AGNICO EAGLE

MELIADINE GOLD PROJECT

Water Management Plan

MARCH 2017
VERSION 3
6513-MPS-11

EXECUTIVE SUMMARY (INUKTITUT)

ᐊᒃᓃᑯ ᐅᔭᕋᒃᑕᓇᐊᓕᓇᔾᒃᑯᑦ (ᐊᒃᓃᑯᒃᑯᕐ) ᐱᕙᓪᓕᐊᓂᖃᖅᑐᑦ ᑕᓯᕐᔪᐊᕐᒥᑦ ᒨᓕᒧᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ (ᐱᓕᕆᐊᖅ), 25 ᑭᓛᒥᑕᓂᒃ ᐅᖓᓯᒃᑎᒋᔪᖅ ᐅᐊᖕᓇᖓᓂᑦ ᑲᖏᖅᖠᓂᐅᑉ ᐊᒻᒪᓗ 80 ᑭᓛᒥᑕᓂᒃ ᐅᖓᓯᒃᑎᒋᑉᐳᓂ ᓂᒋᖅᐸᓯᐊᓂᑦ ᐱᖓᖕᓇᖅᐸᓯᐊᓂᑦ ᐃᒡᓗᓕᒑᕐᔪᖕᒧᑦ ᑭᕙᓪᓕᕐᒥᑦ ᓄᓇᕗᒻᒥᑦ. ᐅᔭᕋᒃᑕᓇᐊᖅ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᒥᑦ ᐊᒻᒪᓗ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᓂᕐᒧᑦ ᐱᔪᒪᔪᑦ ᐱᕙᓪᓕᐊᓗᒍ ᑎᓇᒐᓂᐊᕐᒥᑦ ᒨᓗᐃᕐ, ᒪᕐᕉᖕᓂᑦ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᓂᑦ ᐱᕐᑲᕐᓗᓂ (ᑎᓇᒐᓂᐊᖅ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᖅ 1 ᐊᒻᒪᓗ 2) ᐊᒻᒪᓗ ᐊᑕᐅᓯᕐᒥᑦ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ.

ᐃᒪᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᒪᔪᑦ ᒥᑭᓛᒃᑰᖅᑎᓪᓗᒋᑦ ᐊᒃᑐᖅᓯᓂᐅᔪᖕᓇᖅᑐᑦ ᖃᓄᑎᒋᐅᔪᒥᒃ ᐊᒻᒪᓗ ᖃᓄᐃᓐᓂᖓᓂᒃ ᐃᒪᐅᑉ ᐅᔭᕋᒃᑕᓇᐊᑉ ᐃᓂᖓᓂᑦ. ᐃᒪᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐋᖅᑭᐅᒪᔪᑦ (ᐃᒪᕐᒥᒃ ᐊᓯᐅᔾᑦᑕᐃᓕᓂᕐᒧᑦ ᐊᑐᖅᑐᑦ ᐊᒻᒪᓗ ᓴᖑᑎᑦᑎᓂᕐᒧᑦ ᓱᑉᓗᐃᑦ) ᓴᓇᔭᐅᓂᐊᖅᑐᑦ ᐱᔭᐅᔭᓇᐊᕐᑲᕐᓂᖓᑐᑦ ᑕᐃᑲᓃᑎᓐᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᔪᖅ ᐃᒪᖅ ᐃᓂᐅᔪᓂᑦ ᐱᔭᐅᔪᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒧᑦ ᐊᒻᒪᓗ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᓄᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ. ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᑐᓗᐊᖅᑐᓂᑦ ᐃᓚᐅᔪᑦ: ᐃᒪᕐᑲᕐᕖᑦ, ᐃᒪᕐᒥᒃ ᐊᓯᐅᔾᑦᑕᐃᓕᔾᔪᑏᑦ, ᓱᑉᓗᐃᑦ, ᐊᓇᕐᕕᖕᒥᙵᓛᖅᑐᓕᕆᕝᕕᒃ (STP) ᐊᒻᒪᓗ ᐊᒃᑕᑰᖅᑕᐅᔪᒥᒃ ᐃᒪᓕᕆᕝᕕᒃ (WTP).

ᐅᔭᕋᒃᑕᓇᐊᖅ ᓴᓇᔭᐅᑎᓪᓗᒍ ᐊᒻᒪᓗ ᐊᐅᓛᖅᑎᑕᐅᑎᓪᓗᒍ, ᐊᑐᖅᑕᐅᔪᖅ ᐃᒪᖅ ᐱᔪᖅ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᓂᑦ ᐃᒪᕐᓂᑦ ᐱᓕᕆᐊᖑᓂᐊᖅᑐᑦ, ᓴᖑᑎᑕᐅᓗᑎᒃ ᐊᒻᒪᓗ ᑲᑎᑕᐅᓗᑎᒃ ᐊᔾᔨᒌᙱᑦᑐᓄᑦ ᐃᒪᖅᓯᓄᑦ. ᑲᑎᑕᐅᔪᑦ ᐃᒪᖅ ᐅᔭᕋᒃᑕᓇᐊᒥᑦ ᑯᕕᑎᑕᐅᓕᕋᑦᑐᓂ ᐊᒻᒪᓗ ᑐᖅᑯᖅᑕᐅᓗᓂ ᐃᒪᕐᒥᒃ ᑲᑎᖅᓯᐃᕝᕚᖑᒧᑦ ᑕᓯᕋᔭᕐᒧᑦ (CP1), ᐊᑐᖅᑕᐅᔪᖅ ᐃᒪᖅ ᐱᓕᕆᐊᖑᓗᓂ WTP-ᒥᑦ ᑯᕕᑎᑕᐅᓂᐊᖀᕐᓗᓂ ᓯᓚᒧᑦ ᐅᕙᓘᓐᓃᑦ ᐊᑐᖅᑕᐅᓗᓂ ᐱᓕᐅᓇᕙᓪᓕᐊᕝᕕᖕᒥᑦ. ᐊᑐᖅᑕᐅᔪᖅ ᐃᒪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᓇᐊᒥᑦ ᑲᑎᑕᐅᓂᐊᖅᑐᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᖕᓄᑦ. ᐃᓚᖓ ᐃᒪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐊᑐᖅᑕᐅᒃᑲᓐᓂᕐᓂᐊᖅᑐᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐊᐅᓛᖅᑎᑦᑎᓂᕐᒧᑦ.

ᐊᑯᓂᐅᔪᒥᑦ, ᐅᒃᑯᐊᖅᓯᒪᓕᖅᑎᓪᓗᒍ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓ ᑕᓯᕋᔭᖕᓂᑦ ᐊᒻᒪᓗ ᐃᒻᒥᖅᑐᖅᑕᐅᔪᑦ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᑦ ᑕᓰᑦ ᑎᑭᐅᑎᓯᒪᓂᐊᖅᑐᖅ ᓴᕝᕙᖕᓂᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ ᐱᔪᓂᒃ ᒪᓕᒐᕋᓛᑦ (MMER) ᑭᒡᓕᖕᒋᓐᓄᑦ, ᑲᓇᑕᒥᑦ ᑲᑎᒪᔩᑦ ᒥᓂᔅᑕᐅᑎᐅᑉᐳᑎᒃ ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᒪᓕᒃᑕᐅᔭᕆᐊᓖᑦ ᒥᐊᓂᕆᔭᐅᓂᖕᒋᓐᓄᑦ ᐃᒪᕐᒥᐅᑕᐃᑦ (CCME-WQG) ᐊᒻᒪᓗ/ᐅᕙᓘᓐᓃᑦ ᐃᓂᐅᔪᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᐱᓕᕆᐊᒃᓴᐃᑦ (SSWWO) ᓴᖅᑭᑕᐅᔪᑦ ᐅᔭᕋᒃᑕᓇᐊᑉ ᐃᓂᖓᓄᑦ.

ᐅᒃᑯᐊᖅᐸᓪᓕᐊᑎᓪᓗᒍ, ᐃᒪᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᑐᖅᑐᑦ ᐃᓂᐅᔪᒥᑦ ᑕᐃᒪᐅᖕᒋᓐᓇᕐᓂᐊᖅᑐᑦ ᑭᓯᐊᓂ ᐅᔭᕋᒃᑕᓇᐊᖅ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᓂᖓ ᐱᐊᓂᒃᑕᐅᒃᐸᑦ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖃᑦᑕᕐᓂᖅ ᑕᑯᒃᓴᐅᑎᑦᑎᒃᐸᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓ ᓈᒻᒪᖕᓂᖓᓄᑦ ᑯᕕᑎᑕᐅᒃᐸᑦ ᓯᓚᒧᑦ ᐱᓕᕆᐊᖑᙱᓪᓗᓂ.

EXECUTIVE SUMMARY (ENGLISH)

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Project (the Project), located approximately 25 kilometres (km) north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. The mine plan proposes open pit and underground mining methods for the development of the Tiriganiaq gold deposit, with two open pits (Tiriganiaq Pit 1 and Tiriganiaq Pit 2) and one underground mine.

The water management objectives are to minimize potential impacts to the quantity and quality of surface water at the mine site. Water management structures (water retention dikes/berms and diversion channels) will be constructed as needed to contain and manage the contact water from the areas affected by the mine or mining activities. The major water management infrastructure includes: water containment ponds, water retention dikes, berms, channels, a Sewage Treatment Plant (STP) and an Effluent Water Treatment Plant (WTP).

During mine construction and operation, contact water originating from affected areas on surface will be intercepted, diverted and collected within the various containment ponds. The collected water at the Project will be eventually pumped and stored in Containment Pond 1 (CP1), where the contact water will be treated by the WTP prior to discharge to the outside environment or used as make-up water by the process plant. Contact water from the Underground Mine will be collected in underground storage stopes and sumps. Some water from Underground will be reused for underground operations.

The long-term, post-closure water quality in the containment ponds and in the flooded open pit lakes will meet Metal Mining Effluent Regulations (MMER) limits, Canadian Council of Ministers of the Environment water quality guidelines for the protection of aquatic life (CCME-WQG) and/or the Site Specific Water Quality Objectives (SSWWO) developed for the Project.

During mine closure, the water management infrastructure on site will remain in place until mine closure activities are completed and monitoring demonstrates that the water quality is acceptable for the discharge to the outside environment without treatment.

EXECUTIVE SUMMARY (FRENCH)

Agnico Eagle Mines Limited (« Agnico Eagle ») s'affaire à mettre en valeur le projet aurifère de Meliadine (« projet »), situé à environ 25 kilomètres au nord de Rankin Inlet et à 80 km au sud-ouest de Chesterfield Inlet, dans la région de Kivalliq, au Nunavut. Le plan minier propose des méthodes d'exploitation à ciel ouvert et souterraine pour la mise en valeur du gisement aurifère Tiriganiaq, soit deux fosses ouvertes (Tiriganiaq Fosse 1 et Tiriganiaq Fosse 2) et une mine souterraine.

Les mesures de gestion de l'eau visent à minimiser les impacts potentiels sur la quantité et la qualité des eaux superficielles sur le site minier. Les structures de gestion de l'eau (digues/bermes de retenue et canaux de dérivation) seront construites selon les besoins pour contenir et gérer les eaux usées des zones affectées par les activités minières. Les principales infrastructures de gestion de l'eau comprendront des bassins et digues de retenue, des bermes, des canaux, une station de traitement des eaux usées et une station de traitement des effluents.

Lors des phases de construction et d'exploitation de la mine, les eaux usées provenant des zones touchées en surface seront interceptées, détournées et recueillies dans différents bassins de confinement. Les eaux recueillies sur le site minier seront éventuellement pompées et stockées dans le bassin de confinement (CP1), où les eaux usées seront traitées via la station de traitement des effluents avant d'être déversées dans l'environnement extérieur ou utilisées comme eau d'appoint à l'usine de traitement. Les eaux usées provenant de la mine souterraine seront recueillies dans des chambres de stockage ou albraques souterraines. Une certaine quantité d'eaux souterraines sera réutilisée pour l'exploitation souterraine.

La qualité à long terme des eaux des bassins et des lacs recouvrant les fosses à ciel ouvert après la fermeture de la mine respectera les limites du *Règlement sur les effluents des mines de métaux* (REMM), les recommandations du Conseil canadien des ministres de l'environnement pour la qualité des eaux en vue de protéger la vie aquatique (CCME- WQG) et les objectifs de qualité pour les eaux de certains sites (SSWWO) établis pour le site minier.

Lors de la phase de fermeture de la mine, les infrastructures de gestion des eaux sur le site demeureront en place jusqu'à ce que les activités de fermeture soient achevées. Elles seront démantelées lorsque les analyses de suivi auront démontré que les eaux peuvent désormais être évacuées dans l'environnement extérieur sans traitement.

TABLE OF CONTENTS

LIST OF TABLES IN TEXT

Version	Date	Section	Page	Revision	Author
1	April 2015			The Water Management Plan as Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval	Tetra Tech EBA Inc. and Golder Associates Ltd.
2	June 2016	1.1, 1.2, 1.5, 4.4.7 1.3 4.3, 4.5, 6.1, 7.2, 8.4, 9.1, 9.2 Figures 9.1, 9.2, 9.3 Appendices	1-2 3-4, 27-29 20-21, 31-32 41, 43 46, 47-51 52	Update to reflect issuance of the Type A Water Licence. Removal of original Section 1.3 as was specifically linked to the application. Update to comply with Part B Section 13, and Part E Section 10 of the Type A Water Licence 2AM-MEL1631 Update to align with Schedule I, Table 2 Appendices strictly supporting the Water Licence application and unchanged from that submission have been removed from this iteration.	Golder Associates Ltd.
3	March 2017			Comprehensive Review of the plan	Environment Department

Prepared by:

Jennifer Brown
Water Engineer

Approved by:

Jamie Quesnel
Environmental Superintendent – Nunavut Service Group

ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited
AWAR	All Weather Access Road
CCME	Canadian Council of Ministers of the Environment
CP	Containment pond
FEIS	Final Environmental Impact Statement
FWTP	Freshwater Treatment plant
IDF	Inflow design flood
Licence	Type A Water Licence 2AM-MEL1631
MMER	Metal Mining Effluent Regulations
NWB	Nunavut Water Board
Project	Meliadine Gold Project
Salt Plant	Saline Water Treatment Plant
SD	Support document
SSWQO	Site specific water quality objectives
STP	Sewage Treatment Plant
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
WMP	Water Management Plan
WRSF	Waste Rock Storage Facility
WSER	Wastewater System Effluent Regulations
WTP	Water Treatment Plant

UNITS

%	percent
°C	degrees Celsius
°C/m	degrees Celsius per metre
mg/L	milligram per litre
km	kilometer(s)
km^2	kilo square meter(s)
m	metre
mm	millimetre
m^3	cubic metre(s)
m^3/day	cubic metre per day
m^3/s	cubic metre per second
m^3/hour	cubic metre per hour
m^3/year	cubic metre per year
Mm^3/year	million cubic metre (s) per year
Mm^3	million cubic metre(s)
masl	metres above sea level
Mt	million tonne(s)
tpd	tonnes per day

SECTION 1 • INTRODUCTION

Agnico Eagle Mines Ltd. (Agnico Eagle) is developing the Meliadine Gold Project (Project), located approximately 25 kilometres (km) north of Rankin Inlet (Figure 1.1), Nunavut, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. The Project is subject to the terms and conditions of both the Project Certificate issued in accordance with the Nunavut Land Claims Agreement Article 12.5.12 on February 26, 2015 and Licence No. 2AM-MEL1631 (the Licence), issued by the Nunavut Water Board (NWB) on April 1, 2016 (NWB, 2016).

This report presents an updated version of the Water Management Plan 2016. Certain concepts within the water balance are currently at the conceptual phase and will be update and included with future water management plans (WMP) and submitted in accordance with the Licence, prior to implementation at the Project.

1.1 Water Management Objectives

The water management objectives are to minimize potential impacts to the quantity and quality of surface water at the Project and surrounding waterbodies (The groundwater management plan is currently being developed and will be included as an appendix to the future version of the WMP). The purpose of the WMP is to provide information for water management practices, proposed infrastructure, the water balance model, water quality predictions, and water quality monitoring plan for the Project.

Water management structures (culverts, sumps, pipelines, water diversion channels and water retention dikes/berms) will be utilized to contain and manage contact water and total suspended solids (TSS) from areas affected by mining activities. Measures will be implemented for both the Project Construction and Mine Operation phases of the Project.

1.2 Management and Execution of the Water Management Plan

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

SECTION 2 • BACKGROUND

2.1 Site Conditions

The Project is located in an area of poorly drained lowlands near the northwest coast of Hudson Bay. The dominant terrain in the Project area consist of glacial landforms such as drumlins (glacial till), eskers (gravel and sand), and many small lakes. The topography is gently rolling with a mean elevation of 65 metres above sea level (masl) and a maximum relief of 20 meters.

The local overburden consists of a thin layer of topsoil overlying silty gravelly sand glacial till. Cobbles and boulders are present throughout the region at various depths. Bedrock at the mine site area consists of a stratigraphic sequence of clastic sediments, oxide iron formation, siltstones, graphitic argillite, and mafic volcanic flows (Snowden, 2008; Golder, 2009).

The climate is extreme in the area, with long cold winters and short cool summers, and mean air temperatures of 12°C in July and -31°C in January. The mean annual air temperature at the Project site is approximately -10.4 °C (Golder, 2012a). Strong winds blow from the north and north-northwest direction more than 30 percent of the time.

The mean annual precipitation in the area is approximately 412 mm and is typically equally split between rainfall and snowfall.

2.1.1 Local Hydrology

The Project is located within the Meliadine Lake watershed. Meliadine Lake has a water surface area of approximately 107 square kilometres (km^2), a maximum length of 31 km, features a highly convoluted shoreline of 465 km in length, and has over 200 islands. Unlike most lakes, it has 2 outflows that drain into Hudson Bay through 2 separate river systems. It has a drainage area of 560 km^2 upstream of its two outflows. Most drainage occurs via the Meliadine River, which originates at the south west end of the lake. The Meliadine River flows for a total stream distance of 39 km. The Meliadine River flows through a series of waterbodies, until it reaches Little Meliadine Lake and then continues into Hudson Bay. A second, smaller outflow from the west basin of Meliadine Lake drains into Peter Lake, which discharges into Hudson Bay through the Diana River system (a stream distance of 70 km). At its mouth, the Diana River has a drainage area of 1460 km^2.

Watersheds in the Project area are comprised of an extensive network of waterbodies, and interconnecting streams. The hydrology of these watersheds is dominated by lake storage and evaporation.

2.1.2 Ice and Winter Flows

Late-winter ice thicknesses on freshwater lakes in the Project area range between 1.0 to 2.3 m with an average thickness of 1.7 m. Ice covers usually appear by the end of October and are completely formed in early November. The spring ice melt (Freshet) typically begins in mid-June and is complete by early July (Golder, 2012b).

2.1.3 Spring Melt (Freshet) and Freeze-up Conditions

With the exception of the main outlet of Meliadine Lake, which has been observed to flow continuously throughout the year, outlets of waterbodies near the Project typically start flowing late May or early June, followed by freshet flows in mid-to-late-June. Flows steadily decrease in July and low flows are ongoing from August to the end of October, prior to winter freeze.

2.1.4 Permafrost

The Project is located in an area of continuous permafrost. The depth of permafrost is estimated to be in the order of 360 to 495 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. The typical permafrost ground temperatures at the depths of zero annual amplitude (typically at the depth of below 15 m) are in the range of -5.0 to -7.5 °C in the areas away from lakes and streams. The geothermal gradient ranges from 0.012 to 0.02 °C/m (Golder, 2012c).

2.1.5 Local Hydrogeology

Groundwater characteristics at areas of continuous permafrost that are generally present in the Project area include the following flow regimes:

- A shallow flow regime located in an active layer (seasonally thawed) near the ground surface and above permafrost; and,
- A deep groundwater flow regime beneath the base of the permafrost.

From late spring to early autumn, when temperatures are above 0 ˚C, the shallow active layer thaws. Within the active layer, the water table is projected to be a subdued replica of topography. Groundwater in the active layer flows to local depressions and ponds that drain to larger waterbodies. The talik beneath large waterbodies will be open. The open talik will connect to the deep groundwater flow regime beneath the permafrost.

Elongated waterbodies with terraces and a width of 340 to 460 m or greater are expected to have open taliks extending to the deep groundwater flow regime at the Project. Meliadine Lake and Lake B7 are likely to have open taliks connected to the deep groundwater flow regime (Golder, 2012a). No impact is expected to Lake B7 by mine activities.

2.2 Mine Development Plan

The Mine Plan and key mine development activities, including mine waste management are currently used concurrently with the WMP.

The Mine Plan proposes one underground mine (Tiriganiaq Underground Mine) and two open pits (Tiriganiaq Open Pit 1 and Tiriganiaq Open Pit 2) for the development of the Tiriganiaq gold deposit.

The mine is estimated to produce approximately 12.1 million tonnes (Mt) of ore, 31.8 Mt of waste rock, 7.4 Mt of overburden waste, and 12.1 Mt of tailings. The following phased approach is proposed for the development of the Tiriganiaq gold deposit;

- Phase 1: 4 years for Project Construction. Construction began in 2015 and is estimate to be complete in 2019 (Q4 Year -5 to Year 1);
- Phase 2: 8 years for Mine Operations, beginning in 2019 (Year 1 to Year 8);
- Phase 3: 3 years Mine Closure (Year 9 to Year 11); and;
- Phase 4: Post-Closure (Year 11 forward).

Mining facilities on surface will include a plant site and accommodation buildings, three ore stockpiles, a temporary overburden stockpile, a tailings storage facility (TSF), three waste rock storage facilities (WRSFs), a water management system that includes containment ponds, water diversion channels, and retention dikes/berms, and WTPs.

The general mine site layout plan is shown on Figure 1.2.

SECTION 3 • WATER MANAGEMENT CONTROLS AND STRUCTURES

A network of berms, dikes, containment ponds, channels and sumps will be constructed and maintained to facilitate the Project water management. The following sections describe the water management design criteria for structures and the infrastructure required for the Project.

3.1 Water Management Systems

The water management systems, as shown in Figure 1.2, include the following components:

- Five water containment ponds (CP1, CP3, CP4, CP5, and CP6) and their associated dikes (D-CP1, D-CP3, D-CP4, D-CP5, and D-CP6)
- Three P-Area containment ponds (P1, P2, and P3) and four dikes (DP1-A, DP1-B, DP2-A, and DP3-A)
- A saline surface water sump (Saline Pond)
- Three diversion berms (Berm 1, Berm 2, and Berm 3)
- Eight water diversion channels (Channel 1 to Channel 8)
- Six water passage culverts to convey water through a pad and various haul roads (Culvert1 to Culvert6)
- Three evaporators
- An effluent water treatment plant (WTP)
- A saline water treatment plant (Salt Plant) (location being considered)
- A sewage treatment plant (STP)
- A network of surface pumps and pipelines
- A freshwater intake causeway
- An effluent diffuser located in Meliadine Lake

During the Project Construction and Mine Operation phases, surface contact water will be intercepted, diverted and contained within various containment ponds. The saline water collected in the ponds will be temporarily stored and then pumped to a saline treatment plant (Salt Plant)(currently being considered by Agnico Eagle) prior to being pumped to CP1. At CP1, the water will be treated at the water treatment plant (WTP) and either transferred to the process plant for use as make-up water or discharged through the diffuser located in Meliadine Lake.

Contact water from the Underground Mine will be collected in underground sumps and recirculated for various underground operations. Excess underground contact water that is not used for operations will be stored underground and any excess water that cannot be stored underground will be pumped to the Saline Pond temporarily and then eventually transferred to the Salt Plant and then to CP1.

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.

A list of the water management control structures are presented in Table 1 with the approximate Project phase. Figure 1.2 shows the location of the respective structures at the different development stages (Year – 5 to Year 8) of the mine life. Final design details of these structures have been or will be provided to the regulators for approval at least 30 days prior to construction, as per the Licence.

Table 1: Water Management Control Structures

Project Phase	Infrastructure Name
Pre-Production Construction (Y-5 to Y 1)	Culvert 2
	Channel 2
	D-CP1
	D-CP5
	Freshwater Intake Causeway
	Channel 1
	Berm 3
	Channel 5
	Berm 1
	Channel 6
	Channel 7
	Channel 8
	Culvert 3
	Culvert 4
	Culvert 5
	Culvert 6
	Submerged Diffuser
	WTP Intake Causeway
	Culvert 1
Sustaining Construction during Mine Operation (Y1 to Y8)	CP3
	CP4
	Berm 2
	D-CP3
	D-CP4
	Channel 3
	Channel 4
	D-CP6

3.2 Water Management Structures Design Criteria

The following sections describe various water management systems that will be designed to meet the criteria:

- Water quality that meets regulatory criteria (described in Section 8).
- Design capacity of the WTP, Dike D-CP1 and CP1 will be able to manage the surface contact water from the entire site for a 1:100 wet year spring freshet or a 1:2 mean year spring freshet, plus a 1:1000 return 24-hour extreme rainfall.
- With the design capacity of pumping from CP5 to CP1, Dike D-CP5 and CP5 will be able to manage the water from its catchment area for 3/7 of a 1:100 wet year spring freshet or a 1:1000 return 24-hour extreme rainfall.
- Each of the other water management dikes (D-CP3, D-CP4, and D-CP6) and associated ponds (CP3, CP4, and CP6), with the design pumping capacity, will be able to manage the water from its catchment area for 3/7 of a 1:100 wet year spring freshet or a 1:1000 return 24-hour extreme rainfall.
- The daily pumping rate for each of the CP3 to CP6, Tiriganiaq Pit 1 sump, and Tiriganiaq Pit 2 sump will be designed to have sufficient pumping capacity to handle the runoff water, which would result from one day (24.4 mm) of a 1:100 return wet spring freshet plus a 1:2 return one-hour rainfall (9.8 mm).

Channel2 to Channel4 will be designed to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 9.2 mm. Channel1 and Channel5 to Channel8 are internal channels where any water overflowing the channels will remain within the catchment areas of various containment ponds. Hydraulic analyses indicated that very wide channels are required to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 9.2 mm. As a result, these channels were designed to have a reasonable bottom width to pass a flow with lesser intensity, but the water overflowing the channels can be safely managed by berms or temporarily stored in a lower basin nearby. For example, water overflowing Channel5 can be contained by Berm3. Water overflowing Channel7 and Channel8 can be stored in the lower basin in the drained Pond H13, and Berm1 will protect Portal No.2 from flooding. Water overflowing Channel1 will flow through the flat ground between Ore Pad 1 (OP1)/Ore Pad 2 (OP2) and WRSF2 into CP1.

Hydraulic analyses indicated that many more culverts or larger culverts would be required to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 9.2 mm for Culvert1. As a result, Culvert1 was designed to pass a flow with lesser intensity, but the excess water can be safely managed by berms or temporarily stored in a lower basin nearby. The excess water that cannot pass through Culvert1 can be temporarily stored in the lower basin in the drained Pond H13, and Berm1 will protect Portal No.2 from flooding. Other culverts are less critical and the excess water that cannot pass through the culverts can be temporarily stored in a lower basin nearby within the water containment pond catchments.

Table 2 presents the design parameters for CP1, CP5 and CP6.

Table 2: Design Parameters for CP1, CP5 and CP6

Pond	CP1	CP5	CP6
Original Pond Name	H17	A54	H19
Original Pond Elevation (m)	64.13	65.75	63.53
Pond Volume for Water Elevation at Original Pond Elevation (m^3)	144,577	26,138	16,789
Projected Maximum Pond Operating Water Elevation under Normal Operating Conditions and Mean Precipitation Years (m)	65.13	65.79	63.64
Pond Volume for Water Elevation at Projected Maximum Pond Operating Water Elevation under Normal Operating Conditions and Mean Precipitation Years (m^3)	377,058	27,221	19,154
Estimated Maximum Water Elevation during Inflow Design Flood (IDF) (m)	66.11	66.11	63.94
Pond Volume for Water Elevation at Estimated Maximum Water Elevation during IDF (m^3)	658,936	47,482	31,800
Dike for Pond	D-CP1	D-CP5	D-CP6
Design Crest Elevation of Dike Containment Element (liner system) (m)	66.50	66.30	64.30
Pond Volume for Water Elevation at Design Crest Elevation of Dike Containment Element (m^3)	778,502	66,231	49,627

CP3 and CP4 will be established through sub excavation of the original ground to increase the water storage capacity and eliminate or limit the requirement for berm construction. The key design parameters for CP3 and CP4 are provided in Table 3.

Table 3: Design Parameters for CP3 and CP4

Pond	CP3	CP4
Elevated Pond Bottom Elevation (m)	62.20	61.00
Excavated Pond Outlet Elevation (m)	64.15	63.46
Pond Volume for Water Elevation at Pond Outlet Elevation (m^3)	25,454	30,911
Projected Maximum Pond Operating Water Elevation under Normal Operating Conditions and Mean Precipitation Years (m)	63.49	62.55
Pond Volume for Water Elevation at Projected Maximum Pond Operating Water Elevation under Normal Operating Conditions and Mean Precipitation Years (m^3)	16,899	19,458
Estimated Maximum Water Elevation during IDF (m)	64.32	63.55

Pond	CP3	CP4
Pond Volume for Water Elevation at Estimated Maximum Water Elevation during IDF (m^3)	28,056	32,304
Dike for Pond	D-CP3	D-CP4
Design Crest Elevation of Dike containment Element (liner system) (m)	65.10	64.40
Pond Volume for Water Elevation at Design Crest Elevation of Dike Containment Element (m^3)	42,456	51,337

3.3 Water Containment ponds

Five water containment ponds (CP1, CP3, CP4, CP5, and CP6) will be constructed as part of the water management infrastructure. Table 4 presents the locations and the required operational period of the containment ponds. The locations of the five water containment ponds are shown on Figure 1.2. CP1, CP5, and CP6 will be established within existing shallow ponds.

Table 4: Location of Containment Pond and Required Operation Periods

Containment Pond	Relative Location	Required Operation Period
CP1	Pond H17	Year 2017 to mine closure
CP3	North of Lake B7 and southwest of TSF	Year 2019 to mine closure
CP4	Southeast of Lake B7 and south of WRSF1	Year 2019 to mine closure
CP5	North of Tiriganiaq Pit 2	Year 2017 to mine closure
CP6	Pond H19 and north of WRSF3	Year 2023 to mine closure

3.4 P-Area Containment Ponds

Late in the winter/early spring of 2016, Agnico Eagle initiated a series of corrective actions as a result of the water quality issues associated with the Portal No.1 area. The result was additional water management controls, such as monitoring, improved explosives management, the design/construction of a more robust series of containment ponds around the area of Portal No.1, and a review of chloride management practices.

The immediate focus was to increase the storage capacity at original Containment Pond P1 to accommodate the 2016 spring freshet and minimize seepage towards CP5 (former A54).

To obtain the required minimum temporary storage capacity for management of underground mine inflows and WRFP runoff, the original Containment Pond P1 basin was divided in two ponds [a "new" P1-Containment Pond (P1) and P2-Containment Pond (P2); a third [P3-Containment Pond (P3)] was also constructed in the area.

The three newly constructed containment ponds are collectively known as the P-Area Containment Ponds (P-Area). The total storage capacity of the P-Area ponds is 46,041 m^3. P1 is located at the northern area of the existing containment. P2 is located at the southern area of the original containment area footprint. P3 was constructed east of the existing south access road, with the primary purpose of collecting seepage originating from the P2 confining berm and its abutments. A pumping station was installed to collect and pump any collected water from P3 to P1.

To accommodate these modifications, four (4) emergency water containment berms DP1-A, DP1-B, DP2-A, and DP3-A, with three evaporators (on DP1-B) were constructed during the spring of 2016 to provide the required containment and mitigate the water quality issues in the nearby lakes. Table 5 summarizes the as-built capacities for the P-Area ponds and Figure 3.1 illustrates the P-Area plan view.

Table 5: As-Built Capacity for P-Area Ponds

Pond	P1	P2	P3
As-built Capacity (m^3)	20,781	6,828	18,432
Maximum Design Water Elevation (m)	68.5	67.5	67.0
Total P-Area Capacity (m^3)	46,041		

Increased water monitoring protocols for the P-Area, over and above that required by the License, were also implemented. The additional monitoring included water quality and transfer data such as locations and flow volumes for water pumped to and from the containment ponds and are discussed further in Section 8.

3.5 Saline Pond

In May 2016, water storage capacity was further evaluated and an additional surface storage pond was required to store excess underground saline water between quarter 3, 2016 (Q3-2016) and quarter 4, 2017 (Q4-2017). The Saline Pond was constructed in Q3-2016 to accommodate the excess saline water. The Saline Pond is located east of P3 and north of CP5 (Figure 1.2). Table 6 summarizes the Saline Pond capacity for storage and maximum designed operating water levels.

Table 6: As-Built Storage Capacity for the Saline Pond

Item	Water Balance Under Mean Precipitation Conditions
Maximum Design Water Elevation (m)	62.9
Maximum Saline Water Capacity (m^3)	25,371
Estimated Maximum Storage Capacity at Maximum Water Elevation (m^3)	32,675 *

* Includes the capacity for saline water to be pumped into the Saline Pond between October 2016 and December 2017, a combined capacity for net precipitation, and potential seepage water into the pond during the same period.

3.6 Water Diversion Channels, Dikes and Berms

3.6.1 Water Diversion Channels

Eight water diversion channels (Channel1 to Channel8) will be constructed as part of the water management infrastructure. The key information and design parameters for each channel are presented in Table 7.

Table 7: Design Parameters for Channels

Item	**Channel**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Approximate Total Length (m)	463	300	619	710	429	69	214	315
Bottom Width (m)	3	1	1 or 2*	1 or 2*	3	1	1	1
Side Slopes	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)
Rip-rap Thickness (m)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Minimum Bottom Slope Gradient (%)	0.28	0.30	0.17	0.13	0.17	0.44	0.42	0.38

*** 1 m bottom width for first 100 m upstream section, and 2 m bottom wide for the remaining channel section**

3.6.2 Water Retention Dikes and Berms

In general terms, “dikes” will retain continuous water during normal operations and “berms” may retain short-term water during high level water events. At the end of mine closure when the water quality in the corresponding pond meets direct discharge criteria, each of the other dikes and berms on site (except for Berm2) will be breached to restore the original natural drainage paths. Berm 2 will remain in place to prevent non-contact water from flowing into the Tailings Storage Facility (TSF).

Permafrost is expected to exist beneath the footprint of each dike and berm at the Project. Each of the water retention dikes (D-CP1, D-CP3, D-CP4, D-CP5, and D-CP6) has been designed as a zoned earth fill dam with a geomembrane liner keyed into the expected permafrost foundation to limit the seepage through the dike and its foundation. The characteristics of the dikes and berms required for the water management plan are summarized in Table 8.

Table 8: Design Parameters for Water Retention Dike/Berm

Item	D-CP1	D-CP3	D-CP4	D-CP5	D-CP6	DP1-A	DP1-B	DP2-A	DP3-A	Berm1	Berm2	Berm3
Approximate Maximum Height (m)	4.5	2.0	2.0	2.6	1.8	3.7	3.4	4.0	3.4	1.6	2.5	1.8
Maximum Elevation (m)	67.5	66.1	65.4	67.3	65.3	70.5	70.7	69.5	69.0	68.5	varies	67.5
Maximum Head of Water Retained (m)	3.5	0.2	0.1	1.4	0.5	68.5	68.7	67.5	67.0	0	0	0

3.7 Evaporators

Three evaporators were installed on jetties constructed at DP1-B in June 2016. The evaporator system is designed for vaporizing water contained at the P-Area. The evaporators were implemented to accommodate the quantity of excess saline water before saline water treatment options and disposal plans have been finalized. Based on data collected during 2016, the efficiency of one evaporator was estimated to be 22 m^3/hr.

3.8 Freshwater Intake

Freshwater usage at the Project includes potable uses, fire supression, make-up water for the mill, and other operational requirements, such as drilling water, batch plant use and the washbay. The main freshwater intake is housed within a rockfill causeway located north east of the industrial pad in Meliadine Lake, as shown on Figure 1.2 and an additional freshwater intake pump is located in Lake A8. The intakes consist of vertical filtration wells fitted with vertical turbine pumps that supply water on demand. Both intake pipes will be fitted with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen (NWB, 2016).

The Meliadine Lake intake will be connected to the pump house with piping buried under the rockfill causeway.

3.9 Water Treatment

Water will be treated (if necessary) to meet Licence requirements prior to be discharged to the environment. TSS mitigation techniques (i.e., attenuation ponds, silt screens, etc), oil separation treatment, a STP, Salt Plant, and a WTP will be used at various locations on the Project prior to water being transferred to containment ponds and/or as effluent discharge to Meliadine Lake. Water quality criteria are discussed in Section 8.

3.9.1 Freshwater Treatment Plant (FWTP)

Freshwater from Meliadine Lake will be treated in the FWTP before being directed to the camp areas for potable (domestic) water uses. The design flow rate for freshwater for the main camp and accommodations is 216 m^3/day. In the FWTP, the freshwater will be pumped through cartridge filters, then pumped through ultraviolet units, and finally be treated with sodium hypochloride (chlorine). The treated water will be stored within a potable water tank. Potable water will be monitored according to the Nunavut Health Regulations for total and residual chlorine and microbiological parameters. Operation and maintenance details for the FWTP can be reviewed in the Process and Control Narrative (H2O Innovation, 2016).

3.9.2 Sewage Treatment Plant (STP)

Waste water from the accommodation complex and from satellite sewage tanks will be treated in the STP before being directed to CP1. Operation and maintenance details for the STP can be reviewed in the Operational & Maintenance Manual – Sewage Treatment Plant (Agnico Eagle, 2017a).

3.9.3 Saline Water Treatment Plant (Salt Plant)

Saline water generated from underground mining development and production is currently being stored underground and on surface at the P-Area and Saline Pond. Options for the best practice desalinization treatment for the Project are currently being reviewed and pilot tested. The location for the Salt Plant is also being considered.

3.9.4 Effluent Water Treatment Plant (WTP)

The Effluent Water Treatment Plant (WTP) will be required to treat and discharge 470,000 m^3 of contact water at Year -4. The volume of water requiring treatment and discharge will increase to a maximum of 798,000 m^3 at Year 3 and then decrease to 673,000 m^3 during the final year of the life of mine (Year 8).

3.9.5 Total Suspended Solids

Based on the anticipated water quality (Section 8) and water quantity, the WTP will be used to treat TSS in contact water. The WTP is designed to treat large volumes of water to minimize costs associated with water storage on-site. An iterative process was used to optimize the balance between the size of the containment ponds and the WTP. Based on the maximum flow rate required each year, it was determined that the WTP (Actiflo® system model ACP-600R) will have a maximum capacity of 520 m^3/h (nominal flow) at Year -4 and will be increased with a second ACP-600R to reach a maximum capacity of 1,040 m^3/h at Year 3.

TSS mitigation is ongoing with runoff water and is described further in the Freshet Action Plan (Agnico Eagle, 2017b). Additional TSS removal options are being considered for underground water, prior to pumping to surface.

3.9.6 Oil Separator

In 2017, an oil separator will be installed at the Maintenance Shop to collect and separate oil from water used for washing mining equipment. Operational details can be reviewed in the Instructions for Installation and Operation manual for the Bekosplit 12, 13, 14 [BEKO Technologies GMBK, (unknown year)].

3.10 Discharge Diffuser

The discharge diffuser will be the final effluent discharge location for the Project. The overall purpose of the diffuser is to discharge water from CP1 (at sampling station Mel_14) to Meliadine Lake while providing minimal environmental impacts to the Lake. The effluent mixing will be dependent on ambient currents in Meliadine Lake, which will depend on wind conditions during the open water period. The diffuser modelling was initially conducted by Golder (Golder, 2015) and updated design progress was reported by Tetra Tech EBA (Tetra Tech, EBA 2016).

SECTION 4 • WATER MANAGEMENT STRATEGY

There are four major sources of inflow water considered in the Project water management system; freshwater pumped from Meliadine Lake and Lake A8, natural run off from precipitation, natural groundwater inflow to the underground mine and open pits, and water produced during freshet.

A brief summary of the water management strategy for the Project is presented as follows:

- Contact water from key mine infrastructure will be diverted and/or collected in the containment ponds (CP1, CP3, CP4, CP5, CP6, the Saline Pond and the P-Area Ponds).
- The collected water in CP3 to CP6 will be pumped to CP1. Water collected in CP1 will be reused by the process plant and the excess water will be treated by the WTP prior to discharge to the outside environment via the diffuser into Meliadine Lake.
- Contact water from underground mine will be contained in underground sumps and a water storage stope and reused for mining operations. The excess volumes will be pumped to the Saline Pond or P-Area Ponds to be stored on surface and treated before transferring to CP1.
- Runoff water in the open pits will be collected by the sumps and then pumped to the designated water containment ponds.
- Natural flooding to the open pits at end of mining will be supplemented by using freshwater from Meliadine Lake.
- Upon the completion of underground mining, the underground mine working will be allowed to naturally flood by groundwater seepage.

Appendix A presents the Freshet Action Plan and the Snow Management Plan for the Project. Table 9 summarizes the overall contact water management plan for the key mine infrastructure and presents the initial water collection locations and final water destinations. The plans for water management at key areas are described in the following subsections.

Table 9: Overall Site Surface Contact Water Management Plan

Contact Water Source	Initial Contact Water Collection Location	Final Contact Water Collection Location
Industrial Site Pad Area (camp/process plant area)	CP1	CP1
WRSF1 Area	CP1, CP4 and CP5	
WRSF2 Area	CP1 and CP5	
WRSF3 Area	CP6	
Dry Stack TSF Area	CP1 and CP3	
Ore Stockpiles OP1 to OP3	CP1	
Landfill	CP1	
Landfarm (biopile)	Sump within landfarm	To CP1 after pre-treatment of oil
Tiriganiaq Pit 1 Tiriganiaq Pit 2	Open pit sumps	First to CP5 and then to CP1
Tiriganiaq underground	Sump in underground mine	Mainly within underground mine with excess surface water to be pumped to the ground surface and stored at the P-Area or Saline Pond.

Various containment ponds will be dewatered and treated (as necessary), prior to freshet (open water season) or prior to discharging through the diffuser to Meliadine Lake. The following sections described the strategy for water management at different areas for the Project.

4.1 Key Water Management Activities

The activities required for the water management plan are summarized in Table 10. Water management activities during closure are described in Section 6.

Table 10: Key Water Management Activities

Mine Year	Major Water Management Activities and Sequence
Q4 of Yr -5 (2015)	• Start to re-use the underground water.
Yr -4 (2016)	• Dewatering of H17 into Meliadine Lake. • Dewater Pond A54 in Q3 of Year -4 and pump the water to CP1. • Start to store the excess groundwater from the underground mine at surface. • Implement and test evaporators at P-Area to reduce water volumes stored at

Mine Year	Major Water Management Activities and Sequence
	surface. • Construct trenches down gradient from DP1-B and DP3-A to be able to pump collected water seep and pump back to the associated containment pond.
Yr -3 (2017)	• Start to pump the water from CP1 to WTP for treatment prior to discharge to the outside environment via the diffuser in Meliadine Lake. • Pump the underflow sludge water from the WTP to CP1. To limit recirculation of the sludge within CP1, the discharge will be located away from the WTP intake. • Start to treat sewage water and pump the treated sewage water from sewage treatment plant to CP1. • Start to pump the contact water from CP5 to CP1 for treatment/dilution • Start to pump water seepage collected in trenches, down gradient from D-CP1, D-CP5, DP1 and DP3 to the associated containment pond. • Start to pump the water from the Landfarm to CP1 after pre-treatment for oil. • Start to pump water from washbay to underground for storage until treatment for oil plant arrives at the site • De-ice or divert water from Lakes H17A, H17B, and H17 C
Yr -2 (2018)	• Start to divert the contact water from industrial pad to CP1 via Channel1.
Yr -1 (2019)	• Start to pump the treated water from WTP to the Process Plant as make-up water • Start to pump the underflow sludge water from WTP to the mill • During the open water season, the Process Plant will be supplemented as much as possible with water from the WTP. For the balance of the year, fresh water will be used for ore processing • Start to pump the excess truck wash water from the wash bay into CP1
Yr 1 (2020)	• Start to pump the contact water in CP3 to the partially drained Pond H13 where the water will flow through Channel1 into CP1 • Start to pump the contact water in CP4 to the partially drained Pond H13 where the water will flow though Channel1 into CP1
Yr 2 (2021)	• Start to pump the contact water collected in Tiriganiaq Pit 1 to CP5
Yr 3 (2022)	• Dewater Ponds H19 and H20 in Q3 of Year 3 and pump the water to CP1
Yr 4 (2023)	• Start to pump the contact water collected in Tiriganiaq Pit 2 to CP5 • Start to pump the contact water in CP6 to CP1
Yr 5 (2024)	• Water management plan similar to Year 4
Yr 6 (2025)	• Water management plan similar to Year 4
Yr 7 (2026)	• Water management plan similar to Year 4 • Stop pumping water from opens pits when the pits are mined-out at end of year • Stop pumping excess water from underground when underground mine is completed

Mine Year	Major Water Management Activities and Sequence
Yr 8 (2027)	• Start to fill the mined-out Tiriganiaq Pit 1 and Tiriganiaq Pit 2 with active pumping water from Meliadine Lake • Start natural flooding of Tiriganiaq Underground mine with groundwater seepage • Stop pumping water to process plant when the processing is completed

4.1.1 Pond Dewatering and Displacement

Table 11 summarizes the dewatering plan and estimated volume of water to be dewatered for construction or prior to freshet. For the initial dewatering CP1, CP5, and Ponds H19, and H20, it is assumed that approximately half the volume of water in these ponds has been or will be pumped to Meliadine Lake if it meets discharge criteria, and the remaining half volume of water will be pumped to CP1 to be stored for treatment or dilution.

Table 11: Pond Dewatering Plan

Pond	CP5	CP1	H20	H19
Maximum Pond Water Depth (m)	1.3	1.7	1.6	1.4
Existing Pond Surface Area (ha)	5.99	15.4	9.58	2.91
Dewatering Schedule	Sept. to Oct. of 2016	August to September of 2016	Sept. to Oct. of Year 3	Sept. to Oct. of Year 3
Estimated Total Volume of Water to be Dewatered (m^3)	34,545	82,400	90,307	16,431

The Meliadine Esker is located adjacent and north of CP1 and contains three shallow ponds (H17a, H17b, and H17c) (Figure 1.2). The three ponds will have ice removed or the water will be diverted during the open water season. Ice or water will be diverted to CP1.

Ponds may also be displaced by the placement of fills. The water displaced by fill material will be diverted and collected in the adjacent water containment ponds. During winter season, the ice within the ponds will be removed and deposited at CP1 before site infrastructure construction.
Channel1 will drain Ponds H10, H11, H12, and H13. The water in these ponds will flow into CP1 via Channel1.

Channel5 will drain Ponds A12 and A13. The water in these ponds will flow into CP5 via Channel5.

4.1.2 Underground Water Management

The Underground Mine will extend approximately 650 m below the ground surface and part of the underground mine will be operated below the base of continuous permafrost. The underground excavations will act as a sink for groundwater flow during mining, with water induced to flow through the bedrock to the underground mine workings once the mine has advanced below the base of the permafrost. Table 12 presents the estimated rates of passive groundwater inflow to the underground mine based on the studies presented in the FEIS for the Project (Agnico Eagle, 2014a).

Table 12: Estimated Rates of Passive Groundwater Inflow to Underground Mine

Year	Estimated Passive Inflow (m^3/day)*
2015 to First Quarter of Yr 2019	0
Second Quarter of Yr-3 to End of Yr-3	420
Yr -2 to Yr 7	526

*based on data provided in Agnico Eagle (2014); to be reassessed based on results from the planned 2015 and 2016 hydrogeological investigation program.

Contact water in the Underground Mine will be contained within underground sumps and a water stope. A proportion of the underground water will be recirculated as make-up water for underground drilling. Underground drilling water requirements are estimated to range from approximately 50 m^3/day to a maximum of 1,500 m^3/day in Year 2020. The drilling water will report to the underground sumps for recirculation; however, the need for up to 3% treated water make-up has been assumed to compensate for losses of drilling water due to evaporation or capture within the mined waste rock that is transferred to surface.

Excess underground water will be pumped to surface to be managed. The estimated volume of water to be managed is expected to range from a minimum of about 0.11 Mm^3/year to a maximum of 0.18 Mm^3/year depending on the production. Details of the underground dewatering system are provided in the Mine Plan (Agnico Eagle, 2015a).

Calcium chloride is added to the underground water to increase salinity and reduce water freezing during drilling. Agnico Eagle is considering several options for the long-term management of groundwater reporting to the underground workings at the Project, including saline water treatment.

4.1.3 Water Management for Haul Road

A network of haul roads will be used to provide access to infrastructure at the Project. The majority of the roadways servicing the mining area will be located so that drainage will be directed towards the contact water management infrastructure. Detailed information about water management on roads is described in the Roads Management Plan (Agnico Eagle, 2014b).

4.1.4 Water Management for Landfarm and Landfill

Water management for water collected at the Landfarm will be treated for oil and then pumped to CP1. Additional details for Landfarm water management is described in the Freshet Action Plan (Agnico Eagle, 2017b).

Leachate from the landfill is anticipated to be diluted due to the controls placed on materials acceptable for landfilling. Moreover, drainage from the landfill is largely expected to freeze within the WRSF with little to none reporting to the water collection infrastructure placed around the WRSF. Annual landfill operation will also involve clearing of snow prior to spring melt. However, in the event there is leachate from the landfill due to periods of heavy rainfall or spring freshet, the runoff will be collected, controlled and treated, if necessary (Agnico Eagle, 2015b), and sent to CP1.

4.1.5 Water Management for Emulsion Plant Area

Freshwater will be trucked to the emulsion plant and used for manufacturing emulsion as well as for washing the explosive trucks. Water within the emulsion plant will be re-used when feasible, and excess water will be collected and disposed of with an appropriate method and is currently being evaluated by Agnico Eagle.

4.1.6 Water Management for the Batch Plant

Freshwater is pumped from Lake A8 to the Batch Plant and used for concrete production. Water used in the Batch Plant will be re-used when feasible and excess used water will be collected and disposed of appropriately. Agnico Eagle is currently considering possible storage and treatment options for the excess used water.

4.1.7 Water Management for the Wash Bay

Freshwater is pumped from Lake A8 to the Wash Bay and used to wash equipment at the Project. Water used in the Wash Bay will be re-used when feasible and excess used water will be collected and disposed of appropriately. Agnico Eagle is currently considering possible storage and treatment options for the excess water

4.2 Freshwater and Sewage Water Management

Additional freshwater usage and sewage water management is described in the following sections.

4.2.1 Freshwater Management

Major freshwater usages on site include potable use, fire suppression, a portion of make-up water for the mill, and other operational needs, such as drilling water Freshwater will be sourced from Meliadine Lake through a freshwater intake and pump system. For dust suppression, water will be sourced from ponded water against the All Weather Access Road (AWAR), small ponds proximal to the road and/or from the Meliadine River.

Freshwater will be pumped through an overland pipeline to an insulated main storage tank located at the plant site. Approximately 62,000 m^3/year of freshwater will be required during construction phase, and approximately 318,000 m^3/year of freshwater will be required during operation phase. Additionally, approximately 4,000,000 m^3 of freshwater will be required per year to fill the mined-out open pits during the mine closure. These quantities are inclusive of water needs for dust suppression.

The design flow rate for the potable water for the main camp and accommodations (kitchen, laundry) is 136 m^3 per day (based on a 680-people camp capacity and a nominal consumption of 200 L/day/person). Treated potable water will be piped to areas in the process plant, service complex, and other facilities requiring potable water.

4.2.2 Sewage Water Management

Sewage will be collected from the camp and change-room (dry) facilities and pumped to a STP. The objective of the STP is to treat sewage to an acceptable level for discharge to CP1 via a sewage water discharge pipeline. The STP will be housed in a prefabricated (modular) structure, located at south-east of the service complex at the Industrial Pad, as shown in Figure 1.2. The sewage treatment system will be designed based on a flow rate of 200 L per day per worker for a peak load of 680 people, for an average daily flow rate of 136 m^3 (5.67 m^3/h).

The STP for the camp facilities will be designed to meet appropriate guidelines for wastewater discharge (Agnico Eagle, 2017a).

4.2.3 Process Water Management

Process water will be required in the mill for ore processing. Both contact water from CP1 and sludge water from the WTP will be used as process water. When possible, water from CP1 will be the main source of water for the ore process. Additional water needs will be supplied by fresh water from or Meliadine Lake. Approximately 460 m^3/day of process water will be required in Year 1 to Year 3 operations and approximately 770 m^3/day of process water will be required in Year 4 to Year 8.

4.3 Discharge Diffuser Effluent Flow Rates

The pump sending the effluent into the Meliadine Lake sub-basin is understood to discharge at a design rate of 11,688 m^3/day (a water treatment rate of 12,000 m^3/day minus 312 m^3/day of sludge back to CP1). The pump does not operate continuously. It was assumed that once the pump is activated, it would stay active, i.e., pumping, for at least three consecutive days. The amount of effluent flow released over each month and over each year was based on the overall water balance for the feasibility study (Tetra Tech EBA, 2016).

Table 13 shows the estimated total volume of effluent released per month per year.

Table 13: Estimated Effluent Flow Rates over Mine Operating Life

Year	Effluent Released Over the Course of the Month (m^3)				
	June	July	August	September	October
Year -3: 2017	175,320	233,760	70,128	70,128	23,376
Year -2: 2018	175,320	163,632	81,816	70,128	23,376
Year -1: 2019	175,320	151,944	93,504	58,440	23,376
Year 1: 2020	175,320	268,824	116,880	93,504	35,064
Year 2: 2021	175,320	303,888	105,192	93,504	35,064
Year 3: 2022	175,320	292,200	105,192	163,632	70,128
Year 4: 2023	175,320	350,640	128,568	105,192	35,064
Year 5: 2024	175,320	350,640	128,568	93,504	35,064
Year 6: 2025	175,320	350,640	128,568	93,504	35,064
Year 7: 2026	175,320	350,640	128,568	93,504	35,064
Year 8: 2027	175,320	280,512	105,192	81,816	35,064
Year 9: 2028	175,320	292,200	116,880	93,504	35,064
Year 10: 2029	175,320	292,200	116,880	93,504	35,064
Year 11: 2030	175,320	280,512	116,880	93,504	35,064

SECTION 5 • WATER BALANCE

5.1 Global Water Balance

A water balance model was developed to assist in the evaluation of the water management infrastructure and estimation of the pumping requirements over the life of the mine and under closure conditions. The model includes a water balance conducted on both a monthly and yearly basis. The model focuses specifically on contact water management infrastructure and areas that have been affected by mining activities.

A monthly site-wide water balance was conducted for CP1, CP3, CP4, CP5 to CP6, Tiriganiaq Pit 1, Tiriganiaq Pit 2, water in the underground mine operation, make-up water for the mill, water for the WTPs, and freshwater during mine construction period to mine closure under mean precipitation years. The water balance will be updated in further iterations of the WMP, as stated in the Licence, prior to operations. The following sections present the parameters and assumptions adopted in the water balance model along with a summary of the water balance results.

5.2 Water Balance Framework

The water balance framework developed for the site-wide water balance model was presented in Version 1 of the WMP (Agnico Eagle, 2015c). To simulate a range of conditions, the model was run for the proposed mine life and closure conditions.

5.3 Water Balance Assumptions

The water balance was based on the following:

- snow accumulates throughout the months of November to May, and thaws in June during the annual spring freshet period;
- average precipitation year climate conditions;
- the open pits and water containment ponds (CP3 to CP6) are not to be used for long-term storage of water during operations;
- the water collection sumps and ponds are empty in the autumn prior to the spring freshet each year; and,
- other water management assumptions described in Section 4 of this WMP.

A general water management flow sheet is presented in Appendix B.

5.4 Water Balance Results

The estimated maximum annual water input/output from each of various water management facilities under mean precipitation conditions are summarized in Table 14. Results were also provided for 1:100 year wet and dry conditions, with corresponding basis and assumptions, in a separate technical memorandum (Tetra Tech EBA, 2015).

Table 14: Estimated Maximum Annual Volumes from Mine Site Water Balance

Item	Maximum Annual Water Volume (Mm^3)
Contact Water from CP1	0.800
Contact Water from CP3	0.088
Contact Water from CP4	0.087
Contact Water from CP5	0.240
Contact Water from CP6	0.076
Water Pumped from CP1 to WTP for Treatment	0.798
Fresh Water Pumped from Meliadine Lake during Construction	0.062
Fresh Water Pumped from Meliadine Lake during Operation	0.318
Treated Water from WTP to be Discharged to Outside Environment	0.730
Underground Water Pumped to Underground TSS Removal Plant	0.696
Excess Water from Underground Mine to be Stored on Surface	0.155
Fresh Water Pumped from Meliadine Lake to Fill Mined-out Tiriganiaq Pit 1	3.068
Fresh Water Pumped from Meliadine Lake to Fill Mined-out Tiriganiaq Pit 2	0.749

5.5 Waterbody Inventory

Three watersheds (Watershed A, Watershed B and Watershed H) will be impacted by the Project activities. Table 15 presents the waterbodies that are impacted by mining activities. Watersheds and waterbodies in proximity to the Project location and waterbodies affected by Project infrastructure are shown on Figure 5.1.

Table 15: Inventory of Waterbodies Impacted by Mining Activities

Watershed	Waterbody	Maximum Lake Water Depth, m	Total Area (ha)	Water Volume (m^3)	Notes
A	A9	N/A	0.18	-	Flow regimes impacted by the development of Tiriganiaq Pit 1
	A10	0.67	0.26	-	Ponds removed by development of Tiriganiaq Pit 1
	A11	0.45	0.40	-	
	A12	0.87	0.47	-	Pond drained due to construction of Channel 5
	A13	0.30	0.26	-	
	A17	0.30	0.16	-	Covered by WRSF 1
	A38	N/A	0.05	-	Flow regimes impacted by the development of Tiriganiaq Pit 2
	A39	0.48	0.12	-	Ponds removed by development of Tiriganiaq Pit 2
	A54	1.3	5.99	34,545	Dewatered for CP5
	A58	0.50	0.43	-	Covered by WRSF 2
B	B8	0.8	1.43	-	As part of CP4/D-CP4
	B9	1.40	0.64	-	Covered by WRSF1
	B10	0.8	0.33	-	Ponds removed by development of Tiriganiaq Pit 1
	B28	N/A	0.45	-	As part of CP3/D-CP3
H	H6	0.58	0.75	-	As part of CP1
	H7	0.67	0.11	-	
	H8	0.59	0.38	-	Partially covered by WRSF2 and haul road
	H9	0.40	0.42	-	Partially covered by WRSF2 and OP2
	H10	0.11	0.10	-	Partially covered by WRSF2 and OP2, drained due to construction of Channel1
	H11	0.27	0.28	-	
	H12	0.81	0.97	-	Drained due to construction of Channel1 and partially covered by OP1
	H13	1.04	3.49	-	Drained due to construction of Channel1 and partially covered by industrial pad
	H14A	0.37	0.15	-	Covered by industrial pad
	H15D	0.30	0.15	-	Partially covered by TSF
	H15G	0.40	0.38	-	
	H17	1.70	15.8	195,700	Dewatered for CP1
	H17A	1.50	0.13	1,365	Dewatered for Meliadine esker
	H17B	1.50	0.69	10,350	Dewatered for Meliadine esker
	H17C	1.50	0.23	3,450	Dewatered for Meliadine esker
	H18	0.67	0.74	-	Covered by OP2
	H19	1.40	2.91	16,431	Dewatered for CP6
	H20	1.60	9.58	90,307	Covered by WRSF3

"-" indicates that data not available or not applicable; Ponds to be drained; Ponds to be dewatered

SECTION 6 • WATER MANAGEMENT DURING CLOSURE

The detailed mine closure and reclamation activities are provided in the Preliminary Closure and Reclamation Plan (Agnico Eagle, 2015d).

Water management during closure and reclamation will involve flooding the open pits using precipitation and freshwater from Meliadine Lake, flooding the underground mine working with groundwater inflows (groundwater seepage), and maintaining contact water management systems on site until monitoring results demonstrate that water quality are acceptable for discharge of all contact water to the environment without further treatment. Once water quality meets the discharge criteria, the water management systems will be decommissioned to allow the water to naturally flow to the environment.

The key water management activities during mine closure are summarized in Table 16. Figures 6.1 and 6.2 illustrate the water management plan during mine closure. Additional details for the activities are described in the following sections.

Table 16: Key Water Management Activities during Mine Closure

Mine Year	Figure	Key Water Management Activities and Sequence
Yr 9 to 11	6.1	• Finish flooding the mined-out Tiriganiaq Pit 1 and Tiriganiaq Pit 2 by Q4 of Year 10 • Continue to collect and manage the contact water in CP1 to CP6 • Continue to pump the contact water in CP1 to WTP, if required, for treatment before being discharged to the outside environment • Remove non-essential site infrastructure • Pump the underflow sludge water from WTP to CP1 • Continue natural flooding of Tiriganiaq Underground mine with groundwater seepage • Remove Meliadine Lake pumping system
Post-Closure	6.2	• Treat the contact water until water quality meet direct discharge criteria and then decommission the water management system • Continue natural flooding of Tiriganiaq Underground (progressive reclamation since Year 8) • Breach water retention dikes D-CP1, D-CP3, D-CP4, D-CP5, and D- CP6 once water quality monitoring results meet discharge criteria to allow water to naturally flow to outside environment • Remove culverts and breach remaining water retention dikes/berms in Year 18

6.1 Open Pits Flooding

When flooding the open pits for closure, the maximum pumping rate from Meliadine Lake shall not exceed 4,000,000 m^3/year during closure of the Project, as stated in Part E of the Licence. The planned pumping period will occur during the open water season from mid-June to end of September for each year. Table 17 summarizes the pit volume and expected water elevations at the completion of flooding activities. It will take approximately three years to fill the pits with an assumed pumping rate of 0.44 m^3/s (38,300 m^3/day). The assumed pumping rate of 0.44 m^3/s from Meliadine Lake during closure will have negligible effect to Meliadine Lake when compared to the average outflow rate at the outlet of Meliadine Lake. The pumping rate will be evaluated further to verify possible negative effects to Meliadine Lake do not occur.

Table 17: Pit and Underground Flooding

Pit	Volume (Mm^3)	Final Water Elevation (masl)	Water Source
Tiriganiaq Pit 1	9.20	64.14	Freshwater from Meliadine Lake
Tiriganiaq Pit 2	2.25	64.38	Freshwater from Meliadine Lake
Tiriganiaq Underground	1.4	Groundwater level	Groundwater seepage

The water quality model results indicated that water quality in the flooded pits will meet the discharge criteria and post closure treatment will not be required. The water quality within the pits will be monitored during flooding to verify the prediction of the water quality model. The information will be used to develop a strategy to minimize contamination of the regional surface water system. If required, IFP will be adjusted.

6.2 Underground Mine Flooding

Passive flooding of the Tiriganiaq Underground Mine will occur following the completion of mining. The estimated total flooding volume of the underground workings is 1,372,000 m^3. Seepage water into the underground mine will be the main water source for flooding. At the predicted seepage rate it is estimated to take 6 years to flood the Underground Mine.

6.3 Containment Ponds, Dikes and Berms

The containment ponds, dikes and berms will remain in place to collect the surface runoff water and seepage from the Project until the water quality meets the discharge criteria. Once the water quality meets the discharge criteria, dikes/berms will be breached to allow the water to naturally flow to the outside environment. 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 neighbouring waterbodies. The remainder of the breach would be conducted during the open water season following freshet so as to allow for the deployment of turbidity controls to minimize potential sediment release to the environment.

6.3 Channels and Sumps

Once monitoring results have indicated that contact water conveyed in channels and sumps meets acceptable water quality, the infrastructure will be re-contoured and/or surface treated according to site-specific conditions to minimize wind-blown dust and erosion from surface runoff, if required. This closure activity is intended to enhance site area development for re-colonization by native plants and wildlife habitat.

SECTION 7 • WATER QUALITY

Water quality predictions for the Project were generated using the GoldSim database management and simulations code (Version 11.1.2) where mine site contact water flows derived from the Meliadine water balance are combined with chemistry data from materials exposed in mine infrastructure (tailings storage facility, waste rock piles, etc.), and site baseline information. Where site specific information is not available, data collected at other mine sites in the north are used to supplement the input data.

Water quality estimates were generated for the operational and post-closure periods, for each contact water containment ponds, for sumps in the two open pits and for the two fully flooded open pit lakes post-closure.

The sensitivity of water quality to an added TSS load was evaluated outside of the GoldSim mass balance model. Total parameter concentrations were evaluated at ponds that discharge to the receiving environment (i.e., CP1 during operations, and CP1, CP3, CP4, and CP6 post-closure) based on an addition of 15 milligrams per litre TSS, the maximum monthly mean MMER criteria. Given the uncertainties associated with the modelling exercise (i.e., the development stage of the Project, laboratory-based input values, assumptions where data do not exist and consideration of an average climate year), the predicted concentrations are considered to be order-of-magnitude estimates. The estimates are sensitive to the assumptions and design elements considered. The water quality modelling predictions will be updated as stated in the Licence, in future iterations of the WMP, prior to operations. A water balance and water quality model will be updated at a minimum of every two (2) years following commencement of Operations, as required by the License.

Table 18 shows the various constituent concentrations corresponding to the Licence and the predicted values. These concentrations correspond to end-of-pipe concentrations discharge from the diffuser to Meliadine Lake (Tetra Tech EBA, 2016).

Table 18: Effluent Characteristics

	Water Licence "A"			End-of-Pipe Prediction based on Tiriganiaq Monthly Average Concentrations	
	Maximum end-of-pipe Average Concentration [mg/L]	**Maximum end-of-pipe Concentration of Any Grab Sample [mg/L]**	**Meliadine Lake Median Background Concentration [mg/L]**	**Dissolved Contaminant Concentration [mg/L]**	**Total Used in the Model (Dissolved + 15 mg/L TSS) [mg/L]**
Conventional Constituents					
Total Dissolved Solids	1400	1400	35.0	204	204
Total Suspended Solids	15	30	1.5		15
pH	6 to 9.5	6 to 9.5	7.4		
Major Ions					
Chloride			6.4	20	20
Fluoride			0.03	0.0002	0.0002
Sodium			3.2	5.3	5.6
Sulphate			2.9	35.9	35.9
Nutrients					
Total Ammonia as Nitrogen	14	18	0.025	4.6	4.6
Nitrate Ion	-	-	0.11	5.8	5.8
Phosphorus (total)	2	4	0.0055	0.4	0.4
Cyanides					
Total cyanide	0.5	1.0	0.00100	0.005	0.005
Free cyanide	-	-			
Metals					
Aluminum	2	3	0.0025	0.09	1.20
Antimony			0.0001	0.0029	0.0029
Arsenic	0.3	0.6	0.0003	0.101	0.191
Barium			0.0071	0.012	0.021
Cadmium			0.00003	0.000005	0.000012
Chromium			0.0002	0.00001	0.0030
Copper	0.2	0.4	0.00111	0.0011	0.0037
Iron			0.0235	0.01	1.70
Lead	0.2	0.4	0.00003	0.0011	0.0049
Manganese			0.00283	0.12	0.13

7.1 Summary of Regulatory Guidelines

Water quality results are compared to MMER and SSWQO guidelines and will be compliant prior to discharging to Meliadine Lake or the environment. Post-closure discharge water quality will be compared to CCME guidelines or the Meliadine SSWQO developed for aluminum, fluoride, and iron (Golder 2013a, 2013b, 2014).

7.2 Operations

During operations, the water quality at the Project (including CP1 water) is anticipated to meet Regulatory monthly mean discharge criteria, with the possible exception of TSS at all ponds and arsenic, on occasion, at CP3 which receives water from the TSF. Although TSS content was not specifically modelled, experience at other northern mine sites suggests that TSS in site contact water is likely to require attenuation during operations to meet the MMER effluent criteria of 15 mg/L monthly average (Government of Canada, 2012). A WTP that removes TSS is planned to be operational in Year -4 of the Project.

CP3 arsenic concentration may exceed MMER on occasion if precipitation events generate drainage from the TSF. The main source of arsenic in CP3 is predicted to be from residual process water that is assumed to be present in the filtered tailings. Arsenic transfer from process water to CP3 water will be minimized by effective dewatering of the tailings prior to placement into the TSF, and from freezing of the tailings in the TSF which will act to limit infiltration and seepage. Water from CP3 will be pumped to CP1 where it will mix with other site waters before discharge. Dissolved arsenic concentration in CP1 is predicted to meet the MMER monthly average maximum concentration. All other chemical parameters in CP3 and all chemical parameters in CP4, CP5, and CP6 are predicted to meet MMER limits for chemical constituents.

7.3 Post-Closure

The long-term, post-closure water quality in the Project ponds and in the flooded open pit lakes are anticipated to meet MMER limits and CCME water quality guidelines for the protection of aquatic life (CCME-WQG) or the SSWQOs developed for the Project for aluminum, fluoride, and iron. Arsenic concentrations in CP3 could slightly exceed the SSWQO post-closure, a criteria that is conservatively protective of the receiving aquatic environment (Golder, 2013a). The exceedances predicted are minor, much less than the mixing capacity in the receiving environment. These arsenic concentrations (Golder, 2013a) are within the tolerance levels that have been deemed non-deleterious by Environment Canada for the Project (Environment Canada, 2014).

SECTION 8 • WATER QUALITY MONITORING PROGRAM

Water quality monitoring is an important part of the site water management plan to verify the predicted water quality trends and conduct adaptive management should differing trends be observed. This section outlines the water quality monitoring plan, which will be further defined as the Project advances.

Water quality monitoring has been initiated at the pre-development stage and will continue during construction, operations, closure, and post-closure. Monitoring will occur at three levels:

1. Regulated discharge monitoring that occurs at monitoring points specified in the Licence or regulations.
2. Verification monitoring that is carried out for operational and water management purposes by Agnico Eagle. This monitoring data will not be reported to the Regulators in the Annual Water Licence Report, but can be provided upon request by the Regulators
3. General monitoring that is commonly included in the Licence, specifying what is to be monitored according to a schedule. This monitoring is subject to compliance assessment to confirm sampling was carried out using established protocols, included quality assurance/quality control provisions, and addressing identified issues. General monitoring is subject to change as directed by an Inspector, or by the Licensee, subject to approval by the NWB.

All three types of monitoring will be used at the Project. The following section presents the conceptual water quality monitoring plan during construction, operations and closure. More detailed information on monitoring programs is described in the Environmental Management and Protection Plan (EMPP) (Agnico Eagle, 2015e).

8.1 Water Quality Monitoring

Table 19 presents the water quality monitoring stations during construction, operation, closure and post-closure phases. The monitoring parameters and frequency are described in the EMPP (Agnico Eagle 2015e) and are based on the Licence. Figure 8.1 presents the water quality monitoring locations for all three Project phases.

Table 19: Water Quality Regulated, General Aquatic and Verification Monitoring for the Meliadine Gold Project during Construction, Operations, and Closure

Monitoring Type	Mine Development Phase	Monitoring Station Number	Station Description	Purpose of Station	Frequency
Regulated	Construction	MEL-D-1 to TBD	Dewatering: Water transferred from lakes to Meliadine Lake during dewatering of lakes		Prior to discharge and weekly during discharge Daily during periods of discharge
Regulated	Construction and Operations	MEL-SR-1-TBD	Surface Runoff – runoff downstream of Construction areas at Meliadine Site and Itivia Site, Seeps in contact with the roads, earthworks and any Runoff and/or discharge from borrow pits and quarries		Prior to construction, weekly during construction Monthly during open water or when water is present upon completion
General Aquatic	Construction, Operation, and Closure	MEL_11 (MEL-04 suggested by Agnico Eagle in the Application)	Water intake from Meliadine Lake	Quality of intake water	Monthly during period of intake (Full Suite); Daily during periods of intake (Volume m^3)
Verification	Construction (prior to release), Operation, and Closure	MEL_12	Water treatment plant (pre-treatment) coming from H17 station will be off the pipe and not in the pond	Test quality of water before treatment (required to evaluate treatment efficiency	Monthly during periods of discharge

Monitoring Type	Mine Development Phase	Monitoring Station Number	Station Description	Purpose of Station	Frequency
General Aquatic	Construction (prior to release), Operations, and Closure	MEL_13	Mixing zone in Meliadine Lake, station 1; and MMER exposure stations for final discharge point within mixing zone	Test mixing of effluent in the receiving environment; sample at varied distances and directions from pipe; MMER exposure for final discharge point	Monthly during periods of discharge
Regulated	Construction (upon effluent release), Operation, and Closure	MEL_14[a] (MEL-01 suggested by Agnico Eagle in the Application)	Water treatment plant (post-treatment), end of pipe (before offsite release) in the plant before release.	Test quality of final effluent before release	Prior to discharge and weekly during discharge (Full Suite, Group 3); Daily during periods of discharge (Volume m^3); Once prior to discharge and monthly thereafter (Acute Lethality)
Verification	Operations, Closure	MEL_15	Local Lake, E3	Confirm no leakage/runoff from Emulsion Plant	Bi-annually during open water
Verification	Construction, Operations, Closure	MEL_16	Local Lake, G2	Possible seepage or dust loadings from site infrastructure	Bi-annually during open water
Verification	Construction, Operations, Closure	MEL_17	Pond, H1	Possible seepage or dust loadings from site infrastructure	Bi-annually during open water
Verification	Construction, Operations, Closure	MEL_18	Local Lake, B5	Possible seepage or dust loadings from site infrastructure	Bi-annually during open water

Monitoring Type	Mine Development Phase	Monitoring Station Number	Station Description	Purpose of Station	Frequency
Verification	Operations, Closure	MEL_20	CP3	Collection of drainage from dry stacked tailings	Monthly during open water or when water is present
Verification	Operations, Closure	MEL_21	CP4	Collection of drainage from WRSF1	Monthly during open water or when water is present
Verification	Construction, Operations, Closure	MEL_22	CP5	Collection of drainage from WRSF1 and WRSF2	Monthly during open water or when water is present
Verification	Operations, Closure	MEL_23	CP6	Collection of drainage from WRSF3	Monthly during open water or when water is present
Verification	Construction, Operations, Closure	MEL_24	Seepage from Landfill between the Landfill and H13	Located between the landfill and Pond H3 to monitor seepage from the landfill	Monthly during open water or when water is present
Regulated	Construction, Operations, Closure	Mel-25	Secondary containment area of the tankfarm at Itivia	Test quality before discharge to land	Prior to discharge or transfer of effluent

[a] *Sampling may not occur during break-up (June)*

CP = contact pond; WRSF = waste rock storage facility;

During the closure period, parameters included in the CCME aquatic life guidelines may also be included in the verification monitoring program.

8.2 Licence Water Monitoring

Regulatory guidelines are applied at the last point of control prior to discharge to the receiving environment as part of the Licence.

REFERENCES

Agnico Eagle. 2014a. Meliadine Gold Project, Nunavut. Final Environmental Impact Statement (FEIS). Submitted to the Nunavut Impact Review Board. April 2014.

Agnico Eagle. 2014b. Meliadine Gold Project: Roads Management Plan. Version 3. April 2014.

Agnico Eagle. 2015a. Meliadine Gold Project: Mine Plan. Version 1. 6513-MPS-10. April 2015.

Agnico Eagle. 2015b. Meliadine Gold Project: Landfill and Waste Management Plan. Version 4. 6513-MPS-06 April 2015.

Agnico Eagle. 2015c. Meliadine Gold Project. Water Management Plan. Version 1. 6513 MPS-11. April 2015.

Agnico Eagle. 2015d. Meliadine Gold Project. Preliminary Closure and Reclamation Plan. Version 1.0. 6513-CRP-01. April 2015.

Agnico Eagle. 2015e. Meliadine Gold Project: Environmental Management and Protection Plan (EMPP). Version 4. 6513-MPS-07. April 2015.

Agnico Eagle. 2017a. Meliadine Gold Project. Operational & Maintenance Manual – Sewage Treatment Plant – Version 2, February 2017.

Agnico Eagle. 2017b. Meliadine Gold Project. 2017 Freshet Action Plan.

BEKO Technologies GMBH. Unknown. Bekosplit 12, 13, 14 Instructions for Installation and Operation.

Environment Canada. 2014. Electronic mail communication from Environment Canada to Agnico Eagle. Subject: Assessment of Meliadine Waste Rock. May 6, 2014.

Golder (Golder Associated Ltd.). 2009. Assess of completeness of geotechnical data for feasibility design Tiriganiaq open pit. Submitted to Comaplex Minerals Corp., 26 May 2009, Doc. 008 Rev. 0

Golder. 2012a. SD 7-2 Aquatic Baseline Studies- Meliadine Gold Project, Nunavut, Canada. A Technical Report Submitted to Agnico Eagle Mines Ltd. by Golder Associates, September 19, 2012.

Golder. 2012b. SD 6-1 Permafrost Thermal Regime Baseline Studies- Meliadine Gold Project, Nunavut, Canada. A Technical Report Submitted to Agnico Eagle Mines Ltd. by Golder Associates, September 25, 2012.

Golder. 2012c. Tailings Storage Facility Preliminary Design – Meliadine Gold Project, Nunavut. A Draft Report Submitted to Agnico Eagle Mines Ltd. by Golder, August 16, 2012.INAC, 1992. Guidelines for ARD Prediction in the North. Department of Indian Affairs and Northern Development, Northern Mine Environment Neutral Drainage Studies No.1, Prepared by Steffen, Robertson and Kirsten (B.C.) Inc.

Golder. 2013a. Site specific Water Quality Objectives (SSWQO) Assessment – Meliadine Gold Project, Nunavut. Document 371. Report to Agnico-Eagle Mines Ltd. February 22, 2013. 57 p.

Golder. 2013b. Appendix 7.2-B, Hydrogeological Modelling, Meliadine Gold Project, Nunavut. Technical Report Submitted to Agnico Eagle Mines Ltd. Reference No. Doc 335-101370076, Jan. 16, 2013.

Golder. 2014. Assessment of Site Specific Exposure and Toxicity Modifying Factors on Aluminum Toxicity and Validation of Non-Deleterious Nature of All Parameters of Potential Concern in Waste Rock Leachate – Meliadine Gold Project, Nunavut. Document 440. 2014. Report to Agnico-Eagle Mines Ltd. March 14, 2014. 7 p.

Golder. 2015. Meliadine Gold Project. Appendix E: Near-Field Modelling and Diffuser Design. Report Number: Doc 493-1405283 Ver. 0. March 2015.

Government of Canada. 2012. Metal Mining Effluent Regulations. SOR/2002-222; current to November 18, 2012.

H2O Innovation. 2016. Process and Control Narrative: Meliadine WTP. P65873-I13-0001, 01. July 25, 2016.

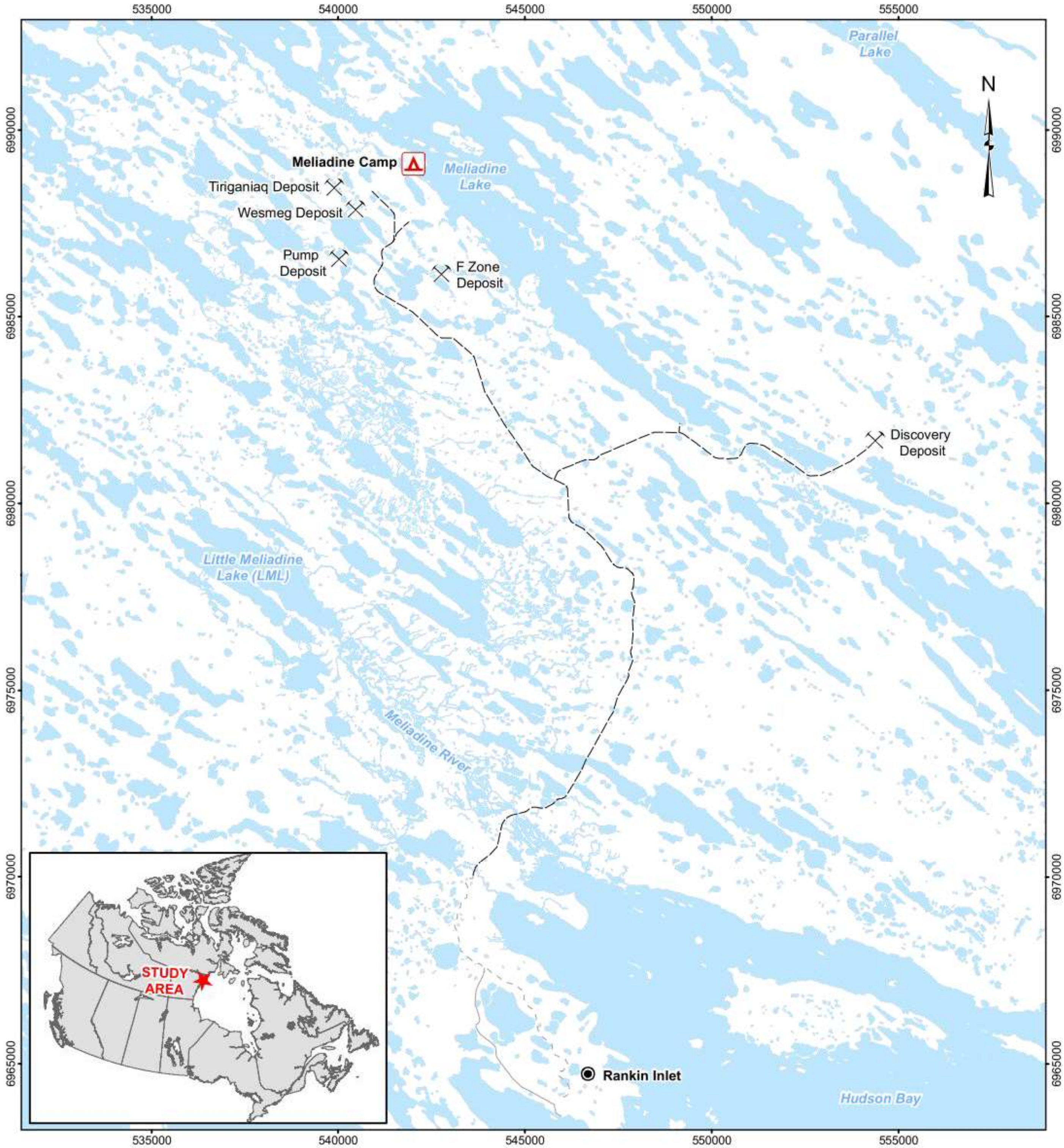
Nunavut Water Board (NWB). 2016. Type A Water Licence: No: 2AM-MEL1631. April 1, 2016.

Snowden. 2008. Tiriganiaq gold deposit, Nunavut – resource update. Submitted to Comaplex Minerals Corp. January 2008.

Tetra Tech EBA. 2015. Summary of Water Balance Key Assumptions and Results, Meliadine Gold Project. Technical Memorandum Submitted to Agnico Eagle Mines Ltd. by Tetra Tech EBA, October 2015.

Tetra Tech EBA. 2016. Meliadine Lake Diffuser Design Progress Report for Discussion. September 20, 2016. File: E14103230-01 Task 007.

FIGURES



LEGEND

- Camp
- Proposed Mine Site
- All-weather Access Road (AWAR)
- Road - New
- Road - Existing
- Watercourse
- Waterbody

AGNICO EAGLE

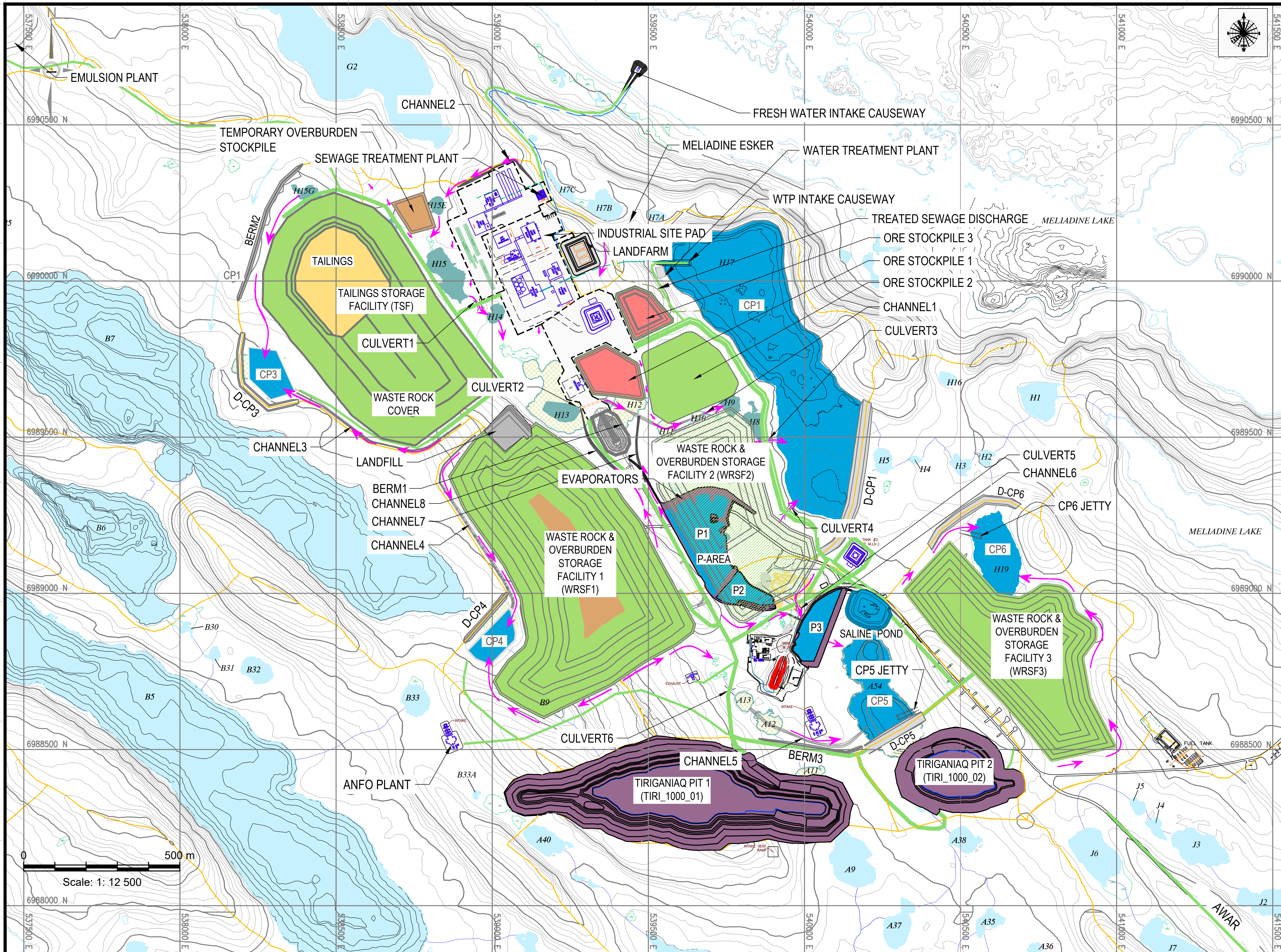
AGNICO EAGLE – MELIADINE GOLD PROJECT

FIGURE 1.1 GENERAL PROJECT LOCATION PLAN

No. PROJET PROJECT No.		DATE	09-23-2014
DESSINÉ PAR DRAWN BY	CB	FEUILLE/SHT	1 / 1
APPROUVÉ PAR APPROVED BY	HX		
NO. DESSIN DRAWING NO.	6500-680-210-200	REVISION	A

NO. DESSIN
DRAWING NO.

FORMAT ANSI B–11x17



LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- NON CONTACT WATERBODY
- CONTACT WATERBODY
- WATER COLLECTION POND
- DRAINED POND AREA
- OPEN PIT
- OVERBURDEN
- WASTE ROCK
- ORE
- TAILINGS
- INDUSTRIAL SITE PAD
- CONTACT WATER FLOW DIRECTION

AGNICO EAGLE

TITRE / TITLE	# DWG
–	–
–	–
–	–
–	–
–	–

DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

REVISIONS

DESSINÉ PAR / DRAWN BY	MDD	DATE	08-03-2017
VÉRIFIÉ PAR / CHECKED BY	JB		08-03-2017
APPROUVÉ PAR / APPROVED BY			
No. PROJET / PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 1.2 GENERAL MINE SITE PLAN LAYOUT

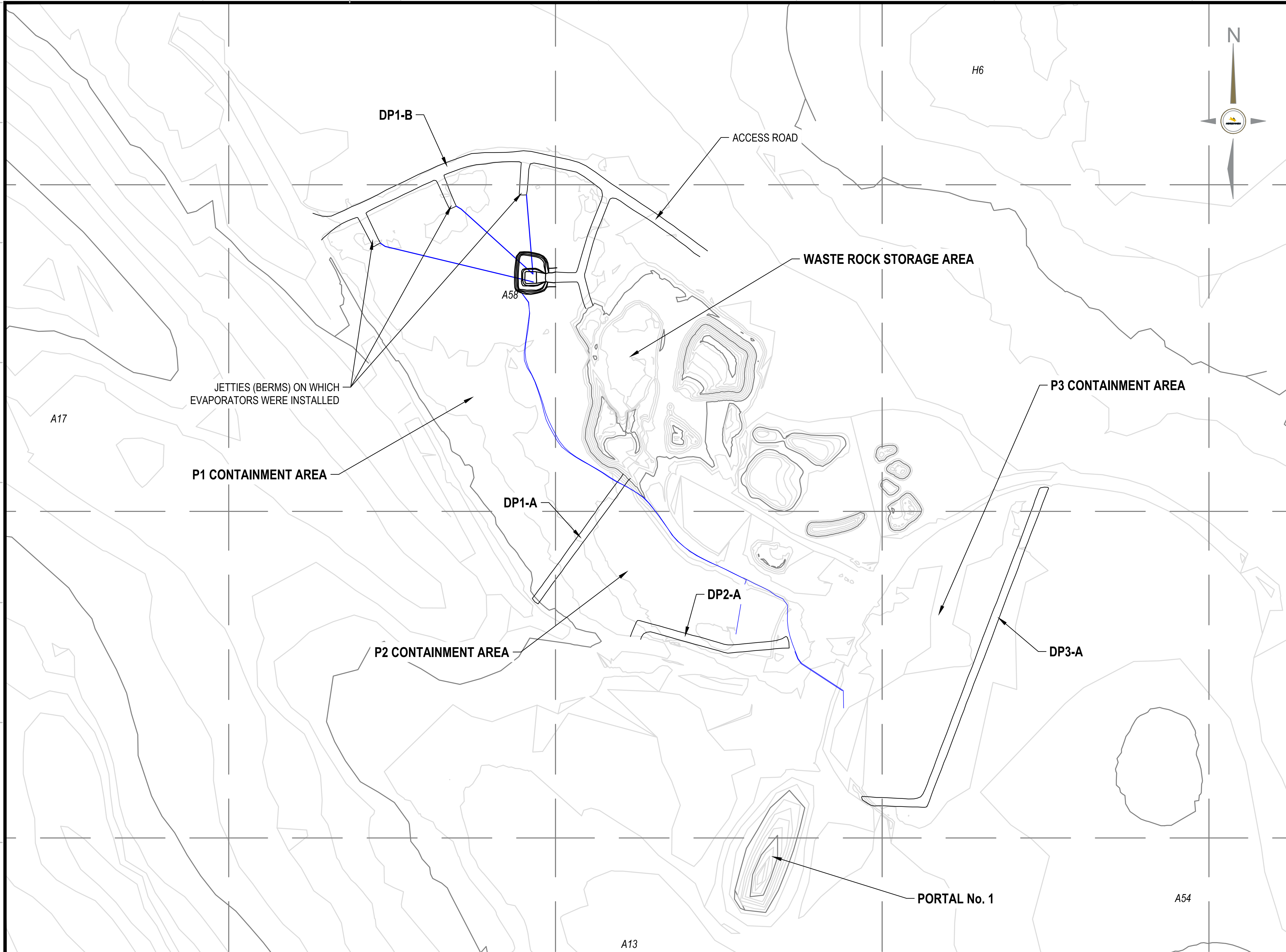
ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
No. DESSIN/ DRAWING NO.	6500–680–210–200–013	REVISION A	FEUILLE/SHT 1 / 1

AE–CART–ANSI B

I:\OPERATIONS\Water Management\WMP Figures\For Jen\Draft2\FIGURE 1.2R2.dwg

NO. DESSIN
DRAWING NO.

FORMAT ANSI B–11x17



NOTES:

AGNICO EAGLE

TITRE / TITLE	# DWG
–	–
–	–
–	–
–	–
–	–

DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

REVISIONS

DESSINÉ PAR DRAWN BY	MDD	DATE	2017–03–09
VÉRIFIÉ PAR CHECKED BY	JB		2017–03–09
APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE MELIADINE GOLD PROJECT

FIGURE 3.1 P–AREA PLAN VIEW

GENERAL LAYOUT

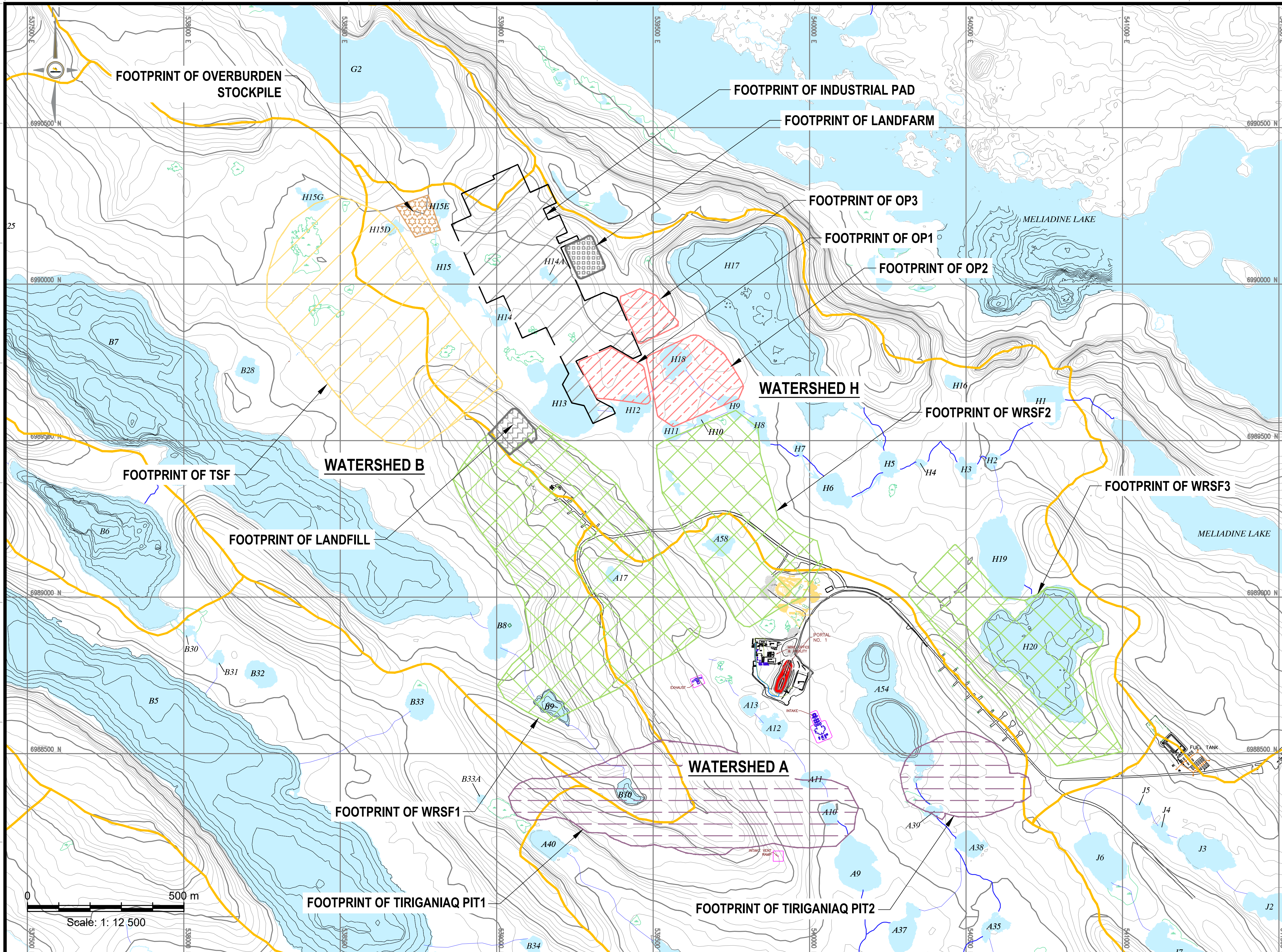
ÉCHELLE/ SCALE	1:3000	FICHIER FILE	
No. DESSIN/ DRAWING NO.	1	REVISION 00	FEUILLE/SHT 1 / 13

AE–CART–ANSI B

I:\OPERATIONS\Water Management\WMP Figures\For Jen\Draft2\FIGURE 3.1R1.dwg–2013–02–19 14:03:29

NO. DESSIN
DRAWING NO.

FORMAT ANSI B-11x17



LEGEND

CATCHMENT BOUNDARY
NON CONTACT WATERBODY

AGNICO EAGLE

TITRE / TITLE	# DWG
–	–
–	–
–	–
–	–
–	–

DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

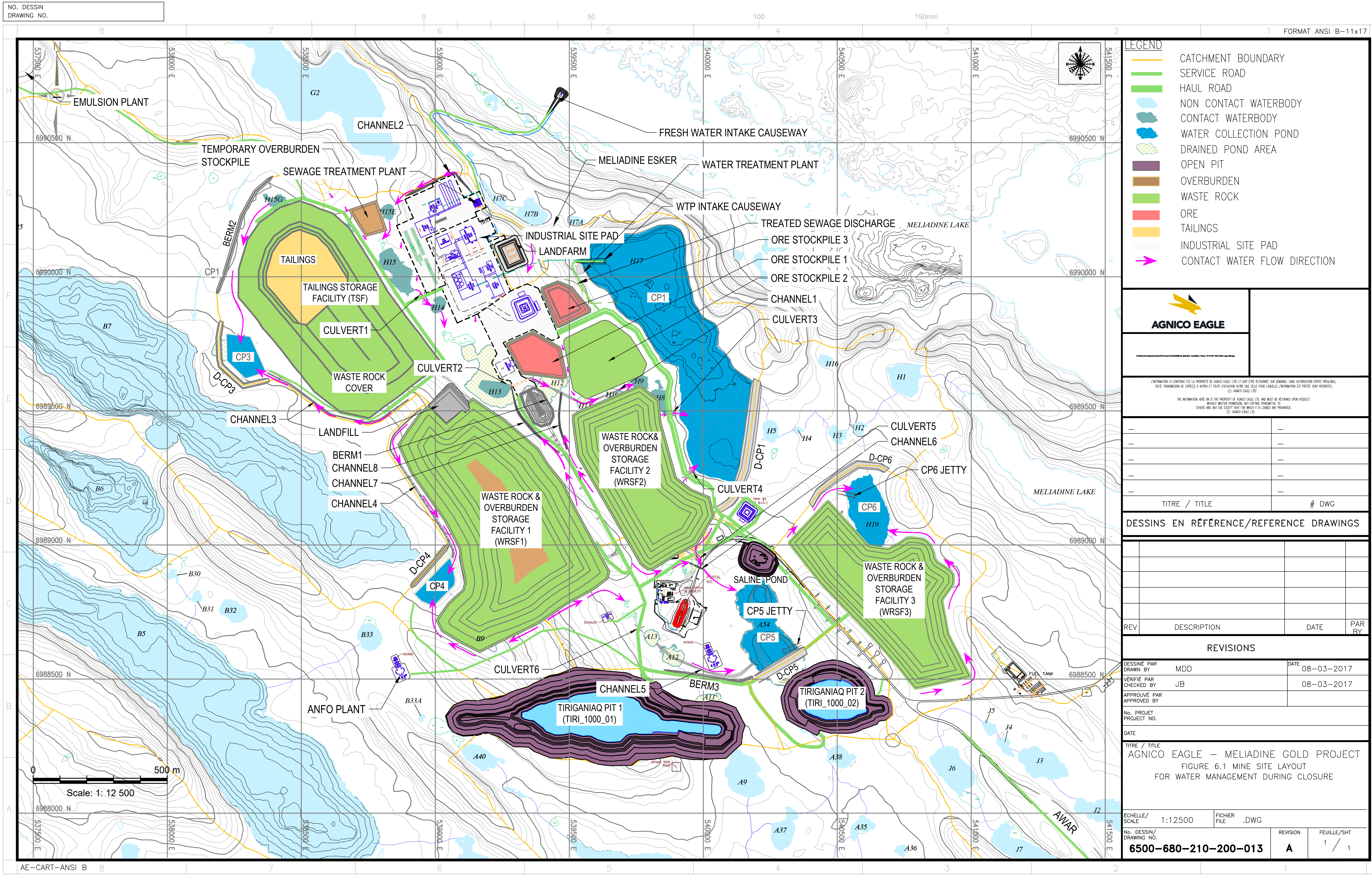
REVISIONS

DESSINÉ PAR / DRAWN BY	MDD	DATE	09-03-2017
VÉRIFIÉ PAR / CHECKED BY	JB		09-03-2017
APPROUVÉ PAR / APPROVED BY			
No. PROJET / PROJECT NO.	6500		
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 5.1 WATERSHED AND WATERBODIES IN PROXIMITY OF MINE SITE

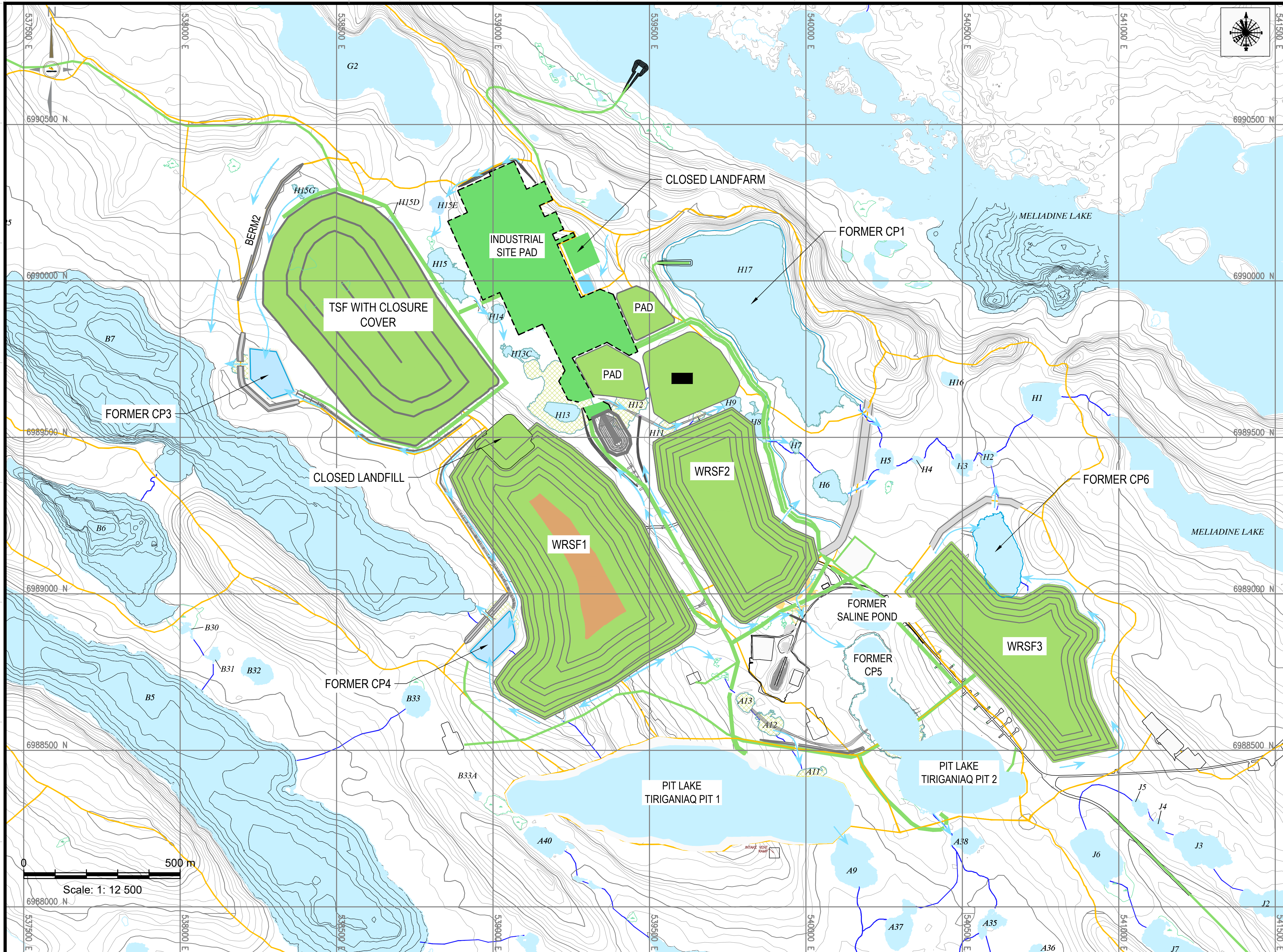
ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
No. DESSIN/ DRAWING NO.	6500-680-210-200	REVISION A	FEUILLE/SHT 1 / 1

AE-CART-ANSI B


NO. DESSIN
DRAWING NO.
FORMAT ANSI B-11x17
EMULSION PLANT
CHANNEL2
FRESH WATER INTAKE CAUSEWAY
TEMPORARY OVERBURDEN STOCKPILE
MELIADINE ESKER
WATER TREATMENT PLANT
SEWAGE TREATMENT PLANT
WTP INTAKE CAUSEWAY
TREATED SEWAGE DISCHARGE
MELIADINE LAKE
BERM2
INDUSTRIAL SITE PAD
ORE STOCKPILE 3
LANDFARM
TAILINGS
ORE STOCKPILE 1
CP1
ORE STOCKPILE 2
TAILINGS STORAGE FACILITY (TSF)
CHANNEL1
CULVERT1
CULVERT3
CP3
D-CP3
WASTE ROCK COVER
CULVERT2
CHANNEL3
LANDFILL
WASTE ROCK& OVERBURDEN STORAGE FACILITY 2 (WRSF2)
CULVERT5
CHANNEL6
D-CP1
D-CP6
CP6 JETTY
BERM1
CHANNEL8
CHANNEL7
CHANNEL4
WASTE ROCK & OVERBURDEN STORAGE FACILITY 1 (WRSF1)
CULVERT4
CP6
SALINE POND
WASTE ROCK & OVERBURDEN STORAGE FACILITY 3 (WRSF3)
D-CP4
CP4
CP5 JETTY
CP5
D-CP5
CULVERT6
CHANNEL5
BERM3
TIRIGANIAQ PIT 1 (TIRI_1000_01)
TIRIGANIAQ PIT 2 (TIRI_1000_02)
ANFO PLANT
AWAR
0
500 m
Scale: 1: 12 500
LEGEND
CATCHMENT BOUNDARY
SERVICE ROAD
HAUL ROAD
NON CONTACT WATERBODY
CONTACT WATERBODY
WATER COLLECTION POND
DRAINED POND AREA
OPEN PIT
OVERBURDEN
WASTE ROCK
ORE
TAILINGS
INDUSTRIAL SITE PAD
CONTACT WATER FLOW DIRECTION
AGNICO EAGLE
TITRE / TITLE
DWG
DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS
REV
DESCRIPTION
DATE
PAR BY
REVISIONS
DESSINÉ PAR DRAWN BY MDD
DATE 08-03-2017
VÉRIFIÉ PAR CHECKED BY JB
08-03-2017
APPROUVÉ PAR APPROVED BY
No. PROJET PROJECT NO.
DATE
TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 6.1 MINE SITE LAYOUT
FOR WATER MANAGEMENT DURING CLOSURE
ÉCHELLE/ SCALE 1:12500
FICHIER FILE .DWG
No. DESSIN/ DRAWING NO. 6500-680-210-200-013
REVISION A
FEUILLE/SHT 1 / 1
AE-CART-ANSI B
I:\OPERATIONS\Water Management\WMP Figures\For Jen\Draft2\FIGURE 6.1R2.dwg

NO. DESSIN
DRAWING NO.

FORMAT ANSI B–11x17



LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- STREAM
- WATERBODY
- DRAINED POND AREA
- WASTE ROCK
- WATER FLOW DIRECTION

AGNICO EAGLE

TITRE / TITLE	# DWG
–	–
–	–
–	–
–	–
–	–

DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

REVISIONS

DESSINÉ PAR / DRAWN BY	MDD	DATE 08-03-2017
VÉRIFIÉ PAR / CHECKED BY	JB	08-03-2017
APPROUVÉ PAR / APPROVED BY		
No. PROJET / PROJECT NO.		
DATE		

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 6.2 MINE SITE LAYOUT AFTER CLOSURE

ÉCHELLE/SCALE	FICHIER/FILE
1:12500	.DWG

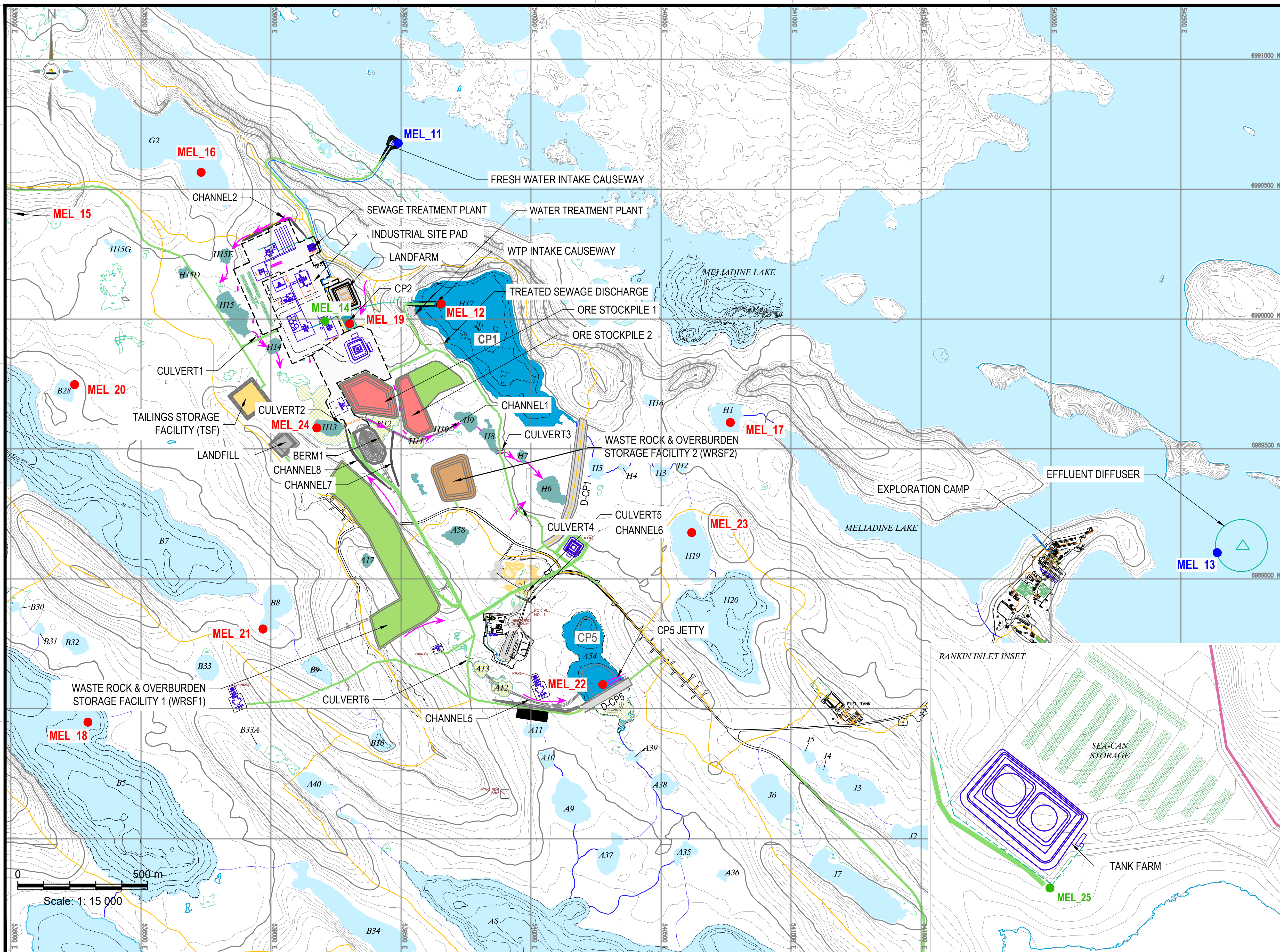
No. DESSIN/DRAWING NO.	REVISION	FEUILLE/SHT
6500–617–210–200	0	1 / 2

AE–CART–ANSI B

I:\OPERATIONS\Water Management\WMP Figures\For Jen\Draft2\FIGURE 6.2R2.dwg

NO. DESSIN
DRAWING NO.

FORMAT ANSI B–11x17



LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- NON CONTACT WATERBODY
- CONTACT WATERBODY
- WATER COLLECTION POND
- DRAINED POND AREA
- OVERBURDEN
- WASTE ROCK
- ORE
- TAILINGS
- INDUSTRIAL SITE PAD
- WATER FLOW DIRECTION
- REGULATED MONITORING LOCATION
- GENERAL AQUATIC MONITORING LOCATION
- VERIFICATION MONITORING LOCATION

AGNICO EAGLE

TITRE / TITLE	# DWG
—	—
—	—
—	—
—	—
—	—

DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

REVISIONS

DESSINÉ PAR DRAWN BY	MDD	DATE	08–03–2017
VÉRIFIÉ PAR CHECKED BY	JB		08–03–2017
APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 8.1: WATER QUALITY MONITORING LOCATIONS

ÉCHELLE/ SCALE	1:15000	FICHIER FILE	.DWG
No. DESSIN/ DRAWING NO.	6500–680–210–200	REVISION A	FEUILLE/SHT 1 / 1

AE–CART–ANSI B

I:\OPERATIONS\Water Management\WMP Figures\For Jen\Draft2\FIGURE 8.1R1.dwg

APPENDIX A • FRESHET ACTION PLAN AND SNOW MANAGEMENT PLAN

AGNICO EAGLE

MELIADINE GOLD PROJECT

FRESHET ACTION PLAN

MARCH 2017

VERSION 2

DOCUMENT CONTROL

Revision				Pages Revised	Remarks
#	Prepared by	Revised	Date		
01	AGNICO EAGLE	Internally	March 2016	All	
02	AGNICO EAGLE	Internally	March 2017	All	

Prepared by:

Jennifer Brown
Water Engineer

Approved by:

Erika Voyer
Environment General Supervisor

Table of Contents

Table of Figures within Text

1 INTRODUCTION

The purpose of this Freshet Action Plan (Plan) is to provide Agnico Eagle with specific management and mitigation measures to address and manage water associated with the freshet season (Freshet), a response plan and procedures to prevent potential environmental incidents at the Meliadine Site (Site) and off-site to water or land.

Freshet is estimated as a period of time between May 15 and July 30. During some years, Freshet can extend to early fall when freezing re-occurs (mid-October). There are areas at the Site that are vulnerable to this excess water during Freshet and the objective is to identify these areas and develop a plan with defined roles and responsibilities to manage the excess water produced during Freshet.

The following guiding principles are applicable to the Plan:

- To ensure that mine contact water from runoff or seepage is managed to prevent adverse environmental impacts;
- To ensure the health and safety of Agnico Eagle employees and contractors; and
- To ensure the Site is in compliance with the Nunavut Water Board (NWB) Water Licence No.: 2AM-MEL1631 (Licence).

The Plan identifies areas for risk during Freshet, risk management and the procedure necessary to address potential concerns.

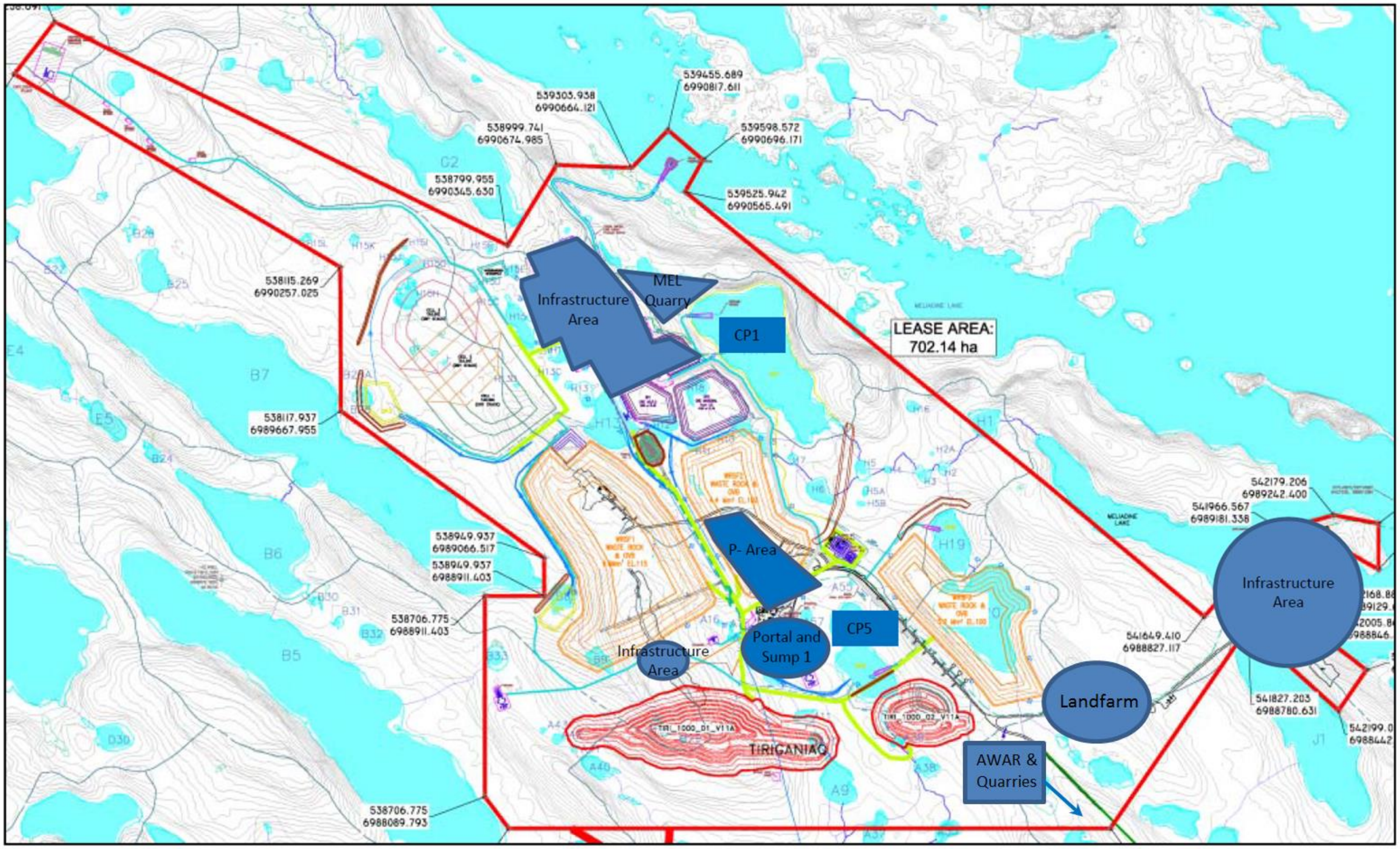
2 AREAS FOR RISK DURING FRESHET

The key areas for risk during Freshet at the Site include the following:

- P-Area
- Sump 1 (Sump LV50)
- Landfarm
- All Weather Access Road (AWAR) and Quarries along the road
- Infrastructure Areas; including the exploration camp area and the industrial area
- Lakes A54 (CP5), H17 (CP1) and the Meliadine Quarry

Each area is considered a priority, based on the guiding principles and they are described in the sections below. Figure 1 shows the locations for the areas of risk at the Site.

Figure 1: Site Plan View with Areas of Risk during Freshet



2.1 P-AREA

The P-Area is the initial containment area identified for precipitation events; snow melt or Freshet water that has come in contact with mine waste rock or surface works in the area of the underground portal (contact water).

The P-Area includes three containment areas (Figure 2); P1 Containment Area (P1), P2 Containment Area (P2), and P3 Containment Area (P3) and has a cumulative capacity of 46,041 m^3. Periodic pumping to P1, from P2 and P3, is planned to manage water levels and to assist with active evaporation from P1.

2.1.2 P1

P1 is the largest containment of the three ponds that make up the P-Area. Lake A58 (A58) is enclosed within P1. Snow removed from the selected areas at the Site throughout winter months, will be directed to P1. Precipitation, water drainage from the adjacent waste rock pile, and any water pumped from P2 or P3 will also be contained within P1. In addition, three evaporators are installed at P1 to assist with active evaporation of water contained at P1.

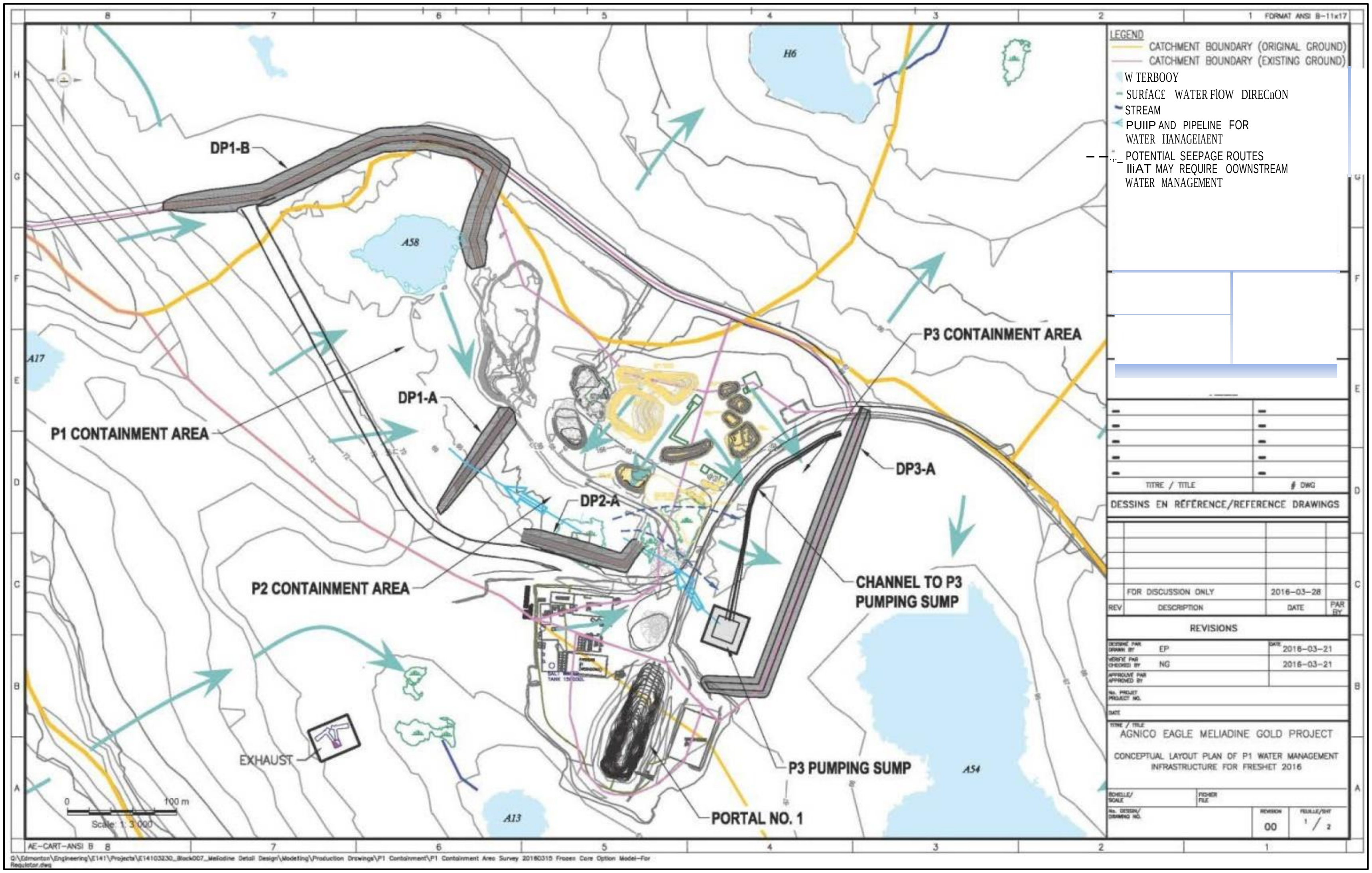
2.1.3 P2

P2 is adjacent and down-gradient to P1 and allows for additional contact water, precipitation and waste rock drainage water management capacity. Additionally, P2 is the main containment area for water pumped to surface from underground Sump 1 (LV50). LV50 is the receptor of surface water that flows from the portal, and is discussed in a section below. Water from P2 is pumped to P1 to be actively evaporated.

2.1.3 P3

P3 is down-gradient to P1 and P2. P3 contains surface runoff from the surrounding portal entrance surface area, precipitation, and water from waste rock and ore piles to the west of P3. Water from P3 is pumped to P1 to be actively evaporated.

Figure 2: P-Area Plan View



2.3 Sump 1 (LV50 SUMP)

LV50 is located 50 meters below grade (mbg) and is the first sump, closest to the underground mine portal entrance. Snow melt and surface run-off that flows to the portal entrance (the lowest elevation at the Site), down the underground haulage ramp to sump LV50, is pumped from LV50 to the P-Area. The overall capacity for LV50 is 29m^3. Water pumped from LV50 to P2 is measured and recorded with a volumetric flow meter.

2.4 Landfarm

The NWB Water License Type B Landfarm (Type B Licence) is located east of the exploration camp north and adjacent to the fuel tank farm. The Landfarm has a geotextile liner and is filled with soil. Water that pools, collects or flows from the Landfarm needs to be collected for monitoring (as per the Licence requirement) and treatment before it is discharged to surface, nearby.

2.5 All Weather Access Road (AWAR)

The All-Weather Access Road (AWAR) was built in 2013 to connect the Site to the hamlet of Rankin Inlet. The road is approximately 23.8 km long with twenty-two water crossings; three bridge crossings and nineteen culverts installed (Figure 3).

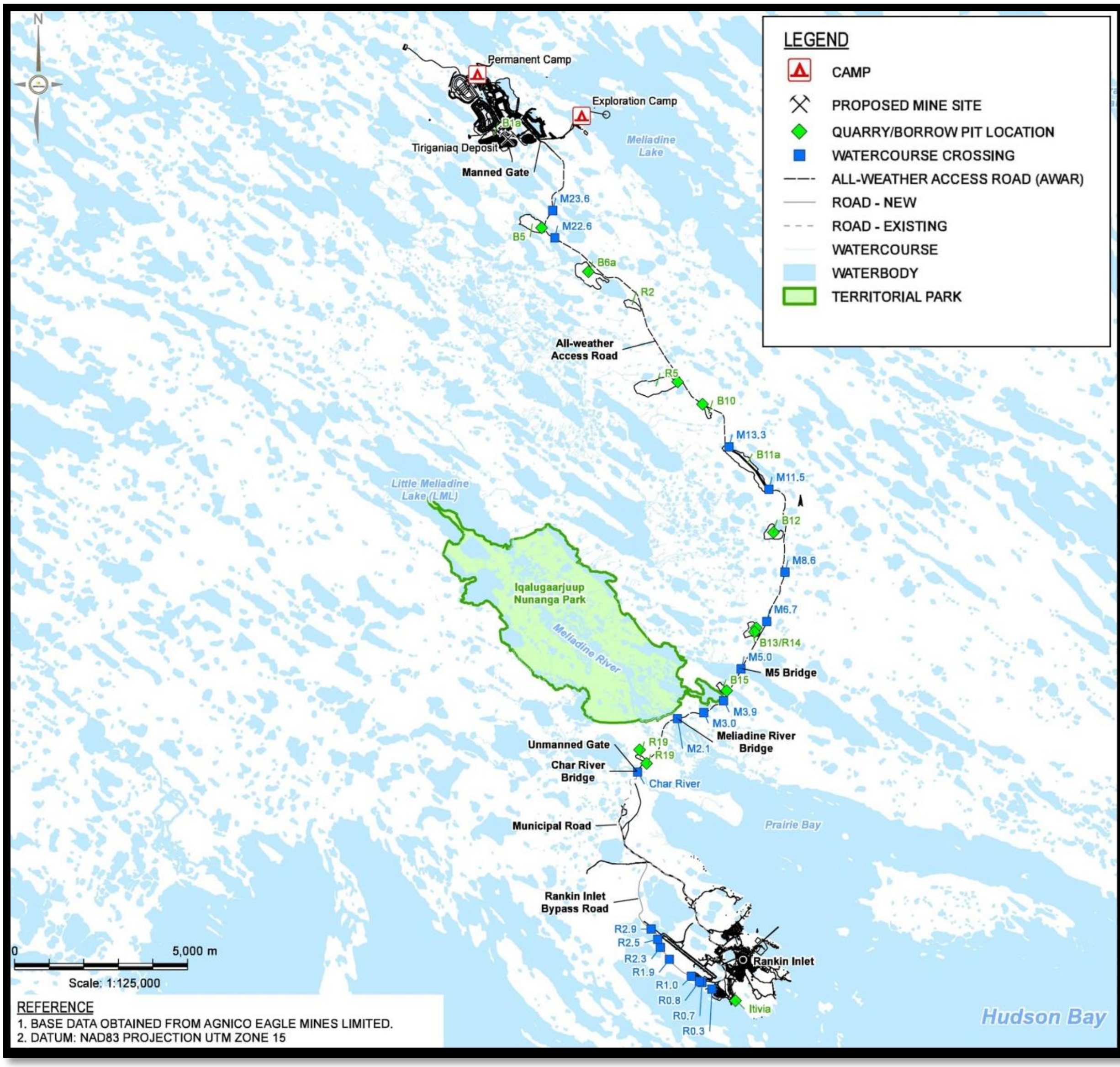
2.6 Infrastructure Areas

Infrastructure Areas represent building, pads and towers installed at the Site. There are various Infrastructure Area locations (Figure 1).

2.7 Lakes A54 (CP5) and H17 (CP1)

Engineered water containment dikes constructed at lakes A54 and H17 will be containment pond CP5 and CP1, respectively. The dikes are designed to contain water and prevent pollution provisions of the *Fisheries Act*. Both CP1 and CP5 will be used for Site contact water and snow and ice collection prior to Freshet. CP1 and CP5 are illustrated in Figure 1 and discussed in Section 4 of this report.

Figure 3: AWAR Map Showing Water Crossing Location



3 FRESHET RISK MANAGEMENT

Managing the risks prior to Freshet is a primary objective. Planning and preparing before Freshet alleviates some of the risk from excess water that may occur suddenly and ensures compliances with applicable regulations. This is managed by removing water (pumping) at containment pond areas prior to winter freeze (fall) to allow for increased capacity from precipitation, snow and ice removal on roads, road water crossings, culverts, ditches, and select containment ponds after winter freeze and before Freshet (winter and spring).

Water treatment options (equipment and technology) are currently being discussed by Agnico Eagle. A saltwater treatment system is estimated to be executed at the Site before the end of 2018. Water contained at the P-Area, CP1, CP5, the Saline Pond and the underground sumps and water stope will be contained and then treated to meet the Mining Metal Effluent Regulations (MMER) and/or Licence requirements prior to effluent discharge to the environment.

Risk management for the Site areas during Freshet are described below and Appendix A presents the Freshet Action Plan procedure for preparation prior to Freshet and during Freshet. Section 4 describes snow management at Site and Appendix B presents the Snow Management procedure.

3.1 P-Area Risk Management

The following management practices are maintained at the P-Area during Freshet and outlines in more detail in Appendix A:

- Water levels will be monitored. The water level will not exceed the maximum design elevation in any of the three containment ponds (P1, P2 or P3).
- Environment will conduct visual inspections of the P-Area. This will include visually monitoring the base of the downstream side of dikes DP1-B and DP3-A (see Figure 2) for seepage, sedimentation deposition, and erosion. If seepage or water with increased TSS is noted during the inspection, water will be sampled, contained, and pumped back to the P-Area.
- Engineering will undertake a written inspection of the water levels, observed seepage, and the condition of the dikes.
- Active evaporation from use of the evaporators will contribute to managing the quantity of water contained at P-Area.

If an emergency occurs, such as the dikes indicating compromised integrity, Agnico Eagle will discharge the water to CP5. The definition and associated design criteria for managing the integrity of the dikes is defined by Golder and Associates during an annual geotechnical inspection.

If CP5 does not have the capacity for water from the P-Area, water will be diverted to the Saline Pond or to the underground water stope for storage until a system for suitable water treatment to meet the Licence and/or MMER or when an alternative storage area has been approved and implemented at the Site.

3.2 LV50 Risk Management

If the P-Area becomes filled to capacity and LV50 sump needs to be pumped, the water from LV50 will flow down gradient to the underground water stope.

3.3 Landfarm Risk Management

During Freshet, if there is any excess water collected at the landfarm, the Environmental Department will request Site Services to pump the excess water. Water samples will be collected in accordance with the License to ensure compliance prior to its release to surface. Based on the Licence, notice will be provided to the Inspector 10 days prior to this pumping activity. Once sample results have been obtained, the Environmental Department will advise the Site Service Department if pumping can begin. If sample results permit, the pumping may begin; to direct water to the tundra/ground (water will be discharged in a manner that will eliminate erosion of the tundra).

In the event that the water sample results do not meet discharge criteria, the water will be stored until suitable treatment system can be put in place to remove contaminants. Suitable treatment methods potentially used are as follows:

- Oil/water Separator
- CI Agent E-VAC Waste Water Filter System
- Carbon Filter System

If a suitable treatment system cannot be obtained the water will be pumped to bladders or totes and will be shipped south for disposal in a certified disposal facility.

3.4 AWAR Risk Management

The following management practices are maintained to ensure the integrity of the AWAR before and during the Freshet and are presented in further detail in Appendix A:

- Snow and ice will be removed from ditches and culverts (water crossings). Proper technique will be used to ensure that no ground disturbance if limited during snow and ice removal.
- Large culverts will be heated/steamed to allow the free flow of Freshet.
- Prior to Freshet, water crossings will have snow removed from ice surface on the up and downstream side of the crossing to allow free flow of water.
- Daily visual inspections will be undertaken as to the structural integrity of the abutments and road integrity by the Site Services Supervisor.
- Weekly throughout freshet and daily during peak flows a written inspection will be completed by the environment department in conjunction with the Site Services department.
- As per the Licence, monthly water samples are collected at the following locations (Figure 3) and possibly during Freshet:
  - Mel-River (M2.1)
  - M3.0
  - M5.0
  - M11.5
  - M23.6
  - Any significant water seeps or ponding on the road will be sampled

If erosion/scouring are observed, Site Services department will be notified for repair action. Turbidity barrier or other sediment control method could be put in place if required

3.5 Infrastructure Areas

Risk management practices for the main Infrastructure Areas at the Site during Freshet are described in the following sections.

3.5.2 Camp Pads and Surroundings

Risk management practices are maintained at the exploration camp, new camp and surrounding camp areas by monitoring observed water pooling. If water pooling is observed, a water sample will be collected and monitored for turbidity. Turbidity will also be monitored at the culvert beside the garage that flows straight to Meliadine Lake. This area will be monitored for TSS and preventative measures (install straw wattles and/or booms) will be implemented to prevent deleterious substances from entering Meliadine Lake.

3.5.3 Industrial Pad and Access Road

The following management practices are maintained to ensure the integrity of the industrial pad and access road:

- The culvert between Lake H12 and H13 will be heated/steamed prior to freshet and will be monitored closely for turbidity.
- This area will be monitored for turbidly and preventative measures (install straw wattles and/or booms) will be implemented to prevent deleterious substances from entering Meliadine Lake.

3.6 Lakes A54 (CP5), H17 (CP1) and Quarries

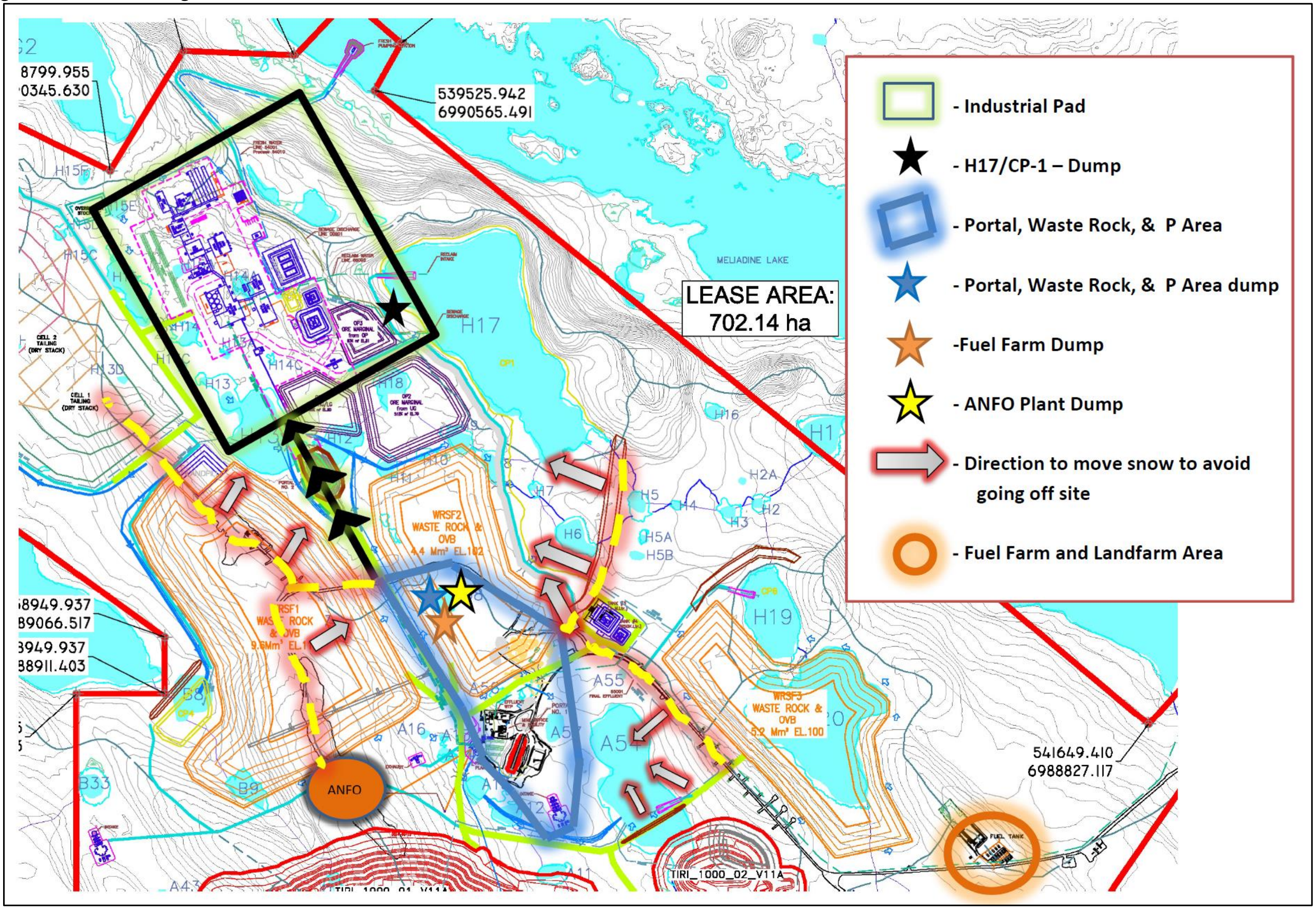
Risk management practices for CP1, CP5, the Meliadine and Quarries include discharging/pumping the water prior to winter freeze to be treated and/or discharged as per the Licence and Water Management Plan for the Site. If water is observed to be flowing or ponding, it will be sampled to ensure deleterious substances and TSS are not released to surrounding water bodies (Part I, Item 11 of the Licence).

4 Snow Management

Proper snow management during the winter contributes to risk mitigation from excess water during Freshet and prevents possible environmental impacts. *The Snow Management Procedure* (Procedure Number MEL-ENV-0017) (Appendix B) presents the plan to efficiently manage snow at the Site.

Snow that is collected and moved from the fuel farm, landfarm, ANFO plant, the area surrounding the portal entrance, waste rock pile and surrounding P-Area will be moved and collected at P1. Snow and ice from the other areas at the Site are removed from roadways with a snow blower or plow and then collected and transported to the CP1 (H17) or CP5 (A54). Figure 4 illustrates the locations for snow collection during the winter and prior to Freshet.

Figure 4: Snow Management Plan



APPENDIX A: FRESHET ACTION PLAN PROCEDURE

<table>
<tr><td colspan="2"></td><td colspan="2">**PROCEDURE NUMBER:** **MEL-ENV-024**</td></tr>
<tr><td rowspan="2">**People concerned**</td><td rowspan="2">All Departments</td><td>**Prepared by**</td><td>Jennifer Brown, Water Engineer</td></tr>
<tr><td>**Reviewed by**</td><td>Jeff Pratt, Sr. Environmental Coordinator
Guillaume Gemme, Site Services General Foreman
Jack Dutil, Construction Manager</td></tr>
<tr><td>**Effective Date:**

Revision Date:</td><td>January 26, 2017</td><td colspan="2">***"Safety First, Safety Last … Safety Always!"***

"No Repeats" – Our Stepping Stone to ZERO HARM</td></tr>
<tr><td colspan="4">*This procedure corresponds to the required minimum safety and environmental standards. All employees must comply with the rules and regulations of the Nunavut Government in terms of health, safety, and environment at work.*</td></tr>
</table>

Objective:

To provide a plan to prevent potential environmental incidents at the Meliadine Site (Site) caused by the freshet season (Freshet) by recognizing specific areas for risk at the Site, possible actions to be undertaken and the departmental responsibilities to address the required actions.

Concerned Departments:

Environment, Site Services, Construction, Engineering and Departmental Supervisors

Note: It is the responsibility of all Meliadine Site employees to report any observed environmental concerns or incidents to their supervisor and/or the Environmental Department to ensure that any required mitigation or corrective procedures will be implemented in a timely manner.

Risks/ Impacts Legend


Health & Safety


Process/quality


Costs


Environment

Freshet Management Procedure

AGNICO EAGLE

Procedure					
Winter and Spring – Preparation Prior to Freshet[1]					***Risks/ Impacts***
Area for Risk		**Action**	**Responsible Department**	**Approximate Dates**	
P-Area	P1, P2 & P3	• Snow must not be stockpiled to be greater than the containment capacity	Environment to coordinate with Site Services, Engineering and Construction	March - May	
AWAR	Culverts	• Weekly Inspections	Environment	March - May	
	Culverts Major Crossings Overall Road	• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Repairs (mark culvert locations, add armouring at downstream around culverts and bridges, replace pipe as needed, and document maintenance and repairs • Monitor signs of erosion (especially downstream at culverts 14.9 and 16 Km) • Notify the Environmental Department about any areas for concern[2, 3]	Site Services	Winter Freeze to May (start of thaw)	
Industrial Pad	Culverts	• Weekly Inspections	Environment		
	Culverts Channels and ditches Access Road	• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Repairs • Notify the Environmental Department about any areas for concern[2, 3]	Construction		
Quarries		• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Re-grade disturbed areas to provide appropriate drainage	Construction Environment (for Sampling)	Winter Freeze to May (start of thaw)	

Note:

[1] See the *Snow Management Procedure* (Procedure No.: MEL-ENV-0017) for additional information for snow removal at the Site.

[2] The Environmental Department will assess the area of concern and action will be undertaken to comply with the Nunavut Water Board (NWB) Water Licence No.: 2AM-MEL1631 (Licence)(i.e. collect field parameters or water samples for analysis of total suspended solids, turbidity, or any deleterious substance).

[3] Areas of concern are defined as high water areas on roads, near the up gradient opening of a culvert, flowing water with sediment, spills, wildlife, etc.

Freshet Management Procedure

Spring and Summer – During Freshet or During Heavy Rainfall				Risks/ Impacts
Area for Risk	**Action**	**Responsible Department**	**Approximate Dates**	
P-Area				   
P1, P2, and P3	• Daily visual inspection • Daily monitor and record water levels • Weekly written inspection • Water sampling	Environment	May - October	
	• If water levels or structural integrity of berms are observed to be compromised, immediate action is required. Notify Supervisor	Engineering		
	• P2 and P3 water volume should be kept as minimal as possible. Pumping of this water should occur regularly (daily) • Measure and record pumping volumes daily and report to Environment weekly	Site Services		
Evaporators	• Commission after sub-zero temperatures no longer occur • Operate as efficient as possible	Site Services		
DP1 and DP3 Trenches /Seep	• Install pump and flow meter at trench to collect seep • Pump water to respective containment area (P1 or P3) • Measure and record pumping volumes daily and report to Environment weekly	Site Services		
All Weather Access Road (AWAR)				
AWAR Culverts	• Inspections for free flow water through culverts and major crossings, pooling water on road, and integrity of road and abutments (2x per Week or after heavy rainfall between May and October and daily during peak flow)	Environment	May - October	
AWAR Major Crossings AWAR (Overall)	• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Repairs and erosion/sediment control implementation • Notify the Environmental Department about any areas for concern [2, 3]	Site Services Environment (for Sampling)		
Quarries	• Repairs and erosion/sediment control implementation • Re-grade disturbed areas to provide appropriate drainange • Notify the Environmental Department about any areas for concern [2, 3]	Construction Environment (for Sampling)		

Spring and Summer – During Freshet or During Heavy Rainfall			
New Camp Pad/Industrial Pad			
Culverts	• Daily inspections for free flow water through culverts and major crossings, pooling water on road, and integrity of road and abutments	Construction Environment (for Sampling)	May - October
Channels and Ditches Access Road	• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Repairs and erosion/sediment control implementation • Notify the Environmental Department about any areas for concern [2, 3]	Construction Environment (for Sampling)	May - October
Infrastructure Pads			
Exploration Camp	• Daily visual inspections • Water sampling as required	Environment	May - June
Landfarm Structure	• Daily inspection of the landfarm retaining wall • Daily visual inspection for seepage • Collect a seepage water sample for hydrocarbon analysis. If seepage is present it should be immediately sampled and the seep be controlled. Whether by creating a sump and pumping back the water or by other methods.	Environment	May - June
Landfarm	• Visually monitor excess water in containment area • Monitor seep (weekly) and collect water sample • Sample water according to the Licence	Environment	Mid-June and September
Landfarm	• Provide notice of pumping (include estimated volume) to be pumped to NWB	Environment	10 days prior to pumping
Landfarm	• Once approval has been received, and if water meets the Licence criteria, water can be pumped to tundra at a low flow to avoid erosion • Measure and record pumped volume	Site Services	Mid-June and September
Garage (Agnico Eagle)	• Install sump to contain excess water • Install straw wattles for sediment control on the other side of the road	Site Services	May
Garage (Agnico Eagle)	• Daily monitoring of TSS and turbidity and possible contaminant runoff	Environment	May - June
Core Box Cemetery and Culvert	• Install straw wattles for sediment control on the other side of the road	Site Services	May
Core Box Cemetery and Culvert	• Daily monitoring of TSS and turbidity and possible contaminant runoff	Environment	May - June
ANFO Pad	• Weekly Inspections • Water sampling as required for ammonia, nitrates, turbidity and TSS	Environment	May - June
ANFO Pad	• Daily visual inspection for pooling water and water run off form ANFO pad, if noticed immediately contact environment department	Dyno Nobel	May - June

Note:

[1] See the *Snow Management Procedure* (Procedure No.: MEL-ENV-0017) for additional information for snow removal at the Site.

[2] The Environmental Department will assess the area of concern and action will be undertaken to comply with the Nunavut Water Board (NWB) Water Licence No.: 2AM-MEL1631 (Licence)(i.e. collect field parameters or water samples for analysis of total suspended solids, turbidity, or any deleterious substance).

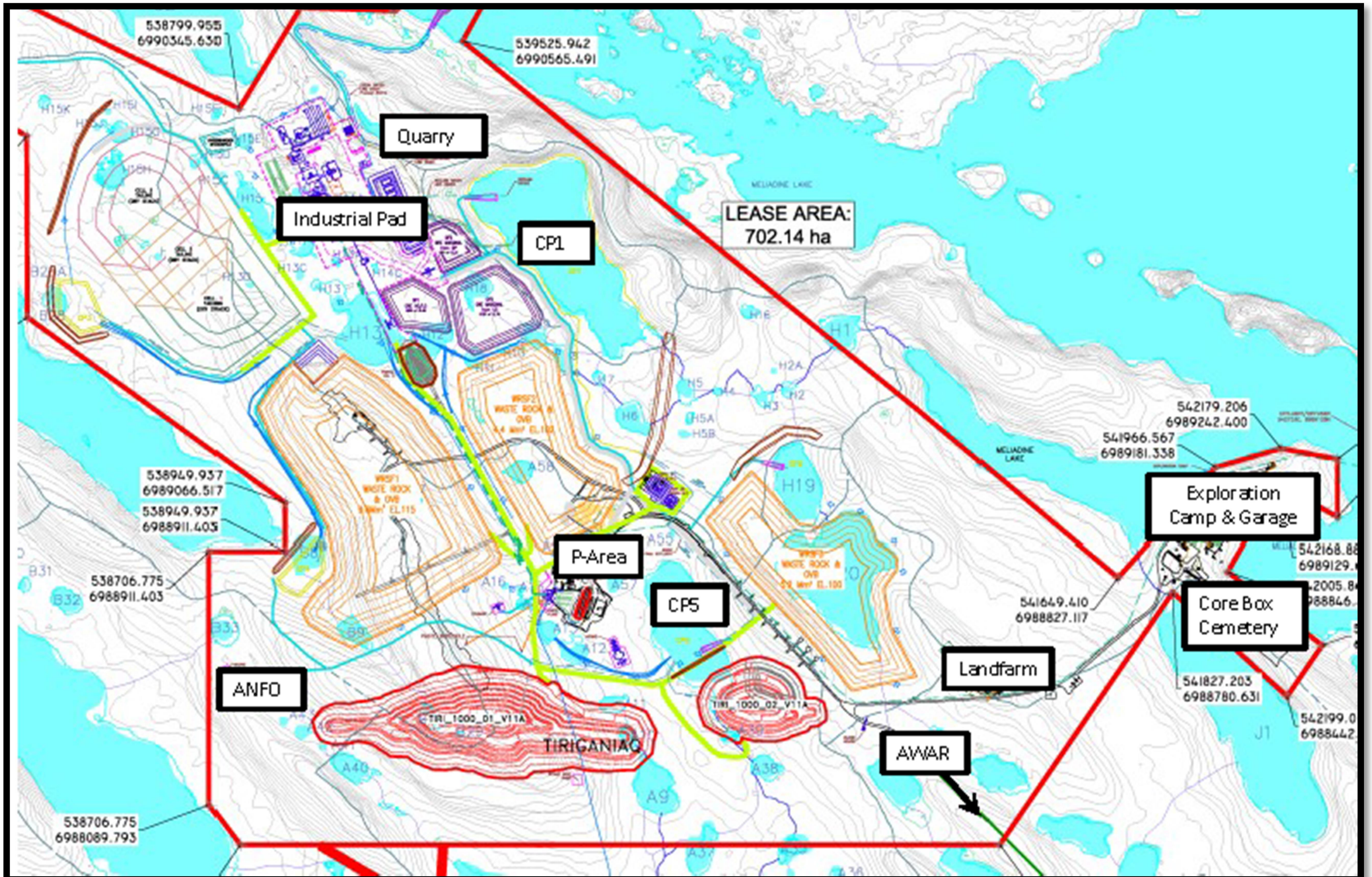
[3] Areas of concern are defined as high water areas on roads, near the up gradient opening of a culvert, flowing water with sediment, spills, wildlife, etc.

AGNICO EAGLE

Freshet Management Procedure

Fall – Preparation Prior to Winter Freeze					***Risks/ Impacts***
Area for Risk		**Action**	**Responsible Department**	**Approximate Dates**	
LV50		• Survey water level and calculate water volume and provide to Environment, and/or • Measure and record flow meter volume prior to pumping and after pumping and provide to Environment	Engineering	Prior to pumping to P2 (Late September)	
		• Pump to P2	Mining	Late September	
P-Area	P2 and P3	• Pump water to P1 for active evaporation	Site Services	June - September	
	P1, P2 & P3	• Remove pumps and prepare equipment for winter storage	Site Services	At beginning of winter freeze	
		• Written inspection • Water sampling	Environment		
	Evaporators	• Decommission for winter	Site Services	Prior to any sub-zero temperatures	
A8		• Move pumphouse/pump closer to Site	Site Services	Late September	
CP5		• Pump water to Saline Treatment Plant	Site Services	Late September	

Figure 1: Areas for Risk



APPENDIX B: SNOW MANAGEMENT PROCEDURE

Snow Management Procedure

		PROCEDURE NUMBER:	**MEL-ENV-0017**
People concerned	All Departments	**Prepared by**	Philip Roy Environment Technician
		Authorized by	Jeffrey Pratt SR. Environment Coordinator Jennifer Brown Water Engineer
Effective :	January 1, 2017	***"Safety First, Safety Last … Safety Always!"*** ***"No Repeats" – Our Stepping Stone to ZERO HARM***	
This procedure corresponds to the required minimum standard. Each and every one must comply with the rules and regulations of the Nunavut Government in terms of health and safety at work.			

Objective:

The overall purpose of the snow management procedure (SMP) is to provide an outline for snow management that will assist with preventing adverse environmental impacts to the Meliadine Project (Site) and to mitigate risks from excess water during the freshet season (Freshet).

Concerned departments:

ALL DEPARTMENTS

Risks/ Impacts Legend

 Health & Safety	 Process/quality	 Costs	 Environment

Definitions:

Snow pad area - an area where snow can be pushed and compacted over an existing structure, such as an access road or a rock pad.

Snow storage area - an area where snow can be taken from another area and stockpiled without causing a negative impact at the freshet.

Negative impact of snow melting during freshet - the transport of fine sediments or deleterious substances from Site to the natural environment, body of water, lake or within 31 m of a water body.

Procedure	**Risks/ Impacts**
1) Snow removal needs to be planned by supervisors and the heavy equipment operators prior to starting the job.	
2) If uncertain, the supervisors or the snow removal equipment operators need to request authorization from the Environment Department to move snow to a non-designated area (see Figure 1 for designated areas).	
3) The supervisors must determine if the snow receiving location is : • Safe for the operators. • Out of the 31 m buffer zone of any lake or water body. • If stockpiled, the snow storage area must be approved by the Environment Department. • If stockpiled, the snow is to be transported to an authorized location (Figure 1) which is determined by the Environment Department. • Snow storage areas are not authorized at the Exploration Camp or along any roadways. Snow must be maintained as a snow pad area. Snow pads can be created over tundra provided that clean snow is used for the pad construction and the surface area is cleaned after use, so that it is not obstructing existing structures, but should still be within the foot print of the mine area. Snow banks must be plowed and leveled to not create snow banks (Figure 2). • The Fuel Farm and Landfarm are safety sensitive areas. The valves and piping/hosing need to be protected and available for inspection at all time. ***Snow should NOT be removed with a snow plow or heavy equipment.*** To improve safety and reduce the risk for any contact with fuel tanks or equipment within the fuel farm, snow removal shall be shovelled by hand. The valve for the single fuel tank in use must be cleared by	

carefully hand shovelling the area.	
4) Authorized snow storage areas are shown in Figure 1 : • Snow that is collected and moved from potential areas for snow to be in contact with contaminants (i.e. the fuel farm, landfarm, ANFO plant, the area surrounding the portal entrance, waste rock pile and the areas surrounding the P-Area) will be collected and stockpiled at P1. • Snow and ice from the other areas at the Site are removed from roadways with a snow blower or plow and/or collected and stockpiled at CP1 (H17) or CP5 (A54).	
5) Snow should be plowed level to make a snow pad area to avoid creating snow banks along the sides of the All Weather Access Road (AWAR) to reduce the risk of snow banks across the road.	

Figure 1: Authorized Snow Removal and Snow Storage Areas

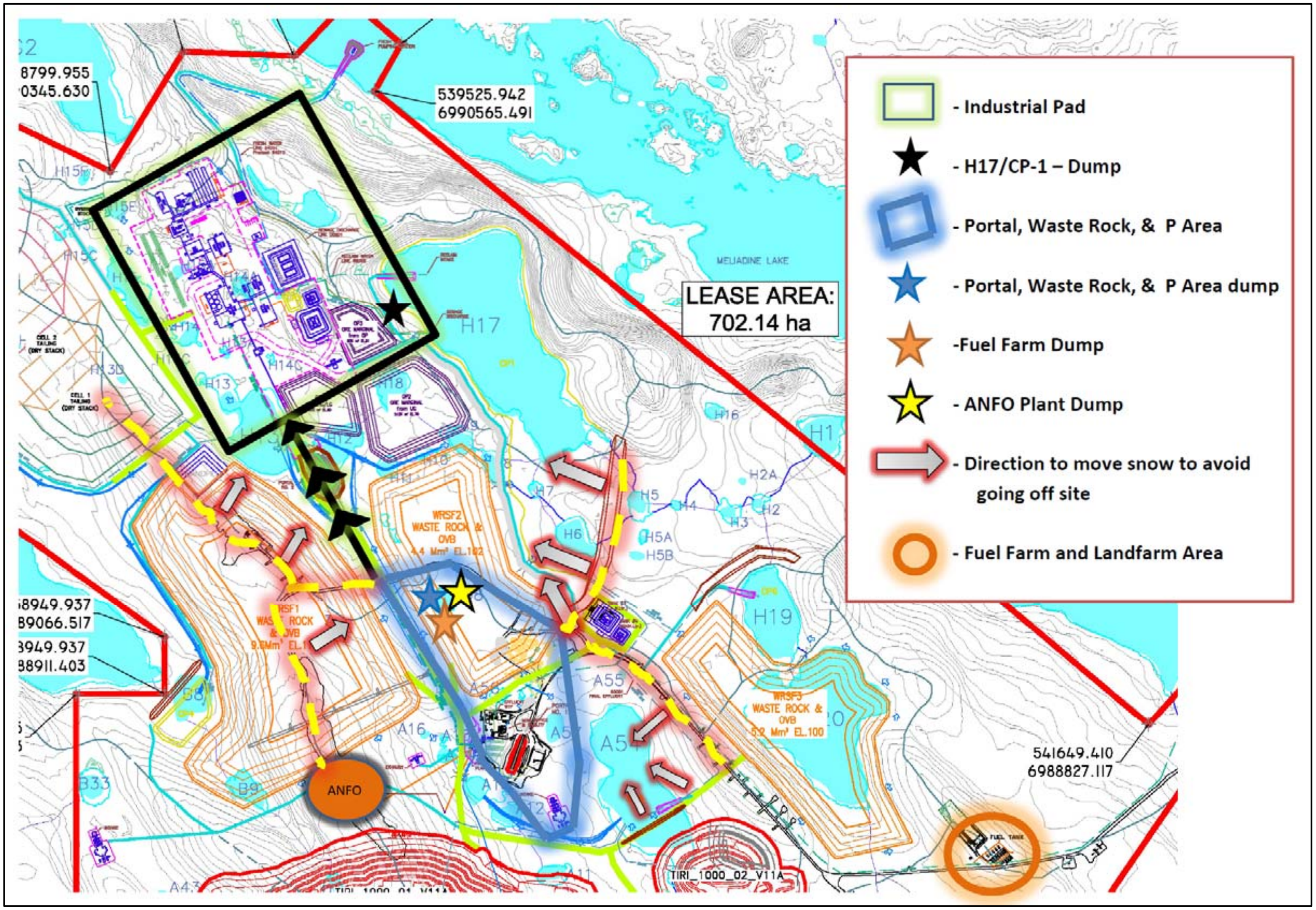
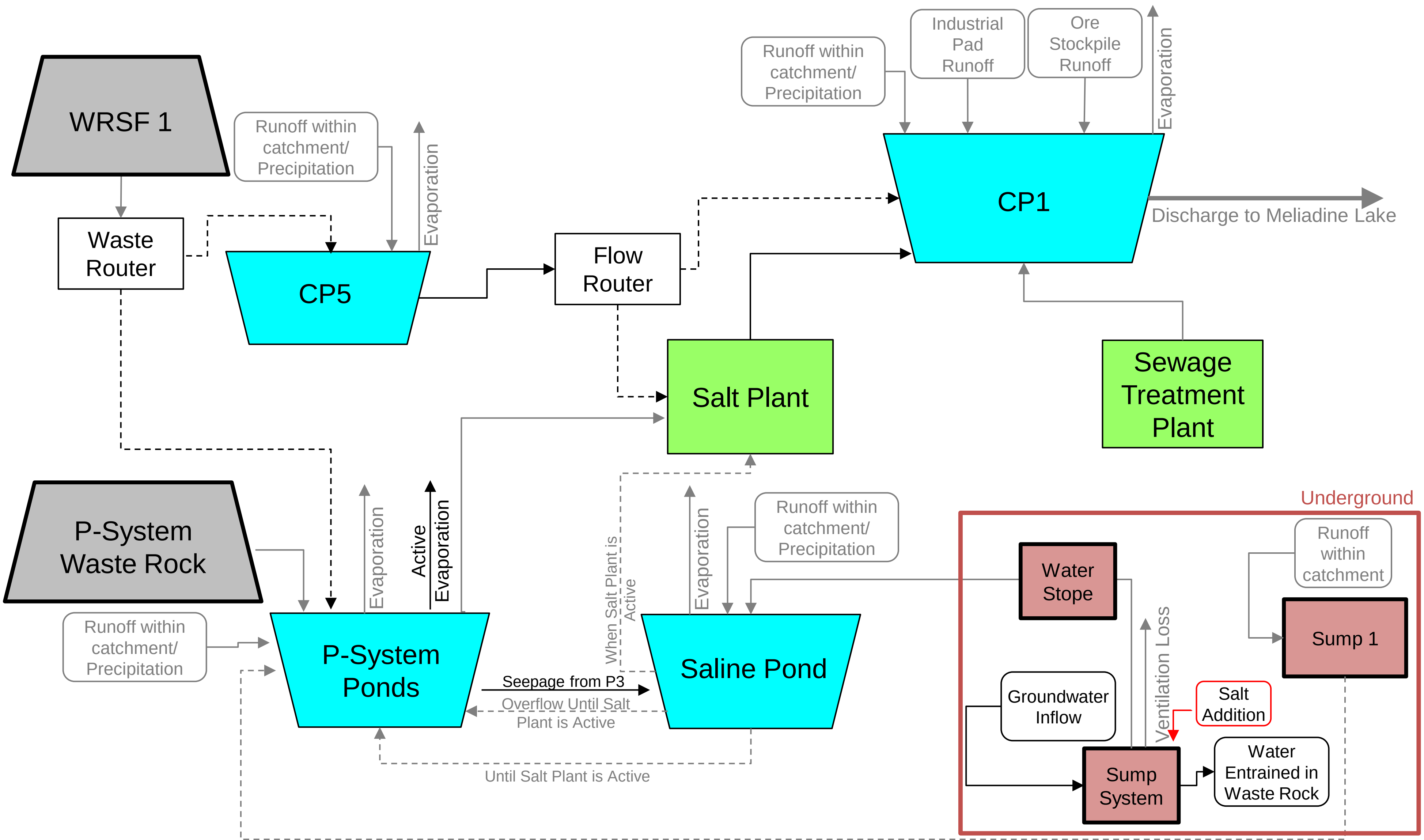


Figure 2: Exploration Camp Snow Pad Area and No Plow Zone Example

APPENDIX B • WATER MANAGEMENT SCHEMATIC FLOW SHEETS



Notes:
P-System Ponds have been grouped for illustrative purposes. Active evaporation from P1 Pond only.

Components shown in black can be controlled via the dashboard. Grey Components are fixed flows.

Dashed lines represent flow/mass routing that changes with time or by scenario.

CLIENT
AGNICO EAGLE MINES LIMITED

PROJECT
MELIADINE GOLD PROJECT
CONSTRUCTION PHASE WATER QUALITY MODEL

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-03-17
PREPARED	MIB
DESIGN	MIB
REVIEW	VJB
APPROVED	VJB

TITLE
WATER BALANCE SCHEMATIC

PROJECT No.	Doc.	Rev.	FIGURE
1668371	611	0	1