



# **AGNICO EAGLE**

**MELIADINE GOLD MINE**

## **Ore Storage Management Plan**

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**DECEMBER 2022  
VERSION 4\_NWB**

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**EXECUTIVE SUMMARY**

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Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Gold Mine (Meliadine), located approximately 25 kilometres north of Rankin Inlet, and 80 kilometres southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. The approved mine plan includes open pit and underground mining methods for the development of the Tiriganiaq gold deposit, with two open pits (Tiriganiaq Pit 1 and Tiriganiaq Pit 2) and one underground mine. As part of Meliadine Extension, several other pits and underground mining operations are planned to extend the life of mine until 2043 and produce 65.0 million tonnes (Mt) of ore. The produced ore will be milled over approximately 20 years of mine life at a rate of approximately 8,500 tonnes per day (tpd).

High and marginal grade ore produced from underground and the open pits is stored in the temporary stockpiles adjacent to the deposit or is trucked directly to the crusher located at the south end of the process plant. The crushed ore is then transported to the ore bin and then to the process plant via a covered conveyor system. Low grade ore is stored in stockpiles and milled when needed, and marginal grade is milled during the last year of operations. There will be no ore stockpiles remaining at mine closure.

Surface runoff and seepage water from the ore stockpiles will flow to the adjacent Collection Pond 1 (CP1) via Channel 1 and Culvert 3, where it will be treated to meet discharge criteria as per the Type A Water Licence 2AM-MEL1631 requirement, prior to being discharged to the receiving environment. The temporary stockpile runoff will report to the surface collection pond by the associated deposit.

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## DOCUMENT CONTROL

Version	Date	Section	Page	Revision	Author
1	April 2015			First version of Ore Storage Management Plan as Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval	Tetra Tech EBA Inc.
2	April 2020			General review throughout the document	Engineering
3	March 2021			Update Quantities according to latest mine plan	Engineering
4_NIRB	November 2021			Updated to address Meliadine Extension application submission to NIRB for review and approval	Permitting Department
4_NWB	December 2022	A yellow arrow in the right-hand margin indicates where updates have been made		Submitted to Nunavut Water Board as part of the Meliadine Extension Amendment.	Permitting Department

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**ACRONYMS**

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Agnico Eagle	Agnico Eagle Mines Limited
CP	Collection Pond
FEIS	Final Environmental Impact Statement
NIRB	Nunavut Impact Review Board
NWB	Nunavut Water Board
WRSF	Waste Rock Storage Facility

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**UNITS**

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%	percent
m <sup>3</sup>	cubic metre(s)
Mm <sup>3</sup>	million cubic metre(s)
t	tonne
t/m <sup>3</sup>	tonne per cubic metre
Mt	million tonne(s)

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## SECTION 1 • INTRODUCTION

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Agnico Eagle Mines Limited (Agnico Eagle) operates the Meliadine Gold Mine (the Mine) located approximately 25 kilometres north of Rankin Inlet, Nunavut, and 80 kilometres southwest of Chesterfield Inlet in the Kivalliq region of Nunavut.

Nunavut Impact Review Board (NIRB) Project Certificate No.006 was issued in 2015 and the environmental assessment of the Meliadine Mine, resulting in the issuance of Project Certificate No.006 in 2015, included approval of a multi-phase approach to development, including mining of Tiriganiaq deposit using open pit and underground mining methods) and mining of the Pump, F Zone, Discovery and Wesmeg deposits using open pit methods.

The Meliadine Extension proposes to include underground mining and associated saline water management infrastructures at the Pump, F Zone, and Discovery deposits, development of a new portal and associated infrastructures in the Tiriganiaq-Wolf mining area, construction and operation of a windfarm, and use of additional borrow pits and quarries. The life of the mine would be extended by an additional 11 years until 2043, closure will occur from 2044 to 2050, and post-closure from 2051 to 2060.

This document presents an updated version of the Ore Storage Management Plan. The purpose of this update is to incorporate changes related to ore storage management at the Mine.

### 1.1 Ore Storage Management Objectives

The ore storage management objectives are to minimize potential impacts to the environment during the mining phase. The purpose of the Ore Storage Management Plan is to provide information to applicable mine departments (Environment, Engineering, Mine, Energy and Infrastructure, etc.) for sound management practices, proposed and existing infrastructure, and provide strategies for water management (runoff), dust control, and monitoring programs.

### 1.2 Management and Execution of the Ore Storage Management Plan

Revisions of the Ore Storage Management Plan can be initiated by changes in the Mine Development Plan (Mine Plan), operational performance, personnel or organizational structure, regulatory or social considerations, and/ or design philosophy. The Ore Storage Management Plan will be reviewed annually by Agnico Eagle and updated as necessary.

### 1.3 Background

Details of Meliadine Mine site conditions are provided in the Environmental Management and Protection Plan.



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## SECTION 2 • ORE STORAGE DEVELOPMENT

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### 2.1 Mine Development Plan

The Approved Mine Plan includes one underground mine (Tiriganiaq Underground Mine) and two open pits (Tiriganiaq Open Pit 1 and Tiriganiaq Open Pit 2) for the development of the Tiriganiaq gold deposit. Meliadine Extension will add mining of several other pits and underground mining operations.

Meliadine Extension is expected to produce approximately 65.0 million tonnes (Mt) of ore, 191.6 Mt of waste rock, 34.6 Mt of overburden waste, and 65.0 Mt of tailings.

The general mine site layout plan is shown on Figure 2.1, while Table 2.1 provides the key mine development activities and sequence.

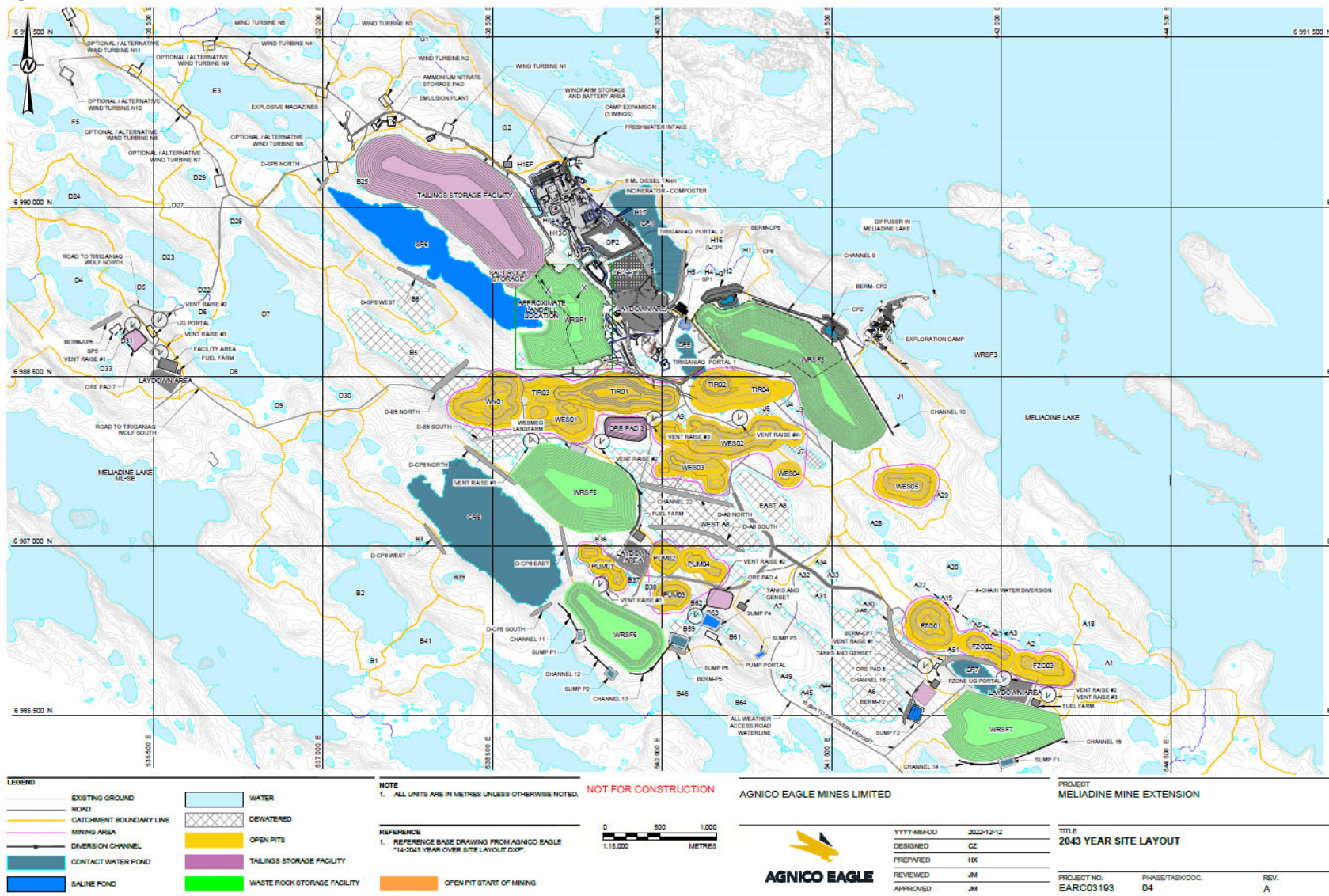
### 2.2 Meliadine Extension Development Schedule and Quantities

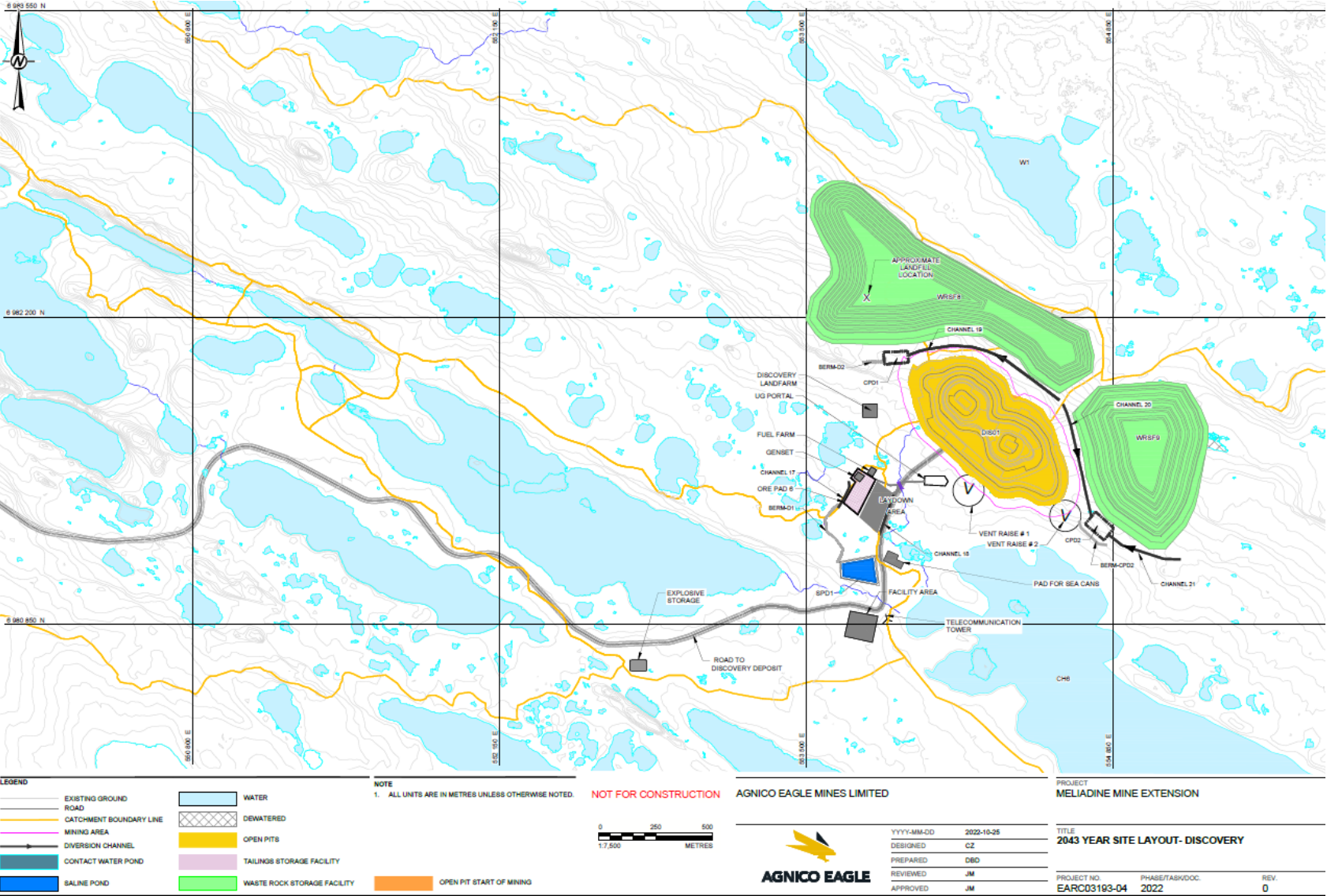
Meliadine Extension gold deposits will be developed using traditional open-pit and underground mining methods. The initial construction phase for Meliadine Extension will commence in 2024 upon reception of permits and approvals. Construction will continue through the operation phase to prepare for mining of new deposits. Closure will extend for 7 years as pits are being re-flooded, from 2044 to 2050. The filling of open pits with water would extend until the end of the closure phase. Post-closure will be initiated when the flooded pits are reconnected to the surrounding environment and will last 10 years, from 2051 onwards.

Approximately 65.0 Mt of ore will be mined over the mine life, comprised of approximately 22.4 Mt from the open pits and approximately 42.5 Mt from underground operations. Three grades of ore are identified: high grade, low grade, and marginal grade. The ore will be milled in the process plant during mine operation at a feeding rate of approximately 8,500 tonnes per day (tpd).

Table 2.2 summarizes the schedule and quantities of ore to be mined from the open pit and underground mining operations.

Figure 2.1 General Mine Site Location Plan







**Table 2.1: Key Mine Development Activities and Sequence**

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**Table 2.2 Summary of Ore Production**

<b>Year</b>	<b>Total Ore Open Pit (t)</b>	<b>Total Ore Underground (t)</b>
2020	201,105	1,722,231
2021	209,456	1,853,757
2022	805,698	1,795,949
2023	522,170	1,784,634
2024	1,162,317	1,914,255
2025	1,335,751	1,875,054
2026	1,682,088	1,830,249
2027	869,780	2,021,221
2028	777,060	2,509,795
2029	919,527	2,621,861
2030	1,227,191	2,304,465
2031	788,971	2,193,953
2032	741,908	2,391,155
2033	613,935	2,226,433
2034	793,675	2,167,472
2035	695,610	2,265,949
2036	1,479,607	2,479,570
2037	567,985	2,390,134
2038	1,252,010	1,335,433
2039	1,676,609	1,171,605
2040	1,727,495	546,805
2041	670,280	540,649
2042	1,098,670	419,008
2043	631,021	176,847
<b>Total (t)</b>	<b>22,449,918</b>	<b>42,538,482</b>
<b>Total (Mt)</b>	<b>22.4</b>	<b>42.5</b>

## SECTION 3 • ORE STORAGE MANAGEMENT

High grade ore produced from underground and open pit operations is stored in the temporary stockpiles adjacent to the deposit or is trucked directly to the crusher located at the south end of the process plant. The crushed ore is then transported to the ore bin and then to the process plant via a covered conveyor system. Low grade ore will be stored in stockpiles and milled when needed, and marginal grade will be milled during the last year of operations. There will be no ore stockpiles remaining at mine closure.

### 3.1 Approved Ore Storage Locations

#### 3.1.1 Ore Storage Pad 2 (OP2)

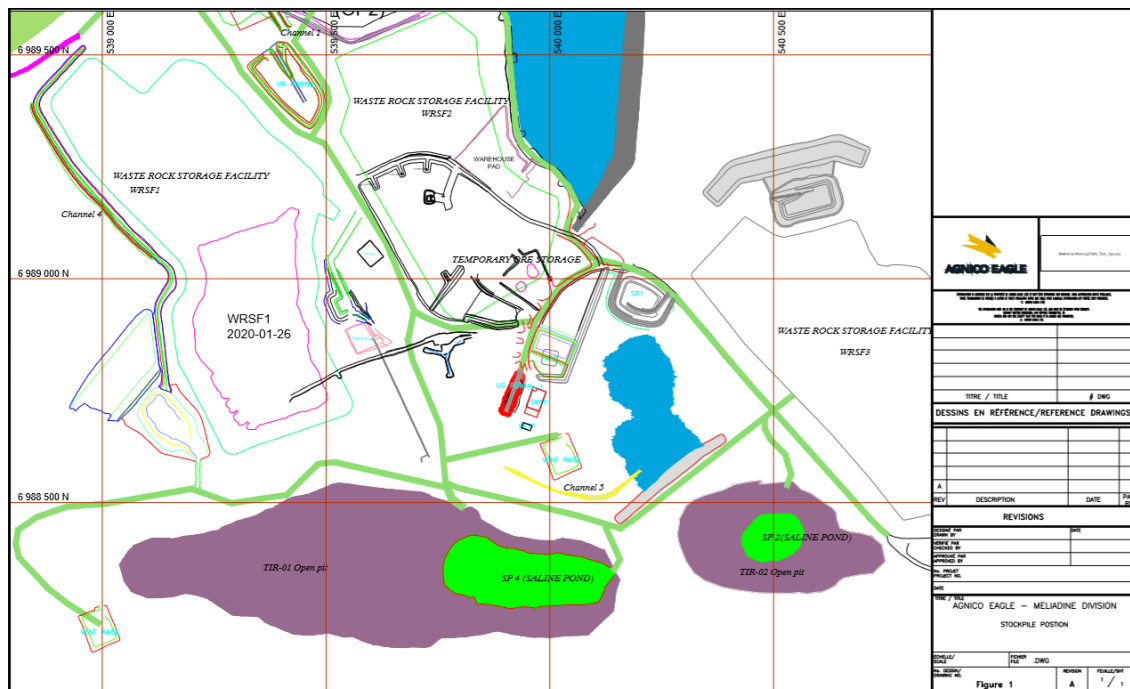
As presented in Figure 2-1, OP2 is located west of CP1.

#### 3.1.2 Temporary Ore Storage

Currently, underground ore recovered from above Level 250 is brought to the surface through Portal 1 and temporarily stored within the footprint of the future waste rock storage facility 2 (WRSF2). The ore is then loaded by surface equipment and moved to OP2 and/or the primary crusher. The location of this ore transfer pad is shown on Figure 3.2.

The practice of temporary ore storage at the WRSF2 transfer facility will cease once construction of WRSF2 commences in 2022.

**Figure 3.2 Temporary Ore Storage on Future WRSF2 Footprint**



### 3.2 Meliadine Extension Ore Stockpile Locations

As part of Meliadine Extension, there will be new temporary ore stockpiles adjacent to the pits and portals at Pump, F Zone, Tiriganiaq-Wolf mining area, and Discovery. The stockpiles are being added to facilitate ore handling and increases productivity of mine fleet which allows for more efficient equipment to transport the ore on a long distance (e.g., specific site to mill). Ore will be segregated by provenance and by ore grade.

### 3.3 Design Parameters

#### 3.3.1 Ore Storage Pad 2

The as-built characteristics of OP2 are presented in the Table 3.1 and Figure 3.3.

**Table 3.1: Key Design Parameters of Ore Storage Pad 2**

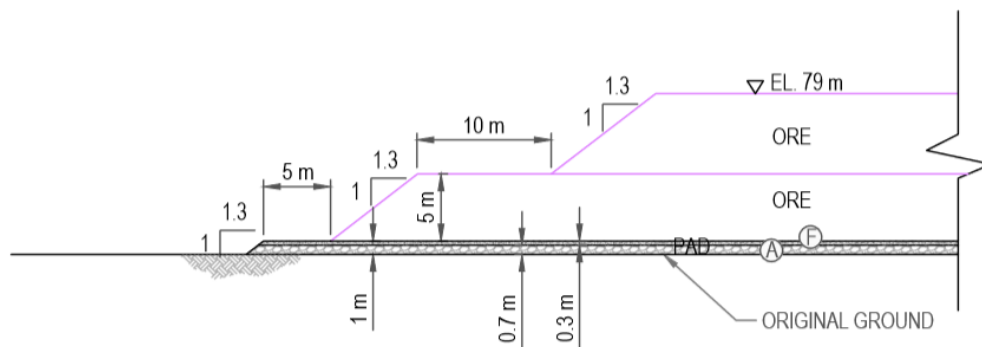
Parameter	As-Built Values
Pad thickness (m)	0.35
Maximum elevation (m)	71.7
Grade towards Channel 1 (%)	1.14
Average side slopes for pad (H:V)	2.3:1 (23.4°)
Grade towards channel 1 (%)	1
Surface area (m <sup>2</sup> )	103,179
Volume of rockfill (m <sup>3</sup> )	107,798

#### 3.3.2 Ore Stockpiles

The ore stockpiles are temporary structures and small compared to the WRSFs. Based on the stability and thermal analyses completed for the WRSFs during detailed design and experience with similar structures at other mine sites (i.e., Meadowbank Mine), the ore stockpiles will have an acceptable factor of safety against potential slope failure. A typical cross section of an ore stockpile is provided in Figure 3.4. Key design parameters for the ore stockpiles are summarized in Table 3.2.

**Table 3.2: Design Parameters for Ore Stockpiles**

Parameter	Value
Bench width from the crest of the pad to the toe of the first lift of the ore (m)	5
Thickness of first lift of ore (m)	5
Bench width from the crest of the first lift to the toe of the second lift (m)	10
Approximate maximum thickness of the second lift of ore (m)	3
Assumed side slopes for ore (H:V)	1.3:1
Maximum elevation of any ore stockpile above sea level (m)	80
Assumed dry density of ore (t/m <sup>3</sup> )	1.88

**Figure 3.4 Ore Stockpile Typical Section***TYPICAL DESIGN SECTION FOR OP2*

Following the above design parameters during ore placement, a maximum theoretical volume of 1.75 M tonnes, or 930,150 m<sup>3</sup>, of ore can be stored on OP2. Dividing the pad into four stockpiles and maintaining a 15 metres distance between the stockpiles provides a sufficient surface area for a total of 1.26 M tonnes, or 672,800 m<sup>3</sup>.

### 3.4 Ore Stockpiling Procedure

Depending on the development schedule of the underground and open pit mining operations, the ore will either be transported directly to the mill and crusher for processing or will be temporally stockpiled at one of the designated ore stockpiles on OP2 for subsequent processing.



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**SECTION 4 • WATER MANAGEMENT ASSOCIATED WITH ORE STORAGE**

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The water management objectives for the mine are to minimize potential impacts to the quantity and quality of surface water at the site.

OP2 is located within the catchment of CP1, as shown in Figure 2.1. The pad was sloped during construction to direct any contact water towards Channel 1 where it will be diverted into CP1 via the Culvert 3 system. If required, the collected contact water will be treated by the Effluent Water Treatment Plant prior to discharge to the outside environment.

Detailed information on the management of runoff water and seepage from the ore stockpiles and construction of infrastructure associated with ore management are described in the Water Management Plan. The temporary stockpile runoff will report to the surface collection pond by the associated deposit.

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**SECTION 5 • DUST MANAGEMENT ASSOCIATED WITH ORE STORAGE**

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The potential sources of dust related to ore management during construction, operation, and closure include:

- Site preparation prior to placement of waste materials (i.e., stripping, excavation and/or placement of storage pad);
- Vehicle traffic dislodging fine particles from the surface of the storage pad and associated haul roads;
- Ore handling and transfer - loading, hauling, unloading and placement; and
- Ore sorting, screening and crushing.

Dust suppression measures, which are considered to be typical of the current mine practices (i.e., Meadowbank Complex) and consistent with best management practices, will be considered through design, operation and closure phases to control the dust.

Dust is expected to be a minor issue during construction of the ore stockpiles. The ore stockpiles will be located at suitable locations and with minimal heights and suitable side slopes to minimize the wind erosion effects. Water and/or approved chemical dust suppressions will be sprayed on ore stockpiles, if required.

The crusher plant has been designed to follow best management practices by having the dump station and rock hammer enclosed to minimize the dust generation. The conveyor from the crusher to the process plant is a covered belt system in which the dust can be easily controlled. The covered conveyor system will be equipped with dust collectors and will be maintained regularly during mine operation. The conveyor loads will be kept within designated load limits to minimize the dust generation during operation. Dust collected during operation will be recycled through the mill.

More details on the dust management are described in the Dust Management Plan.

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**SECTION 6 • RECLAMATION AND CLOSURE OF THE ORE STOCKPILES**

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Closure and reclamation activities are provided in the Conceptual Closure and Reclamation Plan.

Final closure activities of the ore management facilities will commence at the end of mining operations in 2043. Ore will not remain in the ore stockpiles following the cessation of operations; it will all be processed. Key mine development activities during the closure process include:

- Place final closure cover on top of tailings surface
- Finalize placement of Discovery WRSF thermal cover
- Decommission non-essential mine infrastructure and support buildings
- Post-closure monitoring and maintenance

Breaching of dikes and berms will be completed at the end of closure once water quality objectives are met.

In the event of a short-term temporary closure, the water and dust management strategies for the ore stockpiles will be the same as used during active mine operation. In the event of a long-term temporary closure, water control structures will be maintained as required.

## SECTION 7 • MONITORING PROGRAM

The monitoring program presented here, which is carried out during construction and operation includes stability and deformation, ground temperature, and annual inspections per the Type A Water Licence 2AM-MEL1631. The detailed information on monitoring of runoff and seepage from the ores stockpiles is described in the Water Management Plan. General monitoring is subject to change as directed by an Inspector, or by the Licensee, subject to approval by the Nunavut Water Board (NWB). The same monitoring will be carried out as part of Meliadine Extension. Table 7.1 summarizes the monitoring activities for the ore management.

**Table 7.1 Ore Stockpile Monitoring Activities**

Monitoring Component		Monitoring Frequency	Reporting
Verification Monitoring	Quantities of ore processed	Continuously	Monitoring data will be used by Agnico Eagle internally.
	Routine visual inspections of ore stockpiles	Daily during active ore placement; monthly after placement	
	Elevation and geometry survey	Annually	
	Seepage collection and monitoring	Monthly over the open water season	
General Monitoring	Quantities of ore placed into stockpiles	Monthly	Monitoring data will be reported to the Regulators in the annual water licence report or annual inspection report
	Dust monitoring related to ore storage	Governed by Air Quality Monitoring Plan	
	Geotechnical inspection by qualified Geotechnical Engineer	Annually or more frequent at the request of an Inspector	

### 7.1 Verification Monitoring Program

Verification monitoring results will be used by Agnico Eagle in the management of ore stockpiles and production. The following verification monitoring data will be collected, compiled and managed internally:

- The tonnage of ore processed through the mill is monitored and reported internally on a continuous basis. These results are crosschecked with the tailings production rate from the filter press.
- During active development of each stockpile, site staff will carry out daily visual inspections in relation to the performance and condition of each structure. When placement activity ceases on an interim or seasonal basis, the inspection frequency will shift to monthly.
- The maximum heights of the ore stockpiles are estimated to be approximately 15 metres above the pad. During operations, an annual elevation survey of the stockpiles will be performed to estimate overall volume placed and provide input to the operation plan.
- Surface runoff and seepage from the ore stockpiles will be monitored during the construction

and operation phases monthly over the open water season. Additional inspections will be carried out after rainfall events and during freshet. The detailed information on the monitoring of surface runoff and seepage from the ore stockpiles is described in the Water Management Plan.

## 7.2 General Monitoring Program

The following general monitoring data will be reported to the NWB through either the Water Licence Annual Report or an Annual Inspection Report:

- Monthly quantities of the ore placed into the stockpiles during mine operation.
- Dust related to ore management is not expected to be an issue by employing the dust suppression measures presented in Section 5. Air quality at the mine site will be monitored during construction, operation, and closure through air quality monitoring stations and reported annually.
- The performance of the ore stockpiles will be inspected and assessed during the annual geotechnical site inspection by a geotechnical or civil engineer registered in Nunavut. The visual assessment and recommended actions to be taken related to the stockpiles will be summarized in the Annual Inspection Report. Inspections may occur more frequently at the request of the Inspector. Records of all inspections will be maintained for the review of the Inspector upon request.

The results from general monitoring program related to tailings management will be reported to the Regulators in the Annual Water Licence Report or in the Annual Geotechnical Inspection Report.

## REFERENCES

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Agnico Eagle (Agnico Eagle Mines Limited), 2020. *Ore Storage Pad 2 (Stage 1) Construction Summary (As-Built) Report, Agnico Eagle Mines Ltd (6513-687-230-REP-001)*