

Ministry of Mines  
Category C Environmental Assessment  
Project Documentation  
Long Lake Gold Mine Rehabilitation Project

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Mine Rehabilitation Section  
Mines and Minerals Division

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## 1 Introduction

### 1.1 Project Background

The abandoned Long Lake Gold Mine (AMIS # 05292) is located at the south end of Long Lake, in Eden Township, Sudbury District, approximately 6 km south of the City of Greater Sudbury limits. The mine site borders the community of Atikameksheng Anishnawbek First Nations (AAFN) to the west and was historically accessed by a mine road that transected reserve land. Access to the mine is currently provided via a series of public roads and trails along the southeast side of Long Lake. The mine location, historical mine access road and existing access is illustrated below on Figure 1.

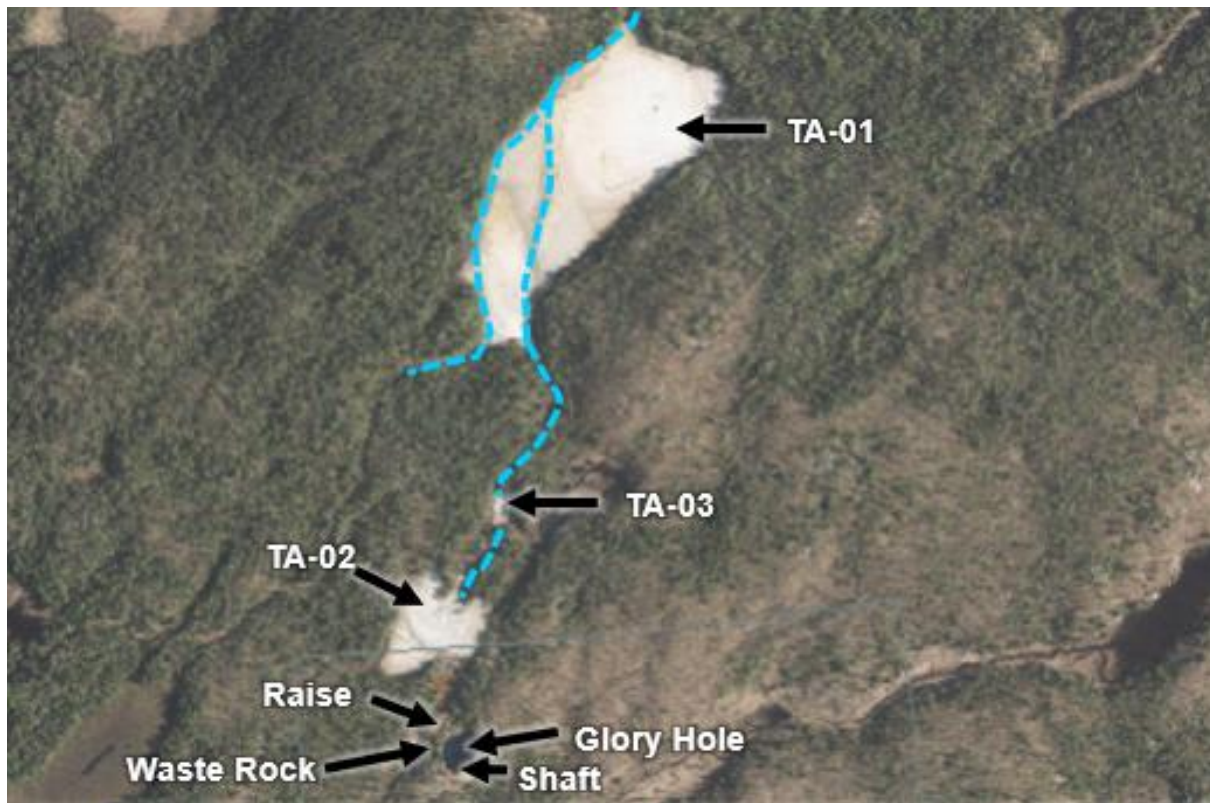


**Figure 1** – Long Lake Gold Mine location, historical mine access road (red dotted line) and existing access road (blue dotted line). Image Source: NHIC Map, MNR 2023.



The Long Lake Gold Mine operated intermittently from 1908 to 1939. The ore body consisted of gold-bearing arsenopyrite and pyrite that was mined through underground mining methods. During its years of operation, approximately 196,000 tonnes of ore was milled that produced approximately 1.7 million grams of gold (52,000 ounces). A mill was historically present that discharged tailings to low-lying areas where they would be naturally contained by the surrounding topography. The mine features three uncontained tailings' areas (referred to as TA-01, TA-02 and TA-03) estimated to contain approximately 163,000 m<sup>3</sup> of tailings. The tailings areas are interconnected by a surface water drainage channel. Other historical mine features include: a two-compartment shaft, a water-filled pit (glory hole), concrete foundations, and a small volume of waste rock located on the north side of the glory hole.

A site characterization study completed by CH2M Hill in 2013 has found that the tailings contain sulphide minerals including arsenopyrite and pyrite. Arsenopyrite and pyrite are sources of acidity and arsenic. Surface runoff and seepage from the tailings are characterized as potentially acid generating (PAG) and contain elevated metal concentrations, especially with respect to arsenic (CH2M Hill 2013). Surface runoff from the tailings' discharges directly into Luke Creek, which flows into the south bay of Long Lake and then to Round Lake located on AAFN reserve lands. Over time, the tailings have eroded into the receiving environment resulting in the deposition of tailings into Luke Creek and the south bay of Long Lake. A tailings "delta" has formed in Long Lake at the outlet of Luke Creek. A site plan illustrating the mine features and tailings delta is provided below on Figure 2.



**Figure 2** - Site plan illustrating the mine features and surface water drainage channel. Image Source; NHIC Map 2022.

Long Lake is a densely populated lake with approximately 1,000 permanent and seasonal residents. The waterbody is the source of drinking water for most residents on the lake. In 2012, surface water samples collected from the south bay of Long Lake found that arsenic concentration exceeded the then applicable Ontario Drinking Water Standard (ODWS) of 25 micrograms per litre ( $\mu\text{g/L}$ ) and Health Canada's guideline of 10  $\mu\text{g/L}$ . It is noted that in 2017 Ontario changed the drinking water standard to align with the lower federal limit. In response to the elevated arsenic, the Sudbury and District Health Unit issued a drinking water advisory to property owners located in the affected area of the lake. The Ministry of Mines has been providing bottled water to affected residence since the advisory was issued in November 2012.

Although arsenic is the primary contaminant of concern (PCOC) associated with the historical mining activities, the acidic drainage from the tailings also has the potential to generate leachate with elevated concentrations of aluminum, cobalt, copper, iron, lead, manganese, and nickel (CH2M Hill 2013). Most of the arsenic in the eroded tailings within Long Lake are present in the sulphide phase and is stable in this form as long as the tailings remain submerged underwater. It is recognized that a small portion of the arsenic is associated with the ferric hydroxide phase, which can remobilize in water under anoxic (low oxygen) conditions; however, this is not a concern as Long Lake does

not provide a reducing environment (CH2M Hill 2013). Tailings in the delta that may be seasonally exposed pose the greatest risk as exposure of the sulphide minerals to atmospheric weathering conditions will dissolve and mobilize previously held arsenic and contribute to the arsenic loading into Long Lake.

Three major sources of arsenic loadings to Long Lake have been identified as part of historical investigations including:

1. The leaching of tailings from the three tailings' areas (TA-01, TA-02 and TA-03). Acidic drainage with elevated arsenic is conveyed in the mine drainage channels and downstream Luke Creek where it is discharged to Long Lake,
2. The leaching of fugitive tailings in Luke Creek and adjacent riparian area. Acidic drainage with elevated arsenic is conveyed in the mine drainage channels and Luke Creek, where it is discharged to Long Lake, and
3. Leaching of fugitive tailings at the exposed Long Lake delta, at the mouth of Luke Creek. At this source location acidic drainage with elevated concentration of arsenic flows directly into Long Lake.

Contamination associated with the tailings has also been observed in a wetland habitat situated on either side of Luke Creek on AAFN land; however, recent studies suggest that the wetland is not a significant source of arsenic loading into the lake (GHD 2022a). The waste rock pile located on the northwest side of the glory hole has been identified as a source of acidity to the surrounding environment. No other mine hazards have been identified as a significant source of contamination.

The leaching of tailings and transport via surface water runoff has been identified as the major pathway for arsenic migration to Long Lake. Although elevated arsenic has been observed in the groundwater underlying the mine, groundwater is not considered to be a significant migration pathway for the transport of arsenic to Long Lake (CH2M Hill 2013). The acidic drainage that has percolated into the groundwater and tailings porewater over the years is assumed to seep to the mine drainage channel and/or Luke Creek, where contaminants are then transported via surface water.

## 1.2 Project Rationale

The Long Lake Gold Mine is one of thousands of mines included under Ontario's Abandoned Mines Rehabilitation Program and is also a contaminated site under the Provincial Contaminated Sites Program. The province utilizes a risk prioritization model that prioritizes provincially owned contaminated sites for remediation and ensures sites that pose the biggest threat to the environment are remediated before low-priority sites. The Long Lake Gold Mine is a priority due to the ongoing risk to drinking water quality and ranks in the top ten by the province for sites requiring remediation.

The overall objective of the Long Lake Gold Mine rehabilitation project is to reduce arsenic concentrations in the south basin of Long Lake to below the drinking water standard of 10 µg/L. Although there are other metal contaminants leaching from the mine site, arsenic has been identified as the PCOC and poses the greatest risk to aquatic and human receptors. It is anticipated that by remediating the source of arsenic contamination, the concentrations of other contaminants potentially leaching from the mine will also be reduced. Once the sources of contamination are removed, downstream receivers are expected to recover, with steady improvement to water quality.

To achieve the overall project objective of reducing arsenic concentration within Long Lake, the following remediation objectives are proposed:

1. Reduce acidic drainage from leaching of tailings and waste rock that results in arsenic loading to Long Lake via the mine drainage channel and downstream Luke Creek. This will be achieved by minimizing the leaching of tailings by surface water and groundwater/porewater from the three tailings area and by removing the source of fugitive tailings and waste rock to prevent continued leaching to downstream surface water features.
2. Prevent and minimize the transport of tailings to Long Lake, specifically:
  - a. Minimize the transport of tailings in the three tailings areas to the downstream mine drainage, Luke Creek and Long Lake delta;
  - b. Prevent the transport of fugitive tailings and sediment to the Long Lake delta; and,
  - c. Reduce the transport of fugitive tailings and sediment from the delta into Long Lake.

Failing to complete this project will result in a continued impairment of water and soil quality. The ministry currently provides bottled water to impacted residents, and this cost would continue indefinitely if the situation were left unresolved as the drinking water advisory would remain in place. In addition, consumption advisory limits for affected fish species would likely remain in place.

### 1.3 Project Description

The preferred rehabilitation strategy for the Long Lake Gold Mine Rehabilitation Project was originally presented to the public in 2017 as part of the MINES Class Environmental Assessment (EA) process. The preferred rehabilitation approach includes the construction of an impoundment area within TA-01 and consolidating all tailings, waste rock and contaminated soils that contribute to the arsenic loading to Long Lake within the impoundment. The consolidated tailings and contaminated materials will be covered by an impermeable liner and a vegetative cover to prevent surface water infiltration,

oxidation, and transport. The proposed rehabilitation strategy will effectively remove the three major sources of arsenic loading to Long Lake. The cover system will also eliminate the pathway for transport of leaching tailings to human and ecological receptors by limiting the infiltration of water into the waste.

The construction of the impoundment and cover will require geomembranes, as well as a significant quantity of aggregates and topsoil. A summary of aggregate requirements is provided below in Section 1.3.5. In 2017, it was proposed that all aggregate be hauled from an off-site source using an existing network of public roads along the southside of Long Lake. This would require approximately 11,985 truck trips over three construction seasons. Several concerns were raised by the public regarding the volume of haul traffic on Long Lake Road, Tilton Lake Road, Wavy Trail, and Lakes End Road. In response to these concerns, the Ministry voluntarily withdrew the 2017 Notice of Completion (NOC) to review alternative access routes and aggregate sources.

The Long Lake Gold Mine Rehabilitation project has since evolved to include alternative aggregate sources closer to the project area that will reduce the quantity of aggregate to be hauled on public roads. Although alternatives to the access road have been explored, the network of roads on the southside of Long Lake remains the preferred option for site access. The results of the alternatives analysis and revised Class EA were presented to the public in October 2019 and the NOC posted in December 2019. Multiple Part II Order requests were received, all related to safety concerns associated with the access road and impacts to residences along the haul route. The Ministry of Mines has since completed additional investigations to ensure that concerns related to the road are adequately addressed and considered.

For the purpose of this Class EA, the Long Lake Gold Mine rehabilitation project has been divided into the following phases:

- **Phase 1:** Access road safety improvements.
- **Phase 2:** Construction of the impoundment area and water management.
- **Phase 3:** Extraction and consolidation of contaminated material.
- **Phase 4:** Installation of engineered cover.
- **Phase 5:** Post- rehabilitation maintenance and monitoring.

A detailed description of Phases 1 through 4 is provided in the following subsection. Post-rehabilitation maintenance and monitoring (Phase 5) is described further in Section 9 of this Class EA.

### 1.3.1 Phase 1 - Access Road Safety Improvements

Access to the Long Lake Gold Mine Rehabilitation Project will be provided by an existing network of public roads located along the southeast side of Long Lake. The network of roads includes the following:

- An approximately 1.4 km section of Long Lake Road between Sunvalley Avenue and Dew Drop Road. This segment of road is within the City of Greater Sudbury (City) and falls under the City’s jurisdiction.
- The entire 11.4 km length of Tilton Lake Road, from Dew Drop Road to Wavy Trail. The northerly 8.8 km of Tilton Lake Road is within the City limits and fall under the City’s jurisdiction. The southerly 2.6 km are outside of the City limits and are under the jurisdiction of a Local Roads Board.
- The 1.1 km length of Wavy Trail from Tilton Lake Road to Lakes End Road. This section of road falls under the jurisdiction of the Local Roads Board.
- The 3.1 km stretch of Lakes End Road, from Wavy Trail to Site Access Road. The easterly 1.9 km of Lakes End Road falls under the jurisdiction of the Ministry of Natural Resources (MNR). The westerly 1.2 km of this segment of Lakes End Road is within the boundary of the Eden Township Forest Conservation Reserve and falls under the jurisdiction of Ontario Parks (Ministry of the Environment, Conservation and Parks (MECP)). The road is maintained by the Lakes End Campers Association.
- The entire 3.6 km length of Site Access Road. The northerly 0.9 km of the road is located within the Eden Township Forest Conservation Reserve and falls under the jurisdiction of the MECP. The remainder of Site Access Road is on Crown land and under the MNR jurisdiction. It is a restricted access road, with a MINES-owned locked gate controlling vehicular access at Lakes End Road.

Road improvements will be needed to facilitate access by heavy equipment and increased vehicular traffic on public roads. The ministry retained DM Wills Associates Limited (DM Wills) to complete the detailed design of the road improvements and assist with the preparation of a construction tender for the work. The road design report and supporting memorandums are summarized in Section 4.9. The draft road improvement specification drawings are included in Appendix A. The proposed road improvements will require some tree/vegetation clearing; trimming back of rock cuts; relocation of six existing utility poles; replacement and/or installation of guide rails; and the replacement and/or installation of new signs. The upgrades aim to improve sight line distances and make the road safer for both local and construction traffic. A summary of the improvements proposed in each road segment are provided below in Table 1.

**Table 1 – Summary of Road Improvements**

Road Segment	Description of Improvements
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<p>Long Lake Road</p>	<ul style="list-style-type: none"> <li>• Replacement of one damaged substandard guide rail and replacement of existing road signs that are in poor condition.</li> </ul>
<p>Tilton Lake Road</p>	<ul style="list-style-type: none"> <li>• Vegetation clearing on the inside of 15 curves to meet the stopping sight distance corresponding to the design speed of the curves. Landowner consent is required where the proposed clearing occurs outside of the municipal road allowance and onto private property.</li> <li>• Trimming back of existing rock cuts on the inside of six curves to provide the minimum stopping sight distance corresponding to the design speed of the curve. On three of these curves, existing utility poles (one at each location) will need to be relocated. Landowner consent is required where the proposed clearing occurs outside of the municipal road allowance and onto private property.</li> <li>• Repair and adjustment of existing guide rail installation and installation of new guide rail. One existing utility pole will need to be relocated to accommodate this work.</li> <li>• Replacement of existing signs in poor condition and installation of new signs.</li> </ul>
<p>Wavy Trail</p>	<ul style="list-style-type: none"> <li>• Vegetation clearing on the inside of one curve to meet the stopping sight distance corresponding to the design speed of the curves.</li> <li>• The intersection of Wavy Trail and Lakes End Road will be relocated.</li> <li>• Relocation of existing signs and installation of new signs.</li> </ul>
<p>Lakes End Road</p>	<ul style="list-style-type: none"> <li>• The width, grades and curves of the existing road are such that use of the existing road surface in the final design was infeasible. As such, this section was designed as a full road reconstruction.</li> <li>• In general, the proposed alignment follows the existing road alignment. Horizontal and vertical realignments are proposed where needed to meet applicable standards.</li> <li>• The approach to Wavy Trail will be realigned to eliminate a R-26 m horizontal curve and 19% vertical grade.</li> <li>• An existing R-20 m hairpin curve and 14.5% vertical grade hill will be realigned to meet applicable standards.</li> <li>• An existing substandard vertical crest curve at the Site Access Road intersection will be improved.</li> <li>• Roadway will be widened from 5 m to 6.6 m to accommodate temporary increase in truck volume.</li> <li>• Installation of new steel beam guide rails and the relocation of two utility poles.</li> <li>• Realignment of an existing snowmobile trail to tie into Lakes End Road.</li> </ul>

<p>Site Access Road</p>	<ul style="list-style-type: none"> <li>• Designed as a full road reconstruction.</li> <li>• In general, the proposed alignment follows the existing road alignment. Horizontal and vertical realignments are proposed where needed to meet applicable standards.</li> <li>• Major vertical realignment required at the approach to Lakes End Road to provide a level grade that allows construction vehicles to stop and start with ease.</li> <li>• Roadway will be widened to 4 m within the Eden Township Conservation Reserve and from TA-03 to the Glory Hole.</li> <li>• Roadway will be widened to 8 m from the Crown Pit to TA-03 as this is where most of the construction traffic will be travelling during the rehabilitation activities. An 8 m width will provide enough width to accommodate two-way traffic.</li> <li>• Installation of a concrete box culvert at Luke Creek.</li> <li>• Realignment of road and existing snowmobile trail around the perimeter of TA-01.</li> </ul>
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The proposed road upgrades will require approximately 81,000 tonnes of aggregate, which will be sourced from a ministry-owned aggregate pit/quarry located on Wavy Trail Rd. Additional details related to aggregate sources and requirements is provided in Section 1.3.5.

**1.3.2 Phase 2- Construction of the Impoundment Area and Water Management**

The preferred rehabilitation approach is the construction of an impoundment area within TA-01 and consolidating all tailings and contaminated soils within the impoundment. The impoundment concept was first proposed by CH2M Hill in 2013 and was advanced to the detailed design stage in 2017 by SNC-Lavalin. The final design and construction-ready tender package has been prepared by GHD. The draft design drawings are included in Appendix A. The impoundment area consists of the following key features: a foundation, toe drains, perimeter berm, perimeter ditches, and water management/treatment systems. A description of the key features of the impoundment is provide below.

Before consolidating the tailings and contaminated material at TA-01 a foundation will be prepared by grading and compacting the existing surface. A drain system consisting of a perimeter “toe drain” will be installed to convey any water that may accumulate under the cover. The toe drain will consist of perforated-high density polyethylene pipe installed on or near the existing surface at TA-01, on the interior side of the perimeter berm. The drain would be surrounded by stone to provide a barrier between the impounded tailings and the air in the toe drain. A series of outlets will be placed that will allow water accumulation in the drainpipe to passively discharge to the perimeter surface water drainage ditches.



A perimeter berm will be constructed to contain the consolidated material and ditches to divert clean water around the impoundment (see Drawing CI-112 in Appendix A). The crest of the berm will have a width of 3 m to accommodate access by vehicles. The berm will be lined with the same liner system used for the impoundment, with both portions combined to form a continuous impervious barrier system. The ditches will be constructed around the perimeter of the stockpile/berm along the eastern and western sides (herein referred to as the east and west ditch). The ditches are intended to divert clean surface water runoff and further isolate the tailings impoundment from site runoff. Runoff conveyed in the ditches will be directed to the existing drainage channel which empties into Luke Creek. The perimeter ditches will be lined with geotextile armored with riprap stone and designed to accommodate a peak-flow capacity and a 1:1000-year flood event.

The construction of the impoundment will require aggregate material of various types and gradations. The material will be sourced from the Crown Pit, located approximately 1 km northeast of the project site. Additional details regarding aggregate requirements are provided below in Section 1.3.5.

Contaminated water and seepage encountered during the construction work will be managed through a temporary treatment system. The treatment system will operate in accordance with an environmental compliance approval (ECA) issued by the Ministry of Environment, Conservation and Parks, with all water discharged meeting or exceeding applicable guidelines and approval conditions.

**1.3.3 Phase 3 - Extraction and Consolidation of Contaminated Material**

All tailings and areas with contaminated soils have been delineated to determine the total estimated quantity of material for removal (GHD 2022a). It is estimated that approximately 110,500 m<sup>3</sup> of tailings and contaminated soil will be consolidated within the impoundment area (GHD 2022a), as well as approximately 4,500 m<sup>3</sup> of waste rock (GHD 2023c). The areas proposed for extraction of tailings and contaminated material are summarized in Table 2.

**Table 2 – Remediation Volumes Estimates**

Location	Description of area to be remediated	Estimated volume (m <sup>3</sup> )
Wetland	The rehabilitation work will include the wetland habitat on either side of Luke Creek where visible tailings and poor vegetation growth is observed. All areas of visible tailings/stunted vegetation will be removed and an additional 0.15 m into the underlying native silt/silty clay layer.	3,500
Luke creek and	Contaminated soil will be removed in the depositional	800

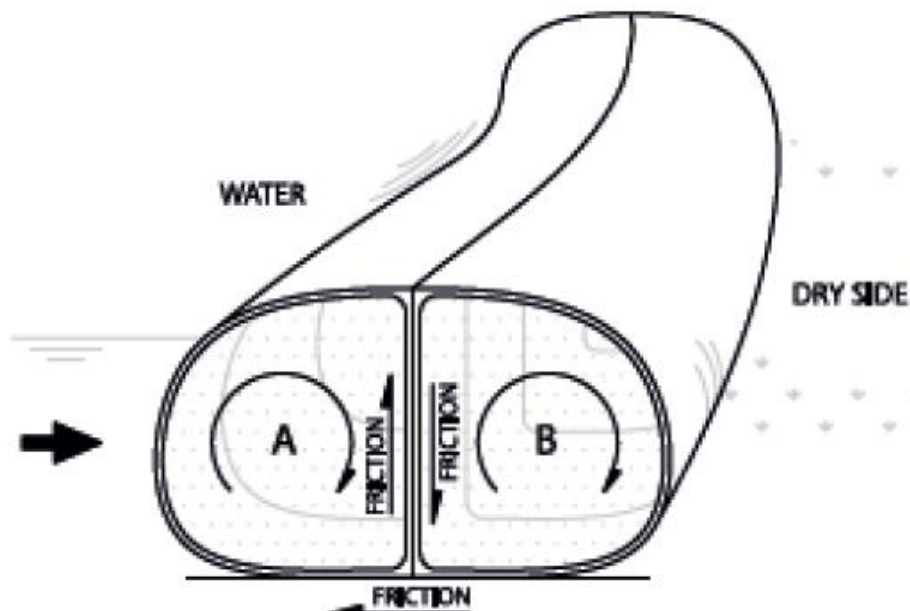
Location	Description of area to be remediated	Estimated volume (m <sup>3</sup> )
drainage channel to TA-01	area at the confluence of Luke Creek and the drainage channel. All visible tailings/stunted vegetation will be excavated and an additional 0.15 m into the underlying native silt/silty clay layer	
TA-02 and TA-03	All tailings in TA-02 and TA-03 and underlying peat material will be excavated. The excavation will be advanced an additional 0.15m into the native silt/silty clay layer.	10,000
Drainage channel from TA-01 to TA-03 and TA-02, including a historic rock drain	Tailings located within the top bank of the drainage channel, upstream to TA-01 to TA-03/TA-02, including a historic rock drain will be excavated. All surficial tailings will be removed and the underlying peat layer to a depth of 0.15 m into the native silt/silty clay material.	1,200
TA-01	All tailings and peat material outside of the designed TA-01 impoundment will be excavated and contained within the TA-01 impoundment. The excavation will be advanced 0.15m into the underlying silty/silty clay layer. The areas where removal occurs will be sloped to create the perimeter ditches, as described in Section 1.3.2 above.	50,000
Long Lake Delta	It is proposed to remove tailings to a depth of 2.0 m below the seasonal low-water level. This depth is proposed to limit oxygen transport to the tailings that would remobilize previously held arsenic. This proposed depth will also allow for natural redistribution of tailings surface due to wave action and the potential natural burial of tailings with silt soils transported from Luke Creek via erosion.	45,000
Waste Rock Pile	There is a waste rock pile located on the northwest side of the Glory Hole, as well as a road constructed of waste rock that extends from the southern side of the waste rock pile. All visible waste rock will be removed and added to the impoundment area.	4,500

The excavation activities within the tailings' areas will be completed using a tracked excavator. The material remove will be combined with a cementing agent prior to consolidating within the impoundment. Excavated areas will be re-contoured to provide positive drainage and prevent water from ponding within the excavation. Any water that may collect during the excavation activities will be treated and discharged, as described

above in Section 1.3.2. Waste rock material will be placed in the central portion of TA-01 prior to consolidating the tailings to limit capillary pressure within the impoundment. The disturbed areas will be revegetated with native plant species and allowed to return to pre-disturbance conditions. The tailings areas TA-02 and TA-03 will be restored to a wetland habitat following the excavation activities.

The excavation of fugitive tailings and contaminated soil from the drainage channel, Luke Creek and the wetland will be achieved by damming a section of the channel, pumping water above the dam, and then removing the contaminated material within the isolated area. Water upstream of the isolated area will be bypassed to below the work area to minimize changes to flow within Luke Creek. The rehabilitation will be initiated upstream and continue downstream towards Long Lake to ensure that the rehabilitated sections are not further contaminated from upstream work. The rehabilitated areas from within the channel and Luke Creek will be stabilized with stone and restored to pre-disturbance condition.

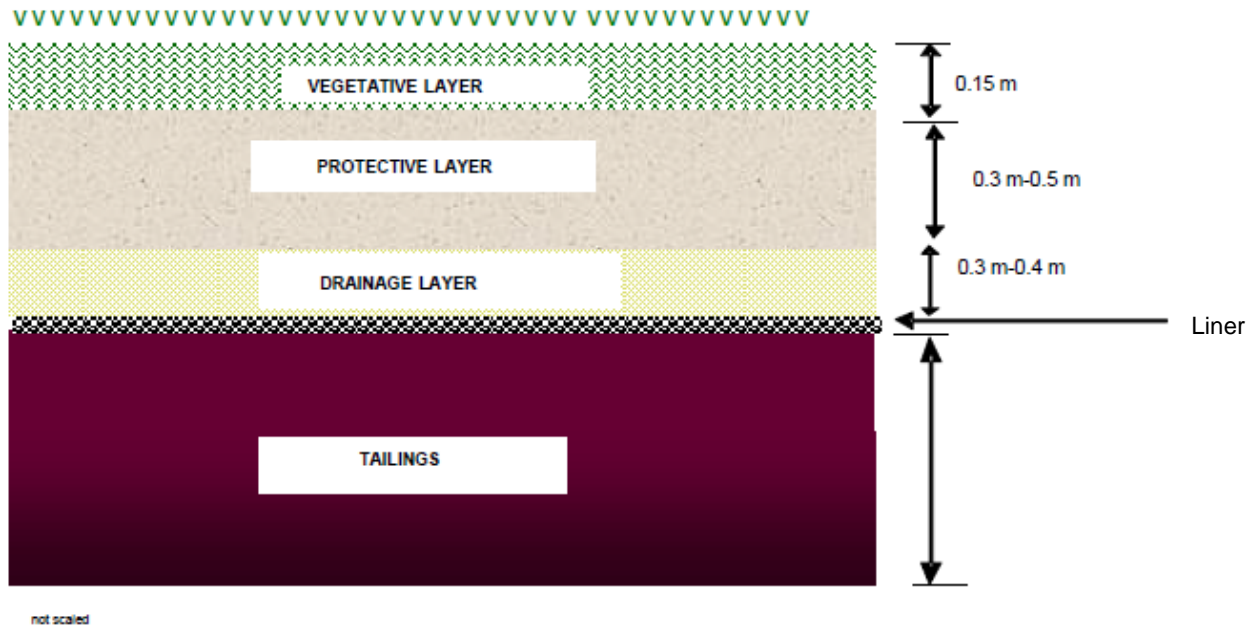
Removal of fugitive tailings and contaminated material from within Long Lake will be completed in a similar manner as what is described above for the drainage channel and Luke Creek. The delta will be isolated in sections over three excavation phases using an AquaDam. An AquaDam is a stable portable water barrier that is used to contain, divert, and control the flow of water, as illustrate in Figure 3 below. For each phase, water will be removed from that section and the material excavated using a long reach tracked excavator. Backfill will be placed in the excavation area and rounded cobble along the shoreline. It is assumed that wind and waves will allow surrounding lake sediment to naturally fill rehabilitated areas. The work will be completed outside of the restricted timing window for fish protection, to protect fish and aquatic species from potential impacts during spawning, migration, and other critical life stages.



**Figure 3** - Cross section of a typical AquaDam water barrier. The structure consists of two polyethylene 'inner tubes' filled with water encased by a stronger but flexible 'outer tube' made of a woven geotextile. Image source: Layfield

#### **1.3.4 Phase 4 - Installation of Engineered Cover**

Once all contaminated material has been consolidated into the impoundment area, the surface of the stockpile will be sloped, and capped with a cover to isolate the tailings from surface water infiltration. The preferred design for the cover consists of a geomembrane liner covering the consolidated soil and tailings, overlain with an aggregate drainage layer, topsoil, and a vegetated cover. As detailed above in Section 1.3.2, the containment cell will be surrounded by a drainage ditch to divert surface water and secured with fencing or boulders to prevent access from vehicles that could damage the cover. A conceptual visualization of the cover system is provided in figure 4 below.



**Figure 4** – Conceptual visualization of cover system. (Image source: modified from CH2M Hill 2013)

Aggregate will be required for the drainage and protective layer of the cover. The material will be sourced from a crown-operated pit located along the mine access road. Topsoil will additionally be needed, which will be hauled from an off-site supplier. Details related to aggregate sources and material requirements for the cover design is provided below in Section 1.3.5.

**1.3.5 Aggregate Sources and Material Requirements**

To reduce the haulage of trucks on public roads, the Ministry will operate two aggregate pits located closer to the site, herein referred to as the Wavy Trail Pit and Crown Pit. The location of the Wavy Trail Pit and Crown Pit relative to the Long Lake Gold Mine is illustrated below in Figure 7.



**Figure 5** – Location of the Crown Pit and Wavy Trail Pit. Image Source: NHIC Map 2023.

The Wavy Trail Pit (Permit ID 6473) is situated approximately 3km northeast from the project site. The pit was historically known as the ‘Pat Taylor Pit’ and was acquired by the Ministry in 2022. The pit is approximately 12.4 hectares (ha) and currently operates as a Category 9 (Pit Above Water) with a permitted aggregate extraction limit of 15,000 tonnes annually. The Ministry is proposing to amend the existing permit to increase the annual tonnage and re-permit to operate as a Category 11 (Quarry Above Water). Operating as a quarry is expected to reduce the footprint of the aggregate extraction activities by allowing material to be extracted vertically into bedrock, as opposed to horizontally into the overburden. Aggregate material extracted from the Wavy Trail pit will be utilized for the road safety improvement construction. Riprap and some granular material obtained from the pit will additionally be utilized to support the remediation, thereby further reducing traffic along Tilton Lake Road.

The Crown Pit is a new aggregate pit identified by the Ministry situated along the mine access road, approximately 1 km northeast of the mine. The pit is approximately 19.1

ha and will operate as a Category 9 (Pit Above Water), with a permitted aggregate extraction limit of 300,000 tonnes annually. Investigative work and technical studies to support the permitting of the pit were initiated in 2017 by SNC Lavalin and further advanced by GHD (2023). The pit has an estimated granular tonnage of 251,000 m<sup>3</sup>. The entirety of the material extracted from the Crown Pit will be utilized to support the remediation.

It is noted that environmental impacts associated with the two aggregate pits are assessed by the Ministry of Natural Resources and Forestry in accordance with the Aggregate Resources Act (ARA) and the *Class EA for Resource Stewardship and Facility Development Projects*. As such, environmental impacts associated the two aggregate pits have been excluded as part of the current assessment.

### **Remediation Aggregate Requirements**

The aggregates needed for the construction of the impoundment and cover has been categorized into nine types based on material use and gradation requirements. Most of the aggregate will be obtained from the Crown Pit, located along the site access road, thereby minimizing the haulage of material on public roads. At this time, it is anticipated that a small quantity of backfill, topsoil and riprap will need to be imported to the mine, resulting in a maximum of approximately 3,600 triaxle dump truck trips over three consecutive seasons. A summary of the aggregate requirements for the remediation is provided in Table 3 below.

**Table 3 – Summary of Aggregate Requirements for Remediation**

<b>Material Type</b>	<b>Material Description</b>	<b>Volume Required (m<sup>3</sup>) (1)</b>	<b>Import Volume (m<sup>3</sup>)</b>	<b>Estimated Truck Volume (4)</b>
Type 1	Berm Material	60,312	Crown Pit (2)	N/A
Type 2	Protective Layer Over Cap	13,762	Crown Pit	N/A
Type 3	Clear Stone	2,550	Crown Pit	N/A
Type 4	Gravel Backfill Submerged	18,215	3,315	276
Type 5	Shoreline Cobbles Rounded	1,537	Crown Pit	N/A
Type 6	General Backfill	68,375	Crown Pit	N/A
Type 7	Riprap D350	10,868	10,868	906
Type 8	Topsoil	18,300	29,280 (3)	2,440
Type 9	In Channel Energy Dissipation D600	25	25	2
<b>Total</b>		193,946	43,488	3,624

Notes:

(1) Volume provided includes a contingency of 25%

(2) Indicates the material can entirely be obtained from the Crown Pit.

(3) Bulking factor of 1.6 applied.

(4) Estimated truck volume assumes 12 m<sup>3</sup>/ load

The estimated truck volume provided in the table above represent a worst-case scenario. The Ministry is continually exploring ways to further reduce truck traffic along public roads. For example, riprap and backfill can both be obtained from the Wavy Trail Pit if permitted as a quarry. Similarly, topsoil may be manufactured from vegetation removed as part of the construction activities.

### ***Road Safety Improvement Aggregate Requirements***

The proposed road safety improvements will require the following aggregate materials:

- A total of approximately 69,750 tonnes of Granular B – Type 1;
- Approximately 10,960 tonnes of Granular A;
- A volume of 3,900 m<sup>3</sup> of riprap; and,
- A volume of 2,900 m<sup>3</sup> of topsoil.

Apart from topsoil, it is expected that all material required to support the road work can be obtained from the Wavy Trail Pit. Assuming a truck volume of 12m<sup>3</sup>/load, it is estimated that approximately 245 truck trips will be needed to haul topsoil for the road safety improvement work.

## **1.4 Class Environmental Assessment**

An overview of Class Environmental Assessment requirements applicable to this project is provided in the following section. The project boundary is defined by the following:

- The three sources of arsenic loadings to Long Lake proposed for remediation and surrounding natural area,
- The waste rock pile, and;
- The preferred access road route along the southside of Long Lake.

It is noted that environmental impacts associated with the two aggregate pits have been excluded from this Class EA as those features are being assessed as part of other processes (i.e., ARA, MNR Class EA). The rehabilitation of other historical mine features, such as the two-compartment shaft, glory hole and concrete foundations, are additionally excluded and will be assessed as part of a separate Class Environmental Assessment.

### **1.4.1 Ministry of Mines Class Environmental Assessment**

The Long Lake Gold Mine Rehabilitation Project is a discretionary rehabilitation activity subject to the *Environmental Assessment Act*, as prescribed in the *Class Environmental Assessment for Activities of the Ministry of Northern Development and Mines under the Mining Act* (amended 2018, MINES Class EA). The purpose of MINES' Class EA is to provide an effective process for screening, evaluating, and mitigating the potential



environmental effects of activities and to provide appropriate consultation opportunities to ensure that all potential environmental effects of a project are considered. The MINES Class EA is an approved process that provides a decision-making structure that ensures the requirements of the *Environmental Assessment Act* are met.

The phases of the MINES Class EA process are summarized below in Table 4.

**Table 4 – Class Environmental Assessment Phases**

<b>Class EA Phase</b>	<b>Description</b>
Project Screening	The proposed rehabilitation activities have been screened as a Category C project with moderate potential for environmental effects and moderate level of anticipated public interest. The completed screening criteria table is provided in Appendix B. The project screening provides additional justification for the categorization of the project.
Consultation	In accordance with Section 4.2.2 of the Class EA, the ministry posted a Notice of Opportunity to Provide Input as a bulletin notice on the Environmental Registry of Ontario (ERO) and on the MINES Class EA website. Further details about consultation completed as part of this Class EA is provided in Section 3.
Studies and Information Gathering	The ministry reviewed various information sources to document baseline conditions of the environment in the study area. Technical studies were completed to fill in any information gaps and to inform this Class EA. A description of existing environment conditions is provided in Section 2. Technical studies completed are summarized in Section 4.
Project Documentation and Notice of Completion	This document has been prepared to satisfy the Category C project documentation requirements, as described in Section 4.2.1.2 of the Class EA. All government agencies, aboriginal communities and other persons consulted with as part of the consultation phase were provided this document with a Notice of Completion (NOC) and the opportunity to provide additional comments or concerns related to this project over a 30-day comment period.
Project Implementation	Assuming the ministry does not receive new comments or information following the NOC comment period that would require the proposed project to be reassigned to a higher category, a Statement of Completion will be prepared and posted on the Class EA website and the proposed rehabilitation activities will proceed as described in this document.

#### **1.4.2 Class Environmental Assessment for Provincial Parks and Conservation Reserves**

It is recognized that a portion of the preferred access road route transects through the Eden Township Forest Conservation Reserve, which is currently under the jurisdiction of the Ministry of Environment, Conservation and Parks, but previously under the jurisdiction of the MNRF when project planning was initiated. The MNRF has their own

Class EA process to minimize impacts to provincial parks and/or conservation reserves, as described in the *Class Environmental Assessment for Provincial Parks and Conservation Reserves* (Class EA-PPCR, 2004). It is noted that section 3.5.1 of the Class EA-PPCR indicates that proponents do not need to fulfill the requirements of the Class EA-PPCR if the project is already being assessed under another Class EA. For the Long Lake Gold Mine Rehabilitation Project, consideration of impacts to values identified within the Eden Township Forest Conservation Reserve are addressed through the MINES Class EA process.

The Ministry of Mines has integrated any consultation, information, and evaluation requirements of the Class EA-PPCR into this EA. The MNRF has identified specific values within the conservation reserve that will be negatively affected by the undertaking and has worked with MINES to develop approaches to minimize impacts. In addition, they have reviewed and provided input on communication deliverables (e.g., project summary and Notice of Opportunity to Provide Input), and have notified MNRF clients (e.g., resource licensees) that may be affected by the project on behalf of MINES. To provide an even greater level of transparency regarding the road work through the Eden Township Forest Conservation Reserve and how environmental assessment requirements will be met, a Memorandum of Understanding (MOU) between MINES and MECP has been prepared, as provided in Appendix C.

### **1.4.3 Atikameksheng Anishnawbek**

A portion of the fugitive tailings' requiring rehabilitation is located on Atikameksheng Anishnawbek reserve land. Atikameksheng Anishnawbek has ratified a land code under the Framework Agreement on First Nations Land Management. The Framework Agreement recognizes First Nations' inherent right to govern their reserve lands, with signatory communities overseeing the administration and law-making authority of their lands, environment, and natural resources. Atikameksheng Anishnawbek has developed an internal environmental assessment process through their land code that is consistent with the Canadian Environmental Assessment Act, 2012. Although a portion of the rehabilitation activities will occur on AAFN land and may be subject to the community's internal EA processes, impacts associated with the work have already been considered as part of MINES Class EA process. All work completed on AAFN land will be authorized by the community as part of a Band Council Resolution (BCR).

## **2 Existing Environmental Conditions**

A summary of existing conditions in the project area is described in the following Section.

## 2.1 Long Lake Gold Mine Site

The three tailings' areas (TA-01, TA-02 and TA-03) are situated in low-lying areas that naturally contain the material within the surrounding topography. The tailings are interconnected by a surface water drainage channel, which flows in a northerly direction towards Luke Creek and eventually empties into Long Lake. The location of the tailings areas and drainage channel is illustrated below on Figure 6.



**Figure 6** – Location of three tailings areas and interconnecting drainage channel (Image Source: CH2MHill 2013)

The largest of the three tailings areas is TA-01, located in the north boundary of the mine site. TA-01 has an area of approximately 7.42 hectares (18.3 acres). The topography of TA-01 slopes gently to the north - northwest, with surface water runoff directed towards the mine drainage channel. Several erosion channels develop overland at TA-01 during periods of heavy rain and the spring freshet, resulting in the migration of tailings northwards towards the mine drainage channel. Silt fencing and straw bales have historically been used to help mitigate tailings migration. The mine drainage channel enters TA-01 from TA-03 in the southeastern corner and continues

along the western boundary of TA-01 where it discharges through a small check dam. There is a suspected rock drain present at the outlet of the drainage channel where it flows into TA-01 in the southeastern corner.

Historical investigations (see Section 4) have found the concentration of arsenic within TA-01 to occur as high as 65,000 µg/g (SNC Lavalin 2017). The stratigraphy underlying TA-01 generally consists of tailings encountered to a depth up to 3.1 meters below ground surface (m bgs), underlain by a thin organic layer and native silt and clays. Bedrock is typically encountered at depths ranging from 1.4 to 16.9 m bgs, with the depth generally increasing towards the middle of TA-01 (SNC Lavalin 2015).

TA-03 is situated approximately 200 m south of TA-01 and is the smallest of the three tailings areas. TA-03 has an area of approximately 0.38 ha (0.94 acres). The topography of TA-03 steeply slopes to the north, where surface water run off is directed towards the drainage channel and TA-01. Historical investigations (see Section 4) have found the concentration of arsenic within TA-03 to occur as high as 44,000 µg/g (SNC Lavalin 2017). The stratigraphy generally consists of sandy tailings to a depth up to 0.75 m bgs, underlain by a thin organic layer, and native clay. Bedrock was encountered at a depth of 2.9 m bgs (SNC Lavalin 2015).

TA-02 is situated in the southern portion of the mine site, approximately 100 m southwest of TA-03. TA-02 covers an area of approximately 1.43 ha (3.53 acres). The topography of TA-02 generally slopes to the north-northeast, towards three drainage channels and TA-03. Erosion channels have developed along the western edge and centrally overland at TA-02, where surface water run off discharges to two separate channels to the northeast. There is evidence of migration of tailings towards TA-03 within the central channel. A small, ponded area is present in the eastern boundary of TA-02, that is contained between two dams and a berm. A shallow pool of water is present over the tailings surface within this ponded area. Historical investigations (see Section 4) have found that concentration of arsenic within TA-02 to occur as high as 81,000 µg/g (SNC Lavalin 2017). The stratigraphy generally consists of sandy tailings encountered up to a depth up to 1.1 m bgs, underlain by a thin organic layer, native clay and glacial till/sand. Bedrock was encountered at depths ranging from 3.0 to 4.0 m bgs (SNC Lavalin 2015).

Evidence of tailings migration is apparent throughout the surface water drainage channel that interconnects the three tailings area. The impacts are generally limited to the channel and channel bank, with thicker depositions of tailings occurring in areas of reduced flow. The surface water drainage channel discharges into downstream Luke Creek, which eventually empties into the south bay of Long Lake. Additional details regarding Luke Creek and other surface water features are provided in *Section 2.4 – Hydrology and Surface Water Features*.

In addition to the three tailings area, the site features a waste rock pile located on the northwest side of the glory hole. On the southern side of the pile, there is a cobble road constructed of waste rock. The volume of waste rock within the pile and road is estimated to be approximately 3,700 and 400 cubic meters, respectively (GHD 2023c). Although the waste rock pile does not contribute to arsenic loading into Long Lake, it is considered a source of acid rock drainage (ARD).

## 2.2 Ecosystem Setting

The Long Lake Gold Mine site is situated in the Sudbury Ecodistrict (Ecodistrict 5E-4), within the Georgian Bay Ecoregion (Ecoregion 5E) (Crins et al. 2009; Wester et al. 2018). This ecodistrict is often described as a rolling topography of bedrock dominated uplands with an undulating landscape of linear valleys of deeper mineral material (Noble 1991, Wester et al. 2018). The area is dominated by Precambrian bedrock, exposed at the surface, or covered by a discontinuous shallow layer of acidic morainal material (Wester et al. 2018). The bedrock geology underlying the site consists of quartz-feldspar sandstone, argillite, and conglomerate of the Huronian Supergroup, Hough Lake Group and Mississauga Formation (OGS 2011). A similar bedrock geology is observed underlying the proposed access road route.

According to the NHIC Map, there are no Areas of Natural or Scientific Interest, provincially significant wetlands, or other environmentally significant areas on or adjacent to the mine (MNRF 2022). The Eden Township Conservation Reserve (C157) is situated approximately 1 km northeast of the mine, along the proposed access road route. According to the Statement of Conservation Interest, the Eden Township Conservation Reserve represents the best example in the area of red pine and cedar dominated forest and contains provincially significant representation of sparse coniferous forest on prehistoric lake sediments (MNRF 2004).

## 2.3 Air Quality and Climate

The Georgian Bay Ecoregion falls within the Humid High Moderate Temperature Ecoclimate Region (Ecoregions Working Group, 1989), where the climate is generally characterized by cool- temperature and humidity (Crins et al. 2009). The nearest Environment Canada meteorological station is the Sudbury A station, located approximately 21 km northeast of the mine. A summary of historical climate data available for the Sudbury A meteorological station from 1981 to 2010 is provided in Table 5 below.

**Table 5 – Historical Climate Data (1981-2010).**

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
<b>Temperature</b>													
Daily Average (°C)	-13	-10.8	-4.9	3.8	11.1	16.5	19.1	18	13	6	-1	-8.6	4.1
Standard Deviation	3.5	2.7	2.3	2.1	2.1	1.5	1.4	1.3	1.6	1.5	2	3.3	1
Daily Maximum (°C)	-8	-5.5	0.4	9.2	17	22.2	24.8	23.4	18.1	10.3	2.6	-4.4	9.2

Daily Minimum (°C)	-17.9	-16	-10.2	-1.7	5.2	10.7	13.4	12.4	7.8	1.7	-4.7	-12.7	-1
<b>Precipitation</b>													
Rainfall (mm)	11.9	7.2	27.9	49.7	81.4	80.3	76.9	85.5	101	84.9	52.3	16.6	675.7
Snowfall (mm)	59.5	51.7	34.9	16.9	1.9	0	0	0	0.1	5.7	29.6	63	263.4
Precipitation (mm)	62.2	51.1	60.5	65.7	83.4	80.3	76.9	85.4	101.1	90.9	78.5	67.5	903.3
Average snow depth (cm)	30	38	27	2	0	0	0	0	0	0	3	16	10
Median Snow Depth (cm)	29	37	27	1	0	0	0	0	0	0	1	15	9
Snow depth at Month-end	36	36	8	0	0	0	0	0	0	0	6	26	9

The total annual precipitation in the project area is an average of 903 mm. Historically, September is the wettest month (101 mm), while February is the driest (51 mm). The accumulate snowpack generally melts by the end of March, and the daily temperature ranges from -13 °C in January to 19 °C in July.

The nearest ambient air monitoring station from the mine is the Sudbury station, situated approximately 25 km north of the mine. Concentrations of measured pollutants (ozone, particulates, nitrogen dioxide, and sulfur dioxide) in the Sudbury area historically meet the Ministry of the Environment (2012) Ambient Air Quality Criteria (AAQC). There is no historical air quality data available for the mine site. Normal activities at the mine and surrounding area do not currently contribute to the release of greenhouse gases or the degradation of ambient air quality.

## 2.4 Hydrology and Surface Water Features

The Long Lake Gold Mine site is situated in the Great Lakes – St. Lawrence Basin and the Lake Panache- Whitefish River watershed (MNR 2023). The surface water features within this watershed drain southwardly and ultimately empties into North Lake Huron. There are several surface water features situated in the vicinity of the mine and along the proposed access road route, a summary of these features is provided below in Table 6.

**Table 6 – Surface Water Features**

Surface Water Feature Name	Description/ Proximity to Project Boundary.
Long Lake	The proposed access road route extends along the southeast side of Long Lake. Long Lake is approximately 14.5 km in length, with the south bay located approximately 500 m northwest of TA-01. Long Lake is the receiver of surface water and fugitive tailings from Luke Creek. The deposition of tailings has resulted in the formation of a tailings delta within the south bay of the Long Lake at the Luke Creek outlet. Additional details regarding Long Lake and the Long Lake Delta are provided below in Section 2.4.2.
Lohi Lake	Lohi Lake is situated approximately 100 m to 500 m west of Tilton Lake Road, along the proposed access road route.

Clearwater Lake	Clearwater Lake is located approximately 75 m to 400 m east of Tilton Lake Road, along the proposed access road route.
Tilton Lake	Tilton Lake Road extends along the eastern shoreline of Tilton Lake. An approximately 300 m section of the road runs directly adjacent to the lake. A stream and waterfall feature has been observed on the eastern side of Tilton Lake Road, which empties into Tilton Lake.
Round Lake	Round Lake is the receiving environment of flow from the south bay of Long Lake via the Whitefish River. The waterbody is situated entirely on AAFN reserve land.
Wavy Creek	Wavy Trail Road extends over Wavy Creek. Wavy Creek flows in a northerly direction where it discharges into Long Lake.
Luke Creek	Luke Creek originates from Luke Lake, which is located approximately 400 m southeast of the mine site. The creek is the receiver of surface water runoff and fugitive tailings from the mine drainage channel. Additional details regarding Luke Creek are provided below in Section 2.4.1.

In addition to the above, numerous streams and wetland habitat are located within the project boundaries. The largest wetland associated with the site is the Luke Creek Wetland located adjacent to the Luke Creek floodplain on AAFN reserve land. According to recent studies (GHD 2022a – See Section 4.8), the slow flow velocity of Luke creek and thick vegetative mat in the wetland is expected to act as a filtering media for entrained tailings in Luke Creek and tailings transport to the wetland is not expected.

There are no flow monitoring stations operated by Water Survey of Canada or Environment Canada located within the Whitefish River watershed. Flow data obtained since 2020 from Luke Creek as part of ongoing environmental monitoring (See Section 4.2) identifies the spring as the highest flow period, with a steady decrease in flow into the summer months. This is consistent with historical investigation (CH2M Hill 2014), which characterizes the annual hydrologic cycle by periods of low flow during the summer, fall and early winter (June through January), that increases to peak flow condition in April.

### **2.4.1 Luke Creek**

Luke Creek is considered the major water features associated with the Long Lake Gold Mine site, which enters the mine from the east, north of TA-01. The creek originates from Luke Lake, located approximately 300 m southeast of the mine. The creek is not expected to provide critical habitat to fish or other aquatic species.

Historical investigations (CH2M Hill 2014) have identified two areas along the Luke Creek floodplain impacted by the deposition of tailings:

- 1) South Floodplain Area: This area includes a low-gradient floodplain downstream of the confluence with the mine site drainage channel and a smaller area extending upstream into the drainage channel. (CH2M Hill 2014).
- 2) North Floodplain Area: This area includes a low-gradient floodplain adjacent to the Luke Creek wetland, west of the mine site extending northward to the south bay of Long Lake. (CH2M Hill 2014).

Areas impacted by the tailings migration within Luke Creek can easily be identified by the presence of tailings and the presence of little to no vegetation and/or stressed or dead vegetation.

### **2.4.2 Long Lake**

Long Lake has an area of approximately 861 hectares and a shoreline perimeter of 53 kilometers. The waterbody is known to support fifteen fish species, including Brown Bullhead, Cisco (Lake Herring), Common Shiner, Creek Chub, Golden Shiner, Iowa Darter, Largemouth Bass, Logperch, Northern Pike, Pumpkinseed, Smallmouth bass, Spottail Shiner, Walleye, White Sucker and Yellow perch (City of Greater Sudbury, 2023).

The south bay of Long Lake is the receiving environment of flow from Luke Creek, as well as flow from the Long Lake north basin. The water within Long Lake eventually empties to the west end of the southern bay and into Round Lake, located on AAFN reserve land. Impacts associated with the Long Lake Gold Mine can easily be identified at the Luke Creek outlet by the deposition of tailings within the lake.

## **2.5 Source Water Protection**

The project area falls within the Nickel District Source Water Protection Area, which is under Conservation Sudbury (Nickel District Conservation Authority) jurisdiction. According to available mapping (MECP 2023), there are no Wellhead Protection Areas, Intake Protection Zones, Significant Groundwater Recharge Areas, Highly Vulnerable Aquifers, or other vulnerable areas that overlap with the project area. A search of the MECP Well Record Interactive Map (MECP 2021) indicates that there are no potable water wells situated within 500 m of the mine site, however there are multiple potable water wells identified along the proposed access road route. Long Lake is the source of drinking water for most residents along the lake.

## **2.6 Vegetation**

The Sudbury Ecodistrict falls within the Eastern Temperate Mixed Forest Vegetation Zone (Baldwin et al. 2018) and the Sudbury-North Bay Section (L.4e) of the Great Lakes- St. Lawrence Forest Region (Rowe 1972). The area is characterized by mixed forest habitat, where typical tree species include trembling aspen, paper birch, large-



toothed aspen, jack pine, eastern white pine, and red pine (Wester et al. 2018). Extensive areas within this ecodistrict have been destroyed or significantly reduced due to historical timber harvesting, fire, and mining activities. The above activities, combined with naturally occurring erosion, has resulted in decreased substrate depth and exposure of bare bedrock terrain. Sparse forests are common, occurring where mineral and organic materials have accumulated in bedrock cracks and crevices. Where disturbance has occurred, hardy pioneer tree species such as paper birch and trembling aspect dominate the landscape, with stunted red oak and red maple occurring in upland sites (Wester et al. 2018).

Vegetation surveys completed to support the permitting of the crown pit, located approximately 1 km northeast of the mine, has identified the principal canopy species to include Red Pine, White Birch, Black Spruce, Trembling Aspen and White Pine. Understorey tree species include mostly Red Oak, Red Maple, and Balsam Fir. Shrub growth is sparse with the most common species being Beaked Hazel; and the herbaceous groundcover was patchy with the main species encountered being Canada Mayflower, Bracken Fern, Wild Spasarella, Large-leaved Aster and Bunchberry. The above species composition is expected to be similar in the area surrounding the mine. There are no vegetation species on the tailings' areas (SNC Lavalin 2018).

According to the NHIC Map, Sinoper Cobblestone Lichen (*Acarospora sinopica*) has previously been observed within the footprint of the mine. The lichen species occurs on acidic, iron rich rock and is currently considered imperiled provincially (S2).

## 2.7 Fish and Wildlife

As indicated above in Section 2.4.2, Long Lake is known to provide habitat to a variety of fish species, including several sought-after sportfish. The tailings delta and Luke Creek are not known to provide critical habitat to fish, such as spawning, nursery or feeding habitat. The impacts associated with the deposition of tailings and arsenic contamination has resulted in differing consumption advisory guidelines for species in the south and north- basin of the lake. Fish species identified in Luke Creek as part of historical investigations (see Section 4.3) include Yellow Perch, Northern Redbelly Dace, Brookback Stickleback and Creek Chub. The waterbodies along the proposed access road route are also expected to support a wide variety of fish species.

The forested habitat surrounding the mine and proposed access road route provides habitat to a variety of terrestrial wildlife. The NHIC Map (MNRF 2022) identifies the previous occurrence of Eastern Whip-poor-will and Blanding's Turtle in the vicinity of the mine. The above avian and turtle species are currently listed as threatened provincially under the ESA (2007) and receive both species and habitat protection. In addition, Massasauga Rattlesnake, Midland Painted Turtle, Snapping Turtle, and Olive-sided Flycatcher have previously been observed along the proposed access road route

(MNR 2022). Among the species identified along the access road route, only the Massasauga Rattlesnake is designated as threatened provincially. The project area also overlaps with the ranges of four endangered bat species including Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis and Tricoloured Bat.

According to the Ontario Breeding Bird Atlas, there are 25 avian species previously observed in the 10km square that encompasses the mine (Square 17TMM82) and 177 species known to occur in the region (Region #32- Sudbury West). Similarly, there are 98 avian species previously observed along the proposed access road route (Square 17TMM83). The avifauna identified include four species listed under the Species at Risk in Ontario list (O.Reg 230/08), including Eastern Whip-poor-will, Eastern Wood-pewee, Canada Warbler, and Barn Swallow. It is noted that only Eastern Whip-poor-will are designated as threatened provincially and receive species and habitat protection.

The Ontario Reptile and Amphibian Atlas identifies the previous occurrence of seven reptile and amphibian species in the 10 km square that encompasses the mine (Square 17MM82), however no species designated as threatened or endangered provincially have previously been identified. There are 19 reptile and amphibian species previously observed along the access road route (Square 17MM93), including two threatened reptile species: Blanding's Turtle and Massasauga Rattlesnake.

## 2.8 General Land Use

Most of the Long Lake Gold Mine site is located on crown land, within the Wanapitei River West General Use Area (G2044) (MNR 2006). A small portion of TA-02 and the glory hole are situated within private land held by a surface rights owner. The land use in the area consists mostly of forest management and recreational activities. The land use intent aims to ensure that fish and wildlife resources and associated recreation and tourism opportunities will continue to be available in the future. The land use guidelines permit existing commercial aggregate extraction operations, but new commercial quarry operations are not permitted. The development and maintenance of new and existing roads is allowed, and local wayside pits may be developed in association with such uses as the construction and maintenance of forest and mining access roads. Mineral exploration and development activities are additionally permitted.

The mine and access road route overlaps within the administrative boundary of trapline area SU064, baitfish harvesting area SU0153, and bear management area SU-42-009 within Wildlife Management Unit 42.

## 2.9 Mining Activities

There are no advanced mining exploration or operational mines located on or adjacent to the project area. The Long Lake Gold Mine overlaps with 23 unpatented mining claims registered to one claim holder.

## 2.10 Residential and Recreational Land Use

There are several properties located on the south bay of Long Lake, which are accessed off Lakes End Road. Most of the properties draw drinking water from the south basin of the lake, where arsenic impacts have historically been observed. Although most of the properties are seasonal in use, there are approximately three to four year-round residences. As indicated in Section 2.8 above, a portion of the Long Lake Gold Mine site is privately owned, however there are no structures associated with the site. There are several residential properties located along the proposed access road route.

The mine site and surrounding area are frequented by recreational users for hunting, fishing, and other activities. Evidence of all terrain vehicles (ATV) is apparent throughout the summer months and snowmobile use in the winter. There is a snowmobile trail that joins the site access road north-northeast of TA-01 that continues south across the tailings area. The trail provides access to the Killarney area and is maintained by the Broder Dill Snowmobile Association. The trail will require rerouting to accommodate the proposed rehabilitation activities.

## 2.11 Indigenous Communities and Land Uses

The Long Lake Gold Mine is located within the Robinson – Huron Treaty Area and is bordered to the west by the community of AAFN. As of April 2019, Atikameksheng Anishnawbek is home to 1303 members, with approximately 433 members living on the reserve. The mine was historically accessed by a mine road that transected through reserve land. Although the footprint of the road remains, the water crossings are no longer in place, and the mine site is currently inaccessible by vehicle from the reserve. Based on conversations with AAFN, there are areas of significance to community along the historical route to the mine.

A portion of the fugitive tailings' requiring rehabilitation is located on reserve land. Water flow from the south bay of Long Lake, empties into Round Lake located on AAFN reserve lands via the Whitefish River. Walleye is the main fish species traditionally harvested by the community at the outflow of Long Lake, as well as Rainbow Smelt on the Whitefish River.

## 3 Consultation Summary

Effective and meaningful consultation of potentially interested and affected stakeholders, government ministries and agencies, members of the public and Indigenous communities is an integral part of MINES' Class EA process. The objective of consultation was to provide stakeholders, government ministries and agencies, members of the public and Indigenous communities' information about, and the opportunity to identify key issues and concerns related to the undertaking. The

consultation efforts completed for the Long Lake Gold Mine Rehabilitation Project exceeded the minimum requirements for a Category C undertaking, as described in Section 4.2.2 of the Class EA. It provided opportunities for meaningful dialogue that strengthened the project and allowed for better decision making.

A copy of the detailed *Record of Consultation* is provided in Appendix D.

### **3.1 Identification of Stakeholder and Indigenous Groups**

Stakeholders, government ministries and agencies, and Indigenous Communities who were expected to have an interest in the project were identified during the early stages of the project planning process in 2013. As the project evolved and new information has become available, several additional groups have been identified with interest in the project.

A summary of all stakeholders, government ministries and agencies and Indigenous Communities contacted as part of the Class EA consultation process and how they were identified is provided below on Table 7.

**Table 7 – List of parties contacted as part of the Class EA.**

Name of Ministry/ Agency/Department/ Organization	Name and Contact Information	Rationale for Inclusion/ Year of Initial Engagement	Comments or Concerns Received
<b>Federal</b>			
Indigenous Service Canada (ISC, formerly Indigenous and Northern Affairs Canada (INAC))	Christine Laino, Consultant <a href="mailto:Christine.Laino@canada.ca">Christine.Laino@canada.ca</a>  Ray Alatalo, Environmental Health Officer <a href="mailto:ray.alatalo@sac-isc.gc.ca">ray.alatalo@sac-isc.gc.ca</a>  Shawn Green <a href="mailto:Shawn.green@aandc-aadnc.gc.ca">Shawn.green@aandc-aadnc.gc.ca</a>	<ul style="list-style-type: none"> <li>• The Luke Creek wetland is situated on federal reserve land.</li> <li>• Contacted to confirm any federal environmental assessment requirements on First Nation land.</li> <li>• Engaged in 2013.</li> </ul>	Response received; no concerns identified.
Impact Assessment Agency (IAA, formerly Canadian Environmental Assessment Act (CEAA))	CEAA	<ul style="list-style-type: none"> <li>• Contacted to confirm if the project triggers federal environmental assessment requirements.</li> <li>• Engaged in 2013.</li> </ul>	Response received; comments summarized in Table 11.
Environment Canada – Canadian Wildlife Service	Lesley Dunn, Regional Director <a href="mailto:lesley.dunn@ec.gc.ca">lesley.dunn@ec.gc.ca</a>	<ul style="list-style-type: none"> <li>• The Luke Creek wetland is situated on federal reserve land.</li> <li>• Contacted to confirm permitting requirements under the federal Species at Risk Act (SARA).</li> <li>• Engaged in 2017.</li> </ul>	Response received; comments summarized in Table 11.
Department of Fisheries and Oceans Canada	Debbie Ming, Regional Manager <a href="mailto:Debbie.Ming@dfo-mpo-gc.ca">Debbie.Ming@dfo-mpo-gc.ca</a>  Terina Hancock <a href="mailto:Terina.hancock@dfo-mpo-gc.ca">Terina.hancock@dfo-mpo-gc.ca</a>	<ul style="list-style-type: none"> <li>• The rehabilitation activities have the potential to impact fish and fish habitat during the removal of fugitive tailings from Luke Creek and Long Lake.</li> <li>• A Request for Review was submitted to determine the potential risks to fish and fish habitat and if authorization is needed under the <i>Fisheries Act</i>.</li> <li>• Reviewed the project to confirm if work contravenes with sections 32, 33 or 58 of SARA.</li> <li>• Engaged in 2014.</li> </ul>	Response received; comments summarized in Table 11.

Name of Ministry/ Agency/Department/ Organization	Name and Contact Information	Rationale for Inclusion/ Year of Initial Engagement	Comments or Concerns Received
		<ul style="list-style-type: none"> <li>A new Request for Review was re-submitted in 2021 due to changes to the Fisheries Act which required additional information.</li> </ul>	
Health Canada	<a href="mailto:hcinfo.infosc@canada.ca">hcinfo.infosc@canada.ca</a>	<ul style="list-style-type: none"> <li>Federal regulatory authority responsible for addressing health risks on federal land.</li> <li>Engaged in 2013.</li> </ul>	No response received.
<b>Provincial</b>			
Ministry of Environment, Conservation and Parks – Lands and Waters Division - Species at Risk Branch	<p>Lindsay McColm, Management Biologist <a href="mailto:Lindsay.mccolm@ontario.ca">Lindsay.mccolm@ontario.ca</a></p> <p>Nikki Boucher, Regional Species at Risk Specialist <a href="mailto:Nikki.Boucher@ontario.ca">Nikki.Boucher@ontario.ca</a></p>	<ul style="list-style-type: none"> <li>The project area has the potential to provide habitat to SAR.</li> <li>Contacted to confirm previous occurrences of SAR and/ or SAR habitat within the project area.</li> <li>Regulatory authority overseeing the <i>Endangered Species Act</i> (2007).</li> <li>Engaged in 2013.</li> </ul>	Recommendations provided by the MECP are summarized in Table 11.
Ministry of Environment, Conservation and Parks – Drinking Water and Environmental Compliance Division – Northern Region	<p>Ed Snucins, Surface Water Specialist <a href="mailto:Ed.Snucins@ontario.ca">Ed.Snucins@ontario.ca</a></p> <p>Elise Burns, Permit to Take Water Coordinator <a href="mailto:Elise.Burns@ontario.ca">Elise.Burns@ontario.ca</a></p> <p>Kerry Whitney, Environmental Officer <a href="mailto:Kerry.Whitney@ontario.ca">Kerry.Whitney@ontario.ca</a></p> <p>Anneleis Eckert, EA Coordinator <a href="mailto:Anneleis.Eckert@ontario.ca">Anneleis.Eckert@ontario.ca</a></p> <p>Rosanna White, Environmental Planner/ EA Coordinator <a href="mailto:Rosanna.White@ontario.ca">Rosanna.White@ontario.ca</a></p> <p>Carrie Hutchison, Environmental Assessment Coordinator</p>	<ul style="list-style-type: none"> <li>Regulatory authority overseeing the <i>Environmental Protection Act, Ontario Water Resources Act, and the Clean Water Act, 2006 (CWA)</i>.</li> <li>Provided comments related to the Notice of Opportunity to Provide Input, 2017/2019 Notice of Completions, and associated project documentation. Recommendations provided to improve documentation and ensure compliance with the Class EA process.</li> <li>An Environmental Compliance Approval (ECA) will be needed to treat and discharge wastewater during the rehabilitation activities.</li> <li>Contacted to confirm if any additional environmental permissions are required to facilitate the work.\</li> <li>Engaged in 2013.</li> </ul>	The MECP provided input related to permitting requirements for the project. No specific concerns or comments related to the proposed work.

Name of Ministry/ Agency/Department/ Organization	Name and Contact Information	Rationale for Inclusion/ Year of Initial Engagement	Comments or Concerns Received
	<a href="mailto:Carrie.hutchinson@ontario.ca">Carrie.hutchinson@ontario.ca</a>		
Ministry of Environment, Conservation and Parks – Environmental Assessment Branch and Permissions Division	Kathleen O’Neil, Director <a href="mailto:Kathleen.ONeill@Ontario.ca">Kathleen.ONeill@Ontario.ca</a>  Annamaria Cross, Manager – Environmental Assessment Services <a href="mailto:Annamaria.cross@ontario.ca">Annamaria.cross@ontario.ca</a>  Callee Robinson, Project Evaluator <a href="mailto:callee.robinson@ontario.ca">callee.robinson@ontario.ca</a>  Wesley Wright, Project Evaluator <a href="mailto:Wesley.Wright@ontario.ca">Wesley.Wright@ontario.ca</a>	<ul style="list-style-type: none"> <li>Regulatory authority overseeing the <i>Environmental Assessment Act</i></li> <li>The MECP- EA Branch has provided comments related to the Notice of Opportunity to Provide Input, previous Notice of Completions, and associated project documentation. They have made recommendations on how to improve documentation and ensure compliance with the Class EA process.</li> <li>Engaged in 2015.</li> </ul>	Comments and concerns provided by the MECP – EA Branch are summarized in Table 11.
Ministry of Environment, Conservation and Parks – Lands and Waters Division – Northeast Zone	Ryan Gardner, Manager Ontario Parks Operations - Northeast Zone <a href="mailto:Ryan.Garnder@ontario.ca">Ryan.Garnder@ontario.ca</a>  Jaclyn Brown, Protected Area Lands Technical Specialist – Conservation Reserves <a href="mailto:Jaclyn.brown@ontario.ca">Jaclyn.brown@ontario.ca</a>	<ul style="list-style-type: none"> <li>The proposed access road route transects through the Eden Township Forest Conservation Reserve. Regulatory authority overseeing the <i>Provincial Parks and Conservation Reserves Act</i> (2006).</li> <li>Engaged in 2019.</li> </ul>	Comments and concerns are summarized in Table 11.
Ministry of Natural Resources and Forestry- Regional Operations Division - Northeast Region	Ross Hart, District Manager, Sudbury Work Centre <a href="mailto:Ross.Hart@ontario.ca">Ross.Hart@ontario.ca</a>  Robert Herbst, Land and Water Technical Specialist, Sudbury Work Centre <a href="mailto:Robert.Herbst@ontario.ca">Robert.Herbst@ontario.ca</a>  Mike Hall, Management Biologist, Sudbury Work Centre	<ul style="list-style-type: none"> <li>Contacted to confirm any land use policies to assist with the project screening.</li> <li>Regulatory authority overseeing the <i>Lakes and Rivers Improvement Act</i> (1990), <i>Aggregate Resources Act</i> (1990), <i>Fish and Wildlife Conservation Act</i> (1997), and the <i>Crown Forest Sustainability Act</i> (1994).</li> <li>Engaged in 2017.</li> </ul>	Comments and concerns are summarized in Table 11.

Name of Ministry/ Agency/Department/ Organization	Name and Contact Information	Rationale for Inclusion/ Year of Initial Engagement	Comments or Concerns Received
	<a href="mailto:Mike.Hall@ontario.ca">Mike.Hall@ontario.ca</a> Kendall Haddow, Aggregate Specialist, Sudbury Work Centre <a href="mailto:Kendall.haddow@ontario.ca">Kendall.haddow@ontario.ca</a>		
Ministry of Citizenship and Multiculturalism – Heritage and Archaeology Planning Unit	Karla Barboza <a href="mailto:Karla.Barboza@ontario.ca">Karla.Barboza@ontario.ca</a>	<ul style="list-style-type: none"> <li>The Heritage Planning Unit and Archaeology Planning Unit was contacted to provide input during the Class EA screening process.</li> <li>Regulatory authority overseeing the <i>Ontario Heritage Act</i>.</li> <li>Engaged in 2015.</li> </ul>	Response received, no concerns or comments identified.
Ministry of Transportation, North Operations	Dean Martin, Technical Services Officer <a href="mailto:Dean.Martin@ontario.ca">Dean.Martin@ontario.ca</a> Marc Rockburn, Municipal Services Manager Marc.rockburn@ontario.ca	<ul style="list-style-type: none"> <li>The southerly 2.6 km of Tilton Lake Road, Wavy Trail Road and Lakes End Road are situated outside of the municipal limits. Maintenance of the road is overseen by a Local Roads Board.</li> <li>Regulatory authority overseeing <i>the Local Roads Board Act</i>.</li> <li>Engaged in 2017.</li> </ul>	Response received, no concerns or comments identified.
Member of Provincial Parliament (MPP) for Nickel Belt Riding	France Gélinas <a href="mailto:gélinas-co@ndp.on.ca">gélinas-co@ndp.on.ca</a>	<ul style="list-style-type: none"> <li>MPP representing the Nickel Belt Riding.</li> <li>Identified to have interest in the project. Updates have been provided throughout the project planning process.</li> <li>Engaged in 2013.</li> </ul>	Updates have regularly been provided throughout the project.
<b>Municipal</b>			
City of Greater Sudbury – Roads and Transportation Services Division	David Kalviainen, Roads Engineer <a href="mailto:David.Kalviainen@greatersudbury.ca">David.Kalviainen@greatersudbury.ca</a> Tony DeSilva, Operations Engineer <a href="mailto:Tony.DeSilva@greatersudbury.ca">Tony.DeSilva@greatersudbury.ca</a>	<ul style="list-style-type: none"> <li>The proposed access road route extending from Long Lake Road to Tilton Lake Road is situated within municipal limits.</li> <li>Contacted to discuss existing road conditions, by-law requirements, potential impacts and maintenance needs, and safety consideration associated with hauling on municipal roads.</li> <li>Engaged in 2017.</li> </ul>	Information provided by the City of Greater Sudbury has been incorporated into the road improvement design.



Name of Ministry/ Agency/Department/ Organization	Name and Contact Information	Rationale for Inclusion/ Year of Initial Engagement	Comments or Concerns Received
City of Greater Sudbury – Ward 9 Councillor	Deb McIntosh, Ward 9 <a href="mailto:deb.mcintosh@greatersudbury.ca">deb.mcintosh@greatersudbury.ca</a>	<ul style="list-style-type: none"> <li>• City councillor representing citizens along the proposed access road route.</li> <li>• Contacted to ensure information is shared and to gather feedback related to public interest.</li> <li>• Engaged in 2017.</li> </ul>	No specific concerns or comments provided. Updates to the project are provided regularly.
Conservation Sudbury (formerly Nickel District Conservation Authority)	Carl Jorgenson <a href="mailto:Carl.Jorgensen@conservationsudbury.ca">Carl.Jorgensen@conservationsudbury.ca</a>  Dennis Lenzi, Regulations Officer <a href="mailto:Dennis.Lenzi@conservationsudbury.ca">Dennis.Lenzi@conservationsudbury.ca</a>	<ul style="list-style-type: none"> <li>• The project is located within Conservation Sudbury’s jurisdiction.</li> <li>• Contacted to confirm permitting requirements under the <i>Conservation Authority Act</i> (1990).</li> <li>• Engaged in 2017.</li> </ul>	Advised that no permits are required for work on Crown Land.
Public Health Sudbury and Districts (formerly Sudbury and District Health Unit)	Burgess Hawkins, Manager – Health Protection Division <a href="mailto:hawkinsb@phsd.ca">hawkinsb@phsd.ca</a>  Stacey Laforest, Director Environmental Health <a href="mailto:laforests@sdhu.com">laforests@sdhu.com</a>	<ul style="list-style-type: none"> <li>• Public Health Sudbury and Districts (PHSD) issues a drinking water advisory to residents in the south bay of Long Lake in 2012.</li> <li>• Contacted to provide input related to drinking water quality, mitigation measures and long-term monitoring.</li> <li>• Engaged in 2015.</li> </ul>	Comments and concerns are summarized in Table 11.
<b>Other Stakeholders</b>			
Local Roads Board	[Redacted] [Redacted]  [Redacted] [Redacted]	<ul style="list-style-type: none"> <li>• Oversees the maintenance of public roads situated outside of the City of Greater Sudbury Limits.</li> <li>• The proposed road improvements will occur on roads overseen by the Local Roads Board.</li> <li>• Engaged in 2015.</li> </ul>	Comments and concerns are summarized in Table 11.

Name of Ministry/ Agency/Department/ Organization	Name and Contact Information	Rationale for Inclusion/ Year of Initial Engagement	Comments or Concerns Received
Tilton Lake Road Property Owners Association	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<ul style="list-style-type: none"> <li>Oversees interest of property owners along Tilton Lake Road with over 85 members.</li> <li>The proposed road improvements include Tilton Lake Road.</li> <li>Engaged in 2017.</li> </ul>	<p>Comments and concerns are summarized in Table 11.</p>
Broder Dill Snowmobile Association	<p>[REDACTED]</p> <p>[REDACTED].m</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<ul style="list-style-type: none"> <li>Oversees the maintenance of the snowmobile trail that follows the southern portion of the mine access road and transects north-northeast across TA-01.</li> <li>The remediation activities will impact the snowmobile trail.</li> <li>Engaged in 2015.</li> </ul>	<p>Comments and concerns are summarized in Table 11.</p>
Private Property Owner	<p>[REDACTED]</p> <p>[REDACTED]</p>	<ul style="list-style-type: none"> <li>Surface rights owner for parts of the mine site.</li> <li>The proposed rehabilitation activities and road improvements along the site access road has the potential to impact access to property.</li> <li>Engaged in 2019.</li> </ul>	<p>No specific concerns or comments provided.</p>
Long Lake Stewardship Committee	<p>[REDACTED]</p> <p>[REDACTED]</p>	<ul style="list-style-type: none"> <li>Group aims to preserve and protect the water quality, ecosystem, and natural habitat of Long Lake.</li> <li>Group has over 500 members and 9 directors.</li> <li>Engaged in 2013.</li> </ul>	<p>Comments and concerns are summarized in Table 11.</p>
Lakes End Road Campers Association	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<ul style="list-style-type: none"> <li>Oversees the interest of 19 property owners in the south end of Long Lake on Lakes End Road.</li> <li>The proposed road improvements include Lakes End Road.</li> <li>Engaged in 2015.</li> </ul>	<p>Comments and concerns are summarized in Table 11.</p>

Name of Ministry/ Agency/Department/ Organization	Name and Contact Information	Rationale for Inclusion/ Year of Initial Engagement	Comments or Concerns Received
Stewardship of Long Lake	[REDACTED]	<ul style="list-style-type: none"> <li>Group aims to protect the aquatic environment and water quality of Long Lake.</li> <li>Membership includes residents of Long Lake.</li> <li>Engaged in 2017.</li> </ul>	Comments and concerns are summarized in Table 11.
Ontario Federation of Anglers and Hunters	[REDACTED]	<ul style="list-style-type: none"> <li>Represents interest of anglers and hunters in the area.</li> <li>Engaged in 2015.</li> </ul>	Comments and concerns are detailed in Table 11.
Force for Nature	[REDACTED]	<ul style="list-style-type: none"> <li>Environmental interest group.</li> <li>Engaged in 2022.</li> </ul>	Comments and concerns are detailed in Table 11.
Lake Panache Campers Association	[REDACTED]	<ul style="list-style-type: none"> <li>Oversees the interest property owners on Lakes Panache.</li> <li>Engaged in 2021.</li> </ul>	Comments and concerns are detailed in Table 11.
Mining Claim Holder	[REDACTED]	<ul style="list-style-type: none"> <li>Mining claim holder.</li> <li>Engaged in 2013.</li> </ul>	Comments and concerns are detailed in Table 11.
<b>Indigenous Communities</b>			
Atikameksheng Anishnawbek	[REDACTED]	<ul style="list-style-type: none"> <li>Atikameksheng Anishnawbek is located adjacent to the west of the site. A portion of the wetland and rehabilitation project will occur on AAFN land.</li> <li>The community has been directly impacted by the contamination associated with the mine.</li> <li>Engaged in 2013.</li> </ul>	Additional details related to indigenous consultation are provided in Section 3.5.
United Chiefs and Councils of M'Nidoo M'Nising (UCCM)	[REDACTED]	<ul style="list-style-type: none"> <li>The North Channel of Lake Huron is the receiving environment of water flow from Long Lake and Round Lake, via Panache Lake and the Whitefish River.</li> <li>Contacted the Ministry in 2013 regarding interest in the project and potential impacts to communities.</li> <li>Engaged in 2013.</li> </ul>	Additional details related to indigenous consultation are provided in Section 3.5.
Sagamok Anishnawbek	[REDACTED]	<ul style="list-style-type: none"> <li>The project may provide economic opportunities to the community.</li> <li>Engaged in 2018.</li> </ul>	Additional details related to indigenous consultation are provided in Section 3.5.

Name of Ministry/ Agency/Department/ Organization	Name and Contact Information	Rationale for Inclusion/ Year of Initial Engagement	Comments or Concerns Received
Wiikwemkoong Unceded Territory	<div style="background-color: black; width: 100%; height: 1em; margin-bottom: 5px;"></div> <div style="background-color: black; width: 100%; height: 1em;"></div>	<ul style="list-style-type: none"> <li>• The project may provide economic opportunities to the community.</li> <li>• Engaged in 2022.</li> </ul>	Additional details related to indigenous consultation are provided in Section 3.5.

## 3.2 Information Sharing and Engagement Activities

The Ministry of Mines began initial engagement activities for this project in 2013 as part of preliminary investigation work. The objective of the information sharing, and engagement activities completed is to inform stakeholders, Indigenous communities and government agencies about the Project, the Class EA process and the findings technical studies that have been completed. The information sharing and engagement activities completed included notices, newsletters, and various information meetings, as described further in the following subsection.

### 3.2.1 Notifications

#### *Notice of Opportunity to Provide Input*

A Notice of Opportunity to Provide Input was posted as a bulletin notice on the Environmental Registry (ERO, formerly the Environmental Bill of Rights) on March 6, 2015 (EBR # 012- 3676), as well as the Ministry's Class EA webpage. Government representatives and agencies, stakeholders, and Indigenous communities were notified about the Notice of Opportunity to Provide Input via email. The notice was supported with a description of the project that fulfilled the requirements outlined in Section 4.2.2 of the Class EA. A copy of the notice, project description, and ERO Bulletin is provided in Appendix D. The public was able to provide input related to the undertaking through the ERO, however no comments were received during the comment period.

#### *Notice of Completion*

The Notice of Completion for this project was originally posted as a bulletin notice on the ERO (EBR# 013-1273) on August 25, 2017, as well as the Ministry's Class EA webpage. Government representatives and agencies, stakeholders, and Indigenous communities were notified about the notice via email. A copy of the notice and ERO bulletin is provided in Appendix D. The 2017 Notice of Completion was voluntarily withdrawn to address concerns raised by the public regarding the volume of haul traffic on public roads. These concerns resulted in the Ministry exploring the feasibility of alternative access road routes and the extraction of aggregate material closer to the project site. The project documentation was updated to incorporate the changes in the project parameters, additional consultation efforts, and recommendation made by the MECP for more detailed information, including how the project has addressed all Class EA requirements.

The revised Notice of Completion and updated project documentation was posted as a bulletin notice on the ERO (ERO #019-0488) on October 8, 2019, as well as the Ministry's Class EA Webpage. Government representatives and agencies, stakeholders, and Indigenous communities were notified about the revised noticed and updated to the project documentation via email. A copy of the notice and ERO bulletin is provided in Appendix D. The Ministry received 18 Part II Order requests from members

of the public, with nearly all the concerns related to safety on public roads. As a result, the Ministry procured additional investigations to ensure that the concerns are adequately addressed, and the road is safe for both construction and local traffic.

### 3.2.2 Newsletters

The Ministry has provided newsletters to potentially interested and affected stakeholders, government ministries and agencies, members of the public and Indigenous communities. The newsletters are distributed via email. Copies of the newsletters are provided in Appendix D with the Record of Consultation. A summary of the newsletters is provided below in Table 8.

**Table 8 – Project Newsletters**

Newsletter Issue/ Distribution Date	Contents
January 2021	<ul style="list-style-type: none"> <li>• Provided a summary of changes made to the Environmental Assessment Act.</li> <li>• Update on current project status and recent studies completed.</li> <li>• Overview of projects to be completed in the spring of 2021.</li> <li>• Summary of outstanding work to be completed prior to initiating construction.</li> <li>• Contact information of Ministry project lead.</li> </ul>
January 2022	<ul style="list-style-type: none"> <li>• Summary of outstanding work to be completed prior to initiating construction.</li> <li>• Project status and accomplishments from 2021-2022.</li> <li>• Overview of the project objectives for 2022-2023.</li> <li>• Contact information of Ministry project lead.</li> </ul>
February 2023	<ul style="list-style-type: none"> <li>• Summary of outstanding work to be completed prior to initiating construction.</li> <li>• Project status and accomplishments from 2021-2022.</li> <li>• Overview of the project objectives for 2022-2023.</li> <li>• Contact information of Ministry project leads.</li> </ul>

### 3.3 Meetings Held

The Ministry has held several public information sessions and meetings with government agencies, stakeholder groups and representatives throughout the project planning process. The purpose of the meetings has been to share information and to provide opportunity for the agencies, public and stakeholder groups to identify new concerns.

A summary of the meetings held is provided below in Table 9.

**Table 9 – Meetings Held**

Date	Location	Purpose/ Overview
February 25, 2013	Sudbury	<ul style="list-style-type: none"> <li>• Presentation and briefing with the Long Lake Stewardship Committee</li> <li>• Shared the results of arsenic sampling and provided an overview of proposed remediation work.</li> </ul>
November 27, 2013	Holiday Inn, Sudbury	<ul style="list-style-type: none"> <li>• Public information session.</li> <li>• The results of a Site Characterization Study were presented by the consultant, CH2M Hill, as well as the proposed options for the remediation.</li> <li>• 66 attendees</li> </ul>
June 12, 2014	Willet Green Miller Centre, Sudbury	<ul style="list-style-type: none"> <li>• Update meeting provided to the Long Lake Stewardship Committee.</li> </ul>
October 29, 2014	Countryside Arena, Sudbury	<ul style="list-style-type: none"> <li>• Long Lake Stewardship Committee Annual General Meeting.</li> <li>• The Ministry presented an update on the project.</li> </ul>
April 28, 2016	Willet Green Miller Centre, Sudbury	<ul style="list-style-type: none"> <li>• Update meeting provided to representatives from other ministry and municipal groups, including the SDHU and MNRF.</li> <li>• 20 attendees</li> </ul>
May 26, 2016	Holiday Inn, Sudbury	<ul style="list-style-type: none"> <li>• Project update meeting provided with more design details.</li> <li>• 46 attendees.</li> </ul>
May 29, 2016	Copper Cliff Arena, Copper Cliff	<ul style="list-style-type: none"> <li>• Presentation provided to the Long Lake Stewardship Committee outlining more design details and updates to the project.</li> </ul>
November 17, 2016	Laurentian University, Sudbury	<ul style="list-style-type: none"> <li>• Project update meeting provided with design details.</li> </ul>
June 6, 2017	Willet Green Miller Centre, Sudbury	<ul style="list-style-type: none"> <li>• Meeting with the Long Lake Roads Board.</li> <li>• Provided an update on the project. Concerns were identified related to impacts to roads.</li> </ul>
August 22, 2017	Willet Green Miller Centre, Sudbury	<ul style="list-style-type: none"> <li>• Meeting with Broder Dill Snowmobilers Associations.</li> <li>• Provided an update on the project and discussed potential impacts to trail use during and after the project.</li> </ul>
September 13, 2017	Holiday Inn, Sudbury	<ul style="list-style-type: none"> <li>• Public Information Session providing more design details.</li> <li>• 71 attendees</li> </ul>
October 5, 2017	Tom Davies Square, Sudbury	<ul style="list-style-type: none"> <li>• Meeting with the City of Greater Sudbury.</li> <li>• The purpose of the meeting was to discuss issues with hauling aggregate and material on public roads, including impacts to road conditions, by-law constrains, and safety considerations.</li> </ul>
October 13, 2017	Willet Green Miller Centre, Sudbury	<ul style="list-style-type: none"> <li>• Long Lake Roads Board and Ministry of Transportation.</li> <li>• The purpose of the meeting was to discuss</li> </ul>

Date	Location	Purpose/ Overview
		<p>anticipated maintenance concerns and costs arising from increased truck traffic on the roads.</p>
November 23, 2017	Sudbury District MNR Office, Sudbury	<ul style="list-style-type: none"> <li>• Update meeting with MNR and MINES staff.</li> <li>• 8 attendees</li> <li>• Provided an update on the Class EA and the status of the MOU for the work being completed within the Eden Township Conservation Reserve.</li> <li>• Identification of new aggregate resources and ARA permitting.</li> <li>• Feedback on ESA Authorizations.</li> </ul>
November 27, 2017	Teleconference	<ul style="list-style-type: none"> <li>• Meeting with the Ministry of Environment and Climate Change.</li> <li>• Provided an update on the project, Class EA process, and comments received through consultation.</li> </ul>
January 23, 2018	Sudbury District MNR Office, Sudbury	<ul style="list-style-type: none"> <li>• Update meeting with MNR and MINES staff.</li> <li>• Withdrawal of the NOC and overview of Part II Order requests received.</li> <li>• Status of the MOU for the work being completed within the Eden Township Conservation Reserve.</li> <li>• Update to the Class EA regarding how the MNR Class PPCR-EA is being considered.</li> <li>• MNR role in regulatory approvals.</li> <li>• Aggregate permit applications.</li> <li>• Need for additional species at risk surveys along Lakes End Road.</li> <li>• 8 attendees</li> </ul>
March 28, 2018	Sudbury District MNR Office, Sudbury	<ul style="list-style-type: none"> <li>• Provided the MNR an update on the project planning. Identified that the Ministry has interest in applying for permits under the aggregate resources act.</li> <li>• 7 attendees</li> </ul>
July 12, 2018	Willet Green Miller Centre, Sudbury	<ul style="list-style-type: none"> <li>• The Ministry met with the Mining Claim holder and business associates to discuss the proposed rehabilitation and potential impact to exploration activities.</li> </ul>
July 15, 2018	Lakes End Road, Sudbury	<ul style="list-style-type: none"> <li>• The Lakes End Road Campers Association annual general meeting.</li> <li>• The Ministry provided an update on the rehabilitation project.</li> <li>• 21 attendees</li> </ul>
July 25, 2018	Sudbury District MNR Office, Sudbury	<ul style="list-style-type: none"> <li>• The Ministry provided an update on the project planning and work to support application of aggregate permits.</li> </ul>
August 30, 2018	Long Lake Gold Mine, Sudbury	<ul style="list-style-type: none"> <li>• The ministry facilitated a site tour of the long Lake Gold Mine site with the MNR, MECP and AAFN.</li> </ul>
October 9, 2018	Teleconference	<ul style="list-style-type: none"> <li>• The Ministry contacted MECP-EA Branch to advice on ability to integrate external EA requirements in the MINES Class EA.</li> </ul>



Date	Location	Purpose/ Overview
November 8, 2018	Long Lake Gold Mine, Sudbury	<ul style="list-style-type: none"> <li>On-site meeting with the Broder- Dill Snowmobilers Association to discuss the placement of a snowmobile bridge on Luke Creek.</li> </ul>
March 18, 2019	Teleconference	<ul style="list-style-type: none"> <li>Meeting with the MECP to provide an overview of changes made to the proposed undertaking and to the Class EA Project Documentation.</li> </ul>
March 26, 2019	Teleconference	<ul style="list-style-type: none"> <li>The Ministry provided an overview to the MNRF of changes made to the project and the Class EA project documentation.</li> <li>Discuss aggregate permit application process, outstanding work and permitting for species at risk.</li> </ul>
May 21, 2019	Teleconference	<ul style="list-style-type: none"> <li>Meeting with the Broder-Dill Snowmobilers Association to discuss the proposed aggregate pit and recommendations to mitigate potential impacts to members.</li> </ul>
July 14, 2019	Lakes End Road, Sudbury	<ul style="list-style-type: none"> <li>Lakes End Road Campers Association Annual General Meeting. The Ministry provided the association an update on the project, recent water quality results, and potential concerns regarding the proposed aggregate pit.</li> </ul>
October 8, 2019	Northbury Hotel and Conference Centre, Sudbury	<ul style="list-style-type: none"> <li>Public Information Session providing an update on the project and the revised approach for acquiring aggregate material.</li> </ul>
December 16, 2019	Holiday Inn, Sudbury	<ul style="list-style-type: none"> <li>Public Information Session for the revised Notice of Completion.</li> </ul>
February 22, 2021	Teleconference	<ul style="list-style-type: none"> <li>Meeting with the Tilton Lake Road Property Owner's Association providing an overview of the site access alternatives evaluation completed.</li> </ul>
June 22, 2021	Teleconference	<ul style="list-style-type: none"> <li>Public Information Session providing the results of the access road evaluation and proposed mitigation measures to address concerns with haul traffic.</li> </ul>
June 24, 2021	Teleconference	<ul style="list-style-type: none"> <li>Public Information Session providing the results of the access road evaluation and proposed mitigation measures to address concerns with haul traffic.</li> </ul>
March 17, 2023	Willet Green Miller Centre, Sudbury	<ul style="list-style-type: none"> <li>Provided the Tilton Lake Road Property Owners Association with an update on the project and proposed road improvements on Tilton Lake Road.</li> </ul>
May 17, 2023	Tilton Lake Road, Wavy Lake Roads, Sudbury	<ul style="list-style-type: none"> <li>Meeting with the Local Roads Board and MTO to review concerns along the roadway.</li> </ul>
June 26, 2023	Teleconference	<ul style="list-style-type: none"> <li>Provided an update to MPP France Gelinis regarding the project and anticipated next steps.</li> </ul>
November 21, 2023	Holiday Inn, Sudbury	<ul style="list-style-type: none"> <li>Stakeholder information session providing an overview of the proposed road improvement design.</li> </ul>

It is noted that the consultation and engagement efforts were temporarily halted in 2020 due to changes in Ministry staff and the COVID-19 global pandemic. The Ministry

continued to provide project updates to the public during this time on an as needed basis.

### 3.4 Stakeholder Communications Committee

In May 2023, a Stakeholder Communications Committee (SCC) was formed between the Ministry and representatives from the following stakeholder groups:

- Tilton Lake Road Property Owners Association
- Broder Dill Snowmobile Association
- Private Property owner
- Long Lake Stewardship Committee
- Lakes End Road Campers Association
- Stewardship of Long Lake
- Local Roads Board
- Force for Nature

The purpose of the SCC was to serve as a consultative body for communicating key information to the public. The SCC consists of representatives from groups that could potentially be affected by activities associated with road construction and site rehabilitation, with the objectives of ensuring that all key stakeholders receive regular and consistent updates and information in an efficient manner, as well as to discuss project progress and resolve problems that might arise during construction, where possible. The committee is intended to be a forum for the two-way channel of communication to share information and respectfully discuss issues and solutions that may arise during planning or during construction.

A summary of meetings held with the SCC is provided below in Table 10. Meeting minutes and supporting material are included in Appendix D with the *Record of Consultation*.

**Table 10 – Summary of Stakeholder Communications Committee Meetings**

Meeting Date	Location	Overview of Meeting
May 2, 2023	Teleconference	<ul style="list-style-type: none"> <li>• Introduction of MINES staff and stakeholder representatives.</li> <li>• Provided an overview of Terms of Reference and Draft Code of Conduct.</li> <li>• Update on current project status and upcoming activities.</li> </ul>
June 6, 2023	Willet Green Miller Centre, Sudbury/ Teleconference	<ul style="list-style-type: none"> <li>• Approval of minutes from May 2<sup>nd</sup> meeting, new member introductions, and approval of revised Terms of References/ Code of Conduct.</li> </ul>

		<ul style="list-style-type: none"> <li>• Overview of the prioritization of the LLGM site, Class EA discretionary decisions, and the Local Roads Board Meeting.</li> </ul>
September 19, 2023	Willet Green Miller Centre, Sudbury/ Teleconference	<ul style="list-style-type: none"> <li>• Approval of minutes from June 6<sup>th</sup> meeting, new member introductions, project schedule.</li> <li>• Overview of the original 2017 design and aggregate estimates, update on volume estimates/ truck traffic, update on the permitting for the Crown and Wavy Trail Pit.</li> </ul>
October 4, 2023	Willet Green Miller Centre, Sudbury/ Teleconference	<ul style="list-style-type: none"> <li>• Approval of minutes from September 19<sup>th</sup> meeting.</li> <li>• Overview of proposed road improvements along each section of road.</li> </ul>
November 14, 2023	Willet Green Miller Centre, Sudbury/ Teleconference	<ul style="list-style-type: none"> <li>• Approval of minutes from October 4<sup>th</sup> meeting.</li> <li>• Overview of the material to be presented at the upcoming stakeholder information session.</li> </ul>

### 3.5 Comments/ Concerns/Issues and Resolution

A summary of key comments and concerns received from stakeholders, government ministries and agencies and proposed resolution is provided below in Table 11. Correspondences are included in Appendix D with the detailed Record of Consultation.

**Table 11 – Summary of Comments/ Concerns/ Issues and Resolution**

Name of Ministry/ Agency/Department/ Organization/ Individual	Comment/ Concern/ Issues	Response/ Resolution
<b>Federal</b>		
Canadian Environmental Assessment Agency (CEAA)	CEAA verbally advised the Ministry in December 2013 that the project does not trigger requirements under the federal Canadian Environmental Assessment Act.	Project planning will be completed in accordance with the MINES Class EA process.
Environment Canada and Climate Change – Canadian Wildlife Service  Lesley Dunn, Regional Director	The Canadian Wildlife Service indicated in a letter dated September 11, 2017, that the critical habitat of federal species at risk does not occur within the project area and the project is unlikely to result in the damage or destruction of residences under SARA. No federal species at risk permits are required to complete the work.	Mitigation measures for species at risk are included in Section 6 of this Class EA.
Department of Fisheries and Oceans Canada  Debbie Ming, Regional Manager – Fisheries Protection Program	The DFO indicated in a letter dated October 27, 2014, that there are no SARA species, or their habitats identified in the project area and no additional approvals required under SARA. They also confirmed that no formal approvals are required under the Fisheries Act provided that the mitigation measures outlined in the Request for Review are adhered to.	Mitigation measures for the protection of fish and fish habitat are included in Section 6 of this Class EA.
<b>Provincial</b>		
Ministry of Natural Resources and Forestry  Robert Herbst, Land and Water Technical Specialist	In an email dated January 29, 2013, it was indicated that no new roads are permitted through the Conservation Reserve, although existing trails do have the potential to be upgraded. It was also indicated that Luke Creek is a cold-water thermal regime and no in-water work will be permitted from September 1 <sup>st</sup> to June 15 <sup>th</sup> . It was additionally indicated that species at risk have the potential to be	No new roads will be constructed through the Conservation Reserve and no in-water work completed from September 1 <sup>st</sup> to June 15 <sup>th</sup> . Mitigation measures to protect the species of conservation interest in the Conservation Reserve, fish habitat, and species at risk are summarized in Section 6 of the Class EA.


Name of Ministry/ Agency/Department/ Organization/ Individual	Comment/ Concern/ Issues	Response/ Resolution
	encountered in the area and the access the potential to cross an archaeological potential area. A work permit may be required from the Nickel District Conservation Authority for water crossings and from the MNRF for roads, trails and/or water crossings.	
Ministry of Natural Resources and Forestry  Mike Hall, Management Biologist	In an email dated November 24, 2017, it was recommended that species at risk surveys for Blanding’s Turtles, Eastern Whip-poor-will and Eastern Massasauga be completed to confirm species presence/ absence and/or habitat.	Species at risk surveys completed are summarized in Section 6 of the Class EA.
Ministry of Environment and Climate Change - Drinking Water and Environmental Compliance Division – Northern Region  Rossana White, Environmental Planner/ EA Coordinator	The Ministry of Environment and Climate Change provided a response to the Notice of Opportunity to Provide Input in a letter dated April 21, 2015. The letter reiterated the Class EA requirements for a Category C project and had several questions related to the cover and monitoring that will be completed during the work.	The Ministry has ensured that all Class EA requirements are met. Details related to the impoundment and cover are provided in Section 1.3 of this Class EA. Monitoring to be completed during and after the construction activities is included in Section 9.
Ministry of the Environment and Climate Change – Environmental Approvals Branch  Annamaria Cross, Manager – Environmental Assessment Services Section	The MOECC indicated in a letter dated October 16, 2017, that the Part II Order requests received for the project will be deferred to allow time for further discussion between the Ministry and the requester.	The Ministry met with the requester and continued consultation efforts for the Project. However, the Notice of Completion was withdrawn. A summary of consultation efforts is provided in Section 3 of this Class EA.
Ministry of the Environment and Climate Change – Drinking Water and Environmental Compliance Division – Northern Region  Anneleis Eckert, EA Coordinator	The MOECC provided a letter dated September 29, 2017, providing comments related to the Class EA Project Documentation. The primary concern identified was that the level in detail was not reflective of the complexity of the project.	The project documentation has been updated based on the comments provided by the MOECC EA Branch.
Ministry of the Environment and	The MOECC provided a letter dated December	The Ministry has ensured that all Class EA

Name of Ministry/ Agency/Department/ Organization/ Individual	Comment/ Concern/ Issues	Response/ Resolution
Climate Change – Environmental Approval Branch  Kathleen O’Neill, Director	22, 2017, acknowledging the Ministry’s withdrawal of the 2017 Notice of Completion for the Long Lake Gold Mine Project. It was indicated that the project was no planned in accordance with the MINES Class EA.	requirements have been met. A description of how Class EA requirements have been met is included in Section 11 of this Class EA.
Ministry of the Environment, Conservation and Parks – Environmental Assessment and Permissions Branch  Callee Robinson, Project Evaluator	The MECP- EA Branch provided comments on the project documentation in a letter dated March 29, 2019. The MECP recommended that additional information and justification for the screening results, clarity to the alternatives analysis completed, and a description of how the Category C requirements have been met.	Additional justification for the screening of the of project has been included in Appendix B, the updated alternatives analysis is provided in Section 7, and a description of how the Category C requirements have been met is included in Section 11 of this Class EA.
Ministry of Environment, Conservation and Parks - Drinking Water and Environmental Compliance Division – Northern Region  Carrie Hutchison, Environmental Assessment Coordinator/ Environmental Resource Planner	The MECP – EA Branch provided comment on the draft project documentation in a letter dated March 29, 2019. Recommendations provided by the MECP include, but is not limited to the following: <ul style="list-style-type: none"> <li>• Clarity in the alternatives analysis completed.</li> <li>• Baseline data and monitoring programs are needed to address areas such as air quality, groundwater, and surface water monitoring.</li> <li>• Ambient air quality monitoring is needed to verify that there are no significant air quality impacts for the potential receptors.</li> <li>• Several sections were indicated that required updating.</li> </ul>	The project documentation has been updated to address the comments provided by the MECP- EA Branch.
Ministry of Environment, Conservation and Parks - Ontario Parks Operations – Northeast Zone,	Ontario Parks provided a letter dated November 6, 2019, with several recommendations related to the proposed road upgrades through Eden Township	All recommendations provided by Ontario Parks have been incorporated into the road design. All work within the conservation reserve will be completed as per the

Name of Ministry/ Agency/Department/ Organization/ Individual	Comment/ Concern/ Issues	Response/ Resolution
Jaclyn Brown, Protected Area Lands Technical Specialist – Conservation Reserves	Conservation Reserve.	conditions of an agreement made with the MECP (see Appendix C). Additional mitigation measures to protect values of conservation interest are included in Section 6 of this Class EA.
Ministry of Environment, Conservation and Parks – Lands and Water Division – Species At Risk Branch  Lindsay McColm, Northern Species at Risk Specialist	In an email dated September 9, 2022 the MECP recommended that further studies be completed to confirm the use of the project by species at risk bats.	The Ministry has retained a consultant to complete additional studies for bat species at risk.
<b>Municipal</b>		
Sudbury District Health Unit (SDHU) Stacey Laforest, Director – Environmental Health Division	The SDHU provided a response to the Notice of Opportunity to Provide Input in a letter dated April 20, 2015. The letter indicated concerns related to escape of tailings into other areas of the lake during the remediation activities and the potential for previously submerged tailings to be exposed in the future. They also recommended that considerations be made for long-term monitoring and to ensure that ground water is protected from potential future contamination.	Mitigation measures to minimize the escape of resuspended tailings outside of the work area is provided in Section 6 of this Class EA. The effects of climate change and lower lake levels has been considered in the remediation plan to ensure that submerged tailings are not exposed in the future. Monitoring to be completed during and after the construction activities is included in Section 9. The monitoring program considers groundwater to ensure contaminants are attenuating after the sources have been removed.
Dennis Lenzi, Regulations Officer Conservation Sudbury	In an email dated November 21, 2017, it was advised that a permit is not required under the Conservation Authority Act if the work is being completed on Crown Land.	The Ministry will continue to share information with the Conservation Authority throughout the project.
<b>Other Stakeholders</b>		
Broder- Dill Snowmobilers’ Association	The Broder-Dill Snowmobilers’ Association indicated in an email dated March 9, 2015 and	The Ministry has ensured that an alternative route for the trail has been incorporated into

Name of Ministry/ Agency/Department/ Organization/ Individual	Comment/ Concern/ Issues	Response/ Resolution
	November 19, 2018, that their C108D trail passes through TA-01. The project activities will result in the permanent loss of the trail.	the project design.
Ontario Federation of Anglers & Hunters (OFAH) [REDACTED]	The OFAH provided a response to the Notice of Opportunity to Provide Input in a letter dated April 16, 2015. The letter indicated concerns over the lack of fisheries assessments completed within Luke Creek. They also indicated that any road upgrades completed to support the project should not result in new access restriction for existing users and that roads should remain open after the completion of the work.	The Ministry has completed several fisheries assessments to confirm use by species within Luke Creek. Detailed related to these assessments are provided in Section 4.3 of this Class EA. There are no access restrictions proposed to any existing public roads and all existing roads will remain open after the completion of the work.
Claim Holder [REDACTED]	The claim holder expressed concerns in an email dated December 4, 2013, that the project may affects the value of his claims and access to the area.	The rehabilitation strategy does not involve the extraction of any material and will improve access to the site.
Lakes End Road Campers Association	An email was provided in on April 19, 2015. The main concern raised was related to safety of the Lakes End Road campers and guests due to increase truck traffic and the current condition of the road.	The proposed road improvements will include the reconstruction of Lakes End Road. The improvements will make the road safer for both local and construction traffic. The design drawings are provided in Appendix X.
	Concerns were raised via phone on March 11, 2015, related to impacts to the lake during the removal of the fugitive tailings.	Mitigation measures to minimize the escape of resuspended tailings outside of the work area is provided in Section 6 of this Class EA.
	The Lakes End Campers Association expressed concerns related to the lengthy process for the project in a letter addressed to the Minister.	The Ministry provided an update on the project, recent deliverables completed, and timeline for the rehabilitation work.



Name of Ministry/ Agency/Department/ Organization/ Individual	Comment/ Concern/ Issues	Response/ Resolution
Long Lake Stewardship Committee	Concerns were raised in an email dated April 4, 2023, regarding the lengthy process for the project.	The Ministry provided an update on the project, recent deliverables completed, and timeline for the rehabilitation work.
Lake Panache Campers Association	The Lake Panache Campers Association expressed concerns in a letter dated April 7, 2021, related to elevated arsenic in Lake Panache and the lengthy process for the project.	The Ministry provided an update on the project, recent deliverables completed, and timeline for the rehabilitation work.
Vermillion Forest Management Company 	The Vermillion Forest Management Company provided input related to the use of the Halifax Road alternative for accessing the site.	The Halifax Road alternative for accessing the site has been eliminated. Additional details about the alternative analysis is provided in Section 7 of this Class EA.
Tilton Lake Road Property Owners Association	The Tilton Lake Road Property Owners Association provided a letter to the Minister dated February 5, 2020. The letter expressed concerns related to the project, particularly the safety risks associated with hauling on public roads and the assessment of the Halifax Road extension alternative.	Additional investigations have been completed to ensure the roads are safe for both construction and local traffic. The additional investigation is detailed in Section 4 of this Class EA. The alternative analysis is provided in Section 7 of this Class EA, including justification as to why the Halifax Road extension was not the preferred alternative.
Force For Nature	<p>Several concerns have been raised since late 2022 related to environmental impacts of the project, including, but not limited to the following:</p> <ul style="list-style-type: none"> <li>• Impacts to the Eden Township conservation reserve due to the development of the Crown Pit and road improvements.</li> <li>• Impacts to species at risk and other wildlife.</li> <li>• The development of the Crown Pit and Wavy Trail pit for aggregate sources, as opposed to utilizing an off-site source or</li> </ul>	The roadwork through the Eden Township Conservation Reserve will follow the existing road footprint and all work completed in accordance with an agreement made with the MECP (Appendix C). Technical studies related to species at risk are provided in Section 4.4 of this Class EA. Applicable authorizations will be obtained under the ESA prior to the proposed work (see Section 8). The use of the Crown Pit and Wavy Trail for aggregate sources were selected as the preferred alternative due to the reduced

Name of Ministry/ Agency/Department/ Organization/ Individual	Comment/ Concern/ Issues	Response/ Resolution
	<p>the Round Lake Pit.</p> <ul style="list-style-type: none"> <li>• Involvement of the Conservation Authority with the project and review of material.</li> </ul> <p>In addition to the above criticism has been made related to the consultation completed by the Ministry for this project and aggregate permitting.</p>	<p>environmental impacts, as detailed in the Alternative Analysis (Section 7). Although the Conservation Authority does not have authority in this project, the Ministry continually provides the Conservation Authority opportunity to provide comment. The consultation efforts completed for the project exceeded the minimum requirements for a Category C undertaking, as described in Section 4.2.2 of the Class EA</p>

### 3.6 Indigenous Consultation

Indigenous communities contacted as part of this Class EA are summarized above in Table 7. Correspondence with Indigenous Communities is included in Appendix E.

#### 3.6.1 Atikameksheng Anishnawbek

Early engagement activities with Indigenous Communities focused on Atikameksheng Anishnawbek First Nation due to the direct impacts the mine has on the community. Project activities occur within the traditional territory of AAFN and the arsenic contamination associated with the mine has had direct impacts on natural resources utilized by the community. The Ministry has maintained regular community with AAFN throughout the planning phases of this project and notifies the community of any work or sampling completed on their traditional land. Community representatives have participated in several site visits and ongoing water sampling programs.

The ministry has organized biweekly meetings with AAFN to ensure the community is informed about the project and work being proposed. The community has been informed of all public information sessions held related to the project. In addition, numerous information sessions have been provided to the community, as summarized below in Table 12. All presentation material and meeting minutes are included in Appendix E.

**Table 12 – Atikameksheng Anishnawbek Information Sessions**

Date	Meeting Overview
December 16, 2013	The Ministry and CH2MHill provided a presentation sharing the results of a site characterization study and the extent of the soil and water contamination. Proposed remediation strategies were also shared.
April 27, 2015	The Ministry provided an update on the progress of the project and planned detail design work to be completed by SNC Lavalin. An overview of potential economic opportunities was also provided.
July 20, 2017	The Ministry provided an update of the project and sought input from the community on the proposed cleanup, a restoration alternative for the wetland, as well as economic opportunities.
December 15, 2017	The Ministry provided an update to the project, including proposed changes to the undertaking in response to comments received during the 2017 Notice of Completion consultation period.
February 8, 2018	The Ministry provided an update to the project, including proposed changes to the undertaking in response to comments received during the 2017 Notice of Completion consultation period.
October 24, 2023	The Ministry and Parslow Heritage Consulting provided an overview of the Heritage Impact Assessment being completed

	as part of the Class EA process and sought feedback from community members regarding mitigation measures for heritage attributes.
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In addition to the meetings outlined above, the Ministry has met directly with Chief and Council and/or AAFN staff on numerous occasions to provide updates and to discuss the project.

**Table 13 – Atikameksheng Anishnawbek Meetings – Chief and Council.**

Date	Overview
February 2016	The Ministry provided an update to Chief and Council on findings indicating a greater extent of soil contamination within the Luke Creek wetland area, as well as proposed remediation options.
October 2, 2017	The Ministry provided an update to Chief and Council and discussed permission requirements and information needed to complete rehabilitation work on AAFN reserve land. The community’s interest in selling aggregate for the project was also discussed.
September 26, 2018	The Ministry met with the newly elected Chief and Council to provide an update on the project.
May 3, 2023	The Ministry met with the new Director of Resource Development and Consultation Lead to provide an overview of the project.

The Ministry continually engages AAFN to ensure they are informed about the project and that the community is provided training and/or economic opportunities. Concerns historically raised by AAFN as part of the engagement are mostly related to the health risks to community members due to exposure of arsenic and lack of federal involvement in the project. Concerns have also historically been raised related to the proposed use of the community’s aggregate resources (Round Lake pit) and updates to the historical mine access road, however these alternatives for site access and aggregate have since been eliminated (See Section 7).

**3.6.2 United Chiefs and Council of M’Nidoo M’Nising (UCCM)**

The United Chiefs and Council of M’Nidoo M’Nising (UCCM) represents six Indigenous communities situated along the North Channel of Lake Huron, including Aundeck Omni Kaning First Nation, Whitefish River First Nation, M’Chigeeng First Nation, Sheshegwaning First nation, Sheguindah First Nation, and Zhiibaahaasing First Nation. The nearest community represented by UCCM from the Long Lake Gold Mine is Whitefish River located approximately 45 km southwest from the Long Lake delta.

On April 16, 2013, the ministry was notified by the MNRF that a representative from UCCM had concerns related to human health and environment risks associated with the arsenic contamination at the mine in the North Channel of Lake Huron. Surface water from Long Lake flows into downstream Round Lake, followed by Panache Lake and the

Whitefish River, where it discharges into the North Channel of Lake Huron. The ministry met with UCCM on May 23, 2013 to provide information on the extent of the arsenic contamination, proposed rehabilitation activities, and to answer any questions or concerns related to the project. The ministry continues to maintain communication with UCCMM.

### **3.6.3 Sagamok Anishnawbek**

The community of Sagamok Anishnawbek First Nations is situated approximately 75 km southwest from the Long Lake Gold Mine. The community contacted the ministry on May 7, 2018, regarding the status of the project and expressed concerns related to impacts of the mine on the watershed and community. The community is located south of the Spanish River, within the Northern Lake Huron Watershed. In response to the concerns, the ministry provided the community with watershed mapping demonstrating that impacts to the Northern Lake Huron Watershed are not anticipated.

### **3.6.4 Wiikwemkoong Unceded Territory**

Wiikemkoong Unceded Territory is located approximately 70km southwest from the Long Lake Gold Mine, on Manitoulin Island, along the North Channel of Lake Huron. The Ministry was contacted by a member of Wiikemkoong Unceded Territory in June 2022 regarding the Long Lake Rehabilitation project and opportunities for economic development. The Ministry has since ensured to notify Wiikwemkoong Unceded Territory of procurement opportunities.

## **4 Technical Studies**

This document has been prepared with relevant findings from technical studies that were used to inform this Class EA. The technical reports have not been appended to this document but may be made available to the public upon request. A chronological list of technical studies completed for the Long Lake Gold Mine and a weblink to download studies procured by the Ministry is included in Appendix F. A summary of pertinent information gleaned from these reports is provided below.

### **4.1 Site Inspection Reports**

The following site inspection reports have been completed for the mine hazards at the Long Lake Gold Mine:

- 1) Ministry of Natural Resources, 1984. File Notes- Long Lake Gold Mine. Dated: December 17, 1984
- 2) Ministry of Northern Development and Mines, 1999. A Site Assessment of the Long Lake Gold Mine and Associated Hazards. Dated: July 1999.
- 3) DST Consulting Engineers Inc. 2000. Site Assessment Report Dated: July 17, 2000

The abovementioned reports provided an overview of the mine hazards at the site, including the tailings area. According to the 1999 Site Assessment report, a cap of fine-grained sand was placed on the tailings area by the Ministry of Labor. The sand cap has a depth of approximately 12-18 inches. The report concluded that more studies are needed to determine if the tailings have eroded into Long Lake. The 2000 Site Assessment Report similarly indicated that more studies are required to determine if any environmental impacts have occurred from the unconfined tailings.

## 4.2 Surface Water Technical Reports and Groundwater Monitoring

Surface water quality at the Long Lake Gold Mine has been monitored intermittently since 1976. Technical reports available for review related to surface water quality included the following:

- 1) Ministry of the Environment, 1988. Technical Memorandum: Impacts of Luke Creek on Long Lake, 1987. Dated: February 9, 1988.
- 2) Ministry of the Environment, 1990. Technical Memorandum: Effects of Tailings Drainage on Water Quality of Luke Creek. Dated: March 1, 1990
- 3) SNC Lavalin, 2015. Bathymetric Survey of the Tailings in Long Lake, Technical Memorandum. Dated: October 21, 2015. \
- 4) SNC Lavalin, 2016. Flow Estimate in Luke Creek, Greater Sudbury, Ontario. Technical Memorandum. Date: August 2, 2016

In addition to the above, several certificates of analysis for surface water samples collected by the Ministry of Environment (MOE) in 2002, 2011 and 2012 were available for review. In 2012, the Ministry of Mines implemented an annual surface water monitoring sampling program with samples collected from the mine site, Round Lake located on AAFN reserve land, the south bay of Long Lake and extending to the north end in Long Lake to Moxam's Landing. In 2020, the Ministry implemented an annual environmental monitoring program consisting of surface water and groundwater sampling. The program was carried out by Pinchin in 2020/2021, Blue Metric Environmental Inc in 2021/2022, and Froskr in 2022/2023.

A summary of pertinent information from the above technical reports and water quality data is provided below.

### ***Ministry of the Environment, 1988. Technical Memorandum: Impacts of Luke Creek on Long Lake, 1987.***

Surface water, sediment and invertebrate samples were collected by the Ministry of Environment (MOE) in 1987 to assess the effects of tailings runoff to Long Lake. Samples were collected from three control sites, located in the north bay of Long Lake, as well as impact sites located at the mouth of Luke Creek/ Long Lake Delta. The study found that arsenic and iron exceeded the PWQO in the sample collected nearest to

Luke Creek and concentrations of nickel and copper were elevated in all samples collected. The sampling location nearest to Luke Creek was also found to have lowest diversity and abundance of benthic invertebrates. The sediment samples had elevated metals in both the control and impacted sites. The report concluded that impacts associated with the tailings are localized to the outflow of Luke Creek, with little impacts to Long Lake.

***Ministry of Environment, 1990. Technical Memorandum: Effects of Tailings Drainage on Water Quality of Luke Creek.***

Water quality data collected between 1976 and 1989 was compiled to determine the effects of the Long Lake Gold Mine tailings drainage on Luke Creek. Samples have historically been obtained from the drainage channel downstream of TA-01 and in Long Lake at the outflow of Luke Creek. Two additional sampling locations were included in 1989, one in Luke Creek downstream of the mine drainage channel and one upstream where impacts from the mine have not occurred. The analytical results indicate that concentrations of copper, nickel, zinc, iron, aluminum, and arsenic exceed the PWQO in all samples collected downstream of the tailings area. Arsenic is noted to consistently exceed the ODWS in all downstream samples, with values ranging from 30 µg/L to 16,000 µg/L. The greatest impacts were observed in the drainage channel downstream of TA-01. The sample collected upstream of Luke Creek, where no impacts from the mine have occurred, met the PWQO for all analyzed parameters except for aluminum. The report concluded that concentrations of arsenic decrease with distance from the tailings area and improvements in water quality reportedly have occurred over the past decade.

***SNC Lavalin, 2015. Bathymetric Survey of the Tailings in Long Lake.***

As part of the detailed design of the rehabilitation activities, a bathymetric survey of the tailings migrated into Long Lake was completed by SNC Lavalin. The survey encompassed an area of approximately 4 hectares that included the tailings delta and surrounding area. The results were used to estimate the volume of tailings requiring excavation and relocation. The water surface elevation at the time of the survey ranged from 227.19 to 226.64 m, with an average of 227.09 m. The tailings within the delta is reportedly completely submerged in the spring when the water level is highest.

***SNC Lavalin, 2016. Flow Estimate in Luke Creek, Greater Sudbury, Ontario. Technical Memorandum.***

Flow measurements in Luke Creek were obtained to support the detailed design of the rehabilitation. The measurements were collected using a portable flow velocity meter at four locations within Luke Creek. The flow values ranged from 126.5 L/min to 528 L/min.

### *Ministry of Environment Water Quality Analytical Results: 2002, 2011 and 2012*

Certificates of analysis for surface water samples collected by the MOE in 2002, 2011 and 2012 were available for review. It is noted that arsenic was not analyzed in the samples collected in 2002. In 2011, all four samples collected downstream of the tailings area had concentrations of arsenic greater than the ODWS, with values ranging from 38 µg/L in Long Lake at the outflow of Luke Creek to 3,100µg/L at the drainage channel downstream of TA-01. Samples collected in 2012 included one location downstream of the drainage channel within Luke Creek, two at the Long Lake delta, and nine locations throughout Long Lake. All surface water samples collected downstream of Luke Creek and in the south bay of Long Lake had arsenic concentration greater than the ODWS, with values ranging from 34 µg/L at the Luke Creek discharge, approximately 16 m below the water surface, to 480 µg/L in Luke Creek downstream of the mine drainage channel. The exceedances in arsenic from the samples collected in the south bay of Long Lake ultimately triggered the drinking water advisory to property owners and prioritization for the current remediation project.

### *Ministry of Mines, Water Quality Analytical Results, 2012 – present*

The Ministry of Mines implemented an annual surface water sampling program in 2012. Samples have historically been collected from the mine drainage channel, Luke Creek, throughout Long Lake, Round Lake, and extending as far down stream as Lake la Vasse and Lake Panage. The monitoring program was completed by Pinchin in 2020/2021, Blue Metric Environmental in 2021/2022, and Froskr in 2022/2023.

The historic water quality data indicates that, in addition to arsenic, exceedances in several other metals have been observed downstream of the mine including aluminum, cadmium, cobalt, copper, iron, manganese, nickel, and zinc. Arsenic is noted to consistently exceed the PWQO and/or ODWS in the surface water samples collected from the mine drainage channel, Luke Creek, and within the south bay of Long Lake. Surface water samples collected from the Long Lake channel and the north portion of Long Lake met the applicable guidelines. Similarly, samples collected from Lake Panage and Lake la Vase had concentrations of arsenic below the laboratory detection limit. The concentrations of arsenic in Round Lake generally met the applicable provincial and federal guidelines, however it is recognized that elevated arsenic has occasionally been observed from samples collected at the Long Lake outlet to Round Lake.

Groundwater underlying the mine has been sampled intermittently since 2013 as part of other contaminant assessments (See Section 4.7). An annual groundwater monitoring program was implemented in 2020 at several existing wells situated within the tailings' areas, and new monitoring wells installed in 2022 adjacent to Luke Creek, the wetland and background locations. The new wells adjacent to Luke Creek reveal a small and seasonally reversing hydraulic head difference between Long Lake and the wetland



south of the Luke Creek delta. This supports recent investigations that suggest contaminants stored in some of the wetland sediments are stable and not contributing to the arsenic loading into Long Lake (GHD 2023c).

Groundwater underlying the site contains several metals, particularly arsenic, with concentrations greater than the applicable Ministry of the Environment (2011) *Soil, groundwater and sediment standards for use under Part XV.1 of the Environmental Protection Act* (Site Condition Standards). Elevated metal concentrations in the bedrock groundwater table is likely impacted by local natural mineralization.

Flow monitoring of Luke Creek was initiated in 2020 as part of the environmental monitoring program. A summary of the flow monitoring results is provided below in Table 14.

**Table 14 – Luke Creek Flow Data**

Parameter	Summer (2020)		Fall (2020)		Summer (2021)		Fall (2021)		Spring (2023)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Temperature (°C)	11.5	23.5	3.5	17.5	13.994	35.084	1.936	18.894	NA	NA
Water Level (m)	0.026	0.24	0.040	0.37	NA	NA	NA	NA	NA	NA
Flow Rate (m <sup>3</sup> /sec)	0.00052	0.22	0.00085	0.33	0.0056	0.0326	0.0591	0.2204	0.04	1.48

### 4.3 Fisheries Assessments

Monitoring of fisheries population within the receiving environment was initiating in 2013. Technical reports available for review related to fish and fish habitat include the following:

- 1) Ministry of Environment and Climate Change. 2013. Memorandum: Long Lake (Sudbury)- arsenic and other metals in 2013 fish samples. Dated: July 17, 2014
- 2) Anishinabek/Ontario Fisheries Resource Centre. 2014. Atikameksheng Anishnawbek First Nation Round Lake Fall Walleye Index Netting, 2011. Dated: April 22, 2014
- 3) Moggy Environmental, 2015. Summary Report for the Environmental Sampling of Round Lake. Dated: November 2015.
- 4) Wood Environment & Infrastructure Solutions, 2021a. Long Lake Gold Mine Aquatic Assessment (2020) Existing Conditions Report. Dated: February 10, 2021/
- 5) Wood Environment & Infrastructure Solutions, 2021b. Long Lake Gold Mine Spring and Summer Aquatic Assessment (2021) Existing Conditions Report. Dated: November 18, 2021.

A summary of pertinent information from the above fisheries assessment is provided below.

***Ministry of Environment and Climate Change. 2013. Memorandum: Long Lake (Sudbury – Arsenic and Other Metals in 2013 Fish Samples.***

The Ministry of Environment and Climate Change (MOECC) collected fish samples from Long Lake in September and October of 2013 in response to community concerns regarding fish consumption and water quality impacts. Cisco, walleye, northern pike, smallmouth bass, and white sucker were collected from the south bay of Long Lake, and brown bullhead was additionally collected from the central basins of the lake. The analysis of fish tissue found that arsenic, selenium, mercury, and chromium were elevated in walleye, cisco, and smallmouth basin. Elevated metals arsenic was especially apparent in cisco. Cisco collected from the south basin of long lake had significantly higher arsenic concentrations, as well as selenium and chromium, compared to fish collected in the central basin of the lake. The report concluded that there is inter-basin difference in arsenic, selenium, and mercury concentrations in cisco. In response to these differences, the *2015-16 Guide to Eating Ontario Sport Fish* was prepared to include two separate tables for Long Lake: one for the central basin and one for the contaminated south bay.

***Anishinabek/Ontario Fisheries Resource Centre. 2014. Atikameksheng Anishnawbek First Nation Round Lake Fall Walleye Index Netting, 2011***

Anishinabek/Ontario Fisheries Resource Centre (A/OFRC) was retained by AAFN to complete a Fall Walleye Index netting survey on Round Lake in 2011. Round Lake was found to support a diverse fish community, with species captured including walleye, yellow perch, smallmouth bass, rock bass, channel catfish, creek chub, white sucker, northern pike, rainbow smelt, cisco (lake herring) and lake whitefish. There were 12 Walleye captured in 2005 and 13 captured in 2011. The Walleye catch per unit effort (CPUE) was 1.1 walleye/net, whereas the CPUE in 2005 was 1.0 walleye/net identified. It is noted that a CPUE of less than 0.5 walleye/net is considered indicative of an unhealthy/stressed population. The report concluded that although the catch data suggests that the walleye population has remained stable, the population status of the walleye is considered unhealthy. This could reportedly be attributed to unsuitable water quality conditions; however additional studies would be needed to understand causal factors.

***Moggy Environmental, 2015. Summary Report for the Environmental Sampling of Round Lake.***

Moggy Environmental was retained by AAFN in 2015 to complete a gap analysis of the existing environmental data for Round Lake and undertake a field sampling program to determine if any environmental impacts to Round Lake and potential health risks to the community have occurred from the Long Lake Gold Mine.

Surface water samples collected identified two sampling locations with concentrations of arsenic above the ODWS. The exceedances were observed from the location collected in the south bay of Long Lake and at the outflow of Long Lake to Round Lake. Metal impacts were noted in all sediment samples collected, with concentrations of arsenic, cadmium, chromium, cobalt, copper, lead, mercury, nickel, silver, and/or zinc above the applicable guidelines. Consistent with the surface water sampling results, the greatest impacts were observed from the sample collected in the south bay of Long Lake. The fish tissue samples collected determined that mercury continues to be the main contaminant associated with fish consumption advisories for Round Lake, with concentrations consistent with 1994 levels. Arsenic was elevated only in Rainbow smelt. The report recommended that ongoing monitoring of surface water, sediment, benthic invertebrates, and fish tissue be completed both prior and during the Long Lake Gold Mine remediation project.

***Wood Environment & Infrastructure Solutions, 2021a. Long Lake Gold Mine Aquatic Assessment (2020) Existing Conditions Report.***

Wood Environment & Infrastructure Solutions (Wood) conducted an aquatic assessment within Luke Creek and the south bay of Long Lake in the fall of 2020. The objective of the study was to collect aquatic resource data to support regulatory permitting requirements and to establish baseline conditions for the development of a monitoring plan to compare the success of the planned remediation activities.

The report identified that the environs within Luke Creek and the nearshore areas of Long Lake were typical of northern Ontario streams and lakes. However, it was noted that the eroded tailings have created areas of hardened substrate with little to no structure or vegetation. This was especially apparent within the Luke Creek outlet tailings delta. Consistent with previous sampling programs, the assessment found that metal contamination in the surface water was greatest downstream of the tailings area and metal impacts were additionally observed in the south bay of Long Lake. Sediment quality within Luke Creek degraded downstream of the site drainage channel, with some of the highest impacts observed in samples collected from the south bay of Long Lake. The benthic samples collected from impacted sites compared to reference locations suggest that invertebrate communities have been impacted by the mine contamination. Similarly, the CPUE within Luke Creek was found to be lower than expected, however this could be attributed to cooler water temperatures.

***Wood Environment & Infrastructure Solutions, 2021b. Long Lake Gold Mine Spring and Summer Aquatic Assessment (2021) Existing Conditions Report.***

Wood was retained to complete an aquatic assessment in the spring and summer of 2021. The objective of the assessment was the same as what is described above for

the fall 2020 aquatic assessment program. The sampling locations were generally consistent with the 2020 study.

The assessment described the habitat types within Luke creek and the nearshore lane environs within Long Lake South Bay. No large-bodied fish were identified within Luke Creek, however samples collected for environmental DNA (eDNA) analysis suggest that small-bodied species may be present including Brook Stickleback, Creek Chub, Fathead Minnow, Finescale Dace, and Northern Redbelly Dace. The most abundant fish species captured within the habitat types in Luke Creek included Yellow Perch, Northern Redbelly Dace, Brookback Stickleback, and Creek Chub. It was postulated that the Yellow Perch was most likely travelling into the creek from Long Lake to forage and avoid predation. The species identified in Long Lake were consistent with previous studies and included Northern Pike, Largemouth bass, Yellow Perch, and Pumpkinseed. The study concluded that Luke Creek has a low species abundance and typical species diversity of Northern Ontario. The data collected in 2020 and 2021 is considered sufficient to support the development of a fish habitat offsetting plan, and to provide success metrics in the event new fish habitat must be created in Luke Creek following the remediation.

#### 4.4 Species at Risk

The following species at risk (SAR) and wildlife studies have been completed to support the rehabilitation projects:

- 1) SNC Lavalin, 2016b. 2015 Species at Risk Surveys. Dated: January 25, 2016.
- 2) Conservation Sudbury, 2019. Wavy creek wetland turtle survey report. Dated: June 17, 2019.

In addition to the above, surveys for Eastern Whip-poor-will were completed by MINES staff in 2018 and 2019 to address gaps in the project area that were not surveyed during the 2015 SAR surveys.

The Ministry has recently retained Parslow Heritage Consulting to complete additional studies to determine the use of the mine by bat species at risk and to confirm the presence/absence of Black Ash. The work is anticipated to be completed by the summer of 2024.

##### *SNC Lavalin, 2016. 2015 Species at Risk Surveys*

SNC Lavalin (SNC) was retained to complete studies for SAR to support anticipated provincial and/or federal permitting requirements. Species-specific surveys were completed for Blanding's Turtle, Massasauga Rattlesnake, and Eastern Whip-poor-will, as well as breeding bird and marsh bird surveys. The field surveys confirmed the presence of the following:

- Three turtle species were documented, including Blanding’s turtle;
- Five species of snakes were documented, however there was no evidence of Massasauga;
- Five individual Whip-poor-will were recorded with, or adjacent to the Project area;
- Sixty-six species of birds were identified across the project area, including one SAR the Eastern Wood- pewee; and,
- Eleven mammal species and eight amphibian species were documented.

The report indicated that the project may be eligible to proceed under the *Threats to health and safety, non imminent* regulatory exemption, as described under Section 23.18 of O.Reg 242/08. However, should any of the activities be out of scope of the exemption, then a Health and Safety Permit under Section 17(2) of the ESA would apply. For any impacts to SAR located on AAFN reserve land, permits under the federal Species at Risk Act (SARA) would be required.

***Conservation Sudbury, 2019. Wavy Creek Wetland Turtle Survey Report***

Conservation Sudbury undertook a search for Blanding’s Turtle over four-days within wetland habitat upstream of Wavy Trail. One male Blanding’s Turtle was identified basking in the southern extend of the wetland, approximately 2km north of the Long Lake Gold Mine property. The survey identified evidence of several other wildlife, as well as cranberry within the southern extent of the wetland.

***Ministry of Mines, 2018-2019 Eastern Whip-poor-will surveys***

Surveys for Eastern Whip-poor-will were completed by MINES staff in 2018 and 2019 in accordance with provincial protocols. Four surveys were completed (three in June 2018, and one in June 2019) during a full moon night or within seven days of a full moon, where at least 50% of the moon face was illuminated. Six stations were surveyed along the entirety of Lakes End Road during all four monitoring events, and TA-01 was additionally surveyed during three of the four monitoring events. A summary of the results is provided below in Table 15.

**Table 15-** Ministry of Mines Whip-poor-will Survey Results

<b>Survey Date</b>	<b>Weather Conditions</b>	<b>Summary of Observations</b>
June 9, 2018	Mainly clear, temperatures 14°C, no precipitation, little to no wind.	Whip-poor-will heard at all five monitoring locations.
June 22, 2018	Mainly clear, temperatures 16°C, no precipitation, no wind.	Whip-poor-will heard at all seven monitoring locations.
June 28, 2018	Clear, temperature 23°C, no precipitation, some wind.	Whip-poor-will heard at six monitoring locations.
June 15, 2019	Clear, temperature 13 °C, no precipitation, little to no wind.	Whip-poor-will heard at four monitoring locations.

Based on the result of the survey, the site has the potential to support Category 2 and Category 3 habitat of Whip-poor-will. Category 2 habitat is defined as the area between 20 m and 170 m of the centre of approximate defended territory and is used for nesting, rearing young, feeding, and resting. Category 3 habitat is defined as the suitable habitat between 170 m and 500 m of the centre of approximated defended territory and used to support various life processes, primarily feeding.

#### 4.5 Geotechnical Investigations

The ministry has completed two geotechnical investigations to support the detailed design of the rehabilitation project and road improvement work. The geotechnical investigations completed include the following:

- 1) SNC Lavalin, 2015b. 2015 Geotechnical Investigation, Detailed Design of the Long Lake Gold Mine Rehabilitation. dated: November 10, 2015.
- 2) Redstone Engineering Inc. 2022. Geotechnical Investigation, Long Lake Gold Mine Road Network Upgrades, Dated: February 24, 2022.

##### *SNC Lavalin, 2015. Geotechnical Investigation, Detailed Design of the Long Lake Gold Mine*

SNC Lavalin completed a geotechnical investigation in 2015 to support the detailed design of the rehabilitation project. The investigation included borehole drilling, soil, and rock sampling, monitoring well installation and in-situ testing. The general stratigraphy of the tailings area consisted of tailings, underlain by organics, native clay, and glacial till. Bedrock was encountered at depths ranging from 1.4 m to 16.9 m below ground surface, with the depth to bedrock increasing towards the middle of TA-01.

##### *Redstone Engineering Inc., 2022. Geotechnical Investigation, Long Lake Gold Mine Road Network Upgrades*

Redstone Engineering Inc. was retained by DM Wills to complete a geotechnical investigation to support the access road improvement design. The purpose of the investigation was to assess the soil, bedrock, and groundwater conditions at test hole locations along the access road route. Seventy-four test pits were advanced to depths ranging from 0.2 to 3.2 m below ground surface (bgs) and nine hand-augered boreholes were advanced to depths of 0.4 to 1.2 m bgs.

The ground surface conditions of Tilton Lake Road generally consisted of gravel with a near-vertical bedrock outcropping immediately southeast of the road platform and Tilton Lake immediately northwest of the road. Lakes End Road was also generally gravel-surface. The stratigraphy in the test pits generally consisted of a surficial layer of topsoil and organics ranging in depths from 0.1 to 1.0 m bgs. The organics were generally underlain by a layer of fill or possible fill, followed by gravel or sand, and silty clay. Bedrock was encountered at forty-seven test pit locations at depths ranging from 0.2 to 2.8 m bgs and groundwater encountered at depths ranging from 0.7 to 2.6 m bgs. The

report provided several recommendations related to the road improvement design, which were incorporated in the design report prepared by DM Wills (See Section 4.9).

#### 4.6 Archaeology and Cultural Heritage

The ministry has completed three archaeological assessments and a cultural heritage evaluation to support the proposed rehabilitation activities and road construction work. The assessments completed include the following:

- 1) URS Canada Inc. 2014. Stage 1-2 Archaeological Assessment, Ministry of Northern Development and Mines, Long Lake Gold Mine, Eden Township, District of Sudbury, Ontario. Dated: December 1, 2014
- 2) Aecom Canada Ltd. 2018. Long Lake Gold Mine – Archaeological Potential for Wetland Located on Atikameksheng Anishnawbek, Ontario. Dated: December 21, 2018
- 3) WSP Canada Ltd. 2023. Cultural Heritage Evaluation Report, Long Lake Gold Mine, Eden Township, District of Sudbury, Ontario. Dated: May 2, 2023.

In addition to the above, the Ministry has retained Parslow Heritage consulting to complete a Stage 1 and 2 Archaeological Assessment for the road improvements and a Heritage Impact Assessment (HIA) for the Long Lake Gold Mine site. At the time of issuance of this report the studies are ongoing and are anticipated to be completed in the spring of 2024.

##### *URS Canada Inc. 2014. Stage 1-2 Archaeological Assessment*

URS Canada Inc. (URS) was retained to complete a Stage 1 and 2 Archaeological Assessment of the Long Lake Gold Mine property. The study area included the glory hole, three tailings, Luke Creek, and nearshore areas of the Long Lake south bay. The Stage 1 background research for the property indicated that it has moderate to high potential for containing archaeological remains, particularly in areas that are seemingly undisturbed by the historical mining activities. The assessment concluded that due to the presence of severe slope, wet areas, heavy ground disturbance, and the fact that no archaeological resources were found during the Stage 2 property, the site has a low archaeological potential, and no further work is required.

##### *AECOM Canada Ltd. 2018. Long Lake Gold Mine – Archaeological Potential for Wetland Located on Atikameksheng Anishnawbek, Ontario*

AECOM Canada Ltd. (previously URS) provided a letter related to the potential for archaeological resources on AAFN reserve land. The wetland was previous excluded from the 2014 AA. Visual assessment completed by an AECOM licensed archaeologist in 2018 confirmed that the wetland has a low archaeological potential and that no further work is required.

*WSP Canada Ltd.. 2023. Cultural Heritage Evaluation Report, Long Lake Gold Mine, Eden Township, District of Sudbury, Ontario*

WSP Canada Ltd. (WSP) completed a cultural heritage evaluation report (CHER) in 2023 to determine whether the Long Lake Gold Mine meets criteria for cultural heritage value or interest as prescribed in O.Reg 9/06 or the criteria for provincial significance prescribed in O.Reg 10/06 of the *Ontario Heritage Act*. The historical background research, field assessment and community engagement determined the following:

1. The Long Lake Gold Mine meet the criteria for CHVI prescribed in O.Reg 9/06 for historical/associative and contextual reasons and should be considered as a potential Provincial Heritage Property (PHP). The mines historical/associative value is related to its direct association with AAFN and the history of the mining industry in the Sudbury basin. The historical relationship between AAFN and the gold mine is significant in that it has had a long-term negative impact due to the legacy of contamination to the natural land and loss of resource areas for the community. The mine is also historically related to the 20<sup>th</sup> century gold mine industry in the Sudbury Basin and has direct associations with several prospectors. The mines structural and concrete foundations may provide information on historical gold mining practises in the Sudbury area.
2. The mine's contextual value lies in its importance in defining, maintaining, or supporting the character of an era. This is evident in its above and below ground workings and tailings, including remaining foundations, features and other landscape elements.

The report indicated that the property does not meet the criteria to be considered as a potential Provincial Heritage Property of Provincial Significance (PHPPS). The report recommended that a Heritage Impact assessment be completed to identify alternatives to address impacts to the mine's heritage attributes.

#### **4.7 Contaminant Characterization Assessments**

Several contaminant assessments have been completed for the Long Lake Gold Mine property to characterize the impacts associated with the eroded tailings and historical mining activities.

- 3) AMEC Foster Wheeler, 2007. Site Condition Summary – Long Lake. Dated: July 25, 2007.
- 4) CH2M Hill, 2013. Long Lake Gold Mine – Assessment of Contaminant Loading from Various Sources to Long Lake Using GoldSIM Model. Dated: October 10, 2013.
- 5) CH2M Hill, 2014a. Site Characterization Report and Data Analysis – Long Lake Gold Mine Tailings Areas, Eden Township, Ontario. Dated: January 2014



- 6) CH2M Hill, 2014b. Remediation Options Report – Long Lake Gold Mine Tailings, Eden Township, Ontario. Dated: April 2014.
- 7) SNC Lavalin, 2017. Characterization of Contaminated Materials, Detailed Design and Constriction Management for Remediation of the Long Lake Gold Mine Tailings. Dated: February 12, 2017.
- 8) Ecometrix Incorporated, 2021. Third- Party Review of Remediation Options for the Long Lake Gold Mine Tailings. Dated: October 4, 2022.

#### ***AMEC Foster Wheeler, 2007. Site Condition Summary – Long Lake***

A site inspection was completed by AMEC in 2007 for the Long Lake tailings area. The report identified both immediate and potential hazards associated with the mine and characteristics of the three tailings areas. Evidence of tailings migration was noted downstream of TA-01, within the mine drainage channel that discharges into Luke Creek. Samples collected from the tailings identified that the tailings have “likely” ARD potential and surface water samples collected confirmed contamination downstream of the mine. Concentrations of arsenic, copper, nickel and zinc exceeded the PWQO, it is noted that concentrations of arsenic in all samples collected additionally exceed the ODWS value of 10µg/L. The report recommended that the three tailings’ areas be re-graded, re-contoured and covered to minimize migration of material and infiltration from surface water.

#### ***CH2M Hill, 2013. Long Lake Gold Mine – Assessment of Contaminant Loading from Various Sources to Long Lake Using GoldSIM Model***

CH2M completed a mass-loading model to assess the contribution of various sources to contaminant loading in Long Lake. Data collected to support the model is divided into three groups: physiographic (e.g., lake boundaries, drainage centrelines, elevation, and bathymetry), hydrologic (e.g., flow measurements) and water quality data (e.g., PCOC and other metals). The pertinent results included the following:

- The main source of arsenic is from Luke Creek (subwatershed SW05), adjacent to the Long Lake delta, representing approximately 73% of total loading to Long Lake. This location includes fugitive tailings and sediments.
- The reach of Luke Creek upstream of the mine impacts (subwatershed SW06) constitutes approximately 75% of total flow draining into Long Lake at the delta. The percentage of arsenic load originating from this location is low as it is located upstream of potential mine impacts.
- The estimated arsenic loading into Long Lake was estimated to be 28.23 g/day for a total of 1.07 kg during the 38 days monitoring period. The estimate of arsenic loading includes only leaching of surface water and does not include leaching due to precipitation events.

Overall, the report concluded that the major sources of arsenic are from the fugitive tailings in Luke Creek, the mine drainage channel, and the tailings areas. The exposed tailings delta was also identified as a major source when leaching occurs due to fluctuation in water levels in Long Lake.

*CH2M Hill, 2014a. Site Characterization Report and Data Analysis – Long Lake Gold Mine Tailings Areas, Eden Township, Ontario.*

A site characterization report was prepared by CH2M in 2014 to characterize the site hydrology, hydrogeology, and contamination sources. The report investigated the following features with the objective of determining their potential to generate acidic drainage and arsenic loading to Long Lake: the three tailings' areas (TA-01, TA-02 and TA-03); fugitive tailings in the mine drainage, Luke Creek, and Long Lake; the waste rock area; and the glory hole and mine workings.

The report identified the three major sources of arsenic load to Long Lake that are proposed for rehabilitation as part of the current project:

1. The leaching of tailings from the three tailings' areas (TA-01, TA-02 and TA-03).
2. The leaching of fugitive tailings in Luke Creek and adjacent riparian area.
3. Leaching of fugitive tailings at the exposed Long Lake delta, at the mouth of Luke Creek.

It is noted that elevated concentrations of arsenic were also observed in the wetland near Long Lake, however the contribution of the wetland to arsenic loading in Long Lake was outside the scope of the assessment. The major pathway for arsenic migration to Long Lake was identified to be transport via surface water. Contaminant loading results indicated that the sources of arsenic loading to Long Lake vary seasonally, with the seasonally exposed fugitive tailings in Luke Creek the major source of loading during low- flow events, while the tailings areas was the highest contributor to arsenic loading during higher flows. The report additionally identified that most of the arsenic present in the tailings in the lake are present in the sulphide phase and should be stable as long as the submerged tailings remain underwater. The seasonally exposed tailings in Long Lake delta poses the highest risk as atmospheric weathering conditions will mobilize previously held arsenic.

*CH2M Hill, 2014b. Remediation Options Report – Long Lake Gold Mine Tailings, Eden Township, Ontario*

Remediation options were evaluated by CH2M Hill to reduce the arsenic concentrations within Long Lake. The remediation options proposed for the tailings area, Luke Creek Floodplain and Long Lake Delta are summarized below in Table 16.

**Table 16** – Summary of remediation alternative.

Remediation Alternatives		
Tailings Areas	Luke Creek Floodplain	Long Lake Delta
Consolidate and cover tailings/ re-establish drainage.	Relocate fugitive tailings to TA-01/ Re-establish Luke Creek.	Submerge exposed tailings/ install protective layer.
Grade and cover tailings/ re-locate drainage.	Relocate fugitive tailings to mine/ re-establish Luke Creek.	Completely remove and relocate all tailings to TA-01/ install protective layer.
Relocate tailings to mine/ re-establish drainage.	Grade and cover fugitive tailings/ re-locate Luke Creek.	Completely remove and relocate all tailings to mine/ install protective layer.
Re-process tailings/ re-establish drainage	Passive treatment of downstream surface water.	Partially remove and relocate tailings to TA-01/ retain submerged tailings/ install protective layer.
Active treatment of downstream surface water and tailings porewater/groundwater.		Partially remove and relocate tailings to mine/ retain submerged tailings/ install protective layer.
Relocate tailings offsite/re-establish drainage.		

The recommended remediation option was to consolidate all major sources of arsenic within the northeast portion of TA-01, contain the tailings with a perimeter berm, and construct a low permeability cap. An information session was provided to the public and AAFN community to present the results of the site characterization report, the remedial options evaluated, and the preferred remediation option. The conceptual option was refined, as needed, to address comments and questions raised as part of the meeting and a cost estimate to complete the remediation was additionally provided. The report recommended that additional investigations and studies be completed to address data and engineering gaps such as: delineation and volume estimates of the three arsenic sources; high resolution mapping of the site and Long Lake bathymetry; and ongoing surface water monitoring.

*SNC Lavalin, 2017. Characterization of Contaminated Materials, Detailed Design and Constriction Management for Remediation of the Long Lake Gold Mine Tailings.*

SNC Lavalin completed a characterization study to inform the detail design for the remediation of the Long Lake Gold Mine. The objective of the assessment was to quantify the volume of impacted contaminated soils and sediment that would be relocated within the containment area, qualify the geochemical attributes of the contaminated soil/sediment, and identify any uncertainties associated with the

recommended remedial option. The field work included a bathymetry of the Long Lake delta, the sampling of tailings/soils/ sediments in the vicinity of impacted areas, and groundwater monitoring from six monitoring wells.

The estimated quantity of contaminated soils/sediment identified at the time of the assessment is summarized below in Table 17. The report assumed that the material would be excavated to bedrock within TA-02 and TA-3, excavated up to one metre over the entire arsenic impacted areas of the wetland, and excavated to maintain a minimum of two-metre water cover within the delta.

**Table 17 – Volume of material proposed for remediation**

Site Area	Area (ha)	Total impacted material (m <sup>3</sup> )	Volume of material to be relocated to TA-01 (m <sup>3</sup> )
TA-01	7.42	499,600	4,000
TA-02	1.43	48,500	48,500
TA-03	0.38	10,500	10,500
Deposit between TA-01 and TA-03	0.07	750	750
Long Lake Delta	2.37	35,815	35,815
Luke Creek Floodplain	6.48	54,100	54,100
<b>Total</b>		649,349	153,665

The report identified the geochemical attributes of the tailings to contain elevated arsenic, cobalt, and nickel, as well as elevated iron concentrations. The tailings are also assumed to be acidic or PAG and if excavated, the materials have the potential to generate water quality with significant loadings of acidity, aluminum, arsenic, cobalt, copper, iron, manganese, and nickel. The contaminated material within Long Lake consists of sediments elevated in arsenic, as well as cobalt, copper, and nickel; however, the underlying clay strata has little impacts identified. The contaminated sediment is considered PAG and has the potential to generate water quality with significant loadings of acidity, aluminum, arsenic, cobalt, iron, and manganese. It was noted that the vertical extent of the arsenic impacts along Luke Creek and the wetland was not fully delineated, and additional investigations were recommended.

*Ecometrix Incorporated, 2021. Third- Party Review of Remediation Options for the Long Lake Gold Mine Tailings.*

Ecometrix was retained to complete a third-party review of previous contaminant investigations to ensure that all sources of chemical loadings to Long Lake have been identified and that the proposed remediation design is appropriate. The investigation included a comprehensive field sampling program of various media to provide a geochemical characterization of tailings and surface water across the site. Water

quality modelling was also completed to determine chemical loading estimates and contaminant sources.

Together the field sampling program and modelling confirmed that the tailings areas and seasonally exposed tailings in the delta represent the main source of arsenic loadings to Long Lake. The contributions of loadings from upstream in Long Lake represent the second largest loading source, while the sediments in south bay contribute only a small fraction of total loadings in the lake. The report concluded that the proposed remediation strategy of consolidating and covering the tailings is a logical preferred option for the rehabilitation of the site.

#### 4.8 Rehabilitation Design Reports

The impoundment concept for the remediation of the Long Lake Gold Mine was advanced to the detailed design stage in 2017 by SNC-Lavalin, as detailed in the *Detailed Design Report- Detailed Design and Construction Management for Remediation of the Long Lake Gold Mine Tailings* (Dated: May 26, 2017). Several information gaps were identified by SNC Lavalin and the Ministry as part of the detailed design report that required additional investigations. The Ministry retained GHD to address the information gaps and to refine the detailed design to a construction ready state.

Several deliverables were completed by GHD to support the construction ready design, with many remaining outstanding. Studies completed in draft at the time of issuance of this Class EA include the following:

- 1) GHD, 2022a. Summary of Preliminary Investigation Results, Draft Report, Dated: February 1, 2022
- 2) GHD, 2022b. Evaluation of SNC- proposed underdrains, TA-01 Containment Cells. Draft Report, Dated: August 31, 2022.
- 3) GHD, 2023a. Crown pit – Aggregate and Groundwater Field investigation and review, Draft Report, Dated: March 8, 2023.
- 4) GHD, 2023b. Evaluation of Low Permeability Cover Options, Draft Report, Dated: February 2, 2023
- 5) GHD, 2023c. Waste Rock Management Conceptual Plan, Draft Report, Dated: October 16, 2023.

A summary of pertinent information gleaned from the above reports is provided below.

##### ***GHD, 2022a. Summary of Preliminary Investigation Results***

GHD completed a field investigation to further delineate the extent of tailings, contaminated soils, and waste rock to support the rehabilitation design. The work included the advancement of several hand auger holes and installation of monitoring wells throughout the mine site and Crown Pit. Soil and groundwater samples collected

were analysed for metals, pH and sulphates and compared to applicable provincial criteria and background locations. The results were utilized to refine the volume and areas for remediation, as summarized above in Table 2 within Section 1.3.3.

The typical stratigraphy in background locations within Luke Creek consisted of a surficial layer of peat overlain by silt and a clay layer. There is reportedly a low flow velocity within Luke Creek towards the wetland area resulting in the settling of tailings within the creek channel. Evidence of contamination within the wetland and creek was apparent by the presence of tailings and absence of vegetation. It was noted that the wetland to the west of Luke Creek contains lush vegetation and a thick peat mat, suggesting that contamination is not readily mobile and not inhibiting wetland function. The investigation proposed that the slow flow velocity of the creek and thick vegetative mat in the wetland acts as a filtering media for the entrained tailings in Luke Creek surface water, thereby minimizing the transport of arsenic. The extent of tailings contamination within Luke Creek and the drainage channel is generally limited to low slope areas where water flow rates decrease and tailings settle out of suspension, and the creek banks, as visually observed by the presence of tailings and absence of vegetation and confirmed by the soil analyses.

The stratigraphy of the tailings' areas generally consisted of tailings, underlain by peat, brown silt, silty clay or clay layers to bedrock. Soil samples collected as part of the subsurface investigation suggest that the arsenic contamination within the tailings does not extend past the native clay layer. As such, the proposed rehabilitation strategy within the tailings' areas is to excavate to a depth of 15 cm below the clay layer surface.

#### ***GHD, 2022b. Evaluation of SNC- proposed underdrains, TA-01 Containment Cells***

GHD completed an assessment of alternative design concepts to relieve potential hydrostatic pressure/water build up within the containment cell. While the detailed design completed by SNC Lavalin suggested an underdrain system, GHD has proposed a perimeter toe-drain. The toe drain would discharge water to the western and eastern surface water diversion ditches outside of the cell perimeter.

#### ***GHD, 2023a. Crown Pit – Aggregate and Groundwater Field Investigation and Review***

GHD prepared a memorandum to assess groundwater elevations in the Crown Pit to confirm soil borrow estimates to support the rehabilitation investigation. The investigation considered previous work completed at the Crown Pit in 2017 by SNC Lavalin and the advancement of four new monitoring wells at the pit location.

The groundwater levels in the monitoring wells were consistent with the groundwater elevations identified as part of previous investigation. Based on this, GHD concluded that the borrow estimates from the pit is approximately 142,000 m<sup>2</sup> of extractable surface area, 251,000 m<sup>3</sup> of extractable aggregate materials and 70,000 m<sup>3</sup> of

overburden material. The investigation confirmed that the Crown Pit has sufficient material to support the rehabilitation activities.

#### *GHD, 2023b. Evaluation of Low Permeability Cover Options*

GHD completed an evaluation of low permeability cover system options to support the rehabilitation design. The low permeability cover is a key component of the rehabilitation design for the confinement of fugitive tailings. The cover will effectively contain and reduce the migration of contaminants and acid mine drainage into the surrounding environment. The evaluation compared the performance and costs of six covers, including: compacted clay, geosynthetic clay, Polyvinyl Chloride (PVC), High Density Polyethylene (HDPE), Low Density Polyethylene (LLDPE), and Bituminous Geomembrane (BGM). The evaluation identified the BGM cover design as the preferred option.

#### *GHD, 2023c. Waste Rock Management Conceptual Plan*

A conceptual plan was prepared by GHD to address the management of waste rock and mine water drainage from the flooded raise situated north of the Glory Hole. Four options were considered for addressing the management of waste rock including: leaving the waste rock in place, disposal of waste rock in the glory hole without capping the mine raise, disposal of waste rock in the glory hole with capping the mine raise and incorporating the material into the impoundment area. Similarly, four options were considered to address the main drainage from the flooded raise including existing drainage ditch design options, restored wetland option, subsurface treatment cell and surface treatment cell.

The assessment concluded that the excavation of waste rock and incorporation into the impoundment area would be the most cost-effective option to ensure ARD/metal leaching (ML) generation is mitigated. The restored wetland design was selected as the preferred option for treatment of the water from the mine raise pond. The restored wetland provides water treatment capacity via biological and chemical mechanisms while providing attenuation of peak flows during storm events. It was recommended that TA-03/TA-02 be restored to wetland habitats following the tailings excavation activities to improve water quality in the mine site catchment area.

## **4.9 Road Design Reports**

The ministry retained DM Wills to complete the detailed design of roadway improvement along the proposed Long Lake Gold Mine access road route. The detailed design report and construction ready drawings are included in Appendix A.

A summary of deliverables completed by DM Wills to support the detailed design for the road upgrades includes the following:

- 1) DM Wills. 2021a. Detailed Engineering of Long Lake Gold Mine, Access Road Improvements – Culvert Inspection Memo. Dated: August 26, 2021.
- 2) DM Wills, 2021b. Long Lake Gold Mine Access Road, Wavy Trail Culvert – Estimated Material Service Life. Dated: September 27, 2021.
- 3) DM Wills. 2021c. Traffic Study Memorandum – Detailed Engineering of Long Lake Gold Mine Access Road Improvements. Dated: October 21, 2021.
- 4) DM Wills, 2021d. Roadside Safety Review Memorandum. Dated: December 12, 2021.
- 5) DM Wills, 2022a. Survey Memorandum. Dated: February 17, 2022.
- 6) DM Wills, 2022b. Field Investigation Memorandum. March 23, 2022.
- 7) Redstone Engineering Inc. 2022. Geotechnical Investigation Report, Long Lake Gold Mine Road Network Upgrades, Dated: February 24, 2022.

***DM Wills. 2021a. Detailed Engineering of Long Lake Gold Mine, Access Road Improvements – Culvert Inspection Memo***

The purpose of the investigation was to document the location, characteristics, and condition of existing culverts within the project limits and to provide recommendation for remedial actions, if required. The study utilized the Ministry of Transportation (MTO) Culvert Collection Guide to aid in the evaluation of the culverts and included four culverts within the project limits. A summary of the results is provided below in Table 18.

**Table 18 – Culvert Inspection Results (DM Wills 2021)**

Culvert ID	Location/Description	Recommended Action
Wavy Creek	Corrugated steel pipe culvert located on Wavy Trail Road, transecting Wavy Creek	The Wavy Creek culvert was identified to be in overall fair condition. Although some surface rusting was noted through, there was no visible perforations or areas of concern. No recommended actions were provided for the culvert.
WS-01, WS- 02 and WS-03	Three wooden stave pipe culverts located along the site access road.	The three wooden stave pipes along the mine access road have completely collapsed and are no currently providing drainage. It was recommended that all three pipes be removed and replaced with new culverts.

***DM Wills. 2021b. Long Lake Gold Mine Access Road, Wavy Trail Culvert - Estimated Material Service Life.***

The remaining service life of the Wavy Trail Culvert was estimated to determine if it would require replacement as part of the Long Lake Gold Mine remediation project. The MTO Gravity Pipe Design Guidelines were used to estimate the material service life of the culvert based on pipe water and soil chemistry characteristics. The assessment assumed that full continuous access to the mine would be required until 2029. The



material service life of the galvanised corrugated steel culvert was estimated at 64 years. Assuming an installation date of 2004, the pipe should not require replacement until 2068. As such, it was advised that there is no need to replace the Wavy Trail culvert at this time.

***DM Wills, 2021c. Traffic Study Memorandum – Detailed Engineering of Long Lake Gold Mine Access Road Improvements.***

A traffic study report was completed to determine the current traffic conditions and anticipated traffic increase due to the Long Lake Gold Mine rehabilitation programs. The information was used to confirm the suitability of the road design standards and contribute to the pavement design for the access road improvements.

Annual traffic growth rates were estimated based on available historical traffic data to determine the anticipated growth in daily traffic over the life of the project. In addition, traffic counts were collected along the access road route in August of 2021. The traffic counts considered the types of vehicles (heavy trucks and light trucks) travelling for each direction over a 24-hr period. Based on the historical traffic data and existing traffic counts collect, the annual average daily traffic on the access road was estimated for the then anticipated start and end dates for the rehabilitation (2023 and 2026) and the total traffic condition for the project was determined to assist with the access road improvement design.

***DM Wills, 2021d. Roadside Safety Review Memorandum***

The roadside safety memorandum documented existing guide rail installations and provided recommended action for each installation. The report additionally assessed existing unprotected roadside hazards within the project limits (e.g. rocks cuts, vegetation) and provided recommendations for new guide rail installations along the proposed access road route. The assessment was based on criteria outlined in the Ministry of Transportation Roadside Design Manual (May 2020).

The following recommendations were provided for the road improvement design to improve the overall safety of the road:

- Of the 11 existing guide rail installations along the access road route, it was recommended that three installations be replaced, the mounting heights of three installations be adjusted, one installation was recommended to be extended, and three end treatments were recommended to be replaced.
- Various maintenance work was recommended at seven of the existing guide rail installations.
- It was recommended that rock and vegetation trimming be completed on the inside of specific curves to improve sight line distances.
- Several utility poles were identified for relocations.

- The provision of additional warning and regulatory signage was recommended.

#### *DM Wills. 2022a. Survey Memorandum*

Survey fieldwork was completed to gather existing condition data of the proposed access road route to inform the design. Existing topographic and LiDAR data was reviewed, and additional surveys were completed by DM Will in 2021. That survey data was summarized in figures and used to assist with the road improvement design.

#### *DM Wills. 2022b. Field Investigation Memorandum*

A field investigation was completed by DM Wills to gather existing condition data of the access road to inform the road improvement design. The investigation focussed on documentation of existing signs and guide rail installations, as well as in-person review of areas of potential roadway realignment. The location, type, and condition of all existing road signs along the full length of the mine access route were documented during the field investigation. A total of 97 signs were located, with 17 signs identified to require replacement. The location, type and condition of all existing guide rail installations along the full length of the mine access route were documented with a total of 11 existing guide rail installations found. Three installations were found to be in poor condition requiring replacement; two had substandard end treatments and another two had damaged end treatments; five did not meet rail mounting height tolerances; four had minor deficiencies; and two did not have object marker signs.

Drainage and hydrology field investigations were completed that focused on two creek crossings: the Wavy Creek culvert and the location of a proposed culvert crossing of Luke Creek. Environmental field investigations documented the locations of red and eastern white pine along Lakes End Road and the Site Access Road within the Eden Township Conservation Reserve. Traffic study field investigations comprised of obtaining traffic counts for use in determining annual average daily traffic along Tilton Lake Road, Wavy Trail Road, and Lakes End Road. Lastly, a geotechnical field investigation was completed consisting of advancing, sampling and logging test holes to gather information about the existing soil conditions along Lakes End Road and the Site Access Road.

## **5 Description of Environmental Effects**

The Ministry of Mines reviewed various information sources and technical reports (see Section 4) to complete an analysis of potential environmental effects associated with the undertaking. Potential impacts associated with the project was also identified through the consultation process. An overview of site-specific information and potential environmental effects (both positive and negative) is provided in the following sections. Mitigation measures that would negate or reduce the significance of identified negative environmental effects are provided in Section 6.

## 5.1 Land Use Planning and Policies

There are no proposed changes to land use associated with the rehabilitation activities and no new infrastructure proposed. The proposed rehabilitation activities do not contravene with the land use planning policies outlined in the *Growth Plan for Northern Ontario* (2011) and the *Provincial Policy Statement* (2020). The area will continue to remain crown land and the use consistent with the land use intent and planning policies for the Wanapitei River West General Use Area (G2044). The proposed activities will allow fish and wildlife resources to recover in previously disturbed areas, thereby benefitting future recreation and tourism opportunities.

## 5.2 Source Water Protection

The project area falls within the Nickel District Source Water Protection Area. There are no Wellhead Protection Areas, Intake Protection Zones, Significant Groundwater Recharge Areas, Highly Vulnerable Aquifers, or other vulnerable areas that overlap with the project area. Long Lake is the source of drinking water for most residents along the lake. The proposed rehabilitation activities are expected to have a positive impact on drinking water sources by removing the source of arsenic contamination to Long Lake, thereby allowing drinking water quality to meet the ODWS. The rehabilitation activities will not further degrade the quality or quantity of drinking water sources. The work as it is currently planned is not expected to contravene with the objectives of the Greater Sudbury Source Protection Plan (2021).

There are multiple potable water wells identified along the proposed access road route. The proposed access road upgrades are not expected to impact the quality and quantity of water in surrounding potable water wells.

## 5.3 Climate Change

Normal activities at the mine do not currently contribute to the release of greenhouse gases. The project design has been optimized to include sources of aggregate closer to the mine site, thereby minimizing the haulage of material on public roads and reducing greenhouse gas emissions from vehicular traffic. Standard construction equipment will be used to complete the work. The emission of greenhouse gases from this equipment is expected to be consistent with the use of similar equipment for short-term projects. Emissions will be further reduced by prohibiting the unnecessary idling of construction vehicles.

Trees and vegetation removal will be required to facilitate the road upgrade work and access to the tailings' excavation areas. The removal of trees will have a negative impact on carbon sequestration. Although some disturbed areas will be allowed to naturally revegetate at the completion of the rehabilitation work, the loss of trees will be permanent at other locations. For example, the removal of trees to widen and reconstruct Lakes End Road will be permanent and irreversible, while the trees

removed to access the excavation areas will be allowed to revegetate. The remediation of the three tailings' areas (TA-01, TA-02 and TA-03) will create soil conditions favourable for new vegetation growth, which will off-set the loss of trees carbon sequestration at other locations. Wetlands have been shown to efficiently sequester carbon. TA-01 and TA-02 will be rehabilitated as wetlands, thus mitigating much of the negative impacts from the tree clearing.

The overall impacts of the project on climate change are not expected to be significant due to the short duration of the project and the relatively small footprint of the vegetation removal areas.

#### **5.4 Air Quality, Noise and Vibrations**

Normal activities at the mine, access road route and surrounding area do not currently contribute to increased air quality, dust, or noise emissions in the atmosphere. There are several residential properties located along the proposed access road route. It is estimated that up to 3600 trucks will be required over three construction seasons to haul equipment and material to the mine. There is the potential to impact residences along the proposed access road route due to increased noise, vibration and fugitive dust associated with the movement of equipment and construction vehicles. The rehabilitation activities at the mine will similarly cause short-term disturbance to seasonal and permanent residences in the south bay of Long Lake due to increased noise and vibrations. Although considered low risk, there is the potential for the excavation of the tailings and movement of construction vehicles overland at the mine to result in the generation of dust contaminated with arsenic. Standard construction equipment will be utilized to complete the work, and the emissions of diesel fumes associated with this equipment is expected to be minimal.

#### **5.5 Ecosystem Protection and Restoration**

There are no ANSI's, provincially significant wetlands, significant woodlands, or other environmentally significant areas on or immediately adjacent to the mine. The Eden Township Forest Conservation Reserve (C157) is situated approximately 1 km northeast of the mine, along the proposed access road route. Approximately 2.0 km of the existing access road to the mine transects through the Conservation Reserve. The Eden Township Forest Conservation Reserve represents the best example of red pine and cedar dominated forest in the Province and contains provincially significant representation of sparse coniferous forest. Upgrades and widening to the existing road will be needed to facilitate the rehabilitation work, which will result in the loss of an estimated 10 to 30 representative red pine and cedar tree species from within the Conservation Reserve. However, the loss of these trees is not expected to affect the overall representational value of the conservation reserve on the landscape. There is

also the potential to introduce non-native invasive species to the conservation reserve and surrounding area through the movement of equipment, material, and vehicles.

The mine and proposed access road route are surrounded by a mix of coniferous and deciduous tree species. Vegetation and tree removal will be required as part of the road upgrade work and rehabilitation activities, which will result in the loss of terrestrial habitat and potential impacts to wildlife and migratory bird species. In addition, wildlife may be temporarily displaced due to increased noise, vibrations and vehicular traffic associated with rehabilitation work and road upgrades. Any potential impacts to wildlife associated with habitat loss or temporary sensory disturbance is not expected to impact the overall landscape structure and function of the surrounding terrestrial ecosystem. The rehabilitation activities will enhance local ecosystems in the long-term by removing contamination from the environment and allowing vegetation to re-establish in previously disturbed areas. Potential impacts to key hydrologic features, namely Luke Creek and Long Lake, are provided below in Section 6.7.

It is possible for turtles to utilize the mine access road and cleared areas for nesting habitat where suitable substrate is available. Similarly, SAR and other terrestrial wildlife may be encountered during the completion of the rehabilitation work. Details regarding impacts to SAR and SAR habitat are provided below in Section 6.6. Increased vehicular traffic may additionally cause injury/mortality to individual animals and domestic waste may unintentionally attract wildlife to the area.

An imperiled lichen species, Sinoper Cobblestone Lichen, has previously been observed within the footprint of the mine. The proposed rehabilitation activities have the potential to impact the growth and survival of this lichen species.

## 5.6 Species at Risk

The area surrounding the mine is known to provide habitat to a Blanding's Turtles and Eastern Whip-poor-will. Based on habitat requirements, it is possible that Massasauga Rattlesnake may additionally be encountered, however no individuals have historically been observed at the mine. The reptile and avian species are both currently listed as threatened provincially and receive both species and habitat protection. Although the rehabilitation activities and proposed access road upgrades as they are currently planned are not expected to result in the alteration or destruction of turtle overwinter habitat, it is likely that turtles may utilize the area nesting habitat where suitable substrate is available. Furthermore, increased vehicular traffic may increase the probability of wildlife vehicle collisions.

Although Eastern Whip-poor-will have previously been heard in the vicinity of the mine, there are no known nests or defended territories directly within the project area. The project activities have the potential to impact Category 2 or 3 habitat of Eastern Whip-

poor-will, which are considered to have a moderate to high level of tolerance to alteration. The habitat impacted is likely to support nesting, rearing young, feeding, and resting by Eastern Whip-poor-will. Considering the availability of potential Eastern Whip-poor-will habitat in the area and relatively small footprint of vegetation removal, negative impacts to Eastern Whip-poor-will and their habitat are not anticipated.

The forested habitat surrounding the mine is likely to support maternity roosting habitat of bat species at risk, including Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), Tri-coloured bat (*Perimyotis subflavus*) and Eastern Small-footed Myotis (*Myotis leibii*). Tree removal will be required as part of the road upgrade work and rehabilitation activities, which will result in the loss of terrestrial habitat and potential bat habitat. Similarly, surrounding bedrock may support roosting habitat of Eastern Small-footed Myotis.

Massasauga Rattlesnake, Midland Painted Turtle, Snapping Turtle, and Olive-sided Flycatcher have previously been observed along the proposed access road route, however only the Massasauga Rattlesnake is designated as threatened provincially and receives protection. The proposed access road upgrades are not expected to impact the habitat or Massasauga Rattlesnake, however increased vehicular traffic may increase the probability of wildlife vehicle collisions.

## 5.7 Surface Water Quality

The objective of the Long Lake Gold Mine Rehabilitation project is to reduce arsenic concentrations in the south basin of Long Lake to below the drinking water standard of 10 µg/L. This will be achieved by removing the sources of arsenic loading into Long Lake and preventing the future migration of fugitive tailings. The project is expected to have an overall positive long-term effect on surface water quality.

There are numerous surface water features situated along the proposed access road route and within the project boundaries. Heavy equipment will be used and there is a risk of leaks and spills that could impact surrounding surface water features. Similarly, there is the potential for sedimentation and/or erosion to occur due to increased vehicular traffic along the access road routes and movement of heavy equipment. Heavy equipment will be required to enter Luke Creek and Long Lake to remove fugitive tailings from the water features. This may result in the resuspension and entrainment of sediment and increase concentration of contaminants in the downstream environment.

The removal of fugitive tailings and stressed vegetation from Luke Creek has the potential to change the channel morphology and habitat structure. The removal of vegetation can reduce cover and protection from predators and physical disturbance by aquatic organisms, as well as the availability of diverse and stable habitats. The removal of fugitive tailings from Luke Creek will be achieved by damming a section of

the channel and diverting water away from the work area. This will result in temporary changes in flow in the downstream environment, and temporary disruption in access to fish habitats. It is also possible that fish may become trapped or entrained during the completion of the in-water work.

## 5.8 Groundwater

Groundwater underlying the mine contains several metals, particularly arsenic, with concentrations greater than the applicable Site Condition Standards. The rehabilitation activities are expected to have a positive long-term effect on groundwater quality by limiting the leaching of tailings by groundwater from the three tailings areas. Contaminated groundwater encountered during the rehabilitation work will be treated on-site and discharged in accordance with ECA conditions. All discharged water will meet or exceed applicable provincial water quality guidelines. Overall, no negative impacts to groundwater quality or quantity are anticipated as a result of the rehabilitation activities. No groundwater takings or installation of water wells are required to facilitate the work.

## 5.9 Excess Materials and Waste Management

No soil or contaminated material will be removed from the site. All tailings and contaminated material will be consolidated within the impoundment area and capped. Similarly, limited excess soil generated as part of the road improvements will be retained and used as part of the road construction activities. The proposed activities does not require the management of excess soil and, as such *O.Reg 406/19 – On-Site and Excess Soil Management* does not apply. The generation of waste will be limited to increased domestic garbage and litter from on-site workers.

## 5.10 Contamination and Contaminated Sites

The Long Lake Gold Mine is considered a contaminated site under the Provincial Contaminated Sites Program. The proposed rehabilitation activities aim to contain the risk the site poses to public health and to the environment. Workers and the environment will be exposed to contaminated tailings, soil, surface water, and groundwater during the completion of the work. Potential exposure to contaminated material by human receptors may occur via direct dermal contact, ingestion, and inhalation of dust particles in outdoor air. The impacted surface soil additionally poses a risk to plants, birds, terrestrial animals and invertebrates through ingestion and dermal contact. The presence of stressed and dying vegetation along Luke Creek provides evidence of impacts to ecological receptors exposed to contaminated material at these locations. The proposed rehabilitation activities are expected to have a positive overall impact by removing the source of contaminants and eliminating the exposure pathway to potential receptors.

The construction of the impoundment and cover will require a significant quantity of aggregates and topsoil. The backfill will be sourced from two ministry owned aggregate pits located close to the project site. Although considered low risk, there is the potential for the backfill to introduce new contaminants to the environment. Similarly, workers and/or the environment may be exposed to previously unidentified contamination during the work.

### **5.11 Servicing, Utilities and Facilities**

No new utility services or facilities are proposed as part of the project. Any structures mobilized to the site, such as the water treatment system or material storage containers, will be temporary and removed at the completion of the work.

The project includes upgrades to the existing network of public roads located along the southeast side of Long Lake. The proposed improvements will require tree/vegetation clearing; trimming back of existing rock cuts; relocation of existing utility poles; and replacement and/or installation of guide rails. The upgrades are expected to have a positive impact by improving sight line distances and making the road safer for both local and construction traffic. There is the potential for increased hauling and traffic volume to result in damage to local road infrastructure.

### **5.12 Archaeological Resources and Cultural Heritage Landscapes**

Previous archaeological assessments completed for the site (See Section 5) have concluded that the site and proposed access road route has low archaeological potential. Although considered low risk, there is the potential to encountered previously unidentified archaeological resources during the excavation activities.

A CHER was completed in 2023 to determine whether the Long Lake Gold Mine meets criteria for cultural heritage value or interest as prescribed in O.Reg 9/06 or the criteria for provincial significance prescribed in O.Reg 10/06 of the *Ontario Heritage Act*. The report concluded that the property meets the criteria for CHVI prescribed in O.Reg 9/06 for historical/associative and contextual reasons and should be considered as a potential Provincial Heritage Property (PHP). The property does not meet the criteria to be considered as a potential Provincial Heritage Property of Provincial Significance (PHPPS). The project activities are likely to impact the heritage attributes of the property.

### **5.13 Recreational Users and Local Residents**

Tailings area TA-01 and TA-03 are located on Crown Land and the area is frequented by recreational users for hunting, fishing, and other activities. There is the potential to impact users that may access the land. The construction phase of the project will result in the temporary disruption to Crown land access, which may have a short-term negative effect to recreational users. Similarly, the surface rights owner that owns the



southern portion of TA-02 and the glory hole will have limited access to their property during the construction work. It is noted that there are no permanent dwellings or structures currently located on the private land. The project will benefit the surface rights owner and claim holder by improving access to their property but may result in temporary negative aesthetic effects while completing the construction of the impoundment.

There is a snowmobile trail that joins the site access road north-northeast of TA-01 that continues south across the tailings area, maintained by the Broder Dill Snowmobile Association. The existing section of trail that extends across the tailings will be permanently closed and may temporarily disrupt access to the Killarney area while the trail is being re-routed. Access across the impoundment area at TA-01 will be restricted to prevent damage to the impoundment structure and cover.

Increased vehicular and construction traffic on public roads may increase the probability of collisions with other vehicles, school buses, cyclist, and pedestrians. Potential impacts to residences due to increased noise, vibration and fugitive dust associated with the movement of equipment and construction vehicles has been detailed above in *Section 6.4 – Air Quality, Noise and Vibrations*. The proposed access road upgrades are expected to have a positive overall impact by improving sight line distances and making the road safer for both local and construction traffic. Similarly, the rehabilitation activities will have a positive impact on drinking water sources to residences on the south bay of Long Lake.

#### **5.14 Claim Holder**

Access to conduct exploration and/or assessment work on some parts of the existing mining claims may be temporarily restricted during construction activities due to safety concerns. However, once the remediation project is completed, the claim area will still be accessible by an improved road.

#### **5.15 Indigenous Communities**

A portion of the fugitive tailings' requiring rehabilitation is located on reserve land. The construction phase of the project will result in the temporary disruption to land access, which may have a short-term negative impact to users that may access the area for hunting, fishing, harvesting or other traditional activities. However, the proposed activities will have a positive overall effect on the community of Atikameksheng Anishnawbek by removing contaminated soils from their land. Completing the project and removing the sources of arsenic contamination will improve water quality in the receiving environment, including within Round Lake, and possibly reduce fish consumption advisory limits for sought after species.

## 5.16 Other Effects Considered

### 5.16.1 Effects of the Environment on the Project

Local conditions have the potential to adversely affect the project and in turn result in effects to the environment. In particular, the effects of climate change have the potential to result in shifts in weather conditions (temperature, precipitation levels) or increase the frequency of extreme weather events (droughts or floods). The potential effects of climate change on the project were considered during the design phases of the project to ensure the cover does not malfunction or fail in the future.

According to the Public Health Sudbury & District Climate Change Modelling Study (PHSD 2022), the average annual temperature at baseline is 4.3°C (1975-2005). With the impacts of climate change the average annual temperature is expected to increase from 6.5 °C between 2021 to 2050, to 8.8 °C between 2051 to 2080 under a high emission scenario. During the summer months, the average summer temperature at baseline is 17.8 °C (1975 to 2005) and this is expected to increase from 20.0°C in 2021 to 2050, to 22.2 °C in 2051 to 2080 under a high emission scenario. The number of “hot days” with temperatures exceeding 30°C is expected to increase (PHSD 2022), which could result in increased dryness and drought in the growing season. This has the potential to negatively affect the ability for vegetation to recover following the rehabilitation activities, particularly on the impoundment area. Poor vegetation growth on the cover and other disturbed areas will result in exposed soil that would be susceptible to erosion. Erosion on the impoundment cover could result in damage to the liner that would expose the tailings to atmospheric conditions, resulting in continued leaching of arsenic into the environment.

To address the impacts above, the ministry is proposing to utilize a geomembrane liner that guarantees resistance to high UV and improved durability in exposed situations. This will ensure that the liner remains intact in the event erosion occurs to allow the ministry to implicate necessary repairs as needed. Other disturbed areas where vegetation is unable to recover and is susceptible to erosion will be addressed in the short term through alternative measures such as manual watering to promote vegetation growth or erosion control matting.

Annual precipitation in Greater Sudbury is predicted to increase by 56 mm in 2021-2050, and 90mm by 2051-2080 under a high emission scenario (PHSD 2022). The largest increase in seasonal precipitation is predicted to occur in the fall, with an increase by 17 mm in 2021-2050, and 22m by 2051-2080. The summer months are expected to experience a decrease in precipitation, resulting in increased drought and dryness. Extreme and heavy rain events are expected to become more intense and more frequent, particularly in the fall (PHSD 2022), which will exacerbate erosion processes. The drainage design and post-construction monitoring program for this

project considers a 1:1000-year flood event and peak flow capacity and are expected to be resilient to increased precipitation associated with climate change.

Climate change may additionally impact water levels within Long Lake resulting in previously submerged tailings being exposed to atmospheric conditions. This potential climate change impact was considered in the project design when determining the areas for remediation within Long Lake.

### **5.16.2 Cumulative Effects**

Cumulative effects generally refer to the combined effects from past, present, and reasonably foreseeable future activities and natural processes. To a limited extent, this class environmental assessment already addresses cumulative environment effects as it considers existing environmental conditions, which includes the cumulative environmental effects of past and existing activities. However, consideration should also be given to the cumulative environmental effects resulting from the interactions among the environmental effects of the proposed project with those of future projects. For this Class EA, future projects are defined as those “that will be carried out” and have been issued permits and approvals or are referenced in publicly available documents as planned to proceed. The spatial boundary considered for predicting cumulative effects extended up to 2km from the project area and proposed access road route.

Existing or planned projects within the study area include the following:

- The operation of a new aggregate pit (the Crown Pit) situated along the site access road. The pit will result in the temporary loss of terrestrial habitat.
- The operation of the existing Wavy Trail Pit and anticipated new permitting as a quarry. The operation of the pit/quarry will result in the loss of terrestrial habitat and increased noise, dust, and vibrations. However, it is noted that there are no sensitive receptors (residences) situated within 500 m of the potential quarry.
- The Ministry of Transportation operates an aggregate pit (ALPS ID 402012) on Tilton Lake Road. The pit has an authorized area of 3.3 hectares.
- Much of the crown land overlapping with the mine site is under active claims. It is unknown if these claims have sufficient resources to warrant advanced exploration and commercial production. As such, these exploration areas are not considered certain projects. Any advancement to the claims will require a Closure Plan that satisfies the requirements of O.Reg 240/00 under the *Mining Act* or additional permits, which may also trigger further Class EA processes.
- The Local Roads Board completes improvements on roadways under their jurisdiction.

The above activities are not expected to result in noticeable cumulative environmental effects with the project. Although it is recognized that the operation of two additional pits

may result in loss of terrestrial ecosystem and potential disturbance to wildlife populations, the availability of habitat is not limited in the area with no impacts to the population health of species at risk, and progressive rehabilitation of the pits is required in accordance with the Aggregate Resources Act. As such, the effects of land clearing associated with the two pits are not anticipated to have noticeable cumulative effects to the Project. Overall, there are no known proposed or planned projects that are expected to have cumulative adverse effects on the environmental indicators assessed as part of this Class EA.

## **6 Mitigation Measures**

Mitigation measures are intended to prevent, reduce, or control adverse environmental effects of a project, and may include compensation or restoration of any damage to the environment resulting from the project. The proposed mitigation measures for the environmental effects described in Section 6 above are summarized below in Table 19. The mitigation measures provided are consistent with best management practices and industry standards. The effectiveness of the mitigation measures will be continually monitored during the construction work and revised, as needed, if the mitigation measures are less effective than anticipated. Additional details regarding adaptive management and monitoring plans is provided in Section 9.

**Table 19 – Summary of environmental effects and proposed mitigation measures.**

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Climate Change	Release of greenhouse gas emissions from construction vehicles and equipment.	<ul style="list-style-type: none"> <li>The unnecessary idling of construction vehicles will not be permitted during the construction work.</li> <li>Only current equipment will be utilized that complies with Transport Canada's Off- Road Compression- Ignition Engine Emissions criteria (SOR/2005-32).</li> </ul>	Transport Canada's Off- Road Compression- Ignition Engine Emissions criteria (SOR/2005-32)
Climate Change	Removal of trees and loss of carbon sequestration.	<ul style="list-style-type: none"> <li>The removal of trees will be minimized to the smallest footprint possible.</li> <li>The area will be allowed to revegetate naturally allowing pioneer species to cultivate previously disturbed areas of the land.</li> <li>Newly constructed wetlands will create natural carbon sinks.</li> </ul>	Not applicable.
Air Quality	Increased fugitive dust along municipal roads and at the mine site.	<ul style="list-style-type: none"> <li>The project specifications will include the requirement of a <i>Dust Best Management Plan</i> to ensure best management practises are implemented to minimize fugitive dust along the mine access road and at the mine site. The plan will include details related to watering frequency, visual monitoring, inspection, record keeping, complaint response and corrective action.</li> <li>Speed limits will be contractually enforced along the access roads and at the mine site to minimize dust emissions.</li> <li>Water or a dust suppressant will be utilized, as needed.</li> <li>Air quality for dust will be compliant with the standards for suspended particulate matter at off-site receptors identified in O.Reg 419/05.</li> </ul>	O.Reg 419/05 -
Air Quality	Emission of diesel fumes associated with construction vehicles and equipment.	<ul style="list-style-type: none"> <li>Only current equipment will be utilized that complies with Transport Canada's Off- Road Compression- Ignition Engine Emissions criteria (SOR/2005-32).</li> <li>Air quality will be maintained to ensure compliance with Ontario ambient air quality criteria (AAQC) for sulphur dioxide, carbon monoxide and particulate matter.</li> </ul>	Transport Canada's Off- Road Compression- Ignition Engine Emissions criteria (SOR/2005-32)  Ontario Ambient Air Quality Criteria

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Noise and Vibrations	Increased noise and vibrations to seasonal and permanent residents' due haulage of equipment/ materials and construction activities.	<ul style="list-style-type: none"> <li>• Haul truck traffic and construction work will be limited to daytime hours.</li> <li>• All construction equipment will operate to not exceed noise levels specific in NPC-115, NPC-118 and NPC-300.</li> <li>• All work within municipal boundaries will comply with the City of Greater Sudbury's Noise By-law (By-law 2018-29).</li> <li>• Speed limits will be monitored and contractually enforced along the access road and at the mine site.</li> </ul>	<p>Greater Sudbury's Noise By-law (By-law 2018-29).</p> <p>NPC-115, NPC-118 and NPC-300</p>
Ecosystems Protection and Restoration	Loss of representative tree species from within the Conservation Reserve.	<ul style="list-style-type: none"> <li>• The removal of trees from within the Conservation Reserve will be limited to the smallest footprint possible. The approximate number of trees will be estimated prior to removal.</li> <li>• The removal of trees will be completed as per the conditions of a MOU made with the MECP (see Appendix C). The agreement is intended to minimize the loss of mature conifers while still allowing for the same and feasible movement of equipment and haul trucks.</li> <li>• The road width will be kept as narrow as safely possible to minimize the loss off values within the Conservation Reserve.</li> <li>• All trees proposed for removal will be flagged and confirmed by Ontario Parks prior to removal.</li> <li>• Smaller, younger red pines will preferentially be removed over mature, older red pines.</li> <li>• Trees that form part of a contiguous forest stand (e.g., southside off Lakes End Road) will be retained over those in existing fragmented areas.</li> </ul>	<p>Conditions of a MOU made with the MECP.</p>

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Ecosystem Protection and Restoration	Introduction of non-native invasive species to the Conservation Reserve and surrounding area.	<ul style="list-style-type: none"> <li>The project specifications will include the requirement of an <i>Invasive Species Management Plan</i> to ensure best management practises are implemented to minimize the spread of invasive species.</li> <li>All equipment, machinery and vehicles will be brought onto site in a clean condition to prevent the accidental spread of non-native, invasive species.</li> <li>The cleaning of equipment will be completed in accordance with the Ontario Invasive Plan Council Document (2013) entitled <i>Clean Equipment Protocol for Industry</i></li> <li>All equipment utilized within Long Lake and Luke Creek will be dried completely prior to demobilization and thoroughly disinfected.</li> </ul>	<i>Clean Equipment Protocol for Industry.</i>
Ecosystem Protection and Restoration	Direct loss of terrestrial habitat and impacts migratory birds and other wildlife.	<ul style="list-style-type: none"> <li>The removal of trees and vegetation will be limited to the smallest footprint possible.</li> <li>Candidate snags and mature trees will preferentially be retained and protected.</li> <li>Tree/vegetation removal activities will preferentially be completed outside of the migratory bird active period which is from approximately mid-April to late-August. If necessary, during the breeding bird season, vegetation proposed for removal will be surveyed by a qualified biologist to confirm the presence/absence of migratory birds or nests. If avian nests are identified, work around the nest will cease and a setback buffer established. All work inside the buffer avoided until the young have fledged and left the area.</li> <li>Vegetation clearing and nest protection measures will comply with the <i>Migratory Bird Regulations, 2022</i>.</li> <li>Existing roads and right of ways will be utilized to the extent practical.</li> <li>Vehicle use will be restricted to designated areas/ roadways. Access to the site by ATVs and other recreational vehicles will be prohibited while construction is occurring.</li> <li>Progressive rehabilitation will be implemented in disturbed areas to promote the reestablishment of native plant species, reduce the potential for erosion, and enhance the natural recovery of the ecological communities.</li> </ul>	<p>Migratory Bird Convention Act</p> <p>Migratory Bird Regulations</p>

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Ecosystem Protection and Restoration	Displacement of wildlife due to increased noise, vibrations, and vehicular traffic	<ul style="list-style-type: none"> <li>The removal of trees and vegetation will be limited to the smallest footprint possible.</li> <li>Speed limits will be monitored and contractually enforced along the access road and at the mine site.</li> </ul>	Not Applicable.
Ecosystem Protection and Restoration	Increased vehicular traffic causing injury/mortality to individual animals.	<ul style="list-style-type: none"> <li>Existing roads and right of ways will be utilized to the extent practical. Speed limits will be contractually enforced along the access road and at the mine site.</li> <li>Warning signs will be posted advising drivers of the possibility of wildlife encounters in areas with high wildlife activity.</li> <li>Vehicle use will be restricted to designated areas/ roadways. Access to the site by ATVs and other recreational vehicles will be prohibited while construction is occurring.</li> <li>Wildlife observations will be reported to the Site Supervisor and shared with workers as part of regular safety meetings.</li> <li>The project specifications will include the requirement of a <i>Wildlife Management Plan</i>. The plan will include, at a minimum, a summary of wildlife that may be encountered within the project area, internal wildlife reporting and response procedures, responses to injured wildlife, mitigation measures and monitoring requirements.</li> <li>Exclusionary fencing will be utilized to deter turtles and other wildlife from entering the work area. The fencing installation and types will be in accordance with the Ministry of Natural Resources and Forestry (MNR) Best Management Practises for <i>Reptile and Amphibian Exclusion Fencing</i> (2021).</li> </ul>	MNR Best Management Practises for <i>Reptile and Amphibian Exclusion Fencing</i> (2021).
Ecosystem Protection and Restoration	Wildlife attractants, such as domestic waste, may increase the prevalent of human-wildlife interactions.	<ul style="list-style-type: none"> <li>The feeding of wildlife will not be prohibited.</li> <li>The work area will remain free of litter and all waste disposed of in accordance with O.Reg 347.</li> <li>Wildlife observations will be reported to the Site Supervisor and shared with workers as part of regular safety meetings.</li> </ul>	O. Reg 347
Ecosystem Protection and	Potential impacts to imperilled lichen	<ul style="list-style-type: none"> <li>All workers assigned to this project will be aware of the presence of this lichen species within the project area.</li> </ul>	Not Applicable.



Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Restoration	species.	<ul style="list-style-type: none"> <li>This species will be protected by a 5 m buffer.</li> <li>Alterations to micro-climate conditions will be limited to the smallest footprint possible.</li> </ul>	
Species at Risk and Species at Risk Habitat	Adverse effects to Blanding's Turtles and its habitat.	<ul style="list-style-type: none"> <li>Applicable permits required under Section 17(2) of the ESA (2007) will be obtained prior to the rehabilitation activities and all work completed in accordance with the permit conditions.</li> <li>All workers assigned to this project will review the previous SAR surveys to ensure they are aware of potential species that may be encountered and how to identify them.</li> <li>If Blanding's Turtle are encountered within the project area, work will immediately stop to allow the individual time to leave the area before continuing with the activity. If the species does not leave the area, measures will be taken to safely relocate the individual by, or in consultation with, a qualified professional.</li> <li>Exclusionary fencing will be utilized to deter turtles and other wildlife from entering the work area. The fencing installation and types will be in accordance with the Ministry of Natural Resources and Forestry (MNR) Best Management Practises for <i>Reptile and Amphibian Exclusion Fencing</i> (2021).</li> </ul>	<p>Compliance with ESA permit conditions.</p> <p>MNR Best Management Practises for <i>Reptile and Amphibian Exclusion Fencing</i> (2021).</p>
Species at Risk and Species at Risk Habitat	Adverse effects to Eastern Whip-poor-will and its habitat.	<ul style="list-style-type: none"> <li>Applicable permits required under Section 17(2) of the ESA (2007) will be obtained prior to the rehabilitation activities and all work completed in accordance with the permit conditions.</li> <li>All workers assigned to this project will review the previous SAR surveys to ensure they are aware of potential species that may be encountered and how to identify them.</li> <li>If Eastern Whip-poor-will are encountered within the project area, work will immediately stop to allow the individual time to leave the area before continuing with the activity. If the species does not leave the area, measures will be taken to safely relocate the individual by, or in consultation with, a qualified professional.</li> <li>Tree/vegetation removal activities will preferentially be completed outside of the migratory bird active period which is from approximately mid-April to late-August.</li> </ul>	<p>Compliance with ESA permit conditions.</p>

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
		<ul style="list-style-type: none"> <li>The removal of trees and vegetation will be limited to the smallest footprint possible.</li> </ul>	
Species at Risk and Species at Risk Habitat	Adverse effects to potential habitat of Massasauga Rattlesnake	<ul style="list-style-type: none"> <li>Applicable permits required under Section 17(2) of the ESA (2007) will be obtained prior to the rehabilitation activities and all work completed in accordance with the permit conditions.</li> <li>All workers assigned to this project will review the previous SAR surveys to ensure they are aware of potential species that may be encountered and how to identify them.</li> <li>If Massasauga are encountered within the project area, work will immediately stop to allow the individual time to leave the area before continuing with the activity. If the species does not leave the area, measures will be taken to safely relocate the individual by, or in consultation with, a qualified professional.</li> </ul>	Compliance with ESA permit conditions.
Species at Risk and Species at Risk Habitat	Adverse effects to SAR and/or SAR habitat not listed in the ESA (2007) Section 17(2) permit.	<ul style="list-style-type: none"> <li>If any SAR are encountered within the project area, work will immediately stop, the MINES Project manager notified, and the MECP consulted as to how to proceed.</li> <li>Tree clearing activities will be avoided during the bat maternity roosting period (approximately June 1<sup>st</sup> to July 15<sup>th</sup>) and candidate snag trees will be retained and protected, where possible.</li> <li>All workers assigned to this project will review the previous SAR surveys to ensure they are aware of potential species that may be encountered and how to identify them.</li> </ul>	Policy Guidance on Harm and Harass under the Endangered Species Act.

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Surface Quality Water	Leaks and spills from construction vehicles and heavy equipment.	<ul style="list-style-type: none"> <li>All vehicle and equipment refueling will be completed on an impermeable surface at a minimum of 30 meters away from any waterbody.</li> <li>An emergency spill kit will be always readily available during construction activities and all workers trained on proper use. Should a spill occur, regardless of its severity, it will be the responsibility of the Site Supervisor to ensure that the Ministry of Environment, Conservation and Parks is immediately notified through the Ontario Spill Action Centre (1-800-268-6060). The MINES Project Manager will be immediately notified, and all applicable provincial and federal regulations adhered to.</li> <li>All equipment will be brought onto site clean, degreased, and free of fluid leaks to mitigate any deleterious substances from entering the water.</li> <li>Project specifications will include the requirements of a <i>Spill Contingency Plan</i> that outlines the procedure to be taken to minimize the impact of a spill to the environment.</li> </ul>	Environmental Protection Act.
Surface Quality Water	Sedimentation and erosion due to increased vehicular traffic along the access road routes and movement of heavy equipment.	<ul style="list-style-type: none"> <li>Sediment and erosion controls (e.g., erosion control fencing, fabrics, straw, sediment trap) will be used to mitigate erosion of exposed soils and sedimentation to adjacent waterbodies. All erosion and control measures will be regularly inspected during all phases of the project.</li> <li>Project specifications will include the requirement of a <i>Sediment Control Plan</i> to minimize sedimentation of the waterbody during all phases of the activity.</li> <li>Access to banks or areas adjacent to waterbodies will be limited to the extent practical to protect the structural integrity of the banks and shorelines.</li> <li>Areas with exposed soils or recent disturbance will be stabilized and rehabilitated to pre-disturbance conditions or better.</li> <li>Work will be scheduled to avoid extreme wet, windy or rainy periods.</li> <li>Waterbodies will be monitored continuously to observed signs of sedimentation during all phases of the project and correction actions taken, as needed.</li> </ul>	Environmental Protection Act
Surface Quality Water	Resuspension and entrainment of sediment and increase	<ul style="list-style-type: none"> <li>Sediment and erosion controls (e.g., erosion control fencing, fabrics, straw, sediment trap) will be used to mitigate erosion of exposed soils and sedimentation to adjacent waterbodies. All erosion and control measures will</li> </ul>	Environmental Protection Act, Fisheries Act

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
	<p>concentration of contaminants in Luke Creek and Long Lake</p>	<p>be regularly inspected during all phases of the project.</p> <ul style="list-style-type: none"> <li>• The project specifications will include the requirement of an <i>Isolation/Containment Plan</i> to ensure best practises are utilized to isolate temporary in-water work zones to always maintain clean flow downstream/ around the work area. The plan will include, at a minimum:               <ul style="list-style-type: none"> <li>○ Details how water flow withdrawal and discharge will be managed to prevent erosion and sediment release to the waterbody.</li> <li>○ How in-water work will be isolated using dams, turbidity curtains or equivalent materials to contain suspended sediments.</li> <li>○ Methods to capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas.</li> </ul> </li> <li>• The isolated work area will be continuously monitored to ensure the effectiveness of the turbidity curtains and that minimal sedimentation occurs outside of the isolated work area. Monitoring will ensure compliance with the Canadian Council of Ministers of the Environment - <i>Water Quality Guidelines for the Protection of Aquatic Life – Freshwater</i> for turbidity and total suspended solids.</li> <li>• Access to banks or areas adjacent to waterbodies will be limited to the extent practical to protect the structural integrity of the banks and shorelines.</li> <li>• Areas with exposed soils or recent disturbance will be stabilized and rehabilitated to pre-disturbance conditions or better.</li> <li>• All in-water work will be completed in compliance with the restricted activity timing windows for the protection of fish and fish habitat to ensure no impacts to fish during spawning, migration, and other critical life history stages.</li> <li>• Security measures will be implemented to ensure that the isolated in-water work area is not vandalised during off-work hours.</li> <li>• Work will be scheduled to avoid extreme wet, windy or rainy periods.</li> </ul>	<p>CCME – Water Quality Guidelines for the Protection of Aquatic Life</p>

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Surface Quality Water	Change in channel morphology and habitat structure.	<ul style="list-style-type: none"> <li>The channel morphology of Luke Creek will be rehabilitated to pre-disturbance condition or better.</li> <li>Instream structure and cover for habitat will be re-established to match structure of previous or adjacent types, where possible.</li> <li>Impacts on riparian vegetation will be limited to those approved for the work.</li> <li>Access to banks or areas adjacent to waterbodies will be limited to the extent practical to protect the structural integrity of the banks and shorelines.</li> </ul>	Fisheries Act
Surface Quality Water	Disruption in flow within Luke Creek.	<ul style="list-style-type: none"> <li>Flow downstream of the in-water work area will be maintained.</li> <li>Screens will be utilized to prevent entrainment of fishes into water intakes.</li> </ul>	Fisheries Act
Surface Quality Water	Disruption in access to fish habitat.	<ul style="list-style-type: none"> <li>All in-water work will be completed in compliance with the restricted activity timing windows for the protection of fish and fish habitat to ensure no impacts to fish during spawning, migration, and other critical life history stages.</li> <li>The project specifications will include the requirement for an <i>Isolation/Containment Plan</i> to ensure best practises are utilized to isolate temporary in-water work zones. The plan will include methods to capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas.</li> </ul>	Fisheries Act
Surface Quality Water	Entrapment or entrainment of fish within work area.	<ul style="list-style-type: none"> <li>All in-water work will be completed in compliance with the restricted activity timing windows for the protection of fish and fish habitat to ensure no impacts to fish during spawning, migration, and other critical life history stages..</li> <li>Screens will be utilized to prevent entrainment of fishes into water intakes.</li> <li>The project specifications will include the requirement for an <i>Isolation/Containment Plan</i> to ensure best practises are utilized to isolate temporary in-water work zones. The plan will include methods to capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas.</li> <li>Fish that become trapped within the isolated work area will be relocated to an appropriate location in the same water by a qualified environmental professional.</li> </ul>	Fisheries Act
Groundwater and	Discharge of water	<ul style="list-style-type: none"> <li>Water will be treated prior to discharge in accordance with the project ECA</li> </ul>	Compliance with

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Surface Water	into the environment.	<p>conditions.</p> <ul style="list-style-type: none"> <li>All discharged water will meet or exceed applicable provincial water quality guidelines.</li> <li>Energy dissipation measures will be utilized to deflect, scatter, and neutralize the erosive force of moving water.</li> </ul>	ECA conditions.
Waste Management	The generation of construction waste.	<ul style="list-style-type: none"> <li>The handling, management, and disposal of waste will be completed in accordance with applicable health and safety and environmental legislation.</li> <li>The work are will remain free of litter and all waste disposed of at a licensed facility in accordance with O.Reg 347.</li> </ul>	O.Reg 347
Contamination – Public Health	Exposure of contaminated soil, surface water and groundwater by workers and the environment.	<ul style="list-style-type: none"> <li>All workers assigned to this project will be aware of contaminants at the site and the risks they may pose to human health.</li> <li>Personal protective equipment will be available to all personnel.</li> <li>Water or an approved dust suppressant will be utilized to minimize dust, as needed.</li> <li>Work will be scheduled to avoid extreme wet, windy or rainy periods</li> </ul>	Environmental Protection Act
Contamination	Introduction of new contaminants to the environment.	<ul style="list-style-type: none"> <li>All backfill material mobilized to site will be transported in clean trucks and will be free of contaminants.</li> <li>The backfill material will meet the applicable Site Condition Standards under Part XV.1 of the <i>Environmental Protection Act</i>.</li> </ul>	Environmental Protection Act
Contamination	Previously unidentified contamination	<ul style="list-style-type: none"> <li>If previously unidentified contamination is identified during the course of the work, the work will immediately stop, and the MINES Project Manager consulted as to how to proceed. Any investigation and/or remedial work will be conducted by an environmental consultant under the supervision of a Qualified Person in a manner consistent with O.Reg 153 and industry standards.</li> </ul>	O.Reg 153
Servicing	Upgrades to existing roads	<ul style="list-style-type: none"> <li>All vegetation removal activities will preferentially be completed outside of the migratory bird active period which is from approximately mid-April to late-August.</li> <li>Pre-construction surveys will be completed by the contractor at potentially impacted residences to ensure no damage occurs during the road upgrade work.</li> <li>The blasting of bedrock will be completed during the daylight hours and in</li> </ul>	OPSS. MUNI 120 Migratory Bird Regulations

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
		<p>accordance with applicable regulations. All blasts will be monitored for ground vibration and overpressure and completed in accordance with the Ontario Public Standard Specification 120 General Specification for the Use of Explosives (OPSS.MUNI 120).</p> <ul style="list-style-type: none"> <li>• Where practical, the footprint of existing roads will be utilized.</li> <li>• The mine access road and other access created to facilitate rehabilitation at the mine site will be returned to pre-disturbance conditions.</li> </ul>	
Servicing	Damage to local road infrastructure.	<ul style="list-style-type: none"> <li>• Road maintenance agreements will be prepared between the Ministry and the City of Greater Sudbury, and between the Ministry and the Ministry of Transportation / Long Lake Local Roads Board to ensure the roadways are actively maintained throughout construction.</li> </ul>	Municipal Act O. Reg. 239/02 - Minimum Maintenance Standards.
Archaeological Resources	Encounters with previously unidentified archaeological resources.	<ul style="list-style-type: none"> <li>• If any previously unidentified archaeological features are identified during construction activities, work will immediately stop and MCM Heritage Planning Unit contacted to determine the appropriate next steps.</li> </ul>	Ontario Heritage Act
Cultural Heritage	Impacts to heritage attributes of the property.	<ul style="list-style-type: none"> <li>• All mitigation measures and avoidance measures outlined in the Heritage Impact Assessment will be adhered to during the completion of the work.</li> </ul>	Ontario Heritage Act
Recreational Users	Access to Crown Land by recreational users and property owner.	<ul style="list-style-type: none"> <li>• Protective fencing and signage will be utilized to secure the work site from public access.</li> <li>• Access to the site will be controlled to ensure no risk to the public, including hunters, recreational users, and the private landowner.</li> </ul>	Occupational Health and Safety Act
Recreational Users	Impacts to the Broder Dill Snowmobile Association trail.	<ul style="list-style-type: none"> <li>• Protective fencing and signage will be utilized to secure the work site from public access.</li> <li>• Access to the site will be controlled to ensure no risk to the public, including users of the snowmobile trail.</li> <li>• The trail will be rerouted to allow continued use of the route. The location of the new trail will be determined through consultation with the Broder Dill Snowmobile Association.</li> </ul>	Occupational Health and Safety Act

Criteria	Environmental Effect/ Issue/ Concern	Mitigation Measure/ Commitments	Standard/ Regulation/Best Management Plans
Residents	Increased probability of accidents on public roads.	<ul style="list-style-type: none"> <li>• Tree/vegetation clearing; trimming back of rock cuts; relocation of utility poles; replacement and/or installation of guiderails; and the replacement and/or installation of new signs will be completed to improve sight line distances and ensure the roads meet applicable design standards.</li> <li>• The haulage of materials on public roads will be avoided during extreme weather conditions, including periods with poor visibility.</li> <li>• Speed limits will be contractually enforced along the access road.</li> <li>• The scheduling of trucks along the public roads will preferentially be completed during a time when traffic is expected to be lowest. No truck traffic will be permitted during school bus loading and unloading periods.</li> <li>• A road maintenance agreement will be prepared between the Ministry, City of Greater Sudbury, Ministry of Transportation, and the Local Roads Board to ensure the roadways are actively maintained throughout construction.</li> <li>• Flagging, signage, and road construction safety measures will be in accordance with the Ontario Traffic Manual – Book 7.</li> <li>• Truck loads will follow the load limits and restriction set out by the City of Greater Sudbury under the Ontario Highway Traffic Act (HTA).</li> </ul>	<p>Ontario Highway Traffic Act.</p> <p>City of Greater Sudbury Engineering Design Manual</p> <p>Transportation Associations of Canada Geometric Design Guide for Canadian Roads</p> <p>MTO's Roadside Design Manual</p> <p>Ontario Traffic Manual.</p> <p>O.Reg 239/02</p>
Claim Holder	Access to conduct exploration and/or assessment work.	<ul style="list-style-type: none"> <li>• To keep the mining claims in good standing, the Ministry of Mines can grant a discretionary order for an exclusion of time for performing and/or filing assessment work under Subsection 67(3) of the Mining Act. This removes the duration considered in the computation of time within which the required units of assessment work must be satisfied and relieves the claim holder of the requirements to carry out the assessment work due to exceptional circumstances outside of their control.</li> </ul>	Mining Act
Indigenous Communities	Impacts to hunting, fishing, harvesting or other traditional activities.	<ul style="list-style-type: none"> <li>• Communication with the community will be maintained throughout the construction activities.</li> <li>• The Ministry will implement a procurement process that training and economic opportunities to the community. .</li> </ul>	Section 35 of the Constitution Act



## 7 Alternatives Analysis

The Ministry has considered a range of alternatives for the project. This includes alternatives to the proposed rehabilitation itself, and alternative methods for carrying out components of the project. As part of this Class EA, alternatives were carried forward only if they provided a viable solution to the problem to be addressed and supported the Ministry's ability to fulfill the project goal and remediation objectives. As detailed in above Section 1.2, the overall goal of the project is to reduce arsenic concentrations within Long Lake to below the drinking water standard of 10 µg/L. To achieve this goal, the following remediation objectives have been proposed:

1. Reduce acidic drainage from leaching of tailings that results in arsenic loading to Long Lake via the mine drainage channel and downstream Luke Creek. This will be achieved by minimizing the leaching of tailings by surface water and shallow groundwater/porewater from the three tailings area and by removing the source of fugitive tailings to prevent continued leaching to downstream surface water features.
2. Prevent and minimize the transport of tailings to Long Lake, specifically:
  - a. Minimize the transport of tailings in the three tailings areas to the downstream mine drainage, Luke Creek and Long Lake delta;
  - b. Prevent the transport of fugitive tailings and sediment to the Long Lake delta; and,
  - c. Reduce the transport of fugitive tailings and sediment from the delta into Long Lake.

A summary of alternatives carried forward for the project and project components that were assessed as part of this Class EA is provided in the following subsections. In addition to alternatives to the project itself, alternatives were considered with respect to site access and aggregate supply.

The evaluation of alternatives was completed with consideration of comments received as part of consultation, and input from technical experts and consultants. Supporting material for the alternatives analysis is included in Appendix G.

### 7.1 Evaluation Criteria

The assessment approach for this Class EA uses a comparative analysis of the overall advantages and disadvantages of each alternative based on the evaluation criteria summarized in Table 20 below. The evaluation criteria selected include several indicator effects that fall under the following "Areas of Considerations": Technical, Physical and Natural Environment, Socio-economic Environment, Cultural Environment, Indigenous Communities, and Cost Considerations.

**Table 20 – Alternatives Analysis Evaluation Criteria**

Criteria	Indicator Effects
Technical	<ul style="list-style-type: none"> <li>• Ability to fulfill the project goal and remediation objectives.</li> <li>• Complies with applicable land use planning policies.</li> <li>• Ease of implementation (i.e., permitting requirements, additional studies, regulatory acceptance).</li> </ul>
Physical and Natural Environment	<ul style="list-style-type: none"> <li>• Potential impacts to air quality, noise, and vibrations.</li> <li>• Provides opportunity to reduce greenhouse gas emissions and carbon footprint.</li> <li>• Potential impacts to groundwater, surface water, and source water protection areas.</li> <li>• Potential impacts to terrestrial habitat and wildlife.</li> <li>• Potential impacts to aquatic species and habitats.</li> <li>• Potential impacts to species at risk and/or species at risk habitat.</li> <li>• Potential impacts to environmentally significant areas (i.e., ANSIs, Significant Wetlands, Conservation Reserves, etc.)</li> </ul>
Socio-economic Environment	<ul style="list-style-type: none"> <li>• Potential for disturbance to residences through temporary effects (i.e., construction noise, dust, property access disruptions).</li> <li>• Potential disturbance to surrounding recreational, forestry, and/or mining activities.</li> <li>• Economic opportunities to local resources and businesses.</li> </ul>
Cultural Environment	<ul style="list-style-type: none"> <li>• Potential impacts to known or potential archaeological resources.</li> <li>• Potential impacts to know or potential cultural heritage resources.</li> </ul>
Indigenous Communities	<ul style="list-style-type: none"> <li>• Potential impacts to Indigenous land and resources.</li> <li>• Economic opportunities to Indigenous Communities.</li> </ul>
Cost	<ul style="list-style-type: none"> <li>• Capital costs require to construct and/or implement the alternative.</li> <li>• Operational and maintenance costs.</li> </ul>

Based on the above criteria, each alternative was ranked as “high”, “moderate” or “low” based on the advantages or disadvantages of each method. Alternatives with the lowest negative impacts and greatest benefits were ranked as “high”, while those with the highest negative impacts and lowest benefits were ranked as “low”. Where a range of impacts and benefits exist a ranking of “moderate” was assigned.

## 7.2 Alternatives to the Project

The alternative methods for completing the remediation of the Long Lake Gold Mine were initially identified by CH2M Hill as part of a Remedial Options Report (see Section 5.6 and Appendix G). The alternatives assessed as part of this Class EA are summarized in the following subsection. It is noted that downstream treatment of surface water has previously been proposed as an alternative to the project; however, this option is not carried forward as part of the current analyses as it does not fulfill the remediation objectives of preventing and minimizing the transport of tailings to Long Lake.

### **7.2.1 Alternative Solution 1 – Do Nothing**

In the “Do Nothing” alternative, no action would be taken to address the environmental impacts of the mine. The major sources of arsenic loadings to Long Lake will remain unchanged.

Although this alternative does not address the overall project goal of reducing arsenic concentrations within Long Lake to below the drinking water standard of 10 µg/L, it provides a benchmark for evaluating the other alternatives.

### **7.2.2 Alternative Solution 2 – Consolidate and Cover On-Site.**

This alternative includes the construction of an impoundment area within TA-01 and consolidating all tailings and contaminated soils that contribute to the arsenic loading to Long Lake within the impoundment. The consolidated tailings and contaminated materials will be covered by an impermeable liner and vegetative cover to prevent surface water infiltration and oxidation. This option will require some in-water work to remove the fugitive tailings from within Luke Creek and Long Lake.

### **7.2.3 Alternative Solution 3 – Cover Tailings In-Situ and Submerge Exposed Tailings Within the Delta.**

This alternative involves grading the tailings within TA-01, TA-02, TA-02 and the Luke Creek floodplain and covering the material in-situ. To execute this option, Luke Creek will need to be permanently relocated to allow for the long-term monitoring of the cover. Several permits and approvals would be needed to relocate the creek. The tailings within Long Lake would be submerged to a deeper area of the lake where they would be unaffected by seasonal water fluctuations.

### **7.2.4 Alternative Solution 4 – Relocate to the Mine Workings**

This alternative involves excavating all tailings within the three tailings’ areas, Luke Creek floodplain and Long Lake and relocating the material to the glory hole, shaft and underground mine workings. The tailings and contaminated material would be submerged a minimum of 2 meters below water in the mine workings. To execute this option, additional studies would be needed to further characterize the tailings and to confirm the extents of useable area in the mine workings. It is also likely that chemical treatment of the tailings may be needed to neutralize the material.

### **7.2.5 Alternative Solution 5 – Relocation off- Site**

This option involves the excavation and relocation of tailings and contaminated material to an off-site source. The excavated areas would then be backfilled, graded, covered, and vegetated. This option would require a licensed waste disposal facility that is large enough to accommodate the material. The material would be transported using existing networks of public roads.

### **7.2.6 Identification of Preferred Solution**

A summary of the comparative alternatives analysis to complete the rehabilitation is summarized below in Tables 21. The construction of an impoundment area within TA-01 and consolidating all tailings and contaminated soils that contribute to the arsenic loading to Long Lake within the impoundment (Alternative Solution 2) was selected as the preferred solution due to the following advantages:

- This impoundment will effectively remove all sources of arsenic loading to Long Lake and the cover system eliminate the pathway for transport of leaching tailings to potential receptors.
- The proposed rehabilitation strategy is the most cost-effective option and easiest to implement.
- The environmental effects associated with implementing this alternative can be mitigated using standard methods. Minimal to no residual effects are anticipated.
- This option will effectively remove the sources of contamination from AAFN land.

**Table 21 – Comparative Evaluation Summary of Alternative Solutions for the Project**

Evaluation Criteria	Alternative Solution 1 – Do Nothing	Alternative 2 - Consolidate and Cover	Alternative 3 - Cover Tailings In-Situ and submerge exposed tailings within the delta.	Alternative 4 –Relocate all tailings to the mine workings (i.e. glory hole, shaft and underground mine workings).	Alternative 5 – Relocation off- Site
<b>Description of Alternative</b>	No action would be taken to address the environmental impacts of the mine.	Construction of an impoundment area within TA-01 and consolidating all tailings and contaminated soils that contribute to the arsenic loading to Long Lake within the impoundment.	The tailings within TA-01, TA-02, TA-03 and the Luke Creek floodplain would be graded and covered in-situ. This option would require the permanent relocation of Luke Creek. The tailings within Long Lake would be submerged to a deeper area of the lake where they would be unaffected by seasonal water fluctuations.	Relocate all tailings within the three tailings' areas, Luke Creek floodplain and Long Lake to the glory hole, shaft and underground mine workings.	The excavation and relocation of material to an off-site source. The material would be transported using existing networks of public roads.
<b>Technical</b>	<ul style="list-style-type: none"> <li>The “Do Nothing” alternative does not fulfill the project objective of reducing arsenic concentrations within Long Lake.</li> <li>No changes to land use and application to land use planning policies.</li> <li>The “Do Nothing” alternative does not require any construction activities.</li> </ul> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>This alternative will effectively remove all sources of arsenic loading to Long Lake.</li> <li>The cover system will eliminate the pathway for transport of leaching tailings to potential receptors.</li> <li>There are no proposed changes to land use associated with the rehabilitation activities and no new infrastructure proposed.</li> <li>Many contractors in Ontario have the capability to carry out this option.</li> <li>Some dewatering will be required.</li> <li>Will require aggregate material and haulage on public roads.</li> <li>Will require some water management and water taking to execute the rehabilitation of the submerged material.</li> <li>Will require ongoing care and maintenance to ensure cover is working as intended.</li> <li>This option is considered the easiest to implement.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This alternative will eliminate the pathway for transport of leaching tailings to potential receptors.</li> <li>There are no proposed changes to land use associated with the rehabilitation activities and no new infrastructure proposed.</li> <li>Least amount of handling of contaminated material is required.</li> <li>A significant amount of permitting and approvals will be needed to relocate Luke Creek.</li> <li>Dewatering will be needed.</li> <li>Many contractors in Ontario have the capability to carry out this option.</li> <li>This option will require the most site preparation.</li> <li>Will require ongoing care and maintenance to ensure cover is working as intended. The care and maintenance will involve more effort compared to Option 1 due to the spatial extent of the cover in-situ.</li> <li>This option is considered the second most difficult to implement.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>This alternative will effectively remove all sources of arsenic loading to Long Lake.</li> <li>There are no proposed changes to land use associated with the rehabilitation activities and no new infrastructure proposed.</li> <li>Additional studies would be required to confirm the extents of usable area in the mine workings.</li> <li>Chemical treatment of the tailings may be required to neutralize the material.</li> <li>This option will likely require the least amount of maintenance in comparison to other options.</li> <li>This option poses the most risks due to the number of uncertainties associate with depositing the tailings within the workings.</li> <li>This option is considered the most difficult to implement due to the additional studies required.</li> </ul> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>This alternative will effectively remove all sources of arsenic loading to Long Lake.</li> <li>There are no proposed changes to land use associated with the rehabilitation activities and no new infrastructure proposed.</li> <li>This option would require a licensed waste disposal facility that is large enough to accept the material.</li> </ul> <p><b>Low</b></p>

Evaluation Criteria	Alternative Solution 1 – Do Nothing	Alternative 2 - Consolidate and Cover	Alternative 3 - Cover Tailings In-Situ and submerge exposed tailings within the delta.	Alternative 4 –Relocate all tailings to the mine workings (i.e. glory hole, shaft and underground mine workings).	Alternative 5 – Relocation off- Site
<b>Physical and Natural Environment</b>	<ul style="list-style-type: none"> <li>The “Do Nothing” alternative does not require any construction activities. As such, no potential impacts anticipated.</li> </ul> <p><b>None</b></p>	<ul style="list-style-type: none"> <li>This option will require the movement of materials and equipment.</li> <li>Will result in the temporary increase in noise and vibrations.</li> <li>There is the potential for the excavation of the tailings and movement of construction vehicles overland to result in the generation of dust contaminated with arsenic.</li> <li>Minor tree removal will be required which will have a negative impact on carbon sequestration.</li> <li>This option will generate greenhouse gases due to emissions created by hauling aggregate for the cover.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This option will require the least movement of equipment and minimal excavation work.</li> <li>Tree removal activities will be required to relocate Luke Creek. This will have negative impacts on carbon sequestration.</li> <li>This option will generate greenhouse gases due to emissions created by hauling aggregate for the cover.</li> <li>This option will require the relocation of Luke Creek and significant disturbance to the aquatic habitat of the Luke Creek floodplain. Will result in the harmful alteration of fish habitat.</li> <li>This option has the greatest impact to the environment due to the vegetation clearing associated with relocating the creek.</li> </ul> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>This option will require the movement of materials and equipment.</li> <li>Will result in the temporary increase in noise and vibrations.</li> <li>There is the potential for the excavation of the tailings and movement of construction vehicles overland to result in the generation of dust contaminated with arsenic.</li> <li>Minor tree removal will be required which will have a negative impact on carbon sequestration.</li> <li>This option has the potential to negatively impact groundwater if the glory hole is hydraulically connected to an aquifer.</li> <li>Some greenhouse gases will be generated when relocating the tailings to the mine workings.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>This option would require the most movement of materials and equipment to relocate the tailings and contaminated material off-site and transport backfill, equipment, etc. to the site.</li> <li>This option would have the greatest impact to greenhouse gases due to the movement of material.</li> <li>Will result in the temporary increase in noise and vibrations.</li> <li>There is the potential for the excavation of the tailings and movement of construction vehicles overland to result in the generation of dust contaminated with arsenic.</li> <li>Minor tree removal will be required.</li> </ul> <p><b>Low</b></p>
<b>Socio- economic Environment</b>	<ul style="list-style-type: none"> <li>The “Do Nothing” alternative does not require any construction activities. As such, no potential impacts anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>This option has the potential to generate dust along public roads due to hauling equipment and aggregate.</li> <li>Will result in the temporary disruption to use of crown land during construction activities.</li> <li>Recreational activities on the impoundment will be prohibited following the completion of the rehabilitation activities to protect the integrity of the cover. This will result in the loss of use of crown land for recreational activities.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This option has the potential to generate dust along public roads due to hauling equipment and aggregate.</li> <li>Will result in the temporary disruption to use of crown land during construction activities.</li> <li>Recreational activities on covered areas will be prohibited following the completion of the rehabilitation activities. This will result in the loss of use of crown land for recreational activities. The area impacted is greater than compared to Option 2.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>This option will result in disturbance to the surface rights owner of the glory hole. There is the potential to impact the landscape of his property.</li> <li>This option would result in the least disturbance to residences along public roads and no aggregate hauling is required.</li> <li>Will result in the temporary disruption to use of crown land during construction activities.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>This option result in the greatest impact to residents due to the haulage of contaminated material, equipment, backfill, etc. along public roads.</li> <li>Will result in the temporary disruption to use of crown land during construction activities.</li> <li>This option will allow recreational activities to proceed on the land following the completion of the work.</li> </ul> <p><b>Low</b></p>
Cultural Environment	<ul style="list-style-type: none"> <li>The “Do Nothing” alternative does not require any construction activities. As such, no potential</li> </ul>	<ul style="list-style-type: none"> <li>Below-grade work is required; however, this is limited to previously disturbed areas of the</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance of natural areas would be needed to relocate Luke Creek. This has the</li> </ul>	<ul style="list-style-type: none"> <li>Below-grade work is required; however, this is limited to previously disturbed areas of the</li> </ul>	<ul style="list-style-type: none"> <li>Below-grade work is required; however, this is limited to previously</li> </ul>

Evaluation Criteria	Alternative Solution 1 – Do Nothing	Alternative 2 - Consolidate and Cover	Alternative 3 - Cover Tailings In-Situ and submerge exposed tailings within the delta.	Alternative 4 –Relocate all tailings to the mine workings (i.e. glory hole, shaft and underground mine workings).	Alternative 5 – Relocation off- Site
	impacts anticipated.	site. • Although considered low risk, there is the potential to encountered previously unidentified archaeological resources during the excavation activities.  <b>High</b>	potential to disturb previously unknown archaeological resources. • Additional investigations would be needed to ensure no archaeological artifacts are in Long Lake where the submerged tailings are deposited.  <b>Moderate</b>	site. • Although considered low risk, there is the potential to encountered previously unidentified archaeological resources during the excavation activities.  <b>High</b>	disturbed areas of the site. • Although considered low risk, there is the potential to encountered previously unidentified archaeological resources during the excavation activities.  • <b>High</b>
Indigenous Communities	• The “Do Nothing” alternative does not require any construction activities. As such, no potential impacts anticipated.	• Work will require excavation activities on AAFN land. • Will effectively remove the sources of contamination from AAFN land.  <b>High</b>	• This option does not remove the contamination on AAFN land. Poses the risk of further impacts in the event the cover is damaged.  <b>Moderate</b>	• Work will require excavation activities on AAFN land. • Will effectively remove the sources of contamination from AAFN land.  <b>High</b>	• Work will require excavation activities on AAFN land. • Will effectively remove the sources of contamination from AAFN land.  <b>High</b>
Cost	• The “Do Nothing” alternative does not require any construction activities and therefore no costs associated with the work. However, the Ministry will be required to provide water for perpetuity.	• This option has the lowest cost for capping material as well as labour and maintenance.  <b>High</b>	• This option requires a higher cost for capping material as well as labour and maintenance. • This option will require greater effort and cost during future monitoring.  <b>Moderate</b>	• Will require additional studies and analysis prior to implementation. • This option has several uncertainties that may increase the cost requirements. • This option is expected to have the highest costs.  <b>Low</b>	• This option will have a high cost associated with the haulage of tailings and contaminated soil to an off-site source. • Tipping fees will be required to dispose of the material at a licensed facility.  <b>Low</b>
<b>Ranking of Alternative Solution</b>	<b>Advantages:</b> • No construction costs or disruptive activities.	<b>Advantages:</b> • This option will effectively remove all sources of arsenic loading to Long Lake. and the cover system will eliminate the pathway for transport of leaching tailings to potential receptors. • This is the most cost-effective option to implement. • Will effectively remove the sources of contamination from AAFN land. • This option is the easiest to implement.	<b>Advantages:</b> • This alternative does not remove the sources of arsenic loading to Long Lake but eliminates the pathway for transport of leaching tailings to potential receptors. • Will effectively remove the sources of contamination from AAFN land.	<b>Advantages:</b> • This option effectively removes all sources of arsenic loading to Long Lake and eliminates the pathway for transport of leaching tailings to potential receptors. • Will effectively remove the sources of contamination from AAFN land. • Does not limit the use of crown land in the future. • Will require less monitoring compared to Alternative 2 and 3.	<b>Advantages:</b> • This option effectively removes all sources of arsenic loading to Long Lake and eliminates the pathway for transport of leaching tailings to potential receptors. • Will effectively remove the sources of contamination from AAFN land. • Does not limit the use of crown land in the future. • Will require less monitoring compared to the other options.

Evaluation Criteria	Alternative Solution 1 – Do Nothing	Alternative 2 - Consolidate and Cover	Alternative 3 - Cover Tailings In-Situ and submerge exposed tailings within the delta.	Alternative 4 –Relocate all tailings to the mine workings (i.e. glory hole, shaft and underground mine workings).	Alternative 5 – Relocation off- Site
	<p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>Does not satisfy the project objective</li> </ul>	<p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>The cover will require aggregate material that would be hauled on public roads.</li> <li>Will result in the loss of use of crown land for recreational purposes to protect the integrity of the cover.</li> <li>Will require monitoring for perpetuity.</li> </ul>	<p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>The cover will require aggregate material that would be hauled on public roads.</li> <li>Requires a significant amount of permitting to relocate Luke Creek and the most site preparation.</li> <li>Will result in the alteration of fish habitat and the greatest impacts to the surrounding terrestrial environment.</li> <li>Does not remove the sources of contamination from AAFN land.</li> <li>Will require monitoring for perpetuity. The area to be monitored covers a larger area compared to Alternative 2.</li> </ul>	<p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>This option poses the highest risk due to the number of uncertainties associated with depositing the tailings within the Glory hole.</li> <li>This option will require additional studies prior to implementation.</li> <li>This option is expected to have the highest costs to implement.</li> </ul>	<p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>This option would have the greatest impact to residents due to the haulage of tailings, contaminated soil, aggregate, equipment, and other material on public roads.</li> <li>This option has higher risks to implement as it would require a facility large enough to accept the material.</li> <li>This option will have highest cost to implement due to haulage and tipping fees.</li> </ul>
	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>



### **7.3 Alternatives to Site Access and Aggregate**

The Ministry completed a detailed *Access Road Evaluation* in March 2021 (see Appendix G). The objective of the report was to address stakeholder concerns related to access to the Long Lake Gold Mine property and to ensure that all alternatives for site access had been adequately assessed. The assessment considered six alternatives for site access and aggregate supply, with three carried forward as part of the evaluation. The alternatives for site access and aggregate supply assessed as part of this Class EA are summarized below.

#### **7.3.1 Alternative Solution 1 – All Aggregate Imported to Site Using Existing Network of Roads**

This alternative is what was originally presented to the public in 2017. It involves hauling all aggregate from an off-site source using the existing network of roads located along the southside of Long Lake. Although this alternative has previously been found to not be an option, it has been carried forward as part of this Class EA to provide a benchmark for evaluating the other alternatives.

#### **7.3.2 Alternative Solution 2 – Aggregate Produced at Ministry Pit Located Near the Project Site**

As detailed in Section 1.3.5, the Ministry is proposing to obtain permits under the ARA to own and operate two aggregate pits closer to the project site: the Crown Pit and Wavy Trail Pit. The Crown Pit is situated approximately 1 km northeast of the project along the site access road, while the Wavy Trail pit is located approximately 3 km northeast on Wavy Trail Road.

This alternative utilizes aggregate resources from two ministry owned pits and the existing network of roads located along the southside of Long Lake. The aggregate pits will significantly reduce the haulage of material along Long Lake Road and Tilton Lake Road, however haul traffic will still occur on Wavy Trail, Lakes End Road, and the Site Access Road. All mobilization/demobilization of equipment, off-site materials, daily construction crews would use this route year-round. Some site access road improvements will be needed to execute this option to ensure that the roads are safe for both local and construction traffic. The improvements would be completed on existing roadways but will include work within the Eden Township Conservation Reserve.

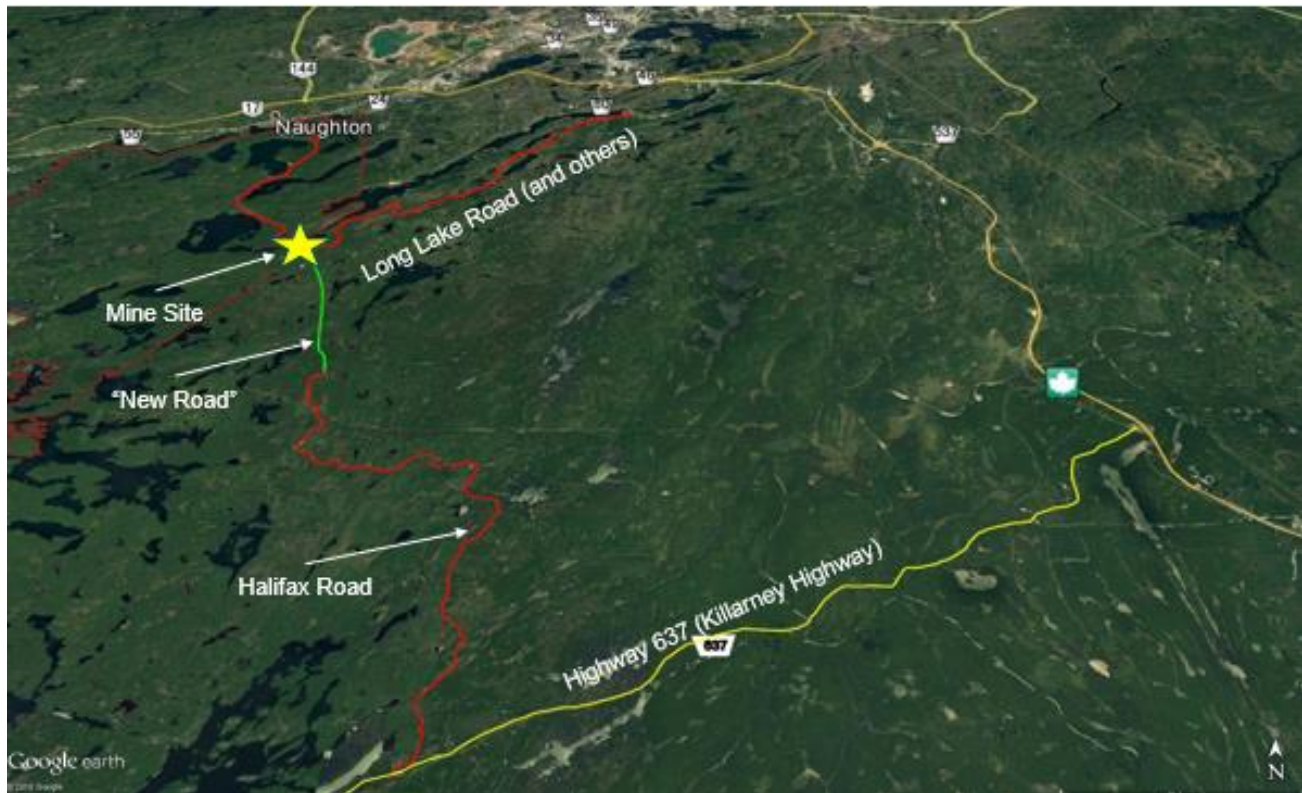
#### **7.3.3 Alternative Solution 3 - Aggregate Provided by Atikameksheng Anishnawbek Using Historical Mine Road**

The Long Lake Gold Mine property was historically accessed by a mine road that transected reserve land (see Figure 1 in Section 1.1). The road is currently overgrown and inaccessible by light vehicles; however, the footprint of the historical road is still visible. Similarly, all water crossings associated with the road have been removed.

This alternative involves upgrading the historical road and obtaining all aggregate from the Round Lake pit situated on reserve land. All mobilization/demobilization of equipment, off-site materials, daily construction crews would use this route year-round. The execution of this alternative would be dependent on the completion of AAFN's environmental assessment process in accordance with their land code. Additional studies would be needed to assess the existing environmental condition along the access road to determine potential environmental effects associated with the road construction.

#### **7.3.4 Alternative Solution 4– Construction of a New Road from Forestry Roads off Highway 637**

This alternative involves the construction of a new 8.6 km road extension from the end of Halifax Road, located off Highway 637. The location of the existing road and proposed extension is illustrated below on Figure 7.



**Figure 7** – Location of the Halifax Road extension alternative.

This option requires the construction of a new road through a forested, undisturbed area. It is assumed that all aggregate utilized will be obtained from ministry owned pits. All mobilization/demobilization of equipment, off-site materials, daily construction crews would use this route year-round.

### **7.3.5 Identification of Preferred Solution**

A summary of the comparative alternatives analysis for site access and aggregate supply is summarized below in Table 22. The preferred alternative for site access is the existing network of roads along the southside of Long Lake; and all aggregate required for the project will be sourced from the ministry owned pits situated close to the project site. The above alternatives were selected as the preferred solution due to the following advantages:

- The proposed access route and aggregate sources support the project and remediation objectives.
- Impact to residences is reduced due to the location of the aggregate pits closer to the mine site. This reduces the haul distance of aggregate and the projects impact on greenhouse gas emissions, as well as potential indices of wildlife-vehicle collisions.
- The proposed access road follows an existing network of roads and only minor improvements are required to improve safety for both local and construction traffic.
- This alternative will result in the smallest environmental impacts as the proposed route follows the footprint of an existing road and the construction of new roads is not required.
- This option has the lowest costs required to implement the work.

**Table 22 - Comparative Evaluation Summary of Alternative Solutions for Site Access and Aggregate**

Evaluation Criteria	Alternative Solution 1 – All Aggregate Imported to Site	Alternative 2 – Aggregate Produced at Ministry Pit Located Near Project Site.	Alternative 3 – Aggregate provided by AAFN and hauled using historical mine access road.	Alternative 4 – Construction of a New Road off Highway 637 (Halifax Road Extension)
<b>Description of Alternative</b>	All aggregate would be hauled from an off-site source using the existing network of roads located along the southside of Long Lake.	Aggregate will be obtained from the Ministry’s Crown Pit and Wavy Trail Pit, located near the project site, and hauled using existing public roads.	Aggregate provided by AAFN at the Round Lake Pit and hauled to site using the historical mine access road.	Construction of a New Road from Forestry Roads off Highway 637 and aggregate from ministry owned pits.
<b>Technical</b>	<ul style="list-style-type: none"> <li>This alternative helps support the project objectives.</li> <li>No changes to land use and application to land use planning policies.</li> <li>This alternative does not require any construction activities.</li> <li>This alternative has previously been identified to not be an option due to concerns raised by the public.</li> </ul> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>This alternative helps support the project objectives.</li> <li>The proposed access road follows an existing network of roads. There are no proposed changes to land use.</li> <li>Permit are required under the ARA to operate the Wavy Trail Pit and Crown Pit.</li> <li>Approvals will be needed to complete the proposed road improvements within the conservation reserve.</li> <li>Additional studies required to support the road improvement design.</li> <li>This option is considered the easiest to implement.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This alternative helps support the project objectives.</li> <li>The use of the road and the Round Lake Pit is dependent on the completion of AAFN’s EA process.</li> <li>Additional studies would be needed to understand the environmental impacts associated with the upgrading of the road and use of the pit.</li> <li>The historical road is not currently utilized by light vehicles. The proposed work will change the land use in the area.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>This alternate helps support the project objectives.</li> <li>This option involves the construction of a new road. Permitting and additional studies will be needed prior to implementation.</li> <li>The proposed extension is currently forested. The proposed work will change the land use in the area.</li> <li>Permit are required under the ARA to operate the Wavy Trail Pit and Crown Pit.</li> </ul> <p><b>Low</b></p>
<b>Physical and Natural Environment</b>	<ul style="list-style-type: none"> <li>This alternative does not require any construction activities. As such, no potential impacts to terrestrial habitat and loss of carbon sequestration.</li> <li>The haulage of material along existing roads will result in increased fugitive dust, noise, and vibrations along residential roads.</li> <li>This option has the longest haul distance and highest impact on greenhouse gas emission.</li> <li>Increased vehicular traffic causing injury/mortality to individual animals.</li> <li>No impacts to groundwater, surface water and source water protection anticipated.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This option follows an existing roadway but will require some vegetation removal to complete the road improvements.</li> <li>This option has the shortest haul route and therefore lowest impact on greenhouse gas emissions.</li> <li>This option may result in increased fugitive dust, noise, and vibration along residential roads.</li> <li>No impacts to groundwater, surface water and source water protection anticipated.</li> <li>The proposed aggregate pits will result in the loss of terrestrial habitat and carbon sequestration.</li> <li>There is the potential to impact SAR and/or SAR habitat due to the removal of vegetation.</li> <li>The proposed road improvements will result in the loss of species within the Conservation Reserve.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>Although the footprint of the road is visible, significant vegetation removal is required to facilitate the work resulting in loss of terrestrial habitat and carbon sequestration.</li> <li>Potential impacts to surface water associated with the construction of water crossings.</li> <li>There is the potential to impact SAR and/or SAR habitat due to the removal of vegetation.</li> <li>Impacts to terrestrial wildlife and habitat anticipated due to vegetation removal activities.</li> <li>This option will result in the increase in fugitive dust, noise, and vibration to support the road upgrades and haulage of equipment/material.</li> <li>No known environmentally significant areas.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>This option has the highest environmental impacts as it involves the construction of a new road through a forested area.</li> <li>High impacts to greenhouse gas emissions anticipated due to the distance of the haul route.</li> <li>The proposed aggregate pits and road construction will result in the loss of terrestrial habitat and carbon sequestration.</li> <li>Potential to impacts and SAR and/or SAR habitat anticipated.</li> <li>The construction of the new road may impact waterbodies and aquatic habitat.</li> <li>No known environmentally significant areas.</li> </ul> <p><b>Low</b></p>
<b>Socio- economic Environment</b>	<ul style="list-style-type: none"> <li>This option will have the greatest impact to residences due to the haulage of</li> </ul>	<ul style="list-style-type: none"> <li>Impact to residences is reduced due to location of the aggregate pits closer to the</li> </ul>	<ul style="list-style-type: none"> <li>This option has the potential to impact residents of AAFN. Particularly those</li> </ul>	<ul style="list-style-type: none"> <li>This option has the lowest impact to residences through temporary effects.</li> </ul>

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	<p>materials, aggregate and other equipment along the proposed haul route.</p> <ul style="list-style-type: none"> <li>No impacts to recreational, forestry and/or mining activities anticipated.</li> <li>This option provides opportunities for local businesses to source aggregate material.</li> </ul> <p><b>Low</b></p>	<p>mine site. Some impacts still anticipated to residences on Lakes End Road and due to haulage of material and equipment.</p> <ul style="list-style-type: none"> <li>This option will result in temporary impacts to users of the Broder Dill Snowmobile trail.</li> <li>This option provides opportunities for local businesses to complete the road improvement work.</li> </ul> <p><b>Moderate</b></p>	<p>that utilize the historical road for traditional activities.</p> <ul style="list-style-type: none"> <li>No impacts to recreational, forestry, and/or mining activities anticipated.</li> <li>This option provides economic opportunity to AAFN and to businesses to complete the road upgrade work.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This option utilizes a forestry road and the potential to impact surrounding forestry activities.</li> <li>Provides economic opportunities for local businesses to complete the road construction work.</li> </ul> <p><b>High</b></p>
Cultural Environment	<ul style="list-style-type: none"> <li>Follows an existing roadway and does not involve construction activities. No impact to archaeological and cultural heritage resources anticipated.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This option follows an existing roadway but will require some vegetation and rock removal activities.</li> <li>There are no known archaeological resources identified within the</li> <li>Although considered low risk, there is the potential to impact previously unknown archaeological or cultural heritage resources.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>Although this option follows the footprint of an existing roadway, there are several areas along the route important to the community of AAFN. The proposed activities will negatively affect these values.</li> <li>The proposed activities have the potential to impact previously unknown archaeological resources.</li> </ul> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>Below-groundwork is required. It is unknown if the area has the potential for archaeological resources.</li> <li>The proposed activities have the potential to impact previously unknown archaeological resources.</li> </ul> <p><b>Low</b></p>
Indigenous Communities	<ul style="list-style-type: none"> <li>The existing roadway and off-site sources of aggregate are not situated on AAFN land.</li> <li>The work may provide economic opportunities to Indigenous Communities.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>The existing roadway and sources of aggregate are not situated on AAFN land.</li> <li>The work may provide economic opportunities to Indigenous Communities.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>The proposed access road and aggregate source are situated entirely on AAFN land.</li> <li>Provides economic opportunities to the AAFN community.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>The existing roadway and sources of aggregate are not situated on AAFN land.</li> <li>The work may provide economic opportunities to Indigenous Communities.</li> </ul> <p><b>Moderate</b></p>
Cost	<ul style="list-style-type: none"> <li>This alternative does not require any construction activities and therefore minimal costs associated with the work.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This option has the lowest cost as it does not involve the construction of a new roadway.</li> <li>Additional costs required associated with operating the new aggregate pits.</li> </ul> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>This option requires a higher cost to upgrade the historical mine road and operate the Round Lake Pit.</li> <li>Additional costs accrued to complete studies to support AAFN EA process.</li> </ul> <p><b>Moderate</b></p>	<ul style="list-style-type: none"> <li>This option has the highest cost as it involves the construction of 8 km of new road.</li> <li>Additional costs accrued to complete studies to support the road construction and operate the new aggregate pits.</li> </ul> <p><b>Low</b></p>
<b>Ranking of Alternative Solution</b>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>This alternative helps support the project objectives.</li> <li>No changes to land use and application to land use planning policies.</li> <li>Does not require any construction activities. As such, no potential impacts</li> </ul>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>This alternative helps support the project objectives.</li> <li>The proposed access road follows an existing network of roads. There are no proposed changes to land use.</li> </ul>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>This alternative helps support the project objectives.</li> <li>Provides economic opportunities to the AAFN community.</li> </ul>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>This option has the lowest impact to residences through temporary effects</li> </ul>

Evaluation Criteria	Alternative Solution 1 – All Aggregate Imported to Site	Alternative 2 – Aggregate Produced at Ministry Pit Located Near Project Site.	Alternative 3 – Aggregate provided by AAFN and hauled using historical mine access road.	Alternative 4 – Construction of a New Road off Highway 637 (Halifax Road Extension)
	<p>to terrestrial habitat and loss of carbon sequestration.</p> <ul style="list-style-type: none"> <li>• Lowest costs to implement.</li> </ul>	<ul style="list-style-type: none"> <li>• This option is considered the easiest to implement.</li> <li>• Has the shortest haul route and therefore lowest impact on greenhouse gas emissions.</li> <li>• Impact to residences is reduced due to location of the aggregate pits closer to the mine site.</li> <li>• Lowest costs required to implement the work.</li> </ul>		
	<p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>• This alternative has previously been identified to not be an option due to concerns raised by the public.</li> <li>• Has the longest haul distance and highest impact on greenhouse gas emission.</li> </ul>	<p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• The proposed road improvements will result in the loss of species within the Conservation Reserve.</li> <li>• Some impacts to residences on Lakes End Road and due to haulage of material and equipment.</li> <li>• Temporary disturbance to users of the Broder Dill Snowmobile trail.</li> </ul>	<p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• The implementation of this alternative is not guaranteed as it is dependent on the completion of AAFN's EA process.</li> <li>• Additional studies would be needed to understand the environmental impacts associated with the upgrading of the road and use of the pit.</li> <li>• Will require vegetation removal that may impact terrestrial habitat and cultural heritage values.</li> </ul>	<p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Requires the construction of a new road. This will result in significant vegetation clearing and changes to land use in the area.</li> <li>• Has the potential to affect surrounding forestry activities.</li> <li>• Highest costs to execute.</li> </ul>
	<b>4</b>	<b>1</b>	<b>2</b>	<b>3</b>

## 8 Approvals, Permits and Agreements

A summary of approvals, permits, and agreements required for the Long Lake Gold Mine Rehabilitation Project and anticipated timeline to obtain the approvals is provided below in Table 23.

**Table 23 – Summary of Project Approvals, Permits and Agreements**

Approval Type/ Regulator	Description	Timeline for Approval
Aggregate Resources Act, R.S.O., 1990,  Ministry of Natural Resources and Forestry	<p>An aggregate permit for a Category 9 (Pit Above Water) will be obtained under the Aggregate Resources Act for the extraction of aggregate material at the Crown Pit no closer than 1.5 meters above the groundwater table.</p> <p>A major amendment would be required to permit the Wavy Trail Pit to increase the annual tonnage and a new application to re-permit the pit as a quarry.</p>	<p>The permit for the Crown Pit is expected to be obtained in early 2024.</p> <p>The Wavy Trail Pit major amendment and quarry application to be submitted in fall 2024.</p>
Endangered Species Act 2007, S.O. 2007, c. 6.  Ministry of Environment, Conservation and Parks	Project activities have the potential to impacts SAR and/or SAR habitat. A Health and Safety species at risk permit will be obtained under Section 17(2)(a) of the ESA (2007). All work will be completed in accordance with the conditions of the permit.	Within six months following the completion of the Class EA.
Crown Forest Sustainability Act, 1994, S.O. 1994.  Ministry of Natural Resources and Forestry	The project will require vegetation and tree removal on crown land. A Forest Resource License (FRL) will be obtained to harvest trees on crown land	Within three months following the completion of the Class EA.
Fish and Wildlife Conservation Act, 1997, S.O. 1997  Ministry of Natural Resources and Forestry	A License to Collect Fish for Scientific Purpose will be required to relocate any fish trapped within the isolated work area.	Two weeks prior to initiating the in-water work.

Approval Type/ Regulator	Description	Timeline for Approval
<p>Environmental Protection Act, R.S.O. 1990</p> <p>Ontario Water Resources Act, R.S.O, 1990.</p> <p>Ministry of Environment, Conservation and Parks</p>	<p>The rehabilitation activities will require the treatment and discharge of contaminated groundwater/seepage. An Environmental Compliance Approval (ECA) is required under Section 53 of the <i>Ontario Water Resources Act</i> and Section 20.2 of the <i>Environmental Protection Act</i>.</p>	<p>Within one year following the completion of the Class EA.</p>
<p>Ontario Water Resources Act, R.S.O, 1990.</p> <p>Ministry of Environment, Conservation and Parks</p>	<p>Construction dewatering activities will be required to facilitate the construction of the impoundment, excavation, and consolidation of contaminated material. It is expected that the volume of water will exceed 50,000 L per day. A Permit to Take Water (PTTW) will be obtained in accordance with the OWRA and O.Reg 387/04.</p>	<p>Within one year following the completion of the Class EA.</p>
<p>Occupational Health and Safety Act, R.S.O, 1990</p> <p>Ministry of Labour</p>	<p>The proposed road improvements and rehabilitation work meet the standards set out in Section 691) of O.Reg 213/91 -Regulations for Construction Project. It will be the contractor's responsibility to provide a Notice of Project to the Ministry of Labour prior to initiating the work.</p>	<p>Two weeks prior to the initiation of the road construction and rehabilitation work.</p>
<p>City of Greater Sudbury Road Occupancy Permit</p>	<p>The road improvement activities will require the partial closure of public roads. It will be the roadwork contractor's responsibility to obtain a Road Occupancy Permit from the City of greater Sudbury. The permit application will be supported with a copy of the contractors traffic control plan.</p>	<p>Two weeks prior to the initiation of the road construction work.</p>
<p>Road Maintenance Agreement</p> <p>City of Greater Sudbury and Local Roads Board</p>	<p>It will be the Ministry's responsibility to maintain the access road route during the construction activities. Road Maintenance Agreements will be prepared between the Ministry and the City of Greater Sudbury, and between the Ministry and MTO / Long Lake Local Roads Board. The agreement is intended to compensate for the additional road maintenance and restoration associated with the haulage of materials and construction traffic.</p>	<p>Within one year following the completion of the Class EA.</p>
<p>Memorandum of Understanding</p> <p>Ministry of Environment,</p>	<p>A Memorandum of Understanding has been prepared between the MECP and MINES for the road improvements proposed within the Eden Township Conservation Reserve. The MOU outlined the roles and responsibilities of each</p>	<p>Finalized within one month following the completion of the Class EA.</p>



Approval Type/ Regulator	Description	Timeline for Approval
Conservation and Parks	Ministry and how potential negative effects will be considered and addressed.	

At this time, project activities are not expected to result in the harmful alteration, disruption or destruction of fish habitat. Based on past engagement with the Department of Fisheries and Oceans (DFO), authorizations under the Fisheries Act are not expected to be required. However, the Ministry will complete a pathways of effects diagrams and re-submit a Request for Review to the Department of Fisheries and Oceans (DFO) to confirm authorization requirements and mitigation measures.

## 9 Environmental Management and Monitoring

A comprehensive environmental monitoring program is being developed by GHD as part of the rehabilitation design. The purpose of the environmental monitoring program is to ensure that the project is carried out in compliance with applicable legislation and consistent with provincial and federal guidelines and industry best practises. The monitoring program considers the following phases of the project:

- Monitoring of environmental effects during construction to ensure project activities are completed in compliance with environmental approvals and permits and to verify the effectiveness of the mitigation measures outlined within this Class EA; and,
- Annual monitoring post-rehabilitation (future effects monitoring) to monitor the integrity of the cover and to ensure that the impoundment is effective in reducing arsenic loading into Long Lake.

An overview of the above monitoring programs is provided in the following subsection. It is noted that the details of the monitoring programs may be further defined as new data becomes available and through the environmental approvals and permitting processes that follows the Class EA. For example, the project ECA may stipulate specific parameters and frequencies for water quality monitoring at the effluent location.

### 9.1 Construction Monitoring

A draft monitoring program for construction, including the monitoring parameters, methods, applicable standards, and frequencies, is summarized below in Table 24 The construction monitoring program will be finalized once all environmental approvals and permits have been obtained. All construction monitoring will be completed by the Ministry’s Contract Administrator for the road improvement and rehabilitation work.

**Table 24 – Overview of Construction Monitoring**

Criteria	Description	Standard/ Guideline	Frequency/ Timeframe	Location
Air Quality – Total Suspended Solids.	Air quality monitoring will be completed during the rehabilitation activities using ambient high-volume samplers. Background samples will be collected prior to initiating the work. The air quality monitoring will ensure that total suspended particulate matter is maintained below applicable standards. It is noted that there is no standard available for arsenic in ambient air.	O.Reg 419/05 air quality standard for TSP over 24-hrs	To be completed every two weeks during rehabilitation activities.	Three locations (to be determined), triangulating the mine to provide upwind and downwind.
Noise and Vibrations – Noise	Noise will be monitored, if needed, during the rehabilitation activities using a noise monitor to ensure compliance with NPC-115 and NPC-118.	NPC 115 and NPC 118	As needed during peak construction period.	At the long lake delta, closest to sensitive noise receptors.
Noise and Vibrations - Vibrations	Vibration levels will be monitored during the road improvement work when blasting is required. Monitoring will be completed by the roadwork contractor using a seismograph for ground vibration and air over pressure.	Ontario Public Standard Specification 120 General Specification for the Use of Explosives.	Monitoring completed continuously during all blasting activities.	At the nearest sensitive receptor from blast location.
Ecosystems Protection and Restoration – Tree/Vegetation Removal	Nest sweeps will be completed when vegetation disturbance is completed between April 15 and August 31. The sweeps will be completed by Qualified Biologist.	Migratory Bird Regulation	As needed between April 15 and August 31.	Area proposed for vegetation removal.
Ecosystems Protection and Restoration – Species at Risk	All work will be completed in accordance with the ESA permit conditions. Exclusionary fencing installed to deter turtles from entering the work area will be visually inspected at regular intervals throughout the active season, particularly following heavy rain events.	ESA Permit Conditions	At the frequency specified in ESA permit conditions and following heavy rain events.	Exclusionary fencing perimeter.
Ecosystems	All incidental wildlife observations will be	Not Applicable	Continuous	Mine Site and

Criteria	Description	Standard/ Guideline	Frequency/ Timeframe	Location
Protection and Restoration – Wildlife-project interactions	reported to the Site supervisor. The frequency of negative wildlife incidents (e.g., injury, mortality) will be recorded to provide direct feedback for adaptive management strategies.		throughout the project.	Access Road.
Surface Water Quality – Sediment and Erosion Control	Sediment and erosion controls (e.g., erosion control fencing, fabrics, straw) used to mitigate erosion of exposed soils will be visually inspected at regular intervals and following heavy rain events. Monitoring will be completed by the contractor in accordance with the contractors approved <i>Sediment Control Plan</i> .	<i>Sediment Control Plan</i>	In accordance with the frequency outlined in the <i>Sediment Control Plan</i> and following heavy rain events.	Adjacent to all waterbodies.
Surface Water Quality – In- water Work (Turbidity)	The in-water work area will be monitored to ensure the effectiveness of the dam/ turbidity curtains and that minimal sedimentation occurs outside of the isolated work area. Monitoring will occur both visually and with a multiparameter. Monitoring will be completed in accordance with the CCME - <i>Water Quality Guidelines (WQG) for the Protection of Aquatic Life – Freshwater</i> for turbidity and total suspended solids. .	CCME WQGs: <ul style="list-style-type: none"> <li>• Turbidity: maximum increase of 8 NTU from background levels.</li> <li>• TSS: maximum increase of 25 mg/L from background levels.</li> </ul>	Continuously throughout all in-water work.	Upstream and multiple locations downstream of the isolated in-water work area.
Surface Water Quality – In- water Work (Contamination)	Surface water samples will be collected outside of the isolated work area to ensure that the in-water work does not further contaminate Long Lake. A baseline sample will be obtained prior to initiating work within the delta and analyzed for metals and pH. Sampling will be completed as needed if turbidity and total suspended solids exceed the CCME WQG.	PWQO and ODWS	If turbidity and TSS exceeded the CCME WQGs.	Upstream and multiple locations downstream of the isolated in-water work area.
Groundwater and	All water discharged into the environment will be	PWQO and ECA	Frequency in	Effluent prior to

Criteria	Description	Standard/ Guideline	Frequency/ Timeframe	Location
Surface Water – discharge of water into the environment	sampled and analyzed to ensure compliance with PWQO and ECA conditions. The samples will be collected directly into laboratory-supplied containers in accordance with industry standards.	conditions.	accordance with ECA conditions.	discharge and at discharge location.
Contamination – Imported backfill	All backfill material brought onto site will be sampled and analyzed to ensure compliance with O.Reg 153. Sampling will be completed under the supervision of a Qualified Person in accordance with industry standards.	Soil, groundwater, and sediment standards for use under Part XV.1 of the Environmental Protection Act.	Sampling in accordance with O.Reg 153.	Stockpile location.
Servicing – Road improvements (blasting).	Pre-construction surveys will be completed at potentially impacted residences to ensure no damage occurs during the road upgrade work. The surveys will be completed by the roadwork contractor in accordance with the Ontario Public Standard Specification 120 General Specification for the Use of Explosives (OPSS.MUNI 120).	OPS MUNI 120	Prior to road improvement work.	At potentially affected residences.
Residents – Road maintenance.	The condition of all public roads will be visually monitored daily to ensure the condition is suitable for both construction and local traffic. Maintenance of the road will be completed in accordance with road maintenance agreements prepared by the between the Ministry and the City of Greater Sudbury; and between the Ministry and the Ministry of Transportation / Long Lake Local Roads Board.	Road Maintenance Agreement	Daily throughout construction work.	Entirety of access road.
Residents – Road safety	Speed limits will be contractually enforced and monitored daily to ensure contractors are abiding to posted limits. Speed traps, GPS monitoring, speed humps and/or other measures will be utilized to reduce and monitor contractor speed, as needed.	Posted speed limit.	Continuously throughout the duration of the project.	Access road route

## 9.2 Post-Rehabilitation Monitoring

A comprehensive post-rehabilitation environmental monitoring program is being developed by GHD as part of the rehabilitation design. The monitoring program post-rehabilitation will consider the following:

- Integrity of the impoundment.
- Revegetation of disturbed areas
- Surface water monitoring
- Groundwater monitoring.
- Fish and benthic monitoring.

An overview of the draft post-rehabilitation monitoring is provided below. The post rehabilitation monitoring will be completed by the Ministry or Ministry's consultant.

### 9.2.1 Impoundment Monitoring

Monitoring of the tailings impoundment will be completed in accordance with the Mine Rehabilitation Code of Ontario (O.Reg 240/00). As per section 65 of Part 9 of O.Reg 240/00, the physical stability of the impoundment will be monitored once per year for the first five years following the rehabilitation activities and at a five-year interval thereafter for perpetuity. The parameters to be monitored will include, at a minimum, the following:

- Surface-erosion, including gully and wind erosion.
- Vegetation cover growth
- Tension cracks at the crest of any slopes.
- Signs of new or ongoing failure.
- Seepage stains.
- Piping failure.
- Bulging of slopes.
- Sloughing of crests.
- Drainage for suspended solids.
- Settlement, seepage increases or internal deformation/

In accordance with Section 66 of O.Reg 240/00 constructed ditches will be monitored annually for erosion, blockage or potential blockage caused by sediment, ice, debris accumulation or animal activity; and the deterioration of the materials used. If defects are identified in any of the features identified above, the Ministry will initiate necessary maintenance activities to ensure the defects are rectified immediately.

### 9.2.2 Revegetation of Disturbed Areas

All revegetated areas will be monitored in accordance with Part 9 of O.Reg 240/00. Monitoring will occur semi-annually following initial planting until vegetation is successfully established. The monitoring will include soil analysis for nutrients and pH.

Once vegetation has been established inspections will be conducted concurrently with the impoundment monitoring to determine any necessary repairs, and to review the progress towards development of a self-sustaining ecosystem. If areas of stressed or dying vegetation are identified the area will be restored and revegetated immediately.

### **9.2.3 Surface Water Monitoring**

Surface water sampling will be completed to ensure that arsenic concentrations within Luke Creek, Long Lake and downstream receiving waterbodies are attenuating back to meet project objectives. The location of the surface water monitoring locations will be determined as part of the comprehensive post-rehabilitation monitoring program but is expected to include, at a minimum, locations within the mine drainage channel, Luke Creek, Long Lake, Round Lake, and upstream background locations. Monitoring will be conducted seasonally (spring, summer, fall) for the first ten years following rehabilitation activities and at a five-year interval thereafter for perpetuity. If the surface water data does not indicate an improving trend in water quality over the first five years of monitoring, then a new site characterization study will be completed to determine the source of arsenic loading into Long Lake.

All surface water samples will be collected as discrete grab samples. Samples will be collected by submerging the sample containers, with care taken not to disturb sediments. Field parameters will be measured using a multiparameter water quality meter.

### **9.2.4 Groundwater Monitoring**

Although elevated arsenic has been observed in the groundwater underlying the mine, groundwater is not considered to be a significant migration pathway for the transport of arsenic to Long Lake (CH2M Hill 2013). Similarly, groundwater is not used as a potable water source and direct ecological exposure to groundwater is not expected, though exposure may occur indirectly where groundwater discharges into surface water bodies. Monitored natural attenuation of the groundwater impacts will be completed following rehabilitation activities as a groundwater risk management option.

If needed, additional wells will be installed around the perimeter of the impoundment to delineate the groundwater plume and assess the impacted area. Prior to removing any water from the well, static groundwater levels will be measured using a water interface probe. Using dedicated tubing and an inertial pump, each well will be purged of groundwater to remove stagnant water and to ensure a representative sample is collected. Groundwater samples will be collected directly into laboratory supplied containers and analyzed for metals.

The wells would be sampled at the following frequency:

- Quarterly for the first two years following construction.

- Annually the next 5 years; and,
- Once every 5 years thereafter for a ten-year period.

### **9.2.5 Fish and Benthic Monitoring**

The aquatic environment of downstream receivers will be monitored for fish and benthic invertebrate community to confirm that the ecosystem is recovering following rehabilitation. The spatial scope of the assessment will be determined as part of the comprehensive environmental monitoring program but is expected to include, at a minimum, the following:

- The south bay of Long Lake;
- Luke Creek downstream of site runoff;
- Round Lake, through collaboration with AAFN; and,
- Upstream (background) location of both Luke Creek and Long Lake.

Fish will be captured live using a variety of methods with a subset of fish lethally samples for tissue contaminant analysis. The collection of fish for contaminant analysis will be completed in accordance with the MECP's Protocol for the Collection of Sport Fish Samples for Contaminant Analyses (MECP 2013). All fish will be identified to species and measured for, at a minimum, the following metrics: length (total and fork), wet (fresh) body weight, sex, and maturity.

Benthic invertebrates are often utilized as indicator of the biological condition of a waterbody. Benthic invertebrate will be collected as replicate samples in accordance with the Ontario Benthos Biomonitoring Network (OBBN) protocol and design methodologies. Organisms will be identified to the lowest practical level (genus or species) and analyzed for, at a minimum, the following metrics: taxon richness, evenness, diversity, and abundance.

The aquatic monitoring program will be initiated five years following the completion of the rehabilitation work and at a five-year interval thereafter until the aquatic ecosystem has returned to baseline conditions or demonstrating a positive trend towards recovery.

### **9.3 Adaptive Management**

The main objective of the monitoring is to ensure that the rehabilitation activities have no negative impact on the surrounding environment, that the impoundment is working as intended and environmental conditions improve to a minimum standard of meeting the project objective. In the event the monitoring data suggests that the environmental effects are different from what was predicted in this Class EA or mitigation measures prove to be less effective than anticipated, adaptive management measures or corrective actions will be implemented as needed. Similarly, as new information

becomes available, the monitoring program will be updated to meet the needs of the project and to satisfy conditions of permits and/or approvals.

## 10 Construction Overview and Schedule

The road improvement work is anticipated to start in 2024 and take two full construction seasons to complete, while the rehabilitation activities is anticipated to be initiated in 2025 and take three construction seasons. It will be the responsibility of the contractor to provide a sequencing plan to as part of the premobilization submittals. An overview of the construction for the road improvements and rehabilitation activities is provided in the following subsection. A detailed schedule is provided in Appendix G.

### 10.1 Road Improvements

The procurement for the road improvements will be awarded in the spring of 2024. The improvements are expected to take two construction seasons to complete, with Long Lake Road, Tilton Lake Road, Wavy Trail Road and Lakes End Road being completed in the first year and Site Access Road being completed in the second year. A schedule to complete the road improvement work was completed by DM Wills in 2024, as provided in Appendix G.

The bulk of the road improvement works are along Lakes End Road and the Site Access Road. The expected sequencing is for the Contractor to start at Wavy Trail and work their way towards the glory hole. This is the sequencing proposed because Lakes End Road and the Site Access Road have sections that are difficult or impossible for construction traffic to navigate in its existing condition. It is expected that the improvements along Long Lake Road, Tilton Lake Road and Wavy Trail will be completed simultaneously to the works on Lakes End Road, as construction activities align. For example, clearing activities will be schedule together and guide rail installation schedule together.

An overview of the milestones for the work and estimated duration for each task is provided below in Table 25. This schedule considers a typical construction season length, half load restrictions, environmental timing windows, and restrictions for lane closures.

**Table 25** – Road Improvement Construction Overview

Task	Description	Estimated Duration
1- Pre-mobilization submittals	Following project award, the contractor will be required to prepare several pre-mobilization submittals as defined in the contract documents. The submittals are expected to include, but is not limited to, the following: <ul style="list-style-type: none"> <li>• Site Health and Safety Plan</li> </ul>	20 days



Task	Description	Estimated Duration
	<ul style="list-style-type: none"> <li>• Communications Plan</li> <li>• Personnel names and training.</li> <li>• Proof of Insurance</li> <li>• Sequencing Plan and Schedule.</li> <li>• Various Monitoring and Management Plans (see Section 6)</li> </ul>	
2- Utility Relocations	Coordination with the utility owners (six months) and relocation of utilities (one month). The relocation of the poles will be completed by the utility owner.	200 days
3 – Road Improvements - Tilton Lake Road and Lakes End Road	The improvements will include clearing and grubbing (10 days), earth excavation (31 days), rock excavation (20 days), fill placement (26 days), granular placement (21 days), guide rail (3 days) and clean-up (10 days). It is anticipated that the clearing and grubbing activities will be initiated in 2024 and the road improvements in 2025.	136 days
4 - Road Improvements – Site Access Road	The improvements will include clearing and grubbing (12 days), earth excavation (23 days), rock excavation (8 days), fill placement (24 days), granular placement (22 days) and clean-up (10 days). It is anticipated that the clearing and grubbing activities will be initiated in 2025 and the road improvements in 2026.	114 days

## 10.2 Rehabilitation Activities

The procurement for the rehabilitation activities will be awarded by the fall of 2025. A conceptual sequencing plan for the rehabilitation work was completed by GHD in 2023, as described in the memorandum entitled *Long Lake Mine Reclamation – Conceptual Sequencing*, dated: December 1, 2023. The conceptual sequencing plan report and detailed schedule is included in Appendix G.

An overview of the milestones for the rehabilitation and estimated duration for each task is provided below in Table 26. It is noted that where tasks have the same number, but are differentiated by a letter, the task can be performed simultaneously.

**Table 26 – Rehabilitation Construction Overview**

Task	Description	Estimated Duration
<b>2025 Pre-Mobilization Activities</b>		
1 - Pre-mobilization submittals	Following project award, the contractor will be required to prepare several pre-mobilization submittals as defined in the contract documents. The submittals are expected to include, but is not limited to, the following: <ul style="list-style-type: none"> <li>• Site Health and Safety Plan</li> </ul>	25 days

Task	Description	Estimated Duration
	<ul style="list-style-type: none"> <li>• Communications Plan</li> <li>• Personnel names and training.</li> <li>• Proof of Insurance</li> <li>• Sequencing Plan and Schedule.</li> <li>• Various Monitoring and Management Plans (see Section 6)</li> </ul>	
2 - Tree clearing/ clearing and grubbing	Tree and vegetation clearing activities will be completed at all rehabilitation work areas and the Crown Pit outside of the breeding bird period.	90 days
<b>2026 Construction Season</b>		
1- Mobilization, support infrastructure and laydown areas.	Various rehabilitation infrastructure will be established including, but not limited to erosion control measures, water management infrastructure, ingress/egress to each remediation area, mixing pad and decontamination pad.	65 Days
2- Grading of TA-01 surface.	A surface of TA-01 will be graded by the contractor to prepare a compacted, level surface as a starting point for the construction of the impoundment.	5 days
3a- Excavate waste rock area	The waste rock pile will be dewatered, and waste rock removed using a tracked excavator and placed in the central portion of the impoundment. Water will be treated, as needed.	25 days
3b- Ground stabilization TA-01 berm footprint	The subsurface soils of the impoundment will be stabilized with a cementing agent to ensure settling of the berm does not occur.	5 days
4a- Dewater TA-02	There is a small, ponded area in the northeast corner of TA-02. The surface water will be dewatered and pumped to a water treatment system.	70 days
4b- Excavate TA-02	Excavation of TA-02 will commence from the west side of the TA-02 and transported to the TA-01 impoundment area. Once moved to the impoundment, the material will be graded and compacted in 0.3 m lifts.	30 days
4c- Restore waste rock area	Restoring the waste rock area will involve placement of 0.15 m topsoil in the removal area, placement of organic erosion control fabric and seeding the area.	20 days
5a- Remediation of drainage channel between TA-02 and TA-03.	To prevent potential recontamination during storm events, the drainage channel between TA-02 and TA-03 will be remediated prior to the excavation of TA-03. Water will be controlled using a temporary dam across the drainage channel and water diverted around the work area. Tailings will be removed and transported to the impoundment area.	5 days
5b- Restore TA-02 as a naturalized wetland	TA-02 will be restored as a naturalized wetland with the primary channel hosting a gypsum bed to support pH buffering. The upland slopes adjacent to the area will be vegetated to match existing conditions.	5 days
6a- Excavate	The excavation of TA-03 will be initiated once the cleaning	6 days

Task	Description	Estimated Duration
TA-03	of the drainage channel is complete. The tailings will be transported to the TA-01 impoundment area.	
6b -Restore drainage channel between TA-02 and TA-03	The drainage channel will be restored with riprap material.	5 days
7a- Remediate the drainage channel between TA-03 outlet and the historic rock drain.	Water will be controlled using a temporary dam across the drainage channel and water diverted around the work area. Tailings will be removed and transported to the impoundment area.	5 days
7b- Restore TA-03 as a naturalized wetland.	TA-03 will be restored as a naturalized wetland. The upland slopes adjacent to the area will be vegetated to match existing conditions.	10 days
8a- Excavate historic rock drain area	Once the cleaning of the drainage channel to the historic rock drain is complete, the historic rock drain area will be excavated. Water will be controlled using a temporary dam across the drainage channel and water diverted around the work area. Tailings will be removed and transported to the impoundment area.	5 days
8b- Restore drainage channel between TA-03 and historic rock drain	The drainage channel will be restored with riprap material.	5 days
9a- Remediation of drainage channel between historic rock drain and TA-01	Water will be controlled using a temporary dam across the drainage channel and water diverted around the work area. Tailings will be removed and transported to the impoundment area.	10 days
9b- Restore historic rock drain as a naturalized wetland	The historic rock drain will be restored as a naturalized wetland. The upland slopes adjacent to the area will be vegetated to match existing conditions.	5 days
10- Restore drainage channel between rock drain and TA-01	The drainage channel will be restored with riprap material.	5 days
11- TA-01 drainage ditch	This task involved the removal of tailings within the footprint of the TA-1 drainage channel and then importing	50 days

Task	Description	Estimated Duration
and berm construction.	fill material to generate the grades for the TA-01 perimeter berm.	
13a- Installation of TA-01 toe drain system.	On the inside of the TA-01 berm, a toe drain will be installed to relieve the hydraulic pressure from the underlying native clay layer.	20 days
13b- Install BGM Cap cover over TA-01 perimeter berm.	To minimize the infiltration of surface water from the TA-01 perimeter ditch, the TA-01 berm will be capped with the BGM liner system.	30 days
13c- Develop drainage ditch subgrades	A drainage ditch will be constructed from the southern end of the impoundment to generate slopes to convey water from the southern end of TA-01 to the north.	30 days
13d- Install TA-01 drainage ditch and berm riprap.	The main drainage channel will be lined with riprap material. The floodplain area will be restored with topsoil and vegetated to match surrounding forest.	5 days
14- Clearing/grubbing and preparation for 2027 construction season	Clearing and grubbing will be completed in the fall/winter of 2026 in preparation for the 2027 construction season. Erosion control measures will be secured and left in place and equipment demobilized, as needed. Erosion control measures will be implemented over the surface of the impoundment and silt fencing installed around the perimeter. It is noted that allowing the impoundment to be exposed to a freeze/thaw cycle prior to capping will reduce the amount of settlement following the cap placement.	45 days
<b>2027 Construction Season</b>		
1 – Remobilization of equipment, site inspection, mitigation measures and supporting infrastructure	Equipment and materials will be remobilized to site. A general site reconnaissance will be completed to verify the condition of erosion control measures and supporting infrastructure will be re-established, as needed. The 2027 remediation activities will include all in-water work. Mitigation measures needed to support these activities (e.g., turbidity curtains, water treatment, silt fencing) will be mobilized and implemented.	27 days
2- Drainage channel between TA-01 and upstream limit of Luke Creek	A temporary dam will be installed to control water within the drainage channel. Water will be pumped around the work area, as needed. Tailings will be removed and transported to the impoundment area.	12 days
3- Luke Creek and drainage channel	A temporary dam will be installed to control water within the drainage channel. Water will be pumped around the work area, as needed. Tailings will be removed and transported to the impoundment area. Sediment control measures will be utilized downstream of the work area to capture water which will be pumped to the temporary water treatment system.	9 days
3b – Restore	The drainage channel will be restored with riprap material.	5 days

Task	Description	Estimated Duration
drainage channel between TA-01 and upstream limit of Luke Creek		
4 – Restore Luke Creek and drainage channel.	Luke creek will be restored to pre-disturbance condition or better. A small riprap material/stone will be utilized at the creek bottom and topsoil along the banks with erosion fabric. Some areas will be restored as a naturalized wetland. Vegetation will be established.	5 days
5- Luke Creek and the Wetland Area	A temporary dam will be installed to control water within the drainage channel. Water will be pumped around the work area, as needed. Tailings will be removed and transported to the impoundment area.	14 days
6 – Restore Luke Creek and Wetland Area	Luke creek will be restored to pre-disturbance condition or better. A small riprap material/stone will be utilized at the creek bottom and topsoil along the banks with erosion fabric. Some areas will be restored as a naturalized wetland. Vegetation will be established.	5 days
7 – Long Lake Delta	The remediation activities within Long Lake will be completed over three phases. The work area will be isolated using an AquaDam, water diverted, and tailings removed using a long-reach excavator. The shoreline will be restored using rounded riprap material and submerged backfill within the excavation areas.	50 days
8 – Complete TA-01 subgrades and implement erosion control measures	The impoundment will be compacted and shaped continuously as material is consolidated. Erosion control measures will be implemented over the surface and silt fencing installed around the perimeter. It is noted that allowing the impoundment to be exposed to a freeze/thaw cycle prior to capping will reduce the amount of settlement following the cap placement.	100 days
<b>2028 Construction Season</b>		
1 – Remobilization of equipment, site inspection, mitigation measures.	Equipment and materials will be remobilized to site. A general site reconnaissance will be completed to verify the condition of erosion control measures and supporting infrastructure will be re-established, as needed.	15 days
2- Install cap on TA-01 impoundment	The cap construction will be implemented in accordance with the design specification. The general tasks are expected to include, but is not limited to, the following: inspection of the subgrade, installation of gas vent risers, install BGM liner, place fill material, place topsoil material, seeding.	50 days
3- Restore disturbed areas	All areas disturbed by the rehabilitation activities will be restored, as needed. This will consist of placing topsoil and	105 days

Task	Description	Estimated Duration
	revegetating to match surrounding conditions.	
4- Site clean-up and Demobilization.	All equipment, personnel and materials will be demobilized from the work area.	15 days

## 11 Class EA Requirements

This project has been completed in accordance with the Category C review and planning process, as detailed in the MINES Class EA. A summary of how Category C requirements have been met is provided in Table 28 below.

**Table 27 – Class EA Requirements**

Category C Project Requirement	MINES Class EA Section	Description
<b>Technical Requirements</b>		
Project Description	Section 4.2.1.1	A project description was prepared and included as supporting material on the ERO posting and distributed with consultation letters. A copy of the project description is provided in Appendix B.
Project Documentation	Section 4.2.1.2	This document has been prepared to satisfy the Category C project documentation requirements. All technical information required as part of Class EA has been included within this report.
<b>Consultation Requirements</b>		
Notice of Opportunity to Provide Input	Section 4.2.2.1	A Notice of Opportunity to Provide Input was prepared that satisfies the requirements of the Class EA, as described above in Section 3.2.1. A copy of the Notice of Opportunity to Provide input is included in Appendix D with the Record of Consultation.
Notice of Completion	Section 4.2.2.2	All parties contacted as part of the consultation phase were provided this document with a Notice of Completion (NOC) and the opportunity to provide additional comments over a 30-day comment period.
Statement of Completion	Section 4.2.2.3	If no new comments or information that would require the proposed project to be reassigned to a higher category is received following the 30-day comment period, the Ministry will issue a Statement of Completion and the rehabilitation activities will proceed as planned.

## 12 Conclusions and Commitments

The Ministry of Mines has completed our assessment for the Long Lake Gold Mine Rehabilitation Project and access road improvements. The objective of the project is to reduce arsenic concentrations in the south basin of Long Lake to below the drinking water standard of 10 µg/L. It is anticipated that by remediating the source of arsenic contamination, the concentrations of other contaminants potentially leaching from the mine will also be reduced. Once the sources of contamination are removed, downstream receivers are expected to recover, with steady improvement to water quality. Completing the project will not only improve water quality, but also address a legacy of contamination on first nation reserve lands and reduce consumption advisory limits for affected fish species.

The preferred rehabilitation strategy for the Long Lake Gold Mine Rehabilitation Project is the construction of an impoundment area within TA-01 and consolidating all tailings, waste rock and contaminated soils that contribute to the arsenic loading to Long Lake within the impoundment. The consolidated tailings and contaminated materials will be covered by an impermeable liner and a vegetative cover to prevent surface water infiltration, oxidation, and transport. The proposed rehabilitation strategy will effectively remove the three major sources of arsenic loading to Long Lake. The cover system will also eliminate the pathway for transport of leaching tailings to human and ecological receptors by limiting the infiltration of water into the waste. All aggregate material needed to support the project will be obtained from two aggregate pits located closer to the site, thereby reducing the haulage of material on public roads.

The following commitments have been made related to the project:

- Surveys for bats and Heritage Impact Assessment will be completed prior to the proposed rehabilitation work. All avoidance and mitigation measures outlined in the abovementioned studies will be adhered to.
- All mitigation measures outlined in Section 6 will be adhered.
- All approvals and permits described in Section 8 will be obtained prior to initiating the work.
- The procurement process for the project will ensure that the work provides economic and training opportunities to the community of Atikameksheng Anishnawbek. The community will be continually engaged throughout the completion of the work.
- The Ministry will work collaboratively with the Ministry of Environment, Conservation and Parks to monitor for impacts within the Conservation Reserve throughout the duration of the project and as part of future effects monitoring.
- A comprehensive environmental monitoring program will be finalized to ensure that the mitigation measures are working as intended. The monitoring program

will be updated, as required, to address adaptive management measures and to satisfy conditions of any newly issued permits or licenses.

The Ministry has considered all input, comments and concerns received from members of the public, stakeholders, government agencies and as part of Indigenous consultation. The Ministry of Mines will implement the Long Lake Gold Mine Rehabilitation Project as described in this project documentation.



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