

LONG LAKE GOLD MINE REHABILITATION PROJECT

Background

The Long Lake Gold Mine is an abandoned mine located in the Geographic Township of Eden; approximately 1.3 km south of the southwest end of Long Lake, and to the south of the City of Greater Sudbury (Figure 1). During the mine's operation from 1908 to 1939, approximately 196,000 tonnes of ore was milled, producing 1.7 million grams (52,000 ounces) of gold.

The mine site workings consisted of a two-compartment shaft, and glory hole, with underground workings. The site has a small pile of waste rock located on the north side of the glory hole and three tailings areas estimated to contain approximately 163,000 m³ of tailings. The tailings contain sulphide minerals including arsenopyrite. Runoff and seepage from the tailings areas are acidic and contain elevated metal concentrations, particularly arsenic. Over time, the tailings have eroded, which has resulted in significant quantities of tailings being deposited in Luke Creek and in the south basin of Long Lake. A tailings "delta" has formed in Long Lake at the outlet of Luke Creek.

The results of a recent expansion in the surface water sampling program by the Ministry of Energy, Northern Development and Mines (ENDM) demonstrated that arsenic levels in the southwest end of Long Lake exceeded the Ontario Drinking Water Standard (ODWS) and Health Canada's guideline of 10 micrograms per litre (µg/L). In the fall of 2012, Public Health Sudbury and Districts issued a Drinking Water Advisory to property owners located in the affected area of the lake.

A site characterization study completed in 2014 determined that the primary contaminant sources of concern to Long Lake are:

1. Three tailings areas (TA-01, TA-02 and TA-03) and associated drainage paths,
2. Fugitive tailings in Luke Creek and adjacent riparian area including a wetland located on Atikameksheng Anishnawbek lands, and
3. Fugitive tailings in Long Lake.

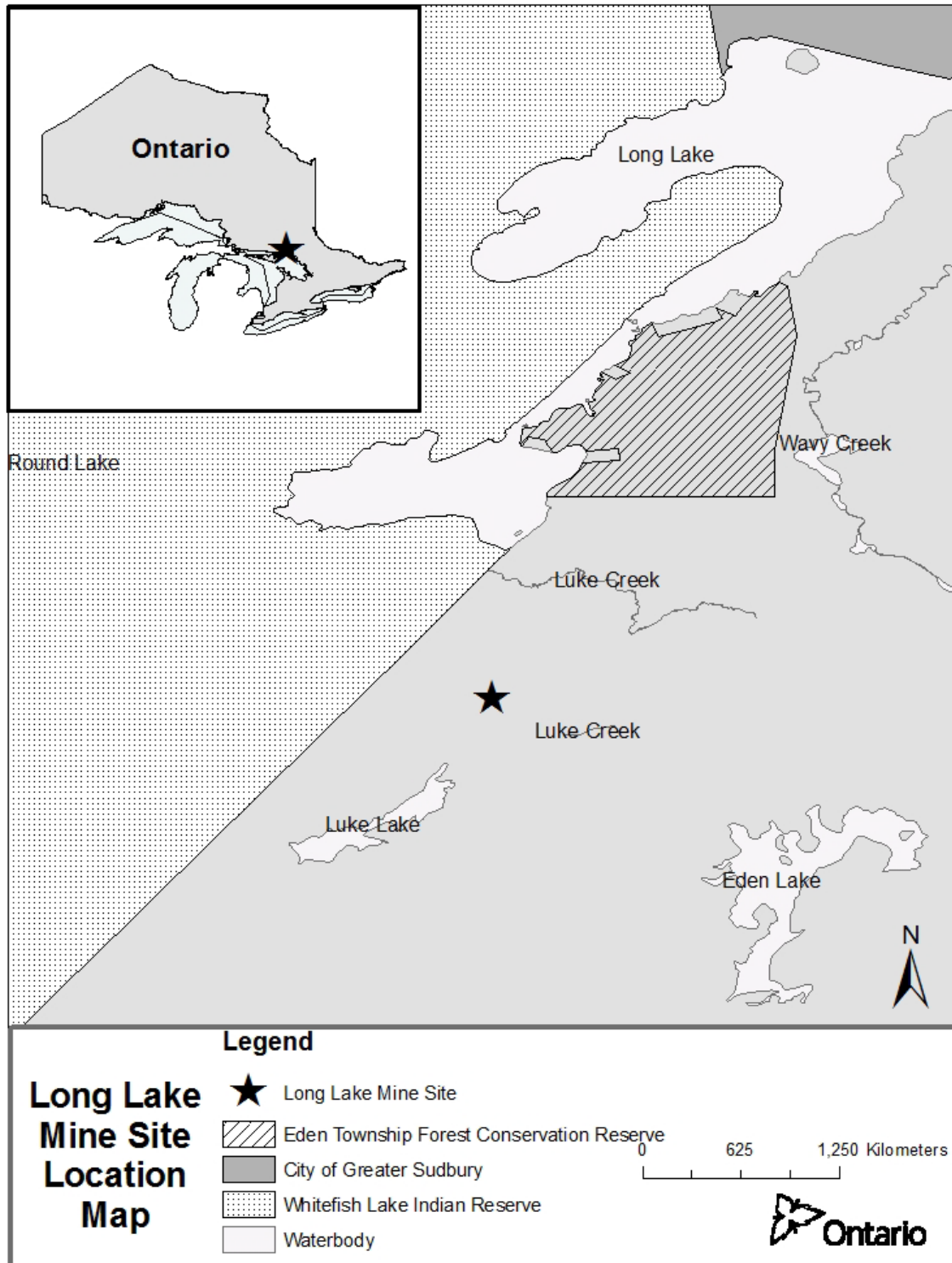
Submerged tailings were determined not to be a significant source of dissolved arsenic to Long Lake. As long as the tailings remain submerged and are not exposed to the atmosphere, the arsenic is stable and will not dissolve into the water.

Additional efforts in 2016 discovered that the extent of contamination in the wetland was greater than originally determined, with approximately one-third of total impacted material being located on Atikameksheng Anishnawbek lands.

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

Figure 1: Location of the Long Lake Gold Mine Project Area



LONG LAKE GOLD MINE REHABILITATION PROJECT

Project Rationale

ENDM has a mandate to ensure a safe and environmentally responsible mineral sector. Based on a provincial risk prioritization model for contaminated sites, the Long Lake Gold Mine site tailings was ranked 8th overall in Ontario and 4th by ENDM for sites requiring remediation work.

The goal of the proposed rehabilitation efforts is to reduce arsenic concentrations in the south basin of Long Lake to meet the drinking water standard of 10 ug/L, by achieving the following remediation objectives:

1. Reduce acidic drainage from leaching of tailings (surface water and groundwater / porewater) that results in arsenic loading to Long Lake via the mine drainage and downstream Luke Creek;
2. Prevent and / or minimize the movement of tailings, specifically:
 - a. Minimize transport of tailings in the three tailings areas to downstream mine drainage, Luke Creek and Long Lake delta
 - b. Prevent transport of fugitive tailings / sediment to Long Lake delta
 - c. Reduce transport of fugitive tailings / sediment from delta into Long Lake.

Failure to complete this project will result in a continued impairment of water and soil quality.

Project Description

The planned rehabilitation of the Long Lake Gold Mine site will involve the remediation of three tailings areas (TA-01, TA-02 and TA-03) and other areas containing contaminated soils or impacted material, by creating a tailings impoundment and consolidating approximately 163,000 m³ of the material within this facility.

The Long Lake Gold Mine project site will be accessed using residential roads along the southeast side of Long Lake (i.e. Long Lake Road, Tilton Lake Road, Wavy Lake Road, and Lakes End Road) and a 2.4 km recreational trail ("Mine Access Road") to transport material that may not be locally available (i.e. specialty aggregates and top soil) and for the mobilization of labour and equipment. Sections of this route are within the Eden Township Forest Conservation Reserve. In addition, the section of a historical mine road situated on Atikameksheng Anishnawbek between the Round Lake aggregate pit and the mine site (approximately 4.5 km) will be used to transport most of the aggregate for the project.

Access into the project site and into the work areas will require tree removal, the clearing and grubbing of vegetation, grading and sloping, ditching, surfacing and compacting. For Lakes End Road and the Mine Access Road, the road will be widened to maximum width of 15 m unless otherwise specified to accommodate other

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

considerations (i.e. snowmobile trail), and straightened where considered necessary to address safety concerns. During the project, road maintenance will include grading and dust control at a minimum, with snow removal and sanding in the winter as required. The road between the Round Lake aggregate pit and the mine site requires upgrading and includes the installation of water crossings on the Whitefish River and three other locations. Approximately 550 m section of the road will also be re-routed away from the shore of Long Lake to avoid environmental and cost concerns with widening this section.

The impoundment feature will be constructed on the largest tailings area (TA-01). Before receiving tailings and contaminated materials, the foundation will be prepared by grading and compacting the surface. Rock drains will be installed to maintain groundwater level at the base of the impoundment. A perimeter ditch designed for a 1 in 1,000-year event will be excavated to divert clean water around the impoundment. The ditch will be lined with a geotextile and armoured with riprap stone. The excavated material from the perimeter will be used to construct the impoundment berm. All water and seepage from active work areas and that collects within the TA-01 impoundment will be treated to meet or exceed PWQO objectives before being discharged into Luke Creek. A mobile package treatment system with an existing Environmental Compliance Approval from the Ministry of the Environment, Conservation and Parks (MECP) will be used for on-site water treatment during construction.

Once all fugitive tailings have been deposited, the impoundment feature will be graded to a stable slope and capped with a linear low-density polyethylene (LLDPE) cover designed to shed water and isolate the tailings from surface water infiltration. The LLDPE will be covered with a protective layer of fill and organic material or other material to a vegetative cover. A ring road will be established around the impoundment feature for long-term inspection and maintenance purposes. The completed impoundment area may also be fenced and signed to prevent recreational vehicles from damaging the integrity of the cover.

A temporary diversion ditch will be constructed to direct downstream flow of Luke Creek into Long Lake, and away from the sections of Luke Creek, the wetland and the Long Lake delta requiring excavation. The ditch will be lined with riprap to prevent erosion.

Contaminated material in tailings areas TA-02 and TA-03 will be excavated to bedrock. All water that collects with the excavated areas will be treated before discharging from the site. Excavated areas will not be backfilled to the original grade but will be re-contoured to prevent water from ponding and will be re-vegetated.

A berm or water control structure will be installed across the mouth of Luke Creek to prevent water from Long Lake entering the excavation sites in Luke Creek and the

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

adjacent wetland. Areas will be excavated to a minimum depth of 1.0 m and the excavated section of Luke Creek will be restored as a channel. For the wetland area located on Atikameksheng Anishnawbek, restoration targets based on consultation with the community include the creation of a new wetland with a higher degree of inundation and the potential for growth of wild crops.

In areas on the mine site where impacted materials are not excavated down to bedrock, the target clean-up limit for arsenic in contaminated soil is 47 ug/g, which corresponds to the soil standard value for subsurface arsenic concentrations in a potable water environment, as described in Ontario Regulation 153/04 under the *Environmental Protection Act*. A maximum allowable arsenic concentration value of 200 ug/g will be used where it is not feasible to achieve a target concentration, which is consistent with the results and recommendations of a Screening Health Level Risk Assessment conducted for tourist areas in Cobalt, Ontario to prevent toddlers from harmful, short-term exposure effects. Because the wetland area is not considered industrial lands, the proposed target concentration is 17 ug/g, which is the recommended Canadian environmental health guideline value for parklands. The 1991 interim soil quality criterion of 30 ug/g is proposed as the maximum allowable arsenic concentration value of 30 ug/g in the wetland where it may not be feasible to achieve a target concentration. The proposed confirmatory sampling protocol will use Table 3 in O. Reg. 153/04 as a guideline, with a minimum of 5 floor and 8 sidewall samples (where applicable) for every 30 m by 30 m area of excavated area.

The remediation of the Long Lake delta area will involve the removal of fugitive tailings to a depth of 2 m below the seasonal low water level. An excavation barrier will be installed to isolate the area and prevent the mobilization of contaminated sediment into the rest of the lake. The material will either be dredged or excavated, and then relocated to the impoundment structure. The remaining submerged tailings will be covered with a layer of gravel to prevent movement or re-suspension. Shoreline erosion protection measures will be established, with the natural shoreline restored to the extent possible upon project completion.

Approximately 171,200 m³ of aggregate will be required, with the majority of the material (79,500 m³) backfill for the excavated areas and for the construction of the impoundment structure. Top soil will be needed to cover these extraction areas and the impoundment. Most of the aggregate will be sourced from the existing Round Lake Pit in Atikameksheng Anishnawbek. ENDM has also applied for a Category 9 aggregate permit to develop and operate a new pit close to the mine site, as an additional source of material to supplement initial construction requirements for road construction and preparation of the impoundment structure. This pit will also be used for long-term care and maintenance of the site.

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

Upon completion of the project, the berm or water control structure across the mouth of Luke Creek will be removed. All on-site access roads not identified for long-term use by ENDM will be decommissioned. The Mine Access Road will be restored to a single lane access road. Excess road width will be scarified to encourage natural re-vegetation. The remaining single lane road will be left in a serviceable condition to provide access by light vehicle for future site inspections, monitoring, and care and maintenance activities. Additional access controls such as gates or barriers may be installed as needed to address issues associated with public access (e.g. damages, vandalism, theft, etc.).

The impoundment structure, on-site surface and ground water quality will be monitored on a regular basis after project completion to determine and maintain the effectiveness of the rehabilitation works. Monitoring, and long-term care and maintenance efforts will likely continue in perpetuity. Access into the mine site will be upgraded as necessary to facilitate these activities.

Environmental Assessment Requirements

The Long Lake Gold Mine Rehabilitation project is a discretionary activity subject to the *Environmental Assessment Act*, and is required to follow the processes prescribed in the Class Environmental Assessment for Activities of the Ministry of Northern Development and Mines under the *Mining Act* (ENDM's Class EA). Based on the results of the screening, the activity was determined to be a Category C project (Appendix A.1). Project documentation was prepared in accordance with the technical and information requirements outlined in ENDM's Class EA.

The consideration of impacts to the Eden Township Forest Conservation Area were addressed through ENDM's Class EA process. In consultation with the Ministry of Natural Resources and Forestry (MNRF), ENDM agreed to integrate any consultation, information and evaluation requirements of the MNRF's Class EA for Provincial Parks and Conservation Reserves into this environmental assessment process, if it had not already been addressed by ENDM's Class EA. To provide an even greater level of transparency and certainty in responsibilities and expectations regarding the upgrading of the road through the Eden Township Forest Conservation Reserve, a Memorandum of Understanding (MOU) for the two ministries was drafted (Appendix F).

Approximately one-third of the fugitive tailings that will need to be removed are located on Atikameksheng Anishnawbek (Whitefish Lake First Nation) lands. ENDM activities that occur on this land are subject to an environmental assessment process that must satisfy federal requirements. Atikameksheng Anishnawbek's Environmental Law was used to provide advice on ENDM's documentation of the proposed remediation activities within the community's wetland. Atikameksheng Anishnawbek will also be

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

using the process to separately evaluate and document the effects arising from the expansion of the Round Lake pit, the upgrading and re-routing of the historic mine road, and transportation of aggregates to the project site.

Consultation efforts for the Long Lake Gold Mine Rehabilitation Project exceeded the minimal notification requirements for a Category “C” project under section 4.2.2 of ENDM’s Class EA. A Notice of Opportunity to Provide Input (March 6 to April 19, 2015) and a Notice of Completion (August 25 to September 24, 2017) were posted on ENDM’s website and on the Environmental Registry of Ontario, and sent directly to potentially affected and interested agencies, stakeholder groups, and individuals. A third opportunity for review was provided with a Revised Notice of Completion (October 8 to November 21, 2019). Consultation opportunities included four public information sessions and five community sessions in Atikameksheng Anishnawbek (Whitefish Lake First Nation) where ENDM shared information on the project and provided opportunities to ask questions. Weblinks were provided to interested stakeholders. Further details regarding meeting dates and locations, and the nature of received comments and responses, can be found in Section 3 of the report and in the Record of Consultation (Appendix B).

Potential Environmental Effects and Mitigation

Based on existing baseline information (Section 2), consultation efforts (Section 3), and studies undertaken (Section 4), ENDM identified several potential environmental effects (Section 5) and proposed appropriate mitigation measures to avoid and/or minimize adverse impacts (Section 6). Key short-term and long-term, positive and negative effects, and proposed mitigation measures are summarized in Table 1.

LONG LAKE GOLD MINE REHABILITATION PROJECT

Table 1: Main environmental effects and general mitigation measures proposed

Environmental Component	Main Effects	General Mitigation Measures
Water Quality	<ul style="list-style-type: none"> • Long-term improvement. • Potential for short-term negative effect during construction. 	<ul style="list-style-type: none"> • Measures that prevent or minimize the movement of contaminants into Long Lake. • Water monitoring program during construction.
Climate Change	<ul style="list-style-type: none"> • CO2 emissions from hauling > 11,000 truckloads of aggregate • Loss of carbon sequestration from vegetation removal • Future climate condition may affect stability/erodibility of the impoundment feature. 	<ul style="list-style-type: none"> • Consider alternatives that reduce haul distances and/or reduce aggregate quantities. • Revegetation of remediated areas. • Design drainage to accommodate intense precipitation events. • Regular post-construction monitoring.
Fish and Wildlife	<ul style="list-style-type: none"> • Removal of arsenic will have long-term positive effect on natural environment. • Short-term negative impacts associated with loss of habitat, noise disturbances; includes three threatened species at risk. 	<ul style="list-style-type: none"> • Revegetation of remediated areas. • Restore wetland to diverse eco-site. • Minimize impacts to species at risk and their habitats, as authorized through an <i>Endangered Species Act</i> health and safety permit.
Protected Areas	<ul style="list-style-type: none"> • Road upgrades through the conservation reserve will remove some values of conservation interest (red pine and cedar). 	<ul style="list-style-type: none"> • Minimize the number of red pine and cedar trees removed.
Residents on Long Lake / Citizens of Atikameksheng Anishnawbek	<ul style="list-style-type: none"> • Road degradation from traffic. • Noise and dust disturbances from hauling and/or aggregate operations. • Increased risk to public safety 	<ul style="list-style-type: none"> • Consider alternatives that reduce haul distances and/or reduce aggregate quantities. • Maintain roads during construction. • Compliance to standard noise and dust measures; speed and load restrictions. • Continued consultation with roads authorities.
Recreational Use	<ul style="list-style-type: none"> • Access to area will be temporarily restricted during construction. • Increased safety risk to snowmobile users during first winter of construction • Trail through mine site will be closed the second winter. 	<ul style="list-style-type: none"> • Road will be widened to accommodate snowmobile use during the first winter. • ENDM will work with snowmobile association on re-routing the section of trail through the mine site.
Mining Claim Holder	<ul style="list-style-type: none"> • Access to conduct exploration or assessment work will be restricted during construction • Improved access to claim area once project is completed • Removes liability if claim is taken to a mining lease. 	<ul style="list-style-type: none"> • ENDM may grant an exclusion of time to keep the claim in good standing. • ENDM will share borehole sample and assay results with claim holder. • Claim holder will be kept informed of project status.

LONG LAKE GOLD MINE REHABILITATION PROJECT

Alternatives Analysis

ENDM considered a range of alternatives for the project, which included a range of remediation approaches and techniques, and options for accessing and hauling aggregate to the project site.

All alternatives were assessed on their ability to achieve these project objectives and address adverse environmental effects (Section 7). The selected approach or recommended to the undertaking was identified by integrating the preferred alternatives from each of the alternative categories.

Remediation Methods

Options considered for remediation approaches included:

- The excavation and consolidation of impacted material into one area of the site at an elevation above the water table;
- The relocation of impacted material to the underground mine workings;
- The placement of multiple covers over contaminated areas across the mine site, including the installation of protective layer on submerged tailings in Long Lake;
- Leaving contaminated materials in place and installing a passive or active water treatment system downstream of the tailings areas to treat run-off surface water;
- The relocation of impacted material to an off-site receiver for impoundment that could include the re-processing of tailings at an off-site facility to recover gold;
- Methods for the removal of impacted material from Long Lake including excavation (sediment removal method conducted after the water has been pumped out) and dredging (an excavation activity carried out underwater); and
- Water treatment technologies capable of producing an effluent that meets the *Provincial Water Quality Objectives* (PWQO) for Ontario.

Based on the results of the site characterization and contaminant loading estimates, a range of feasible remediation alternatives were developed which included assessing options of locating impacted materials on-site or transporting to an off-site receiver, extraction methods for removing impacted materials from the Long Delta, and water treatment options. A combination of qualitative ratings and quantitative information was used to compare the alternatives, for each the following criteria:

- Feasibility of Implementation and Effectiveness
- Cost of Implementation and Long-Term Care and Maintenance
- Required Long-Term Care and Maintenance
- Longevity / Permanence
- Potential Impacts to Interested Party Concerns
- Regulatory Requirements

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

The preferred methods for remediation are described in Table 2.

Table 2 – Preferred methods of remediation at the Long Lake Gold Mine site

Project Element	Preferred Alternative	Rationale for Selection
Location of Impacted Materials	On-Site Remediation: Consolidate and Cover Tailings	<ul style="list-style-type: none"> • Most feasible alternative with proven success. Minor low-term maintenance. The overall cost of implementation is moderate. • Reduces the volume of tailings to consolidate. Reliable way of inhibiting arsenic oxidation.
Removal of Impacted Materials from Long Lake	None selected	<ul style="list-style-type: none"> • Both options of excavation and dredging, and specific methods for removal and dewatering, are comparable in overall ability to meet the specified performance criteria. • Method used for removal will be determined by the project contractor.
Treatment of Water from Active Work Site	None selected	<ul style="list-style-type: none"> • All proposed water treatment system processes can produce effluent that meets the <i>Provincial Water Quality Objectives (PWQO)</i>. • The treatment technology will be determined by the project contractor.

Access and Aggregate Sources

Feasible options for access included use of:

- An existing network of public roads and trails along the southeast side of Long Lake;
- A historical road through the First Nation of Atikameksheng (Whitefish Lake #6) used to access the Long Lake Gold Mine prior to abandonment; and
- Existing forestry roads off Highway 637 that will also require the construction of a new 8.5 km road to the project site.

Options for sources of material included:

- Purchasing material from existing aggregate operators and having it transported to the project site by:
 - having the contractor be responsible for determining and acquiring the source of aggregate and top soil; and/or
 - purchasing the aggregate material from Atikameksheng Anishnawbek; and/or
- The identification, extraction and processing of available aggregate resources from Crown land located on or adjacent to the project site.

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

The alternatives evaluated included:

Alternative 1 – “Original Proposal” :

- Use of existing access through the south side of Long Lake with aggregate obtained by the remediation contractor (“Original Proposal”).

Alternative 2 – “New ENDM Pit”

- Use of existing access through the south side of Long Lake with most of the aggregate produced by a new Crown-held aggregate operation located near the project site.
- Additional material may need to be obtained by the remediation contractor

Alternative 3 - “Aggregate from AAFN”

- Use of existing access through the south side of Long Lake but with majority of the aggregate produced at the Round Lake Pit on Atikameksheng Anishnawbek First nation (AAFN) and transported to the project site using the historical access route.
- Additional material may also need to be obtained by the remediation contractor

Alternative 4 - “Aggregate from 2 Sources”

- Use of existing access through the south side of Long Lake with most of the aggregate produced at the Round Lake Pit on Atikameksheng Anishnawbek and transported to the project site using the historical access route.
- Aggregate needs will be supplemented by a new aggregate operations permitted to ENDM.
- Additional material may also need to be obtained by the remediation contractor

Alternative 5 – “Access from Highway 637”

- Use of existing forestry roads from Highway 637 (Killarney Highway) and construction of new 8 – 9 km road to the project site.
- Most of the aggregate will be produced at the Round Lake Pit on Atikameksheng Anishnawbek and transported to the project site using the historical access route. Aggregate needs will be supplemented by a new aggregate operations permitted to ENDM.
- Additional material may also need to be obtained by the remediation contractor.

All five alternatives identified were assumed to be equal in their ability to achieve remediation objectives of preventing the leaching of arsenic into Long Lake and further migration of the tailings.

Each alternative was assessed by considering three main evaluation components:

1. anticipated effects on key sub-components of the natural and the social environments;

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

2. project and long-term monitoring / maintenance costs; and
3. the potential for economic benefits to Atikameksheng Anishnawbek.

Each evaluation component was allocated a portion of points out of a total score of 100 points to reflect relative importance or weight of each evaluation component. Sub-components (i.e. values or factors considered within each component) were assigned a percentage of the points available for each component. Performance scores for each component were tallied to generate a final score (Table 3).

Table 3 – Summary of alternative analysis re: acquiring and delivering aggregate

Evaluation Component	Alternative				
	1	2	3	4	5
Impacts to Natural Environment (25 points)					
Environmental Impact Score	-2.33	-2.00	-2.00	-2.00	-3.00
Points Awarded	13.3	15.0	15.0	15.0	10.0
Impacts to Other Land Users (25 points)					
Environmental Impact Score	-2.30	-1.35	-2.05	-1.70	-0.75
Points Awarded	13.5	18.3	14.8	16.5	21.3
Remediation Costs (25 points)					
Relative Project Costs (15 points)	+27%	lowest	+15%	+19%	+15%
Points Awarded	11.8	15	12.6	13.0	10.7
Long-Term Maintenance Costs (10 points)	+91%	lowest	<91%	lowest	+38%
Points Awarded	5.2	10	5.2	10	7.2
Indigenous Participation (25 points)					
Points Awarded	6.3	6.3	25	18.8	18.8
FINAL SCORE	50.1	64.6	72.6	73.3	68.0

With the highest overall score (73.3), Alternative 4 was selected as the preferred approach that would best balance the environmental impacts with remediation costs and economic benefits. A sensitivity analysis was also conducted to determine the effect of weighting on the alternative performance, as well as identify the limitations of the methodology used. Under most scenarios considered, Alternative 4 still generated the highest performance score, highlighting its robustness at balancing environmental impacts, costs and societal benefits. Detailed results the alternative analyses are provided in Appendix C.

A summary of the advantages and disadvantages of each alternative is provided in Table 4.

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

Table 4 – Summary of advantages and disadvantages for alternatives

Alternative	Advantages	Disadvantages
Alternative 1 “Original Proposal”	<ul style="list-style-type: none"> • Smallest physical footprint resulting in less habitat disturbance • Minimal impacts to residents of Atikameksheng Anishnawbek 	<ul style="list-style-type: none"> • Highest amount of CO₂ emissions. • Highest impacts to the residents of Long Lake and Tilton Lake Roads. • High project /maintenance costs. • Minimal opportunities for Indigenous communities. • Most number of potentially high negative effects. • Does not address Part II Order request
Alternative 2 “New ENDM Pit”	<ul style="list-style-type: none"> • Significant reduction in the amount of hauling required along residential roads. • Least amount of CO₂ emissions • Least expensive project with low maintenance costs. • Minimal impacts to residents of Atikameksheng Anishnawbek. 	<ul style="list-style-type: none"> • Large project footprint due to new aggregate operations resulting in greater potential for short-term impacts to wildlife. • Minimal opportunities for Indigenous communities.
Alternative 3 “Aggregate from AAFN”	<ul style="list-style-type: none"> • Significant reduction in the amount of hauling required along Long Lake, Tilton Lake and Lakes End Roads. • Greatest potential for economic benefits to Atikameksheng Anishnawbek. 	<ul style="list-style-type: none"> • Highest impact to residents of Atikameksheng Anishnawbek. • Aesthetic impacts for some residents of Lakes End Road • Potential for high, long-term maintenance costs. • Potential to delay the project to address other environmental processes.
Alternative 4 “Aggregate from 2 Sources”	<ul style="list-style-type: none"> • Significant reduction in the amount of hauling required along residential roads. • Low maintenance costs. • Still provides significant economic benefits to Atikameksheng Anishnawbek. • No high negative effects/costs 	<ul style="list-style-type: none"> • Aesthetic impacts for some residents of Lakes End Road.
Alternative 5 “Access from Highway 637”	<ul style="list-style-type: none"> • Eliminates construction traffic along residential roads. • No impacts to the conservation reserve • Least amount of noise impacts to residents of Lakes End Road. • Still provides potential for significant economic benefits to Atikameksheng Anishnawbek. • Potential to facilitate mineral exploration in the area. 	<ul style="list-style-type: none"> • Large project footprint due to new road corridor and greatest potential for long-term impacts to wildlife. • High CO₂ emissions. • Most expensive project with potential for high, long-term maintenance costs • Delay project a minimum of two years to conduct additional studies and consult with MNRF.

LONG LAKE GOLD MINE REHABILITATION PROJECT

The Selected Project

The selected project integrates the preferred remediation methods identified previously in Table 2 with access and aggregate sources described for Alternative 4.

The advantages associated with the Long Lake Gold Mine project:

- An improvement in water quality in Long Lake that will meet provincial and federal drinking water limits;
- The removal of tailings and soils will reduce contaminants in the aquatic and terrestrial ecosystems;
- Restoration of wetland to a marsh ecosystem has the potential to enhance biodiversity by improving fish and wildlife productivity; and
- Short-term benefits for local economies.

The disadvantages associated with the project:

- Short-term increase in noise for the residents of Long Lake;
- Short-term degradation to road infrastructure, and safety concerns;
- Temporary disruption in the public's ability access to Crown land, and potential for long-term access restrictions for certain activities;
- Removal of some trees in the Eden Township Forest Conservation Reserve;
- Potential for short-term disturbance and habitat damage for three species at risk; and
- The project is expensive and will continue to have long-term costs associated with monitoring and maintenance of a rehabilitation structure.

Planned Project Construction Schedule

The work schedule and sequencing of activities (Section 8) will be determined by the successful contractor. However, certain restoration activities will need to occur in the winter or summer conditions. It is anticipated that the described reclamation activities can be completed over a 2.5-year period.

The general sequence or stage of construction components / activities are summarized below. The timeline is only tentative, and is dependant upon the completion of Class EA requirements as well as time associated with obtaining regulatory approvals.

- **November 2019** – Completion of Class EA (Statement of Completion)
- **November/December 2019** – Tendering
- **January 2020** – Remediation contract awarded
- **January – March 2020** - Access construction and upgrades

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

- **April 2020** – Mobilization + Phase 1 (construction of berm, drainage)
- **July 2020** – Phase 2 (clean-up of mine drainage and Luke Creek)
- **October 2020** – Phase 3 (clean-up of wetlands and TA-02/TA-03)
- **July 2021** (Dredging) or **December 2021** (Excavation) – Phase 4 (clean-up of the Long Lake delta)
- **May 2022** – Phase 5 (capping and closure)
- **August 2022** – Demobilization
- **On-going** - Long term monitoring and maintenance

Agreements, Approvals And Permits

The following permits and authorizations (Section 9) have or will be obtained by ENDM or the successful remediation contractor:

Atikameksheng Anishnawbek First Nation Approvals

Under the *First Nations Land Management Act*, Atikameksheng Anishnawbek is an operating community that has been transferred the rights and administrative ability to manage reservation land and resources. To date, Chief and Council have passed four Band Council Resolutions that approved the following activities:

- A Stage 1 and 2 archaeological assessment in and around the mine site that included lands located on Atikameksheng Anishnawbek;
- An assessment of aggregate type and quantities in the Round Lake Pit by OGS;
- The proposed restoration of the wetland that includes the exportation of impacted material and the importation of clean material; and
- The sale of aggregate for use in the project and the upgrading of a historic mine road from the aggregate pit to the project site.

Provincial Approvals

Aggregate Resources Act - a Category 9 Pit Above Water permit from the MNRF will be required to operate an aggregate pit near the project site. The disposition of land for aggregate extraction is subject to the requirements of MNRF's Class Environmental Assessment for Resource Stewardship and Facility Development Projects.

Crown Forest Sustainability Act – a Forest Resource Licence issued from Sudbury District MNRF office will be required to remove merchantable trees from Crown land.

Endangered Species Act - work will apply conditions of the Section 17(2)(a) "Health and Safety" Endangered Species Act permit obtained from the Minister of MECP.

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

Environmental Protection Act - an Environmental Compliance Approval issued by MECP will be required for the package system to treat wastewater and seepage from active work areas and the impoundment area before being discharged into Luke Creek.

Occupational Health and Safety Act - prior to starting the project, the contractor will be responsible for filing a Notice of Project with the Ministry of Labour.

Ontario Heritage Act - Review and Entry into the Ontario Public Register of Archaeological Reports in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18 - the Ministry of Tourism, Culture and Sport (MTCS) has confirmed that the fieldwork and reporting for two archaeological assessments were consistent with the 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licences.

Ontario Water Resources Act - a Permit to Take Water (PTTW) will be required from the Ministry of the Environment, Conservation and Parks to treat water (i.e. precipitation and seepage) that collects within the TA-01 impoundment area, prior to discharging the water to the environment. Water takings from TA-02, TA-03 and Luke Creek are all expected to be less than 400 m³/day and will be EASR registered prior to construction.

The passive diversion required to facilitate the removal of contaminated material from Luke Creek, the wetland and Long Lake; and to replace the road/causeway, meets the exemption requirements so a PTTW or EASR registration is not required.

MECP-ENDM Memorandum of Understanding (MOU) - an MOU between the Ministry of the Environment, Conservation and Parks (MECP) and the Ministry of Energy, Northern Development and Mines (ENDM) has been drafted. The MOU defines the expected outcomes regarding the use and upgrade of an existing road through the Eden Township Forest Conservation Reserve to the Long Lake Gold mine site; outlines the roles and responsibilities of each Ministry; and provides documentation demonstrating how potential negative impacts will be considered and addressed.

Future Effects Monitoring

Future effects monitoring (Section 10) will be conducted to confirm the remediation goal and objectives. This will include assessing the physical integrity and effectiveness of the rehabilitation structure and the environmental response to remediation efforts. If arsenic concentrations do not decrease to safe drinking water levels (10 ug/L) within the first 5 years, then a new site characterization study will be done to identify the continuing source of arsenic contamination. Monitoring will also be conducted to determine the extent of any residual impacts that may have arisen directly and / or indirectly from the project activities.

Executive Summary

LONG LAKE GOLD MINE REHABILITATION PROJECT

The proposed monitoring program includes:

- The physical stability of the impoundment areas will be monitored at a minimum once per year for 5 years, and then once every five years. Inspection of the revegetated area shall be conducted semi-annually following initial planting until vegetation is successfully established;
- Surface water chemical monitoring will be conducted seasonally for the first 5 years. If by the end of 5 years arsenic concentrations have declined below the PWQO (5 µg/L) in Luke Creek and the south basin of Long Lake, then monitoring will occur annually for another 5 years, and then every 5 years afterwards.
- Because groundwater does not represent a significant pathway to Long Lake, monitoring is only proposed for the impoundment area using perimeter wells. The information will be used to determine the extent of efforts required to treat groundwater collected under the tailings impoundment structure. Ground water monitoring will be conducted seasonally (spring, summer, fall, and winter).
- Five years following completion of remediation work at the Long Lake Gold Mine site, tissue samples will be collected from fish species captured in the south basin and central basin of Long Lake and sent to an MECP laboratory for contaminant analysis. Additional fish may be collected from Round Lake in cooperation with Atikameksheng Anishnawbek. Fish tissue sampling efforts will be repeated every five years until such time the consumption advisory limits for arsenic concentrations in the south basin of Long Lake are the same as those for the rest of Long Lake.
- Once remediation efforts have been completed, ENDM may collaborate with Atikameksheng Anishnawbek to develop a program to monitor the wetland to determine if wetland restoration objectives have been accomplished.
- If needed, ENDM will meet with the conservation reserve manager to discuss the effectiveness of access controls on mitigating impacts to the conservation reserve and implement the appropriate measures.

The project file report and appendices, as well as additional information, studies and technical reports are available through the following project weblinks:

LLGM_EA_Documents.zip:

- www.geologyontario.mndm.gov.on.ca/mines/documents/client/LLGM_EA_Documents/LLGM_EA_Documents.zip

LLGM_EA_Studies.zip:

- www.geologyontario.mndm.gov.on.ca/mines/documents/client/LLGM_EA_Documents/LLGM_EA_Studies.zip

Executive Summary