facilities and dispensing area	Damage to habitat	Low	Low	7
Transportation accident – hazardous materials (excluding fuel)	Damage to habitat, aquatic life and downstream human environment	Very Low	High	6
Transportation accident – non-hazardous materials	Local terrestrial environment impact	Low	Low	7
Chemical spills from pressurized vessels	Damage to property and human environment	Negligible	Very high	6
Other Malfunctions				
Unexpected water quality concerns	Damage to aquatic life	Very Low	High	6

8.1.1 Effects predicted and mitigation measures by proponent

8.1.1.1 Structural failures

The environmental impact statement (EIS) identifies six potential structural failures and in each case the proponent has either identified design safeguards or proposed actions to mitigate effects.

Open pit slope failure

The EIS indicates that open pit slope failure of 40 m could cause a rerouting of the Pinewood River into the open pit, which could reduce downstream flow. The likelihood, however, is low because the flood control berm is 60 m from the open pit slope. Potential effects of reduced water flow into the Pinewood River are discussed in section 6.2.

Proponent's design safeguards:

- Maintain appropriate ramp width and grade;
- Monitor pit wall for geotechnical stability;
- Maintain appropriate overburden slope angles;
- Monitor overburden slope movement;
- Revegetate exposed overburden as soon as practical;
- Reinforce, in case of localized erosion, overburden slopes with mine rock or progressive re-vegetation; and
- Construct a flood protection berm 60 m from the maximum open pit extent.

East mine rock stockpile slope failure

The EIS indicates that the east mine rock stockpile contains encapsulated potentially acid generating (PAG) waste rock. In the event of a slope failure, there would be a release of runoff affected by acid rock drainage and metal leaching (ARD/ML) and loss of habitat. If the rock failure were to infill a perimeter ditch,

ARD/ML runoff could potentially overflow or otherwise exit the ditch and could drain towards the Clark Creek diversion or the Pinewood River. Effluent could contain pH, total suspended solids and ammonia in excess of applicable discharge criteria and would be toxic to aquatic life. Potential effects on water quality and fish and fish habitat are discussed in sections 6.3 and 7.1, respectively.

Proponent's proposed actions in case of failure:
- Re-contour, in the event of a stockpile slope failure, the slope in place;
- Excavate any material which migrated as far as the drainage ditch area and return it to the stockpile. If required, repair the drainage ditches; and
- Report and monitor spill, if PAG rock or stockpile runoff migrated beyond the collection ditches.

Overburden stockpile slope failure

The EIS indicates that the overburden and west mine rock stockpile, containing non-potentially acid generating (NPAG) rock, could partially sink to the ground raising the toe of the stockpile (where the slope meets the ground) adjacent to the West Creek Diversion Channel or Pinewood River.

A worst case failure is expected by the proponent to extend 10 m from the stockpile toe and potentially release suspended solids into the West Creek Diversion Channel or Pinewood River. Suspended solids could interfere with aquatic life by damaging fish gills, interfering with feeding, or smothering eggs by preventing oxygen exchange. Potential effects on fish and fish habitat are discussed in section 7.1.

Proponent's design safeguards:
- Construct external slopes with relatively dry clays or clays mixed with rock for stability; and
- Capture stockpile runoff in perimeter runoff collection ditches and direct the water to sedimentation ponds.

Proponent's proposed actions in case of failure:
- Excavate any material that migrates as far as the perimeter ditch and return it to the stockpile. If required, repair the drainage ditches; and
- Deploy silt fencing, if the slope failure caused effluent in the perimeter ditching to spill, downstream of the spill to prevent sediment laden waters from entering a watercourse.

Tailings Management Area dam failure

The EIS indicates that failure of the Tailings Management Area (TMA) dam could result in some contained spilling of tailings solids and ponded effluent into the Pinewood River. The proponent anticipates that TMA dam failure is unlikely to occur as the ponded effluent would be stored in the north portion of the TMA. Some of the tailings solids would be deposited in the constructed wetland as the tailings slurry flows down the West Creek into Pinewood River. The tailings slurry would destroy fish habitat and vegetation in its path. The tailings slurry would degrade surface water and groundwater quality. Potential effects on water quality and fish and fish habitat are discussed in sections 6.3 and 7.1, respectively.

Proponent's design safeguards:
- Construct TMA dams to withstand the probable maximum flood and maximum possible earthquake in accordance with Ontario's *Lakes and Rivers Improvement Act;*
- Inspect TMA dams visually on a daily basis;
- Install geotechnical monitoring equipment to monitor any movement of dams; and
- Conduct geotechnical inspections at regular intervals.

Proponent's proposed actions in case of failure:
- Pump, in the event of a breach or failure, the TMA pond to the water management pond, to reduce the amount of released effluent during the emergency repair;
- Contain the spill to the extent possible using temporary earthen or snow dams, silt fences, turbidity curtains,

sandbags and other available equipment;
- Work closely with local residents and authorities and address the needs of downstream residents; and
- Develop spill management measures as part of the contingency and response plan in consultation with appropriate government agencies in the event of dam failure to:
    - Contain spilled tailings based on their ARD characteristics;
    - Excavate spilled tailings and haul them back to the repaired TMA or, alternatively, engineer a cover over the deposited material; and
    - Restore and revegetate all areas where tailings are removed to the extent practical.

Pond dam failure

The EIS indicates that the proponent will create several ponds containing mine-affected water to support onsite water management. The mine rock, water management, water discharge, and seepage collection ponds may contain elevated levels of minerals and metals. If a pond dam breaches, the effluent would flow into the Pinewood River causing toxic substances to destroy fish and fish habitat. Other ponds such as the West Creek, Clark Creek, stockpile, and Teeple ponds will contain fresh water. If these pond dams breach, the fresh water would flow into Pinewood River. Depending on the quantity of water and speed of release, the environment in the flow path would be damaged with scour and erosion. A major pond failure could damage vegetation, result in a temporary loss of aquatic habitat and cause physical harm to any wildlife caught in the flow path, either by drowning or debris collision. Potential effects on water quantity, water quality, and fish and fish habitat are discussed in sections 6.2, 6.3 and 7.1, respectively.

The proponent noted that, should a release of deleterious waters occur, remediation would not be possible unless a downstream pond is present to catch released water. Although water from the mine rock pond and water management pond would be toxic to aquatic life, it would be diluted to non-toxic levels when mixed with Pinewood River under the emergency condition. The proponent does not expect long-term environmental impacts from a pond dam failure.

Proponent's design safeguards:
- Store environmental design flood runoff above the maximum operating water level in ponds containing mine-affected water;
- Construct spillways to ensure safe discharge to the environment should an event ever exceed the environmental design flood;
- Construct dam slopes and crest widths for stability in relation to the mine rock pond, water management pond, as well as ponds not affected by mine water;
- Design the retention period of sedimentation ponds to meet the *Metal Mining Effluent Regulations* (MMER) discharge requirements for total suspended solids;
- Size the diversions to convey the probable maximum flood without overtopping; and
- Inspect pond dams on a regular interval (by site employees); and periodically, on an interval that meets, at a minimum, regulatory requirements (by a qualified geotechnical engineer).

Proponent's proposed actions in case of failure:
- Deploy, in the event of a failure or imminent failure of a pond dam, silt fences, turbidity curtains, sandbags and other erosion and sediment control measures to prevent the entry of sediments into a downstream water body; and
- Keep appropriate spill control equipment at the project site.

Creek diversion failure

The EIS indicates that complete failure of either West Creek or Clark Creek diversion channels would be related to erosion, sedimentation and loss of aquatic habitat due to a major storm event. The excess flows could wash soil out from vegetation causing erosion and could degrade terrestrial habitat. Where the

beached runoff re-enters surface waters, extra sediments would be released to the water column thus affecting aquatic life, including fish and fish habitat. Potential effects on water quantity, water quality, and fish and fish habitat are discussed in sections 6.2, 6.3 and 7.1, respectively.

Proponent's design safeguards:
- Size all diversions to convey the probable maximum flood without overtopping; and
- Operate the initial portion of the West Creek diversion channel as the emergency spillway for the West Creek pond.

Proponent's proposed actions in case of failure:
- Undertake emergency repair, in the event of a failure or imminent failure of a diversion, as soon as possible;
- Address the needs of downstream residents by working closely with local residents and authorities; and
- Install, if possible, erosion and sediment control measures (such as silt fences, turbidity curtains, sandbags, erosion mats and other equivalent measures) downhill of the failure.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

8.1.1.2 Accidents

The EIS indicates seven potential accidents or failures and in each case the proponent has either identified design safeguards or proposed actions to mitigate effects.

Tailings pipeline failure

The EIS indicates that a tailings pipeline failure would result in a tailings slurry spill. The effect of the spill would depend on the time of the year, the location of the spill and the volume spilled. If the spill occurred when the ground was frozen, spilled material would be readily cleaned up and no environmental impact would be expected. During the remainder of the year, the spill would cover surrounding terrestrial or aquatic habitat. The pipeline only crosses one watercourse (West Creek). The solids (essentially sand) contained in the slurry would be retained in close proximity to the pipeline rupture, regardless of season. Liquid from the spill would flow by gravity toward the West Creek and West Creek Diversion Channel, the constructed wetland, and potentially the Pinewood River. Potential effects on water quality and fish and fish habitat are discussed in sections 6.3 and 7.1, respectively.

Proponent's design safeguards:
- Install pressure sensors at four locations along the pipeline route and flow transmitters at the onsite metal mill and at the TMA dam as the primary operational safeguards;
- Install a vacuum relief valve at the TMA dam to ensure reverse flow is not possible. The proponent responded that the pump will automatically shut off in the event of a pressure loss resulting from a failure;
- Inspect the tailings pipeline twice per 12-hour shift;
- Undertake incidental observation to identify leaks occurring below the pressure loss detection point; and
- Institute a ditch and capture basin system to act as secondary containment in case of a leak; and
- Install secondary containment at the tailing pipeline crossing of the West Creek.

Proponent's proposed actions in case of accident:
- Use heavy equipment and spill containment materials in order to contain or limit the discharge of tailings and effluent to the environment;
- Implement spill management measures as part of the contingency and response plan, depending on the amount of tailings spilled and whether tailings enter West Creek, in consultation with appropriate regulatory agencies; and
- Excavate spilled tailings and load on a haul or vacuum truck, and transport to the TMA.

Water pipeline failure

The EIS indicates that a water pipeline failure would release water causing erosion downslope due to the force and volume of water being released. This could result in a short-term sediment plume to be released to water, resulting in potential impacts to aquatic life by damaging fish gills, interfering with feeding, or smothering eggs by preventing oxygen exchange. Potential effects on fish and fish habitat are discussed in section 7.1.

Proponent's design safeguards:
- Inspect and employ regular incidental observation activities to identify visible leaks or failure of the pipeline.

Proponent's proposed actions in case of accident:
- Shutdown pumps, upon discovery of a leak or failure, and repair the pipeline; and
- Employ, if possible, erosion and sediment control measures, such as matting, straw bales or silt fencing to prevent overland runoff containing sediments from directly entering a watercourse.

Fuel release during truck transport

The EIS indicates that fuel spills from tanker trucks could occur due to collisions, accidents related to poor weather conditions, or other mishaps. A diesel spill from a truck travelling to site could affect the soil (or snow in winter) in the vicinity of the spill, and could potentially enter a water body and impact aquatic life, if the accident occurred on or near a water crossing. Diesel fuel and gasoline is toxic to aquatic life when spilled in fresh water and impacts to aquatic life could include serious physiological damage or mortality. Potential effects on water quality and fish and fish habitat are discussed in sections 6.3 and 7.1, respectively.

Proponent's design safeguards:
- Develop and implement spill management measures as part of the contingency and response plan; and
- Manage trucking and supply contracts, by incorporating, as reasonable, features to minimize the potential for environmental impacts on the trucking route, including:
    - strict adherence to speed limits, national trucking hour limits and other applicable requirements;
    - drivers must meet all applicable regulatory training requirements as per the *Transportation of Dangerous Goods Act*, be trained in spill response procedures and carry Material Safety Data Sheets (MSDS) for hauled material regulated under the federal *Hazardous Products Act*; and
    - all material transport vehicles must maintain basic emergency response equipment in order to stop or slow spills, using available equipment.

Proponent's proposed actions in case of accident:
- Employ spill counter measures, including use of absorbent materials, establishment of a collection trench, and setting of containment booms on water;
- Contain fuel with booms, berms or other means, and, possibly also pump, skim or mop fuel with absorbent matting, and dispose in an approved facility designed to manage such wastes;
- Contain and remediate, where possible, spills that may directly enter a fast moving watercourse; and
- Conduct a review, after any major spill, to ensure that the required design changes, procedures and appropriate monitoring measures are in place to ensure that similar incidents are not repeated.

Fuel release from storage facilities and dispensing areas

The EIS indicates that environmental effects of a fuel release from storage may be less than a release from truck transport, as fuel storage tanks are in a fixed location. A fuel spill or a major spill during a rainfall event would affect the immediate terrestrial environment. The fuel storage facility will be located near the crusher where drainage will flow to the mine rock pond or stockpile pond. In either case, the spill and associated runoff would be contained and treated prior to being discharged from the pond.

Proponent's design safeguards:

- Include design and construction features to minimize the potential for environmental impacts as follows: containment berms, collision protection poles, placement of the storage areas away from watercourses and the use of leak detection requirements;
- Incorporate operational procedures to minimize the potential of accidents or malfunctions into the contingency and response plan;
- Keep and maintain a large spill kit, including absorbent material, at the fuel storage facility; and
- Inspect, regularly, all fuel storage locations and volumes for leakage and other operational problems.

Proponent's proposed actions in case of accident:

- Implement spill management measures as part of the contingency and response plan if fuel escapes the secondary containment berms;
- Seal, when the area is secured, the leak or failure, if possible;
- Contain the spill by using absorbent materials or by constructing a downstream berm;
- Collect and haul spilled fuel offsite for disposal;
- Send offsite used absorbent material for disposal at a licensed facility;
- Report on and notify spills in accordance with the Ministry of the Environment and Climate Change (MOECC) requirements;
- Cease, if a spill migrates to the mine rock pond or stockpile pond, all pumping from the pond, contain the spill with a boom, and remove with a skimmer;
- Test soils in the vicinity of the spill for hydrocarbons and delineate the affected soils; and
- Treat impacted soil onsite in a bioremediation area or haul offsite for treatment and disposal.

Transportation accidents

The EIS indicates that transport vehicle accidents on route to the project site could result in a spill of the materials, including fuel or hazardous materials. The consequences of a spill would depend on the type and quantity of material spilled, and the location and timing of the spill. Spills involving solid briquettes of cyanide are of particular concern as impacts to aquatic life would occur, including serious physiological damage and mortality. Potential effects on water quality, and fish and fish habitat are discussed in sections 6.3 and 7.1, respectively.

Proponent's design safeguards:

- Ship all materials of consequence in sealed containers, such as tanker trucks, containers, shipment cubes (1000 L), sealed bulk bags, 205 L sealed drums and smaller containers on pallets;
- Ensure, all shipments comply with regulatory requirements, including the federal *Transportation of Dangerous Goods Act* and associated regulations; and
- Incorporate operational procedures on minimizing the potential for environmental impacts into trucking contracts and the contingency and response plan including: strict adherence to speed limits; restricting oversized loads to daylight travel where possible; avoiding material transport when visibility is low; and regular vehicle maintenance.

Proponent's proposed actions in case of accident:

- Remove potential ignition sources in the event of a spill of flammable or combustible materials if safely possible and slowdown or stop the spill;
- Notify the MOECC's Spills Action Centre (per the requirements of the Ontario *Environmental Protection Act*, the Township of Chapple, Emo Fire Department, and, if required, the Technical Standards and Safety Authority (fuel fires and explosions);
- Conduct an assessment and determine the best means to prevent immediate environmental impacts;
- Implement spill management measures as part of the contingency and response plan, such as the use of absorbent materials, establishment of a collection trench downslope, and setting of containment booms on water if effective for the spilled material;
- Ensure clean-up and remediation reduces long-term environmental impacts to the extent possible; and
- Conduct a review and report, after the incident, to ensure that any required design changes and procedures are in place to prevent a similar accident.

Chemical spill within contained facilities and chemical spills from pressurized vessels
The EIS indicates that pressurized vessel failure has the potential to affect worker health, cause damage to project infrastructure or facilities; and cause localized temporary air quality concerns due to a release of sulphur dioxide or oxygen. Impacts would be limited to the immediate atmospheric environment as a result of the rapid dissipation of the material as it expands out from the vessel itself and the volume of gas contained.

Proponent's design safeguards:
- Store all chemicals which pose a potential risk to the environment within contained areas, with sealed floors and sumps or drains reporting to facilities which will provide for retrieval of the spilled materials;
- Ensure all chemicals used at the site have a MSDS, in order to comply with industry best practices and with the Workplace Hazardous Materials Information System Ontario Regulation 860 and *Occupational Health and Safety Act* for the safe use of these materials;
- Include a spill pad for the liquid oxygen storage area; and
- Manage spills from the sulphur dioxide area in a containment area.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

8.1.1.3 Other malfunctions
Unexpected water quality concerns related to ARD
The EIS indicates that effluent released from the water management pond could impact water quality (i.e. pH levels, elevated dissolved minerals, ammonia or cyanide) and would be toxic to aquatic life, if the treatment of mine rock and tailings materials is insufficient. Potential effects on water quality and fish and fish habitat are discussed in sections 6.3 and 7.1, respectively.

Proponent's design safeguards:
- Segregate rock for use as construction materials according to a site-specific protocol, which is expected to include:
    - preliminary visual identification of construction materials from the open pit which undergo geochemical testing;
    - supplementary refinement based on a geochemical block model, to identify the location of blocks of material which are eligible for construction usage;
    - periodical geochemical testing of the blocks to assess appropriate location for storage or for construction use and confirmation of model results; and
    - visual inspection of material during placement and after construction for signs of ARD.
- Extract and transport any material used in construction, after visual identification and subsequent sampling, that is identified as acid generating to the East Mine Rock Stockpile for storage or encapsulate (or take other measures), as appropriate, to leave the material in place.

The proponent has committed to implement additional mitigation measures as identified in Appendix A: Part 2.

8.1.2 Residual effects by proponent
Residual effects from structural failures of the east mine rock stockpile slope, overburden stockpile slope, TMA dam, pond dam, and creek diversion were predicted to have the potential to destroy or disrupt fish and fish habitat through the release of acid drainage, metals and suspended solids into the Pinewood River watershed. Residual effects from accidents such as tailings pipeline failure, water pipeline failure, fuel release during truck transport and transportation accidents were predicted to also have the potential to

impact aquatic life by damaging fish gills, interfering with feeding or smothering eggs by preventing oxygen exchange. Chemical spills within contained facilities and chemical spills from pressurized vessels were predicted to have a potential impact on the atmospheric environment as a result of rapid dissipation of released material. Residual effects on unexpected water quality concerns related to ARD were predicted to have a potential impact to fish and fish habitat through degradation of water quality.

The residual effects on structural failures, accidents and other malfunctions are unlikely to occur taking into account the implementation of mitigation measures, proposed project design, operational safeguards and contingency procedures.

8.1.3 Comments received

8.1.3.1 Government authorities

Federal authorities expressed concerns over the potential effects of a TMA dam failure on channel morphology, substrate types and downstream fish and fish habitat. The proponent provided an additional dam breach and watercourse erosion assessment. This assessment included the worst case scenario of a full dam breach releasing a large volume of tailings into the Pinewood River at a time of low to zero flow in the summer. The assessment indicates that the release of tailings would likely affect a six kilometre reach of the Pinewood River, immediately downstream of the TMA. The remaining 30 km reach of the Pinewood River to the confluence of Rainy River would have low susceptibility to erosion.

Environment Canada (EC) expressed concern about the potential for uncollected seepage from project facilities and requested more information on the management of effluent from the sediment ponds. The proponent will have a contingency and response plan in place to address the potential for uncollected seepage from project facilities, including the sediment ponds. In response to EC's concern the proponent will install secondary containment for tailings and contact water pipelines at the crossing of the West Creek.

EC expressed concerns about the potential for poorly screened materials through visual inspection of PAG or NPAG rock to affect water quality and fish in the Pinewood River watershed. The proponent will use visual evaluation and geochemical data to characterize the rock material as PAG or NPAG. The local potentially PAG till is quite distinctive from the surrounding materials and is readily identified in the field. EC was satisfied.

8.1.3.2 Aboriginal communities

Aboriginal communities expressed concerns about spills and suggested the establishment and dissemination of a protocol in advance of a spill or emergency. The proponent indicated that there is no possible event where downstream waters would be contaminated by a spill, such that alternative drinking water would be required by First Nation communities. The additional dam breach and watercourse erosion assessment includes worst-case scenarios for a tailings dam failure. The proponent will develop a contingency and response plan that includes a number of aspects relating to accidents and malfunctions.

Concerns were expressed about spills and accidents impacting on Aboriginal fisheries and wildlife in the Pinewood River watershed. The proponent will provide timely notification and consultation on spills and accidents if any, and on the details of any investigation and response to these events (Appendix A). The

proponent will also provide assistance and opportunities for ongoing consultation on environmental approvals, the mine closure plan, a contingency and response plan, and the follow-up monitoring plan.

Aboriginal communities expressed concerns about the potential for ARD and ML to impact drinking water and aquatic life. The proponent would ensure that surface water going into the Pinewood River from the mine would meet site-specific criteria for the protection of aquatic life.

Concerns were raised about the potential for ARD from tailings and mine rock to enter the Pinewood River. The proponent will use in-plant SO_2 and air treatment on the mill effluent followed by removal of additional metals through effluent aging in the TMA and water management ponds. The proponent also indicated that the constructed wetland is expected to absorb residual metals over the period of the mine life, such that there will be an expected accumulation of residual metals within the wetland sediments. The area of the wetlands is comparatively small and the potential exposure to fish and wildlife is limited.

8.1.3.3 Public

Members of the public did not express concerns about structural failures or accidents. There was a concern related to unexpected water quality impacts from ARD. The public expressed concern about the potential for groundwater contamination in the event of seepage or leakage from the TMA. The seepage from the TMA is expected to be small given the low permeability of the bedrock and clays in the area. The proponent will monitor groundwater quality around the TMA including pre-mining samples collected from well owners who request sampling.

8.1.4 Agency analysis and conclusion

The Agency is satisfied with the characterization of the risk of structural failures, accidents, and other malfunctions in the EIS. The proponent has responded to government authorities, Aboriginal and public comments including by committing to provide timely notification to Aboriginal communities on spills and accidents, if any. The structural failures, accidents and other malfunctions that could result in significant residual effects, have a very low to negligible likelihood of occurrence. The proponent will continue to engage the Aboriginal communities in the development of a contingency and response plan related to accidents and malfunctions. The Agency considers that the residual effects on structural failures, accidents and other malfunctions are unlikely to occur, taking into account the implementation of mitigation measures, proposed project design, operational safeguards and contingency procedures.

The Agency concludes that the Project is not likely to result in significant adverse environmental effects as a result of structural failures, accidents, and other malfunctions, taking into account the likelihood and consequence of occurrence, the proposed project design, operations safeguards, contingency procedures and implementation of the mitigation measures.

If the Minister of the Environment decides that the Project is not likely to cause significant adverse environmental effects or if, in the event that adverse environmental effects are considered significant but justified in the opinion of Governor in Council, the Minister will establish conditions in relation to the unlikely event that an accident or malfunction occurs.

8.2 Effects of the Environment on the Project

Environmental factors such as water supply availability, increased mine water volumes, and natural hazards could potentially affect the project, resulting in service interruption, damage to infrastructure, or adverse environmental effects.

8.2.1 Effects predicted by proponent

Water Supply Availability

Local runoff conditions vary, resulting in a probability of too little, or too much water at the project site in any given year. Low flows in the Pinewood River would reduce assimilative capacity of the river to accept mine effluent in a sufficient mixing ratio to meet discharge limits for the protection of aquatic life.

Increased Mine Water Volumes

The TMA provides for seasonal effluent discharge to the environment. Increased mine water from precipitation, surface runoff and groundwater inflow would potentially increase the rate or period of seasonal excess effluent release to the environment. Mine water does not pose a safety hazard and will not cause additional malfunctions or environmental effects.

Natural Hazards

Potential natural hazards in the geographic location of the Project include earthquakes (TMA structural failure), extreme floods (TMA structural failure and open pit flooding), natural fires, and ice jams. A TMA structural failure resulting from an earthquake would have the potential to release contaminants from the TMA directly into the environment. However, the project site is located in a low risk seismic zone. Extreme floods would have the potential to cause structural failure of the TMA and to flood site facilities. This would result in some contained tailings material and all of the ponded effluent to spill into the Pinewood River. Forest fires are part of the natural regeneration cycle at the project site. Project components most vulnerable to fires include the onsite metal mill and the transmission line. Natural fires would not result in any additional environmental effects. Ice jams on the Pinewood River could affect the integrity and function of the pit protection berm.

8.2.2 Mitigation measures by the proponent

The Agency agrees with the following mitigation measures proposed by the proponent to mitigate any change to the Project that may be caused by the environment:

- *Design the water management plan (Figure 8-2) to provide a large reservoir capacity, within the TMA, and the east mine rock and water discharge ponds, that will accommodate year to year variations in runoff (water supply) conditions;*
- *Design the TMA and open pit to withstand the probable maximum flood,* including by constructing a pit protection berm between the Pinewood River and the open pit, and designing the TMA according to the Ontario's *Lakes and Rivers Improvement Act;*
- *Ensure that an electrical distribution system at the project site is available* by repairing damaged transmission lines, maintaining emergency diesel generators; and locating the onsite metal mill and transmission line close to open fields, wetlands, patchy forest and exposed rock terrain, to limit the risk of damage from fire; and

- *Develop measures to manage ice jams* as part of the contingency and response plan to ensure that ice jams will not cause the Pinewood River to overflow the pit protection berm.

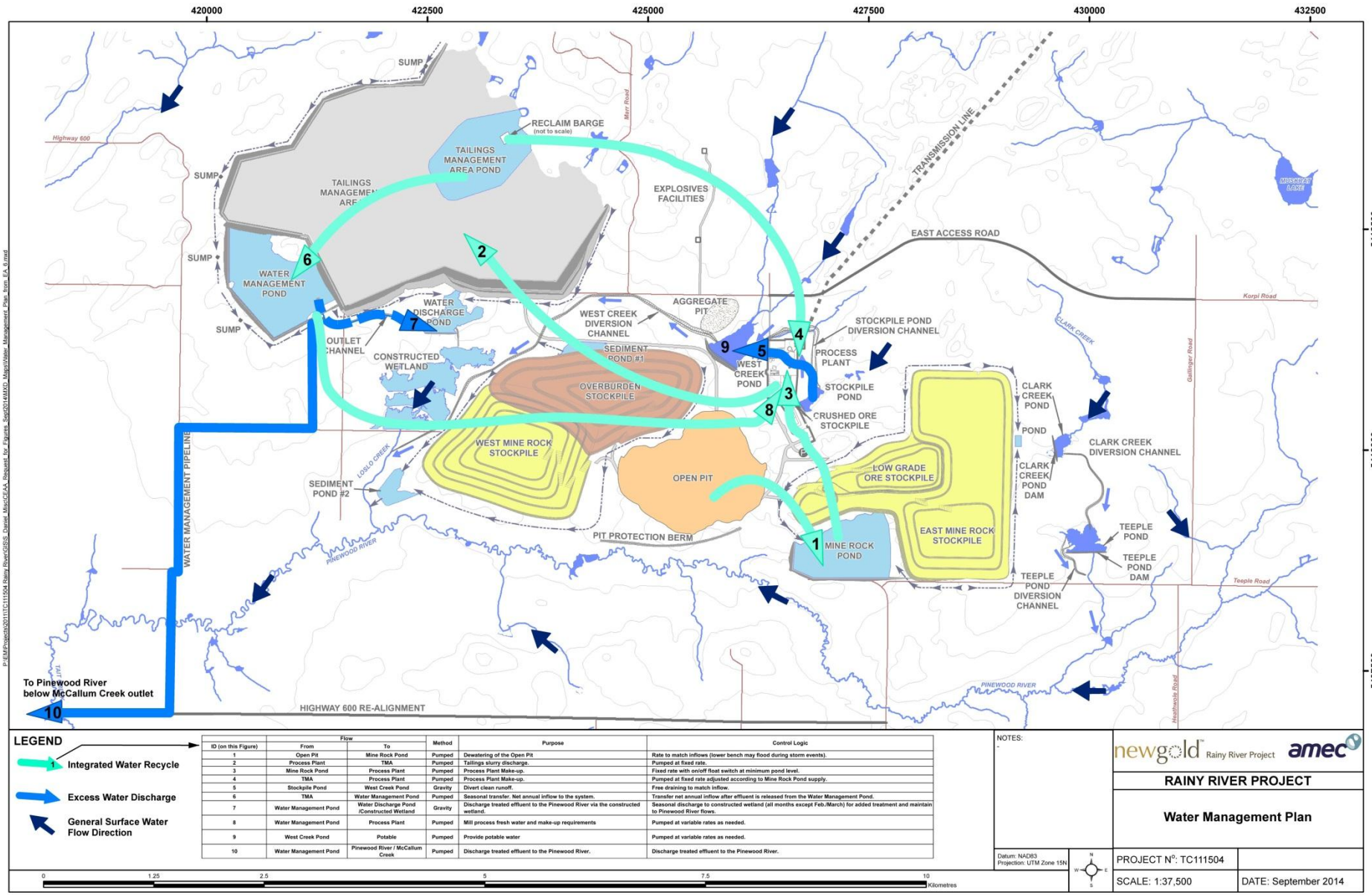

Figure 8-2: Water Management Plan (Source: Rainy River EIS, AMEC).

8.2.3 Residual effects by proponent

The residual effects on water supply availability, increased mine water volumes and natural hazards were predicted not to cause additional malfunctions or environmental effects with the implementation of mitigation measures. In addition, the increased mine water volumes were predicted not to pose a safety hazard. A further assessment of the impacts to water quantity is discussed in section 6.2.

8.2.4 Comments received

8.2.4.1 Government authorities

Federal authorities raised concerns about the efficacy of proposed design safeguards to mitigate for the effects of potential water level fluctuations in covered and uncovered areas of the TMA.

Federal authorities also raised concerns about impacts of insufficient water supply in the Pinewood River on fish and fish habitat. The proponent proposed to take water in Pinewood River for a maximum of two years during mine construction.

8.2.4.2 Aboriginal communities

Aboriginal communities expressed concerns about the effect of ice jams on the outflow infrastructure of the mine, mixing of effluent, and water quality sampling. Ice jams are expected to occur in the Pinewood River from time to time.

8.2.4.3 Public

During the comment period of the EIS Guidelines, members of the public raised concerns about the potential for surface and groundwater contamination, in the event that heavy flooding or rainfall events cause the TMA to overflow.

8.2.5 Agency analysis and conclusion

The proponent has adequately designed the Project to account for water supply availability, increased mine water volumes, and natural hazards. Mitigation measures to reduce the potential effects include designing the TMA to contain the environmental design flood and spillways to pass the probable maximum flood. The proponent has responded to government authorities, Aboriginal and public comments including by committing to maintaining the top of the tailings surface below the elevation of the spillway by three metres. The Agency expects that the residual effects of the environment on the Project will not cause additional malfunctions or environmental effects with the implementation of mitigation measures. In addition, the Agency agrees with the proponent that the increased mine water volumes are not predicted to pose a safety hazard.

8.3 Cumulative Environmental Effects

A cumulative environmental effects assessment determines if environmental effects are likely to result from the designated project in combination with other physical activities that have been or will be carried

out. The proponent's assessment of cumulative effects took into consideration the *Agency's Operational Policy Statement*[8].

8.3.1 Approach and scoping

The cumulative environmental effects assessment considered all valued components (VCs) identified (Table 1-1) during the assessment of environmental effects of the Project. It incorporated the temporal and spatial boundaries of the VCs in the project-specific environmental effects assessment. It was restricted to the analysis of cumulative effects on the existing environmental baseline conditions, related to identified projects and activities that will be carried out within the broader regional context, and possibly overlapping with the Project in terms of effects, time, and location. Projects and activities at the planning stage, for which a decision to proceed has not been made, were generally excluded.

The EIS considered past and current projects and activities in the evaluation of project-specific effects, relative to existing baseline conditions. These included forestry operations, transportation uses and potential disturbances to wildlife. No regional studies are available for consideration.

The EIS identifies potentially foreseeable but undefined projects that could contribute to cumulative effects. These projects are listed in Table 8-2.

Table 8-2: Summary of Existing and Reasonably Foreseeable Projects Identified by the Proponent (Adapted from Rainy River EIS, AMEC).

Project/Activity	Distance from the Project	Project/Activity Status
Existing projects		
Dave Rampel Solar Park	1.5 km east of the hamlet of Pinewood, within the lower portion of the Pinewood River watershed.	Ontario's Renewable Energy Approval received in September 2013
Forestry – Crossroute Forest Management Unit	Project site is located within the Ontario's Crossroute Forest Management Unit	No planned harvesting in the area overlapping with the human environment local study area (HLSA).
MTO rehabilitation projects	Human environment regional study area (HRSA)	To be constructed from 2013 to 2016
Municipal works (e.g. building or local road upgrades)	HRSA	To be completed in 2015
Exploration – Bayfield Ventures	At the project site	Exploration
Madsen Gold Project - Exploration	266 km north	Exploration
Reasonably foreseeable projects		
Hammond Reef Gold Project	187 km east	Federal and provincial EA in preparation
Josephine Cone Mine	145 km northeast	Federal and provincial EA in preparation
Phoenix Gold Project	263 km north	Provincial approval received; tentative plans for production in

[8] Canadian Environmental Assessment Agency. 2013. Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012.*

Project/Activity	Distance from the Project	Project/Activity Status
		2014
Cochenour Project	258 km north	Production anticipated in the first half of 2015

The EIS indicates that Dave Rampel Solar Park is the only planned project within the Natural Local Environmental Study Area (NLSA) and Natural Regional Environmental Study Area (NRSA). The other listed projects are either hypothetical or located outside the NLSA and NRSA, and cumulative effects with the Project are not anticipated by the proponent. The proponent reported that no reasonably foreseeable new projects are planned for the area that would likely impact the VCs identified for the Project. Effects of past and existing activities and projects, inclusive of agriculture, forestry and transportation infrastructure are already included in baseline conditions, and were considered in the effects assessment on the existing environment.

The EIS identifies possible positive cumulative effects on regional employment and business opportunities from some larger proposed mining projects listed in Table 8-2, and from the proposed Dave Rampel Solar Park.

8.3.2 Comments received

8.3.2.1 Government authorities

Health Canada (HC) expressed concern about cumulative effects on air quality and noise of future quarries for the Project, and its potential to impact Aboriginal health. Explosives would also be required in the development of quarries, which could increase air emissions and noise levels near the project site. The proponent noted that locations identified for the proposed quarries, are all within the project site, and not close to any Aboriginal communities, which are all located well outside the NLSA and NRSA. It also noted that approximately 3 700 000 m^3 of aggregate is required, the equivalent of 30 days of mining during the operations phase. The proponent concluded that based on this comparison the potential effects on air quality from aggregate handling in the pits and quarries is minor, compared to the potential air quality effects during the operation phase. HC was satisfied with the response.

8.3.2.2 Aboriginal communities

Aboriginal communities expressed concern about land and animals already impacted by forestry practices in the area, and requested information on the Crossroute Forestry Management Plan to inform the cumulative effects assessment. The proponent indicated that information on the Crossroute Forest Management Plan and forestry practices are described in the EIS.

Aboriginal communities expressed concern about existing health impacts on fish, and suggested that information from other mines be used to inform the cumulative effects assessment. The proponent contacted the Seven Generations School and MNRF, but did not obtain any additional information to inform the assessment. The proponent clarified that deformities and legions were not noted on fish captured within the NRSA or NLSA. Fish diseases or parasites that were visually recognizable were limited to black spot (caused by larval trematodes) which do not pose a health risk.

Aboriginal communities expressed concern that the spatial boundary in the consideration of cumulative effects was unclear. The project effects on the natural environment were unlikely to extend beyond the NRSA. Only future projects that have the potential to affect identified VCs within the NRSA were considered in the assessment of cumulative effects; no such projects were identified by the proponent.

Big Grassy River First Nation expressed concern about existing impacts; impediment to accessing lands; the ability of members to harvest berries, wild rice and other culturally important plants; and the ability to practice a traditional way of life. The proponent is pursuing ongoing discussions of site-specific mitigation measures on key VCs, including but not limited to culture, water quality, and traditional land use. The proponent will work closely with Big Grassy River First Nation to address community impacts; an important aspect of this will be an agreement that is being negotiated with Big Grassy River First Nation that will outline certain benefits to the community as a result of the Project.

8.3.2.3 Public

Members of the public did not raise concerns about cumulative effects.

8.3.3 Agency analysis and conclusion

The Agency considered the proponent's approach to cumulative effects assessment, and sought additional information in relation to past effects from forestry, agriculture and fires on migratory birds and exclusion of Bayfield Ventures activities as a reasonably foreseeable project. The Project will put additional stress on migratory bird habitats, but the proponent will implement additional mitigation measures to limit effects. The Agency accepts the proponent's position that the Bayfield Ventures project is hypothetical as there is no defined project plan other than continued exploration drilling.

The baseline for existing projects, such as agriculture, forestry and transportation infrastructure, was considered in the EA. The reasonably foreseeable projects listed in Table 8-2 are located far enough from the project site and are not expected to have a cumulative effect with the environmental effects of the Project within the NRSA identified by the proponent.

The only planned project within the NRSA is the Dave Rampel Solar Park. The EIS does not describe the potential environmental effects of this solar park, but notes that there will be no tree or forest clearing associated with the solar park proposal, since the entire lease area consists of active agricultural fields. Upon review of the Dave Rampel Solar Park Renewable Energy Application[9], the Agency has confirmed the predicted effects of the solar park include noise disturbance, dust, spills, alteration of current land conditions, storm water runoff, and materials generated at or transported from the project location. These effects are predicted to extend 300 m from the solar park. No predicted or residual effects of the solar park appear to overlap with the effects of the Project.

The Agency considers that there are no cumulative effects of the planned projects identified by the proponent with the Project. The thirteen MTO rehabilitation projects within the HRSA are mainly bridge rehabilitation works where the environmental effects are localized and understood. The potential effects can be mitigated with the implementation of MTO's environmental standards and practices, developed to

[9] Ontario Solar PV Fields Inc., 2010 http://www.ontariosolarpvfields.com/project4.html

protect the environment during all stages of highway management including maintenance. Residual effects are not expected.

The Agency concludes that the Project is not likely to result in significant adverse cumulative effects taking into account the proponent's assessment of potential cumulative effects, HC and Aboriginal comments, the proponent responses and the Agency's analysis.

9 Impacts on Potential or Established Aboriginal or Treaty Rights

9.1 Potential or Established Aboriginal or Treaty Rights in the Project Area

The Project is located in a region covered by a historic treaty (Treaty 3) and overlapping assertions of Aboriginal rights by Métis represented by the Métis Nation of Ontario. As a result, the proponent identified several potential or established Aboriginal and treaty rights held by First Nations and Métis communities that could be potentially affected by the Project. These include rights to fishing, hunting, and plant harvesting.

Plant and animal species of particular importance to the exercise of potential or established Aboriginal or treaty rights were identified through Traditional Knowledge and Traditional Land Use studies conducted by the proponent, Big Grassy River First Nation, and Métis Nation of Ontario Region 1. These resources include deer, furbearers, game birds, moose, wild rice and berries.

9.2 Potential Adverse Impacts of the Project on Potential or Established Aboriginal or Treaty Rights

The EIS indicates that the Project has potential environmental effects that may adversely impact potential or established Aboriginal or treaty rights. Vegetation clearing for mine construction and replacement of native species with non-native species during decommissioning has the potential to adversely affect potential or established Aboriginal or treaty rights, due to the loss and fragmentation of terrestrial wildlife habitat for hunting and the loss of traditional plants for food and medicinal purposes. In addition, changes to fish, fish habitat, and commercial fisheries could adversely affect potential or established Aboriginal or treaty rights to fishing, due to loss of fishing opportunities and contamination of fish tissues.

Potential effects on Aboriginal peoples within the context of current use of lands and resources for traditional purposes, health and socio-economic conditions, physical or cultural heritage and effects on historical, archaeological, paleontological or architectural sites or structures are discussed in greater detail in sections 7.3, 7.4, and 7.5, respectively.

Appendix E provides a table summarizing key Aboriginal concerns.

9.3 Proposed Accommodation Measures

The proponent worked with Aboriginal communities and federal and provincial authorities in developing mitigation measures that also serve as accommodation measures, designed to minimize or avoid potential adverse impacts on potential or established Aboriginal or treaty rights.

The EIS indicates that the proponent is working with the Ministry of Natural Resources and Forestry (MNRF) to secure approximately 1000 ha of private lands to be used as habitat compensation for the Eastern Whip-poor-will. Subject to MNRF support, there is an opportunity to provide access to these lands to Aboriginal communities for hunting and plant gathering. The proponent committed to working with

community members from the Métis Nation of Ontario Region 1 and Big Grassy River First Nation to develop adaptive management techniques related to the mine closure plan, and the remediation of wildlife habitat after decommissioning. These measures are discussed in greater detail in section 7.3.

The EIS also notes that access to nearby private lands will be provided by the proponent for traditional plant harvesting activities and the proponent committed to using native plant species to revegetate the project site during reclamation, to offset direct losses of traditional plants harvested for food and medicinal purposes. Measures to compensate for losses of traditional plants will also serve to minimize, avoid or compensate for potential adverse effects on potential or established Aboriginal and treaty rights. These measures are discussed in greater detail in section 7.3.

The proponent is working with Fisheries and Oceans Canada (DFO) and the MNRF on fish habitat offsetting and compensation plans to offset the loss of fish habitat within the proposed mine footprint. These plans are discussed in greater detail in section 7.1.

The proponent stated that it has signed some agreements with Aboriginal communities, and is working to finalize others. These agreements are expected to address any potential residual adverse impacts to potential or established Aboriginal or treaty rights that may remain after the implementation of proposed mitigation measures.

9.4 Issues to be Addressed During the Regulatory Approval Phase

The regulatory approval phase of the Project consists of authorizations, licenses, or approvals related to areas of federal jurisdiction (e.g. effects on fish and fish habitat). Substantive work for potential federal authorizations under the *Fisheries Act, Explosives Act* and the MMER will be required should the EA decision conclude that the Project can proceed. In this situation, the federal Crown would consult Aboriginal communities, as appropriate, prior to making regulatory decisions. The decision to undertake additional Crown consultation will take into consideration the consultation record resulting from the EA.

9.5 Agency Conclusion Regarding Impacts to Aboriginal or Treaty Rights

Based on the analysis of environmental effects of the Project on Aboriginal peoples and the related mitigation measures outlined in sections 7.3, 7.4 and 7.5 and the potential impacts and accommodation measures provided in sections 9.2 and 9.3, the Agency is satisfied that the potential impacts of the Project on potential or established Aboriginal or treaty rights have been adequately identified and appropriately accommodated.

If the Minister of the Environment decides that the Project is not likely to cause significant adverse environmental effects or if, in the event that adverse environmental effects are considered significant but justified in the opinion of Governor in Council, the Minister will establish conditions in relation to the key mitigation measures. Conditions related to key mitigation measures that address environmental effects on Aboriginal peoples would also support accommodation of potential impacts on potential or established Aboriginal or treaty rights.

10 Follow-Up Program

Under the Act, every environmental assessment (EA) must consider the need for, and the requirements of, a follow-up monitoring plan. The purpose of a follow-up monitoring plan is to verify the accuracy of an EA and to determine the effectiveness of any measures taken to mitigate the adverse environmental effects of a project. The results of a follow-up monitoring plan may also support the implementation of an AMP to address unanticipated adverse environmental effects. Appendix I provides an overview of the proponent's follow-up monitoring plan, and Table 10-1 summarises the measures to verify the accuracy of the effects predictions and the effectiveness of mitigation, including additional specifications identified during the course of the EA.

Monitoring results will be provided to the Agency and federal and provincial authorities annually during the construction, operation, decommissioning, and abandonment phases of the Project. Additional reporting mechanisms will be prescribed in provincial and federal environmental approvals.

Table 10-1: Follow-up Monitoring Requirements

Factor/Effect	Report Elements
Fish and Fish Habitat *Loss of fish habitat for Aboriginal, recreational and commercial fisheries in the Minor Creek Systems and Pinewood River* *Potential contamination of fish tissue* *Potential effects to fish and fish habitat caused by increases or decreases in flows* *Potential decrease in water quality from contaminants in effluent, seepage and site runoff*	The follow-up monitoring plan will include: • Conducting fish habitat and fisheries assessments to assess the character and quality of aquatic resources and habitat stability and structural function; • Verifying water flows and levels in the Minor Creek System and the Pinewood River and updating groundwater modelling; • Verifying effectiveness of water treatment; and • Determining the effects of effluent discharges on water quality.
Migratory Birds *Disturbance to migratory birds* *Loss of migratory bird habitat*	The follow-up monitoring plan will include: • Implementing a wildlife follow-up monitoring plan for Eastern Whip-poor-will, Bobolink, Barn Swallow and Common Nighthawk populations, and for nesting; • Conducting targeted point-count surveys for woodland area-sensitive breeding birds and diurnal SAR, including but not limited to Golden-winged Warbler, Barn Swallow, Bobolink, and targeted twilight surveys for Eastern Whip-poor-will in suitable habitat; • Selecting monitoring locations in proximity to the proposed mine and transmission line sites, within compensatory habitat areas, and in appropriate control areas; and Maintaining a log of vehicle collisions with migratory birds.
Current use of lands and resources for traditional purposes by Aboriginal peoples *Potential changes to fishing, hunting, and plant harvesting practices* **Health and socio-economic conditions of Aboriginal peoples** *Potential decreases in air quality* *Potential changes to Aboriginal health from contamination of country foods and potential changes to commercial fishing practices* **Physical or cultural heritage and effects on**	The follow-up monitoring plan will include: • Sharing with and engaging Aboriginal communities on the development and implementation of monitoring plans; • Determining changes in availability of fisheries and wildlife resources, based on data derived from biological follow-up monitoring plans; • Monitoring terrestrial landscapes after decommissioning, including restoration of habitat and use by wildlife. • Monitoring air quality for dust and metals (TSP, PM_{10}, $PM_{2.5}$, Hg, As, Cd, and Pb) as well as NO_2 and SO_2; • Monitoring contaminant levels in country foods; • Monitoring groundwater levels throughout

historical, archaeological, paleontological or architectural sites or structures of Aboriginal peoples *Potential changes to cultural heritage resources*	the area on a continuous basis to confirm that effects on groundwater are restricted to project site and do not affect drinking water wells; and • Conducting a post-construction assessment of known cultural heritage sites and structures to confirm the integrity of such resources. *Implementation of the follow-up monitoring plan is subject to any terms of agreement with the local First Nations and Métis. The reporting of any results relating to traditional pursuits would be subject to confidentiality and other considerations expressed by the Aboriginal peoples involved, and if deemed appropriate, would be reported in summary form as part of the follow-up monitoring plan annual report.* *Any notable cultural heritage finds will be reported according to regulatory requirements at the time, with reporting as required when and if further information becomes available.*
Recreation and Commercial Use	No specific follow-up monitoring requirements have been identified by the Agency.
Amphibians and Reptiles and Furbearers	No specific follow-up monitoring requirements have been identified by the Agency.
Federal Species at Risk *Loss of habitat and increased disturbance to federal species at risk*	The follow-up monitoring plan will include : • Monitoring SAR, including Short-eared Owl, during construction, operation, and decommissioning, as well as habitat development and use by wildlife in the abandonment phase.

10.1 Comments Received

10.1.1 Government authorities

Federal and provincial authorities have indicated that they will be identifying specific monitoring and reporting requirements as part of regulatory authorizations. They also requested that the follow-up monitoring plan be designed to confirm flow predictions in Pinewood River and confirm maintenance of ecological flows and stability for fish life cycles in the Minor Creek Systems. The proponent will measure flows in the Pinewood River and indicated that the stability of diversion channels and ponds will be monitored on an annual basis for habitat stability and habitat structural function until the completion of construction. The proponent will issue a final report in the third year. The Ministry of Natural Resources and Forestry (MNRF) was concerned by the lack of a follow-up monitoring plan for transplanting of rare plants (section 6.4.5.1). Fisheries and Oceans Canada (DFO) requested a description of monitoring in relation to the fish habitat offsetting plan. The proponent will consult with DFO on the development of the follow-up monitoring plan.

Natural Resources Canada (NRCan) reviewed the information related to impacts to groundwater quantity and is of the view that the proponent has provided sufficient information for the purpose of the EA. NRCan agrees with the proponent's model conclusions, mitigation measures and water management plan. NRCan notes that the proponent will update its groundwater modeling and implement monitoring as part of the water management plan.

10.1.2 Aboriginal communities

Aboriginal communities expressed concern about the risks of mercury pollution on human health and the potential effects on drinking water. They were also concerned about the potential health risks from consuming fish and wild game, including White-tailed Deer, if heavy metals accumulate in their tissues. The contamination of wildlife that will be consumed may cause Aboriginal communities to avoid these areas for hunting. They were also concerned about contamination of berries. The proponent responded that no appreciable change in mercury levels is expected in the Pinewood River and mercury health risks associated with fish consumption are not expected to change. The proponent will work with local Aboriginal peoples to monitor metal concentrations in country foods, including wild rice, berries and other wild plants, fish muscle and liver tissue, White-tailed Deer liver tissue, and other wildlife tissues as appropriate. This analysis could be expanded to include testing for additional metals. The most effective path forward will be determined in collaboration with local Aboriginal hunters and First Nations.

Aboriginal communities expressed concern about impacts on water quality and requested that they be involved in monitoring for water quality. The proponent committed to joint water quality monitoring and reporting with local Aboriginal communities and to engage them in developing the water management plan prior to construction.

Aboriginal communities expressed concerns about the potential dewatering of wells in the vicinity of the 2.5-km radius zone of influence from the open pit. The proponent acknowledged that there will likely be changes to groundwater flow from mine development, but these changes will almost entirely be restricted

to its privately owned property. The proponent will establish a groundwater well (piezometer) network around the open pit area to monitor groundwater levels on a continuous basis using water level transducers, with transducer downloads to be completed twice per year, commencing at least six months prior to the start of pumping. The proponent will also request well owners to participate in well water quality monitoring.

Aboriginal communities raised general concerns regarding the effects of the Project on wildlife, habitat, and wildlife movement. They asked to be involved in the planning and execution of the proposed follow-up monitoring plan related to several components, including terrestrial landscapes and SAR. The proponent will engage Aboriginal communities and provide opportunities for ongoing consultation on environmental approvals, the mine closure plan, contingency and response plan, and follow-up monitoring plan; engage Aboriginal communities in the implementation of monitoring; and monitor key terrestrial landscapes and SAR during the construction, operation, and decommissioning, including post closure habitat development and utilization by wildlife.

10.1.3 Public

Public comments were not received in relation to the follow-up program.

10.2 Agency Analysis and Conclusion

The Agency and government authorities reviewed the proponent's follow-up monitoring plan. During the course of the EA, the proponent clarified the frequency of monitoring for certain elements of the plan as follows: air quality, sound, vibration, surface and groundwater, key terrestrial landscapes and SAR will be monitored during the construction, operations, and decommissioning phases; archaeology and built heritage will be monitored only during the construction phase; and monitoring frequency for traditional land use will be defined following ongoing consultations with Aboriginal groups. The proponent committed to updating groundwater modelling and implementing monitoring in response to comments from government authorities and Aboriginal groups. It also committed to implement a wildlife follow-up monitoring plan for Eastern Whip-poor-will, Common Nighthawk, Bobolink, and Barn Swallow populations in response to government authorities' comments. Furthermore, the proponent committed to providing assistance and opportunities for ongoing consultation to Aboriginal groups on environmental approvals, the mine closure plan, the contingency and response plan, and the follow-up monitoring plan on matters related to spills and accidents. It confirmed that it would develop an addendum on matters related to engaging the Métis Nation of Ontario Region 1 and other Aboriginal communities on the follow-up monitoring plan. Specifically, the Agency notes that the follow-up program will be informed by additional decisions made during the regulatory phase, and will be enhanced by specific engagement of Aboriginal communities.

The Agency is satisfied with the follow-up program as proposed by the proponent with changes proposed during the course of the EA.

11 Conclusions and Recommendations of the Agency

In determining whether or not the Project is likely to cause significant adverse environmental effects, the Agency took into account the environmental impact statement (EIS), the views of the public, government agencies, and Aboriginal groups and the requirements of the follow-up monitoring plan to be implemented by the proponent.

The environmental effects of the Project have been determined using assessment methods and analytical tools that reflect current best practices of environmental and socio-economic assessment practitioners, including the consideration of cumulative effects and potential structural failures, accidents and malfunctions.

The Agency concludes that the Rainy River Project is not likely to cause significant adverse environmental effects, taking into account the implementation of the key mitigation measures described in this environmental assessment (EA) report.

Following a public consultation on this EA report, the Minister of the Environment will decide whether, taking into account the implementation of mitigation measures, the Project is likely to cause significant adverse environmental effects. The Agency will propose conditions in relation to key mitigation measures for consideration by the Minister of the Environment. The Project will then be referred back to the Agency as the responsible authority for appropriate course of action in accordance with section 31 of the Act.

Appendices

Appendix A: Part 1 – Key Mitigation Measures Summarized by the Agency in the EA Report

Valued Component	Mitigation Measures	Proponent Commitment Reference No.*
Effects identified under Section 5(1) of the Act		

Fish and Fish Habitat	• *Manage fish and fish habitat by:*
	  ○ *implementing a fish habitat compensation plan***, in accordance with MMER, to offset the loss of fish habitat resulting from the deposit of deleterious substances into water bodies frequented by fish. This compensation plan will involve the creation of 25.71 ha of fish habitat through the creation of the West Creek Diversion Channel, the Stockpile Pond Diversion Channel, the Clark Creek Diversion Channel, the West Creek Pond, Stockpile Pond and the Clark Creek Pond (Figure 6-1) for losses associated with the removal of creeks at the project site.
	  ○ *implementing a fish habitat offsetting plan****, to offset serious harm to fish, including any permanent alteration to, or destruction of, fish habitat, in accordance with the *Fisheries Act*. This offsetting plan will involve watershed-based enhancements (fencing off cattle, offline cattle watering sources, and channel and riparian zone restoration) and the creation of 4.5915 ha of fish habitat through establishing Teeple Road Pond.
	  ○ *designing infrastructure* (road crossings, pipeline crossings, and outfalls) to minimize disturbance to creeks.
	  ○ *following the DFO Freshwater Intake End-of-Pipe Guidelines* for water intakes.
	• *Manage flows and levels in the Pinewood River and Minor Creek Systems by*:
	  ○ *establishing flow and level requirements* for the protection of fisheries in the Pinewood River, in consultation with the appropriate government authorities, and addressing any proposed water taking and the effects of the creek diversions.
	  ○ *designing and implementing the water management plan* to achieve these flow and level requirements during all applicable project phases, including recycling water onsite, capturing and returning groundwater to the Pinewood River, optimizing the timing and position of final effluent discharges, and balancing water needs during
		mitigation: 20, 22, 24, 27, 29, 30, 33, 34, 36, 38, 42, 43 44, 45, 46, 47, 49, 51, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62, 65, 66, 68, 70,72, 73, 74, 75, 81, 118

Valued Component	Mitigation Measures	Proponent Commitment Reference No.*

	open pit filling at decommissioning.
	• *Manage quality of water discharged into the Pinewood River and Minor Creek Systems from the project site by:*
	  ○ *ensuring compliance with* the MOECC Environmental Compliance Approval and federal MMER Schedule 4 limits at all times.
	  ○ *designing and implementing the water management plan* to achieve these compliance limits during construction and operations. This includes treatment of effluent prior to discharge to the environment; treatment of tailings slurry to break down cyanide and precipitate heavy metals prior to discharge to the TMA; collection of runoff and seepage in ditches; diversion of contaminated site contact water directly or indirectly into the TMA; use of sediment ponds #1 and #2 for sedimentation of solids prior to discharge; use of a constructed wetland with a control structure for final effluent polishing of a major portion of the discharge; and placement of secondary containment at pipelines that cross West Creek Channel Diversion.
	  ○ *covering tailings with overburden and 2 m of water*, maintaining the tailings in a perpetually saturated state, developing the margins of the tailings pond into wetland habitat, and employing passive treatment (rather than chemical treatment) measures to the upper pit lake water column during decommissioning and abandonment.
	• *Manage PAG rock* throughout the project lifecycle by:
	  ○ sorting waste rock into non-PAG and PAG rock stockpiles, using PAG material for construction only where saturated conditions can be maintained, and placing an engineered cover over the east mine rock stockpile at decommissioning.	

Migratory Birds including those listed as federal SAR	• *Provide compensatory habitat* as an overall benefit for species listed under the Ontario *Endangered Species Act* (ESA), which will provide protection and habitat for migratory birds. • *Restrict clearing and modification of woodland, marsh and open country breeding bird habitat* to outside of the breeding season (March 1 to August 15 for woodland bird species; March 15 to August 15 for marsh bird species; April 1 to August 15 for open country bird species).	mitigation: 85, 86, 98, 101, 102, 103, 104, 108, 110, 111, 112, 113, 197

Valued Component	Mitigation Measures	Proponent Commitment Reference No.*
	• *Maintain forest buffers* between project components and nesting/foraging habitat. • *Create artificial nesting structures* to encourage colonization by Barn Swallows, as per the Ontario *Endangered Species Act (*ESA). • *Establish zones where Barn Swallow colonization is desired, tolerated or not desired* to provide protection to swallows nesting in other locations and to not cause conflict with mine operations. • *Manage site lighting fixtures* to reduce light pollution in surrounding environment and minimize disturbance to nocturnal species, such as Common Nighthawk. • *Ensure sound levels do not exceed MOECC NPC-300 Guidelines* by using mining trucks and excavators with low sound power levels, and applying sound abatement measures where necessary. • *Enforce speed limits, install warning signs for wildlife encounters, and keep a log of collisions* to help avoid the increased potential for vehicular collisions with wildlife. • *Encourage the development of habitats capable of supporting a diversity of wildlife species* when restoring disturbed habitats at decommissioning.	
Current use of lands and resources for traditional purposes of Aboriginal Groups	• *Develop a compact project site* to reduce overall habitat loss and to limit potential interference with wildlife movement, and reduce extent of air and noise emissions. • *Provide 1000 ha of compensatory habitat* as an overall benefit for species listed under the Ontario ESA. This will also provide Aboriginal communities with opportunities for upland game bird and big game hunting and plant harvesting. • *Develop strategies for relocating rare plants*, including Aboriginal medicinal plants, in consultation with MNRF and Aboriginal groups, along the transmission line or at the project site in advance of a possible *Ontario Public Lands Act* authorization. • *Prohibit the use of herbicides and minimize removal of vegetation* along the transmission line corridor. • *Revegetate and recolonize disturbed areas* as part of progressive restoration during operations and decommissioning. • *Separate and stockpile removed organic rich material* during construction (of open pit and during tailings dam stripping) for use as topsoil during revegetation. • *Revegetate in a manner that ensures selected native plant species recolonize easily* in the project site, such as on mine rock stockpiles, in collaboration with regulatory authorities.	mitigation: 95, 115, 116, 119, 122, 127, 129, 130, 131, 132, 194

Valued Component	Mitigation Measures	Proponent Commitment Reference No.*
	• *Restore access to Aboriginal communities to the project site* following decommissioning, to the extent that such access is safe and possible.	
Health and socio-economic conditions of Aboriginal Groups	• *Manage air emissions* in accordance with AAQC. • *Develop a fugitive dust best management practices plan* for both construction and operation phases. The plan will identify all potential sources of fugitive dusts, outline mitigation measures, and detail inspection and recordkeeping requirements to demonstrate effective management; • *Use dust control equipment* (e.g. bag houses, bin vents, surfactants, such as calcium chloride and water sprays) to control dust emissions from the crusher and onsite metal mill, provided such applications are acceptable to the MOECC; • *Maintain site roadways to minimize silt loading*. The road maintenance and inspections procedures, including timelines, will be incorporated into the fugitive dust best management practices plan; • *Use low-sulphur diesel equipment and pollution control equipment* to control air emissions from mobile heavy equipment operations. Meet TC's off-road vehicle emission requirements. Develop and implement preventative maintenance measures related to air quality; and • *Employ dedicated water sprays at active stockpile areas,* if further mitigation is required; and • *Revegetate disturbed areas in a manner that eliminates all exposed dust sources*.	mitigation: 4, 8, 123, 138, 144, 167
Physical or cultural heritage and effects on historical, archaeological, paleontological or architectural sites or	• *Manage construction and site clearance activities respectfully:* o *Manage site clearance* in accordance with Part VI of the Ontario *Heritage Act;* o *Avoid culturally significant sites* where possible; o *Assess additional significant sites*, should any be discovered during project development; o *Preserve any discovered burial sites*; and o *Preserve and manage artifacts* by transferring them to a facility owned by Rainy River First Nation on behalf of three other First Nations, namely Naicatchewenin First Nation, Anishinaabeg of Naongashiing First Nation and Pwi-Di-Goo-Zing-Ne-Yaa-Zhing Advisory Services.	mitigation: 175

Valued Component	Mitigation Measures	Proponent Commitment Reference No.*

structures of Aboriginal Groups	• *Protect and preserve Aboriginal cultural values:*
	  ○ *Ensure access to site for cultural and ceremonial purposes* to Aboriginal communities, including young people, to participate in ceremonies and learn from elders and ceremonialists;
	  ○ *Conduct a ceremony once the artifacts are physically returned*, and follow direction on curatorial services required from Aboriginal communities; and
	  ○ *Provide current cultural use in nearby accessible areas.*	

Effects identified under Section 5(2) of the Act		
Recreation and commercial use	• *Develop an accommodation with local trapline holders* that meets the needs of both the proponent and the trappers; and • *Enhance components of the Richardson Trail* and mitigate the impacts in collaboration with local landowners.	135
Amphibians and reptiles including those listed as federal SAR	• *Restrict clearing of amphibian breeding habitats* to periods outside breeding season as directed by the MNRF. • *Engage MNRF in the design and review of West Creek and Clark Creek Diversions* as part of the fish habitat compensation plans to ensure amphibian habitat is taken into account. • *Modify the timing of draining of wetlands* to encourage frogs to move to other equally suitable habitat adjacent to the project site and to minimize the impact of clearing wetland habitat where frogs are likely to overwinter. • *Use exclusion fencing for reptiles and amphibians during construction and operations.* The placement of fencing will be decided upon through consultation with the MNRF and EC. • *Capture and release reptiles and amphibians* during construction and operations, in consultation with EC and MNRF.	mitigation: 93, 94, 95, 96
Furbearers	No specific mitigation measures have been identified by the Agency.	
Federal Species at Risk	• *Prohibit food waste generation and disposal onsite* to avoid attracting wildlife and reduce potential predation of Snapping Turtles. • *Use exclusion fencing for Snapping Turtle along roads.* The placement of fencing will be decided upon through consultation with the MNRF and EC.	

Valued Component	Mitigation Measures	Proponent Commitment Reference No.*
	• *Capture and release Snapping Turtle along roads*, in consultation with EC and MNRF.	
Other measures		
Accidents and Malfunctions	• In the unlikely event that an accident or malfunction occurs, the proponent will implement measures to minimize any adverse environmental effects associated with the occurrence. • In the unlikely event that an accident or malfunction occurs, the proponent is to exercise due diligence and inform the Agency and other responsible federal and provincial agencies as soon as practicable regarding the nature of the occurrence, measures taken to reduce the environmental effects of the occurrence and plans to avoid like future accidents or malfunctions.	42, 43, 159, 182, 197
Follow-Up Program		
Fish and Fish Habitat	The follow-up monitoring plan for fish and fish habitat will include: • Conducting fish habitat and fisheries assessments to assess the character and quality of aquatic resources and habitat stability and structural function within; • Monitoring contaminants of potential concern in fish from the Pinewood River; • Verifying water flows and levels in the Minor Creek System and the Pinewood River and updating groundwater modelling; and • Verifying effectiveness of water treatment; determining the effects of effluent discharges on water quality.	24, 28, 32, 43, 47, 51, 52, 63, 64, 67, 69, 76, 77, 80, 81
Migratory Birds including those listed as federal SAR	The follow-up monitoring plan for migratory birds will include: • Implementing a wildlife follow-up monitoring plan for Eastern Whip-poor-will, Bobolink, Barn Swallow and Common Nighthawk populations, and for nesting; • Conducting targeted point-count surveys for woodland area-sensitive breeding birds and diurnal SAR, including but not limited to Golden-winged Warbler, Barn Swallow, Bobolink, and targeted twilight surveys for Eastern Whip-poor-will in suitable habitat; • Locations selected in proximity to the proposed mine and transmission line sites, within compensatory habitat areas, and in appropriate control areas; and • Maintaining a log of vehicle collisions with migratory birds.	82, 85, 99, 105, 109, 110, 111, 112

Valued Component	Mitigation Measures	Proponent Commitment Reference No.*
Aboriginal Peoples Current use of lands and resources for traditional purposes by Aboriginal peoples Health and socio-economic conditions of Aboriginal peoples Physical or cultural heritage and effects on historical, archaeological, paleontological or architectural sites or structures of Aboriginal peoples	The follow-up monitoring plan will include: • Sharing with and engaging Aboriginal communities on the development and implementation of monitoring plans; • Determining changes in availability of fisheries and wildlife resources, based on data derived from biological follow-up monitoring plans; • Monitoring terrestrial landscapes after decommissioning, including restoration of habitat and use by wildlife. • Monitoring air quality for dust and metals (TSP, PM_{10}, $PM_{2.5}$, Hg, As, Cd, and Pb) as well as NO_2 and SO_2; • Monitoring contaminant levels in country foods; • Monitoring groundwater levels throughout the area on a continuous basis to confirm effects on groundwater are restricted to project site and does not affect drinking water wells; and • Conducting a post-construction assessment of known cultural heritage sites and structures to confirm the integrity of such resources. *Implementation of the follow-up monitoring plan is subject to any terms of agreement with the local First Nations and Métis. The reporting of any results relating to traditional pursuits would be subject to confidentiality and other considerations expressed by the Aboriginal peoples involved, and if deemed appropriate, would be reported in summary form as part of the follow-up monitoring plan annual report.* *Any notable cultural heritage finds will be reported according to regulatory requirements at the time, with reporting as required when and if further information becomes available.*	4, 8, 117, 121, 164, 168, 174, 176

Valued Component	Mitigation Measures	Proponent Commitment Reference No.*
Furbearers, Amphibians and Reptiles, and Recreation and Commercial Use Effects identified under Section 5(2) of the Act	• No specific follow-up monitoring requirements have been identified by the Agency.	

*The numbers in this column correspond to the commitments made by the proponent in their document entitled, "New Gold Rainy River Project – Commitments Registry" dated August 2014. This Appendix is a subset of the proponent's list of commitments.
**The fish habitat compensation plan is referred to as the No Net Loss Plan in the proponent's EIS.
*** The fish habitat offsetting plan is also referred to as the No Net Loss Plan in the proponent's EIS.

Appendix A: Part 2 –Proponent's Mitigation Measures and Commitments to Address Effects on Valued Components Identified by the Aboriginal Community and Federal Authorities

(Adapted from Rainy River EIS, AMEC)

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
FVC	Fish and Fish Habitat		
PVC	Geochemistry		
20, 24	• Design and build ditches and the water management plan to collect, monitor, and treat runoff and seepage, in accordance with federal MMER and Schedule 4 limits and provincial MOECC Environmental Compliance Approval, from the site to ensure water quality is compliant. • Monitor runoff and seepage related to tailings and stockpiles. • Carry out blast hole sampling from open pit operations for mine rock segregation during open pit operations phase. • Collect tailings samples at regular intervals during mine operations phase. • Carry out field trials to confirm modelling results during all or a portion of the mine construction and operations phases.	E,C,O,D	MNDM, MOECC, EC
27	• Place an engineered cover over the east mine rock (PAG) stockpile to minimize the potential for ARD/ML in any remaining effluent draining into the Mine Rock Pond and leaching into the surface and groundwater.	O,D	MNDM
28	• Monitor kinetic cells to both demonstrate and continue to evaluate the robustness of the geochemical results.	C,O	MNDM, EC
29	• Encapsulate remaining ore stockpile at decommissioning with multi-layer cover and seeding. • Direct runoff and seepage to the open pit as part of the passive water management plan.	C,O,D	MNDM

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
30	• Divert all site contact water directly or indirectly into the TMA, with the exception of runoff collected by sediment ponds #1 and #2, which will be monitored (in accordance with federal MMER Schedule 4 limits and provincial MOECC Environmental Compliance Approval) and discharged into the West Creek diversion and Loslo Creek and Cowser Drain respectively. • Take immediate action should discharges from sediment ponds #1 and #2 exceed the effluent discharge limits.	C,O,D	EC, MOECC
FVC	Fish and Fish Habitat		
PVC	Water Quantity		
32, 36	• Monitor, on a continuous basis, West Creek pond and West Creek diversion flows using water level transducers. • Monitor, on a monthly basis, by taking manual measurements, during the winter period, when transducer results experience interference caused by ice pressure. • Place a secondary containment in place at the tailings pipeline crossing at West Creek.	C,O	MOECC, The Agency, MNRF
33	• Maintain the West Creek Diversion Channel separate from the constructed wetland downstream of the TMA so as not to mix the natural creek water with excess water discharged from the TMA.	C,O,D,P	NS
34	• Collect and divert West Creek and Clark Creek flows around the mine and facilities using channels designed to provide fish habitat and passage. • Position West Creek Diversion Channel far enough from the pit perimeter to ensure integrity and stability and to provide like-for-like fish habitat replacement.	C,O,D,P	MNRF,DFO
38	• Manage Pinewood River water flows when developing the initial water inventory. • Restrict water taking from the Pinewood River to the first two years of the construction phase. • Shutdown or scale back, temporarily, onsite metal mill operations, or alter the proposed timing of water discharge into Pinewood River.	C,O	MOECC
43	• Ensure that the TMA dams meet the requirements of the Ontario *Lakes and Rivers Improvement Act*. • Construct TMA to withstand the probable maximum flood and maximum credible earthquake;	C,O	MNRF

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community

	• Design safeguards against TMA dam failure:
	  ○ Construct TMA dams to withstand the probable maximum flood and maximum possible earthquake in accordance with Ontario's Lakes and Rivers Improvement Act.
	  ○ Inspect TMA dams visually on a daily basis.
	  ○ Install geotechnical monitoring equipment to monitor any movement of dams.
	  ○ Conduct geotechnical inspections at regular intervals.
	• Implement actions in case of TMA dam failure:
	  ○ Pump, in the event of a breach or failure, the TMA pond to the water management pond, to reduce the amount of released effluent during the emergency repair.
	  ○ Contain the spill to the extent possible using temporary earthen or snow dams, silt fences, turbidity curtains, sandbags and other available equipment.
	  ○ Work closely with local residents and authorities and address the needs of downstream residents.
	  ○ Implement an emergency management plan in consultation with appropriate government agencies in the event of dam failure to:
	  • Contain spilled tailings based on their ARD characteristics.
	  • Excavate spilled tailings and haul them back to the repaired TMA or, alternatively, engineer a cover over the deposited material.
	  • Restore and revegetate all areas where tailings are removed to the extent practical.
	• Implement an emergency management plan in the event of dam breach.		

43	• Design safeguards against open pit slope failure:
	  ○ Maintain appropriate ramp width and grade.
	  ○ Monitor pit wall for geotechnical stability.
	  ○ Maintain appropriate overburden slope angles.
	  ○ Monitor overburden slope movement.
	  ○ Revegetate exposed overburden as soon as practical.
	  ○ Reinforce, in case of localized erosion, overburden slopes with mine rock or
		C,O	

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	progressive re-vegetation. o Construct a flood protection berm 60 m from the maximum open pit extent. • Design safeguards against overburden stockpile slope failure o Construct external slopes with relatively dry clays or clays mixed with rock for stability. o Capture stockpile runoff in perimeter runoff collection ditches and direct the water to sedimentation ponds. • Implement actions in case of overburden stockpile slope failure: o Excavate any material that migrates as far as the perimeter ditch and returned to the stockpile and if required, repair the drainage ditches. o Deploy silt fencing, if the slope failure caused effluent in the perimeter ditching to spill, downstream of the spill to prevent sediment laden waters from entering a watercourse. • Implement actions in case of east mine rock stock pile slope failure: o Re-contour, in the event of a stockpile slope failure, the slope in place. o Excavate any material which migrated as far as the drainage ditch area and returned to the stockpile, and if required, repair the drainage ditches. • Report and monitor spill, if PAG rock or stockpile runoff migrated beyond the collection ditches.		
FVC	Fish and Fish Habitat		
PVC	Water Quality		
22, 44	• Capture and monitor runoff and seepage from the TMA and stockpiles. • Release treated effluent to the environment only if it meets federal MMER Schedule 4 limits and provincial MOECC Environmental Compliance Approval or re-use treated effluent in the process plant during operations. • Control cyanide and metal concentrations in the TMA seepage and all treated effluent discharges to the environment through the use of in-plant cyanide destruction and heavy metal precipitation, augmented by extended effluent aging in the TMA ponds.	O	MOECC, EC
42	• Control any chemical spills within the process plant or chemical storage areas through provision of secondary containment.	C,O,D, P	NS

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	• Prohibit any chemical from spills from entering the environment.
	• Manage spills of potentially hazardous materials during transport, or from onsite material storage and handling facilities.
	• Take measures to prevent and clean up any hydrocarbon spills (and other spills) at source.
	• Design safeguards for fuel release during truck transport:
	  o Develop and implement an emergency management plan.
	  o Manage trucking and supply contracts, by incorporating, as reasonable, features to minimize the potential for environmental impacts on the trucking route, including:
	  ▪ strict adherence to speed limits, national trucking hour limits and other applicable requirements
	  ▪ drivers must meet all applicable regulatory training requirements as per the Transportation of Dangerous Goods Act, be trained in spill response procedures and carry appropriate Material Safety Data Sheets (MSDS), regulated under the federal Hazardous Products Act
	  ▪ all material transport vehicles must maintain basic emergency response equipment in order to stop or slow spills, using available equipment
	• Proponent's proposed actions:
	  o Employ spill counter measures as part of the emergency management plan, including use of absorbent materials, establishment of a collection trench and setting containment booms on water;
	  o Contain fuel by booms, berms or other means, and, possibly also pump, skim or mop fuel with absorbent matting, and dispose in an approved facility designed to manage such wastes.
	  o Contain and remediate, where possible, spills that may directly enter a fast moving watercourse.
	  o Conduct a review, after any major spill, to ensure that the required design changes, procedures and appropriate monitoring measures are in place to ensure that similar incidents are not repeated.		

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	• Design safeguards against fuel release from storage facilities and dispensing areas:
	  ○ Include design and construction features to minimize the potential for environmental impacts as follows: containment berms, collision protection poles, placement of the storage areas away from watercourses and the use of leak detection requirements.
	  ○ Incorporate operational procedures to minimize the potential of accidents or malfunctions into the emergency management plan.
	  ○ Keep and maintain a large spill kit, including with absorbent material, at the fuel storage facility.
	  ○ Inspect, regularly, all fuel storage locations and volumes for leakage and other operational problems.
	• Implement actions in case of fuel release from storage facilities and dispensing areas:
	  ○ Implement spill response measures as part of the emergency management plan if fuel escapes the secondary containment berms.
	  ○ Seal, when the area is secured, the leak or failure, if possible.
	  ○ Contain the spill by using absorbent materials or by constructing a downstream berm.
	  ○ Collect and haul spilled fuel offsite for disposal.
	  ○ Report on and notify spills in accordance with MOECC requirements.
	  ○ Cease, if a spill migrates to the mine rock pond or stockpile pond, all pumping from the pond and contain the spill with a boom, and remove with a skimmer.
	  ○ Test, soils in the vicinity of the spill, for hydrocarbons and delineate the affected soils.
	  ○ Treat impacted soil onsite in a bioremediation area or haul offsite for treatment and disposal.
	• Send offsite used absorbent material for disposal at a licensed facility.
	• Employ passive treatment measures, rather than long-term chemical treatment, of the upper pit lake water column during abandonment to minimize long-term chemical use for water treatment.		

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42	• Design safeguards against transportation accidents:
	  o Ship all materials of consequence in sealed containers, such as tanker trucks, containers, shipment cubes (1000 L), sealed bulk bags, 205 L sealed drums and smaller containers on pallets.
	  o Ensure all shipments comply with regulatory requirements, including the federal Transportation of Dangerous Goods Act and associated regulations.
	  o Incorporate, into trucking contracts and the emergency management plan, operational procedures on minimizing the potential for environmental impacts, including: strict adherence to speed limits; restricting oversized loads to daylight travel where possible; avoiding material transport when visibility is low; and regular vehicle maintenance.
	• Implement actions in case of transportation accidents:
	  o Remove potential ignition sources in the event of a spill of flammable or combustible materials if safely possible and slowdown or stop the spill.
	  o Notify the MOECC's Spills Action Centre (per the requirements of the Ontario Environmental Protection Act), the Township of Chapple, Emo Fire Department, and, if required, the Technical Standards and Safety Authority (fuel fires and explosions).
	  o Conduct an assessment and determine the best means to prevent immediate environmental impacts.
	  o Implement spill countermeasures as part of the emergency management plan, such as the use of absorbent materials, establishment of a collection trench downslope and setting collection booms on water if effective for the spilled material.
	  o Ensure clean-up and remediation reduces, to the extent possible, long-term environmental impacts.
	  o Conduct a review and report, after the incident, to ensure that any required design changes and procedures are in place to prevent a similar accident.
	• Design safeguards against chemical spill within contained facilities and chemical spills from pressurized vessels:
	  o Store all chemicals which pose a potential risk to the environment, within
		C,O	

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	contained areas, with sealed floors and sumps or drains reporting to facilities which will provide for retrieval of the spilled materials. o Ensure all chemicals used at the site have a MSDS, in order to comply with industry best practices and with the Workplace Hazardous Materials Information System Ontario Regulation 860 and Occupational Health and Safety Act for the safe use of these materials. o Include a spill pad for the liquid oxygen storage area. o Manage spills from the sulphur dioxide area in a containment area. • Ensure the gas plume dissipates quickly upon entering the natural environment.		
45	• Inspect all active pipelines twice per 12 hour shift and informally at other times. • Inspect immediately should flow unexpectedly lessen or stop in a pipeline. • Design safeguards against water pipeline failure: o Inspect and employ regular incidental observation activities to identify visible leaks or failure of the pipeline. • Implement actions in case of water pipeline failure: o Shutdown pumps upon discovery of a leak or failure and repair the pipeline. o Employ, if possible, erosion and sediment control measures, such as matting, straw bales or silt fencing to prevent overland runoff containing sediments from directly entering a watercourse. • Design safeguards against tailings pipeline failure: o Install pressure sensors at four locations along the pipeline route and flow transmitters at the onsite metal mill and at the TMA dam as the primary operational safeguards. o Install a vacuum relief valve at the TMA dam to ensure reverse flow is not possible. The proponent responded that the pump will automatically shut off in the event of a pressure loss resulting from a failure. o Undertake incidental observation to identify leaks of less than the pressure loss detection. o Institute a ditch or capture basin system to act as secondary containment in case of a leak.	C,O,D	NS

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	• Implement actions in case of tailings pipeline failure:
	  ○ Use heavy equipment and spill containment materials in order to contain or limit the discharge of tailings and effluent to the environment.
	  ○ Implement spill response measures as part of an emergency management plan, depending on the amount of tailings spilled and whether tailings enter West Creek, in consultation with appropriate regulatory agencies.
	• Excavate spilled tailings and load on a haul or vacuum truck, and transport to the TMA.		

46	• Cover the exposed tailings beach at decommissioning with a layer of low permeability overburden and the remaining tailings with at least two metres of water to restrict oxygen contact with the tailings.	O,D	MNDM
47	• Maintain the deposited tailings during the abandonment period in a saturated condition in perpetuity to prevent the generation of ARD/ML. • Monitor and evaluate the integrity of the TMA cover system (e.g. low permeability overburden zone) and the continuous saturation of the tailings.	P, C,O	MNDM, EC
49	• Develop a detailed mine closure plan to ensure that the deposited tailings solids remain permanently saturated in the post-closure condition.	E,O,D,P	MNDM, EC
51	• Protect the Pinewood River watershed: • Recycle the treated onsite metal mill effluent discharge into the TMA, and reuse the contact water collected from the various stockpile and seepage collection systems to reduce the demand for potable freshwater from West Creek pond. • Recycle contact water for the onsite metal mill needs to reduce overall water demands. • Minimize final effluent discharge volumes into the Pinewood River. • Use SO_2/Air treatment for cyanide destruction and heavy metal precipitation in the onsite metal mill followed by extended effluent aging in the TMA pond and in the water management pond to achieve the highest quality effluent reasonably achievable. • Use a constructed wetland system for final effluent polishing of a major portion of the discharge. • Manage the site for ARD/ML control during operations and following decommissioning to prevent adverse water quality impacts to the Pinewood River. • Follow DFO's Freshwater Intake End-of-Pipe Guidelines as mitigation for potential	C,O	MOE, MNDM, MTO, DFO

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	fisheries effects associated with water intakes. • Design infrastructure (road crossings, pipeline crossings, and outfalls) to minimize disturbance to creeks. • Construct the Pinewood River Highway 600 realignment crossing (bridge or culverts) in a manner that does not restrict fish passage. • Meet scientifically defensible alternative, with concurrence from regulatory authorities, for all surface water going into the Pinewood River from the mine for the protection of aquatic life. • Monitor groundwater quality around the TMA including pre-mining samples collected from well owners who request sampling. • Maintain current fish habitat productivity. • Implement an extensive water management plan for water quality and flow discharges, and receiving water aquatic life and habitat.		
47, 51	• Design safeguards against unexpected water quality concerns related to ARD: o Segregate rock for use as construction materials according to a site-specific protocol, which is expected to include: ▪ preliminary visual identification of construction materials from the open pit which undergo geochemical testing. ▪ supplementary refinement based on a geochemical block model, to identify the location of blocks of material which are eligible for construction usage. ▪ periodical geochemical testing of the blocks to assess appropriate location for storage or for construction use and confirmation of model results. ▪ visual inspection of material during placement and after construction for signs of ARD. • Extract and transport any material used in construction, after visual identification and subsequent sampling, that is identified as acid generating to the East Mine Rock Stockpile for storage or encapsulate (or take other measures), as appropriate, to leave the material in place.		

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
52	• Ensure all final discharge points have a point of control to immediately cease discharge; • Construct the control structure at the discharge point of the treatment wetland in compliance with MMER. • Sample, regularly, all discharge locations in accordance with Ontario's environmental approval requirements.	C,O	MOECC, EC
53	• Ensure that excess water discharged to the environment meets federal MMER Schedule 4 limits and provincial MOECC Environmental Compliance Approval in the receiver.	C,O,D,P	MOECC, EC
55	• Develop, by working with MOECC, a mutually acceptable minimum flow threshold, below which water from the Pinewood River would not be taken to build up the initial water inventory for the onsite metal mill.	E,C,O	MOECC, DFO
FVC	Fish and Fish Habitat, Aboriginal Health and Socio-Economic Conditions, and Current Use of Lands and Resources for Traditional Purposes by Aboriginal Peoples		
PVC	Fish and Fish Habitat		
56	• Set up, a separate dedicated flow monitoring station, either independently (if the WSC is found unsuitable), or in association with the WSC.	E,C	MOECC
57	• Limit the potential for adverse flow effects to the Pinewood River by optimizing the timing and positioning of final effluent discharges.	C,O,D	MOECC
58	• Operate the final effluent discharge from both the constructed wetland and the pipeline discharge from the water management pond, such that a minimum 1:1 receiver to final effluent mixing ratio would be maintained in the Pinewood River, with the understanding that receiver to final effluent mixing ratios of greater than 1:1 would be the norm.	O,D	MOECC
59	• Ensure discharge of effluents to the Pinewood River achieves rapid mixing within the river. • Implement additional measures if mixing is not attained. These will include the use of rock groynes placed on either side of the channel to force mid-channel mixing, and use of boulder clusters to increase flow turbulence within the mixing zone.	O	MOECC
60	• Consider environmental aspects (such as fish spawning) when scheduling project development activities.	E,C	MNRF,DFO, EC
61	• The proponent will be required to:	E,C	DFO

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	• Develop and implement fish habitat offsetting and compensation plans to offset the loss of fish habitat. • Develop an AMP which will define monitoring criteria and minimum flow requirements for the protection of fisheries in the Pinewood River during operation and decommissioning. • Establish minimum flow requirements for the protection of fisheries in the Pinewood River. These minimum flow requirements will be associated with the proposed water taking directly from the Pinewood River and the proposed flow diversion of West and Marr Creeks into Loslo Creek through the West Creek Diversion Channel. • Develop a fish habitat offsetting plan under the *Fisheries Act* to address the potential adverse flow reduction effects on fisheries in the Pinewood River, if required pending discussions with DFO. These potential offsetting strategies may include restoration activities within the Pinewood River Watershed as well as adjacent watersheds.		

59, 61	• Design safeguards against creek diversion failure:
	  o Size, all diversions to convey the environmental design flood.
	  o Operate the initial portion of the West Creek diversion channel as the emergency spillway for the West Creek pond.
	  o Size the West Creek diversion channel to convey the probable maximum flood without overtopping.
	• Implement actions in case of creek diversion failure:
	  o Undertake emergency repair, in the event of a failure or imminent failure of a diversion, as soon as possible.
	  o Address the needs of downstream residents by working closely with local residents and authorities.
	• Install, if possible, erosion and sediment control measures (such as silt fences, turbidity curtains, sandbags, erosion mats and other equivalent measures) downhill of the failure.
		C,O	

62	• Maintain a 120 m buffer zone adjacent to rivers and creeks to the extent practical, to protect watercourses and their associated vegetated margins, except where aquatic habitat will be lost (and compensated for as part of DFO authorizations) for project	C,O	MRN, DFO

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	development.		
63	• Monitor metals on a continuous basis in walleye and northern pike species after mine start-up. • Collect and analyse a reasonable sample of fish flesh and fish organ tissue, by working with fishermen, to reflect any applied methods of food preparation and increased fishing in Pinewood River.	O,D	The Agency
64	• Sample fish tissue, including both northern pike and walleye (dorsal muscle tissue and livers). • Monitor Pinewood River game fish tissues for contaminants of potential concern one year after the start of commercial production, and at three-year intervals thereafter. If contaminant concentrations increase over time, the proponent responded that it will inform consumers, and the MOECC and MNRF to facilitate provincial issuance of fish consumption advisories. • Notify potential consumers and the applicable Provincial departments (MOECC and MNRF), if contaminant concentrations increase over time, and provide information related to increased health risks (if any).	O,D	MOECC, MNRF, The Agency
65	• Provide specific erosion and sediment control measures and their locations in the permit application documents.	E,C	MNRF,DFO
66	• Inspect pond dams at a regular interval by a qualified geotechnical engineer for any visible signs of concern and particularly during and after major storm events. • Design safeguards against pond dam failure: o Store environmental design flood runoff above the maximum operating water level in ponds containing mine-affected water. o Construct spillways to ensure safe discharge to the environment should an event ever exceed the environmental design flood. o Construct dam slopes and crest widths for stability in relation to the mine rock pond, water management pond, as well as ponds not affected by mine water. o Design all sedimentation ponds with a retention period to meet the MMER discharge requirements for total suspended solids. o Size diversions to convey the environmental design flood.	C,O,D,P	MNRF,DFO

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	○ Inspect pond dams on a regular interval (by site employees); and periodically, on an interval that meets, at a minimum, regulatory requirements (by a qualified geotechnical engineer). • Implement actions in case of pond dam failure: ○ Deploy, in the event of a failure or imminent failure of a pond dam, silt fences, turbidity curtains, sandbags and other erosion and sediment control measures to prevent the entry of sediments into a downstream water body. • Keep appropriate spill control equipment at the project site.		
67	• Monitor surface water, including Pinewood River, for flow and water quality, during construction, operations and active closure phases, with decommissioning monitoring expected to continue for a decade (or more) at reduced frequencies pending ongoing analysis of data. • Take any corrective action necessary to ensure compliance with all applicable laws, regulations and instruments.	C,O,D,P	MOECC, MNDM, EC
69	• Sample sediments to evaluate soil quality parameters prior to undertaking any further closure activities for any contact water ponds and drainage works (including stockpile sediment ponds) where breaching is proposed.	D	MNDM
70	• Describe the ongoing water management plan and provide freshet data on request.	E	BGRFN, MOECC, EC
72	• Carry out the following mitigation measures related to the transmission line: ○ Leave tree stumps, root mats and ground vegetation cover intact to reduce the potential for surface erosion and to help maintain groundcover for plant and wildlife habitat. ○ Leave vegetation (shrub) screens to the extent practical along the single creek crossing that exists between Beadle and Preachers Lake, near the east end of the alignment, for erosion protection, while ensuring clearance requirements for conductors. ○ Maintain in-water work and place all poles above the high water mark. ○ Apply industry standard sediment interception and erosion control practices. ○ Reseed or otherwise stabilize any exposed areas to control erosion until native	C	MNRF

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	vegetation takes hold, at the end of the construction period. If the erosion is more severe, use other methods such as placement of straw matting or equivalent. o Store larger quantities of construction materials at a minimum distance of 200 m from any open (non-frozen) surface water, and from major access points. o Do not conduct fuelling and maintenance of vehicles within 50 m of surface water bodies.		
68, 73, 74, 75, 118	• Include a First Nation training component and First Nation representatives in the collection and sharing of laboratory results in the water management plan. • Commit to a joint water quality monitoring and reporting program with the area First Nations (including BGRFN) as part of the water management plan, which will be funded by the proponent. The program will be developed jointly with the First Nations in lead-up to the initiation of mine construction. (Letter to Chiefs from Kyle Stanfield, October 2013). • Provide a plan of close coordination with Rainy River First Nation in support of the pre-existing First Nation Watershed Program and water quality protection. • Place a layer of non-potentially acid generating rock in the former Clark creek channel bed area to help limit the exposure of potentially acid generating materials.	C,O,D,P	AC, The Agency, RRFN, DFO, MNDM
FVC	Fish and Fish Habitat, Recreation and Commercial Use		
PVC	Groundwater		
76, 77, 80	• Monitor groundwater during construction, operations and decommissioning phases as part of the water management plan. • Monitor ground water, as part of the mine closure plan, with abandonment monitoring expected to continue for a decade (or more. • Update groundwater modelling. • Engage applicable regulatory authorities as part of the water management plan and the mine closure plan. • Implement a water management plan that will include regular sampling and dipping of dedicated monitoring wells to identify any impacts to any wells in the vicinity of the zone of influence from the open pit and rectify any impacts to water availability for well	C,O,D,P	MOECC, MNDM

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	owners. • Provide timely notification to Aboriginal communities and on spills and accidents if any, and on the details of any investigation and response to these events. • Provide assistance and opportunities for ongoing consultation to Aboriginal communities on environmental approvals, the mine closure plan, the emergency management plan, and the follow-up monitoring plan. • Request local well owners to participate in well water quality monitoring as part of the water management plan. • Enhance components of the Richardson Trail and mitigate the impacts working with local landowners. • Place groundwater monitoring wells around the TMA and east mine rock stockpile and pond areas, as shown in Figure 13-3 of the EIS. This groundwater monitoring network may be amended or expanded through the MOECC approvals process. • Measure water levels, continuously, in the monitoring wells with data downloaded semi-annually. • Collect groundwater samples quarterly.		
81	• Carry out the following mitigation measures to reduce potential effects on groundwater: • Capture and return groundwater to the Pinewood River during mine operations to minimize potential flow effects on the river, particularly during low flow periods. • Use SO_2/Air treatment of tailings slurry for cyanide destruction and associated heavy metals precipitation, before discharge to the TMA. • Manage the site for ARD control, both during operations and following closure to prevent adverse water quality impacts to the Pinewood River, including that associated with any groundwater seepage. • Store treated water in the TMA during high runoff years to release into the Pinewood River during low-flow years to maintain fish habitat. • Monitor water levels and flow discharges as part of the water management plan. Water flow management can be optimized during mine operations should the need to accommodate unexpected concerns arise.	E,C,O,D,P	MOECC, MNDM

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
FVC	Migratory Birds, Aboriginal Health and Socio-Economic Conditions, and Current Use of Lands and Resources for Traditional Purposes by Aboriginal Peoples		
PVC	Vegetation communities and rare plants		
82, 109	• Monitor key terrestrial systems and SAR during the construction and operations phase, with post closure habitat development and utilization by wildlife to continue at reduced frequencies consistent with *Endangered Species Act* Permit requirements.	C,O,D,P	MNRF

85	• Implement measures to limit short- and long-term adverse effects to local vegetation communities:
	• Develop a fugitive dust best management practices plan. The plan will:
	  o identify all potential sources of fugitive dusts;
	  o outline mitigation measures; and
	  o detail inspection and recordkeeping requirements to demonstrate effective management.
	• Integrate adaptive management into the fugitive dust best management practices plan to accommodate results of site inspections and monitoring.
	• Maintain site roadways to minimize silt loading. The road maintenance and inspections procedures, including timelines, will be incorporated into the fugitive dust best management practices plan.
	• Use water cannon/sprays trucks to control dust emission from roads and stockpiles. At full production, two water trucks with water sprays and cannons will be at site for this purpose. Alternatively, surfactants, such as calcium chloride, could be used to control dust, particularly on roads, provided such applications are acceptable to the MOECC.
	• Use water cannon/spray trucks to control dust emissions from stockpiles and aggregate handling activities. If further mitigation is required, dedicated water sprays at active stockpile areas will be employed.
	• Use dust control equipment (e.g. bag houses, bin vents, and water sprays) to control dust emissions from the crusher and onsite metal mill.
	• Use low-sulphur diesel equipment and pollution control equipment to control air emissions from mobile heavy equipment operations. Meet EC's off road vehicle emission requirements. Develop and implement preventative maintenance measures.
		C,O,D	NS, MOECC

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	• Conduct active revegetation and recolonization of disturbed areas as part of progressive reclamation during operation and active reclamation at decommissioning. • Discuss appropriate vegetation seed mixes for the project site with appropriate regulatory authorities to recolonize native plant species in the project site, such as mine rock stockpiles. • Separate stockpiling of removed organic rich material during open pit and tailings dam stripping, for use as topsoil during progressive revegetation and at decommissioning.		
86, 102, 203	• Carry out the following mitigation measures with regards to transmission line: • Undertake transmission line construction in winter (normally December 1 to March 31) to better protect ground cover in sensitive areas where the protection of wetlands, rare plants and SAR is required, and completion of the remainder of transmission line construction in the late summer and fall, outside of the breeding bird season. • Develop strategies for relocating rare plants, including Aboriginal medicinal plants, in consultation with MNRF and Aboriginal groups, along the transmission line or at the project site in advance of a possible Ontario *Public Lands Act* authorization • Ensure conductor wire separation distances are sufficiently far apart to preclude larger avian species, particularly those which frequently use hydro pole for perching or nesting, from electrocution by contacting two conductor wires simultaneously. • Reduce vegetation removal to the extent necessary to support construction activities and longer-term transmission line reliability (from interference with conductors and fall of adjacent hazard trees). Minimize vegetation removal and retain existing low vegetation ground cover. • Prohibit use of herbicides and minimize mechanical removal for vegetation management.	E,C	MNRF,MTO, EC
FVC	Furbearers and Amphibians and Reptiles		
PVC	Ungulates, Furbearers, Bats, Amphibians		
91	• Carry-out a wildlife follow-up monitoring plan that will record the efficacy of these avoidance measures (will evaluate the effectiveness of the methods implemented).	C,O,D	EC, MNRF, The Agency
92	• Develop detailed wildlife monitoring strategies as part of the follow-up monitoring plan through consultation with the MNRF and EC. Additional control sites around the	E,C,O	MNRF

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	periphery of the mine footprint can be developed and monitored following mine construction and periodically throughout mine operations.		
93	• Use exclusion fencing for reptiles and amphibians during construction and operations. The placement of fencing will be decided upon through consultation with the MNRF and EC.	C,O	MNRF,EC, The Agency
94	• In regard to the transmission line, the proponent will carry out the following mitigation measures: • Advise construction crews not to interfere with or harass wildlife. No hunting or fishing by construction crews will be allowed. Disciplinary actions will be taken should either occur. • Ensure contractors handle food and food wastes in a responsible manner, and educate workers to ensure no feeding of wildlife. • Contact MNRF for direction should any nuisance wildlife be encountered which pose a risk to construction crews.	C	MNRF
FVC	Migratory Birds, Amphibians and Reptiles		
PVC	Wildlife		
95	• Carry out the following primary mitigation strategies for limiting adverse effects to wildlife: • Maintain a 120 m buffer zone adjacent to rivers and creeks to protect watercourses and their associated vegetated margins. • Restore disturbed habitats at decommissioning and develop habitats capable of supporting a diversity of wildlife species. • Enforce speed limits, install warning signs for wildlife encounters, and log collisions to help identify and avoid increased potential for vehicular collisions with wildlife. • Include wildlife awareness information into regular safety and environmental inductions performed by the mine. Workers and contractors will be made aware of seasonal changes in local deer or large or local mammal behaviour or presence in proximity to the mine. • Treatment of the tailings slurry to levels equal to or less than 1 mg/L weak acid dissociable cyanide before deposition in the TMA (which is well below the 50 mg/L	E,C,O,D	MOECC, MNRF,MNDM

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	weak acid dissociable cyanide threshold criteria outlined by the International Cyanide Management Code). • Fence off the TMA to prevent access. • Cover the exposed tailings beach at decommissioning with a layer of low permeability overburden and the remaining tailings with at least two metres of water to restrict oxygen contact with the tailings. • Implement a fugitive dust best management practices plan at the start of mine construction to minimize dust deposition on vegetation along the transportation routes and the zone of influence on habitat that may be used by breeding bird species. Primary dust suppression methods will include road watering. • Reduce potential predation of wildlife by disposing of food wastes generated on site to limit the attraction of wildlife to the mine site.		
96	• Develop a compact project site to reduce overall habitat loss and to limit potential adverse effects related to sound emissions to the extent practical. • Install silt fencing if frog mortality on roadways is found to be a problem along mine access roads or the re-aligned Highway 600. This will prevent frogs from crossing the road and may direct them to the nearest culvert(s). • Modify the timing of draining of wetlands to encourage frogs to move to other equally suitable habitat adjacent to the project site.	C,O	
FVC	Migratory Birds, Aboriginal Health and Socio-Economic Conditions, and Current Use of Lands and Resources for Traditional Purposes by Aboriginal Peoples		
PVC	Birds and Habitat , SAR: Species protected under the Ontario ESA and species of special concern and provincially rare species		
98, 101, 103, 104, 108, 113	The primary mitigation strategies for limiting adverse effects to birds and habitat: • Restrict clearing and modification of woodland, marsh and open country breeding bird habitat to outside of the breeding seasons. • Implement sound abatement strategies. • Enforce speed limits, install warning signs for wildlife encounters, and keep a log of collisions to help identify and avoid increased potential for vehicular collisions with wildlife.	E,C,O,D	MNRF,EC, MOECC, MNDM

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	• Provide environmental training of project personnel, including SAR identification and sensitivities, and knowledge of Ontario ESA permit conditions. • Maintain forest buffers between project components and nesting/foraging habitat where practicable. • Manage site lighting fixtures, where feasible, to reduce light pollution in surrounding environment and minimize disturbance to nocturnal species. • Provide compensatory habitat to provide protection and indirect habitat for migratory birds. • Restore disturbed habitats at decommissioning and develop habitats capable of supporting a diversity of wildlife species. • Restrict clearing to periods outside of the bird breeding season from May 1 to August 15. • Actively restore the project site to productive, naturalized vegetation communities on cessation of mining capable of supporting a diversity of wildlife species. • Provide suitable habitat for SAR through project revegetation efforts at decommissioning, as well as minimizing the length of time that areas are exposed to erosion and sediment transport.		
99, 105, 110, 113	• Mitigation measures that will be used to reduce potential adverse effects to Eastern Whip-poor-will include the following: o Provide compensatory whip-poor-will habitat that protects known territories and other identified suitable habitat. o Implement a noise abatement plan to dampen sound infiltrating habitats surrounding high traffic areas of the mine. o Manage dust through dust suppression activities (best management practices). o Develop a wildlife follow-up monitoring plan for Common Nighthawk and Eastern Whip-poor-will, in partnership with the MNRF, EC and interested First Nation Communities. o Include a mortality trigger and other requirements that will be decided upon during consultation with the MNRF and EC.	E,C,O,D	MNRF, MOECC
111	• The primary mitigation strategies for limiting adverse effects to Bobolink will include:	E,C,O,D	MNRF, MOECC,

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	○ Restrict the development of open country habitats to periods outside the breeding bird season which occurs from May 1 to July 31. ○ Acquire and protect compensatory open country breeding bird habitat suitable for Bobolink breeding at a ratio of 1:1 for open-country habitat removed for project development. ○ Implement a noise abatement plan to dampen sound infiltrating habitats surrounding high traffic areas of the mine. ○ Implement a wildlife follow-up monitoring plan for Bobolink populations and nesting in proximity to the proposed mine site within compensatory habitat areas, and in appropriate control areas.		MNDM
112	• Mitigation measures that will be used to reduce potential adverse effects to Barn Swallows will include the following: ○ Identify Barn Swallow nesting colonies prior to mine construction. ○ Create artificial nesting structures to encourage re-colonization or new colonization by Barn Swallows, as per the Ontario ESA. Zones will be established where Barn Swallow colonization is desired, tolerated or not desired to provide protection to swallows nesting in other locations where their presence is encouraged and does not cause problems for mine operations. ○ Implement a noise abatement plan to dampen sound infiltrating habitats surrounding high traffic areas of the mine. ○ Implement a wildlife follow-up monitoring plan for Barn Swallow populations in proximity to the proposed mine and transmission line sites and in appropriate control areas.	E,C,O,D	NS, MOECC, MNDM
FVC	Aboriginal Groups – Current use of lands and resources for traditional purposes and Aboriginal groups – Physical or cultural heritage and effects on historical, archaeological, paleontological or architectural sites or structures		
PVC	Land and resource use: related to both traditional and non-traditional use: Land use plans and policies; Mineral exploration; Forestry; Agriculture and adjacent residents; Hunting; Trapping; Fishing, and Other outdoor recreational uses.		
115, 116,	• Collect TK/TLU information, as appropriate, for the construction, operation and	E,C,O,D,P	AC, The Agency,

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
117, 119, 121, 122, 123, 127, 131, 145	decommissioning phases of the project and continue to dialogue on project matters with Aboriginal communities. For example, the proponent will further investigate the historical travel corridor and incorporate appropriately any new information that may become available. (Letter to Chiefs from Kyle Stanfield, October 2013). • Share results of the TK/TLU data collection in non-public Aboriginal community forums. (Letter to Chiefs from Kyle Stanfield, October 2013). • Maintain an open invitation for First Nations to participate in all joint baseline and environmental monitoring and reporting plans. (Letter to Chiefs from Kyle Stanfield, October 2013). • Reach out to the Seven Generations Education Institute and/or the MNRF to obtain any additional information on baseline health of animals and fish. (Letter to Chiefs from Kyle Stanfield, October 2013). • Coordinate monitoring programs targeted at ungulates (moose, deer) as part of the wildlife follow-up monitoring plan with Aboriginal communities. (Letter to Chiefs from Kyle Stanfield, October 2013). • Assemble a map showing the locations of the closest First Nation community water supply intakes on receipt of the locations/coordinates. (Letter to Chiefs from Kyle Stanfield, October 2013). • Provide information to Aboriginal communities on any potential impacts on health. (Letter to Chiefs from Kyle Stanfield, October 2013). • Calculate the area of forest land that will be removed from the total forest land within Big Grassy River First Nation territory, utilizing public sources and provide this information to the First Nation on delineation of the traditional territory by the Big Grassy River First Nation. • Continue to involve Big Grassy River First Nation and Métis Nation of Ontario Region 1 members in the development of an AMP related to the mine closure plan, including the rehabilitation of habitat for wildlife. • Restore access to project lands following mine closure to the extent that such access is safe and possible. • Develop accommodation with local trapline holders that meets the needs of both the		BGRFN, MNO

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	proponent and the trappers;		
132, 200, 133, 168	• Allow limited and controlled cultural use of the proponent's lands in select areas at select times. • Provide access to approximately 10 km^2 of private lands to be used as habitat compensation for the Eastern Whip-poor-will to Aboriginal communities, such as Big Grassy River First Nation and Métis Nation of Ontario Region 1, for big game hunting and plant gathering. This land use would be subject to notification of access in the case of hunting, to ensure the safety of any persons using those lands for other purposes, such as studying Eastern Whip-poor-will. • To mitigate direct effects on land which would have an indirect cultural heritage effect on Aboriginal peoples, the proponent agreed to: • Avoid culturally significant sites where possible. • Assess additional significant sites, should any be discovered during project development. • Provide cultural features as specified by Métis Nation of Ontario Region 1 in nearby accessible areas. • Honour requests by land users for ceremonies in advance of construction. • Preserve any discovered burial sites. • Ensure that Aboriginal communities (including Big Grassy River First Nation) have the ability to access the site for cultural and ceremonial purposes.	E,C,O,D,P	BGRFN, The Agency
139	• Fish habitat compensation will be provided onsite related to the Federal *Fisheries Act*. A portion of this compensation habitat, notably the Clark Creek, Clark Creek pond and Teeple pond, could potentially be provided to licensed bait fishermen.	E,C	BGRFN, DFO
FVC	Aboriginal groups – Health and socio-economic conditions		
PVC	Economic VSECs: Direct, indirect and induced employment opportunities Business opportunities, Income growth, Economic diversification, Human capital, and Government revenues.		
165	• Conduct analysis of ungulate organ meat by local hunters for potential health risks associated with its consumption. Results of any such analysis would be made available to local residents and Aboriginal communities.	E,C,O,D	AC, NS

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
169	• Work with local Aboriginal peoples on an ongoing basis to monitor metal concentrations in country foods including wild rice, berries and other wild plants, fish muscle and liver tissue, White-tailed Deer liver tissue, and other wildlife tissues. This analysis could be expanded to include testing for additional metals. The proponent will work with local Aboriginal hunters and First Nations to determine the most effective path forward on this topic.	E,C,O	NS, The Agency, BGRFN
170	• Conduct a risk assessment of the potential long-term exposure of fish and wildlife to accumulated metals within the constructed wetland. Such a study will be carried out within one to two years prior to mine closure (or earlier during the project operations phase), and if a meaningful risk is determined to exist the risk will be mitigated as part of overall mine decommissioning by removing and disposing the contaminated sediments to the bottom of the pit lake. This could readily be accomplished by a small dredging operation.	O,D	BGRFN, MNDM
4, 8	• Conduct air quality monitoring, during construction, operation and decommissioning, including monitoring of the following parameters: total suspended particulate (TSP) and metals on the TSP size fraction, PM10, dust fall and passive monitoring for NO_2 and SO_2.	C,O,D	
FVC	Aboriginal Groups – Current use of lands and resources for traditional purposes and Aboriginal groups – Physical or cultural heritage and effects on historical, archaeological, paleontological or architectural sites or structures		
PVC	Social VSECs: Demographics and populations; Housing and accommodations; Public utilities; Community and social services; Highway traffic; Human health; and Cultural heritage resources.		
175	• Monitor for archaeological findings during the construction phase.	C	The Agency, MTCS
177, 176	• Supervise construction, related to transmission line, by a qualified archaeologist at identified areas of high archaeological potential. • Hold, regular and ongoing discussions with stakeholders, Aboriginal people and local communities to help monitor any effects to the socio-cultural environment. • Identify mutually satisfactory ways to mitigate negative or enhance positive effects.	C	MNRF

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community

	• Establish a formal complaints procedure will be established to provide stakeholders and Aboriginal peoples a voice during the construction, operation and decommissioning phase of the transmission line project.
	• Establish a response protocol to ensure that follow up occurs.
	• With regard to protection of cultural heritage values during transmission line construction:
	  o Suspend all work should human remains be identified during construction.
	  ▪ Notify the Ontario Provincial Police, or local police, who will conduct a site investigation and contact the district coroner.
	  ▪ Notify the Ministry of Tourism, Culture and Sport, the Registrar of Cemeteries, and the Ministry of Government Services.
	  o Suspend all work should cultural heritage values (archaeological or historical materials or features) be identified during construction or operations.
	  o Contact the Ministry of Tourism, Culture and Sport archaeologist.
	  o Engage Aboriginal people about the transmission line construction and respond should culturally significant areas, including deeply buried sites not typically identified, be discovered.
	• In addition for the project site, the proponent agreed to:
	• Transfer artifacts to a facility owned by Rainy River First Nation on behalf of three other First Nations, namely Naicatchewenin First Nation; Anishinaabeg of Naongashiing First Nation and Pwi-Di-Goo-Zing-Ne-Yaa-Zhing Advisory Services.
	• Present on the technique used to locate ancient sites to First Nation and gather as much information as possible for the identified sites
	• Conduct a ceremony once the artifacts are physically returned, at which time the proponent will likely receive direction on what curation should be provided.		

PVC	General/Other		
186, 191, 192, 193, 194	• Conduct environmental monitoring in accordance with standard practice and regulatory requirements, including any site-specific environmental approvals. • Develop monitoring details through ongoing stakeholder consultation during the EA process, and through conditions placed on regulatory instruments such as permits,	E,C,O,D,P	MOECC, MNRF,MNDM, DFO, EC, NS, MNO

Proponent Commitment Reference No.*	Commitment / Mitigation	Project Phase	Link to Federal or Provincial Authority or Aboriginal Community
	authorizations and approvals, issued by the Federal and Provincial regulatory agencies. • Implement a follow-up monitoring plan. This plan will verify the accuracy of the environmental assessment of a designated project and determine the effectiveness of any mitigation measures. • Monitor results of the EA, subject to acceptance in writing of the follow-up monitoring plan by the Federal and Provincial governments, and provide an annual report to the parties during the construction and operation phases of the project. • A list of follow-up monitoring plan commitments made during the EA process will be maintained by the proponent, indicating where appropriate: o The nature of the commitment; o To whom, or to what group or agency the commitment was made, if specific; o Whether the commitment is related to the EA process alone; o Whether the commitment is addressed or linked to a regulatory instrument, such as a regulation or environmental approval; o Any applicable timeline; o The status of the commitment; and o Additional actions required to fulfil the commitment • Work closely with Aboriginal Groups in relation to development of environmental management plans and an emergency management plan, for construction, operations, decommissioning, and taking into account accidents and malfunctions.		

*The numbers in the first column correspond to the commitments made by the proponent in its document entitled, "New Gold Rainy River Project – Commitments Registry" dated August 2014. This Appendix is a subset of the proponent's list of commitments.

Notes:

FVC = federal valued component; PVC = proponent's valued component

E: Engineering and procurement; C: Construction; O: Operations; D: Decommissioning and active closure; P: Abandonment

NS: Non-specific; AC: Aboriginal communities; other Aboriginal groups as listed (Note: the government agencies listed are generally for reporting purposes per Agency guidance, rather than necessarily the comment source agency as follows DFO: Fisheries and Oceans Canada; EC: Environment Canada; MNDM: Ontario Ministry of Northern Development and Mines; MNRF: Ontario Ministry of Natural Resources and Forestry; MNO: Métis Nation of Ontario Region 1; MOECC: Ontario Ministry of the Environment and Climate Change; MTCS: Ontario Ministry of Tourism, Culture and Sport; TC: Transport Canada)

Appendix B: Summary of Residual Effects Assessment

VC Affected	Residual Effect	Predicted Degree of Effect After Mitigation						Agency determination on significance of residual adverse environmental effect	Likelihood of Occurrence
		Magnitude	Extent	Duration	Frequency	Reversibility	Natural environment context/Socio-economic environment context		
Fish and fish habitat	• Loss of approximately 26 ha of existing fish habitat in Minor Creek Systems*. • Changes in flow from loss of fish habitat in the Minor Creek Systems* and indirect changes to the Pinewood River. • Diminished flows from the Pinewood River during water taking. • Potential water quality changes and related effects on fish habitat in the Pinewood River from treated effluent releases.	Level I - low Effects considered to be minor (4% of the NRSA) and will be offset in accordance with the *Fisheries Act* and MMER. Effects are considered to be minor (<20% during average and high flow years; with flow enhancement during low flow periods in the Pinewood River). Treated runoff and seepage discharges will be in compliance with federal MMER Schedule 4 limits and provincial MOECC Environmental Compliance Approval.	Level I - low Effects are considered to be confined to the project site.	Level III - high Effects to Minor Creek Systems and the Pinewood River are long-term and will extend beyond the life of the Project.	Level III - high Effect is expected to be continuous through construction, operation, decommissioning and abandonment. Level II - medium Effects are expected to have seasonal regularity; water taking will be continuous during the open water period during the second half of the construction period.	Level III - high Effects to the Minor Creek Systems* are not reversible at decommissioning, but the loss of fish habitat will be offset. Level I – low Effects of water taking are readily reversible over time and upon cessation of water taking from the Pinewood River during construction.	Level II - medium Adverse effects to Minor Creek Systems would involve commonplace and widespread ecological communities, typical of small headwater creek systems in the area. The Pinewood River and the Minor Creek Systems* are dominant local systems which support commonplace and widespread ecological communities.	Not significant Rationale: Effects on fish and fish habitat are expected to diminish in duration and frequency and are expected to be reversible upon the establishment of fish habitat offsetting measures. The measures will offset the loss of fish habitat and maintain the productivity of the fisheries in Minor Creek Systems* and the Pinewood River. Residual effects are expected to be minor and localized with the implementation of the proponent's water management plan and its commitment to develop minimum flow thresholds to protect aquatic habitats, in consultation with MOECC and DFO. The proponent's commitment to implement monitoring programs for groundwater and surface water quantity will verify the predictions in the EA and determine the effectiveness of the mitigation measures.	Effect will occur.

VC Affected	Residual Effect	Predicted Degree of Effect After Mitigation						Agency determination on significance of residual adverse environmental effect	Likelihood of Occurrence
		Magnitude	Extent	Duration	Frequency	Reversibility	Natural environment context/Socio-economic environment context		
Migratory birds	• Habitat removal (1475.3 ha of woodland, 291.8 ha of wetland, and 399 ha of open country habitats) from mine site development.	Level I - low Effects are considered to be minor (8% of the NLSA).	Level I – low Effects are considered to be confined to the project site.	Level III – high Long-term effects will persist for the life of the Project.	Level III - high Effect is expected to be continuous through construction, operation, and decommissioning of the mine.	Level III - high Effects are reversible following decommissioning and abandonment.	Level III - high Adverse effects will generally involve commonplace and widespread species, together with some SAR species.	Not significant Rationale: Residual effects on migratory birds are localized and the Project is unlikely to affect habitat availability or use of the migratory birds within the NLSA. Effects are expected to diminish in duration and frequency and are expected to be reversible upon the provision of compensatory habitat that will protect and provide habitat for migratory birds listed on SARA and designated by COSEWIC and those that are not listed or designated. Potential local habitat for the migratory birds may be created from rehabilitation of the project site at decommissioning and abandonment.	Effect will occur.
Current use of lands and resources for traditional purposes by Aboriginal peoples	• Loss or fragmentation of terrestrial wildlife habitat for hunting and impacts to species hunted (e.g. White-tailed Deer, Moose, furbearers). • Loss of 27 ha of existing fish habitat in Minor Creek Systems* for bait fishing. • Loss of plants harvested for	Level I - low Effects on hunting are considered to be minor (1.5% of the Wildlife Management Unit 10) Ungulates such as White-tailed deer are considered widespread and abundant in the NLSA. Effects on fishing are considered to be minor as fishing activities are limited in the Pinewood River and Minor	Level I – low Effects are considered to be confined to the project site and the HLSA.	Level II – medium Effects are medium-term and will last until decommissioning.	Level III - high Effects are expected to be continuous through construction, operation, and decommissioning.	Level II - medium Effects are reversible following decommissioning and abandonment.	Level III - high Aboriginal communities identified traditional land uses on the project site and within the regional study areas, including hunting, subsistence fishing and baitfish harvesting, and plant harvesting.	Not significant Rationale: Effects on current use of lands and resources for traditional purposes are expected to diminish in duration and frequency and are expected to be reversible upon the provision of access to 1000 ha of private land for hunting and plant harvesting, the fish habitat offsetting and compensation plan for the loss of fish habitat and the implementation of a water management plan. Taking into account mitigation and proponent's commitments, Aboriginal peoples will be able to continue traditional practices in a modified context in the NRSA.	Effects could reasonably be expected to occur.

VC Affected	Residual Effect	Predicted Degree of Effect After Mitigation						Agency determination on significance of residual adverse environmental effect	Likelihood of Occurrence
		Magnitude	Extent	Duration	Frequency	Reversibility	Natural environment context/Socio-economic environment context		
	food and medicines. • Loss of cultural features. • No predicted effects on historical travel routes used to cross what is now the Canada-US border between Ontario and Minnesota.	Creek Systems*. Loss of fish habitat will be compensated. Effects on plant harvesting (wild medicines, berries, etc.) are considered to be minor and will be compensated. Effects on current cultural use will be compensated.							
Health and socio-economic conditions of Aboriginal peoples	• Potential concerns with indirect health effects from possible contamination in the atmosphere, surface water, and groundwater from the mine development (particularly heavy metals that bioaccumulate in the food chain).	Level I - low Effects of contaminant releases are considered to be minor and within federal and provincial emission and discharge criteria. Effects on fish habitat considered to be minor (4% of the NRSA) and will be compensated in accordance with the *Fisheries Act.*	Level I - low Effects are considered to be confined to the project site and the HLSA.	Level I - low No possible health effects are anticipated for Aboriginal communities.	Level I - low Effects are expected to occur infrequently or not at all.	Level II - medium Effects are reversible at decommissioning.	Level III - high Potential health risks identified by Aboriginal communities are important to address because of their use of the land and consumption of White-tailed Deer, fish and plants in the NLSA. Aboriginal communities identified commercial fishing and baitfish harvesting on the project site and within the regional study areas.	Not significant Rationale: Residual effects are expected to be minor and localized as contaminant releases are to be within federal and provincial emission and discharge criteria. The mitigation measures for impacts to water and air quality will reduce the risks of bioaccumulation of contaminants in country foods that could affect Aboriginal health. The proponent will monitor metal concentrations in country foods, including wild rice, berries and other wild plants, fish muscle and liver tissue, and White-tailed Deer liver tissue to verify the predictions on health related risks.	Effects unlikely to occur.

VC Affected	Residual Effect	Predicted Degree of Effect After Mitigation						Agency determination on significance of residual adverse environmental effect	Likelihood of Occurrence
		Magnitude	Extent	Duration	Frequency	Reversibility	Natural environment context/Socio-economic environment context		
	• Loss of 27 ha of existing fish habitat in Minor Creek Systems* for commercial baitfish license holders.							Aboriginal peoples would be able to continue commercial bait fishing in a modified context in the NLSA after taking into account mitigation measures including the development and implementation of the fish habitat offsetting and compensation plan and proponent's commitments.	
Physical or cultural heritage, and effects on historical, archaeological, paleontological or architectural sites or structures of Aboriginal peoples	• Construction and operation (i.e. stockpiles and TMA) will impact current cultural use. • Effects to archaeological sites are not expected. No known archaeological sites within project site. • Cultural sites and historical travel routes of importance to Aboriginal groups were identified on the project site and within the regional study areas.	Level I - low Effects on current cultural use within project site will occur.	Level I – low Effects are considered to be confined to the project site.	Level III - high Effects on current cultural use are expected to extend beyond the life of the Project.	Level III - high Effects on cultural features are expected to be continuous through construction, operation and decommissioning	Level III - high Effects are not reversible at decommissioning, but current cultural use will be compensated.	Level III - high Cultural heritage resources are of high importance to Aboriginal peoples. Aboriginal communities identified cultural sites and historical travel routes on the project site and within the regional study areas.	Not significant Rationale: Residual effects on current cultural use are expected to diminish in duration and frequency and are expected to be reversible upon the provision of access to nearby sites for cultural use and limited and controlled cultural use of project site in select areas at select times. Aboriginal peoples would be able to continue current cultural use in a modified context in the NLSA after taking into account mitigation and proponent's commitments.	Effect will occur.

VC Affected	Residual Effect	Predicted Degree of Effect After Mitigation						Agency determination on significance of residual adverse environmental effect	Likelihood of Occurrence
		Magnitude	Extent	Duration	Frequency	Reversibility	Natural environment context/Socio-economic environment context		
Recreation and commercial use	• Displacement of lands and restricted access for trapping, hunting and fishing (1.5 percent of Ontario's Wildlife Management Unit #10). Removal of a portion of Richardson Trail by the TMA.	Level I – low Effects are considered to be minor (1.5 percent of Wildlife Management Unit #10).	Level I – low Effects are considered to be confined to the HLSA.	Level II – medium Effects will last until decommissioning.	Level III – high Effects are expected to be continuous during construction and operation of the mine.	Level II –medium Effects are reversible at decommissioning.	Level II – medium Recreation and commercial use are limited in the HLSA. Richardson Trail is an important recreation use trail for local residents.	Not significant Rationale: Residual effects on recreation and commercial use are expected to diminish in duration and frequency and are expected to be reversible at decommissioning. Recreation and commercial uses will be able to continue in a modified context. The proponent's commitments to further discussions with local landowners to enhance Richardson Trail components; restoring access to lands within the project site for trappers and hunters at decommissioning; and implementing the fish habitat offsetting and compensation plans, provide confidence that the indirect socio-economic effects on recreation and commercial use have been characterized and mitigated appropriately.	Effects unlikely to occur.
Amphibians and reptiles	• Habitat removal (1475.3 ha of woodland and 291.8 ha of wetland) from mine site development.	Level I – low Effects are considered to be minor (6.5% of the NLSA).	Level I - low Effects are considered to be confined to the project	Level III – high Effects will persist throughout construction, operation, and well into the decommissioning	Level III – high Effects are expected to be continuous through construction and operation of the	Level I - low Effects are reversible at decommissioning.	Level II – medium Adverse effects will generally involve commonplace and widespread amphibian and reptile species.	Not significant Rationale: Effects on amphibians and reptiles are expected to diminish in duration and frequency and are expected to be reversible upon the establishment of fish habitat offsetting and compensation measures. The	Effect will occur.

VC Affected	Residual Effect	Predicted Degree of Effect After Mitigation						Agency determination on significance of residual adverse environmental effect	Likelihood of Occurrence
		Magnitude	Extent	Duration	Frequency	Reversibility	Natural environment context/Socio-economic environment context		
	• Loss of 27 ha of existing fish habitat in Minor Creek Systems* which may also be habitat for amphibians and reptiles.		site.	phase.	mine.			creation of like-for-like fish habitat may indirectly provide habitat for amphibians and reptiles. Local adverse residual effects are unlikely to produce significant effects.	
Furbearers	• Habitat removal (291.8 ha of wetland) from mine site development. • Loss of 27 ha of existing fish habitat in Minor Creek Systems* which may also be habitat for furbearers.	Level I – low Effects are considered to be minor (1.2% of the NLSA).	Level I - low Effects are considered to be confined to the project site.	Level III – high Effects will persist throughout construction, operation, and well into the decommissioning phase.	Level III – high Effects are expected to be continuous through construction and operation of the mine.	Level I - low Effects are reversible at decommissioning.	Level II – medium Adverse effects will generally involve commonplace and widespread furbearer species.	Not significant Rationale: Effects on furbearers are expected to diminish in duration and frequency and are expected to be reversible upon the establishment of fish habitat compensation and offset measures. The creation of like-for-like fish habitat may indirectly provide habitat for furbearers associated with watercourses. Local adverse residual effects are unlikely to produce significant effects.	Effect will occur.
Federal species at risk	• Habitat removal (1475.3 ha of woodland, 10.9 ha of open rock and mineral barren, 291.8 ha of marsh, and 399 ha of open country habitats) from mine site development.	Level I - low Effects considered to be minor (8.1% of the NLSA). Adverse effects for some species will be compensated in accordance with the Ontario ESA.	Level I - low Effects are considered to be confined to the project site.	Level III - high Long-term effects will persist for the life of the Project and will take several years for forest habitats to re-establish following active reclamation at decommissioning.	Level III - high Effect is expected to be continuous through construction and operation of the mine.	Level III - high Effects are reversible following abandonment.	Level III - high Adverse effects will involve species that are listed under SARA and designated by COSEWIC.	Not significant Rationale: Effects on species that are listed under SARA and designated by COSEWIC are expected to diminish in duration and frequency and are expected to be reversible upon the provision of compensatory habitat that will protect and provide habitat for migratory birds listed on SARA and designated by COSEWIC. Potential local habitat for species that are listed under SARA and designated by COSEWIC may	Effect will occur.

VC Affected	Residual Effect	Predicted Degree of Effect After Mitigation						Agency determination on significance of residual adverse environmental effect	Likelihood of Occurrence
		Magnitude	Extent	Duration	Frequency	Reversibility	Natural environment context/Socio-economic environment context		
								be created from rehabilitation of the project site at decommissioning and abandonment.	

* Minor Creek Systems refer to the following creeks: Clark Creek and Teeple Drain, West Creek, Marr Creek, and Loslo Creek, and Cowser Drain

Appendix C: Environmental Effect Rating Criteria

Table C-1: Environmental Effect Attribute Rating Criteria (Source: AMEC, Rainy River EIS)

Significance Level	Context		Extent		Frequency	Reversibility	Likelihood of Occurrence
	Ecological	Socio-economic	Magnitude and Geographic Extent	Duration			
I	No meaningful adverse ecosystem effects.	Effect is not considered important or is not considered important to the stability of affected communities in the region.	See Table C-2 for VC specific criteria.	Short-term: effect is not measurable beyond construction period (two years), or beyond active reclamation period, if directly linked to reclamation phase.	Effect is expected to occur infrequently, or not at all.	Effect is readily reversible.	Unlikely to occur.
II	Adverse effects involve common species or communities, or resources of limited significance.	Effect is considered somewhat important to the stability of affected communities in the region by persons living in potentially affected communities	See Table C-2 for VC specific criteria.	Medium-term: effect is likely to persist for life of this project.	Effect is expected to occur intermittently, possibly with some degree of regularity.	Effect is reversible at substantial cost, or with difficulty.	Could reasonably be expected to occur.

		or the region.					
III	Adverse effects involve locally or regionally important species, communities, or resources.	Effect is considered highly important to the stability of communities by persons living in potentially affected communities or the region.	See Table C-2 for VC specific criteria.	Long-term: effect is likely to persist beyond life of this project.	Effect is expected to occur regularly or continuously.	Effect is not reversible.	Will occur, or is likely to occur.

Table C-2: Environmental Effect Rating Criteria - Magnitude and Geographic Extent (Source: AMEC, Rainy River EIS)

Valued Component	Level I	Level II	Level III
Water quantity	Change to creek and river flows is <15 percent of seasonal norms; or is otherwise such that downstream aquatic habitat would not be meaningfully affected.	Change to creek and river flows is 15 to 25 percent of seasonal norms.	Change to creek and river flows is >25 percent of seasonal norms.

Valued Component	Level I	Level II	Level III
Water quality	Water quality effects in receiving waters consistent with applicable Federal and Provincial regulations and guidelines, or other scientifically defensible values; or if guidelines exceeded, no anticipated adverse environment effects beyond any defined mixing zones.	Water quality effects in receiving waters have the potential to adversely affect drinking water uses, aquatic life, and/or wildlife, beyond any defined mixing zones.	Water quality effects in receiving waters are likely to adversely affect drinking water uses, aquatic life, and/or wildlife, beyond any defined mixing zones, likely resulting in an unacceptable effect.
Fish and fish habitat	No net loss of the productive capacity of habitats.	Unacceptable loss of the productive capacity of local fish habitat.	Unacceptable loss of the productive capacity of regional fish habitat.
Wildlife* (including SAR)	Effect considered to be minor, and/or solely confined to project lands; or in the case of applicable SAR species, where no net loss of the productive capacity of habitat is achieved (or anticipated to be achieved) through permits.	Activity has the potential to meaningfully affect off property wildlife species.	Activity is likely to meaningfully affect off property wildlife species.

Valued Component	Level I	Level II	Level III
Socio-economic**	No or Low level effects; individuals or local communities are affected. Effect occurs but may or may not be detectable, and is within the normal range of variability. If effect can be measured quantitatively, then Level I effect represents change <10% from baseline conditions within project/local study area.	Effect is clearly distinguishable but is unlikely to pose a serious risk to the VC or represent a management challenge. If effect can be measured quantitatively, then Level II effect represents change of 10 to 20 percent from baseline conditions within project study area. Effect extends to the regional study area and/or includes effects at a Provincial level.	Effect is likely to pose a serious risk to the VC and represents a management challenge. If effect can be measured quantitatively, then Level III effect represents change >20 percent from baseline conditions within project study area. Effect is expected to extend beyond the regional study area and Provincial to the National or International level.

*Wildlife refers to migratory birds, furbearers, amphibians and reptiles.
** Socio-economic also refers to recreation and commercial use and VCs related to Aboriginal peoples.

Appendix D: Alternative Means and Preferred Options

(Adapted from Rainy River EIS, AMEC)

Project Component	Alternative Type (Method, Location or Both)	Alternatives Considered	Economic and Technical Feasibility and Select Environmental Considerations	Preferred Option
Construction and Operation				
Mining	Method	Open-pit	• Technically and economically feasible for shallow ore deposits, large ore deposits, or high tonnage/low grade deposits. • Generates larger quantities of mine rock. • Higher surface disturbance.	
		Underground	• Not considered to be feasible based on disseminated nature of the deposit. • Generates lower quantities of mine rock. • Less surface disturbance.	
		Combination of open-pit and underground	• Technically and economically feasible for complex ore bodies. • Generates larger quantities of mine rock. • Higher surface disturbance.	✓
Mine water management	Method and location	Integrate mine water treatment with site water management	• Technically and economically feasible. • No direct release of mine water to the environment. • Preferred option for decreasing the overall area of project site.	✓

		Separate mine water pond system	• Considered to be technically feasible. • Considered to economically unfeasible. • Direct discharge to the environment on meeting all regulatory requirements.	
Mine rock and overburden management *(the complete alternatives were evaluated under EC's Guidelines for the Assessment of Alternatives for Mine Waste Process which can be found in the Final Rainy River EIS report, Appendix P)*	Location	Alternative A (Northwest Alternative) located to the immediate southwest of the proposed TMA	• Economically unfeasible and therefore dismissed. • Unacceptable distance from the project site. • Considered to be technically feasible. • Does not overprint waters frequented by fish.	
		Alternative B (South alternative) located directly south of the proposed open pit and south of the Pinewood River	• Economically unfeasible and therefore dismissed. Financial backing from investors was not secured because of inability to comply with MOECC noise guidelines at Black Hawk area receptors. • Does not overprint waters frequented by fish.	
		Alternative C (Clark Creek Basin) located immediately east of the open pit	• Considered to be economically feasible. • Technically preferred for PAG mine rock and low grade ore stockpiling. • Overprints a portion of small creek systems.	✓
		Alternative D (Northeast Alternative) located north of and slightly overlapping with Alternative C	• Economically unfeasible and therefore dismissed. • Considered to be technically feasible. • Does not overprint waters frequented by fish.	
		Alternative E (West Alternative) located immediately west of the open pit	• Considered to be economically feasible. • Technically preferred for NPAG mine rock and overburden stockpiling. • Overprints a portion of small creek systems.	✓

Processing	Method	Whole ore cyanidation	• Considered to be economically unfeasible. • Considered to be technically preferable. • Easily detoxified either within the onsite metal mill or through volatilization in tailings ponds.	
		Gravity recovery	• Considered to be economically unfeasible. • Considered to be technically feasible. • Requires cyanidation of the gravity concentrate.	
		Flotation concentrate recovery	• Considered to be economically unfeasible. • Considered to be technically feasible. • Requires cyanidation of the floatation concentrate. • High power demands. • More tailings management options.	
		Combination of non-cyanide and cyanide recovery (gravity recovery and whole ore cyanidation)	• Technically and economically feasible. • Preferred option for higher gold recovery. • Requires cyanidation of gravity or flotation concentrate.	✓
Onsite metal mill effluent management	Method	In-plant SO_2/air treatment coupled with natural degradation	• Highest operating cost, but considered to be economically preferred for low investor and environmental risk. • Considered to be technically preferred for ability to destroy cyanide when followed by natural degradation. • Results in lower metal concentrations in the final effluent. • Preferred option for reclamation.	✓
		Natural Degradation Followed by hydrogen peroxide oxidation	• Economically, technically (higher risk), and environmentally (natural and human) acceptable. • Less effective on effluent tailings slurries. • Acceptable at reclamation.	

TMA *(the complete analysis of alternatives can be found in the Final Rainy River EIS report, Appendix P were evaluated under EC's Guidelines for the Assessment of Alternatives for Mine Waste Process, which)*	Location	Alternative A (Northwest Alternative)	• Considered to be economically unacceptable (proximity to residential area, unfavourable tailings storage to dam fill ratio). • Considered to be technically preferable (lower dam). • Unable to service site effectively. • Overlaps only 2 SAR territories, no loss of aquatic habitat and; suitable for water cover at closure.	
		Alternative B (Loslo Creek Basin Alternative)	• Considered to be economically and technically preferable (lower dam). • Acceptable for servicing the site effectively (potential delays - MMER). • Displaces two creeks and beaver meadow wetlands, overlaps Bobolink territory, but can produce high quality effluent and avoid whip-poor-will habitat; suitable for water cover at closure.	✓

Onsite metal mill complex (East of open pit) - Onsite metal mill, primary crusher, and coarse ore transfer house; ancillary buildings; and electrical substation, diesel generators, and onsite distribution system	Location	Options for shifting the onsite metal mill location to avoid interference with whip-poor-will habitat	• Selection of a site is constrained by proximity to the open pit and protection from blast fly rock, foundation conditions, property boundaries, and SAR sensitivities. • Shifting of the complex to other suitable areas will either result in loss of whip-poor-will habitat, conflict with surface rights of other companies, or does not provide a suitable location geographically. • An Ontario ESA Net Benefit permit will be required from the MNRF to provide further suitable habitat for Eastern Whip-poor-will instead.	✓
Explosives facility	Location	Offsite	• Explosives facilities in Winnipeg and Thunder Bay are considered too far and economically unfeasible. • Transportation increases risk of traffic accidents and collisions with wildlife.	
		Onsite	• Common practice with consideration of safe operational setbacks, distance to mining operations, traffic routes, and SAR sensitivities. The site will be east of the TMA. • Avoids interference with known whip-poor-will habitat.	✓

Aggregates (further investigation may change the preferred alternatives)	Location	NPAG mine rock	• Cost-effective, environmentally responsible (will already be available as a result of mining operations), and technically feasible. Preferred option for aggregate production. • Temporary and intermittent air emissions associated with crushing.	✓
		Quarry sources on project site	• Rock outcrops on project property that could be developed (technically feasible and environmentally preferred). • Preferred for Highway 600 and East Access Road. • Shorter haul distances, and consequently reduced traffic and greenhouse gas emissions.	✓
		Sand and gravel sources on project site	• Gravel pit; loss of whip-poor-will habitat. • Feasibility still under investigation. • Shorter haul distances, and consequently reduced traffic and greenhouse gas emissions.	
		Off property sand and gravel sources	• Higher costs due to longer haul distances. • Potential to support local quarries. • Upon further investigation, may be found to be technically preferable. • Increased greenhouse gas emissions associated with longer haul distance.	
Water supply	Method and Location	Take water directly from the Pinewood River	• Pipelines will be constructed for effluent discharge and additional costs will be minimal. • Confinement of project site. • Loss of fish habitat. • Can develop an initial water inventory to support onsite metal mill start-up.	

		Capture site drainage water (site runoff)	• No cost as this will be done for regulatory reasons (MMER) and tailings management construction. • Loss of fish habitat. • Maintains flow losses in the Pinewood River under all flow conditions.	
		Groundwater	• Potential to meet early water needs inadequate.	
		Combination of water taking sources	• Capture of site drainage for ongoing operations and initial water inventory from the Pinewood River. • Loss of fish habitat. • Maintain Pinewood River low flows during low flow conditions.	✓
Solid waste management: hazardous solid waste	No Alternative	No alternative	• To be shipped offsite to a licensed landfill or other facility • Less land area required. • Hydrocarbon affected soils to be potentially remediated onsite using approved methodologies. • Limited air and greenhouse gas emissions from fuel consumption to transport the waste.	✓
Solid waste management: non-hazardous solid waste	Location	Truck waste offsite to the Township of Chapple Landfill	• Economically preferred. • Less land area required. • Opportunities for local business; capacity to handle project waste was confirmed in a study. • Limited air and greenhouse gas emissions from fuel consumption to transport the waste.	✓
		Develop an onsite landfill	• Design and development make this option costly. • Less transportation and release of greenhouse gases in transportation. • Avoids air and greenhouse gas emissions from fuel consumption to transport the waste.	

Domestic sewage management	Method and Location	Package sewage treatment plant	• Proven technologies make it technically preferable. • Discharge to environment is expected to meet MOECC requirements.	✓
		Offsite treatment	• May generate local business opportunity. • Haulage costs will exceed operating costs of package systems. • Increased emissions related to transport.	
Highway 600 realignment	Location	Alternative A	• Crosses the Pinewood River.	
		Alternative B	• Crosses the Pinewood River.	
		Alternative C	• Supported by the Township of Chapple and MTO (removing investor risk). • Best sightlines (fewer turns). • Crosses the Pinewood River.	✓
		Alternative D	• Crosses the Pinewood River and a minor tributary.	
Power supply	Method and Location	Construct a 230 kV transmission line to the existing grid	• High construction costs but low operating costs, lower financial risk. • Risk of service disruptions. • Potential for habitat fragmentation.	✓
		Diesel-fired generators	• Low construction costs but high operating costs. • Typically used on smaller scale projects. • Less susceptible to service disruptions. • Higher impact on air quality.	
Transmission line routing	Location	Alternative A (northeastern route)	• Low clearing costs; most lands already owned. • More remote option and has fewer impacts on local residents.	✓

		Alternative D (Along existing roads)	• Reduced tree clearing and access costs, but longest route and runs along a winding road which is not preferable for transmission line routing. • Accessible year round for construction.	
Decommissioning and Abandonment				
Open pit	Method	Natural flooding	• Will extend costs across a long timeframe. • More time to stabilize pit water quality. • Pit walls exposed to oxidation.	
		Enhanced flooding	• Shortens the reclamation timeframe and allows for earlier reclamation of the TMA. • Decreased exposure of walls to oxidation. • Adverse effects on downstream fish habitat.	✓
		Partially backfill the open pit with tailings	• Substantial savings in tailings management. • Must ensure that the pit can be safely separated from underground workings at a reasonable cost to avoid catastrophic flooding (must be technically viable). • Preferred, given that safety of underground workings can be guaranteed.	✓
Underground mine	Method	Natural flooding	• Standard industry practice with no additional costs. • Little effect on site effluent discharge quality, receiving water quality or receiver fish habitat.	✓
		Enhanced flooding	• Involves use of secure bulkheads to separate underground from open pit. • Advantage includes less time for ARD to occur. • Disadvantages include reductions in flows for fish and fish habitat.	

		Backfill with mineral wastes	• Partial backfilling required supporting mining; full backfilling is not financially or technically viable. • Preferred for part of the underground mine. • Little effect on site effluent discharge quality, receiving water quality or receiver fish habitat.	✓
Stockpiles	Method and location	Re-use	• Tailings dam and other related construction. • Potentially used for development and maintenance of site roads. • Reduction in overall mineral wastes.	✓
		Stabilize, cover and revegetate	• Overburden and west mine rock stockpiles will use a self-sustaining vegetative cover. • Provision of wildlife habitat. • Reduction in overall mineral wastes.	✓
		Use in backfill	• Used in the underground mine. • Reduction in overall mineral wastes.	✓
		Engineered cover	• For the east mine rock stockpile and unprocessed ore stockpile on surface at closure. • Provision of wildlife habitat. • Reduction in overall mineral wastes.	✓
TMA	Method	Cover with mineral wastes, and revegetate	• Considered to be economically unfeasible. • Terrestrial and wetland habitat created.	
		Stabilize and permanent flooding, and perimeter cover with overburden and revegetate (combination of two alternatives described above)	• Considered to be economically, technically, and environmentally preferred. • Terrestrial and wetland habitat created.	✓

		Cover with modified mineral waste and revegetate	• Considered to be economically unfeasible. • Terrestrial habitat created.	
Buildings and Equipment	Method and location	Combination	• Parts that are not suitable for resale or reuse offsite can be stored in an approved landfill on the mine site (pending approval). • Hazardous material must be shipped to a licensed landfill.	✓
Infrastructure (roads, pipelines, and transmission lines)	Method and location	Decommission, remove and dispose of wastes in accordance with applicable regulations	• Viable for pipelines and transmission lines as there is no future use for them.	✓
		Leave in place for future use	• Viable for Highway 600 realignment and East Access Road.	✓
		Reclaim in place	• Potential to reclaim site haul roads.	✓
Drainage (road culverts, ditching, various ponds, creek realignments)	Method and location	Stabilize and leave in place	• Preferred for ditching as there will be no flood risk once culverts are removed.	✓
		Removal and restoration (ponds)	• Water management ponds will no longer be required and will create an unnecessary liability.	✓
		Maintain West Creek and Clark Creek realignment	• The creeks will become stabilized over the course of mine development and may become part of project fish habitat compensation.	✓

Appendix E: Summary of Key Aboriginal Concerns

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
Multiple groups	Atmospheric environment	5(1)(c), 5(1)(a)	Concern about dust and noise.	• The proponent responded that proposed mitigation measures for controlling dust include spraying water. • **Sound and air quality will be monitored during construction, operation, and active closure phases consistent with MOECC requirements.** • Studies of air quality and noise carried out for the project are described in the EIS, section 7.2; section 9.2.1; volume 2, section 5.3; and volume 2, sections 7.3 and 7.4. Creation and protection of compensatory habitat such as nesting structures.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Multiple groups	Surface water quality and quantity	5(1)(a)	Concern about storage of tailings and potential for mine waste and ARD to enter the Pinewood River watershed.	• The proponent provided information on plans for tailings storage. • **Monitor Pinewood River flows, measure contaminants, and take corrective action if necessary.** • The potential for tailings waste to affect water quality in the area and proposed mitigation measures are described in the EIS, section 8.2.6; and volume 2, section 6.8. Changes to the plans for the TMA since initially proposed are identified in the EIS, table S-4.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Multiple groups	Surface water quality and	5(1)(a)	Concern about surface water	• **The proponent aims to develop a compact site to limit the areal extent of**	The Agency is satisfied with the

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
	quantity		quality and the ability of the wetlands to accommodate the flows and water quality values.	**disturbance to creeks; design infrastructure using best management practices; and implement a water management plan to collect, monitor, and treat contact water as required**. • **Active re-vegetation at closure will minimize length of time that areas are exposed to erosion and sediment transport.** • **Fish habitat will be provided to offset losses that cannot be otherwise mitigated.** • Surface water quality is described in the EIS, section 7.5; and volume 2, sections 5.6.3, 5.8 and 5.7.5. The potential for environmental effects on human health associated with treated effluents discharged to surface waters are described in the EIS section 9.2.9; section 13.1; and volume 2, section 7.21. Concerns and proposed approaches to resolve concerns associated with potential impacts to surface water are identified in the EIS, table S-16.	proponent's response and factored it in the Agency analyses and conclusions.
Big Grassy River First Nation	Surface water quality and quantity	5(1)(a), 5(1)(c)	Concerns that examination of changes to water was inadequate.	• The additional information collected and shared through Big Grassy River First Nation's TK/TLU Study supports the existing effects assessment (i.e. current bait fishing and extensive use of the Pinewood River). • The EIS indicates that aquatic life in the Pinewood River will be protected. The	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
				proponent intends to monitor and establish ecological targets to ensure that the Pinewood River continues to provide for all life functions for all resident fish species during all phases of the Project. • The EIS also describes fish habitat offsetting and compensation plans to offset the loss of fish habitat. The plan involves offsite watershed restoration and onsite like-for-like habitat replacement, at a one to one ratio. The collaborative process included working with Aboriginal communities.	
Big Grassy River First Nation	Surface water quality and quantity	5(1)(b)	Concerns about lack of detailed planning for the proposed co-disposal of overburden with the NPAG mine rock to facilitate handling of clay rich materials.	• The NPAG and overburden material are proposed for disposal in an area west of the open pit. • As identified in the EIS, the stockpiles are to be partially co-disposed, to facilitate access for the overburden, rather than as completely discrete stockpiles as shown schematically on the report figures. The stockpiles have been planned and designed accordingly and no changes to surface area are required. • Further detail about the disposal of overburden and NPAG material is provided in the EIS, section 4.6.	The Agency understands that the stockpiles have been designed on a conceptual basis and more detail will be developed during the regulatory phases.
Multiple groups	Surface water quality and quantity	5(1)(a), 5(1)(c)	Concerns about the potential for increased mercury methylation rates	• **Wetland treatment is one component of the overall water management plan proposed for the project site.** Constructed wetlands have been proven to be effective in	The Agency is satisfied with the proponent's response and

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
			within the constructed wetland, and human health risks from mercury pollution.	polishing mine-related effluent and have been in used since the 1970's. That said, there is a potential for increased mercury methylation rates within the constructed wetland. • However, mercury health risk associated with fish consumption from the Pinewood River is not expected to change as a result of project site development. • **The proponent agrees to work with local Aboriginal peoples on an ongoing basis to monitor metal concentrations in country foods, such as fish muscle and liver tissues (pike and walleye), and White-tailed Deer liver tissue. A commitment to monitor contaminants of potential concern in fish tissues is stated in the EIS, section 13.5.2.** • Information on human health risks from metals (i.e. As, B, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, and Zn), is included in the EIS, section 7.21. Data presented in table 7-41 of the EIS indicates that mercury concentrations in the final TMA discharge are likely to be similar to those of background Pinewood River concentrations.	factored it in the Agency analyses and conclusions.
Naotkamegwanning First Nation	Surface water quality and quantity	5(1)(a)	Concerns about iron oxide staining being observed in open pit mines,	• The proponent has a water management plan for in-pit water. No direct discharge of water from the open pit to the environment will take place during construction or	The Agency is satisfied with the proponent's response and

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
			and subsequent treatment and relocation.	operation. During the early construction phase water will be collected and treated for discharge to the environment. Water within the pit will be pumped to a pond to be contained and re-used. The pit will be allowed to flood when operation ceases. Once flooded, the pit may discharge to the environment by gravity through a constructed spillway after the pit water quality meets the regulatory requirements.	factored it in the Agency analyses and conclusions.
Multiple groups	Groundwater	5(1)(a)	Concern about the drawdown of water and whether it could affect community water supplies.	• The proponent does not expect any measurable effects on water supply wells that it does not own. • **The proponent committed monitoring groundwater level (flow) and quality as part of the water management plan. This will include regular sampling and dipping of dedicated monitoring wells to identify any impacts to any wells in the vicinity of the zone of influence from the open pit and rectify any impacts to water availability for well owners.** • **The proponent will invite local well owners to participate in well water quality monitoring as part of the water management plan.**	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Multiple groups	Vegetation	5(1)(a), 5(1)(c)	Concern about effects on vegetation, country foods, and	• The EIS indicates that environmental effects on vegetation communities within the project site are direct and localized. All of the vegetation community types that will be	The Agency is satisfied with the proponent's response and

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
			rare plants.	displaced by vegetation clearing are common throughout the NLSA and NRSA. • **The proponent proposes to develop a compact project site, avoiding riparian and other sensitive habitats to the extent practical; use water spraying to manage dust; transplant rare plant species; and implement active re-vegetation at closure to restore habitats.** • The proponent has committed to monitoring metal concentrations in country foods, including wild rice, berries, and other wild plants to verify the predictions on human health effects and assess the effectiveness of the mitigation measures. • Studies of vegetation carried out for the project are described in the EIS, section 7.7; section 9.2.4; volume 2, section 5.9; and volume 2, section 7.8.	factored it in the Agency analyses and conclusions.
Multiple groups	Fish and fish habitat, human health	5(1)(a)	Concern about fish and fish habitat.	• The EIS identifies mitigation measures for the direct loss of fish habitat and indirect effects on fish and fish habitat from changes in water quality and quantity. • The EIS also describes a fish habitat compensation plan for losses associated with the removal of creeks in the NLSA in accordance with the MMER. This plan will result in the creation of 25.7 ha of fish habitat through the creation of the West Creek diversion channel, the stockpile pond	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
				diversion channel, the Clark Creek diversion channel, the West Creek pond, and the Clark Creek pond. The EIS also describes an offsetting plan for unavoidable serious harm to fish, in accordance with the *Fisheries Act*. • The proponent provided information on its proposed fish habitat **offsetting and compensation plans** and water management plan in relation to water quality standards. • Studies of fisheries and aquatic resources carried out for the project are described in the EIS, section 7.6; section 9.2.2; volume 2, section 5.8; and volume 2, section 7.5 and 7.6. • Approaches to resolve concerns associated with potential impacts to local fisheries are identified in the EIS, tables S-1, S-2, S-3, and S-16. Changes to the project since initially proposed (including considerations for fish and fish habitat) are also identified in table S-4 of the EIS.	
Multiple groups	Fish and fish habitat, human health	5(1)(a)	Big Grassy River First Nation identified an inadequate examination of effects on fish, fish habitat, and inadequate human	• The major metal removal mechanisms would occur with in-plant SO_2/air treatment of the mill effluent, followed by the removal of additional metals through effluent aging in the TMA and **water management ponds**. However, the constructed wetland is expected to take up residual metals over the period of the mine life, such that there would	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
			health risk assessment. Aboriginal communities recommend a human and animal risk assessment on the long-term exposure to contaminants of concern.	be an accumulation of residual metals in the wetland sediments. The potential exposure to fish and wildlife is limited to within the wetland. Once milling operations cease, the quality of water released from the TMA on an ongoing basis, during abandonment, is expected to improve. • **The proponent agrees to work with local Aboriginal communities on an ongoing basis to monitor metal concentrations in country foods (notably fish muscle and liver tissues, and White-tailed Deer liver tissue).** Section 13.5.2 of the EIS contains a commitment to monitoring contaminants of potential concern in fish tissues**.** • **The proponent agrees to conduct a risk assessment of the potential long-term exposure of fish and wildlife to accumulated metals in the constructed wetland, within one to two years prior to mine closure. If a risk is determined to exist, the proponent has committed to mitigating it during mine closure by removing and disposing the contaminated sediments (for example, bottom of the pit lake).** This could readily be accomplished by a small dredging operation.	

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
Big Grassy River First Nation	Human health	5(1)(c)	Concerns about chemical treatment of water as a long-term treatment option. This is not an option that Big Grassy River First Nation considers ideal.	• The most recent modelling studies, included as Appendix E to the draft mine closure plan, indicate that long-term chemical treatment of water would not be required for the project site at closure. • Water quality and water treatment is addressed in a number of locations within the EIS, including sections 4.12, 5.6.3, 7.5 to 7.7, 13.5, and 13.6; and appendices E, T and W.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Naotkamegwanning First Nation	Human health	5(1) (c)	Concerns about impacts on farm land surrounding the project site and how it will affect the human consumption of crops and produce.	• The proponent provided information about human health and ecological risks in relation to air, TMA and stockpile emissions, and responded that project development would be unlikely to cause heavy metal enrichment in local country foods or surrounding farmland. Hence, there is no potential adverse effect to human consumption of crops and produce on neighbouring lands.	The Agency is satisfied with the proponent's response with the understanding that the proponent has committed to monitoring metal concentrations in country foods, including wild rice, berries, and other wild plants.
Multiple groups	Wildlife	5(1)(c)	Concern about potential impacts on wildlife (especially waterfowl) in the area of the mine	• The **proponent provided information on its proposed water management plan and water quality standards.** The proponent stated that it would provide funding for a third-party independent review of the draft mine closure plan. • The EIS indicates that the NLSA is not an	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
				important migratory stopover location, as field studies conducted in spring and fall found low numbers of migrating waterfowl, shorebirds, and songbirds. • Species like Trumpeter Swans and other waterfowl require marsh habitat for breeding. Marsh habitat will be directly impacted and displaced by the proposed TMA. • The proponent committed to restricting clearing and modification of woodland, marsh and open country breeding bird habitat to outside of the breeding season (March 1 to August 15 for woodland bird species; March 15 to August 15 for marsh bird species; April 1 to August 15 for open country bird species), and to creating generally abiotic conditions within the fenced TMA to limit interest in the pond to waterfowl and other birds. • Studies of wildlife carried out for the project are described in the EIS, section 7.8; and volume 2, section 5.10. Concerns and proposed approaches to resolve concerns associated with potential impacts to wildlife are identified in the EIS, tables S-1, S-2, S-3, and S-16. Changes to the Project since proposed (including considerations for fish and fish habitat) are identified in the EIS, table S-4.	

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
Multiple groups	Wildlife	5(1)(c)	Request for more information on the effects on wildlife, wildlife movement, contamination, and their habitat	• **The EIS indicates the proponent's willingness to work with Aboriginal hunters to undertake an ongoing analysis of White-tailed Deer liver tissues to test for any trends in cadmium levels, the primary metal of potential concern in ungulate organ meat. This analysis could be expanded to include testing for additional metals.** The proponent has committed to working with local Aboriginal hunters to determine the most effective path forward on this topic. • Effects to vegetation, habitat, and to wildlife groups and species are addressed in the EIS, sections 7.8 through 7.16. The effects assessment for wildlife includes the potential for effects due to contaminant release. The potential for effects to human consumers of country foods is addressed in section 7.21 of the EIS.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Naotkamegwanning First Nation	Wildlife	5(1)(c)	Concerns about lack of detail noting changes in migratory routes of bird species, and some species no longer returning to the area.	• The proponent provided information on details of field investigation methods and published references regarding the existing baseline condition with respect to migratory birds used in the assessment of potential impacts related to the Project.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
Multiple groups	Traditional knowledge/ traditional land use	5(1)(c)	Concerns about inadequate traditional knowledge and traditional land use data collection (including changes to fish harvesting, water use, land use, and the effects of traveling further).	• The EIS indicates that Aboriginal groups identified activities on the project site and within the regional study areas, including hunting, subsistence and commercial fishing and baitfish harvesting, plant harvesting, cultural sites, and historical travel routes. • Big Grassy River First Nation and the Métis Nation of Ontario Region 1 Consultation Committee completed their own TK/TLU studies after the final EIS was issued by the proponent. • The proponent responded that no changes to the effects assessment are proposed because the additional TK/TLU information collected and shared through these studies supports the existing EA effects assessment. • Pursuant to completion of the TK/TLU, the proponent committed to continuing to collect TK/TLU information, as appropriate, for the construction, operation, and decommissioning of the Project. It further noted that it would continue dialogue on project matters with Aboriginal communities and involve them in monitoring.	The Agency is satisfied with the proponent's response and notes that the proponent proposed additional mitigation measures to reduce the indirect effects on current use of lands and resources for traditional purposes by Aboriginal peoples.
Multiple groups	Traditional knowledge/ traditional land use	5(1)(c)	Concern about effects on medicines collected in the area.	• **The proponent committed to refraining from the use of herbicides for transmission line vegetation control. Access to compensatory lands will also be provided for medicine harvesting.**	The Agency is satisfied with the proponent's response and factored it in the Agency analyses

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
					and conclusions.
Multiple groups	Traditional knowledge/ traditional land use	5(1)(c)	Concerns about the loss of traditional hunting areas.	• The proponent does not expect the residual effects on hunting due to loss of hunting habitat at the project site to be significant, and does not expect there to be any effects on hunting due to the transmission line ROW. The proponent does not expect a significant effect from minor habitat disturbance due to the realignment of Highway 600. **To mitigate these effects, the proponent supports an Aboriginal community's suggestion to provide improved access to other nearby private lands for hunting.** • At closure, the **proponent commits to involving Aboriginal community members in the development of adaptive management techniques related to the mine closure plan, including the rehabilitation of habitat for wildlife, and commits to restoring access to project lands to the extent safe and possible.**	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Multiple groups	Traditional knowledge/ traditional land use	5(1)(c)	Concerns about the loss of cultural and spiritual sites	• The proponent acknowledges the cultural sites mentioned in the TK/TLU studies and commits to the following during the construction and operations phases: ○ honouring requests of land users for ceremonies in advance of	The Agency is satisfied with the proponent's response and factored it in the Agency analyses

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
				construction; and ○ allowing limited and controlled cultural use of project site lands in selected areas at selected times. • **The proponent responded that it proposes to develop a compact mine site; adjust site layout to accommodate known archaeological sites and sensitive areas; and avoid culturally significant sites where possible.**	and conclusions.
Multiple groups	Traditional knowledge/ traditional land use	5(1)(c)	Concern about the effects of Aboriginal trails and travel routes along the transmission line right-of-way.	• Based on the TK/TLU studies, the proponent does not expect effects to any trails used by Aboriginal communities. Several forest access roads and trails developed by forestry operators would be used to access the transmission line right-of-way during construction. • The proponent commits to undertaking additional consultation and engagement with Aboriginal groups during the regulatory phase for right-of-way clearing and infrastructure development.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Multiple groups	Traditional knowledge/ traditional land use	5(1)(c)	Concern about the effects on traditional plant harvesting.	• Based on TK/TLU studies, the **proponent** does not expect effects on traditional plant harvesting and **supports an Aboriginal community suggestion to provide improved access to other nearby private lands for plant harvesting.**	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Big Grassy	Traditional	5(1)(c)	Request that	• The proponent appreciates the additional	The Agency is

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
River First Nation	knowledge/ traditional land use		water losses in the Pinewood River be reviewed in light of new data that has been released by Big Grassy River First Nation on the TK and TLU.	information, however does not plan to change the effects assessment because it believes that anticipated changes to quality, quantity and rate of flow would not alter traditional land use.	satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Big Grassy River First Nation	Traditional knowledge/ traditional land use	5(1)(c)	Request that a review of the TK and TLU data to determine if more conservative protection levels for the Pinewood River are warranted.	• The proponent does not believe that further protection is required based on the results of the TK/TLU studies in relation to use and rights. **The proponent expects that implementation of the water management plan and an AMP will protect aquatic life in the Pinewood River**.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Big Grassy River First Nation	Traditional knowledge/ traditional land use	5(1)(c)	Concerns that closure objectives do not relate to restoration of land use that has been identified by the BGRFN TK/TLU study. Traditional use and rights should be practiced throughout the	• As most of the project site is private land where access to practice traditional use is limited, and some mine hazards would remain at the site post-closure, the proponent did not commit to providing completely open access to the site post closure for traditional use. • However, **the proponent committed to providing access to other nearby private lands for hunting and plant harvesting and continuing to involve Aboriginal groups in the development of adaptive**	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
			region.	**management techniques related to the mine closure plan, including the rehabilitation of habitat for wildlife. The proponent also committed to restoring access to the project site following mine closure to the extent that such access is safe and possible.**	
Big Grassy River First Nation	Aboriginal peoples – health and socio-economic conditions	5(1)(c)	Big Grassy River First Nation was concerned that the socio-economic assessment was poorly conducted, failing to take into account the values, priorities, strengths, and vulnerabilities of Aboriginal peoples. They expressed their desire to realize community-specific socio-economic benefits from the Project including, but not limited to employment opportunities and improved	• The proponent committed to implementing a program to hire Aboriginal employees, including by developing and distributing a table of employment opportunities to all area Aboriginal communities; and monitoring the hiring and performance success of Aboriginal employees. The proponent also committed to addressing community impacts, including the completion of an agreement that will outline benefits to the community as a result of project development. Furthermore, the proponent committed to developing and implementing programs to ensure employee well-being by providing training for mine employees on cultural awareness; training for mine employees on dangers of drug use; and training for mine employees to encourage drug testing.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
			community social services and infrastructure.		
Multiple groups	Accidents and malfunctions	5(1)(a)	Concern about the potential for accidents and malfunctions.	• The potential for spills and the proponent's safeguards and contingency plans are listed in chapters 9 and 13 of the EIS, and **the proponent has committed to developing an emergency management plan that includes a number of aspects relating to accidents and malfunctions.** • The proponent is also willing to provide assistance and opportunities to Aboriginal groups for ongoing consultation on environmental approvals, the mine closure plan, the emergency management plan, the follow-up monitoring plan, timely notification and consultation on spills and accidents if any, and on the details of any investigation and response to these events.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Big Grassy River First Nation	Cumulative effects	N/A	Concern that the cumulative effects assessment is inadequate, particularly where biophysical VCs are being impacted by multiple sources.	• The proponent responded that it is pursuing ongoing discussions of site-specific mitigation measures for key VCs, including but not limited to culture, water quality, and traditional land use. The proponent responded that it will work closely with Big Grassy River First Nation. • The proponent assessed several cumulative effect causing agents and their mitigation measures: habitat destruction and fragmentation; movement of animals further	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
				away from preferred harvesting areas; disturbance of important areas for harvesting medicines and other plants; potential changes to water quality in the proposed project site; and lack of access or disruption to important places and spiritual sites.	
Naotkamegwanning First Nation	Water quality	5(1)	Expressed interest in whether the method of mine construction will be similar to fracking and its potential impact to water quality.	• The proponent responded that there is no fracking (hydraulic fracturing) proposed for the Rainy River Project. Fracking is a specialized means of accessing gaseous materials (like natural gas) deep in the earth that is not relevant to the project.	The Agency is satisfied with the proponent's response and factored it in the Agency analyses and conclusions.
Rainy River and Naicatchewenin First Nations	Consultation process	N/A	Opposed the Project due to lack of meaningful engagement by the proponent and concerns not fully accommodated.	• The proponent believes that its engagement has been robust and adequate and that it has been respectful and generous in its negotiations with the Aboriginal groups. • The proponent released a draft EIS along with funding to both First Nations and Métis communities to undertake independent technical review of the draft EIS. The proponent provided Aboriginal groups with the capacity and an additional two months to review complex technical documents. • The proponent also signed on to a Participation Agreement in March 2012 with several First Nations including Rainy River and Naicatchewenin First Nations and has	The Agency notes that the proponent is committed to ongoing engagement and negotiations with the Rainy River and Naicatchewenin First Nations to address their concerns related to meaningful engagement by the proponent and accommodation.

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
				been requested to be involved in further negotiations in December 2013. • The proponent committed to ongoing consultation processes and negotiations with Rainy River and Naicatchewenin First Nations.	
Naotkamegwanning First Nation, Northwest Angle #37	Consultation process	N/A	Concern about potential impacts the project may have.	• N/A	The federal Minister of the Environment provided a response noting that the Agency communicated with the First Nation at key steps of the EA and sought comments from the First Nation on supporting documents. Participant funding has also been offered to the First Nation to support its participation. The Agency also followed-up with phone calls and considered their comments in the

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
					Agency analyses and conclusions.
Northwest Angle #37	Consultation process	N/A	States that Northwest Angle #37 has not been consulted by New Gold Inc. or the Crown.	• N/A	The Agency responded by providing copies of past correspondence with the First Nation and information on next steps of the EA process.
Anishinaabeg of Naongashiing First Nation, Onigaming First Nation	Consultation process	N/A	Concern about potential impacts the project may have. Also concerned with the short timeframe to provide comments on the proponent's EIS.	• N/A	The Agency responded with a request for more information on how the project may adversely impact the First Nation's potential or established Aboriginal or treaty rights. The Agency also followed-up with phone calls and indicated that it would consider comments received after the comment

Group	Subject	Link to Section 5 of CEAA 2012	Comment or Concern	Summary of Proponent's Response	Agency Response
					period on the EIS.
Big Island First Nation	Consultation process	N/A	After the comment period on the EIS, Big Island First Nation inquired about applying for Participant Funding.	• N/A	The Agency responded that there was an opportunity to apply for funding to support their participation in the review of the draft EA Report. However, the First Nation did not respond.

Appendix F: Summary of Key Public Comments

Subject	Comment/Concern	Summary of Proponent's Response
Water quality and quantity	Concerns about impacts to the water table in the area and effects on water resources (drinking water, contaminants, liability for these issues, ability to seek compensation).	Groundwater effects have been predicted through exploratory drilling and computer modelling. Water table drawdown is predicted to extend 3 km north of the open pit and will be restricted to the local watershed. Groundwater flow effects will be limited to lands held privately by the proponent. Degradation of groundwater is not expected. Water quality and quantity predictions will be confirmed through monitoring; any effects to a homeowner's water supply will be remedied by the proponent.
Wildlife	Concerns about the mine and tailings pond sites being fenced to ensure local wildlife cannot consume water from the site. Concerns regarding the consumption of wildlife that does drink water at the site.	Cyanide in process water will be destroyed to levels well below the toxicity threshold for wildlife. Long-term water quality in the TMA is predicted to meet Ontario drinking water standards. The TMA will be fenced off and is not expected to pose a threat to wildlife.
Groundwater	Concerns about seepage and leakage from discharge at the TMA into local groundwater, and monitoring of local wells.	Little seepage from the TMA is expected due to low permeability of underlying clay and bedrock. Degradation of groundwater is not expected. Water quality and quantity predictions will be confirmed through monitoring; any effects to a homeowner's water supply will be remedied by the proponent.
Air quality	Resident in close proximity to mine is concerned about health issues from contaminants and chemicals released during mining operations.	Potential air quality effects were predicted using computer modelling and were compared to AAQC limits. Contaminants that are expected to be released include particulate matter, NO_x, SO_2, metals, and HCN. Predicted concentrations are below AAQC limits at sensitive receptors in the vicinity of the Project; no significant adverse effects on local air quality are expected.
Noise	Concerns about noise from operations, traffic, blasting of explosives, and whether blasting and transportation of ore will occur	Blasting sound levels are expected to be below Ontario's blasting guideline noise limits. Blasting is not expected to occur at night and will follow a regular schedule. Truck movement for material

	at night. Comments were received regarding noise pollution and possible effects to the value and livability of lands surrounding this site.	transportation was modelled and is expected to meet Ontario's noise guideline limits. The Project is not expected to affect the value and livability of lands surrounding the site.
Soil	Concerns whether mine discharges will contaminate soil and which heavy metals will be released in the slurry from the tailings.	Soil contamination by discharge from mine operations is unlikely; material discharged to the TMA consists of ground rock of the same composition as that found throughout the area and will be contained within the TMA. Spraying clean water to manage dust will help protect soils from airborne deposition. Monitoring will identify any contaminated soil, which will be remediated according to provincial government requirements.
Health	Concerns about long-term health effects of living next door to the mine. A question was raised inquiring if EC had any information available from past mining projects.	Potential releases of contaminants and spills of controlled materials that could affect human health were considered in the EIS. No such long-term health effects are anticipated. Air quality modelling showed that AAQC limits for health-based parameters for the worst case meteorological condition will not be exceeded. Concentrations of contaminants after mixing in the Pinewood River are predicted to meet PWQO and CEQG limits for drinking water and are not expected to pose a direct health hazard. The proponent and EC are unaware of any such studies by EC.
Road access	Proposed road access and municipal services (such as road maintenance) have not been finalized and there are concerns about resident access through the project site and associated potential delays and risks. Additionally, existing hydro services may be altered. Finally, residents conducting business at their properties may incur additional costs as a result of interruptions.	The proponent will ensure safe access to properties during the construction and operation phases. Input into detailed plans will be welcomed as they are developed. Any infrastructure that requires relocation will be completed as quickly as possible to minimize disruption to local users. The only disruption of hydro services is anticipated to occur during the switchover from the existing line to the constructed line.
In favour	United Native Friendship Centre noted that although it is important that the environment be completely protected through all stages of the project, the	The proponent acknowledged the importance of environmental protection. The Project has been designed to minimize local and regional environmental impacts, including a compact project site and maximized water recycling. Habitat is being created to offset

	employment opportunities stemming from the project will be an important factor in the wellbeing of communities near the Project.	certain unavoidable impacts to fisheries and other species. In addition, the Project has been designed to minimize adverse impacts to factors that contribute to community wellbeing, while providing direct and indirect economic opportunities to the local and regional population.
In favour	Rainy River Future Development Corporation (RRFDC) noted that this project holds great promise for the economic future of Fort Frances and the Rainy River District and they fully support the company in their efforts to open the mine.	The proponent thanked the RRFDC for their support.

Appendix G: Summary of Water Bodies

Summary of various water bodies and their role in the water management plan for the Project. Summarized based on the Rainy River EIS (AMEC).

Water Body	Role of Water Body	Result
TMA pond	The TMA provides permanent storage for tailings from the onsite metal mill (after treatment for cyanide destruction and metals precipitation), along with water permanently stored within the tailings pore spaces. Natural degradation and precipitation processes within the TMA will result in a clear water TMA pond above the tailings surface.	Water within treatment system
Water management pond	Surplus water from the TMA pond will be transferred to the water management pond where it will be allowed to further age.	Water within treatment system
Water discharge pond	The water discharge pond will receive decanted water from the water management pond and runoff from the local catchment area.	Water within treatment system
Constructed wetland	A constructed wetland will be established downstream of the water discharge pond within the Cowser Drain (Loslo Creek) valley, upstream of the Pinewood River. It will be designed to improve water quality through the enhancement of natural water treatment processes. Point of discharge to Loslo Creek.	Water within treatment system
Discharge pipeline	All effluent from the water management pond that is not discharged through the constructed wetland will be discharged by pipeline to the Pinewood River downstream of McCallum Creek. The direct release of effluent by pipeline would occur during the spring and fall, to take advantage of extended aging in the TMA pond and water management pond, and the increased seasonal flows. Point of final discharge into Pinewood River downstream of McCallum Creek.	Water within treatment system

Water Body	Role of Water Body	Result
Mine rock pond	The mine rock pond will receive runoff from the east mine rock stockpile (encapsulated PAG mine rock), low grade ore stockpile and some runoff from the process plant. The open pit and underground mine water will be pumped to the mine rock pond. Water from this pond will be recycled for use within the site water management plan.	Water within treatment system
Sediment ponds #1 and #2	Ditches will also be excavated around the overburden and west mine rock stockpiles to direct runoff to sediment control ponds (sediment ponds #1 or #2) for collection and settling of solids. Runoff and seepage collected by these facilities would discharge directly to the environment via West Creek Diversion Channel (pond #1), and Loslo Creek (pond #2).	Water within treatment system
West Creek Diversion Channel	The West Creek Diversion Channel collects non-contact water and receives discharge from Sediment pond #1. It will be situated parallel to, but separate from, the constructed wetland to avoid mixing of fresh water and effluent.	Mix of treated water and freshwater
West Creek Pond	The West Creek Pond will be established in line with West Creek to supply potable water for domestic and sanitary uses. The West Creek Pond will contain natural, non-contact water, and therefore does not require further management or treatment prior to release.	Fresh water
Stockpile Pond	The Stockpile Pond will collect non-contact water and route it to the West Creek Pond.	Fresh water
Clark Creek Diversion Channel and Clark Creek Pond	The (proposed) Clark Creek Pond will be constructed at the head of the Clark Creek Diversion Channel to facilitate re-routing of the lower reach of Clark Creek to Pinewood River.	Fresh water
Loslo Creek	The remaining Loslo Creek channel will receive effluent discharge from the TMA via the constructed wetland outflow, a mix of treated and freshwater from the West Creek Diversion Channel, and discharge from Sediment Pond #2.	Mix of treated water and freshwater
Pinewood River upstream of Loslo Creek	Will receive freshwater inputs from the Clark Creek Diversion Channel and Clark Creek Pond.	Freshwater

Water Body	Role of Water Body	Result
Pinewood River downstream of Loslo Creek	Will receive treated effluent via the discharge pipeline downstream of McCallum Creek, and a mix of treated and freshwater from Loslo Creek.	Mix of treated water and freshwater
Minor Creek Systems	Portions of the Minor Creek Systems not mentioned here will be altered or replaced by mine components, as per creek modifications described in Section 6.2.	N/A

Appendix H: Summary of Species at Risk

Summary of species listed under Schedule 1 of Species at Risk Act (SARA) and those designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), their preferred habitat, likelihood of occurrence, and potential effects (Rainy River EIS, AMEC)

Species	Species Designation	Preferred Habitat	Observed (Likelihood of Occurrence)	Potential Effects
Species at Risk listed as Endangered, Threatened or Special Concern under Schedule 1 of SARA				
Short-eared Owl (*Asio flammeus*)	Special Concern	• Nest in areas of tall grass in grasslands, agricultural lands, and wetlands. • Use similar habitat for foraging.	• One individual was observed in 2010. • Surveys between 2011 and 2013 did not provide additional observations.	• Will remove 690.8 ha of open country and wetland habitat. • Increased mortality rate from collisions. • No direct impact by project activities.
Snapping Turtle (*Chelydra serpentine)*	Special Concern	• Inhabit a wide variety of aquatic habitats (e.g. ponds, sloughs, shallow bays or river edges, and slow streams). • Tolerate disturbance and will inhabit man-made ponds, ditches and canals. • Nest in sand and gravel banks along waterways and within a variety of manmade features, including road embankments.	• Two were observed in the NLSA during baseline studies. • While a suitable nesting habitat was observed, no nests were noted. • Beaver ponds are widespread. • Natural sand and gravel substrates are not common.	• Will remove 291.8 ha of wetland habitat. • Increased predation of snapping turtles and their nests. • It is not expected that harmful levels of contaminants will affect snapping turtles.
Eastern Whip-poor-will *(Antrostomus vociferous)*	THR (Sched. 1)	• Prefer rock or sand barrens with scattered trees, savannahs, old burns in early succession,	• Suitable habitat in the form of rocky outcrops and open forests is widespread within the NLSA. • 51 were observed in the	• Will remove 1475.3 ha of woodland habitat and 10.9 ha of open rock barren habitat. • Sound may affect 454 ha of

Species	Species Designation	Preferred Habitat	Observed (Likelihood of Occurrence)	Potential Effects
		and open conifer plantations. • Pine (barrens and plantations), oak (barrens and savannahs), and aspen and birch (early to mid-succession) are common tree species associations.	NLSA from 2010-2012.	woodland and open rock barren habitat. • Increased mortality rates from collisions.
Canada Warbler (*Cardellina Canadensis)*	THR (Sched. 1)	• Will nest in the interior of wet mixed woodlands or swamps.	• Habitats are rare in the NLSA and likely inhibit this species from occurring in greater numbers. • At three different locations during 2009-2010 and 2012 surveys, with two of those along the proposed transmission line.	• Will remove 1475.3 ha of woodland habitat and specifically 18 ha along the proposed transmission line corridor. • Negatively impact interactions with the environment and decrease breeding success. • Less concerned about collisions.
Olive-sided Flycatcher *(Contopus cooperi)*	THR (Sched. 1)	• Prefer natural forest openings created by natural disturbance. • Snags of large trees remaining on disturbed landscapes provide elevated perches used for foraging and may provide habitat for insects.	• Widespread in Northern Ontario. The NLSA provides suitable breeding habitat. • At seven locations between 2009 and 2012. • Sightings were widespread across the area and in various habitats, including clear cut and riparian habitat bordering agricultural land.	• Will remove a total of 291.8 ha of wetland and 118.3 ha of coniferous forest. • Sound may decrease breeding success. • Increased mortality rates from collisions.

Species	Species Designation	Preferred Habitat	Observed (Likelihood of Occurrence)	Potential Effects
Golden-winged Warbler *(Vermivora chrysoptera)*	THR (Sched. 1)	• Breed in successional/shrub, or old field habitats surrounded by forests. • Associated with deciduous of mixed forests occurring over upland landscapes.	• Known to occur near Rainy River. The NLSA contains ample suitable breeding habitat. • Total of 23 birds between 2011 and 2012 in woodland habitat.	• Will remove a total of 123.3 ha of shrub land and 419 ha of suitable woodland habitat. • Fifteen to seventeen pairs will likely be displaced as a result of vegetation removal. • Decrease breeding success. • Increased mortality rates from collisions.
Red-headed Woodpecker *(Melanerpes erythrocephalus)*	THR (Sched. 1)	• Associated with the Carolinian forest where they inhabit open woodlands, oak savannah, riparian forest, and hedgerows. • Drawn to American Beech trees on which they forage for beach nuts and insects.	• Estimated 30 to 50 pairs occur in 10 Ontario Breeding Bird Atlas (OBBA) survey squares in the Rainy River Clay Plain. • Oak savannah is not present. • Open woodlands and riparian forest may provide suitable habitat. • One bird was observed in 2011.	• Will remove a total of 1475.3 ha of woodland habitat. • Sound may decrease breeding success. • Increased mortality rates from collisions.
Common Nighthawk (*Chordeiles minor*)	THR (Sched. 1)	• Utilize a wide variety of natural open country habitats including sand dunes, cutovers, burns, rocky outcrops, bogs, short-grass prairies, open forests, marshes, lakeshores, rock barrens, and forest	• In proximity to the proposed mine footprint and along the proposed transmission line corridor. • Cumulative studies between 2010 and 2011 indicated that they were most readily observed where cleared forest and rocky outcrops were present, particularly in	• Will remove a total of 1475.3 ha of woodland habitat in the NLSA, with 10.9 ha of treed and open rock barren and 123.3 ha of shrub habitat. • Sound disturbance along the transmission line will affect auditory cues. • May experience a greater

Species	Species Designation	Preferred Habitat	Observed (Likelihood of Occurrence)	Potential Effects
		clearings. • Adapted to anthropogenically modified habitats including mine tailings, quarries, urban parks, airports, gravel roads, and flat-topped buildings. • Prefer natural habitats.	proximity to the proposed transmission line. • Cleared forest in this area provides both nesting habitat and open foraging habitat.	increase in mortality rates from collisions.
Grey Fox (*Urocyon cinereoargenteus)*	THR (Sched. 1)	• Prefer deciduous forests, especially swampy areas. • Appear along the border with the United States.	• The NLSA provides suitable habitat. Three commercial traplines partially intersect the NLSA. Published fur harvesting records show that Grey Fox had been captured in the general area.	• No adverse environmental effects.
Species Designated as Endangered, Threatened or Special Concern by COSEWIC				
Eastern Wood-pewee *(Contopus virens)*	Special Concern (no schedule or status)	• Breed in deciduous and mixed forests. • Prefer forest edge habitats.	• Occurs near Rainy River District. • The NLSA contains ample suitable breeding habitat associated with natural open areas (rock outcrops and wetlands), and interspersed agricultural lands. • A total of 14 were recorded at 14 point count locations.	• Will remove 1140 ha of suitable deciduous forest habitat. • Will displace at least five pairs of Eastern Wood-pewee. • Increased mortality rate from collisions.
Barn Swallow (*Hirundo rustica)*	THR (Sched. Status pending)	• Nest largely in and on artificial structures including barns and other outbuildings,	• The NLSA contains a small rural settlement which may provide artificial structures with suitable breeding	• Removal of 399 ha of open country and 291.8 ha of wetland habitat may reduce potential foraging

Species	Species Designation	Preferred Habitat	Observed (Likelihood of Occurrence)	Potential Effects
		garages, houses, bridges, and road culverts. • Prefer various types of open habitat for foraging including grassy fields, pastures, various kinds of agricultural crops, lake and river shorelines, cleared right-of ways, cottage areas and farmyards, islands, wetlands, and subarctic tundra.	habitat. • The presence of agricultural lands, suitable for foraging habitat, is extensive within the NLSA, consisting primarily of hay fields and pasture lands (row cropping is rare in the area). • A total of 29 were observed.	grounds. • Two barns and farm buildings on six rural properties used for nesting will be removed. • Road mortality from vehicle collisions. • Human presence may cause stress on adults or startle fledglings.
Bobolink (*Dolichonyx oryzivorus)*	THR (Sched. Status pending)	• Nest primarily in forage crops (e.g., hayfields and pastures) and old field habitat. • Can adapt to low-moderate livestock grazing, but not intensive grazing. • Preferred habitat characteristics are often found in old (≥8 years) forage crops. • Nesting success is positively correlated to larger habitat size, although this species will utilize smaller	• The presence of agricultural lands is extensive within the NLSA, consisting primarily of hay fields and pasture lands (row cropping is rare in the area). Scattered populations of Bobolink are known to exist in the Rainy River District. • Frequently observed in hayfields and in 41.2 percent of the breeding bird point counts in 2011.	• Loss of 399 ha of open country habitat, 134 ha of which were assessed as high quality Bobolink habitat. • Fifteen to twenty pairs of Bobolink will likely be displaced. • Increased mortality rates from collisions with vehicles. • Effects of noise include masking important communication signals and causing physiological changes.

Species	Species Designation	Preferred Habitat	Observed (Likelihood of Occurrence)	Potential Effects
		areas of 10 to 30 ha.		
Lake Sturgeon (*Acipenser fulvescens*)	Special Concern	• Spawning occurs in the spring in fast-flowing water at depths between 0.6 and 5 m over hard-pan clay, sand, gravel and boulders.	• Was recorded at the confluence of the Pinewood River and the Rainy River.	• Effects are not predicted to reach the confluence of the Pinewood River and the Rainy River. • No adverse environmental effects.
Little Brown Myotis *(Myotis lucifugus)*	END	• Requires cavity trees of large diameter to use as maternity roots and foraging habitat such as wetlands and open woodlands. • Bat hibernacula generally consist of caves, abandoned mine shafts, and underground foundations.	• The study area provides an abundance of forest edge interface as well as low-lying swamplands which provide ample foraging habitat. Woodlands consisting of large diameter Trembling Aspen likely provide suitable cavities for maternal roosts. • Was recorded at all five bat detector locations a total of 137 times.	• Vehicular collisions may pose a mortality threat. • Will remove six percent of hardwood that is a high quality habitat for cavity-nesting bats.
Northern Myotis *(Myotis septentrionalis)*	END	• Requires cavity trees of large diameter to use as maternity roots and foraging habitat such as wetlands and open woodlands. • Bat hibernacula generally consist of caves, abandoned mine shafts, and underground foundations.	• The study area provides an abundance of forest edge interface as well as low-lying swamplands which provide ample foraging habitat. Woodlands consisting of large diameter Trembling Aspen likely provide suitable cavities for maternal roosts. • Passes were identified twice at one detector location.	• Vehicular collisions may pose a mortality threat. • Will remove six percent of hardwood that is a high quality habitat for cavity-nesting bats.

Notes: THR – Threatened; END- Endangered

Appendix I: Excerpts from Proponent's List of Monitoring Commitments

Factor/Effect	Report Elements	Proponent Commitment Reference No.*

Section (5)(1)(a)(i) Fish and Fish Habitat
 	
Loss of fish habitat for Aboriginal, recreational and commercial fisheries in the Minor Creek Systems and Pinewood River.
 	
Potential contamination of fish tissue
 	
Potential effects to fish and fish habitat caused by increases or decreases in flows
 	
Potential decrease in water quality from contaminants in effluent, seepage and site runoff
	The follow-up monitoring plan will include:
	
	(A) Provisions to detect and report impacts to fish and fish habitat:
	• Assessing the character and quality of aquatic resources during construction, operation, and decommissioning at the West Creek Diversion Channel, Pinewood River, and upstream and downstream of the project site in accordance with the *Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring* (EC 2012);
	• Monitoring the contaminants of potential concern by collecting and analyzing fish dorsal muscle and liver tissue samples from fish in the Pinewood River, including Northern Pike and Walleye, and by working with fishermen, to reflect any applied methods of food preparation and increased fishing in Pinewood River; and
	• Conducting fish habitat and fisheries assessments starting one year after the date of commercial production of the mine and at three year intervals thereafter, including:
	  ○ sediment and benthos investigations of West Creek Diversion Channel, Clark Creek Diversion Channel (upstream of the east mine rock stockpile), Clark Creek Pond, Teeple Road Pond, Stockpile Diversion Channel, Stockpile Pond, and Pinewood River; and
	  ○ fish life cycle stability in Minor Creek Systems and stability of diversion channels and ponds for habitat and structural function until completion of construction.
	
	(B) Provisions to monitor water flows and levels, including:
	• Monitoring surface water flows, including in Pinewood River, during construction, operation and decommissioning, with monitoring expected to continue for a decade (or more) at reduced frequencies pending ongoing analysis of data;
	• Monitoring, on a continuous basis, West Creek Pond and West Creek Diversion Channel flows using water
		24, 28, 32, 43, 47, 51, 52, 63, 64, 67, 69, 76, 77, 80, 81

	level transducers and on a monthly basis, by taking manual measurements, during the winter period, when transducer results experience interference caused by ice pressure;
	• Monitoring flow rates upon completion of construction on the West Creek pond and the West Creek Diversion Channel at:
	  o West Creek at the West Creek pond outflow;
	  o West Creek Diversion Channel; and
	  o Pinewood River at Highway 617;
	• Determining the effects of effluent discharges and runoff on the flow rates of West Creek Diversion Channel and the Pinewood River;
	• Collecting and analyzing samples to measure rates of flow from site discharges, runoff, and seepage collection facilities, at the start of their respective operations, including:
	  o TMA discharges to the Pinewood River;
	  o Sedimentation Pond #1 and #2 discharges to West Creek;
	  o Aggregate operation(s) discharges;
	  o Rock stockpiles;
	  o Sewage effluent discharge; and
	  o Runoff and seepage collected from site operations areas in accordance with MMER and ECA requirements;
	• Sampling sediments to evaluate soil quality parameters prior to undertaking any further closure activities for any contact water ponds and drainage works (including stockpile sediment ponds) where breaching is proposed; and
	• Developing annual statistical flow estimates for local watercourses based on flow data derived through monitoring for each waterway, including monthly averages; annual averages; and extreme low and high flow statistics corresponding to 2, 5, 10, and 20 year return period conditions.
	
	(C) Provisions to monitor water quality downstream and at the project site, including:
	• Using SO_2/Air treatment of tailings slurry for cyanide destruction and associated heavy metals precipitation before discharge to the TMA;
	• Installing and maintaining monitoring stations, specifically the three stations on West Creek, the five stations on Pinewood River and the two current baseline monitoring stations on the Rainy River for monthly monitoring;
	• Determining the effects of effluent discharges and	

	runoff on the water quality and biota of West Creek and the Pinewood River; • Monitoring runoff and seepage related to tailings and stockpiles and the ability of water treatment and water management facilities to produce effluents and runoff that meet PWQO, CEQG, and other regulatory requirements, including MOECC site-specific criteria and MMER; • Carrying out field trials to confirm modelling results during all or a portion of the mine construction and operation phases; • Analyzing select quarterly water samples from sampling stations for total mercury and methyl mercury; • Monitoring the water quality upstream and downstream of the same discharge locations identified above for water flow monitoring, monthly; • Monitoring water pipelines twice per 12 hours to prevent large volumes of water and resulting sediment plumes impacting fish and fish habitat; • Monitoring and evaluating the integrity of the TMA cover system (e.g. low permeability overburden zone) and the continuous saturation of the tailings; • Undertaking further studies to optimize final pit overflow water quality; and • Conducting confirmatory sampling and analyses prior to any direct discharge from the pit lake into Pinewood River during decommissioning and abandonment, so that appropriate treatment (if necessary) can be implemented. (D) Provisions to monitor groundwater quality and quantity and the integrity of containment structures: • Establishing a groundwater well (piezometer) network around the open pit area to monitor groundwater levels throughout the area on a continuous basis using water level transducers, with transducer downloads to be completed twice per year, commencing at least six months prior to the start of pumping; • Monitoring groundwater quality and quantity during construction, operations and decommissioning phases, with abandonment monitoring expected to continue for a decade (or more); • Measuring water levels, continuously, in the monitoring wells with data downloaded semi-annually; • Installing groundwater monitoring wells around the TMA and east mine rock stockpile and pond areas,	

	with any amendments or expansion of the network approved through the MOECC approvals process; • Implementing a water management plan that will include regular sampling and dipping of dedicated monitoring wells to identify any impacts to any wells in the vicinity of the zone of influence from the open pit and TMA and rectify any impacts to water availability for well owners; and • Monitoring kinetic cells to demonstrate and continuously evaluate the robustness of the geochemical results. (E) Provisions to comply with monitoring and reporting obligations to the relevant government agencies and Aboriginal communities: • Sharing with and engaging Aboriginal communities on the development of the water management plan prior to construction and the development and implementation of monitoring plans; • Providing assistance and opportunities for ongoing consultation to Aboriginal communities on environmental approvals, the mine closure plan, the contingency and response plan, and the follow-up monitoring plan; • Providing timely notification to Aboriginal communities on spills and accidents if any, and on the details of any investigation and response to these events; • Requesting local well owners to participate in well water quality monitoring as part of the water management plan; and • Notifying potential consumers of fish and the applicable provincial departments (MOECC and MNRF), if contaminant concentrations in fish increase over time, provide information related to increased health risks (if any) and facilitate provincial issuance of fish consumption advisories. (F) Provisions to establish adaptive management techniques: • Developing an AMP as a condition of the *Fisheries Act* authorization that will define monitoring criteria and ecological targets to ensure that the Pinewood River continues to provide for all life functions for all resident fish species during operation and decommissioning, and will include contingency mitigation or offset provisions in the event that unanticipated effects beyond the ecological targets are detected;	

	• Monitoring water levels and flow discharges to address any unforeseen flow reductions through adaptive management techniques. Water flow management can be optimized during mine operations should the need to accommodate unexpected concerns arise; • Assessing whether additional mitigation measures may be required as part of an AMP; and • Taking any corrective action necessary to ensure compliance with all applicable laws, regulations and instruments.	
S(5)(1)(a)(ii) Migratory Birds *Disturbance to migratory birds* *Loss of migratory bird habitat*	The follow-up monitoring plan will include: • Monitoring SAR during the construction, operation and decommissioning phases, with post closure habitat development and utilization by wildlife to continue at reduced frequencies consistent with SAR Permit requirements; • Implementing a wildlife follow-up monitoring plan for Eastern Whip-poor-will, Bobolink, Common Nighthawk, and Barn Swallow populations and for nesting in proximity to the proposed mine and transmission line sites, within compensatory habitat areas; • Conducting post-construction monitoring surveys in the first year following completion of construction and at three year intervals thereafter until decommissioning is complete; • Conducting targeted point-count surveys for woodland area-sensitive breeding birds and diurnal SAR, including Golden-winged Warbler, Barn Swallow, Bobolink, using survey protocols described in the *Ontario Breeding Bird Atlas Guide for Participants* (OBBA 2001); • Conducting targeted twilight surveys for Eastern Whip-poor-will in suitable habitat using survey protocols as outlined in the *Whip-poor-will Roadside Survey Participant's Guide* (BSC 2012); • Collecting observation data regarding the Common Nighthawk during targeted Eastern Whip-poor-will surveys; • Collecting incidental data collection for SAR, including Canada Warbler, and Olive-sided Flycatcher; • Maintaining a wildlife log of breeding bird observations at the project site focusing on SAR species (including vehicle collisions); and • Sharing with and engaging Aboriginal communities on the development and implementation of the monitoring plans.	82, 85, 99, 105, 109, 110, 111, 112

S(5)(1)(c)(iii) Current use of lands and resources for traditional purposes by Aboriginal peoples *Potential changes to fishing, hunting, and plant harvesting practices*	The follow-up monitoring plan will include: • Updating TK/TLU studies conducted for the Project beginning five years after the commencement of operations, to determine if there have been any changes to resource harvesting patterns by local Aboriginal peoples as a result of the Project, and the reasons for any such changes; • Determining any changes in the availability of fisheries and wildlife resources for local harvesters, based on data derived from biological follow-up monitoring plans; • Monitoring terrestrial landscapes after decommissioning, including restoration of habitat and use by wildlife; and • Sharing with and engaging Aboriginal communities on the development and implementation of monitoring plans. *Implementation of the follow-up monitoring plan is subject to any terms of agreement with the local First Nations and Métis. The reporting of any results relating to traditional pursuits would be subject to confidentiality and other considerations expressed by the Aboriginal peoples involved, and if deemed appropriate, would be reported in summary form as part of the follow-up monitoring plan annual report.*	117, 121
S(5)(1)(c)(i) Health and socio-economic conditions of Aboriginal peoples *Potential decreases in air quality* *Potential changes to Aboriginal health from contamination of country foods and potential changes to commercial fishing practices*	The follow-up monitoring plan for potential contamination of country foods will include (during construction, operation, and decommissioning): • Monitoring metal concentrations in country foods including wild rice, berries and other wild plants, fish muscle and liver tissue, White-tailed Deer liver tissue, and other wildlife tissues. Providing any new information regarding the Project's effects that could impact health, to Aboriginal people; and • Sharing with and engaging Aboriginal communities on the development and implementation of monitoring plans. The follow-up monitoring plan for air quality will include (during construction, operation, and decommissioning): • Monitoring air quality for dust and metals (TSP, PM_{10}, $PM_{2.5}$, NO_x; full metal scan for Hg, Ar, Cd, and Pb; and passive monitoring for NO_2 and SO_2); • Collecting and analyzing late-winter snow pack samples for pH and metals to help determine the effects of dust fall accumulated within the snow pack during spring melt; • Annual monitoring of dust deposition on vegetation	4, 8, 164, 168

	adjacent to mine roads; • Assessing whether additional mitigation measures may be required as part of an AMP for the fugitive dust best management practices plan, to accommodate results of site inspections and monitoring; and • Sharing with and engaging Aboriginal communities on the development and implementation of monitoring plans.	
S(5)(1)(c)(ii) and S(5)(1)(c)(iv) Physical or cultural heritage and effects on historical, archaeological, paleontological or architectural sites or structures of Aboriginal peoples *Potential changes to cultural heritage resources*	The follow-up monitoring plan will include: A) Provisions to monitor cultural heritage and archaeological findings: • Conducting a post-construction assessment of the state of known cultural heritage sites and structures in the vicinity of project activities to confirm the integrity of such resources; • Maintaining a record of all known cultural heritage resources in the vicinity of planned developments, such that intrusion on or damage to such resources can be avoided during construction, recognizing and respecting confidentiality limitations; and • Monitoring for archaeological findings during the construction phase, including employing a trained archaeologist during the construction of major project works to reduce impacts to undocumented cultural heritage sites, and to supervise transmission line construction at identified areas of high archaeological potential. B) Provisions to comply with monitoring and reporting obligations to Aboriginal communities: • Holding regular and ongoing discussions with Aboriginal people to help monitor any effects to the socio-cultural environment; • Maintaining an active dialogue with Aboriginal peoples with cultural heritage knowledge to encourage sharing of knowledge regarding undocumented cultural heritage sites; and • Enlisting the services of elders or other cultural advisors in the event that cultural heritage resources are encountered. *Any notable cultural heritage finds will be reported according to regulatory requirements at the time, with reporting as required when and if further information becomes available.*	174, 176

S(5)(2) Recreation and Commercial Use *Potential changes to the enjoyment of the Richardson Trail*	• No follow-up monitoring was identified.	
S(5)(2) Furbearers, and Amphibians and Reptiles, including Snapping Turtle *Loss of habitat and increased disturbance to amphibians, reptiles and furbearers*	The follow-up monitoring plan will include: • Maintaining a log of furbearer, amphibian and reptile observations (including vehicle collisions) during construction, operation, and decommissioning; • Reporting on timing of vegetation clearing during construction and vegetation restoration progress during decommissioning in relation to furbearers, amphibians and reptiles; • Detailed wildlife monitoring strategies developed through consultation with the MNRF and EC. Additional control sites around the periphery of the mine footprint may be developed and monitored following mine construction, and periodically throughout mine operations; and • Sharing with and engaging Aboriginal communities on the development and implementation of monitoring plans.	91, 92
Section 79(2) of the Species at Risk Act Federal Species at Risk *Loss of habitat and increased disturbance to federal species at risk*	Follow-up monitoring for Snapping Turtles is described with reptiles in *s(5)(2)* above. Follow-up monitoring for Eastern Whip-poor-will, Canada Warbler, Olive-sided Flycatcher, Golden-winged Warbler, and Red-headed Woodpecker is described with other migratory birds, in *s(5)(1)(a)(ii),* above. The follow-up monitoring plan for Short-eared Owl will include: • Collecting incidental data collection.	

*The numbers in this column correspond to the commitments made by the proponent in their document entitled, "New Gold Rainy River Project – Commitments Registry" dated July 2014.