

APPENDIX 8-F

Addendum for Closure and Reclamation Plan





8-F.1: Interim Whale Tail Closure and Reclamation Plan





Meadowbank Division

WHALE TAIL PIT

Interim Closure and Reclamation Plan

JUNE 2016 VERSION WT

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Version	Date	Section	Page	Revision	Author
WT	June 2016	All	n/a	Interim Closure and	Golder Associates Ltd.
				Reclamation Plan for the Type	
				A Water Licence Amendment	



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1.0 SECTION 1 • PLAIN LANGUAGE SUMMARY

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is proposing to develop Whale Tail Pit (referred to in this document as the Project), a satellite deposit located on the Amaruq property, to continue mine operations and milling at Meadowbank Mine. Agnico Eagle is seeking approval to extend Meadowbank Mine to include development of resources from Whale Tail Pit. Concurrent with the reconsideration of the Project Certificate by the NIRB, Agnico Eagle is seeking an amendment to Meadowbank Mine Type A Water Licence (No. 2AM-MEA1525) to include mining of Whale Tail Pit and construction and operations of associated infrastructure from the Nunavut Water Board (NWB).

Agnico Eagle has provided financial security for the closure and reclamation of the Meadowbank Mine facilities. Refer to the existing Meadowbank Mine Interim Closure and Reclamation Plan (ICRP) for details.

The Amaruq property was acquired by Agnico Eagle in April 2013 subject to a mineral exploration agreement with Nunavut Tunngavik Incorporated. The Amaruq property is a 408 square kilometre (km²) site located on Inuit Owned Land approximately 150 kilometres (km) north of the hamlet of Baker Lake and northwest of Meadowbank Mine in the Kivalliq Region of Nunavut, Canada.

Ore from Whale Tail Pit will be segregated by grade, the high grade will be crushed on-site and transported to the approved infrastructure at Meadowbank Mine for milling as part of the run of mine operation while the low grade ore will be stockpiled on the low grade ore pad until the end of the mining operation and then crushed on-site and transported to the Meadowbank Mine. Agnico Eagle proposes to dispose the tailings slurry generated by the Project in the Meadowbank Tailings Storage Facilities authorized under the current Meadowbank Mine Certificate and Type A Water Licence.

In November 2015 Agnico Eagle received approval to construct an access road under the Type B Water License (2BE-MEA1318), which will connect the Vault Pit (one of the Meadowbank Mine pits) to the Amaruq exploration camp site in support of exploration activities. Vault Pit is approximately 8 km northeast of Meadowbank Mine. The proposed access road will be about 64.1 km long and during the exploration stage, it will have a top width of 6.5 m. Agnico Eagle is proposing to upgrade the proposed access road to accommodate increased traffic rates and haul trucks (referred to in this document as the haul road). No changes are proposed for the existing Meadowbank All Weather Access Road (AWAR) to Baker Lake, or any winter road.

Agnico Eagle expects to begin construction in 2018 and ultimately have full production in 2019. The operational phase will span three to four years, from Year 1 (2019) to Year 4 (2022). Mining activities are expected to end in Year 3 (2021) and ore processing is expected to end during Year 4 (2022). The Whale Tail Pit will produce approximately 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock and 5.6 Mt of overburden (with very limited organic material) for a total of 51.7 Mt of waste.

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As part of the exploration drilling program, some infrastructure has already been developed at the Project site and it will be developed further. The exploration program is being carried out following the approved Type B Water Licence and Land Use Permits. The exploration facilities include:

- an exploration camp;
- an exploration ramp and two vent raises (permit in process; permit is expected to be received by end of 2016);
- a small airstrip;
- 10 km of exploration roads;
- two borrow pits, and
- proposed access road and associated borrow pits (seven borrow pits).

The existing and proposed exploration facilities at the Project site are not covered in this Interim Closure and Reclamation Plan (ICRP) as they are covered under the Exploration Facilities Conceptual CRPs (Agnico Eagle 2015b, 2015c). With respect to the Whale Tail access road, only the works related to upgrading the exploration access road for production use are covered in this ICRP.

The area that will be disturbed during construction and operations for the proposed Project is approximately 325.1 hectares (ha).

The infrastructure proposed at the Project and covered under this ICRP includes the following, see Figure 1.1-1 for Project infrastructure locations:

- Whale Tail Pit;
- a crushing facility;
- supporting infrastructure, including gated access, a communication tower, heli-pad, tank
 farm, potable water treatment plant, sewage collection and treatment system, effluent water
 treatment plant (WTP), a permanent camp (Main Camp), maintenance and on-site storage
 areas, three ore stockpiles, a temporary overburden stockpile, a power plant, two freshwater
 intakes and a water diffuser;
- a Waste Rock Storage Facility (WRSF) (waste rock and overburden will be co-disposed in the WRSF, the WRSF includes a landfill);
- four water retention dikes (Whale Tail, Mammoth, WRSF, and Northeast);
- two Saddle/Coffer Dams;
- three water diversion channels (Whale Tail, East, and North, if deemed necessary);
- the contact water collection channels and ponds in the different sectors of the Project (Main Camp, Industrial, Attenuation Pond, Open Pit, WRSF);
- transportation routes including internal access and the haul road; and
- quarries and borrow pits.

The Whale Tail deposit is partly located in Whale Tail Lake. The proposed approach to develop the pit involves isolating the pit area with three dikes (Whale Tail Dike, Mammoth Dike, and Northeast Dike).

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The isolated area (referred to in this document as 'dewatered Whale Tail Lake area' or 'dewatered area') will be dewatered for the development and operation of the pit. The dewatered water level will be maintained through the life of the Project by diverting most the fresh water that would become in contact with the mine site to other sub-watersheds using diversion channels and by pumping (operational dewatering) the contact water to the WTP for treatment before discharge in Mammoth Lake.

Agnico Eagle has received comments from various local and regional communities and government stakeholders on the Project. Key community findings and the Company's response to address them are outlined in the Whale Tail Pit Final Environmental Impact Statement (FEIS; Agnico Eagle 2016). Agnico Eagle has used this feedback to refine the Project design to reduce potential environmental impacts from the Project.

This report outlines the Interim Closure and Reclamation Plan (ICRP) for the Project and it has been prepared in terms of an addendum to the current existing ICRP and financial security for Meadowbank Mine. It has been submitted to NWB for review and approval in support of the Type A Water Licence Amendment. This report is Version 0 of the ICRP for the Project.

The "Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories", issued by the Mackenzie Valley Land and Water Board (MVLWB) and Aboriginal Affairs and Northern Development Canada (AANDC) in 2013 (MVLWB/AANDC 2013), were used to prepare the ICRP. The ICRP will be updated through the detailed design and operational phases of the Project, as new information (such as monitoring results) become available.

The Project ICRP describes the plan to carry out the required closure activities, and to establish self-sustaining ecosystems with land uses similar to pre-development conditions. Progressive closure activities will take place during mining. Areas that have been disturbed by mining will be reclaimed once operations in that area are complete. The mining operation has been designed with final closure in mind. Where possible, the designs of the WRSF and water management facilities have been chosen to reduce the overall impact of the Project on the area.

If operations stop temporarily with the intent of resuming mining activities in the near future, the Project site would be placed in a care and maintenance phase. The Project may need to shut down for a short-term or indefinitely (long-term) due to economic, environmental and/or social factors. The plans for both of these closure periods are discussed in this ICRP.

Ultimately, the mining operations will stop as the pit is completed and the Project site would be closed. The work that would take place when the Project site is placed in closure is described in this ICRP.

Environmental design features and mitigation, as well as current wildlife management practices used in other mining projects in Nunavut and the Northwest Territories (e.g., Meadowbank, Ekati, Diavik, and Snap Lake mine sites) for closure, will also be used at the Project as much as possible.

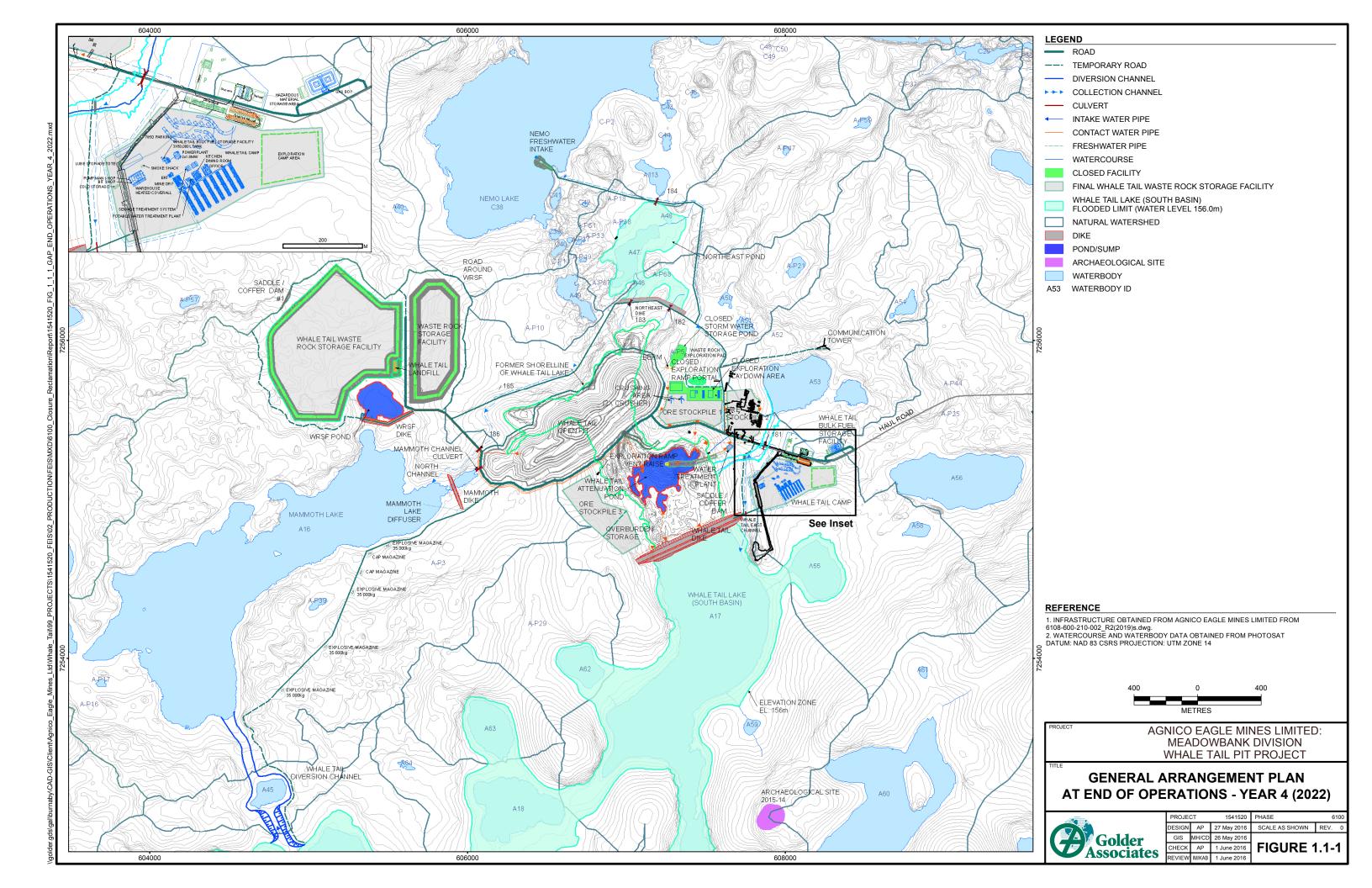
There will be three main stages of closure at the Project. Activities that take place during each stage are:

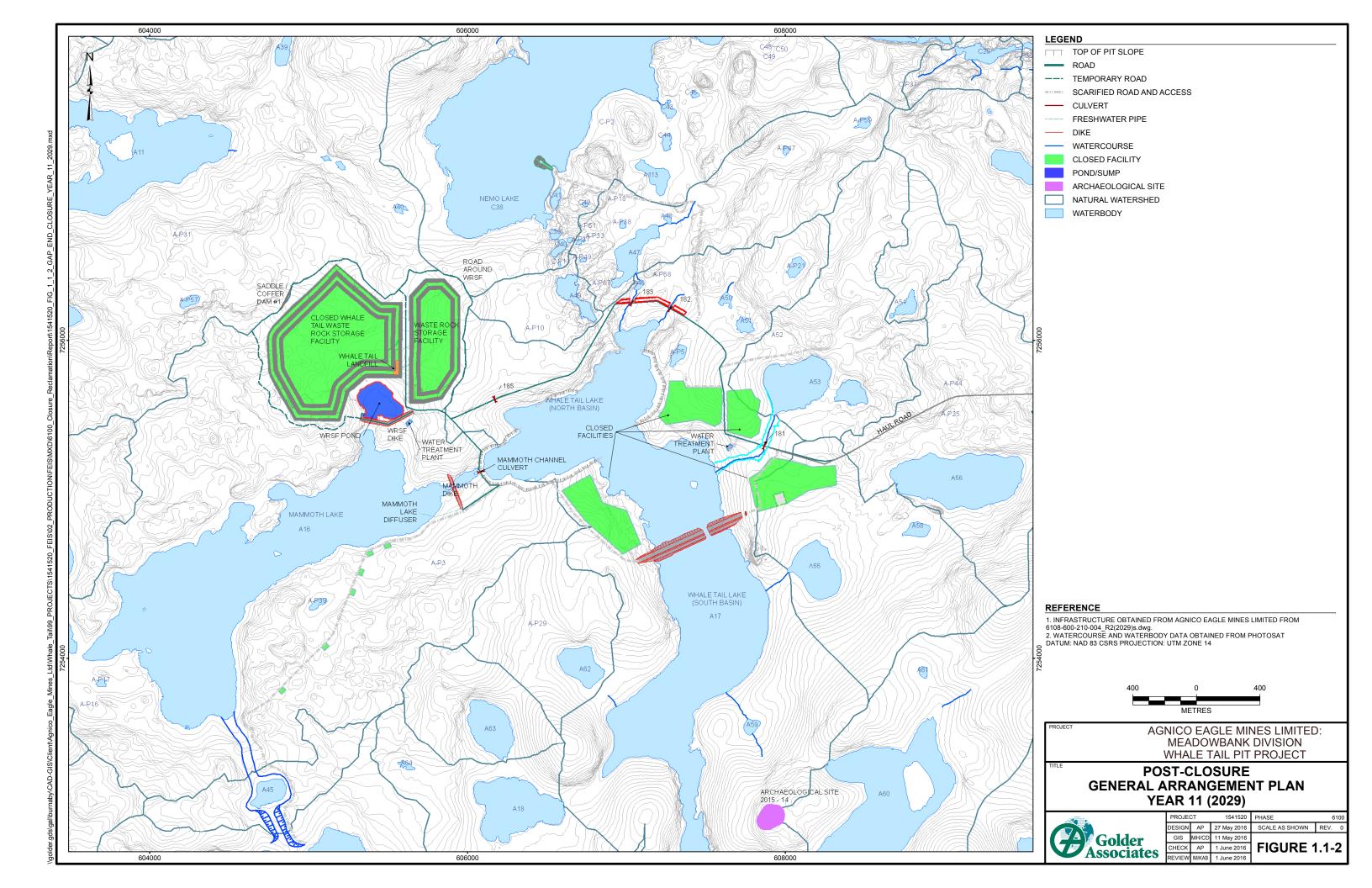
- Progressive Reclamation Stage (Operating Year 1 to Year 3), during which reclamation of the WRSF through cover placement will occur progressively (Figure 1.1-1). Active care, maintenance, and monitoring will be required for the reclaimed areas of the WRSF throughout this stage.
- Closure Stage (Year 4 to Year 11), during which the removal of the non-essential site infrastructure and back-flooding of the dewatered area to re-establish the original water level of the Whale Tail Lake will occur (Figure 1.1-2). The dewatered Whale Tail Pit area will be back-flooded in two phases: 1) back-flood the pit area; and 2) back-flood to 152.5 m (the original lake water level). Active care, maintenance, and monitoring will be required for the decommissioned and remaining facilities throughout this stage.
- Post-Closure Stage (Year 11 onwards), will commence as closure is completed in Year 11.
 During this stage, continued monitoring and maintenance will be carried out at a reduced frequency, depending on the results of the monitoring and measures of success selected for closure (Figure 1.1-3).

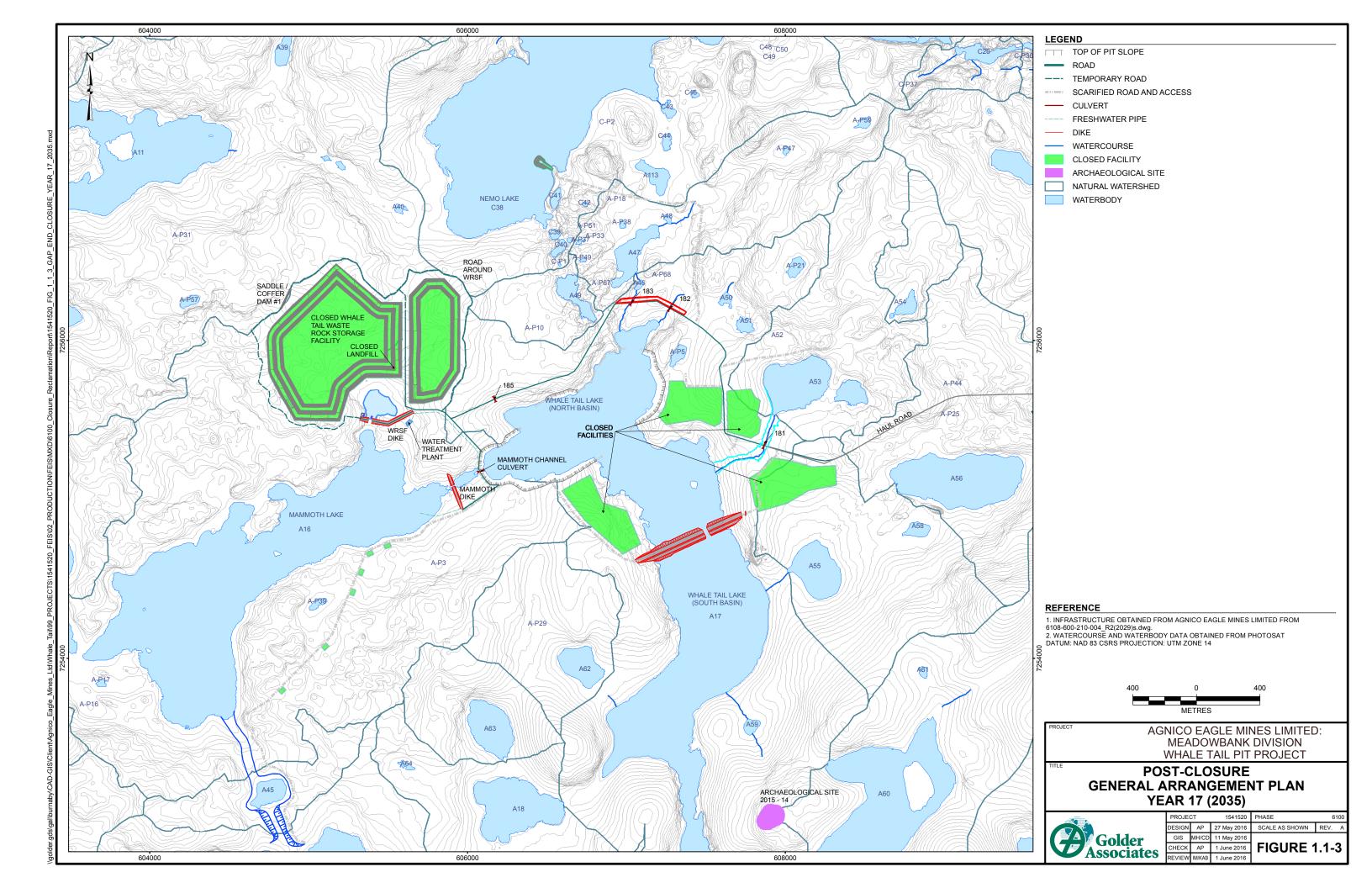
At closure, it is expected that the residual disturbances derived from the Project will be minimal (Figure 1.1-3).

Table 5.2-1 through Table 5.2-7 presented in Section 5.0 provide the interconnection between the closure objectives, closure criteria, and closure actions for each of the Project components. These are divided into valued ecosystem components (Component).









1.1 Closure and Reclamation Activities

The major closure and reclamation activities planned for the Project are expected to occur during the first two years of closure. It is expected that the original water level of the Whale Tail Lake in the dewatered area will be reached over an 8 year period (before the freshet of Year 2029) with the pit area itself back-flooded over a period of 4 years (by the end of Year 2025). The main components and activities proposed at closure, including progressive reclamation activities are summarized below.

Open Pit Mine Workings:

The dewatered Whale Tail Pit area will be back-flooded in two phases:

- Phase 1: back-flood the pit area (Figure 1.1-1) between Year 4 (2022) and Year 7 (2025); and
- Phase 2: back-flood the Whale Tail Lake to 152.5 m between Year 8 (2026) and Year 11 (2029) (Figure 1.1-2).

It is anticipated that approximately 24,000,000 m³ will be required over 8 years to back-flood the mined-out Whale Tail Pit (i.e., approximately 17,000,000 m³) and Whale Tail Lake (North Basin) (i.e., approximately 7,000,000 m³) to its original level.

Once the water in the back-flooded area is suitable for direct discharge to the environment, the pumping and pipelines systems will be removed. The Whale Tail Dike and Mammoth Dike will then be breached and the back-flooded area would then be restored to the original conditions. The dikes will be breached at selected locations.

Waste Rock and Overburden Storage Facility:

The WRSF will be designed for long-term stability. Thus no additional re-grading of the sideslopes will be required. It will be necessary to contour the top surface to ensure positive drainage and to prevent ponding.

An engineered cover will be progressively placed on the surface of the WRSF. The design proposed is similar to the approved Vault WRSF at Meadowbank Mine, namely the addition of 2 to 4 m of non-potentially acid generating (NPAG) waste rock as final surface of the WRSF. The intent of the cover is to contain the yearly active layer inside the thickness of the cover and maintain a temperature below 0° Celsius for the underlying rock. The objective of the cover is the control of acid generating reactions and of migration of contaminants. The segregation of the PAG/NPAG and ML/Non-ML waste rock will occur during the operation of the mine. The covering of the top of the WRSF will be completed during the closure period using a storage of NPAG (and non-ML to the extent possible) waste rock.

Cover design will be finalized during the detailed design phase of the Project and will consider operational experience at other northern mine sites including the Meadowbank Mine, and available design guidelines including MEND Report 1.61.5c – Cold Regions Cover System Design Technical Guidance Document (MEND 2012).

The contact water management system for the WRSF will be maintained during the closure period. The water collected from the WRSF, will be treated in the WTP if required until water quality monitoring demonstrates that water flowing from this facility is acceptable for direct release to the environment. Once water quality is acceptable for direct release based on criteria established through the water licensing process, the WRSF contact water management system will be decommissioned.

Buildings and Equipment:

- Equipment used for closure activities and long-term maintenance (e.g., trucks, backhoes, etc.) will be removed from the Project site once they are no longer required. Most of the mobile equipment will be removed once the closure stage is complete. A small subset of equipment will be retained on-site for a portion of the post-closure stage.
- Phase 1 and 2 ESAs will be carried out to identify areas where soils may be contaminated by hydrocarbons; contaminated soils will be excavated and hauled to Meadowbank Mine landfarm for remediation.
- Salvageable buildings and surface structures will be dismantled and demobilized from the site. The buildings will be offered to the Kivalliq Inuit Association (KIA) (the land owner) at closure for potential re-use elsewhere.
- Non-salvageable buildings and structures will be dismantled or demolished and inert nonhazardous materials will disposed in the landfill area in the WRSF.
- Hazardous wastes will be removed for disposal by a licensed handler.
- Any above grade concrete structures will be demolished and the rubble will be disposed of in the WRSF landfill. Any slabs on grade will be punctured and then left in place and covered with soil or NPAG/non-metal leaching waste rock. Any subgrade foundations will be left in place.
- All disturbed site areas will be re-graded to suit the surrounding topography. In areas where
 the original ground surface was lowered for site grading or structural requirements, the slopes
 will be stabilized and contoured. Cover materials may be required for erosion and dust
 control. It is anticipated that a succession of indigenous plant species will naturally revegetate the surface over time.
- Fuel not required during the closure and reclamation activities will be sold, returned to suppliers, disposed by a licensed handler or incinerated.

Mine Infrastructure:

- Salvageable equipment such as the jaw crushers and conveyors will be dismantled and demobilized from the site.
- Non-salvageable structures will be dismantled or demolished and inert non-hazardous materials disposed of in the landfill area in the WRSF.
- Hazardous wastes will be removed for disposal by a licensed handler.

- Any above grade concrete will be demolished and the rubble will be disposed in the WRSF landfill. Remaining concrete foundations and slabs will be cut in pieces and buried or removed.
- After the crushing facilities are removed, the areas will be re-graded to promote natural
 drainage. All disturbed site areas will be re-graded to suit the surrounding topography. In
 areas where the original ground surface was lowered for site grading or structural
 requirements, the slopes will be stabilized and contoured. Cover materials may be required
 for erosion and dust control. It is anticipated that a succession of indigenous plant species will
 naturally re-vegetate the surface over time.

Transportation Routes:

- The roads not required for post-closure monitoring, and not assumed by the community or by a third party after consultation, will be decommissioned and the terrain will be restored. Decommissioning of the road will start from the site.
- Decommissioning will occur by loosening compacted surfaces and flattening side slopes.
- The road surface will be scarified, allowing the native plant community to naturally establish itself on the former road surface.
- Slopes will be stabilized against erosion potential.
- If necessary, wildlife access will be provided at suitable intervals by re-grading the embankment shoulders to provide flatter slopes.
- All bridges and culverts will be removed and original drainage patterns will be restored.
- Stream crossings will be rehabilitated as they are encountered during the progression of the road decommissioning work.
- Cross-drain structures (cross-ditches) will also be installed where necessary between culvert sites. Where armouring rock (rip-rap) is required, this rock will be non-acid generating and non-metal leaching for the protection of aquatic life. Where affected watercourses are fish bearing, the timing of work will be restricted to within the designated Fisheries and Oceans Canada (DFO) fisheries work window.
- The loosening of compacted surfaces will be accomplished by ripping the road bed using a dozer with a "ripper" attachment on the back. Successive passes with the dozer longitudinally along the road bed will eliminate the level road surface and make travel difficult. It is anticipated that, in this way, the abandoned roads will not be useable by wheeled vehicles (i.e., cars, trucks, and pick-up trucks). The road bed would still be useable by all-terrain vehicle or snowmobile after final reclamation.

Landfill and Other Waste Disposal Areas:

• The leachate from the landfill is anticipated to be of very low ionic strength (dilute) due to controls on materials to be placed in the landfill. Moreover, drainage from the landfill is

largely expected to freeze within the WRSF, with little to none reporting to the water collection infrastructure.

- The design, operation, and/or closure of the landfill do not rely on total freezing; however, as an added control strategy, a minimum of 2 m thick NPAG waste rock cover will be placed over the landfill (as with other parts of the surrounding WRSF). The cover thickness is considered sufficient for planning purposes and is based on maintaining the active layer within the waste rock cover so that the materials landfilled will remain frozen. The cover will be placed at closure. The cover is designed to account for potential climate warming and would be modified if required. When finalizing the design for the cover, the need for thermistors to be installed will be evaluated. The surface will be left irregular so as to capture snow, windblown sediment, and plant seeds.
- The hazardous waste and contaminated soil (soil not treated through the Meadowbank Mine landfarm (i.e., soil contaminated with heavy hydrocarbons or other contaminants not suitable for remediation in the landfarm) will be managed continually during operations and closure by sending the soil to a licensed off-site treatment facility. Therefore, there will be little to no accumulation of such wastes during mine operations or closure at the Project site, subject to seasonal shipping considerations.
- Inert, non-combustible wastes will be disposed in the WRSF landfill.
- Domestic waste will be burned in the Meadowbank Mine incinerator during operation and closure as part of camp maintenance.
- Any above-ground structures will be demolished and the non-hazardous debris will be disposed in the WRSF landfill.
- Concrete slabs on grade will be cut in pieces and buried, or moved to the WRSF landfill.
 Foundations will be left in place and covered with fill.
- The top of the landfill will be contoured to encourage drainage and to prevent ponding. A 2 m thick cover of NPAG rock will be placed on top (as discussed above).

Water Management Facilities:

Freshwater Intake and Potable Water Treatment Plant: The pumps will be removed from the freshwater intake for salvage if economic to do so. The wet wells will be filled in with granular material. Above grade buildings will be demolished and the debris will be disposed in the WRSF landfill. The potable water treatment plant will be dismantled and salvaged or disposed of in the WRSF landfill when it is no longer required. Any slabs on grade from the potable water treatment plant will be perforated and covered, or removed. The areas will be re-graded to promote natural drainage and natural re-vegetation.

WTP and Mammoth Lake Effluent Diffuser: The WTP will be decommissioned once it is no longer required (i.e., when the water quality from the Project components meets licence criteria for direct discharge). The WTP and the Mammoth Lake effluent diffuser will be maintained for 3 water treatment seasons as a contingency before being dismantled and disposed of in the WRSF landfill.

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Any concrete slabs on grade from the WTP will be perforated and covered, or removed, and the area will be re-graded to promote natural drainage and natural re-vegetation.

Dikes/Dams: The Northeast Dike will be breached at the end of the operations phase (expected in Year 4 2022). The remaining water retention and dewatering berms/dams will be kept intact to provide a barrier between the facilities and surrounding lakes until the water quality (seepage and runoff collected from facilities, and from the back-flooded area) is considered acceptable for release to the environment without treatment. Once this is achieved, the remaining dikes/dams will be breached. The dikes/dams will be breached at selected locations.

Channels and ponds: The channels and ponds for contact water will be maintained as required in closure until site water quality monitoring results indicate that the water can be released directly to the environment without further treatment. No closure measures are necessary for the fresh water bypass channel from Whale Tail Lake (South Basin) to Mammoth Lake because its invert elevation will be above the final water level in the lake.

All water management infrastructures when they are no longer required will be re-contoured and/or surface-treated according to site-specific conditions to minimize wind-blown dust and erosion from surface runoff to and enhance the site area for natural re-vegetation and wildlife habitat post-closure.

Pipelines, culverts, pumps: Pipes, culverts, and pumps will be maintained as required in closure until site water quality monitoring results indicate that the water can be released directly to the environment without further management (Golder 2016c). All water management infrastructure will be dismantled and salvaged or disposed of in the WRSF landfill when they are no longer required. Reclaimed areas will be re-graded to promote natural drainage and natural re-vegetation.

Diversion channels: The diversion channels will be maintained as required in closure until site water quality monitoring results indicate that the water can be released directly to the environment without further management.

The channels will be re-contoured and/or surface-treated according to site-specific conditions to minimize wind-blown dust and erosion from surface runoff to and enhance the site area for natural re-vegetation and wildlife habitat post-closure.

Quarries and Granular Borrow Sites:

The reclamation of the borrow sites is covered in the Exploration Facilities Conceptual CRPs (Agnico Eagle 2015b, 2015c).



1.2 Monitoring and Maintenance Plans

Monitoring and maintenance of the reclaimed facilities will be carried out during operations and into closure. It is planned that the haul road would be maintained for a sufficient period to enable access to the site for minor maintenance required in the initial portion of the post-closure period. The haul road, if not assumed by the community or a third party will be decommissioned once maintenance requirements at the site are anticipated to be minor and could be achieved with small crews sent to site via helicopter in the summer.

The proposed closure monitoring and maintenance activities are summarized below.

Open Pit Mine Workings:

- carry out visual inspections of the reclaimed areas;
- sample surface water and profiles of the back-flooded area; and
- inspect fish habitat in back-flooded area.

Waste Rock and Overburden Storage Facility (WRSF):

- periodic inspections will be performed by a geotechnical engineer to visually assess stability and performance of the WRSF;
- ground conditions in the WRSF will be monitored to confirm permafrost conditions are being established as predicted;
- thermistor data will be monitored to determine thermal conditions within the WRSF to confirm predicted permafrost aggradation/encapsulation and to verify that the thickness of the active zone is less than the design thickness of the cover;
- water quality from controlled discharge points around the WRSF will be monitored to confirm that drainage is performing as predicted and is not adversely affecting the environment; and
- any seepage areas from the toe of the WRSF will be identified and monitored.

Buildings and Equipment:

- periodic inspections will be performed to visually assess the reclaimed areas; and
- all buildings and equipment left on-site during closure will be maintained until no longer required, at which time they will be removed from the site or demolished and disposed in the WRSF landfill.

Mine Infrastructure:

periodic inspections will be performed to visually assess the reclaimed areas.

Transportation Routes:

- periodic inspections will be performed to visually assess the reclaimed areas; and
- all roads to be used during closure will be maintained until they are no longer required.

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Landfill and Other Waste Disposal Areas:

- periodic inspections will be performed to visually assess the reclaimed areas;
- all waste management facilities to be used during closure will be maintained until they are no longer required; and
- visual observations for cracking or slumping of the landfill cover and for underlying waste material pushing its way up through the cover will be completed periodically.

Water Management Facilities:

- the water quality in the open pit will be profiled during the back-flooding process;
- water management points (including seepage) that were not anticipated will be identified and monitored;
- ongoing inspection and maintenance of the WTP will be conducted as long as it remains in operation;
- the rate of back-flooding of the open pit and the dewatered area will be monitored and compared with predictions;
- periodic inspections will be performed to visually assess the reclaimed areas;
- unstable areas will be identified and monitored; and
- all water management facilities to be used during closure will be maintained until they are no longer required.

A permanent closure and reclamation financial security cost estimate has been prepared to a conceptual level with the present Project layout and infrastructure.

1.3 Cost Estimate

The cost estimate covers the closure and reclamation of all Project facilities as described in this ICRP and was prepared using RECLAIM Version 7.0, March 2014, for permanent closure of the Project.

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2.0 SECTION 2 • INTRODUCTION

2.1 Background

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is proposing to develop Whale Tail Pit (referred to in this document as the Project), a satellite deposit located on the Amaruq property, to continue mine operations and milling at Meadowbank Mine. Agnico Eagle is seeking approval to extend Meadowbank Mine to include development of resources from Whale Tail Pit. Concurrent with the reconsideration of the Project Certificate by the NIRB, Agnico Eagle is seeking an amendment to Meadowbank Mine Type A Water Licence (No. 2AM-MEA1525) to include mining of Whale Tail Pit and construction and operations of associated infrastructure from the Nunavut Water Board (NWB).

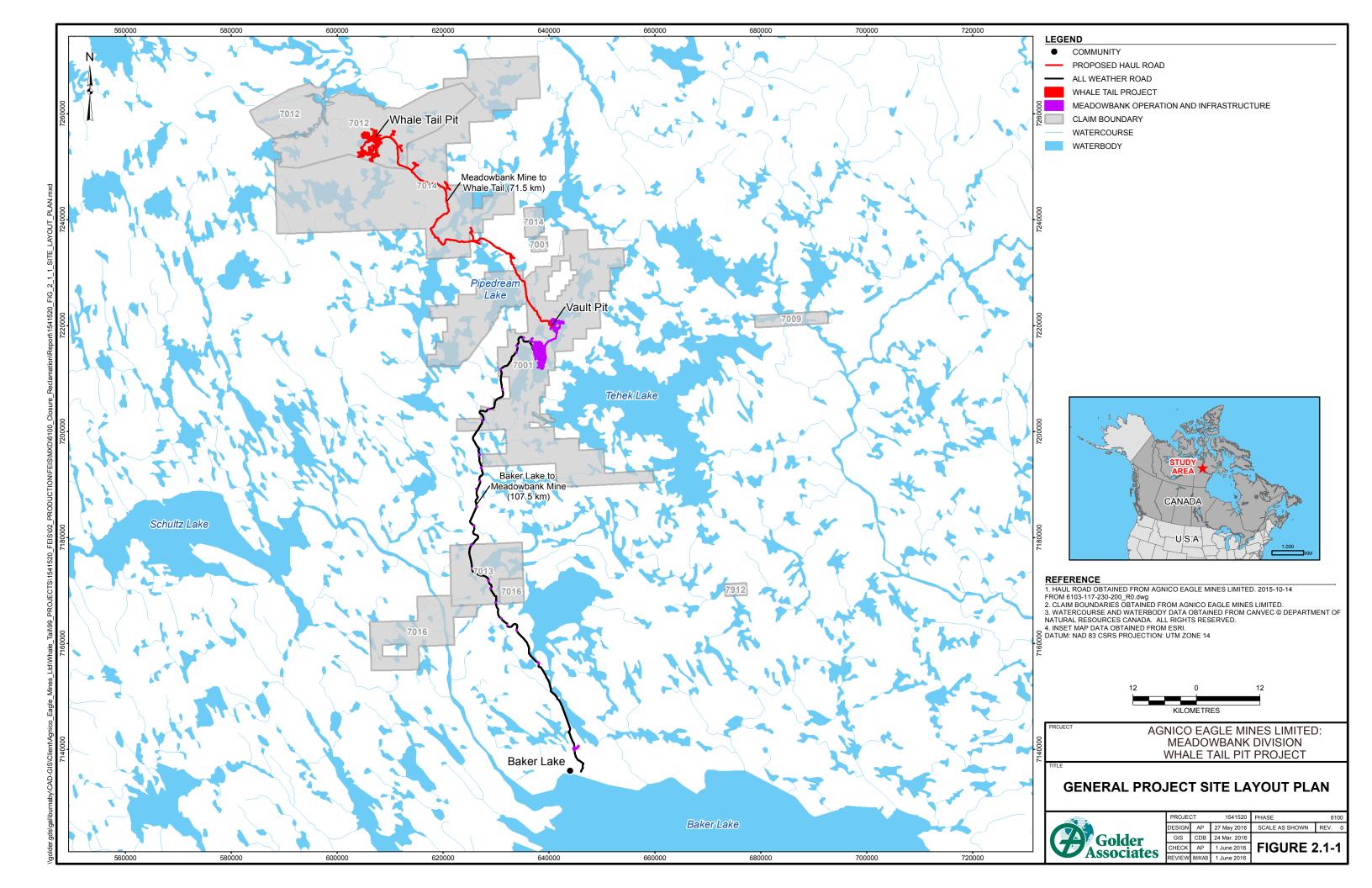
The Project involves construction, operations, and closure, including decommissioning and the rehabilitation of the Project facilities. The Project is 100% owned by Agnico Eagle.

The Amaruq property is located in the Kivalliq Region of Nunavut, Canada, centered at approximately latitude 65° 24′ 36 ″ N, longitude 96° 41′ 41″ W. The property was acquired by Agnico Eagle in April 2013 subject to a mineral exploration agreement with Nunavut Tunngavik Incorporated. The Amaruq property is a 408 square kilometre (km²) site located on Inuit Owned Land approximately 150 kilometres (km) north of the hamlet of Baker Lake and northwest of the Meadowbank Mine (Figure 2.1-1). Inuit Owned Land is governed under the Nunavut Land Claims Agreement (NLCA).

In November 2015, Agnico Eagle received approval to construct an access road under the Type B Water License (2BE-MEA1318), which will connect the Vault Pit to the Amaruq exploration camp site in support of exploration activities. Vault Pit is approximately 8 km northeast of Meadowbank Mine site. The proposed access road will be about 64.1 km long and it will have a top width of 6.5 m. Prior to mining of the Project, Agnico Eagle is proposing to upgrade the proposed access road to accommodate increased traffic rates and haul trucks. (The upgraded road is referred to in this document as the haul road.) No changes are proposed for the existing Meadowbank All Weather Access Road (AWAR) to Baker Lake, or any winter road.

The proposed upgrade of the access road mainly entails widening from the current 6.5 m width to 9.5 m width. Road surfacing will be constructed using waste rock or aggregates from the quarry sites. The access road bridges and culverts were already designed at the exploration stage to accommodate potential for use of the access road as a haul road.





The Whale Tail deposit is partly located within Whale Tail Lake. The proposed approach to develop the pit involves isolating the pit area with three dikes (Whale Tail Dike, Mammoth Dike, and Northeast Dike). The isolated area (referred to in this document as the 'dewatered Whale Tail Lake area' or the 'dewatered area') will be dewatered for the development and operation of the pit. The dewatered water level will be maintained through the life of the Project by diverting most the fresh water that would become in contact with the mine site to other sub-watersheds using diversion channels and by pumping (operational dewatering) the contact water to the WTP for treatment before discharge in Mammoth Lake (Figure 1.1-1).

Ore from Whale Tail Pit will be segregated by grade, the high grade will be crushed on-site and transported to the approved infrastructure at Meadowbank Mine for milling as part of the run of mine operation while the low grade ore will be stockpiled on the low grade ore pad until the end of the mining operation and then crushed on-site and transported to the Meadowbank Mine. Agnico Eagle proposes to dispose the tailings slurry generated by the Project in the Meadowbank Tailings Storage Facilities authorized under the current Meadowbank Mine Certificate and Type A Water Licence.

The Whale Tail Pit will produce approximately 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock and 5.6 Mt of overburden (with very limited organic material) for a total of 51.7 Mt of waste.

There are four phases to the development of the Project:

- **Construction phase:** is anticipated to start in the second quarter of Year -1 (2018) and will focus on site preparation and the construction of infrastructure, with the development of the starter pit to produce construction material. The duration of the construction phase will be about 2 years.
- Operations phase: will span approximately three to four years, from Year 1 (2019) to Year 4 (2022). Mining activities are expected to end in Year 3 (2021) and ore processing is expected to end during the first quarter of Year 4 (2022). During this time reclamation of the WRSF through cover placement will occur progressively.
- **Closure phase:** will occur from Year 4 (2022) to Year 11 (2029) after the completion of mining and will include removal of the non-essential site infrastructure and the back-flooding of the dewatered area to the original Whale Tail Lake water level.
- Post-closure phase: will commence as closure is completed in Year 11 (2029) and will
 continue until Year 17 (2035) or it is shown that the site and water quality meets the
 regulatory closure objectives.

Infrastructure/activities at Meadowbank Mine that support the Whale Tail Pit will be extended for another three years and will remain the same as already approved.

Proposed Project facilities to support the mining activities over the Project life are listed in Section 1.0.

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The Project is regulated by the NWB; which is also responsible for approving Closure and Reclamation Plans in the Nunavut region. This report outlines the Interim Closure and Reclamation Plan (ICRP) for the Project and it has been prepared in terms of an addendum to the current existing ICRP and financial security for Meadowbank Mine. It has been submitted to NWB for review and approval in support of the Type A Water Licence Amendment. This report is Version A of the ICRP for the Project.

This ICRP has been completed following the "Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories" issued by the Mackenzie Valley Land and Water Board (MVLWB) and Aboriginal Affairs and Northern Development Canada (AANDC) in 2013 (MVLWB/AANDC 2013). These Guidelines are an important tool for confirming responsible closure and reclamation at mine sites. This ICRP has also been completed following Agnico Eagle's Closure Plan goals. It also addresses the Mine Site Reclamation Policy for Nunavut (AANDC 2002).

Mine closure is integral to the mine design and this plan is a "living" document that will be modified as the Project progresses. Planning for permanent closure is an active and iterative process, in which the intent is to develop a final plan using adaptive management. The process begins in the mine design phase and continues through to closure implementation. Adaptive management enables the plan to evolve as new information becomes available through analyses, testing, monitoring, and progressive reclamation.

A general layout plan of the Project at end of operations is shown in Figure 1.1-1.

2.2 Purpose and Scope of the Closure and Reclamation Plan

Agnico Eagle has engaged Aboriginal groups and other stakeholders since the early stages of mine planning and closure and reclamation plan development. Their inputs have been considered in the preparation of this ICRP.

The regulatory process for the closure and reclamation planning in the Nunavut region require Agnico Eagle to amend the current existing Meadowbank Mine ICRP when changes to the mine planning are proposed and/or site-specific factors or new information resulting from reclamation research necessitate modifications to closure objectives for example. In this case, the Project will modify the mine planning and therefore this ICRP has been prepared in terms of an addendum to the Meadowbank Mine ICRP in support of the Meadowbank Mine Type A Water Licence Amendment. ICRPs and a Final Closure and Reclamation Plan (FCRP) are required during mining operations (MVLWB/AANDC 2013).

This ICRP is intended to provide NWB with a conceptual level description of all the related closure concepts and closure activities involved for the Project site following suspension of the mine operations, either temporarily or permanently.

The closure concepts and closure activities for the Project presented in this document will be refined through the detailed design and operation phases as additional information and monitoring results

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become available and as additional community feedback is collected through ongoing public consultations. The refined closure concepts and closure activities for the Project will be incorporated in future updates of the current existing Meadowbank Mine ICRP. The ICRP is required to be updated every three years. The FCRP is required two years prior to the end of mining operations, and is to be approved by the NWB by the end of mining operations.

This ICRP does not include fisheries offsetting compensation activities. Independent closure plans and cost estimates for these activities are provided in the following documents which will be amended to include the Project:

- Agnico Eagles Mines Meadowbank Division No-Net-Loss Plan, October 2012;
- Agnico Eagles Meadowbank Mine Draft No-Net-Loss Plan, Implementation Cost Estimate and Construction Schedule, May 2013; and
- No Net Loss Plan (Offsetting) (Ver. 3, October 2013).

The focus of this ICRP for the Project is to:

- provide closure objectives for the Project components;
- describe closure options for temporary and permanent closure;
- identify uncertainties related to the proposed closure objectives, options, or criteria;
- identify post-closure monitoring requirements and responsibilities for the selected closure activities;
- predict the likelihood of potential post-reclamation risks to the environment and human and wildlife health; and
- estimate the closure and reclamation liability costs and financial security.

2.3 Goal of the Closure and Reclamation Plan

The overall goal of closure is to return the proposed Project site and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities. The overall closure goal is supported by the four closure principles of physical stability, chemical stability, no long-term active care requirements, and compatibility with future land uses for each component of the Project.

The closure goals of this ICRP are to:

- preserve shareholder value;
- ensure Agnico Eagle and shareholder goals are included in closure planning;
- address water license Meadowbank Mine Type A Water Licence (No. 2AM-MEA1525) requirements;
- help protect traditional values;
- comply with applicable standards and guidelines requirements and objectives;



- protect public and employee health, safety and welfare using known, safe, and responsible reclamation practices;
- mitigate socio-economic impacts in the area where the mine is located following decommissioning and closure as practically possible;
- give preference to closure solutions that do not require subsequent maintenance ("walk away" solutions) or else solutions that reduce maintenance requirements (example "passive water treatment");
- progressive closure of facilities, whenever possible, spaced out over the operational life of the mine as activities in areas are completed;
- establish conditions that allow the natural environment to recover from mining activities and that are compatible with future uses (including aesthetics and values) as agreed with local government and communities if applicable; and
- reduce costs and long-term liabilities to Agnico Eagle, the government, and the public.

2.4 Closure and Reclamation Planning Team

The proponent of the Project is: Agnico Eagle Mines Limited (Agnico Eagle)

The address for the proponent is: Agnico Eagle Mines Limited

10200, Route de Preissac

Rouyn-Noranda, Quebec JOY 1CO

Canada

The Project site is located at: latitude 65° 24′ 36 ″ N, longitude 96° 41′ 41″ W

Territory of Nunavut, Canada

Acting on behalf of the proponent: Golder Associates Ltd. (Golder)

16820 107 Avenue, Edmonton, Alberta

T5P 4C3, Canada

The contact person for the Project is: Ryan Vanengen

Environment Superintendent – Nunavut

Agnico Eagle Mines Limited

Baker Lake, Nunavut, Canada, XOC 0A0

Ph.: 819.759.3555 x6838

M: 819.651.2974

Email: ryan.vanengen@agnicoeagle.com



2.5 Engagement

Since operation of the mine began, Agnico Eagle has continued public consultation on a regular basis by meeting with communities, local stakeholders, regulatory agencies, and local employees. Effective consultation has provided Agnico Eagle with a better general understanding of the rights, interests, values, aspirations, and concerns of the potentially affected stakeholders and in particular the local population. Through this continued consultation Agnico Eagle has developed an operational culture that recognizes and respects these relevant interests in the planning and executing processes at the Meadowbank Mine.

Consistent with the Whale Tail Pit Final Environmental Impact Statement (FEIS) (Agnico Eagle 2016), Agnico Eagle has documented where, how, why, and with whom it conducted consultation. In addition, Agnico Eagle documented how the information collected from participants was used. Consultation records to date related to the Whale Tail Pit are presented in the FEIS (Volume 1, Agnico Eagle 2016). Records include discussions with the Nunavut Impact Review Board (NIRB), the Kivalliq Inuit Association (KIA), Government of Nunavut (GN), local Hunters' and Trappers' Organizations (HTO), and Fisheries and Oceans Canada (DFO) for example.

2.5.1 Incorporation of Inuit Qaujimajatuqangit

Inuit Qaujimajatuqangit (IQ) was used in the FEIS to enhance the understanding of the environment through literature review, public interaction, and interviews. Interviews were conducted by a local Inuit heritage consultant (Hattie Mannik). Workshops were held with the community and with HTO to help support and clarify the baseline data collected, specifically with regard to caribou migration patterns and fish (FEIS Volume 5, Agnico Eagle 2016). Arctic literature and an examination of other Arctic mining projects also yielded IQ information.

To date Agnico Eagle has conducted a series of engagement activities to gather IQ related to the Meadowbank Mine and associated exploration activities in the region, so that it can be considered and incorporated in all phases of the Whale Tail Pit development. Inuit Qaujimajatuqangit already gathered for the Meadowbank Mine is applicable to the addition of Whale Tail Pit. Supplemental IQ information specific to the Whale Tail Pit expansion was gathered during engagement activities conducted in 2015 (Agnico Eagle 2016).

Consistent with the FEIS, all IQ information collected for the Project was used in all aspects of the Project design, where appropriate. For example, the haul road alignment was adjusted to ensure an archaeological site (i.e., gravesite) identified during the September 2015 consultation session was avoided and respected.

The field crews for the 2015 baseline western base science field programs were supported by local assistants for the collection of IQ. The IQ information collected during the field session was only recorded by field crews, if permission was granted. Through follow-up consultation sessions and/or

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the workshop sessions, information relevant to the study area was marked on maps and recorded, where appropriate.

Agnico Eagle has taken a holistic approach to collecting IQ for the Whale Tail Pit that includes the following:

- reviewing the preceding IQ information relevant to the Project area prior to beginning new studies;
- conducting a IQ workshops with Baker Lake Elders;
- conducting detailed baseline data collection around the proposed Whale Tail Pit and haul road, using western science methods that were informed and partially designed by IQ workshop data, endorsed by local hunters and supported in the field by local Inuit; and
- facilitating the review and verification of IQ information by Elders and HTO members during a site visit (Agnico Eagle 2016).

2.6 Regulatory Instruments for Closure and Reclamation

The Project is located within the Nunavut Territory and is thus subject to the regulatory processes established under the applicable laws and regulations of Canada and of Nunavut.

A FEIS was submitted by Agnico Eagle in June 2016 for the Project.

In the preparation of this ICRP, Agnico Eagle has taken into account the following:

- · comments received during public consultations;
- current existing Meadowbank Mine ICRP including the progressive reclamation activities carried out to date at the mine site;
- Mine Site Reclamation Policy for Nunavut (AANDC 2002);
- Mine Site Reclamation Guidelines for the Northwest Territories (AANDC 2007);
- Abandonment and Reclamation Policy for Inuit Owned Lands; and
- guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories issued by the MVLWB and AANDC (MVLWB/AANDC 2013).

Fisheries protection and pollution prevention measures for the Project are subject to the requirements of the *Fisheries Act* s.35, which states that no person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational, or Aboriginal fishery, or to fish that support such a fishery. The Project is not expected to cause serious harm to fish. Therefore, it is not anticipated that an authorization will be required under the *Fisheries Act* for the proposed Project undertakings, works, or activities. Agnico Eagle intends to follow DFO operational statements for the installation of clear span bridges and culverts.

The overall approach to closure and reclamation planning for the Project conform to accepted practices for mine closure. Selected aspects of closure and reclamation planning completed for other

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mining operations in the Nunavut region have been reviewed and incorporated, where applicable, in the development of this ICRP.

Table 2.6-1 lists the known Federal and Territorial Acts and Regulations applicable to the ICRP. A list of existing authorizations for Meadowbank Mine and the Project is found in Table 2.6-2. Table 2.6-3 outlines the list of primary approval requirements for the Project that Agnico Eagle has identified to date which are also relevant to this ICRP.



Table 2.6-1: Primary Applicable Acts, Regulations, and Guidelines Applicable to Closure and Reclamation

Acts	Regulations	Guidelines		
Federal				
Canadian Environmental Protection Act (1999 c.33)	Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197)	Canadian Council of the Ministers of Environment - Environmental Code of Practice for Aboveground		
	Environmental Emergency Regulations (SOR/2003-307)	and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products		
	Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2002- 301)	Notice with respect to substances in the National Pollutant Release Inventory		
	Release and Environmental Emergency Notification Regulations (SOR/2011-90)	Canada-Wide Standards for Particulate Matter (PM) and Ozone		
		Canada-Wide Standards for Petroleum Hydrocarbons (PHC) In Soil		
Canada Wildlife Act (1985 w9)				
Species at Risk Act (2002 c.29)		Species at Risk Policies		
Canadian Transportation Accident Investigation and Safety Board Act (S.C. 1989, c. 3)	Transportation Safety Board Regulations (SOR/92-446)			
Navigable Waters Protection Act (R.S. 1985 c. N-22)	Navigable Waters Works Regulations (C.R.C., c. 1232)			
	Navigable Waters Bridges Regulations (C.R.C., c. 1231)			
Fisheries Act (R.S.C. c. F-14)	Metal Mining Effluent Regulations (SOR/ 2002-2222)	The Policy for the Management of Fish Habitat		
35. (1) No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.	Marine Mammal Regulations (SOR/93-56)	The Fisheries Protection Policy Statement, 2013 Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting		
Projects that have the potential to obstruct fish passage, modify flow or result in the entrainment of fish may also				

Table 2.6-1: Primary Applicable Acts, Regulations, and Guidelines Applicable to Closure and Reclamation (continued)

Acts	Regulations	Guidelines
cause serious harm to fish. In these situations, an authorization under Subsection 35(2) is required.		
Proponents are responsible for avoiding and mitigating serious harm to fish that are part of or support commercial, recreational or Aboriginal fisheries. When proponents are unable to completely avoid or mitigate serious harm to fish, their projects will normally require authorization under Subsection 35(2).		
Canada Labour Code (R.S.C., 1985, c. L-2)	Canada Labour Standards Regulations (C.R.C., c. 986)	
	Canada Occupational Health and Safety Regulation (SOR/86 304)	os .
Territorial Lands Act (R.S. 1985, c. T-7)	Northwest Territories and Nunavut Mining Regulation (C.R.C., c. 1516)	IS
	Territorial Land Use Regulations (C.R.C. 1524)	
	Territorial Quarrying Regulations (C.R.C. c. 1527)	
Nunavut Waters and Nunavut Surface Rights Tribunal Act (2002, c. 10)	Northwest Territories Waters Regulations (SOR/93/303)	
Nunavut Act (1993 c.28)	Nunavut Archaeological and Paleontological Site Regulations (SOR/2001-220)	es s
Nunavut Land Claims Agreement Act (1993, c. 29)		

Table 2.6-1: Primary Applicable Acts, Regulations, and Guidelines Applicable to Closure and Reclamation (continued)

Acts	Regulations	Guidelines				
Territorial – Nunavut						
Environmental Protection Act (RSNWT (Nu) 1988, c E-7)	Spill Contingency Planning and Reporting Regulations (NWT	Guideline on Dust Suppression				
	Reg (Nu) 068-93)	Guideline for the General Management of Hazardous Waste in Nunavut				
		Environmental Guideline for Waste Asbestos				
		Guideline for Industrial Waste Discharges in Nunavut				
		Guideline for Industrial Projects on Commissioner's Land				
Historical Resources Act (RSNWT (Nu) 1988, c H-3)						
Territorial Parks Act (RSNWT (Nu) 1988, c T-4)	Territorial Parks Regulations (RRNWT (Nu) 1990 c T-13)					
Wildlife Act (RSNWT (Nu) 1988, c W-4)	Wildlife General Regulations (NWT Reg (Nu) 026-92)					
	Wildlife Licences and Permits Regulations (NWT Reg (Nu) 027-92)					
	Wildlife Management Barren-Ground Caribou Areas Regulations (NWT Reg (Nu) 099-98)					
	Wildlife Management Zones Regulations (RRNWT (Nu) 1990 c W-17)					
	Wildlife Regions Regulations (NWT Reg (Nu) 108-98)					
Commissioner's Land Act (RSNWT 1988, c C-11)	Commissioner's Land Regulations (RRNWT 1990, c C-13)					
Mine Health and Safety Act (SNWT (Nu) 1994, c 25)	Mine Health and Safety Regulations (NWT Reg (Nu) 125-95)					

Table 2.6-2: List of Existing Licenses/Permits for the Project

Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
66A/8-71-2	Land Lease	INAC	All Weather Private Access Road construction, operation, maintenance and reclamation	Active	01-Jan-07	31-Dec-21	
66A/8-72-2	Land Lease	INAC	Quarrying for the AWPAR	Active	01-Jan-07	31-Dec-16	
08-HCAA-CA7-00039	Freshwater Intake Pipe Screen Approval	DFO	Freshwater Intake Pipe at Exploration Camp	Active	06-Jan-09		No obligations or renewal deadlines. Approval does not have expiry date.
08-HCAA-CA7-00040 (NU-08-0040)	Freshwater Intake Pipe Screen Approval	DFO	Freshwater Intake Pipe at Meadowbank Camp	Active	06-Jan-09		No obligations or renewal deadlines. Approval does not have expiry date.
NU 03-191 s30	Freshwater Intake	DFO	Freshwater Intake at Emulsion plant	Active	16-Nov-09		No obligations or renewal deadlines. Approval does not have expiry date.
FWISL-ACC-07-08-056	Animal Use Protocol	DFO		Expired		31-Mar-08	
FWI-ACC-2009-027	Animal Use Protocol	DFO		Expired	04-Jun-09	31-Dec-09	
FWI-ACC-2008-2009-054	Animal Use Protocol	DFO		Expired	07-Jul-08	31-Mar-09	
FWI-ACC-2008-2009-064	Animal Use Protocol	DFO	······	Expired	31-Jul-08	31-Mar-09	
FWI-ACC-2010-022	Animal Use Protocol	DFO	······	Expired	09-Jun-10	31-Dec-10	
FWI-ACC-2011-025	Animal Use Protocol	DFO		Expired	17-Jun-11	31-Dec-11	
FWI-ACC-2012-038	Animal Use Protocol	DFO		Expired	13-Jun-12	01-Oct-12	
FWI-ACC-2013-033	Animal Use Protocol	DFO		Expired	11-Jun-13	01-Nov-13	
FWI-ACC-2015-021	Animal Use Protocol	DFO		Expired	11-Jun-15	01-Dec-15	

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Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
S-08/09-1042-NU	Licence to fish for scientific purposes	DFO		Expired	11-Aug-08	31-Oct-08	
S-08/09-1040	Licence to fish for scientific purposes	DFO		Expired	14-Jul-08	30-Sep-08	
S-09/10-1027-NU	Licence to fish for scientific purposes	DFO		Expired	24-Jun-09	30-Sep-09	
S-10/10-1011-NU	Licence to fish for scientific purposes	DFO		Expired	17-Jun-10	15-Oct-10	
S-11/12-1015-NU	Licence to fish for scientific purposes	DFO		Expired	15-Jun-11	15-Oct-11	
S-11/12-1042-NU	Licence to fish for scientific purposes	DFO		Expired	10-Aug-11	31-Aug-11	
S-12/13-1023-NU	Licence to fish for scientific purposes	DFO		Expired	15-Jun-12	30-Sep-12	
S-13/14-1010-NU	Licence to fish for scientific purposes	DFO	AWPAR and on-site fisheries monitoring including CREMP	Expired	15-Jun-13	15-Oct-13	
S-13/14 3018-YK	Licence to fish for scientific purposes	DFO	Vault Fishout	Expired	15-Jul-13	31-Mar-13	
S-15/16-1012-NU	Licence to fish for scientific purposes	DFO	AWAR and habitat compensation work	Expired	30-Jun-15	31-Jan-16	
NU-03-0190	HADD Authorization - AWPAR (amendment #1 and #2)	DFO	AWPAR - Infilling of fish habitat as a result of water crossing construction affecting a total of 0.53 HU / 2,793 m ³ of fish habitat	Expired	02-May-07	31-Dec-08	
NU-03-0191	HADD Authorization - Mine Site. <i>Fisheries Act</i> Authorization	DFO	Infilling of fish habitat as a result of infilling and dewatering of Second	Expired	30-Jul-08	15-Dec-15	

Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
			and Third Portage Lakes - dikes and pits + airstrip extension				
NU-03-0191.02	s.32 <i>Fisheries Act</i> Authorization - Meadowbank Dewatering Bay Goose	DFO	Authorization for the fish destruction by means other than fishing during the dewatering of Bay Goose impoundment area in Third Portage Lake	Expired	22-Feb-11	31-Jul-12	
	Portage Pit and Bay		Second Portage Lake: Dewatering, excavation, dike and road footprint (east and central dikes) and in water placement of coarse material				
NU-03-0191.03 Goose Fisheries Act Authorization	DFO	Third Portage Lake: Dewatering, excavation, road footprint, Bay Goose and South Camp Dike footprints and in water placement of coarse material	Active	05-Mar-13	31-Dec-17		
NU-03-0191.04	Vault <i>Fisheries Act</i> Authorization	DFO	Dewatering, excavation, dike construction and placement of course material in Vault Lake basin	Active	02-Apr-13	31-Dec-17	
NU-08-0013	HADD Authorization - Western Channel	DFO	Infilling of fish habitat as a result of a temporary culvert installation	Expired	28-May-08	13-Jun-08	

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Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
			affecting 1.01 HU on the westernmost channel connecting 2PL and 3PL				
NU-08-0052	Authorization for destruction of fish	DFO	Fisheries Act Sec.32 - destruction of fish arising from dewatering of NW arm of 2PL	Expired	02-Mar-09	31-Dec-10	
NU-10-0049	Vault Culvert Crossing	DFO	Vault Culvert Crossing	Active	25-Jan-11		No end term
MMER Sec 27.1 Approval TIA (08-HCAA-CA7-00191)	Letter of Approval	DFO	Authorization for deposition of tailings in TIA. Approval of Compensation Plan.	Active	14-Jan-10		TIA Habitat Compensation Plan
DvlptPA	Development Partnership Agreement	GN	700,000 m ³ /annually - mining, milling & associated activities, operation of Baker Lake Facilities, operation of AWPAR	Active	17-Feb-07	17-Feb-22	As per article 11.1, Agreement remains in force until completion of Closure and Reclamation
L-51260	Baker Lake Marshalling Area	GN	Marshalling Facility; tank farm, explosive area, access road.	Active	01-Mar-10	01-Mar-13	Permit renewal on going
L-51261	Baker Lake Marshalling Area, Land Lease	GN	Baker Lake Spud Barge	Active	01-Mar-10	01-Mar-20	
L-51262	Baker Lake All Weather Private Access Road Section	GN	Municipal Lands portion of Tahek Lake AWPAR, Baker Lake, Nunavut	Active	01-Mar-10	01-Mar-20	
LUP-06-603-001 (a)	Land use permit	GN	AWPAR construction	Expired			
QP-06-603-001 (a)	Quarry Permit	GN	AWPAR Quarry 1: authorization to take 85,388m ³ of quarries bedrock - granite	Expired			

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Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
603-0-LUP-07-001	Land use permit	GN	Baker Lake Marshalling Area	Expired	01-May-07	01-May-08	
WL-2012-050	Wildlife Research Permit	GN	Ground survey of birds, nest, raptors, other animals, and wildlife signs. Must submit report at end of study	Expired	01-Jun-12	31-May-12	
WL-2014-055	Wildlife Research Permit	GN	Ground survey of birds, nest, raptors, other animals, and wildlife signs. Must submit report at end of study	Expired	1-Aug-14	31-Jul-15	
WL-2015-058	Wildlife Research Permit	GN	Ground survey of birds, nest, raptors, other animals, and wildlife signs. Must submit report at end of study	Expired	1-Jun-15	1-Jun-16	
WL-2016-044	Wildlife Research Permit	GN	Ground survey of birds, nest, raptors, other animals, and wildlife signs. Must submit report at end of study	Active	1-Jun-16	30-Jun-17	
Memorandum of Understanding	Wildlife Research	GN	GN has requested that the Proponent participate in the Kivalliq Ungulate Monitoring Program and the Proponent desires to work collaboratively and in good faith to increase the common knowledge	Active	11-Sep-13	11-Sep-16	

Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
			of caribou and muskoxen for mutual benefit.				
IIBA	Inuit Impact Benefit Agreement	KIA	Inuit Impact Benefit Agreement	Expired	25-Mar-06	23-Jun-11	Reviewed every third year for material change and automatically renewed for a subsequent 3 year term
IIBA	Inuit Impact Benefit Agreement	KIA	Inuit Impact Benefit Agreement	Expired	23-Jun-11	23-Jun-14	Reviewed every third year for material change and automatically renewed for a subsequent 3 year term
IIBA	Inuit Impact Benefit Agreement	KIA	Inuit Impact Benefit Agreement	Active	23-June-14	23-June-17	Reviewed every third year for material change and automatically renewed for a subsequent 3 year term
KVCA06Q11	Quarry Permit - AWPAR	KIA	Quarrying for All Weather Private Access Road, 254,546 m ³ of material	Active	02-Feb-07	31-Dec-21	Permit expires in 2022 or when the specified amount of material has been quarried
KVCA09Q09	Quarry Permit	KIA	Removal of 50,000 m ³ of gravel material - sand quarry for concrete production	Expired	03-Mar-09	03-Mar-11	Expires within 24 months or when material has been quarried
KVCA08Q10	Quarry Permit	KIA	Removal of 250,000 m ³ of gravel, sand, loam,	Expired	15-May-08	15-May-12	Expires 12 months from the date hereof

Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
			mining backfill or shot rock from the land				or when material has been quarried
KVPL08D280	Surface Production Lease (Amendment #1 and #2)	KIA	Surface Production Lease: Construction, operation and closure of the mine on Inuit owned land	Active	24-Jul-08	31-Dec-27	Production Lease Amended #1 Feb. 9th, 2009 ; Production Lease Amended #2 May 2, 2013
KVRW06F04	Right of Way Agreement - AWPAR (amendment #1)	KIA	All Weather Private Access Road (and Quarry - KVCA06Q11)	Active	01-Jan-07	31-Dec-21	
KVRW09F05	Right of Way Authorization	KIA	Winter Access Road for sand quarry	Expired	03-Mar-09	31-May-11	ROW expires one year before the sand quarry
Mine Water Comp Agrmt	Water Compensation Agreement - Mine	KIA	Compensation for water consumption at Meadowbank site and any changes in water quality, quantity or flow due to project activities	Active	14-Apr-08		Agreement terminates with C&R when KIA provides a letter of clearance
Road Water Comp Agrmt	Water Compensation Agreement - Road (amendment #1)	KIA	Compensation where development and operation of AWPAR has substantial effect on water quality, quantity or flow	Active	29-Jan-08		Agreement terminates following C&R of the road and all IOL affected by road
PC_NIRB-004	Project Certificate + modification condition 32	NIRB	Approval for the Meadowbank Project to proceed subject to its Terms & Conditions	Active	30-Dec-06	31-Dec-21	change in Condition 32 in September 15, 2010 (ATV access on AWPAR)
							Removal of condition 48 and changes to



Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
							condition 49 and 53 related to Phaser Lake (NIRB decision on April 18, 2016)
03-023-10N-M	Scientific Research License	NRI	Wind Data Collection	Expired	01-Jan-10	31-Dec-10	Multi-year license for January 1, 2010 - October 29, 2011 but needs to renewed each year
BL14-001-PL Vault	Subsurface Production Lease	NTI	Vault	Active	01-Jul-12	01-Jul-17	
2AM-MEA0815	Water License + Modification East Dike + Modification Airstrip + Amendment Fuel Tank Baker Lake	NWB	700,000 m³ annually - Milling, mining and associated activities at the Meadowbank Project site Amendment freshwater use permit – 1,870,000 m³ in 2013 and 1,150,000 m³ thereafter	Expired	10-Jul-08	31-May-15	Approved by the Minister on July 10, 2008 Modification East Dike approve on July 3, 2013 Modification Airstrip approved in 2012 Amendment Fuel Tank Baker Lake on May 5, 2010
2AM-MEA0815	Short Term Water Licence	NWB	Same conditions as the approved 2008 water licence and amendment	Expired	20-April-15	27-Nov-15	Short term licence while waiting for the water licence renewal

Permit/License	Туре	Licensor	Approved Ops	Status	Begin of Term	End of Term	Comments
2AM-MEA1525	Renewed Water Licence	NWB	2,350,000 m ³ annually up to December 31 2017 and 4,935,000 m ³ annually starting in 2018 through to the Expiry of the License- Milling, mining and associated activities at the Meadowbank Project site	Active	23-Jul-15	22-Jul-25	

INAC = Indigenous and Northern Affairs Canada (formally Aboriginal Affairs and Northern Development Canada); DFO = Fisheries and Oceans Canada; GN = Government on Nunavut; KIA = Kivalliq Inuit Association; NRI = Nunavut Research Institute; NTI = Nunavut Tunngavik Incorporated; NWB = Nunavut Water Board; m³ = cubic metres.

Table 2.6-3: Primary Project Approval Requirements

Permit/Approval Legislation	Administering Agency	Project Activity			
Project Certificate NLCA (Article 12)	NIRB	Project approval			
Inuit Impact and Benefit Agreement NLCA (Article 26)	KIA	Project commencement			
Mineral Production Lease	Nunavut Tunngavik Inc.	Required for mineral production			
Inuit Water Rights Compensation Agreement NLCA (Article 20)	KIA	May be required			
Water Licence Nunavut Waters and Nunavut Surface Rights Tribunal Act	NWB	Required for water use and waste disposal			
Class 1/Class 2 Archaeology Permit Nunavut Archaeological and Paleontological Sites Regulations	Government of Nunavut Department of Culture, Language, Elders and Youth (CLEY)	Required to conduct archaeology research and to mitigate archaeologi sites to allow development to occur			
IOL – Commercial Land Use Lease or Right of Way NLCA	KIA	Long-term land tenure required for land use on Inuit Owned Lands; land required for infrastructure, roads and activities associated with construction, operations, and closure phases			
IOL – Quarry Lease/Permit NLCA	KIA	Required for quarrying of material on Inuit Owned Lands during construction, operation and closure			
Crown Land – Lease/Land Use Permit Territorial Lands Act Territorial Land Use Regulations	INAC	Required for quarrying of material on Crown land during construction, operation and closure			
Approval and/or Exemption Navigable Waters Protection Act (sections 5, 22 and 23)	Transport Canada	Construction of works in navigable waters. Prescriptions of Sections 22 and 23 of the Navigable Waters Protection Act will be followed as necessary.			
Fisheries Authorization for Harmful Alteration Disruption or Destruction (HADD) of Fish or Fish Habitat	Fisheries and Oceans Canada (DFO)	Required if HADD cannot be avoided; if HADD can be avoided, DFO may provide a letter of advice outlining best management practices			

Permit/Approval Legislation	Administering Agency	Project Activity	
Fisheries Act (section 35)			
Licence for a Factory and Magazine Explosives Act and Regulations	Natural Resources Canada	Required for construction of explosives factories and magazine(s) and storage of explosives	
Permit to Store Detonators Explosives Use Act Mine Health and Safety Act and Regulations	Nunavut Mine Health and Safety Nunavut Workers Compensation Board	Required to store detonators in a magazine	
Explosive Use Permit Explosives Use Act Mine Health and Safety Act and Regulations	Nunavut Mine Health and Safety Nunavut Workers Compensation Board	A permit is required to use explosives unless used in accordance with the regulations	
Spill Contingency Plan Approval Environmental Protection Act Spill Contingency Planning and Reporting Regulations	Nunavut Department of Environment (DoE)	A Spill Contingency Plan must be filed with the Chief Environmental Protection Officer to store fuel in an above-ground facility with a 20,000 capacity or greater	
Assorted Scientific Research Permits Scientist Act Wildlife Act	Nunavut Research Institute	Required to conduct some of the environmental monitoring activities	

2.7 Related Management Plans

This Plan should be read in conjunction with the following key plans submitted as part of the Type A Water Licence Amendment Application:

- Water Management Plan;
- Mine Waste Rock and Tailings Management Plan;
- Landfill Design and Management Plan; and
- Road Management Plan (including Quarry Management Plan).

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3.0 SECTION 3 • ENVIRONMENT

This section provides a detailed description of the pre-disturbance conditions and the current development status of the Project).

3.1 Atmospheric Environment

3.1.1 Climatic Conditions

Climate characteristics for the Project presented herein were extracted from the 2015 Hydrology Baseline Report (Golder 2016a), Section 5.3 – Terrain, Permafrost, and Soils of the FEIS (Agnico Eagle 2016) and the Water Management Plan in Appendix 8-B.2 of the FEIS (Agnico Eagle 2016).

The site is located at the southern limit of the Northern Arctic terrestrial ecozone, with a Low Arctic ecoclimate (Golder, 2016a). This ecoregion is classified as a polar desert and is characterized by long cold winters and short cool summers (Agnico Eagle 2016).

The Baker Lake A meteorological station (ID: 2300503) operated by Environment Canada located approximately 125 km southeast of the Project was selected to represent conditions at the Project site. Long-term (1981 to 2010) meteorological records from the Baker Lake A meteorology station record average daily air temperature in June to September of approximately 7 degree Celsius (°C) with October to May average daily air temperatures of -20.6 °C (Agnico Eagle, 2016). The mean annual air temperature at the Project site is approximately -11.3 degrees Celsius (°C). The monthly average temperature ranges from -31.3°C in January to +11.6°C in July, with above-freezing averages for only four months of the year (i.e., June to September (Agnico Eagle, 2016).

Total annual precipitation at Baker Lake station is low, averaging just 249 millimetres (mm) per year, with 59% of precipitation falling as rain, and 41% falling as snow. (Agnico Eagle 2016). Table 3.1-1 summarizes estimated monthly climate characteristics at the Project site. Average annual evaporation for small waterbodies in the Project area is estimated to be 248 mm between June and September. The average annual loss of snowpack to sublimation and snow redistribution is estimated 29% of the total precipitation for the winter period and occurs between October and May.

Winds are predominately from the northwest and exceed 20 kilometres per hour (km/hr) more than 25% of the time (Agnico Eagle 2016).

Short-duration rainfall, representative of the Project are presented in Table 3.1-2, based on Intensity-duration-frequency (IDF) curves available from the Baker Lake A meteorological station (1987-2006) operated by Environment Canada (Agnico Eagle, 2016).



Table 3.1-1: Estimated Mine Site Monthly Climate Characteristics (Agnico Eagle 2016)

Month ^(a)	Monthly Air Temperature (°C)	Monthly Precipitation ^(b) (mm)			Lake Evaporation	Snow Sublimation
		Rainfall	Snowfall ^(c)	Total	(mm)	(mm)
January	-31.3	0	7	7	0	9
February	-31.1	0	6	6	0	9
March	-26.3	0	9	9	0	9
April	-17.0	0	13	13	0	9
May	-6.4	5	8	13	0	9
June	4.9	18	3	21	9	0
July	11.6	39	0	39	99	0
August	9.8	42	1	43	100	0
September	3.1	35	7	42	40	0
October	-6.5	6	22	28	0	9
November	-19.3	0	17	17	0	9
December	-26.8	0	10	10	0	9
Annual	-11.3	146	103	249	248	72

Note: Some numbers may not add due to rounding.

Table 3.1-2: Estimated Mine Site Extreme 24-hour Rainfall Events (Agnico Eagle 2016)

Return Period (Years) ¹	24-hour Precipitation (mm) ¹		
2	27		
5	40		
10	48		
25	57		
50	67		
100	75		
1000	101		

Notes:

IDF curve values obtained from the Water Management Plan Report in Appendix 8-B.2 of the FEIS (Agnico Eagle 2016).

IDF curve values for return period higher than 100 years were computer based on Gumble probability distribution and the method of moments.

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⁽a) Climate characteristics obtained from the Water Management Plan Report in Appendix 8-B.2 of the FEIS (Agnico Eagle, 2016).

⁽b) The Baker Lake A precipitation data were available between 1946 and 2015 (excluding 1973 and 1993). Smaller data gaps were filled using the average values from available years for the same day and month.

⁽c) Snowfall was estimated as total precipitation minus rainfall.

3.1.2 Climate Change

Climate Change characteristics for the Project presented herein were extracted from Section 5.3 – Terrain, Permafrost, and Soils of the FEIS (Agnico Eagle 2016) and Water Management Plan in Appendix 8-B.2 of the FEIS (Agnico Eagle, 2016).

The climate in the Arctic is changing faster than at mid-latitudes (IPCC 2014). The most recent set of climate model projections (CMIP5) predict an Arctic-wide year 2100 multi-model mean temperature increase of +13°C in late fall and +5°C in late spring under the IPCC's "business as usual scenario" (RCP8.5). IPCC climate change mitigation scenario RCP4.5 results in a year 2100 multi-model Arctic wide prediction of +7°C in late fall and +3°C in late spring (Overland et al. 2013). The effects of changes of this magnitude to terrestrial, aquatic and marine ecosystems, social and economic systems of the Arctic are an active area of research. However, the short duration of the proposed Project means that climate change related effects to the Project are likely negligible.

Permafrost is sensitive to climate change and an increase in air temperature will likely cause natural permafrost degradation. The sensitivity of permafrost to climate warming in Canada has been assessed by Smith and Burgess (1998, 2004) by categorizing the response of ground thermal conditions to climate and the effects of permafrost thaw on terrain stability. The impacts of the warming and thaw of permafrost will be most important in areas of ice-rich permafrost. The Project is within the continuous permafrost zone, and the ground ice content is reported to be between 0 and 10% (Heginbottom et al. 1995). Within the Project area, permafrost is regionally predicted to be moderately thermally sensitive to climate change, with a low to moderate physical response resulting from thaw (Smith and Burgess 2004).

3.1.3 Air Quality

The baseline air quality was characterized through a review of the publicly available Canadian Arctic air quality monitoring data. The Canadian Arctic air quality monitoring data were analyzed using statistics to estimate background concentrations of criteria air contaminants (Golder, 2015a). Background concentrations of particulate matter smaller than 2.5 micrometers (i.e., $PM_{2.5}$) were calculated as 6.6 microgram per cubic meter ($\mu g/m^3$) for the 24-hr period for the 90^{th} percentile and 3.6 $\mu g/m^3$ for the average annual (between 8.8 to 28 of the Canadian Ambient Air Quality Standards) (Agnico Eagle, 2016). Background concentrations for gases including carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide were calculated as 0.3 $\mu g/m^3$, 5.0 $\mu g/m^3$, 17.3 $\mu g/m^3$ - 30.6 $\mu g/m^3$ and 1.0 $\mu g/m^3$ for the 1-hour period of the 90^{th} percentile respectively (Agnico Eagle, 2016).

3.1.4 Noise

Noise and vibration characteristics for the Project presented herein were extracted from Section 4.4 – Noise and Vibration of the FEIS (Agnico Eagle 2016) and Golder (2015b). To gather information about existing ambient noise levels in support of the Project noise impact assessment, a baseline field survey was completed in August 2015. The purpose of this baseline field survey was to measure existing

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ambient noise levels at four locations in the Local Study Area (LSA) and Regional Study Area (RSA). The results of the baseline field survey are described in detail in Volume 4 of the FEIS.

The baseline noise results indicate that the baseline noise levels in the area of the proposed Project, except for the area adjacent to Vault Pit operations, are primary influenced by noise generated by natural noise sources, (e.g., wind, waves, birds). The baseline daytime and nighttime noise levels from natural sources varied between 29 decibels (i.e., dBA) and 31 dBA for daytime, and between 29 dBA and 31 dBA for nighttime (Golder, 2015b).

3.2 Physical (Terrestrial) Environment

3.2.1 Topography and Lake Bathymetry

The topography surrounding the Project is generally flat with local surface relief of up to 20 m. The low terrain of the area has resulted in a diffuse drainage pattern. High flows are observed during spring runoff, while low flows and dry stream channels are typical in late summer. Whale Tail Lake drains to the south via a network of low lying lakes.

The following characteristics of Whale Tail Lake are based on a bathymetry survey completed in 2015 (provided by Groupe Conseil Nutshimit-Nippour, 2015).

- The lake elevation was measured at 152.4 meters above sea level (masl) in August 2015.
- The depth of the lake in the northwest end of the lake, in the vicinity of the pit, ranges from 1 to 16 m.
- The lake bottom is terraced. The terraces extend out from the shoreline for a distance of between 1 m and 150 m. Beyond the terrace is an abrupt drop-off.

Mean annual temperatures from the bottom of the lakes in Nunavut and North West Territories (that do not freeze in winter) are 4°C.

Regional lake ice characteristics were reviewed using the Canadian Ice Database. The closest reference to Whale Tail Lake is Baker Lake (120 km to the south), which records a mean maximum lake ice thickness of 2.25 m (data from 1957 to 1990). It is expected that the mean ice thickness over Whale Tail Lake is within this range.

3.2.2 Terrain and Soil

Terrain and soil characteristics for the Project presented herein were extracted from Section 5.3 – Terrain, Permafrost, and Soils of the FEIS (Agnico Eagle 2016). In general, the local surficial geology shows strong evidence of glacial activity. The area is dominated by veneers and blankets of till overlying undulating bedrock. Bedrock frequently outcrops in isolated exposures, elevated plateaus and elongated ridges. The southern part of the haul road is controlled more by the underlying bedrock than the Whale Tail Pit where thicker till deposits are more common. A large glaciofluvial esker and

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terrace complex is found in the northeast part of the Whale Tail Pit and extends towards the southeast intersecting at or close to the haul road in several areas. Lakes and ponds are abundant throughout the LSA, occupying approximately 16% of the area.

Soils within the LSA are dominated by Cryosols (in particular Turbic Crysols) which develop on till dominated landscapes. Saturated soil layers overlying frozen layers were observed in Turbic and Static Cryosols during the 2015 field survey (Agnico Eagle, 2016), and were also noted in CRL (2005b). Other soils identified within the LSA include Brunisols, which are most prevalent on glaciofluvial material (e.g., eskers), Gleysols, which develop on till in transition areas between upland and depressional landscape positions, and Regosols, which are poorly developed soils. Organic Cryosolic soils were found in wetlands.

Soil erosion risk is a primary concern for disturbed soils because the sparse vegetation cover exposes soil materials to the elements (e.g., wind and water). Field results suggest that the mineral soils in the LSA are predominantly acidic to neutral, ranging from pH 5.14 to 6.96, with pH tending to increase with soil depth. Due to their mineralogy, the mineral soils in the Project area are increasingly sensitive to adverse effects due to acid deposition with decreasing baseline pH.

The coarse-textured soils commonly found in the LSA, with their higher initial total porosity, are relatively resistant to compaction compared to finer textured soils found in other geographies. Soil compaction influences the success of reclamation by decreasing plant establishment and plant growth. Soil changes due to compaction causes shifts in the microbial community, impedes root growth and seedling establishment, decreases water, air and nutrient movement, and reduces plant productivity (Agnico Eagle, 2016).

3.2.3 Geotechnical Characteristics

Geotechnical characteristics for the Project presented herein were extracted from the Amaruq Dikes Pre-Feasibility Study – Geotechnical Investigation Report (Agnico Eagle 2015a), the Geotechnical and Water Management Infrastructure Report (SNC 2015) and the Geochemistry report (Golder 2016b). A geotechnical site investigation program was carried out at the Project site in May 2015 in the areas of the proposed alignment for the Whale Tail Dike and the Mammoth Dike.

A total of 14 geotechnical boreholes were drilled. Of these, eleven were in the Whale Tail Dike area, and these holes were drilled from the iceon Whale Tail Lake. The other three boreholes were located in the Mammoth Dike area. Three thermistors were installed (i.e., two on Whale Tail Dike area and one on Mammoth Dike area) during the site investigation program.

The results from the geotechnical investigation revealed that the bedrock is encountered at shallow depth along the proposed alignment of both structures. An esker at the west abutment of the Whale Tail Dike has been identified.

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The underlying overburden material encountered a till deposit underlain by bedrock in most of boreholes. The till deposit consisted mainly of a sand and gravel some silt matrix, with cobbles and boulders. The till thickness ranged between 0.4 m and 3.7 m. The bedrock was encountered at depths between 1.9 m and 6.6 m under Whale Tail Lake.

Overburden in the Whale Tail Pit area is expected to be similar to that of the Meadowbank Mine. At the Meadowbank Mine, overburden consists of glacial till having an average thickness of 2.75 m, with local deposits over 10 m thick (CRL, 2003). The glacial till varies from silty sand to gravel with minor boulders (Golder 2002). In a previous report (Golder 2005), overburden is described as silty to sand-sized with 25 to 50% pebble to boulder-sized particles. Where sampled at Whale Tail Pit (in July), the overburden was frozen below 1 meter depth, and samples were collected in the surficial unfrozen zone only.

3.2.4 Permafrost

Permafrost characteristics for the Project presented herein were extracted from Section 5.3 – Terrain, Permafrost, and Soils of the FEIS (Agnico Eagle, 2016), Section 6.2 – Hydrogeology of the FEIS (Agnico Eagle 2016) and Water Management Report in Appendix 8-B.2 of the FEIS (Agnico Eagle 2016).

The Project site is located within a region of continuous permafrost. In this region, the layer of permanently frozen subsoil and rock is generally deep and overlain by an active layer that thaws during summer. The depth of the active layer is estimated to range between 1 and 3 m. Permafrost thickness (defined by the depth of zero degree isotherm in the baseline study area is expected to be approximately 425 m below ground surface (Agnico Eagle 2016). Below Whale Tail Lake, a talik is expected to form a continuous channel that is closed in the northern portion of Whale Tail Lake below the open pit and becomes open towards the south and central portion of the lake. Circular lakes with a radius greater than 300 m, or elongated lakes with a half-width of at least 150 m, are assumed to be connected to the deep groundwater flow regime through open taliks.

Periglacial processes are evident throughout the landscape in the form of frost shattered bedrock, sorted and non-sorted polygons, mud boils, ice wedge polygons and solifluction. Detailed descriptions of these processes are provided in Volume 5, Appendix 5-A of the FEIS in Agnico Eagle (2016). The typical permafrost ground temperatures at the depths of zero annual amplitude (typically at the depth of below 15 m) is approximately -8.0 °C in the areas away from lakes and streams (Agnico Eagle 2016). The geothermal gradient measured is 0.02 °C/m (Agnico Eagle, 2016). Late-winter ice thickness on freshwater lakes is approximately 2.0 m. Ice covers usually appear by the end of October and are completely formed in early November. The spring ice melt typically begins in mid-June and is complete by early July.



3.2.5 Hydrology

Hydrology characteristics for the Project presented herein were extracted from Section 6.3 – Surface Water Hydrology of the FEIS and Appendix 6-C (Agnico Eagle 2016). The Hydrology Baseline Study included characterization of local watersheds and drainage patterns, flow regimes, and lake shoreline and outlet channel geomorphology, based on a desktop review of available data and five field visits in May (during frozen conditions), June, July, August, and in September 2015.

The Project site, and specifically the haul road, is located within the Meadowbank River, Quoich River, and Thelon River watersheds. Three distinct watersheds within the Hydrology baseline study area were defined as the A watershed (i.e., where Whale Tail and Mammoth Lake are located) with a total drainage area of 110 km², the B watershed (i.e., located just north of the A watershed, and west of Nemo Lake) with a total drainage area of 7.1 km², and the C watershed (i.e., where Nemo lake is located) with a total drainage area of 17.6 km². The proposed Mine Site is located within the A watershed and Lake A16 (i.e., Mammoth Lake) and the water management activities are planned in the A watershed, and the C watershed. These three watersheds each drain into Lake DS1. See Figure 3.2-1 for the hydrology baseline study area. These watersheds comprise an extensive network of lakes, ponds, and interconnecting streams, and have lake water surface fractions (i.e. the ratio of lake surface area to watershed area) of 16% (A watershed) and 23% (C watershed).

Two types of hydrometric stations were installed in 2015, including six continuous hydrometric stations equipped with data loggers and sixteen (16) manual hydrometric stations, primarily reliant on discrete discharge and water level measurements and visual observations.

Derived mean annual water yields for lakes varied between 86 mm (i.e., Lake C38 – Nemo Lake) and 230 mm (Lake A69). The lower water yields at Lake C38 may be attributed to proportions of ineffective areas in the watersheds and the potential for shallow subsurface flow to convey water outside the assumed drainage boundaries.

The majority of the shorelines surveyed exhibit a consistent terrain type related to shorelines that have developed in morainal material. These morainal shorelines were observed at all lakes visited during the field survey. Limited areas of bedrock and shallowly sloped sandy shorelines were also observed. As a general characteristic for the surveyed shorelines, the predominant materials are boulder gardens with cobble with very limited soils or organic materials on top. The outlet channels are short relative to lake dimensions, with a low sinuosity and exhibit the same characteristics for streambed materials. This results in interstitial between large boulders or below the surface likely close to the bedrock, making low and moderate flows difficult to observe and measure.



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