AGNICO EAGLE

Meliadine Division

Conceptual Closure and Reclamation Plan

FEBRUARY 2022
VERSION 2_NIRB

ᓇᐃᓈᖅᓯᒪᔪᖅ

ᑖᓯᕐᔪᐊᑉ ᐅᔾᕋᑦᑕᕆᐊᖅᑲ ᐅᖅᑲᓯᖕᓂᖃᖅᑐᖅ 25 ᑭᓚᒥᑐᒥᒃ ᑲᓇᖕᓇᖅᑲᓂ ᑲᖏᖅᓱᓂᐅᑉ.

ᐊᖏᖅᑕᐅᓚᐅᖅᓯᒪᓂᖅᑲᓂ 2015 ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ, ᐊᒻᒪ ᐅᖅᑲᕙᕆᐊᖅᑕᐅᓯᒪᓕᕐᓗᓂ ᐊᐅᓚᓂᖅᑲ, ᐊᒡᓃᑯᒃᑯᑦ ᖃᐅᔨᒪᓂᖏᓐᓂᒃ ᕿᓂᕈᖕᓇᕐᓂᖏᓐᓂᒡᓗ ᒨᓗᒃᓴᓂᒃ ᑖᓯᕐᔪᐊᕐᒥ ᑲᔪᓯᑦᓯᔪᖕᓇᓚᐅᕐᒪᑕ ᕿᓂᒃᑲᓐᓂᕈᖕᓇᕐᓂᕐᒥᒃ. ᑖᒻᓇ ᒪᓕᒃᑕᐅᐸᓗᓂ ᐋᕿᒃᑲᓐᓂᕈᑕᐅᔪᒪᐸᓗᓂᓗ ᑖᓯᕐᔪᐊᕐᒥ ᐃᓚᒋᐊᒃᑲᓂᕈᑎᖅᑲ ᐃᓱᒪᒋᔭᐅᓚᐅᖅᐳᖅ. ᑖᓯᕐᔪᐊᑉ ᐃᓚᒋᐊᒃᑲᓐᓂᕈᑎᖅᑲ ᐅᒃᑯᐃᖅᓯᒪᑦᑎᑦᓯᓂᐊᕐᒪᑦ ᐅᔾᕋᑦᑕᕆᐊᕐᒥᒃ 2032 ᑎᑭᓪᓗᒍ 2043 ᐃᓚᓯᓗᓂᓗ ᓄᓇᐅᑉ ᐊᑖᓂᒃ ᐅᔾᕋᑦᑕᕆᐊᕐᕕᖕᓂᒃ ᐊᓯᖏᓐᓂᒃ ᐊᖏᖅᑕᐅᓯᒪᓕᐊᓂᒃᑐᓂᒃ Wesmeg, Pump, F Zone, ᐊᒻᒪ Discovery ᐅᔾᕋᑦᑕᕆᐊᖏ.

ᐊᖏᖅᑕᐅᓯᒪᓕᐊᓂᒡᓗᓂᓂ ᒪᑭᒪᔪᑎᒃᓴᖏᑦ ᓯᖃᓪᓕᑎᕈᑦ, ᐱᓕᕙᐅᓂᐊᖅᑐᖅ, ᐊᑦᑯᑎᒃᓴᖅᑲᑦ, ᐃᒥᐅᑉ ᓴᓗᒪᖅᓴᐅᑎᖅᑲ, ᐅᖅᓱᐊᓗᖃᕝᕕᑦ, ᐱᖁᑎᑦ ᑐᖅᑲᕕᒃᓴᖅᑲᑦ ᑲᖏᖅᓱᓂᕐᒥ ᐊᒻᒪ ᐅᔾᕋᐃᑦ ᓯᖄᓕᑕᐅᓂᑯᖏᓐᓄᑦ ᑲᑎᖅᓱᐃᕖᑦ (WRSFs) ᐊᑐᖅᑕᐅᑐᐃᓐᓇᕐᓂᐊᕐᒪᑕ. ᐊᓯᖏ ᒪᑭᒪᔪᑎᒃᑲᓐᓃᑦ ᐊᓄᕆᐅᑉ ᑲᐃᑉᔾᔪᖅᑎᑕᖅᑲ, ᐊᓯᖏᑦ ᐃᑳᒃᑲᓐᓃᑦ ᐱᓕᕆᕙᖕᒥ, ᓯᐅᕋᖅᑕᕝᕕᒃᓴᑲᓐᓃᑦ ᐊᒃᑕᑰᕝᕕᒃᓴᑲᓐᓂᓪᓗ ᐊᒻᒪ ᐅᖅᓱᐊᓗᖃᕝᕕᑦ ᐃᓱᒪᓕᐊᕆᔭᐅᔪᑦ ᐃᓚᒋᐊᕈᑕᐅᓂᐊᕐᓗᑎᒃ ᑖᓯᕐᔪᐊᕐᒥ.

ᒪᑐᔭᐅᕝᕕᒃᓴᖅᑲ ᑖᓯᕐᔪᐊᑉ ᐃᓚᒋᐊᕈᑎᖅᑲᑕ ᐱᒋᐊᕐᓂᐊᖅᐳᖅ 2044. ᓄᓇᐅᑉ ᐊᑖᓂ ᐅᔾᕋᑦᑕᕆᐊᕐᕖᑦ ᑕᑕᑎᖅᑕᐅᔪᓖᖅᐳᑦ ᒪᑐᔭᐅᕆᐊᖅᐸᑦ ᐱᐊᓂᒃᓯᒪᓕᖅᐸᑕᓗ. ᑕᑕᑎᖅᑕᐅᓂᖅᑲ ᐃᓱᒪᒋᔭᐅᓯᒪᕗᖅ ᐃᓗᐊᓂ 7-ᐅᑭᐅᑦ ᐱᓕᕆᐊᕆᔭᐅᓗᓂ. ᒪᑐᔭᐅᓂᖅᑲᑕ ᐃᓱᓕᑉᐸᓪᓕᐊᓂᖅᑲ ᐱᒋᐊᕐᓂᐊᖅᐳᖅ 2051 ᐃᒥᖅᑲᑦ ᖃᐅᔨᓴᖅᑕᐅᕈᓐᓂᒃᓯᒪᓕᖅᐸᑦ ᑖᓯᕐᓂ ᓈᒻᒪᑎᐊᕐᒪᖔᑖ.

ᒪᓕᒃᓱᑎᒃ 2014 ᑭᖑᓪᓕᐅᑉ ᐊᕙᑎᑉ ᐊᒃᑐᐃᓂᖅᑲᓄᑦ ᑎᑎᕋᖅᓯᒪᓂᖅᑲᓐᓂᓐ, ᐃᓱᒪᒋᔭᐅᓯᒪᓂᖅᑲ ᐅᑯᐊᖅᑕᐅᕙᓕᐊᓂᐊᕐᓂᖅᑲᓄᑦ ᐊᒻᒪ ᐃᓕᖁᓯᖅᑲᓐᓄᑦ ᐅᑎᖅᑎᑕᐅᕙᓕᐊᓂᖅᑲᑕ ᐸᕐᓇᐅᑎᖅᑲ (CCRP) ᐋᕿᒃᑕᐅᓯᒪᖅᒪᑦ ᓈᒻᒪᑎᐊᕐᓂᐊᕐᓗᓂ ᐊᕙᑎᐅᑉ ᐊᒃᑐᖅᑕᐅᓂᖅᑲᑕ ᑎᑎᕋᖅᓯᒪᓂᐅᑉ ᐃᓚᒋᐊᕈᑎᖅᑲᓐᓂ ᑖᓯᕐᔪᐊᕐᒥ ᐃᓚᒋᐊᕈᒻᒧᑦ ᑐᓂᔭᐅᓂᐊᕐᓗᓂ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ. ᐃᓱᒪᒋᔭᐅᓯᒪᓂᖅᑲᓐᓄᑦ ᐸᕐᓇᐅᑎᑦ ᐅᑯᐊᖅᑕᐅᓂᖅᑲᓄᑦ ᐊᒻᒪ ᐅᑎᖅᑎᑕᐅᓂᖅᑲᓐᓄᑦ ᑖᓯᕐᔪᐊᑉ ᐃᓚᒋᐊᕈᑎᖅᑲᑕ ᐅᖃᐅᓯᐅᖅᒪᑕ ᐊᒻᒪ ᖃᓄᐃᓕᐅᕈᑕᐅᓂᐊᖅᑐᑦ ᐅᖃᐅᓯᐅᓯᒪᑉᓗᑎᒃ. ᐃᓱᒪᒋᔭᐅᓯᒪᓂᖅᑲ ᐅᒃᑯᐊᖅᑕᐅᕙᓕᐊᓂᐊᕐᓂᖅᑲᓄᑦ ᐊᒻᒪ ᐃᓕᖁᓯᖅᑲᓐᓄᑦ ᐅᑎᖅᑎᑕᐅᕙᓕᐊᓂᖅᑲᑕ ᐸᕐᓇᐅᑎᖅᑲ (CCRP) ᐃᓚᖃᖏᒪᑦ ᐅᖃᐅᓯᖃᖅᑐᓂᒃ ᓯᕗᓂᖅᑲᓂ ᐅᑯᐊᖅᑕᐅᓂᐊᕐᓂᖅᑲᓂᒃ, ᐃᓱᒪᒋᔭᐅᑉᓗᓂ ᐅᒃᑯᐊᖅᑕᐅᓂᖅᑲ ᓯᕗᓂᖅᑲᓂᓪᓗ ᐊᖏᖅᑕᐅᓂᐊᕐᒪᓂᒃ ᐊᑐᓚᐅᐱᓪᓚᖕᓂᐊᖅᑑᑉ ᐅᒃᑯᐊᖅᑕᐅᓂᖅᑲᑕ ᐊᒻᒪ ᓄᓇᐅᑉ ᐃᓕᖁᓯᖅᑲᑕ ᐅᑎᖅᑎᑕᐅᕙᓕᐊᓂᖅᑲᓄᑦ ᐸᕐᓇᐅᑦ (ICRP) ᑖᓯᕐᔪᐊᑉ ᐅᔾᕋᑦᑕᕆᐊᖅᑲᓐᓄᑦ.

ᐊᖏᖅᑕᐅᓯᒪᔫᒃ ᐊᑐᓚᐅᐱᓪᓚᖕᓂᐊᖅᑑᑉ ᐅᒃᑯᐊᖅᑕᐅᓂᖅᑲᑕ ᐊᒻᒪ ᓄᓇᐅᑉ ᐃᓕᖁᓯᖅᑲᑕ ᐅᑎᖅᑎᑕᐅᕙᓪᓕᐊᓂᖅᑲᓄᑦ ᐸᕐᓇᐅᑦ (ICRP) ᐊᒻᒪ RECLAIM Model ᑖᓯᕐᔪᐊᑉ ᐅᔾᕋᑦᑕᕆᐊᖅᑲ ᖃᐅᔨᓴᖅᑕᐅᓗᓂ ᐊᒻᒪ ᓄᑖᖑᖅᑎᑕᐅᓗᑎᒃ ᐃᓚᐅᓗᓂ ᐃᓚᒋᐊᒃᑲᓂᕈᑎᖅᑲ ᑎᑎᕋᖅᓯᒪᔭᕆᐊᖃᕐᒪᑦ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑕ (NWB) ᖃᓄᐃᑑᓂᖅᑲᓗ A ᐃᒥᐅᑉ ᓚᐃᓴᖅᑲᓐᑕ ᑐᒃᓯᕋᐅᑎᖅᑲᓂ. ᑖᓯᕐᔪᐊᑉ ᐃᓚᒋᐊᕈᑎᖅᑲᑕ ᐊᑐᓚᐅᐱᓪᓚᖕᓂᐊᖅᑑᑉ ᐅᑯᐊᖅᑕᐅᓂᖅᑲᑕ ᐊᒻᒪ ᓄᓇᐅᑉ ᐃᓕᖁᓯᖅᑲᑕ ᐅᑎᖅᑎᑕᐅᕙᓕᐊᓂᖅᑲᓄᑦ ᐸᕐᓇᐅᑦ (IRCP) ᐃᓗᐊᓂᓯᐅᕐᓂᐊᕐᒪᑦ ᐊᐅᓚᑕᐅᓂᖅᑲᓐᓄᑦ ᐋᕿᒃᓯᖅᑕᐅᓂᖏᑦ ᖃᐅᔨᓴᖅᑕᐅᓂᖅᑲᓪᓗ ᐊᒻᒪ ᑐᑭᓯᒃᑲᓐᓂᕈᑏᑦ ᒪᓕᒐᓂ ᐊᑐᐃᓐᓇᓂᐅᖅᐊᑐᑦ ᖃᕆᑕᐅᔭᒃᑯᑦ ᐋᕿᒃᑕᐅᓯᒪᓗᑎᒃ ᐱᓕᕆᐊᖑᓂᐊᖅᑎᓪᓗᒍ ᐊᖏᖅᑕᐅᓂᓗᙵᖅᑲ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑕ (NWB) ᖃᓄᐃᑦᑑᓂᖅᑲᓗ A ᐃᒥᐅᑉ ᓚᐃᓴᖅᑲᑕ ᐊᑐᓚᐅᐱᓪᓚᖕᓂᐊᖅᑑᑉ ᐅᑯᐊᖅᑕᐅᓂᖅᑲᑕ ᐊᒻᒪ ᓄᓇᐅᑉ ᐃᓕᖁᓯᖅᑲᑕ ᐅᑎᖅᑎᑕᐅᕙᓕᐊᓂᖅᑲᓄᑦ ᐸᕐᓇᐅᑦ (IRCP) ᑐᑭᓯᒃᑲᓂᕈᑎᓪᓗ ᑲᑎᑕᐅᓂᐊᖅᑐᑦ ᐃᓄᐃᑦ ᐊᒻᒪ ᐱᖃᖃᑕᐅᔪᑦ ᑐᓴᐅᒪᑎᑕᐅᓂᖅᑲᓂ ᑖᓯᕐᔪᐊᑉ ᐃᓚᒋᐊᕈᑎᖅᑲᓐᓂ.

Executive Summary

The Meliadine Gold Mine (Meliadine Mine) is located approximately 25 kilometres (km) north of Rankin Inlet.

Since its approval in 2015 by the Nunavut Impact Review Board (NIRB), and to extend the life of the mine, Agnico Eagle has continued to extend its knowledge and validation of the gold deposits around the Meliadine Mine by way of additional exploration. As a result, an improved project, collectively referred to as Meliadine Extension, is being proposed. Meliadine Extension will extend the life of the mine from 2032 to 2043 and will add underground mining activities at the already approved Wesmeg, Pump, F Zone, and Discovery deposits.

Already approved infrastructures such as the mill, camp, AWAR, water treatment complex, tank farm, landfarm, fuel farm, the laydown area in Rankin Inlet, the tailings storage facility (TSF), and waste rock storage facilities (WRSFs) will continue to be used. Additional infrastructures such as a windfarm, additional wings for the camp, additional landfarms, and additional fuel tanks are proposed as part of Meliadine Extension.

The closure period of Meliadine Extension will commence in 2044. The open pits will be flooded at closure when open pit mining is completed. Flooding is planned to spread over a 7-year period. The post-closure period will commence in 2051 once water quality objectives in the pit lakes are met.

In accordance with the 2014 FEIS, this Conceptual Closure and Reclamation Plan (CCRP) has been prepared to a level appropriate for inclusion in the Environmental Impact Statement Addendum of Meliadine Extension to be submitted to the NIRB. The conceptual plans to close and reclaim the Meliadine Extension facilities are described herein, and a preliminary schedule to achieve the activities is presented. The CCRP does not include specifics details on the post-closure monitoring programs, as it is anticipated that closure and post-closure monitoring will be conducted as described in the approved Interim Closure and Reclamation Plan (ICRP) of Meliadine Mine.

The Approved ICRP and RECLAIM Model of Meliadine Mine will be reviewed and updated to include Meliadine Extension as part of the Nunavut Water Board (NWB) Type-A Water Licence application process. The Meliadine Extension IRCP will include refined engineering and monitoring concepts as well as site-specific information and monitoring data available Potential changes in technology and/or standards or legislation will also be incorporated during the revision process of the Approved IRCP as well as information that will be gathered during the public and stakeholder consultations of the Meliadine Extension.

DOCUMENT CONTROL

Version	Date (YM)	Section	Page	Revision
1_NIRB	April 2014	All	-	Submitted to NIRB as part of the 2014 Final Environmental Impact Statement
2_NIRB	February 2022	All	-	Updated to address Meliadine Extension application submission to NIRB for review and approval

Abbreviation and Acronym List

AEMP	Aquatic Effects Monitoring Plan
ARD	Acid Rock Drainage
AWAR	All-weather Access Road
CCME	Canadian Council for Ministers of the Environment
CRP	Mine Closure and Reclamation Plan
DFO	Fisheries and Oceans Canada
FEIS	Final Environmental Impact Statement
IPCC	Intergovernmental Panel on Climate Change
MEND	Mine Environment Neutral Drainage Program
MDMER	Metal and Diamond Mining Effluent Regulations
Mm^3	Million cubic metres
NIRB	Nunavut Impact Review Board
Non-PAG	Non-Potentially Acid-Generating
NWB	Nunavut Water Board
PAG	Potentially Acid-Generating
TEMMP	Terrestrial Environment Management and Monitoring Plan
TSF	Tailings Storage Facility
WRSF	Waste Rock Storage Facility

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TABLES

FIGURES

1.0 INTRODUCTION

The Meliadine Gold Mine (Meliadine Mine) is located approximately 25 kilometres (km) north of Rankin Inlet.

Since its approval in 2015 by the Nunavut Impact Review Board (NIRB), and to extend the life of the mine, Agnico Eagle has continued to extend its knowledge and validation of the gold deposits around the Meliadine Mine by way of additional exploration. As a result, an improved project, collectively referred to as Meliadine Extension, is being proposed. Meliadine Extension will extend the life of the mine from 2032 to 2043 and will add underground mining activities at the already approved Wesmeg, Pump, F Zone, and Discovery deposits.

Already approved infrastructures such as the mill, camp, AWAR, water treatment complex, tank farm, landfarm, fuel farm, the laydown area in Rankin Inlet, the tailings storage facility (TSF), and waste rock storage facilities (WRSFs) will continue to be used. Additional infrastructures such as a windfarm, additional wings for the camp, additional landfarms, and additional fuel tanks are proposed as part of Meliadine Extension.

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In accordance with the 2014 FEIS, this Conceptual Closure and Reclamation Plan (CCRP) has been prepared to a level appropriate for inclusion in the Environmental Impact Statement Addendum of Meliadine Extension to be submitted to the NIRB. The conceptual plans to close and reclaim the Meliadine Extension facilities are described herein, and a preliminary schedule to achieve the activities is presented. The CCRP does not include specifics details on the post-closure monitoring programs, as it is anticipated that closure and post-closure monitoring will be conducted as described in the approved Interim Closure and Reclamation Plan (ICRP) of Meliadine Mine.

The Meliadine Extension CCRP summarizes the conceptual measures for reclamation, closure, and decommissioning of the following:

- Open pits
- Underground mines
- WRSFs
- TSF
- Water management facilities
- Quarries and granular borrow areas
- AWAR
- Laydown area and tank farm at Rankin Inlet
- Windfarm
- Airstrip (Option/Alternative)
- Waterline
- Ancillary facilities, buildings and infrastructure related to the operation, maintenance, and closure of the above-mentioned facilities

The Approved ICRP and RECLAIM Model of Meliadine Mine will be reviewed and updated to include Meliadine Extension as part of the Nunavut Water Board (NWB) Type-A Water Licence application process. The Meliadine Extension IRCP will include refined engineering and monitoring concepts as well as site-specific information, potential changes in technology and/or standards or legislation, and information that will be gathered during the

public and stakeholder consultations of the Meliadine Extension will also be incorporated during the revision process of the Approved IRCP.

1.1 Concordance with Meliadine Extension Guidelines

The purpose of this document is to address Guidelines issued by the NIRB (NIRB 2012), and specifically those relating to the preparation of the CCRP.

1.2 Objectives

The general objectives of closure and reclamation for the Meliadine Extension are as follows:

- **Physical Stability**: To reclaim areas with respect to physical stability such that they do not erode, subside, or move from the intended location under natural extreme events or disruptive forces to which they may be subjected after closure and should not endanger public, wildlife, or environmental health and safety (AANDC 2007).
- **Chemical Stability**: To reclaim areas with respect to chemical stability such that any chemical constituents released from the mine components should not endanger public, wildlife, or environmental health and safety, should not result in the inability to achieve the water quality objectives in the receiving environment, and should not adversely affect soil or air quality into the long-term (AANDC 2007).
- **Future Use and Aesthetics**: The reclaimed site should be compatible with the surrounding lands once reclamation activities have been completed. Reclamation activities should consider natural recovery of areas affected by mining and the mining related activities at the Meliadine Extension sites and re-establish productive use of the land and water in the vicinity of the mine site for future generations in a manner that is consistent with the pre-development use of the land and water (AANDC 2007).

A general layout plan of the Meliadine Extension end of operations is shown in Figures 1.1 and 1.2. They present the main site and Discovery, respectively.

Figure 1.1: Meliadine Extension General Layout Plan at end of Operations (2043)

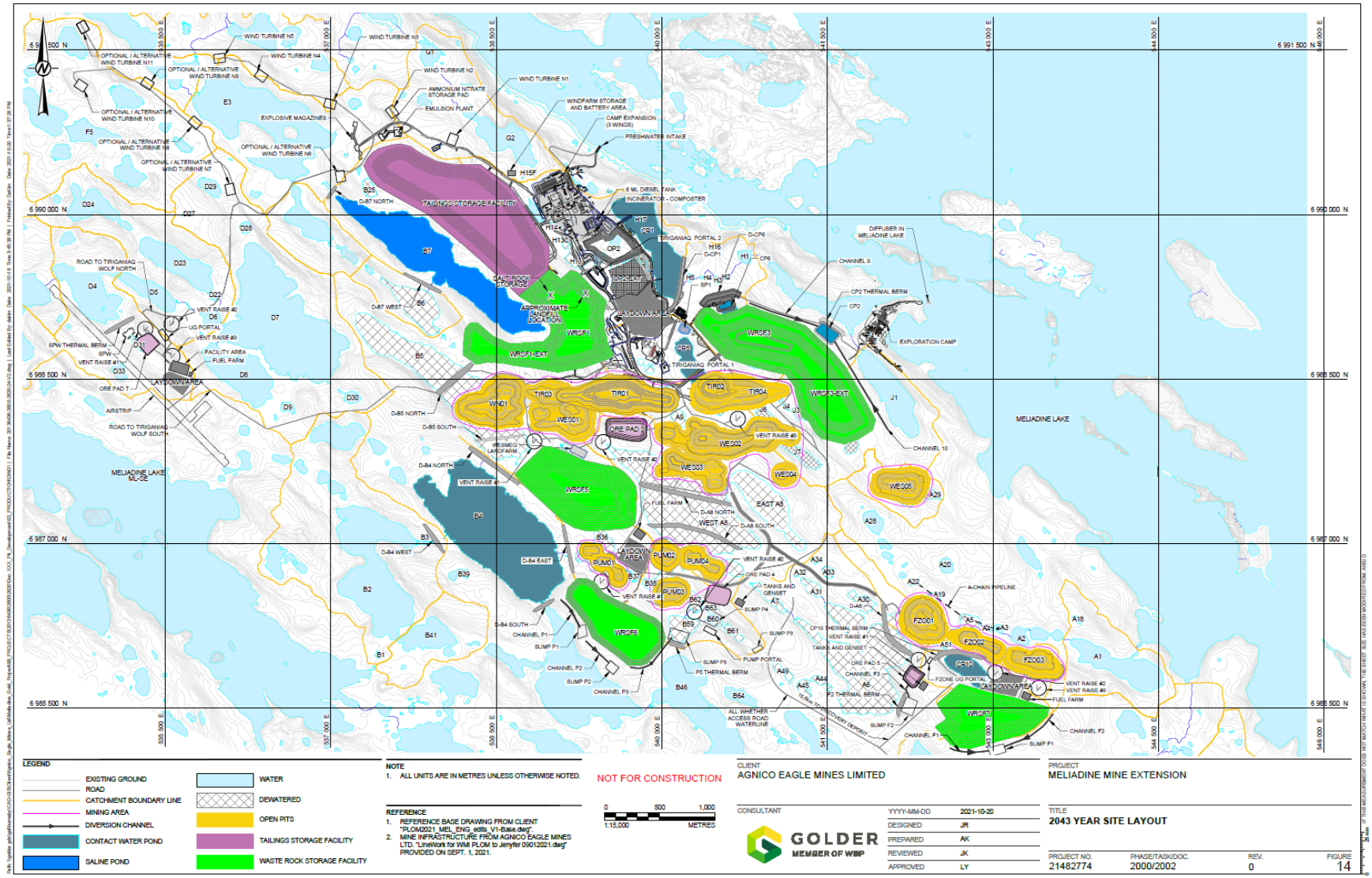
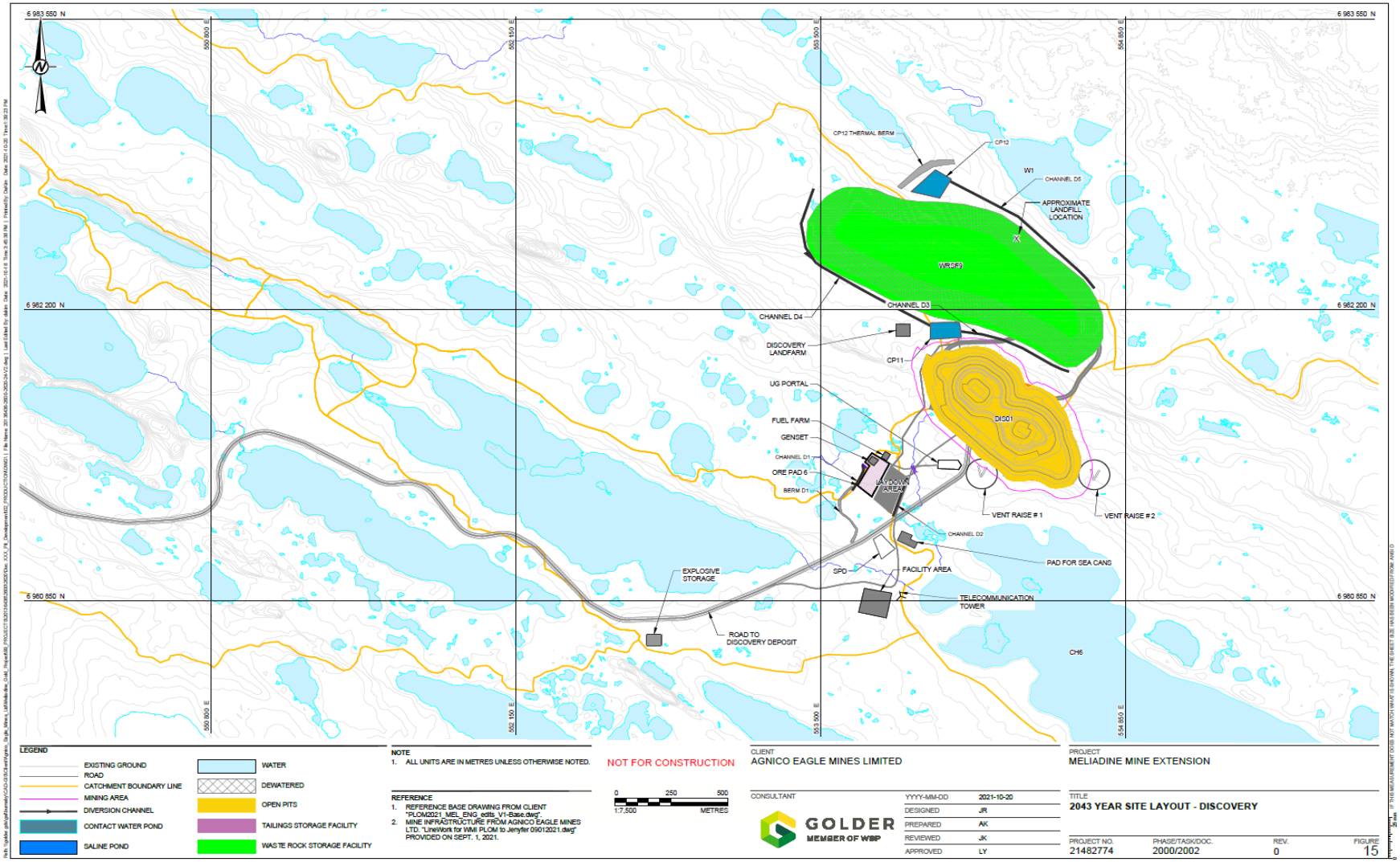


Figure 1.2: Discovery General Layout Plan at End of Operations (2043)



1.3 Guidelines and Regulatory Requirements

Regulations and guidelines can provide guidance for closure and reclamation objectives. This conceptual CCRP was developed consulting the following guidelines and regulations:

- Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (AANDC/ MVLWB, 2013).
- Mine Site Reclamation Guidelines for the Northwest Territories (AANDC, 2007).
- Abandonment and Reclamation Policy for Inuit Owned Lands (QIA).
- Mine Site Reclamation Policy for Nunavut (AANDC, 2002).
- Environment Canada, Environmental Code of Practice for Metal Mines (Environment Canada, 2009).
- Abandoned Military Site Remediation Protocol (AMSRP) (INAC 2008)

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. The Project is subject to the Federal and Territorial Acts and Regulations listed below:

- Arctic Waters Pollution Prevention Act and Regulations;
- Canadian Environmental Act and Regulations;
- Fisheries Act and Regulations;
- Metal and Diamond Mining Effluent Regulations;
- Navigable Waters Protection Act and Regulations;
- Nunavut Land Claims Agreement and Regulations;
- Nunavut Waters and Nunavut Surface Rights Tribunal Act and Regulations;
- Territorial Lands Act and Regulations;
- Nunavut Environmental Protection Act and Regulations;
- Nunavut Transportation of Dangerous Goods Act and Regulations; and
- Nunavut Mine Health and Safety Act and Regulations.

2.0 BACKGROUND INFORMATION

2.1 Climate

The Meliadine Mine is located in an arid arctic environment that experiences extreme winter conditions, with an annual average temperature of -10.4°C. The monthly average temperature ranges from -30.9°C in January to +10.5°C in July, with above-freezing averages for only 4 months of the year (i.e., June to September). The Meliadine Mine is underlain by thick and continuous permafrost, except under larger waterbodies where taliks can exist. Winds are moderate to strong and generally originate from the north-northwest and the north. Mean monthly wind speeds are typically between 19 kilometres per hour (km/hr) and 29 km/hr, with an average of 22.3 km/hr.

The annual average total precipitation at the Meliadine Mine is 430 millimetres per year (mm/year) and falls almost equally as snow and rainfall. Average annual evaporation for small waterbodies in the Meliadine Mine area is estimated 40-45% of the total precipitation between June and September. The average annual loss of snowpack to sublimation and snow redistribution is estimated to vary between 30-35% of the total precipitation for the winter period and occurs between October and May (Okane, 2021). Table 2.1 summarizes the estimated monthly climate characteristics used for the Meliadine Extension climate modelling.

Table 2.1: Estimated Mine Site Monthly Climate Characteristics

Month[a]	Monthly Air Temperature (°C)			Monthly Precipitation	
	Minimum	Average	Maximum	mm	(days)
January	-33.9	-30.3	-26.7	17	27
February	-33.7	-30.05	-26.4	17	25
March	-29.2	-24.95	-20.7	22	27
April	-20.4	-15.9	-11.4	29	22
May	-8.9	-5.6	-2.3	30	21
June	0.6	4.35	8.1	32	15
July	6.3	10.7	15.1	46	16
August	6.3	9.75	13.2	59	18
September	1.4	3.9	6.4	53	21
October	-7.2	-4.5	-1.8	57	27
November	-20.8	-16.9	-13	39	27
December	-29.2	-25.45	-21.7	25	28
Annual	-14.0	-10.41	-6.77	426	272

Source: Summary of average climate parameters for the 39-year (1981-2020) Meliadine historical climate database with adjusted precipitation (Tetra Tech 2021 and Okane 2021)

Table 2.2 summarizes the extreme 24-hour rainfall events derived for the mine site intensity-duration-frequency curves established from the regional Rankin Inlet rainfall observation.

Table 2.2: Estimated Mine Site Extreme 24-hour Rainfall Events

Return Period (Years)	24-hour Precipitation (mm)
2	29.9
5	40.1
10	45.7
20	50.5
50	56
100	59.9

Source: Tetra Tech 2021

2.2 Climate Change

In October 2014, after the issuance of the 2014 FEIS, the Intergovernmental Panel on Climate Change's (IPCC) adopted four new Representative Concentration Pathways (RCPs) to replace the Special Report on Emission Scenarios (SRES)3 that was used for the 2014 FEIS climate change assessment (IPCC 2014). As such, the Meliadine Extension climate change analysis was conducted under Representative Concentration Pathway (RCP) to represent greenhouse gas concentration trajectories as described in volume 5, section 5.4 of this FEIS Addendum.

RCP4.5 was selected as the Meliadine Extension climate change base case in all the models and designs. The RCP4.5 climate change database for Meliadine Extension was developed following the recommendations outlined on the Canadian Climate Data and Scenarios (CCDS) website, which is wholly supported by Environment and Climate Change Canada (ECCC). Refer to Section 5.3 of the Meliadine Extension FEIS Addendum for details on climate change predictions for Meliadine Extension.

2.2.1 Temperature

Temperatures at Meliadine Extension are anticipated to rise at approximately 0.06°C/year relative to historical averages for RCP4.5, an average annual temperature of approximately -4.6°C over the last 30 years of the climate change database from 2020 to 2120 (Okane 2021a).

A summary of annual average temperature for 2020 to 2120 is presented in Table 2.3

Table 2.3: Annual Average Temperature Estimates from 2020 to 2120

Climate Change Scenario	Climate Normals 1981 to 2020 (°C)	2020 to 2050 (°C)	2050 to 2090 (°C)	2090 to 2120 (°C)
RCP 4.5 *	-10.4	-7.7	-5.9	-4.4

*Meliadine Extension base case climate change scenario
Source: Okane 2021

2.2.2 Precipitation

Precipitation Normals for the Meliadine Extension were adjusted for missing data, as presented in Section 5.3.2 of this FEIS Addendum, and for gauge undercatch and evaporation due to wind effect (Okane 2021a). Historic precipitation Normals were used to create the site-specific RP4.5 climate change database for Meliadine Extension, following the recommendations outlined by (CCDS) online tool, which is wholly supported by ECCC.

Precipitations predictions for Meliadine Extension are anticipated to increase approximately 0.7 mm/year (70 mm total increase over 100 years) for RCP4.5. A summary of annual average precipitation for 2020 to 2120 is presented in Table 2.4 (Tetra Tech 2021).

Table 2.4: Annual Average Precipitation Estimates from 2020 to 2120

Climate Change Scenario	Climate Normals 1981 to 2020 (mm)	2020 to 2050 (mm)	2050 to 2090 (mm)	2090 to 2120 (mm)
RCP 4.5 *	430	415	451	486

*Meliadine Extension base case climate change scenario
Source: Tetra Tech 2021

2.3 Topography and Lake Bathymetry

Meliadine Mine area comprises glacial landforms such as drumlins (glacial till), eskers (gravel and sand) and lakes as presented in the 2014 FEIS. A series of low relief ridges composed of glacial deposits-oriented northwest-southeast control the regional surface drainage patterns. The same topography was assumed for Meliadine Extension

The Tiriganiaq, F Zone, Pump, and Wesmeg deposits are located on a large peninsula separating the east and west basins of Meliadine Lake. The Discovery deposit is located south and east of Meliadine Lake. Bathymetry surveys of critical lakes included in the Meliadine Extension modelling are presented in Table 2.5 and result from new bathymetry survey performed in 2019 (Agnico Eagle 2019a).

Table 2.5: Maximum Lake Depths

Area	Lake	Maximum Lake Depth[(a)] (m)
Main	B4	2.0
	B5	3.0
	B7	4.5
	A6	4.0
	A8	4.0
Discovery	CH6	8.0

(a) Based on bathymetry survey using 0.5 m contours (Agnico Eagle 2019a)

2.4 Permafrost

The Meliadine Mine is located in an area of continuous permafrost. The depth of permafrost is estimated to be in the order of 285 to 430 m with an average of 400 m. The depth of the active layer ranges from about 1 m in areas with shallow overburden, up to 3 m adjacent to the lakes. It is anticipated that the active layer adjacent to lakes or below a body of moving water such as a stream will be deeper.

The typical permafrost ground temperatures at the depths of zero annual amplitude (typically at the depth of below 18 m) are in the range of -5.9 to -7.0 °C in the areas away from lakes and streams. The geothermal gradient ranges from 0.016 to 0.02 °C/m (Golder 2012b). Supplemental information to update the understanding of current permafrost conditions and applied to the Meliadine Extension are presented in section 6.3 of this FEIS Addendum.

2.5 Groundwater

In support of the Meliadine Extension, 2-Dimensional thermal modelling was completed to update the predicted depth to the base of permafrost in the study area, to assess the extent of lake taliks and to determine whether the proposed open pits and additional underground developments will remain within the permafrost limits (Golder 2021b). This approach was adopted given the proposed underground mining activities and proximity of these to lakes with potential open taliks.

The 2014 FEIS predicted that taliks extending through the permafrost would exist beneath circular lakes having a minimum radius of approximately 290 to 330 m, and beneath elongated lakes having a minimum half width of approximately 160 to 195 m. Taliks (areas of unfrozen ground) are to be expected where lake depths are greater than about 1.0 m to 2.3 m. Formation of an open talik, which penetrates through the permafrost, would be expected for lakes which exceed a critical depth and size. The thermal modelling update indicates that below Lake B7, Lake A8, Lake B5, Lake A6, Lake B4, Lake D4 and Lake CH6 will have open taliks with some being connected to the deep groundwater flow regime (Golder 2021).

2.6 Open Pits and Underground Facility

The mining methods used for the open pits and underground mines will follow similar extraction methods as presented in the 2014 FEIS which consist of a conventional truck/shovel method for the open pits, and long hole mining with some mechanized cut and fill in flat areas for underground. The configuration will be a mix of transverse and longitudinal stoping. Scoop and truck equipment will be used to extract material which will be transported to the ore stockpiles. Stopes will be backfilled with either rock fill, cemented rock fill and/or paste fill.

The mining method includes the segregation of waste rocks coming from the underground mines and open pits. Dedicated waste rock facilities will be built to facilitate management of material coming from underground portions to keep it separate from open pit materials. The Meliadine Extension upper production rate will remain at 8,500 tonnes per day (tpd). The locations of the open pits are shown in Figures 1.1 and 1.2.

The following mining development sequence is currently planned:

1. **Tiriganiaq:** Open pits in this area are the first to start and will be exploited for the entire life of mine. Underground mining will also occur below the Tiriganiaq open pits. The Tiriganiaq-Wolf mining area will also be mined using underground mining methods. Separate waste and water management infrastructures will be built for the Tiriganiaq-Wolf mining area.
2. **F Zone:** The second open pit area to be developed alongside Wesmeg. Underground mining will be initiated after the initial production from the pits. The rock generated from underground mining will be re-used as backfill with excess reporting to the WRSF-7.
3. **Wesmeg:** A large open pit area located immediately south of the Tiriganiaq deposit. Wesmeg will be mined using multiple open pits. The underground development of these orebodies is closely linked to the Tiriganiaq deposit and will be mined within the same years.
4. **Pump:** Located close to Wesmeg, Pump will be mined using four open pits. The underground development of the Pump orebody will occur in the second half of the overall property development.
5. **Discovery:** Open pit area located at a distance from the mill and other mining infrastructure. It is currently planned that the Discovery underground will be developed initially followed by the open pit.

2.7 Mine Development Plan

Meliadine Extension proposes to extend the LOM (i.e., operation phase) until 2043. Closure will extend from 2044 to 2050. Post-Closure will occur from 2051 to 2060. Agnico Eagle will continue exploration activities with the objective to extend mine life beyond 2043.

2.8 Overburden and Waste Rock Storage Facilities

The 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. Most of the material will be stored within one of the following WRSFs as shown in Figures 1.1 and 1.2.

- **WRSF1 and WRSF1_Ext:** located near Tiriganiaq and Wesmeg deposits
- **WRSF3 and WRSF3_Ext:** located near the Wesmeg mining deposit.
- **WRSF5:** Located near Wesmeg deposit
- **WRSF6:** Located near Pump deposit
- **WRSF7:** Located near F Zone deposit
- **WRSF9**: Located northwest of the Discovery deposit.

Approximately 15.9 Mt of waste rock generated from the underground mining activities will be produced as part of Meliadine Extension. Of this total, approximately 11.9 Mt will be required for underground backfill. Although underground waste rock will be separated from the open pit waste rock for the most part, a small amount of Non-PAG, non-ML underground waste rock (approximately 4 Mt) will be placed in WRSF1, WRSF 1 Ext. and WRSF 3. Ext. A small amount (1.1 Mt) of excess underground waste rock will be temporarily stored in saline WRSFs on surface. The saline WRSFs will be brought back underground throughout the mine life and completely removed from surface by closure. The four saline WRSFs are:

- Saline WRSF 1 – from Pump Underground
- Saline WRSF 2 - from F Zone Underground
- Saline WRSF 3 - from Discovery Underground
- Saline WRSF 4 - from Tiriganiaq-Wolf Underground

All WRFs will be designed and operated to minimize the impact on the environment and with geotechnical stability and geochemical considerations. The material will be generally transported by truck and end-dump. Waste rock and overburden will be co-disposed in the WRSFs in a manner that encourages total freezing. Several thermistors will be placed during operations to confirm the rate of freezing for the various material cells and modify the management if required. The geochemical characterization results show that the Discovery WRSF contains rock with potential for acid generation or potential to leach metals and will require a thermal cover to reduce potential impacts on the environment. Approximately 80% of the Discovery WRSF thermal cover of WRSF will be progressively placed during operations phase of Meliadine Extension, and the remaining 20% of the thermal cover will be placed during the active closure period (2044 – 2050).

2.9 Tailings Storage Facility (TSF)

Tailings will continue to be deposited in the approved TSF, authorized under Project Certificate No.006 and Type A Water Licence 2AM-MEL1631. The TSF will be extended to accommodate additional tailings produced by the extension of the LOM. The footprint of the TSF will remain within the assessed and approved footprint of the original 2014 FEIS.

Approximately 64.9 Mt of tailings will be produced over a 20-year period. Approximately 51.6 Mt or 79.5 % of the tailings will be deposited within the TSF and the remaining 13.3 Mt or 20.5% will be used as underground cemented paste backfill. The TSF is located within the catchment of saline pond B7 as shown in Figure 1.1. Seepage from the TSF will be collected at this pond.

The closure and reclamation activities of the TSF includes the placement of an engineered cover over the tailings surface. Approximately 80% of the TSF cover will be progressively placed during operations phase of Meliadine Extension, and the remaining 20% of the cover will be placed during the active closure period (2044 – 2050). Refer to the TSF Design Report of the Approved Mine (Tetra Tech, 2018) for details on the TSF cover design criteria and parameters which will be applied for Meliadine Extension.

2.10 Ore Stockpiles

Ore pad OP2 location will remain unchanged to maximize the storage space next to the crusher. There will be new temporary ore stockpiles adjacent to the pits and portals at Pump, F Zone, Tiriganiaq, 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 over long distances (e.g., specific site to mill). Ore will be segregated by provenance and by ore grade. The ore will either be transported directly to the Approved mill and crusher for processing or will be temporally stockpiled at OP2. Contact water from the stockpiled ore material will be captured and redirected to the proper collection ponds.

2.11 All-weather Access Road and bypass road, and access roads

The AWAR and bypass road will continue to provide year-round access to the Meliadine Mine. The Rankin Inlet airstrip will continue to be used to transport workers and cargo. New access roads to the Tiriganiaq-Wolf mining area, airstrip, and to wind turbine locations will be constructed for the Meliadine Extension. It is anticipated that two roads will be constructed to access the Tiriganiaq-Wolf mining area, one to the north of Lake D7 and one to the south. The access roads will be constructed using waste rock or aggregates from quarry and borrow pit sites, and top-dressed with esker, quarry material or crushed open pit waste rock.

2.12 Marine Shipping

All shipping is carried out during the open water season (typically from early August to late October) and follows established shipping lanes that are presently in use for the annual sealift to Rankin Inlet and other communities. There is no ice breaking to extend the shipping season.

2.13 Rankin Inlet Facilities

Containers, materials, and equipment from barges will continue to be offloaded at the beach in Rankin Inlet. A laydown area will continue to store incoming and outgoing containers, materials, and equipment pending truck delivery to the Meliadine Extension site by road. There are no proposed changes to the upper fuel storage limit of 80 million litres.

2.13.1 Itivia Harbour

Agnico Eagle completed an assessment to discharge to Itivia Harbour at 6,000 to 12,000 m^3/day, and as an alternative, up to 20,000 m^3/day in the 2020 FEIS Addendum (Agnico Eagle 2020a). This included a discharge of a blend of saline and surface contact water through the waterline.

Subsequently, as part of Meliadine Extension, Agnico Eagle completed an assessment to continue discharge at a rate of 20,000 m^3/day through the waterline until 2043. There are no proposed changes to the discharge of water at Itivia for Meliadine Extension. Water, which will be tested and analyzed prior and during discharge, will be conveyed via the waterline that runs from the Meliadine Mine along the AWAR, Discovery Road and bypass road, ending at the Rankin Inlet Infrastructure – Fuel Storage Facility. The diffuser is located at a depth of about 20 m in the Itivia Harbour.

2.14 Domestic Waste Management

Consistent with the 2014 FEIS, Agnico Eagle does not propose changes to the on-site landfill located within WRSF1. A landfill will also be built within the WRSF9. Agnico Eagle will continue to adhere to management practices in accordance with the Landfill and Waste Management Plan.

2.15 Hazardous Waste

Hazardous material is segregated at site and will continue to be shipped to an approved disposal location in the south. Hazardous waste and contaminated soil will be managed by removal off site to an appropriate licensed facility (light hydrocarbon contaminated soils, i.e., diesel fuel contaminated soil, will be treated on site at an engineered landfarm facility).

2.16 Incineration

Consistent with the 2014 FEIS, Agnico Eagle does not propose changes to the incinerators currently in place, which were selected based on ECCCs *Technical Document for Batch Waste Incineration*. The incinerators are in their own buildings on the south end of the industrial pad, down-wind of other mine infrastructure. Agnico Eagle will continue to adhere to management practices in accordance with the Incineration and Composter Waste Management Plan.

2.17 Composter

Agnico Eagle is proposing to add one composter at the Meliadine Mine to improve waste management. Organic material including food, paper and cardboard will be diverted from the incinerator to the composter. The composter will be located in the same building as the incinerator. Further details are provided in the Incinerator and Composter Waste Management Plan.

2.18 Landfarm

The Project operates a Type A Landfarm, associated with the NWB Type A Water Licence 2AM-MEL1631, for onsite storage and remediation of light Petroleum Hydrocarbons (PHC) (such as diesel, gasoline, and light oils), contaminated soil that is generated at the Meliadine Mine. This involves screening, mixing and placement of contaminated soil into windrows to enhance the conditions for volatilization and aerobic microbial degradation of PHCs. In addition to the Type A Landfarm, there is a Type B Landfarm associated with NWB Water Licence 2BB-MEL1424.

As part of Meliadine Extension, two additional landfarms will be added, one at Wesmeg and one at Discovery. The landfarms will also be designed to receive soils, rock, snow, and ice contaminated with petroleum hydrocarbons (includes light hydrocarbons such as diesel and gasoline), consistent with the Approved project. The locations of the landfarms were chosen to minimize the footprint of the sites and transport distance of contaminated material from potential spill locations.

The proposed Wesmeg landfarm is adjacent to WRSF5 and open pit WES01. Contact water will be collected within a sump inside the landfarm and will be pumped to an oil pre-treatment plant to remove any hydrocarbons. The treated water will then be discharged into the CP1.

The proposed Discovery landfarm is adjacent to WRSF9 at the Discovery deposit. Excess water will be collected within a sump inside the landfarm and will be pumped to an oil pre-treatment plant to remove any hydrocarbons. The water will then be discharged into SPD.

2.19 Quarries and Granular Borrow Sites

Agnico Eagle has identified potential sites for quarries and borrow pits to support the construction of Meliadine Extension. The list of potential borrow pits and quarries are presented in Table 2.6. An approximate upper limit of 530,000 m^2 of impacted area will be disturbed for material excavation selected sites to reduce environmental footprint. An approximate total amount of 1.6 Mm^3 of waste rock will also be used for construction purposes. Once that surface limit has been reached, other borrow pits/quarries will not be used. Management, mitigation, and monitoring of borrow pits and quarry material will be implemented in accordance with the Borrow Pits and Quarries Management Plan.

Table 2.6: Proposed Quarries and Borrow Pits for Meliadine Extension

Borrow Pits	New Quarries
NW-GB16	NW-RQ1
PFZ-GB3	PFZ-RQ6
PFZ-GB15	
PFZ-GB22	
PFZ-GB23	
D-GB1	
D-GB2	
D-GB3	
D-GB5	
D-GB16	
D-GB17	

2.20 Power Generation

The Power Plant will continue to be operated as a diesel generated facility. However, to evaluate long-term objectives of displacing high carbon emissions from diesel generators with lower carbon emissions from wind turbines, Agnico Eagle completed an assessment to include a windfarm as part of the Meliadine Extension. The windfarm is planned to be built in a phased approach whereby wind turbines will be constructed based on needs and other economic factors.

It is anticipated that wind turbines N1 to N5 would be constructed during a first phase. The AWAR (including the bypass road to Itivia Harbour) and the Rankin Inlet barge landing area will be able to receive and allow transportation of the wind turbine components to the Meliadine Extension without requiring modifications. Heavy equipment from the Meliadine Extension will be used where feasible, and extra equipment will be rented and barged in and out of the site via Rankin Inlet, as required. It is anticipated that the proposed wind turbines will operate for the duration of the Meliadine Mine life but may be extended as exploration continues.

2.21 Fuel and Explosives Facilities

Agnico Eagle anticipates that approximately 122 million litres of diesel fuel per year will be used with the Meliadine Extension and that additional fuel storage at Pump, F Zone, and Discovery deposits will be needed. Each site will consist of four 75,000 L and one 50,000 L tanks for a total of 350,000 L per site (i.e., Pump, F Zone, and Discovery); for a combined total of 1,050,000 L. An additional 6 million litre tank will be added adjacent to the existing fuel tanks on-site in the industrial pad area.

Consistent with Agnico Eagle best management practices, the storage tanks will be double walled and the whole area will be surrounded by low permeable berms to prevent a release to the environment should the double wall leak. A fueling station will be located in front of the fuel farms to allow fueling of mobile equipment. These stations, as well as the equipment being refuelled, will also be sitting on a lined pad. From Rankin Inlet, fuel will continue to be transported on a year-round basis by highway class tanker trucks to the Meliadine Extension via the bypass road and AWAR.

2.22 Explosives Production and Storage Sites

The total quantity of explosives needed is estimated at about 12,000 tons of emulsion per year (full production years) for Meliadine Extension. The existing emulsion plant and storage magazine located near the Meliadine Mine will be maintained for Meliadine Extension.

A storage magazine will be added at the Discovery deposit. All explosives will be shipped to the Meliadine Extension by the annual sealift and will be packaged and transported in accordance with Canadian regulations for the transport and storage of explosives. Wastewater generated by the emulsion plant will be re-used within the plant when feasible and any excess water will be evaporated (remaining solids will be disposed in the same manner as unusable emulsion). Any unusable emulsion waste will be taken to the mine blast patterns for disposal down the boreholes

2.23 Maintenance, Warehouse, Laydown

Primary maintenance for Meliadine Extension activities will occur using existing infrastructure at Meliadine Mine. The vehicle wash bay is equipped with an oil/water separation unit to allow residual hydrocarbons to be removed from the dirty wash water generated by washing of the vehicles.

In addition, there are no changes proposed for Meliadine Extension activities for the warehouse, which is designed to store small and medium-sized maintenance spares for the process plant, mine equipment, and plant support vehicles and equipment, including related consumables. A separate contained area inside the warehouse will be

dedicated to the storage of special lubricants and greases. Large-sized process equipment spares will be stored in a dedicated laydown area on the east side of the process plant. The laydown is also an open space area where numerous sea cans are stored.

2.24 Construction and Operation of an On-site Airstrip

Agnico Eagle is proposing the development of an on-site airstrip as an alternative to the Rankin Inlet airstrip to support year-round access to site during operations, including regular scheduled crew changes, and some equipment and materials resupply.

Agnico Eagle is not actively looking at building the airstrip in the short-term, but this alternative has been included into this Application. The proposed location of the airstrip is presented in Figure 1.1. This location was selected considering potential impacts to wildlife and waterbodies, as well as noise impacts.

The proposed airstrip runway is aligned well with the overall site which will lower overall noise emissions. In addition, the proposed location would allow for the potential to utilize infrastructure that would also be needed for the Tiriganiaq-Wolf mining area (e.g., garage, access road, pads).

The following specifications are anticipated for the airstrip:

- Will be all-weather and capable of servicing passenger and large cargo aircraft (e.g.,737-200 with gravel kit)
- Will only be accessible to chartered flights (i.e., no commercial flights)
- Will be up to 60 m x 2,134 m (200 ft x 7,000 ft)
- Anticipate 4-6 flights per week during operations and closure
- An operations center will be located at the airstrip.

2.25 Water Management Facilities

The water management facilities of Meliadine Extension include dikes, berms, sumps, contact water ponds, saline water ponds, channels, and a water treatment complex. The details of the water management facilities described below were summarized from the Water Management Plan. The channels will direct non-contact runoff water away from areas affected by mining activities. Surface contact water originating from mine site areas will be intercepted, collected, and conveyed to collection water ponds.

Water from the surface contact water will be discharged to the environment if water quality meets discharge criteria or the water will be treated before release to the environment. Saline water originating from underground mining will be collected and conveyed to sumps and saline storage ponds.

Water management infrastructure from the approved activities for Meliadine Mine s (2014 FEIS and 2018 FEIS Saline Effluent to Marine Environment) will continue to be used in addition to the Meliadine Extension water management infrastructure. A summary the water management facilities of Meliadine Extension by deposit is presented in Table 2.7.

Table 2.7: Summary of Meliadine Extension Water Management Infrastructure by Deposit

Ore Deposit	Meliadine Extension Water Management Infrastructure	Details
Tiriganiaq and Wesmeg	Dike D-B7 North	Located north saline pond B7. D-B7 North will be used to contain saline water from the (TSF) and prevent the saline water from flowing to the downstream receiving environment.
	Dike D-B7 West	Located in the narrow between saline pond B7 and Lake B6. D-B7 West will be used to contain saline water from the TSF and prevent the saline water from flowing into dewatered Lake B6.
	Dike D-B5 North	Located North of Wesmeg pit within Lake B5. D-B5 North will be used to divert runoff from flowing into WN01 pit.
	Dike D-B5 South	Located south of WN01 pit within Lake B5. D-B5 South will be used to collect runoff from B5 south catchment and portion of runoff from WRSF5.
	Channel 9	Located northeast of the WRSF3. Channel 9 will be used to divert contact water from the WRSF3 towards CP2.
	Channel 10	Located east of the WRSF3-Ext. Channel 10 will be used to divert contact water from the WRSF3-Ext towards CP2.
Pump	Dike D-B4 South	Located within the narrow of collection pond B4. D-B4 South will be used to contain contact water stored within collection pond B4 and prevent the contact from flowing to the downstream receiving environment.
	Dike D-B4 West	Located in the narrow between collection pond B4 and B3. D-B4 West will be used to contain contact water stored within collection pond B4 and prevent the contact from flowing to the downstream receiving environment.
	Dike D-B4 North	Located in the narrow between collection pond B4 and Lake B5. D-B4 North will be used to contain contact water stored within collection pond B4 and prevent the contact from flowing to the dewatered Lake B5.
	Dike D-B4 East	Located west of PUM01 pit. D-B4 East will be used to contain contact water stored within collection pond B4 and prevent the contact from flowing into PUM01 pit.
	Dike D-A8 South	Located north of PUM02 and PUM02 pits. D-A8 South will be used to divert runoff from flowing into PUM02 and PUM04 open pits.
	Dike D-A8 North	Located south of WES05 open pit. D-A8 South will be used to divert runoff from flowing into WES05 pit.
	Channels P1, P2, and P3	Channels P1 and P2 to divert contact water from WRSF6 towards Sumps P1 and P2. Channel P3 to divert contact water from WRSF6 towards pond B59.
	Sumps P1 and P2	Sumps P1 and P2 to collect contact water from WRSF 6 that has been diverted by Channels P1 to P2.
	Sumps P3 and P4	Sumps P3 and P4 to saline contact water from Saline WRSF1.
	Sump P5	Sump P5 will be used to contain contact water from the Pump Ore Pad and WRSF6 and prevent the contact from flowing to the downstream receiving environment.
	P5 Thermal Berm	Located in the narrow between pond B59 and Lake B46. The P5 Thermal Berm will be used as thermal protection berm for Sump P5.
F Zone	Dike D-A6	Located southwest of FZO01 pit. D-A6 will be used to divert contact water from Lake A6 from flowing into FZO01 pit.
	CP10	Located upstream of FZO02 open pit. CP10 will be used to collect water from WRSF7 and prevent contact water from flowing into F Zone pits.
	CP10 Thermal Berm	CP10 thermal berm will be used as a thermal protection berm for CP10 to reduce seepage to F Z zone open pits from CP10.
	Channel F1 and F2	Channel F1 and Channel F2 to divert contact water from WRSF7 towards Sump F1.
	Channel F3	Channel F3 to divert contact water from F Zone Ore Pad and Saline WRSF 2 towards Sump F2.
	Sump F1	Sump F1 to collect contact water from WRSF7 that has been diverted by Channel F1 and Channel F2.
	Sump F2	Sump F2 to collect saline water from F Zone Ore Pad and Saline WRSF 2 that will be diverted by Channel F3 and saline water from F Zone underground.
	F2 Thermal Berm	Located between Lake A6 and Sump F2. F2 Berm will be used as thermal protection berm for Sump F2.

Ore Deposit	Meliadine Extension Water Management Infrastructure	Details
Discovery	CP11	Located downstream of WRSF9. CP11 will be used to collect contact water from WRSF9 and DIS01 pit.
	CP12	Located downstream of WRSF9. CP12 will be used to collect contact water from WRSF9.
	CP12 Thermal Berm	Located north of CP12. CP12 Thermal Berm will serve as a thermal protection berm to control the seepage flow from CP12 to downstream
	SPD	Located downstream of WRSF9. SPD will be used to collect contact water from WRSF9, ore pad, industrial pad, and fuel pad. It will also serve as a temporarily saline water storage area from underground mining.
	Channels D1 and D2	Channels D1 and D2 to divert contact water from WRSF9, ore pad, industrial pad, and fuel pad towards the downstream SPD.
	Channels D3 and D4	Channels D3 and D4 to divert contact water from WRSF9 towards CP11.
	Channel D5	Channel D5 to divert contact water from WRSF9 towards CP12.
	Berm D1	Located west of WRSF9 and industrial pad. Berm D1 will be used to divert contact water from WRSF9, industrial pad, and saline water from saline WRSF 3 and prevent the contact water from flowing to the downstream receiving environment.
Tiriganiaq - Wolf	SPW	SWP will be used to collect contact water from ore pad, industrial pad, saline WRSF 4, and store the ground water from Tiriganiaq-Wolf underground.
	SPW Thermal Berm	SPW Thermal Berm will serve as a thermal protection berm to control the seepage flow from SPW to Lake D4.
Overall Site	Culverts	For water conveyance through haul roads and access roads.

2.26 Inflow Flood Design

A runoff coefficient of 1.0 was adopted to estimate the runoff volume during an inflow flood design (IDF) event. The IDF for a given classification is suggested in Canadian Dam Association (CDA) (2013). Based on a classification of "Significant", the annual exceedance probability (AEP) of between 1/100 and 1/1,000 is recommended in CDA (2013). For the collection ponds which store water year-round (e.g., collection pond B4) and the collection ponds which temporarily store the freshet water (e.g., CP10 and CP12), with the associated dikes/berms are classified as "Significant", the following four cases were evaluated and the case resulting in the highest water level in the storage was adopted for IDF.

- Spring freshet for a 1 in 100 return wet year without pumping.
- Spring freshet for a mean (1 in 2 return) year plus a 1 in 1,000 return 24-hour extreme Spring rainfall event without pumping.
- Maximum monthly total rainfall for a mean (1 in 2 return) year plus a 1 in 1,000 return 24-hour extreme Summer-Autumn rainfall event without pumping; and maximum monthly total rainfall for a 1 in 100 return wet year without pumping.

For the collection ponds which will be operated generally in "dry" condition (temporarily store the freshet water) and may store water in the summer with the associated dikes/berms are classified as "High", the following three cases were considered and the case resulting in the highest water level in the storage was adopted for IDF.

- For dry condition before freshet, spring freshet for a 1 in 1,000 return wet year without pumping.
- For dry condition before freshet, spring freshet for a 1 in 2 return wet year plus a 1/3 between 1 in 1,000 and PMF 24-hour extreme Spring rainfall event without pumping.
- For wet condition (with ponding water in the summer).

Dikes are constructed to maintain water levels in specific waterbodies, and to divert water away from pits. At the end of mine life, all dikes will be breached. The dike breaches will be designed to accommodate the peak runoff rate from a 1:100-year, 24-hour storm. This will be reviewed in the final closure plan to confirm this is acceptable for each dike facility.

2.27 Water Balance

Details of overall water management for Meliadine Extension are discussed in the Meliadine Water Management Plan. A network of berms, dikes, collection ponds for surface contact water and saline water, channels, culverts, and sumps are in place and maintained to facilitate water management on site. The primary water management objectives for Meliadine Extension are to store and manage the surface contact water and saline water using separate facilities.

For surface contact runoff water, collection pond 1 (CP1) and contact collection pond B4 will be used as main attenuation ponds with smaller collection ponds (i.e., CP2, CP6, B5 North, A6, A8, CP9, CP10, CP11, and CP12) to be used for temporary water storage during freshet and after a precipitation event in summer. In general, the contact water from the smaller collection ponds will be pumped to the larger collection ponds but gravity drainage will also occur depending on the topography. The surface contact water from Wesmeg, Pump, and F Zone deposits will be pumped to the main collection pond B4. The water stored in collection pond B4 will be transferred to CP1 from where water will be treated and then discharged to the Meliadine Lake or combined with saline water for discharge into Itivia Harbour.

Per 2020 FEIS Addendum (Agnico Eagle, 2020a), and with the purpose of minimizing discharges in Meliadine Lake, a portion of the surface contact water collected in CP1 is treated for total suspended solids (TSS) at the EWTP (housed within the WTC) and discharged through the diffuser located in Meliadine Lake, the other portion of surface contact water collected in CP1 will be discharged through the Waterline into Itivia Harbour.

The Tiriganiaq-Wolf underground mine has a relatively small, disturbed area. Accordingly, the contact water and saline water will not be separated and all water at Tiriganiaq-Wolf will be collected in a saline pond (SPW). Surface contact water from Discovery open pit will be collected in pond CP12. Surface contact water from WRSF9 will be collected in CP11. Water from CP11 will be pumped to CP12. Excess saline contact water from Discovery underground, the temporary saline WRSF3, the ore pad and facility area will be pumped to surface to SPD. Water from SPD will then be pumped back to the Meliadine Mine to saline pond B7.

Same as with the Approved project, saline contact water from the Underground Mines of Meliadine Extension will continue to be collected in underground sumps, transported to a clarification system, and subsequently recirculated for use in various underground operations.

For saline water, saline pond B7 will be used as the main saline water collection pond. Sumps P3 and P4 at Pump pit, and Sump F2 at F Zone pit will be used to temporarily store the saline contact water from saline WRSF and groundwater from underground mining. The water stored in the local ponds (except for SPD) will be pumped to the main saline pond B7. The saline water collected in the SPD together with the contact water from CP11 and CP12 at Discovery will be pumped to the main saline storage pond (TIR02 open pit or saline pond B7 depending on the operational year).

Per 2020 FEIS Addendum (Agnico Eagle, 2020a), saline contact water that is not used for operations will be treated at the Saline Effluent Treatment Plant (SETP). The treated water from SETP and CP1 will be stored in SP3 and discharged in Itivia Harbour via the waterline.

During the mine closure, the water management infrastructure will remain in place until closure activities are completed and monitoring demonstrates that water quality is acceptable for discharge to the environment without treatment. In the event that contact water does not meet closure criteria, the primary plan is to use the waterline to discharge to Itivia Harbour and minimize discharge to Meliadine Lake.

2.28 Geochemistry

The geochemistry details for the Meliadine Extension are provided in the Geochemical Characterization Report and included in Appendix G of this FEIS Addendum and are briefly summarized herein.

2.28.1 Waste Rock

Most waste rock that will be excavated as part of the Meliadine Extension is classified as non-Potentially Acid Generating (non-PAG) except for the Discovery deposit. The distinct Acid Rock Drainage and Metal Leaching (ARD-ML) potential at Discovery is due to lower carbonate mineralization compared to other deposits, reducing the amount of Neutralizing Potential (NP) that is available to neutralize acidity generated from sulphide oxidation. Owing to the relatively low carbonate content, material classified as Potentially Acid Generating (PAG) or Uncertain are found in all three major waste rock lithologies (Sedimentary, Gabbro and Iron Formation). The occurrence of PAG rock outside of Discovery is essentially limited to the Iron Formation lithology. This lithology is primarily hosted with ore and comprises a minor component of waste rock from most deposits. The occurrences of Iron Formation at Wesmeg, Pump and F Zone tend to show similar ARD potential as Iron Formation at Discovery, while Iron Formation occurrences at Tiriganiaq and Wesmeg North are generally non-PAG.

Overall, 63% of Discovery open pit waste rock is classified as PAG or Uncertain. Only 5% of total waste rock outside of Discovery is expected to be classified as PAG or Uncertain. The ARD potential associated with Discovery open pit waste rock will be mitigated through progressive construction of a thermal cover on WRSF9, as discussed in OKC (2021). All the underground waste rock produced at Discovery will be backfilled into the mine underground and flooded at mine closure, eliminating the ARD potential associated with Discovery underground waste rock.

2.28.2 Tailings

Milled tailings tend to have lower ARD potential compared to ore due to differences in ARD screening criteria. Discovery is the only deposit where most tailings are considered PAG. At Discovery, both major lithology types (Sedimentary and Iron Formation) are expected to be PAG or Uncertain. Outside of Discovery, the ARD potential is essentially limited to Iron Formation. Only 18% of tailings from all other deposits are classified as PAG or Uncertain. Mitigation of ARD potential of tailings placed in the TSF will occur through encapsulation by NPAG non-PAG material.

Throughout operations a closure cover will be progressively installed over the TSF to minimize the metal leaching potential from this facility.

2.28.3 Overburden

Overburden from within the pit footprints is non-acid-generating and does not require means to prevent oxidation. Metal release under laboratory conditions is low despite the relatively high total arsenic content. Leachate concentrations in overburden are generally lower than waste rock and meet MDMER monthly mean limits. Waste rock and overburden have compatible geochemical characteristics such that they could be managed together in the same facility (Geochemical Characterization Report, Appendix G).

Salinity associated with overburden permafrost is the primary water quality concern associated with this material type. Permafrost Overburden salinity in the Kivalliq Region is related to the intrusion by the Tyrrell Sea which inundated the area at the postglacial marine maximum 5-6 ka (Hivon and Sego, 1993). Investigation of overburden salinity at Meliadine found that salinity is generally absent from the active zone above permafrost. Below the active

zone, permafrost overburden salinity is observed to increase from 2 to 6 m depth. Below a depth of 6m, salinity was observed to remain relatively constant. Below a depth of 6m, salinity was observed to remain relatively constant, with a peak pore water TDS of 10,000 mg/L. A relationship between landform and overburden salinity has not been established. However, any overburden present in the active zone, or formed from sediments deposited after the post-glacial marine maximum can be assumed to contain minimal salinity

Overburden excavated from mine pits will be co-disposed with waste rock in the WRSFs. Overburden excavations will be mostly conducted during winter months, to maintain frozen conditions, mitigating metal and salinity leaching potential from this material.

2.29 Site Water Quality

Surface water quality modelling has been carried out to assess the requirement for water treatment during operations and closure. In general, run off from the waste rock and overburden materials used in construction or placed in the WRSFs are expected to meet MDMER criteria during operations and into closure.

Surface runoff from the TSF and underground mines during operations require water treatment. Throughout operations an engineered cover will be progressively placed on the TSF and will be completed at the beginning of the active closure phase. As such, water treatment should be significantly reduced or not required.

2.30 Vegetation

In general, the community types identified within the Project and AWAR areas, or in the vicinity, include upland terrestrial vegetation classes, wetland classes and un-vegetated classes.

The Upland terrestrial vegetation is predominantly heath vegetation. Heath vegetation in this area is defined as land where the soils are not saturated for extended periods of the year. Heath refers to the presence of low growing evergreen shrubs, such as Labrador tea, bearberry, and black crowberry that are typical of these areas. Heath vegetation in the area also consists of heath tundra or heath boulder and bedrock associations.

Wetlands or riparian vegetation are defined as areas that are saturated for most, or all the growing season. Wetlands or riparian vegetation in the area consists of wet sedge meadows or tussock-hummock areas and low shrubby riparian vegetation along the margins of lakes and rivers.

Miscellaneous land cover types include un-vegetated areas, such as areas disturbed by pre-mining activities or bare ground and water.

A total of six rare plant species were observed within the Project area and include: pretty milkvetch (*Astragalus eucosmus*), northern tansy-mustard (*Descurainia sophioides*), hairy butterwort (*Pinguicula villosa*), Lanate willow (*Salix lanata* sp. *calcicola*), moor rush (*Juncus stygius*) and false chamomile (*Tripleurospermum maritimum*).

There are an additional 11 species of rare plants that may have the potential to occur in the Project area, though they were not encountered during previous field programs. These are listed as “Sensitive” in NU (CESCC 2011), though none are federally listed (COSEWIC 2012; *SARA* 2012).

2.31 Wildlife

The wildlife baseline details for the Project are provided in SD 6-2 2009 Terrestrial Synthesis Baseline of the 2014 FEIS and are briefly summarized herein.

Wildlife studies identified the following species within the Project and AWAR areas:

- Barren-ground caribou;
- Arctic fox;

- Raptors;
- Upland birds;
- Shorebirds; and
- Waterfowl.

Key baseline details from the area include:

- Barren-ground caribou of the Qamanirjuaq herd are regular but transient visitors during their spring migration and calving periods.
- 37 bird species have been observed including 14 species of waterfowl, five species of shorebird, three species of raptor, and two owl species.
- The most common species of upland birds are Lapland Longspur (*Calcarius lapponicus)*, Horned Lark (*Eremophila alpestris)*, and Savannah Sparrow (*Passerculus sandwichensis)*.
- Shorebirds are uncommon and have not been documented breeding.
- Pacific Loons (*Gavia pacifica)* and Tundra Swans (*Cygnus columbianus)* are confirmed, regular breeding summer residents.
- Peregrine Falcon (*Falco peregrines)*, Rough-legged Hawk *(Buteo lagopus)*, and Gyrfalcon (*Falco rusticolus)* have been documented and confirmed as breeding.
- Short-eared Owls (*Asio flammeus)* have been documented and nest observations indicate that they are likely breeding.
- Sandhill Cranes (*Grus canadensis*) occur throughout the study area in summer and are confirmed as breeding.
- Arctic fox (*Alopex lagopus*) and Arctic hare (*Lepus arcticus*) are common residents.
- Wolves (*Canis lupus*), muskox (*Ovibos moschatus)*, and polar bears (*Ursus maritimus)* are infrequently observed.
- Wolves (*Canis lupus*), muskox (*Ovibos moschatus)*, and polar bears (*Ursus maritimus)* are infrequently observed.
- Grizzly bear (*Ursus arctos)* is listed under Committee on the Status of Endangered Wildlife in Canada as "Special Concern" and have the potential to be in the study area but were not observed in the study area during wildlife surveys for the Meliadine Extension.
- Wolverine (Gulo gulo) is listed under Committee on the Status of Endangered Wildlife in Canada as "Special Concern" and have the potential to be in the study area but were observed only once in the study area to date.
- Red knots, *Calidris canutus rufa* and *Calidris canutus islandica* are listed as "Endangered" and "Special Concern", respectively under the Committee on the Status of Endangered Wildlife in Canada and have the potential to be in the study area, but were not observed during wildlife surveys for the Project; and
- Polar bear, peregrine falcon, wolverine, and short-eared owl were the only species that are listed under Committee on the Status of Endangered Wildlife in Canada as "Special Concern" that have been documented in the study area.

3.0 CLOSURE AND RECLAMATION STRATEGIES

3.1 General Strategy

The intent of closure and reclamation is producing a final landscape minimizing the potential for disturbances to cause degradation of the surrounding water, air, and land. The following summarizes the general closure strategy to achieve these objectives:

- Comply with applicable standards and guidelines requirements and objectives for mine closure.
- Give preference to closure solutions that do not require subsequent maintenance ("walk away" solutions) or else solutions that minimize maintenance (example "passive water treatment"); and
- Whenever possible, the closure of facilities would be progressive, spaced out over the operational life of the mine as activities in areas are completed.

3.2 Ecological Restoration

3.2.1 Terrestrial Habitat Reclamation Strategies

The closure and reclamation phase is the first opportunity to initiate major reclamation of areas not accessible to wildlife use during the construction and operation phases. Removal of Meliadine Extension facilities, reclamation of the TSF and WRSFs, and the deactivation of access and haul roads and additional reclamation activities will result in the natural re-vegetation of many previously affected areas of the Meliadine Extension.

Certain facilities will be reclaimed progressively during the life of the mine, such as the TSF, WRSF9, camps, temporary workspace, marshalling yards, quarries, borrow pits, and storage areas. Other facilities will be reclaimed during the closure and post-closure phase of the Meliadine Extension. The surface may be prepared (e.g., scarified, re-contoured, slopes stabilization, natural drainage patterns restored) to provide a suitable environment for plant growth to take place. Reclamation will be a progressive process that will continue throughout the life of the mine as soon as opportunities to reclaim decommissioned facilities present themselves.

Terrestrial riparian vegetation may become established in shoreline areas; therefore, consideration will be given to contouring the upper portion of the pit slopes if the slope is in soils above the final water level to enhance re-colonization of shoreline vegetation and to improve for local slope stability. In areas where solid rock is exposed at the final water level, no re-sloping is planned. Terrestrial area(s) created by dikes will be contoured, and erosion by wind and water will be minimized by providing proper drainage. Shoreline areas encroached upon by dikes will be restored.

For all mine facilities and structures, all contaminated soil will be treated on site or shipped to a licensed facility, foundations and building structures will be dismantled, the area will be re-contoured (e.g., berms flattened) to encourage re-growth of natural vegetation, and original drainage patterns will be restored to the greatest extent possible.

The AWAR, Rankin Inlet bypass road, and temporary mine roads will be scarified, culverts and bridges removed, drainage patterns restored, and slopes stabilized. Consideration will be given to rehabilitating roads to imitate esker habitats when practical. Disturbance of near-shore vegetation will be minimized during removal of culverts and bridges (e.g., along the AWAR).

All Rankin Inlet infrastructure, including spud barge, laydown pad and tank farm, will be removed and the site allowed to revegetate, where applicable.

3.2.2 Aquatic Habitat Reclamation Strategies

Several closure strategies will be implemented to minimize potential impacts to contaminant levels in the aquatic environment after mine operations cease. These include the following:

- Open pits and underground workings will be flooded.
- An engineered cover will be progressively placed on the surface of the TSF and Discovery WRSF (i.e., WRSF9) to limit vertical infiltration of water to the tailings surface and prevent ARD initiation in the WRSF.
- Hazardous waste and soil will be removed and sent to a licensed offsite treatment facility.
- Unused hazardous materials and explosives will be removed from site; and
- Mine water management infrastructure, including ditches, sumps, dikes, ponds, and the water treatment plant, will be maintained until water quality monitoring demonstrates that the water reporting from the reclaimed areas is of acceptable water quality for release to the environment without further management.

Consistent to the Approved project, a Conceptual Fisheries Screening Assessment and Offsetting Plan has been prepared for Meliadine Extension following consultation with Fisheries and Oceans Canada (DFO). Before an authorization to proceed is issued by DFO, a plan for the mitigation and offsetting (if required) of fish habitat losses must be in place and approved by DFO. With subsequent implementation of the plan proposed therein, no additional residual effects on fish habitat are anticipated. The objectives of plan are as follows:

- Describe aquatic habitats to be impacted by Meliadine Extension.
- Describe procedures and structures designed to avoid and mitigate/manage potential Meliadine Extension impacts to fisheries productivity
- To determine whether Harmful Alteration, disruption, and destruction (HADD) likely to occur (i.e., identify residual effects, if any).
- Incorporate Traditional Knowledge and Inuit Qaujimajatuqangit (IQ) into the development of the plan, where applicable.
- Describe plans to monitor mitigation measures and to assess their effectiveness; and develop contingency offsetting options so that the DFO's fisheries protection policy can be achieved.

4.0 PERMANENT CLOSURE PLANS

Permanent closure is defined as the final closure of the mine site. At this time, there is no foreseeable intent by Agnico Eagle to use the site for future exploration or mining, though permanent closure would not preclude renewed or future mining. Permanent closure also means that site activities are intended to be limited to post closure monitoring and possible contingency closure actions.

The following sub-sections describe closure objectives, strategies, and plans for the various components of the mine site. Specific objectives for each component are proposed in addition to the general closure objectives previously discussed. Closure objectives were developed based on requirements from regulations, guidelines and activities carried out at other applicable mine sites. All closure planning and activities would be developed and implemented to provide long term stable conditions (physical and chemical), minimize potential contaminant levels in the environment, and ensure the safety of the public after mine operations cease.

This Closure and Reclamation Plan (CRP) has been prepared to a conceptual level appropriate for inclusion in the FEIS of Meliadine Extension. The conceptual plans to close and reclaim the Meliadine Extension facilities are described herein, and a preliminary schedule to achieve the activities is presented. This conceptual plan does not include specifics of post-closure monitoring programs, as it is anticipated that these would be extensions of operations monitoring plans.

The Approved project Interim Closure and Reclamation Plan (ICRP) and RECLAIM Model will be reviewed and updated as the Meliadine Extension proceeds into permitting for Type-A Water Licence Amendment with the Nunavut Water Board (NWB), detailed engineering and monitoring concepts are advanced in greater detail, and site-specific information and monitoring data become available.

4.1 Underground Facilities

This section describes the closure activities as they relate to the underground facilities proposed for Tiriganiaq, Tiriganiaq-Wolf, Pump, F Zone, and Discovery.

The underground facilities consist of mine workings that will extend to approximately 845 m below the ground surface, which is below permafrost. Therefore, groundwater flows are expected into the underground mine workings. The underground mine inflows will be managed during the operation phase of the Meliadine Extension and all mine access is planned with specific portals near the pits and near the mill as shown in Figure 1.1 and Figure 1.2.

4.1.1 Closure Objectives

The closure objectives for the underground facilities are as follows:

- Remove access to underground workings and surface openings at the end of the mine life to protect human and wildlife safety.
- Maximize the stability of underground workings and crown pillars so that there is no surface expression of underground failure.
- Close underground workings so they do not become a source of contamination to the surface environment.
- Contour as required to achieve the desired end land use targets.

4.1.2 Closure Methods and Strategies

Guidance on generic options or strategies for closure of underground mine workings is provided in AANDC (2007). The relevant strategies are discussed below:

- Seal drill holes and other surface openings, especially those connecting the underground workings to the surface.
- Assess risk of subsidence in underground mines and take appropriate measures to prevent subsidence in cases where the risk of subsidence is determined to be significant.
- Remove infrastructure and equipment if needed. Any equipment or infrastructure left underground will be cleaned, drained of fluids, inspected, and remediated as appropriate to ensure that there is no risk of any contaminant leakage.
- Remove hazardous materials from underground shops, equipment, and magazines (fuels, oils, glycol, batteries, explosives, etc.).
- Identify and remediate contamination associated with vehicle and equipment operations at Meliadine Extension maintenance shops or work areas prior to final closure.
- Secure underground raise openings using properly designed concrete caps for permanent closure.
- Flood and plug underground workings as appropriate based on hydrogeological and groundwater quality studies.
- Contour the surface to establish positive natural drainage patterns and blend in with the surrounding topography or re-contour to prevent natural surface flows to the underground; and
- Un-used explosives and areas with excessive hydrocarbon contamination will be removed or cleaned as necessary.

The estimated total void space volume of the underground mines for Meliadine Extension is 3Mm^3. The underground workings will be flooded over the first year of active closure by a combination of groundwater seepage, surface contact water and saline contact water stored in contact and saline ponds.

Approximately 120Mm^3 of freshwater will be pumped in a controlled manner from Meliadine Lake to the pits. The maximum fill rate will be based on the maximum acceptable draw down of Meliadine Lake and are within the approved volumes of 2014 FEIS. Testing and monitoring would be carried out to assess the water quality in the underground workings as they are flooded progressively.

4.2 Open Pits

This section describes the closure activities as they relate to the following open pits shown in Figures 1.1 and 1.2:

- Tiriganiaq open pits.
- Wesmeg open pits.
- Pump open pits.
- F Zone open pits; and
- Discovery open pit

4.2.1 Closure Objectives

The closure objectives for the open pits are as follows:

- Minimize access of humans and wildlife to open pits.
- Develop a plan to enable exit from the flooded pits.
- Integrate a water management plan to minimize and control contaminated drainage from the flooded pits, implement a system to collect and treat these waters, and have these waters meet site permit water quality objectives, which will be developed during operation.
- Stabilize all slopes and flood open pits to satisfy end land use for the open pit lake area where feasible.
- Establish in-pit water habitat where feasible for pits which may be flooded; and
- Establish new surface drainage patterns if necessary.

4.2.2 Closure Methods and Strategies

Proposed closure strategies and activities will commence at the end of mining each open pit facility, and will include the following:

- All pit access ramps will be secured by rock berm barricades, and berms will be constructed around the perimeter of each pit at a given setback in accordance with applicable mine regulations and rock mechanics studies conducted for pit stability.
- The open pits are designed to have stable slopes during the mine life and post-closure. The slopes will be monitored as part of mine operations and will be progressively modified as required to maintain stability where feasible.
- Each open pit will be flooded over a period of approximately seven years. Estimated pit flooding volumes are provided in Table 4.1. Flooding will be achieved by a combination of seepage, precipitation, partial re-direction of annual freshet flows, and active pumping from Meliadine Lake.

Table 4.1: Estimated Pit Flooding Volumes Meliadine Extension

Pit	Volume (m^3)
DIS01	17,468,052
FZONE-01	7,147,859
FZONE-02	2,311,128
FZONE-03	3,257,596
WN01	12,492,168
PUMP-01	1,930,943
PUMP-02	1,239,027
PUMP-03	2,027,768
PUMP-04	1,868,689
Tiri01	13,553,821
Tiri02	3,093,821
Tiri03	2,986,370
Tiri04	20,446,392
WES01	6,450,760
WES02	12,513,981
WES03	3,500,153
WES04	520,698
WES05	5,524,137
Total	**118,333,360**

Source: Lorax, 2021

- Water will be pumped into the pits at controlled rates from Meliadine Lake using barge-mounted, high-capacity mechanical pump systems or siphons. Water intakes will be properly screened to avoid ingress of fish or debris into the pumping system.
- Surface contact water and saline water will be pumped to underground during closure to minimize discharges to Meliadine Lake and Itivia Harbour. A water quality assessment will be carried out prior to closure to assess the effects of waste rock disposal in flooded open pits.

It is anticipated that water quality in the open pits will meet discharge criteria upon flooding of the pits as sources for acid rock drainage or metal leaching will be under water or covered. Meliadine Lake water will be used to flood the bulk of the pit volumes.

- Additional surface water quality testing is required to assess surface water quality from runoff of various facilities. Testing and monitoring would be carried out to assess the open pit water quality as they are flooded.
- Water quality in the pits will be monitored continuously throughout the flooding process. All diversion dikes will be kept intact to provide a barrier between the open pits and surrounding lakes until the pit lake water levels achieve static conditions and the water quality is considered acceptable for release to the environment without treatment. If the water quality is unacceptable for discharge, then the water will be treated either in-situ or through the water treatment plant depending on the specific water quality concerns. The duration of the treatment will be dependent on monitoring results and acceptable discharge criteria.

4.3 Waste Rock Storage Facilities

This section describes the closure activities as they relate to the WRSFs. Waste rock generated from the underground mining activities will be separated from the open pit waste rock and temporarily stored in separate saline WRSFs on surface, as shown in Figures 1.1 and 1.2.

All WRSFs will be designed and operated to minimize the impact on the environment and considering geotechnical and geochemical stability. The material will generally be transported by truck and end-dumped, following a sequence developed for the operation. WRSF9 at Discovery contains rock with potential for acid generation or potential to leach metals and will require a thermal cover to reduce potential impacts on the environment. Approximately, 80% the WRSF9 will be progressively reclaimed during the operations period with the remaining 20% of the thermal cover placed during the active closure period.

It is currently proposed to manage overburden material and waste rock in the same facilities as it is not anticipated that there will be a potential to reuse the overburden at closure. Separately salvaging and storing overburden for reclamation activities is not considered feasible at northern mine sites as the frozen material thaws and results in the handling becoming very difficult and potential stability concerns if not supported with waste rock. Overburden is retrieved early in the mining life and based on the results from field investigations from the 2014 FEIS, the overburden is expected to have relatively high water and ice content. Overburden placed within the facilities is expected to be completely frozen at the time of closure, and therefore would require blasting, melting, and drying prior to reuse as a reclamation material. Experience from Meadowbank has shown that once the overburden material is blasted and melted, its loose nature and excess water content causes the material to saturate, resulting in significant reduction of the materials strength. This reduction in strength makes handling and transportation a major challenge, if possible.

4.3.1 Closure Objectives

The closure objectives for the WRSFs are as follows:

- Minimize erosion, thaw settlement, slope failure, collapse, or the release of contaminants or sediments.
- Develop and implement preventative and control strategies to effectively minimize the potential for ARD-ML to occur.
- Mitigate and minimize impacts to the environment if acid rock drainage and/or metal leaching is occurring.
- Avoid reliance on long-term treatment as a management tool (e.g., effluent treatment facilities are not appropriate for final reclamation but may be used as a progressive reclamation tool).
- Design to meet future land use targets; and
- Design to minimize the overall Meliadine Extension footprint.

4.3.2 Closure Methods and Strategies

Proposed closure strategies and activities will include the following for WRSFs:

- Geochemical testing indicates that most of the waste rock and overburden is non-potentially acid generating. It is anticipated that some PAG material may be encountered at Discovery. Therefore, a closure cover system is expected for the Discovery WRSF and the ARD potential of Discovery rock will be verified during operations through monitoring of the buffering capacity and sulphur content of Discovery waste rock and monitoring of rock pile contact water quality (Appendix-D-21, Mine Waste Management Plan. The underground waste rock from Discovery will be backfilled at closure.

- Water quality monitoring will be completed throughout the mine life to monitor the contribution of specific infrastructure components (including the WRSFs) to the overall site water quality. The water quality

monitoring, which is referred to as Verification Monitoring (Appendix D 35, Water Management Plan), will be used to support the closure planning process for the WRSFs. The intent of the closure planning process is to develop a final plan using adaptive management. The use of adaptive management will enable the closure plan to evolve as new information becomes available through analysis, testing, monitoring, and progressive reclamation.

- The WRSF contact water system will be maintained during the closure period until water quality monitoring demonstrates that water reporting from these facilities 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, contact water channels and sumps will be re-contoured and/or surface treated according to site-specific conditions to minimize wind-blown dust and erosion.
- The WRSFs will be designed for long-term stability. No additional re-grading or construction of wildlife ramps will be carried out as part of closure activities.
- Approximately 80% of the Discovery WRSF (i.e., WRSF9) thermal cover will be progressively reclaimed during the operations period, and the remaining 20% will be placed during the active closure period.
- The WRSFs will be allowed to naturally re-vegetate. It is anticipated that the lichen community will re-vegetate the surface over time. Dust from the WRSF is anticipated to be a minor issue during closure because waste rock produced at the site will generally be large, and not susceptible to wind erosion. The overburden materials are fully encapsulated with waste rock; therefore, dust generation is not possible. The need for additional dust control measures will be evaluated and implemented during operations and closure, as required.

4.4 Tailings Storage Facility

This section describes the closure activities as they relate to the TSF shown in Figure 1.1.

4.4.1 Closure Objectives

The closure objectives for the TSF are as follows:

- To ensure that the TSF is physically and chemically stable in the long-term.
- To ensure that runoff and seepage from the TSF is collected and meets the Water Licence criteria for direct discharge
- The TSF will designed for closure and will account for seismic and permafrost conditions. A cover is placed during operation and closure for dust control (wind erosion), stability and water infiltration
- Develop and implement preventative and control strategies to effectively minimize the potential for acid rock drainage and/or metal leaching to occur.
- Build to meet future land use targets; and
- Build to minimize the overall Meliadine Extension footprint.

4.4.2 Closure Methods and Strategies

Proposed closure strategies and activities for the Meliadine Extension TSF will follow the same closure strategies of the Approved Project, which include the following:

- An engineered cover will be progressively placed on the surface of the tailings as it reaches the ultimate elevation, per approved activities pf the Meliadine Mine. The intent of the engineered cover will be to limit vertical infiltration of water into the tailings. The placement of the engineered cover will also help prevent dust generation. The cover is graded to divert runoff to the saline pond B7.

- A thermal assessment of the TSF was completed as part of the Meliadine Extension design and modelling results show that the TSF will remain frozen in post-closure. The TSF closure plan will be reviewed and updated as required based on the results of the thermal analysis.
- Seepage from the TSF will be diverted to saline pond B7.
- The discharge water quality and the water management structures for the TSF will be monitored and assessed according to an approved monitoring plan during each stage of the mine life, including pre-development, operations, closure, and post-closure.
- Seepage monitoring and kinetic testing completed on whole ore tailings samples show that drainage water quality is expected to meet MDMER monthly mean effluent limits except for arsenic and ammonia. Therefore, the cover design will consider infiltration and potential arsenic loading in surface runoff. Water quality analysis through hydrogeological (groundwater) modelling, unsaturated flow modelling in the cover layer, and field trials will be undertaken to assess the water quality from the TSF at closure, if necessary. If undertaken, the modelling will be completed during operations and the CCRP will be revised based on the results of the water quality analysis.

4.5 Mine Infrastructure

This section describes the closure activities as they relate to key mine infrastructure on site and at Rankin Inlet. These include the process plant, power plant, camp, mine maintenance shop, sewage treatment plant, fuel farm, landfarms, windfarm, the airstrip, the waterline, explosives facility and all other ancillary infrastructure, Rankin Inlet laydown area and Rankin Inlet tank farm.

Prior to closure, infrastructure and equipment deemed to be salvageable/and usable condition will be offered to the Kivalliq Inuit Association at closure for potential re-use elsewhere.

At closure, all buildings and structures will be decontaminated, decommissioned, and dismantled. Demolition waste that cannot be reused, recycled, or provided to local interests will be disposed of in the on-site landfill. Salvageable material will be removed off site and metals will be separated and shipped off-site as scrap if economical to do so.

4.5.1 Closure Objectives

The closure objectives for mine infrastructure are:

- Confirm buildings and equipment do not become a source of contamination or a safety hazard to wildlife and humans; and
- Return the general area to its original state or to a condition compatible with the end land use targets.

4.5.2 Closure Methods and Strategies

Proposed closure strategies and activities for the mine infrastructure are consistent with the Approved Project. The proposed closure strategies will commence at the end of mining, and will include the following:

- Salvageable buildings and surface structures will be dismantled and demobilized from the site. The buildings will be offered to the Kivalliq Inuit Association for potential re-use elsewhere at closure.
- Non-salvageable buildings and structures will be dismantled or demolished and disposed of in WRSFs in areas designated for inert non-hazardous landfill materials.
- Concrete structures and foundations will be broken up and graded to match existing topography.
- 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.
- The mine site tank farm will be dismantled and disposed of offsite at an approved disposal facility.

- All remaining bulk fuel located at Itivia will first be cleaned and then removed and offered to local interests. Remaining bulk fuel and empty portable fuel storage tanks will be offered to community interests. Fuel not required during the closure and reclamation activities will be sold, returned to suppliers, disposed by a licensed handler, or incinerated.
- The wind turbines will be dismantled and recovered.
- The landfarms will be decontaminated.
- The airstrip, if constructed, will be scarified.
- The waterline will be removed, dikes will be breached, sumps backfilled, berms will be removed, and channels will be backfilled and contoured.
- In Rankin Inlet, the laydown area will be reclaimed, the tankfarm dismantled and, if necessary, disposed offsite at an approved disposal facility. The Government of Nunavut owns the land for the facilities in Rankin Inlet and it is important to note that the proposed fuel tank farm and laydown area are all situated on lands leased from the Government of Nunavut and thus Agnico Eagle's commitment is to remove all these facilities.

4.6 All-weather Access Road

This section describes the closure activities as they relate to the AWAR. The 8 m wide AWAR is approximately 24 km long from Rankin Inlet to the Tiriganiaq deposit with an approximately 10 km road to the Discovery deposit. Also, to be closed is the approximately 5 km long bypass road running south of the airport to the AWAR.

Agnico Eagle has committed to decommission the AWAR once mine reclamation has been completed and the site no longer requires ongoing care and maintenance. However, during the consultation activity, Agnico Eagle has heard from the community of Rankin Inlet, including the Hunters and Trappers Organization (HTO) that the community wants the AWAR to remain open to allow public access with minimal restrictions. Consequently, Agnico Eagle has proposed that the AWAR be operated as a privately operated road with unrestricted public access. Agnico Eagle would continue to operate the AWAR under these conditions for as long as it has a physical presence at the Meliadine Mine. Once the mine closure activities are complete and the physical presence is gone from the mine site, then Agnico Eagle would not be able to provide maintenance or emergency services along the road. The road would then be closed to cars and trucks, as Agnico Eagle could then no longer guarantee public safety. At that point, Agnico Eagle would complete the closure activities discussed below.

In addition, Agnico Eagle expects that during a short term or temporary mine site shut down, the road would remain open; however, during a long term or indefinite shut down the road would likely be closed.

4.6.1 Closure Objectives

The closure objectives for the AWAR and Rankin Inlet bypass road are as follows:

- Ensure road does not become a source of contamination.
- Return area to a state compatible with the desired end use.
- Restore natural drainage patterns where surface infrastructure has been removed; and
- Restore natural use for wildlife.

4.6.2 Closure Methods and Strategies

Proposed closure strategies and activities will commence at the end of mining and the closure tasks for other mine infrastructure, and will include the following:

- The AWAR, all site roads and the bypass road not required for post-closure monitoring will be decommissioned and the terrain restored. Decommissioning of the road will start from the site and progress south towards Rankin Inlet.
- The road surface will be scarified, allowing the native plant community to 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, if required.
- All bridges and culverts will be removed, and original drainage patterns restored.
- Stream crossings will be rehabilitated as they are encountered during the progression of the work.
- Cross-drain structures (cross-ditches) will also be installed where necessary between culvert sites. Where armouring rock 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 have to be restricted to within the designated DFO fisheries work window.

4.7 Landfill

This section describes the closure activities related to the landfill site and the waste management building.

4.7.1 Closure Objectives

The closure objectives for the landfill are as follows:

- Control erosion and effects on the ground thermal regime.
- Prevent inadvertent access.
- Ensure waste disposal areas do not become a source of contamination; and
- Return area to its original state or to a state compatible with the desired end use.

4.7.2 Closure Methods and Strategies

Proposed closure strategies and activities will commence at the end of mining, and will include the following:

- A landfill is located within the WRSF1, per Approved Project. The other landfill will be located within WRSF9 at Discovery. 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 WRSFs, with little to none reporting to the water collection infrastructure (for more details refer to the Landfill Management Plan).
- The design, operation and/or closure of the landfill do not rely on total freezing; however, as an added control strategy the landfill will be buried within the WRSFs with a cover of minimum of 3.7 m of thickness (refer to the Landfill Management Plan). The cover thickness of 3.7 m is considered sufficient for planning purposes and is based on maintaining the active layer within the rockfill so that the materials landfilled will remain frozen.
- Hazardous waste and contaminated soil (soil not treated through the proposed landfarm i.e., soil contaminated with heavy hydrocarbons or other contaminants not suitable for remediation in the biopile) will be managed continually during operations and during closure in sending the soil to a licensed offsite treatment facility. Therefore, there will be little to no accumulation of such wastes during mine operations or during closure at the mine site, subject to seasonal shipping considerations.
- Dispose of inert, non-combustible wastes in underground mine workings and WRSFs.
- Burn domestic waste in the incinerator during operation and at closure as part of camp maintenance.

- Burn waste oils, solvents, and other hydrocarbons on site in the incinerator if approved (chlorinated substances will not be burned).
- If necessary, divert runoff with cover waste rock; and
- The waste management building will be the last building to undergo closure and reclamation.

4.8 Landfarms

As described in the Landfarm Management Plan on site storage and remediation are the method for treatment of light petroleum hydrocarbons (PHC) contaminated soil that may be generated at the mine.

Following the removal of all remediated soil from the landfarm, closure and reclamation will be conducted. Prior to closure and reclamation of the landfarm, confirmatory sampling of the landfarm material will be done in accordance with the Landfarm Management Plan.

This section describes the closure activities related to the landfarm sites.

4.8.1 Closure Objectives

The closure objectives for the landfarm are:

- Post-closure conditions that, where appropriate, do not require a continuous presence of mine staff until a walk away condition is achieved.

4.8.2 Closure Methods and Strategies

Once all the soil has been remediated to the approved guidelines and placed in the WRSFs, the berm and base of the landfarms will be sampled on a 10-m grid to determine if the PHC concentrations of the underlying soils are less than the guidelines.

- Based on the Abandoned Military Site Remediation Protocol (AMSRP), for impacted areas greater than 2,500 m^2, discrete samples should be collected from each 12 m x 12 m grid and 50% should be submitted for laboratory analyses.
- If the PHC concentrations of the analyzed soil samples are less than the AMRSP guidelines for soils between 0 and 0.5 m, no additional excavation will be required.
- If the PHC concentrations are greater than the AMSRP guidelines for soils between 0 and 0.5 m but are less than the guidelines for soils at depths greater than 0.5 m, the landfarm will be covered with 0.5 m of waste rock or other reclamation material.
- If the PHC concentrations exceed the management limit for soils at depths greater than 0.5 m, the soil will be excavated and treated in another landfarm or disposed of at an approved facility. The excavated area will be sampled according to the grid density to confirm if AMSRP guidelines are met, and the excavation backfilled with waste rock or other reclamation material. The landfarm will be kept active until soil remediation is deemed completed.

4.9 Quarries and Granular Borrow Sites

This section describes the closure activities as they relate to the quarries and granular borrow sites shown on the site closure plan.

4.9.1 Closure Objectives

The closure objectives for the quarries and granular borrow sites are as follows:

- Minimize access of humans and wildlife to quarries and granular borrow sites.

- If necessary, integrate a water management plan to minimize and control contaminated drainage should it be encountered, implement a system to collect and treat these waters, and have the waters meet site permit water quality objectives.
- Meet water quality objectives for any discharge.
- Meet end land use target for resulting surface expression; and
- Establish new surface drainage patterns.

4.9.2 Closure Methods and Strategies

Proposed closure activities may commence prior to the end of mining, and would include the following:

- Reclamation and closure of quarries and granular borrow pits will depend on the individual site conditions.
- All mobile and stationary equipment would be removed.
- Excavated slopes would be stabilized and contoured.
- Progressive reclamation of the quarries should lead to vegetation re-establishing on disturbed areas.
- Loose rock will be pulled to the floors of the quarries, and the entrances blocked with large boulders.
- The slopes and base of the quarries would be re-contoured to promote positive drainage; and
- Rock quarries would remain open and will be re-contoured as necessary to promote positive drainage.

4.10 Water Management Facilities Closure Plan

This section describes the closure activities as they relate to the following water management facilities: sumps, contact water collection ponds, saline water collection ponds, channels, dikes, berms, diffuser, water intake infrastructure, waterline, and water treatment complex. The post-closure site layouts of Meliadine Extension are shown in Figures 4.1 and 4.2.

4.10.1 Closure Objectives

The closure objective for the water management facilities are as follows:

- Dismantle and remove and/or dispose of as much of the system as possible and restore natural or establish new drainage patterns.
- Stabilize and protect from erosion and failure for the long-term.
- Maintain controlled release from water dams, ditches, and all points of water discharge to the environment; and achieve approved water quality limits and, implement long-term treatment only if necessary and ensure that minimal maintenance is required.

Figure 4.1: Water Management Facilities at Start of Post-Closure – Meliadine Mine

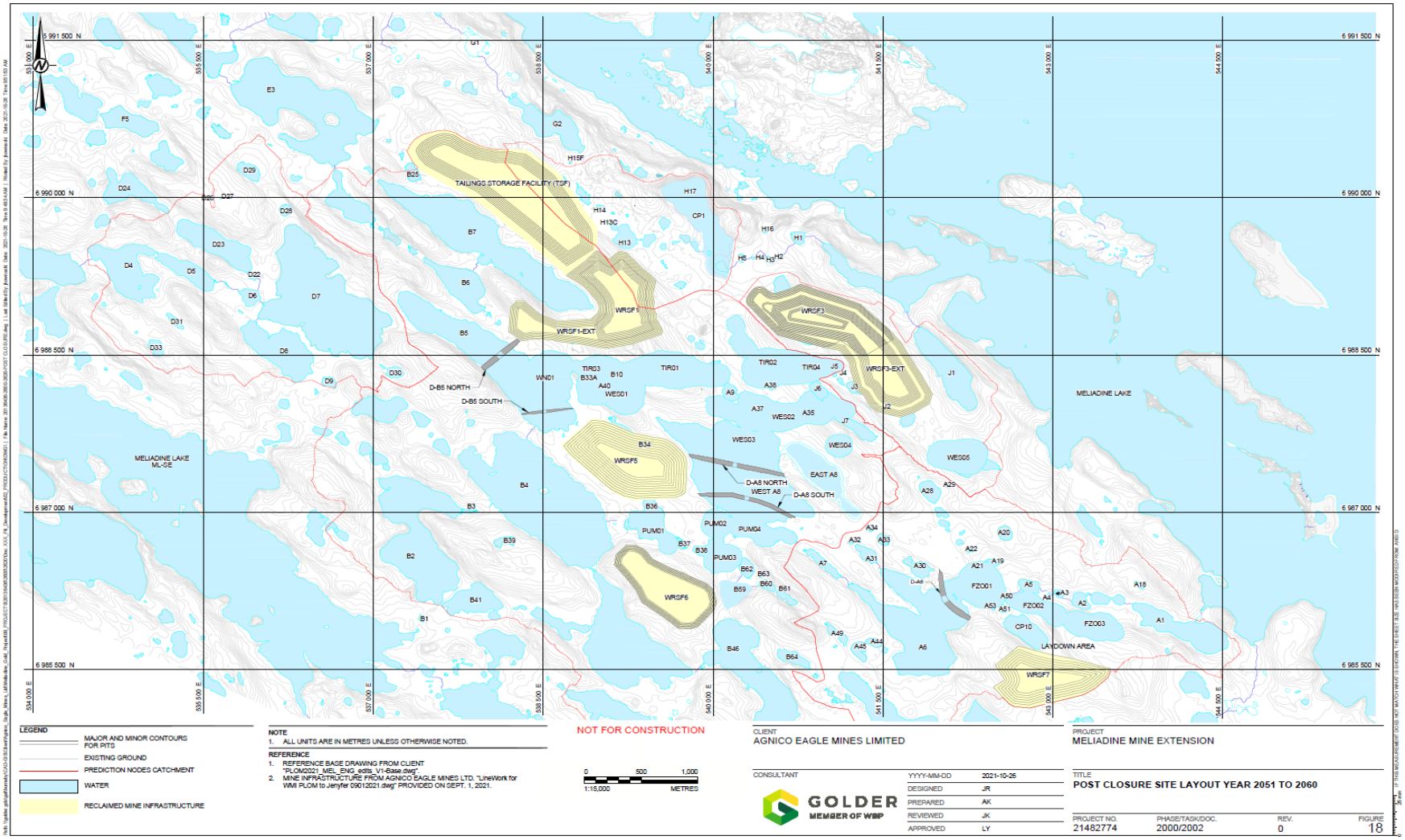
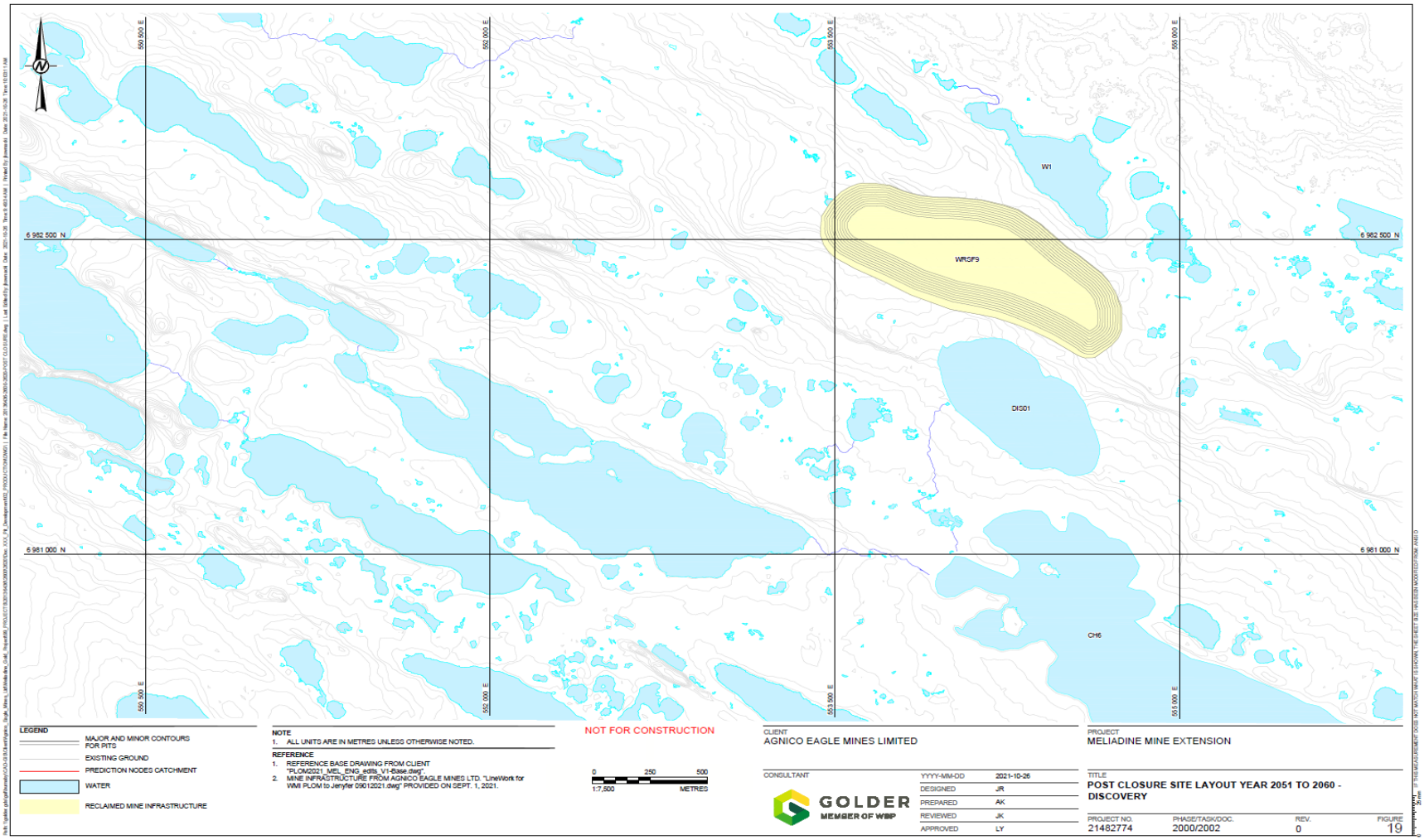


Figure 4.2: Water Management Facilities at Start of Post-Closure – Discovery Deposit



4.10.2 Closure Methods and Strategies

Water management infrastructure on site will remain in place until mine closure activities are completed, and water quality is acceptable for environmental discharge without treatment. Proposed closure activities will commence at the end of mining water management facilities, and will include the following:

- **Water Treatment Plant:** The water treatment plant will be required during operations. It is anticipated that water treatment will not be needed during the closure period because the surface contact water and saline water will be used to flood the underground mines and discharge into Meliadine Lake or Itivia Harbour will be minimized. However, the water treatment complex will remain in place for contingency. Once the active water treatment needs are satisfied, the need for water treatment plant will be re-evaluated. The need for a plant will be determined based on closure water quality monitoring at key locations around the site. If the water treatment plant is found not to be required, it will be maintained for three water treatment seasons as a contingency before being dismantled and disposed of in an appropriate landfill facility either on site or in Rankin Inlet (if approved).

  During closure, water from saline ponds will be used to flood the underground workings. Any surplus saline water will be treated and discharged through the waterline to Itivia Harbour.

- **Dikes/Berms:** The dikes and berms will remain in place to collect the surface runoff water and seepage from the mine until the water quality meets discharge criteria. Once the water quality meets discharge criteria, dikes/berms will be breached to allow runoff to follow natural (topographically induced) flow paths. Dikes/berms breaching will involve the removal of a portion of the dikes to a minimum depth of 1 m below average water level or back to original ground levels. Consideration will be given to breach staging, with the above water portions of the dike/berm in the breach area removed during winter periods, when there will be little surface water flow, thereby minimizing the potential release of sediments to the neighboring waterbodies. The remainder of the breach would be conducted during the open water season following freshet as to allow for the deployment of turbidity curtains to control potential releases of sediment. Exposed till surfaces within the breach opening above normal lake water levels will be covered with non-potentially acid generating and non-metal leaching materials. Non-potentially acid generating and non-metal leaching materials will also be used below water surface depending upon availability.

- **Channels, sumps, culverts, and ponds:** The contact water management system 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. Once the mill site is reclaimed, the local mill sump(s) will be reclaimed, and surface runoff will flow to its original catchment. Select non-contact water diversion ditches may be retained to promote surface water drainage.

  All water management infrastructure that may be maintained for closure and reclamation, including ditches and sumps, 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 development site area for natural revegetation and wildlife habitat post-closure.

5.0 PROGRESSIVE CLOSURE AND RECLAMATION MEASURES

Progressive reclamation includes closure activities that take place prior to final closure in areas or at facilities that are no longer actively required for the current or future mining operation. Reclamation activities can be done during operations with the available equipment and resources to reduce future reclamation costs, minimize the duration of environmental exposure, and enhance environmental protection. Progressive reclamation may shorten the time for achieving reclamation objectives and may provide valuable experience on the effectiveness of certain measures that might be implemented during permanent closure.

A summary of key progressive reclamation activities and the proposed timeline are provided below.

5.1 Tailings Storage Facility

Closure of the TSF will include the progressive placement of an engineered cover to limit vertical infiltration of water into the tailings. The placement of the engineered cover will also help prevent dust production. The surface of the TSF will be graded to shed water.

As noted above, cover design will be finalized during the detailed design phase of the Meliadine Extension and will consider operational experience at other northern mine sites, and available design guidelines (e.g., MEND 2012). A detailed thermal assessment of the TSF will also be completed during the detailed design phases of the Meliadine Extension. Suitable instrumentation will be installed within the TSF to monitor the thermal performance and freeze back of this facility. Data collected from this instrumentation will provide information regarding the post-closure thermal performance of the facility. The locations and number of instruments will be defined during the detailed design phase for the TSF.

5.2 Open Pits

Flooding of the open pits, water management, and closure monitoring activities will take approximately seven years following completion of pit operations and will be followed by post-closure monitoring. At present the open pits will not be closed as mining in each pit is completed to enable an evaluation of the potential to develop the deposits underground. If there is no potential for future mining, the pits will be reclaimed progressively as excavation or mining in each pit is completed.

5.3 Site Facilities

Certain facilities will be reclaimed progressively during the life of the mine, such as camps, temporary workspace, marshaling yards, quarries, borrow pits, and storage areas. Buildings not required for end land use targets will be dismantled. All building excavations or sumps will be backfilled to grade to restore natural drainage or acceptable new drainage. Small footings and floor slabs would be removed and buried. All materials that are placed in the final landfill in the WRSFs will be buried at a minimum depth of 3.7 m below the active layer. Select non-contact water diversion ditches may be retained to promote surface water drainage. Disturbed areas will be allowed to recover naturally.

6.0 INTERIM SHUTDOWN

6.1 Description

The mine operation is planned to be continuous for the full proposed operating period. However, the mine may need to shut down temporarily or indefinitely due to economic, environmental and/or social factors. Notification of interim shut down would be presented to the staff and the local population with at least 30 days' notice; if the conditions allow, a longer notice period will be provided where possible. The plans for both shutdown periods are discussed below.

6.2 Temporary Shutdown

Temporary shutdown occurs when a mine ceases operations with the intent to resume mining activities soon. Temporary shutdown could last for a period of weeks or for several months (up to 12 months) based on economic, environmental, and social factors. The objective of temporary shutdown is to ensure ongoing protection of the environment and regulatory compliance during the shutdown period. Measures deemed necessary will depend upon the duration and extent of site activities/presence during the temporary shutdown. It is anticipated that water management facilities will function at the same level during temporary shutdown periods as in operations.

The following summarizes the measures that will be taken as required during a temporary shutdown:

- Post warning signs and fences or berms as needed around the open pit perimeters.
- Dewatering of open pits and any underground areas will continue as conducted during operations since flooding and subsequent dewatering may adversely impact stability of the pit walls or underground workings.
- Environmental monitoring and sampling will continue at regular intervals as set out in the mine operations and monitoring program and in accordance with all applicable licenses, permits and authorizations.
- Routine geotechnical stability monitoring and maintenance will continue as per Water Licence requirements. The open pit areas will be inspected routinely to check for rock falls, changes to groundwater inflows and overall integrity.
- All mobile equipment except for small service equipment required for open pit inspections will be removed and placed in secure onsite storage.
- Fuel, lubricants, and hydraulic fluids will be removed from the open pit area and stored in designated areas.
- Fluid levels in all fuel tanks will be recorded and monitored regularly for leaks or removed from the site.
- An inventory of chemicals and reagents, petroleum products, and other hazardous materials will be conducted and secured appropriately or removed.
- All explosives will be relocated to the main powder magazine and secured, disposed of, or removed from the site.
- Surface water management facilities such as the ditches, water treatment plant and collection ponds will be maintained to manage contact water runoff.
- All water will be treated and discharged during the open water season
- Monitoring of water quality of the attenuation ponds will continue as per during operations.
- Water distribution lines will be drained or emptied, flushed with water, and allowed to drain, but would be left in place.
- Minimum staffing levels will be maintained to carry out care and maintenance.
- The camp will be operated at a reduced staffing level.
- Critical facilities (plant and camp) will have nominal heat to prevent freezing of the facilities and possible damage.

- The Sewage Treatment Plant will continue to operate as needed.
- Hazardous wastes on site will be collected and stored in an appropriate area for annual disposal to a registered disposal facility.

6.3 Indefinite Shutdown

Indefinite shutdown is a cessation of mining and processing operation for an indefinite period greater than 12 months. The intention is that the mine will resume operations as soon as possible after the cause for the indefinite shutdown has been addressed. The site must maintain safety and environmental stability during this time. Possible causes for an indefinite shutdown include prolonged adverse economic conditions or extended labour disputes. A decision on the estimated length of the indefinite shutdown would be made after the initial 12-month period.

Decisions on possible extensions to the indefinite shutdown would be made every six months thereafter and would be based on the conditions at that time. At present, the maximum length of time or number of extensions for interim shutdown before moving to final closure has not been defined.

The following summarizes the measures that will be taken as required during an indefinite shutdown:

- Minimum staffing levels will be maintained to carry out care and maintenance.
- The camp will be operated at reduced staffing levels.
- Environmental and geotechnical monitoring and sampling will continue at the regular level as set out in the mine operations and monitoring program, and in accordance with all applicable licenses, permits and authorizations.
- Monitoring of the pumps in the open pits will continue and the open pits will be maintained in a dry condition to maintain dry, stable pit slopes.
- The tailings surface area will be re-graded, if needed, to promote slope stability. Erosion control measures will be implemented, if required, to reduce the potential mobilization of tailings by wind, such as a cover of non-PAG waste rock placed over the exposed tailings to control dust. If necessary, the working face of the waste rock pile slopes will be graded to ensure stability and drainage to the surface water drainage system adjacent to the WRSFs. As the WRSF will be designed and operated for long-term stability, it is anticipated that any grading required will be localized and minimal. The TSF and WRSFs will be monitored to ensure the site stays in compliance with any permits and/or licences.
- The dikes will be monitored and maintained, and none of the dikes will be breached.
- Surface water control structures will be maintained as required. In areas where water quality is suitable for discharge, natural drainage courses may be re-established.
- Water distribution lines will be drained or emptied, flushed with water, and allowed to drain.
- Hazardous wastes and hazardous materials will be removed from site and sent for proper disposal at a licensed facility.

7.0 CLOSURE AND POST-CLOSURE MONITORING AND MAINTENANCE

The CCRP is a “living” document and includes a commitment to adaptive management and monitoring during all stages of the mine life to demonstrate the safe performance of the mine facilities and to minimize any contamination on the site or in the adjacent area after mine operations cease. Monitoring during operations and in closure will identify non-compliant conditions; allow timely maintenance and clean up as needed; allow timely planning for adaptive and corrective measures; and enable successful completion of the CRP.

Monitoring programs will be initiated during construction, and operations to provide additional baseline information on which to base the final CCRP document. The adaptive management plans to be used in closure will follow the

actions completed during operations and will be co-ordinated with the existing operational monitoring programs (e.g., Aquatics Effects Monitoring Plan [AEMP] and the TEMMP) to set appropriate trigger levels, and mitigation plans and actions.

Monitoring and maintenance programs that are implemented during the closure and post-closure phases of the mine life will use the data collected during operational monitoring to assess the performance of the reclamation and closure procedures, and identify long-term maintenance requirements, if any. The data collected during post-closure monitoring will allow the procedures and activities to be adjusted or modified as necessary to confirm ongoing environmental protection.

7.1 Operational Monitoring Strategies

The overall objectives of the AEMP and the TEMMP plans are to provide programs to identify and mitigate potential adverse Meliadine Extension related impacts, so that construction and operational activities do not cause any undue harm to water quality, sediment quality, vegetation, biota, wildlife, and wildlife habitats. Both the AEMP and the TEMMP provide the basis for integrating monitoring efforts with future revisions to the CCRP to ensure compliance with regulatory instruments and agreements, both federally and territorially, such as administered by the Nunavut Water Board, Fisheries and Oceans Canada (DFO), Nunavut Impact Review Board, Environment and Climate Change Canada, Crown–Indigenous Relations and Northern Affairs Canada, and the Government of Nunavut.

The AEMP and the TEMMP would be reviewed and updated in the final year of operations to reflect conditions at the site as the mine approaches closure. The changes would allow the basic portions of the plans to continue to be used to cover the closure period activities. Finally, as the closure effort is completed, the two plans would be reviewed and updated again to cover the long-term or post closure monitoring period. It is anticipated in time it may be practical to reduce monitoring to a minimum.

7.2 Closure and Post-Closure Strategies

Development of monitoring and maintenance programs is an iterative process and will be developed in more detail in consultation with communities and regulators as the Meliadine Extension advances. The programs will be extensions of efforts undertaken during the operations phase and would reflect the success of the management of the site during operations to limit contamination. The actual conditions or impact from the operations within the mine footprint would be understood at closure and this information would be used to modify monitoring plans moving to closure and post-closure.

It is anticipated that closure and post-closure monitoring will be conducted as described in the approved ICRP. Guidance on generic monitoring and maintenance programs for closure and post-closure is provided in AANDC (2007). The relevant strategies are discussed below:

Underground facilities

- Check for surface expression (subsidence) of underground failure.
- Conduct geotechnical assessment of the overall safety and risk within the subsidence zone, if required.
- Install and check thermistors where appropriate to monitor freeze-back in permafrost areas and to confirm that ground thermal regime has not degraded.
- Periodically backfill areas of subsidence as required; and
- Monitor groundwater hydrogeology in the closure period with reduced monitoring in the initial stages of post closure. It is anticipated that after several years in the post closure period, monitoring would not be required.

Open pits

- Check ground conditions to confirm permafrost conditions are being re-established as predicted.
- Sample surface water and profiles of flooded ponds/pits and sampling water during and post flooding
- Identify and test water management points (including seepage) that were not anticipated.
- Inspect barriers such as berms; and
- Inspect fish habitat in flooded pits where applicable.

Waste rock storage facilities

- Perform periodic inspections by a geotechnical engineer to visually assess stability and performance of WRSFs.
- Perform periodic inspections of ditches and diversion berms to confirm performance of the features developed and check the performance is consistent with similar features in the region.
- Examine ground conditions to confirm predicted permafrost conditions are being established as predicted.
- Check thermistor data to determine thermal conditions within waste rock piles to confirm predicted permafrost aggradation/encapsulation where applicable.
- Test water quality and measure water volumes from controlled discharge points of workings to confirm that drainage is performing as predicted and not adversely affecting the environment and that the predictions of metal leaching and acid rock drainage are consistent with modelling completed during operations; and
- Identify water discharge areas (include volume and quality) that were not anticipated.

Tailings storage facility

- Conduct periodic safety and stability reviews after closure.
- Inspect contact water collection systems.
- Monitor TSF contact water quality to confirm closure targets.

Mine infrastructure

- Maintain all buildings and equipment left on site during closure and until the equipment is removed; and
- Inspect disposal areas periodically to establish if any buried materials are being pushed to the surface as a result of frost heaving.

Landfills

- Test water quality and quantity to measure the success of the mitigation measures for waste disposal areas.
- Identify any unpredicted sources of potential contamination; and
- Check for cracking or slumping of the cover and for underlying waste material pushing its way up through the cover.

Landfarms

- Identify reclaimed area for any unpredicted sources of potential contamination; and
- Sample surface water and soil if site specific conditions dictate during the closure period.

Water management facilities

- Perform periodic inspections in the post-closure period to assess the performance of the existing water management structures.
- Check the performance of erosion protection on embankment structures such as riprap, and the physical stability of water management systems including permafrost integrity where applicable.
- Check water quality and flows to ensure system is working as predicted.
- Conduct ongoing inspection and maintenance of passive or active water treatment facilities associated with non-compliant mine water or runoff discharges; and
- Sample surface and groundwater if site specific conditions dictate during the closure period.

The closure and post-closure monitoring described above will determine the long-term maintenance that would be required for the post-closure period. It is planned that the AWAR would be maintained for sufficient period to enable access to the site for minor maintenance required in the initial portion of the post closure period. The maintenance anticipated would be for ditches and minor erosion. The need for this maintenance will be reduced with time once the surface water management ditches are well established and the pits are flooded. The AWAR will be scarified once maintenance requirements are anticipated to be minor and could be achieved with small crews sent to site via helicopter in the summer. It is anticipated that the need for ongoing maintenance would be reduced with time or will not be required once the site is physically and chemically stable.

7.3 Post-Closure Revegetation Considerations

The pre-development terrain is covered by discontinuous vegetation interspersed with few bedrock outcroppings and continuously aggrading surfaces. The vegetation includes lichens, mosses, shrubs, heaths, grasses, and sedges. The reclamation plan will be designed to encourage a natural succession of indigenous plant species within disturbed site areas. Grading and contouring would be done, where appropriate, to control soil stability to promote revegetation by natural colonization. Revegetation studies would be completed to assess the potential for vegetation to establish in disturbed areas or on rockfill covers.

8.0 ONGOING STUDIES

The following studies will continue to be implemented as Meliadine Extension progresses through construction, operations and into closure. The results of these studies will be used in future iterations of the CCRP.

8.1 Revegetation Study

In 2018, Agnico Eagle Mines and the University of Saskatchewan were successful in receiving a Natural Sciences and Engineering Research Council (NSERC) Collaborative Research and Development grant. The grant entitled “Tundra Restoration: Niche construction in early successional plant-soil systems” will support on-site and laboratory research from June 2018 to June 2022. The primary objective of this research is to address Term and Condition no. 41 of the Project Certificate for the Meliadine Mine. The specific objective is the characterization of initial and realized niches of biological soil crusts and tundra vascular plants across a sequence of naturally recolonized drilling waste dumps. Work started during the summer of 2018 and continued in 2019, with both educational activities and a field revegetation trial. Due to the COVID pandemic there was no field work in 2020. There was field work in 2021, and technical report will be issued in Spring 2022 by the University of Saskatchewan.

Vegetation monitoring is also completed as part of the Terrestrial Ecosystem Monitoring and Management Plan (TEMMP).

8.2 Surface Water and Groundwater Quality Monitoring

Groundwater quality and surface water quality testing is carried out through monitoring programs during construction and operations per Water Licence Amendment. The monitoring programs evaluate the quality of surface water runoff and groundwater reporting to the mine site areas against surface water quality predictions. The design for the water treatment plant during closure, if needed, will be based, and revised on the results of the water quality testing.

9.0 CLOSURE AND RECLAMATION SCHEDULE

The preliminary CCRP is based on conceptual level design for many facilities and correspondingly the proposed schedule is based on the conceptual closure methods and strategies discussed in the above sections. It is anticipated that the schedule will be refined throughout the mine life as the designs are advanced and the closure methods and strategies are further developed. All schedules are subject to changes in mine plans and market conditions. The proposed closure schedule is given in Figure 9.1.

A closure and reclamation cost estimate has not been finalized for the Preliminary CCRP with the present mine layout and infrastructure. An estimate will be submitted to the NWB during the Type-A Water Licence process.

The assumptions that would be considered for estimating the duration of the closure and reclamation activities and the associated costs are summarized as follows:

- Construction and operations activities were based on the mine development sequence described in the 2021 FEIS Addendum Section 2.
- Pumping rates to flood each open pit will be based on filling all pits in seven years. Re-sloping of the pit walls as required for long term stability would be carried out during operations. Closure construction activities for the open pits consist of placing a 2 to 3 m high berm along the edge of the pit perimeter in addition to the flooding.
- The TSF will be progressively reclaimed during operations using a minimum 2.5m thick non-PAG and non-metal leaching rockfill and 0.5m of overburden cover placed on the tailings surface as the tailings reach final elevation.
- All water management facilities will be active during closure until water quality meet discharge criteria and dikes are breached. Ditches and ponds will be scarified to promote vegetation and natural drainage once the dikes have been breached.
- The AWAR will be active during closure until water quality meets discharge criteria and dikes are breached. The road surface will be scarified to promote vegetation when access to the mine site is no longer required.
- Infrastructure will be dismantled and disposed of onsite or, if necessary, at an approved disposal facility or sold. The schedule conservatively considers all infrastructure being dismantled onsite and at Rankin Inlet.

Figure 9.1: Closure and Post-Closure Schedule