APPENDIX 29-18. WATER MANAGEMENT PLAN

AGNICO EAGLE

MELIADINE GOLD MINE

Water Management Plan

MARCH 2025
VERSION 15B
6513-MPS-11

EXECUTIVE SUMMARY

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

The water management objectives are to minimize potential impacts to the quantity and quality of surface water at the Mine. Water management structures (surface ponds, water retention dikes/berms, water diversion channels and culverts) are in place and 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 contact water and saline contact water collection ponds (CPs and SPs), water retention dikes, berms, channels, a potable Water Treatment Plant (WTP), a Sewage Treatment Plant (STP), an Effluent Water Treatment Plant (EWTP), a Saline Effluent Treatment Plant (SETP), and a Saline Effluent Waterline.

During mine Construction and Operations, contact water originating from affected areas on surface will be intercepted, diverted and collected within the various collection ponds. The collected water at the Mine will be eventually pumped and stored in Collection Pond 1 (CP1), where the contact water will be treated by the EWTP for removal of Total Suspended Solids (TSS) prior to discharge to the receiving environment. Discharge to Itivia Harbour is prioritized, with the remainder discharged to Meliadine Lake according to the approved Meliadine Mine Adaptive Management Plan. At the Discovery site, contact water will be managed in the Discovery collection ponds (CPD1 and CPD2) and routed to SP6 for discharge to Itivia Harbour. 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. Excess saline contact water will be pumped to different SPs on the surface, and then routed to Tiriganiaq Pit 02 (TIR02) and then Saline Pond 6 (SP6) once constructed. All saline contact water will be eventually conveyed from TIR02 or SP6 to the SETP-WTC prior to discharge to Itivia Harbour via the waterline.

The long-term, post-closure water quality in the collection ponds and in the flooded open pit lakes will meet Metal and Diamond Mining Effluent Regulations (MDMER), Canadian Council of Ministers of the Environment Water Quality Guidelines (CCME-WQG) for the protection of aquatic life and/or the Site-Specific Water Quality Objectives (SSWQOs) developed for the Mine.

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 environmental discharge without treatment.

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ᐊᒡᓃᑯ ᐄᒍ ᐅᔭᕋᒃᑕᓇᐊᒃᑯᑦ (ᐊᒡᓃᑰᒃᑯᑦ) ᑕᓯᕐᔪᐊᕐᒥᑦ ᐅᔭᕋᒃᑕᓇᐊᓕᐅᖅᐸᓪᓕᐊᔪᑦ (ᐅᔭᕋᒃᑕᓇᐊᖅ), 25 ᑭᓚᒥᑕᓂᒃ ᐅᖓᓯᒃᑎᕆᔪᖅ ᐅᐊᖕᓇᖓᓂᑦ ᑲᖏᖅᖢᓂᐅᑉ, ᐊᒻᒪ 80 ᑭᓚᒥᑕᓂᒃ ᐅᖓᓯᒃᑎᕆᐸᒍᓂ ᓂᒋᐊᓂᑦ ᐱᖓᖕᓇᖅᐸᓯᐊᓂᑦ ᐃᒡᓗᓕᒫᕐᔫᑉ ᑭᕙᓪᓕᕐᒥᑦ ᓄᓇᕗᒻᒥᑦ.

ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᒪᔪᑦ ᒥᑭᓪᓕᒃᑰᖅᑎᓪᓗᒋᑦ ᐊᒃᑐᖅᓯᓂᐅᔪᖕᓇᖅᑐᑦ ᐃᒪᖃᖅᑎᒋᓂᖓ ᐊᒻᒪ ᖃᓄᐃᓐᓂᖓᑕ ᖁᖓᓂᑦᑐᑦ ᐃᒪᐃᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ. ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐋᖅᑭᐅᒪᔪᑦ (ᓄᓇᐅᑉ ᖁᖓᓂᑦ ᐃᒪᖅᓱᐃᑦ, ᐃᒪᕐᒥᒃ ᐸᐸᑦᑎᓂᕐᒧᑦ ᐊᕙᓗᐃᑦ, ᐃᒪᕐᒥᒃ ᓴᖑᑎᑦᑎᓂᕐᒧᑦ ᑯᐸᓗᐃᑦ ᐊᒻᒪ ᑯᐸᓘᓐᓃᑦ) ᑕᐃᒪᐅᔪᑦ ᐊᒻᒪ ᓴᓇᔭᐅᓂᐊᖅᑐᑦ ᐱᔭᕆᐊᖃᕐᒪᑕ ᓄᖅᑲᖓᑎᓪᓗᒍ ᐊᒻᒪ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᒃᑐᖅᑕᐅᔪᑦ ᐃᒪᐃᑦ ᐃᓂᐅᔪᓂᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᓂᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐅᔭᕋᒃᑕᖅᑎᓪᓗᒋᑦ. ᐊᖏᔪᖅ ᐃᒪᓕᕆᕝᕕᖕᒥᑦ ᐃᓚᐅᔪᑦ ᐃᒪᕐᒥᒃ ᑲᑎᑦᑎᕝᕕᐅᔪᑦ ᑕᓯᕋᔭᐃᑦ, ᐃᒪᕐᒥᑦ ᐱᓯᒪᓂᕐᒧᑦ ᐊᕙᓗᐃᑦ, ᑯᐸᓗᐃᑦ, ᐃᒥᖅᑕᐅᓂᐊᖅᑐᒥᒃ ᐃᒪᓕᕆᕝᕕᒃ (WTP), ᖁᕐᕕᖕᒥᙳᖅᑐᓕᕆᕝᕕᒃ (STP), ᐃᒪᑦᑎᐊᕙᓕᐅᕐᕕᒃ (RO), ᑯᕕᔪᓂᒃ ᐃᒪᓕᕆᕝᕕᒃ (EWTP), ᐊᒻᒪ ᑕᕆᐅᓕᖕᒥᑦ ᐃᒪᕐᒥᑦ ᑯᕕᔪᓕᕆᕝᕕᒃ (SETP).

ᐅᔭᕋᒃᑕᓇᐊᖅ ᓴᓇᔭᐅᑎᓪᓗᒍ ᐊᒻᒪ ᐊᐅᓚᖅᑎᑕᐅᑎᓪᓗᒍ, ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ ᐱᔭᐅᔪᖅ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᓂᑦ ᐃᓂᐅᔪᓂᑦ ᓄᓇᐅᑉ ᖁᖓᓂᑦ ᐱᔭᐅᓂᐊᖅᑐᑦ, ᓴᖑᑎᑕᐅᓗᑎᒃ ᐊᒻᒪ ᑲᑎᑕᐅᓗᑎᒃ ᐊᔾᔨᒌᙱᑦᑐᓄᑦ ᑲᑎᑦᑎᕝᕕᐅᔪᑦ ᑕᓯᕋᔭᖕᓄᑦ. ᑲᑎᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ ᑯᕕᑎᑕᐅᓕᖃᑦᑕᕐᓂᐊᕐᓗᓂ ᐊᒻᒪ ᑲᑎᑦᑎᕝᕕᐅᔪᖅ ᑕᓯᕋᔭᒃ 1-ᒧᐊᖅᑕᐅᓗᓂ (CP1), ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ ᐱᓕᕆᐊᖑᖃᑦᑕᖅᓱᓂ EWTP-ᒥᑦ ᐄᕐᓂᐊᕐᓗᒋᑦ ᑲᑎᖕᒍᒋᑦ ᑖᓂᖅᓵᖅᑐᑦ ᓯᑎᔪᐃᑦ (TSS) ᑯᕕᑎᑕᐅᓂᐋᖅᑎᓪᓗᒍ ᓯᓚᒧᑦ. ᑯᕕᑦᑎᓂᖅ ᐃᑎᕝᕕᐊᓄᑦ ᓯᕗᓪᓕᐸᐅᑎᔭᐅᔪᖅ, ᐊᒥᐊᒃᑯᖓ ᑯᕕᑎᑕᐅᓂᐊᕐᓗᓂ ᑕᓯᕐᔪᐊᕐᒧᑦ ᒪᓕᒡᓗᒍ ᓈᓚᒋᔭᐅᔪᖅ ᑕᓯᕐᔪᐊᕐᒥᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒥᒃ ᐸᕐᓇᐅᑎ. ᑎᒃᑲᕗᓇᒥᑦ ᐃᓂᐅᔪᒥᑦ, ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ ᐊᐅᓚᑕᐅᓂᐊᖅᑐᖅ ᑎᒃᑲᕗᓇᒥᑦ ᑲᑎᑦᑎᓂᕐᒧᑦ ᑕᓯᕋᔭᖕᒧᑦ (CPD1 ᐊᒻᒪ CPD2) ᐊᒻᒪ SP6-ᒧᐊᖅᑕᐅᓗᓂ ᑯᕕᑎᑕᐅᓂᐊᕐᓗᓂ ᐃᑎᕝᕕᐊᓄᑦ. ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ ᐱᔪᖅ ᑲᑎᑕᐅᓂᐊᖅᑐᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᖓᓄᑦ ᑯᕕᑎᑎᔾᔪᑎᓄᑦᑐ. ᐃᓚᖓ ᐃᒪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐱᔪᖅ ᐊᑐᖅᑕᐅᒃᑲᓐᓂᕐᓂᐊᖅᑐᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐊᐅᓛᖅᑎᑦᑎᓂᕐᓄᑦ. ᐊᒥᐊᒃᑯᖓ ᑕᓇᐅᓕᒃ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ ᑯᕕᖅᑕᖅᑕᐅᓂᐊᖅᑐᖅ ᐊᓯᐊᓄᑦ SP-ᓄᑦ ᖁᖓᓂᑦᑐᓂᑦ, ᐊᒻᒪ ᑎᓇᒐᓂᐊᖅ ᓄᓇᒥᑦ ᐃᓗᑦᑐᖅᓯᒪᔪᒧᐊᖅᑕᐅᓗᓂ (TIR02) ᐊᒻᒪ ᑕᓇᐅᓕᒃ ᑕᓯᕋᔭᒃ 6-ᒧᑦ (SP6) ᓴᓇᔭᐅᓯᒪᓕᖅᐸᑦ. ᑕᒪᑐᒧᒃᑖᖅ ᑕᓇᐅᓕᒃ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ TIR02-ᒧᐊᖅᑕᐅᕋᑕᕈᓖᖅᑐᖅ ᐅᕝᕙᓘᓐᓃᑦ SP6-ᒧᑦ SETP-WTC-ᒧᑦ ᑯᕕᑎᑕᐅᓂᐋᖅᑎᓪᓗᒍ ᐃᑎᕝᕕᐊᓄᑦ ᓱᑉᓗᓕᒃᑰᖅᑎᓪᓗᒍ.

ᐊᑯᓂᐅᔪᒧᑦ, ᐅᒃᑯᐊᖅᓯᒪᓕᖅᑎᓪᓗᒍ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓ ᑲᑎᑦᑎᕝᕕᐅᔪᑦ ᑕᓯᕋᔭᖕᓂᑦᑐᑦ ᐊᒻᒪ ᐃᒻᒥᖅᑐᖅᑕᐅᓯᒪᔪᑦ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᓚᔪᑦ ᑕᓲᑦ ᑎᑭᐅᑎᓯᒪᓂᐊᖅᑐᑦ ᓴᕖᑦ ᐊᒻᒪ ᓯᑎᔪᓂᑦ ᐅᔭᖅᖃᓂᒃ ᐅᔭᕋᒃᑕᓇᐊᕐᒥᑦ ᑯᕕᔪᓄᑦ ᒪᓕᒐᕿᓂᑦ (MDMER), ᑲᓇᑕᒥᑦ ᒦᓂᔅᑕᐅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐊᕙᑎᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᒪᓕᒃᑕᐅᔪᒃᓴᖏᓐᓂᑦ (CCME-WQG) ᒥᐊᓂᕆᓂᐊᕐᓗᒋᑦ ᐃᒪᕐᒥᐅᑕᐃᑦ ᐆᒪᔪᑦ ᐊᒻᒪ/ᐅᕝᕙᓘᓐᓃᑦ ᐅᓂᐅᔪᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᐱᔭᒃᓴᐅᑎᐅᔪᑦ (SSWQOs) ᐋᖅᑭᒃᑕᐅᓯᒪᔪᑦ ᐅᔭᕋᒃᑕᓇᐊᕐᒧᑦ. ᐅᔭᕋᒃᑕᓇᐊᖅ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᑎᓪᓗᒍ, ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᖁᑏᑦ ᐃᓂᐅᔪᒦᓐᓂᐊᖅᑐᑦ ᑭᓯᐊᓂ ᐅᔭᕋᒃᑕᓇᐊᖅ ᐅᒃᑯᐊᖅᑕᐅᕙᓪᓕᐊᓂᖓ ᐱᐊᓂᒃᐸᑕ ᐊᒻᒪ ᖃᐅᔨᒋᐊᖃᑦᑕᕐᓂᒃᑯᑦ ᖃᐅᔨᓇᖅᓯᒃᐸᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓ ᓈᒻᒪᑦᑎᐊᕐᓂᖓᓄᑦ ᐊᕙᑎᒧᑦ ᑯᕕᑎᓐᓂᐊᕐᓗᒍ ᐱᓕᕆᐊᖑᙱᑦᑐᓂ.

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LIST OF FIGURES

LIST OF TABLES

DOCUMENT CONTROL

Version	Date	Section	Page	Revision	Author
6	March 2019	All	All	Update is to fulfill annual review requirement (NWB)	Environment Department
		1	4	Update to Mine Development Plan	
		3.1	8-12	information	
				Updated Version 6 changes	
		3.2	11-12	Updated existing water management control structures.	
				Revised structure design semantics; corrections to culvert design; updated CP3, CP4 design parameters and	
		3.3	12-14	naming convention; removed incorrect	
		3.6	15	artifact pertaining to culvert 1 flow handling	
				Addition of SP3; updates to SP2 design	
		3.8, 3.9	17-21	Included as-built parameter values; updated berm and dike naming convention, thermistor information	
				Updated freshwater intake design	
		3.11	21-22	information; updates to SWTP system; RO management; EWTP monitoring;	
		4.1, 4.2	25-31	removed incorrect information pertaining to Freshwater intake	
				Updated management of saline discharge to sea; revised information proposed in initial design	
		4.6	35	Updated key management activities	
		6.3	37	schedule to include discharge to sea;	
		7	40	updated regarding underground inflow management; revised haul road	
		Figure 1.2		management; revised wash bay	
		Figure 6.1, 6.2		management; updated process water quantities	
				Updated impacted waterbodies status	
		Figure 7.1a		Revised semantics regarding flow	
		3.9.4		paths	
				Included additional information	
7	August 2019		20	regarding July 23rd exceedance	
		4.1		Updated Layout to most recent General Mine Site Plan	
		4.1.1	26	Specified plan layouts are from feasibility level study	
			27-28	Updated Layout with monitoring stations to most recent General Mine	
		3.5		Site Plan	

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				Updated EWTP trigger limit to account
8	November	Figure 3.2		for variance introduced by TSS-
	2019	All	15-16	turbidity correlation strength
				Updated Key Activities (Table 10) to
		Exec.	55	reflect changes to H19/H20
9	March	Summary		dewatering schedule
	2020	3.1	All	Revised H19/H20 dewatering plan with
				requirements for advancement in
		3.2		dewatering schedule; Updated
		3.3		dewatering schedule (Table 11)
			9	
		3.4		
		3.5	12	Updated Saline Pond section to include
		3.6	13	current existence of SP2 and plans for
		3.9		construction of SP4.
			15	Figure changed from planned location
		3.11	15	of SP2 to planned location of SP4.
			16-17	Update is to fulfill annual review
		3.12	19-21	requirement (NWB)
		4.1		Updated to include SETP, excess saline
		4.2	22	contact water management
		4.3		Updated existing water management
			23	systems (saline ponds, SETP, discharge
		5	26-30	to sea)
		7	31	Updated Table 2 and Table 3
			32-33	Updated to include CP4 as existing
				structure and modified CP6
		Figure 1.1	33-34	construction date
		Figure 1.2	40	Update to Section
				Updated to Section
		All		Updated Table 7
		3		Update to SWTP and EWTP systems,
				addition of SETP
		3.1		Updated management of saline water
10	July	3.2		discharge to sea
	2020 2021	3.3		Update to Section
		3.5	All	Updated Table 10 and Section
		3.6	11-22	Updated process water management
		3.9.4		Updated Meliadine Lake diffuser
		4	13	effluent flow rates and EWTP sludge
		4.3	15	disposal options
		5	16	Update to Section
			18	Update to Section. Removed
		6	18-20	information already presented in
		7	25	annual report (i.e., MEL-14 and MEL-SR
		Figure 2	27-35	results).
		Figure 4	34-35	Updated Layout to most recent
		Figure 6	36-38	General Mine Site Location Plan
		Figure 8		Updated Layout to most recent

			40-41	General Mine Site Plan
		Figure 9	42	
				Updated to support Water Licence
		All		Amendment
				Updated to include CP2, CP2-Berm,
		2.2		Channel 9 and 10, and
		3		decommissioning of SP2
				Updated Table 1 and section
11	August	3.1		Updated Table 3 and section
	2021		All	Updated Table 4 and section
		3.4		Removed SP2 and updated Table 6 and
			8-9	section
		3.5	10	Updated Table 7 and 8 and section
		3.6		Update to EWTP system
			10	Updated to add CP2 and update Table
		3.9.3		9 and 10
		3.9.4	15-16	Update EWTP discharge rate and Table
				13
		3.9.4.3	16	Water Balance update, moved section
			16-17	of Water Balance results and table into
		3.9.5		appendix C
			20-21	Water Quality update
		4	21	ICRP 2020 update and Table 16 to
				include CP2
		4.1	22	Updated layout to most recent General
		4.3		Mine Site
		5 & 6	22	Updated following decommissioning of
				SP2
			26	Updated to include CP2 monitoring
				Updated layout to most recent General
		3.9.6	28-30	Mine Site during closure
			35	Updated layout to most recent General
		2.1.5	35,37	Mine Site after closure
		3.1		Updated as per Part B, Item 13 of the
		3.2		Amended Water Licence
12	April 2022	3.4	23	Updated section to reflect current
		3.6		Mine Plan
13	April 2023	3.7	8	Added terminology and definitions for
			10-12	Plan clarity, removed Evaporators
		4.1	14	subsection
			15-16	Removed SWTP from water
		4.1.2	16-17	management systems, updated Table 1
			18	Updated section and Table 5 to reflect
		4.3		P-Area decommissioning
			30	Added section on Contaminated Snow
				Cell
			32	Updated section and Table 6 to include
				Tiriganiaq Pit 2 as saline water storage
			38	Updated section to reflect current

				SWTP status Section reorganized to include EWTP and SETP in Water Treatment Complex (WTC) Added section to discuss current and possible future sludge management options Updated to include second oil water separator at the maintenance shop wash bay Updated section and Table 9 to include Tiriganiaq Pits 1 and 2 in Water Management Strategy items Updated section and Table 10 Updated section and Table 13 Updated sections, removed WB and WQ results from document (these are/will be provided in Annual Reports) Added RO treatment section. Minor changes to the local hydrology section text Addition of channel 2 berm planned in Q2 2023 Modification of as-built numbers Text update on section P-area containment ponds Addition of description on SP3 saline pond Update of as-built numbers for channels 9 and 10, addition of channel 2 berm Management activities accomplished in 2022 and planned for 2023 Modification of predicted Groundwater inflows for version V14 of the Golder model Update of Effluent discharge numbers for 2022	
14_NWB	January 2024	Throughout		Submitted to Nunavut Water Board as part of the Meliadine Mine Water Licence Amendment	Permitting Department
14.1_NWB	February	4.3		Submitted to Nunavut Water Board Errata	Permitting Department
15	February 2025	1 2.2	7 11	Text edits Text edits	Environment Department

	Table 1	11	Table modification according to schedule updates
	3.1	13-14	Additions of water management system components and text edits
	Table 2	16	Addition of Channel 2 berm
	Table 3	16-17	Addition of containment ponds, Berm 4, removal of channels 12-13
	3.2	18-19	Addition of detail on design criteria for new water management infrastructure and text edits
	Table 6	20	Addition of CP9
	3.4	20	Detail on modification of P3 area
	Table 7	21	Inclusion of detail on P3 sump design criteria
	3.6.1	22	Text edits
	3.6.2	23	Text edits
	3.7.1	23-24	Text edits
	Table 9	25	Addition of channel 11
	3.7.2	25	Text edits
	Table 10	26	Addition of Channel 2 berm and Berm 4
	3.9.4.1	28	Text edits
	3.9.4.2	29	Text edits
	3.9.4.3	30	Text edits
	3.11	32	Text edits
	Section 4	35	Text edits
	Table 12	36	Removal of SUMP P1, P2 and P5
	4.1	37	Text edits
	Table 13	37-38	Addition of planned infrastructure and merge of previous version’s Table 14
	4.1.1	41	Inclusion of details on pond dewatering
	Table 14	42-43	Addition of a table detailing planned pond dewatering information
	Table 15	44	Inclusion of latest updated groundwater model results
	4.1.4	45	Text edits
	4.2.1	46	Text edits
	Table 16	46-47	Columns label update
	4.3	47-48	Text edits
	Figure 6	49	Volume updates
	Section 5	50-60	Addition of details on water balance modelling
	6.3	62-63	Text edits
	Appendices	All	Removed Appendices. These will be submitted as standalone documents moving forward.

15b	March 2025	3.9.4.2 3.9.4.3	28 29	Updated to reflect Agnico Eagle is currently designing a treatment system for ammonia nitrogen to meet the MDMER which will replace breakpoint chlorination
		5.3.7	51	Updated Table 16 and related text

ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited
AWAR	All Weather Access Road
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CCME-WQG	Canadian Council of Ministers of the Environment Water Quality Guidelines
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CP	Collection Pond
ECCC	Environment and Climate Change Canada
EQC	Effluent Quality Conditions
EWTP	Effluent Water Treatment Plant
FDP	Final Discharge Point
FEIS	Final Environmental Impact Statement
GTC	Ground Temperature Cable
GWMP	Groundwater Management Plan
ICRP	Interim Closure and Reclamation Plan
IDF	Inflow Design Flood
Licence	Type A Water Licence 2AM-MEL1631
MDMER	Metal and Diamond Mining Effluent Regulations
NIRB	Nunavut Impact Review Board
NWB	Nunavut Water Board
Mine	Meliadine Gold Mine
OP	Ore Pad
RO	Reverse Osmosis
SD	Support Document
SETP	Saline Effluent Treatment Plant
SP	Saline Pond
SSWQO	Site Specific Water Quality Objective
STP	Sewage Treatment Plant
SWTP	Saline Water Treatment Plant
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
WMP	Water Management Plan
WQ-MOP	Water Quality Management and Optimization Plan
WRSF	Waste Rock Storage Facility
WTC	Water Treatment Complex
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)

SECTION 1 • INTRODUCTION

Agnico Eagle Mines Ltd. (Agnico Eagle) operates the Meliadine Gold Mine (Meliadine Mine) located approximately 25 kilometres (km) north of Rankin Inlet (Figure 1), Nunavut, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. The Mine is subject to the terms and conditions of both the amended Project Certificate 006 issued by the Nunavut Impact Review Board (NIRB) in accordance with the Nunavut Land Claims Agreement Article 12.5.12 on March 2nd, 2022 (NIRB, 2022) and the Amended Water Licence No. 2AM-MEL1631 (the Licence), issued by the Nunavut Water Board (NWB) on October 25th, 2024 and approved by the Minister of Northern Affairs on November 22nd, 2024 (NWB, 2024). The previous Type A Water Licence (2AM-MEL1631) authorized the mining undertaking at Tiriganiaq open pits and underground. The recently amended Water Licence also includes mining of the Wesmeg/Wesmeg North, Pump, F Zone, and Discovery deposits that were included in the 2014 Final Environmental Impact Statement (Agnico Eagle 2014) and Project Certificate No.006.

This document presents an updated version of the Water Management Plan (WMP) following the approval of the most recent Water Licence Amendment.

1.1 Water Management Objectives

The water management objectives are to minimize potential impacts to the quantity and quality of surface water at the Mine and surrounding waterbodies. The purpose of the WMP is to provide information to applicable mine departments (e.g., Environment, Engineering, Mine, Energy and Infrastructure, etc.) for sound water management practices, proposed and existing infrastructure, the water balance model, water quality predictions, and for the water quality monitoring plan for the Mine.

Water management structures (collection ponds, culverts, sumps, pipelines, water diversion channels and water retention dikes/berms) are utilized to contain and manage contact water from areas affected by mining activities. Measures have been implemented for the Mine Construction and Mine Operation phases.

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, personnel or organizational structure, regulatory or social considerations, and/or design philosophy. The WMP will be reviewed annually by Agnico Eagle and updated as necessary as part of the Annual Report. The Meliadine Mine Adaptive Management Plan is also used in combination with the Water Management Plan to provide management and mitigation actions.

SECTION 2 • BACKGROUND

2.1 Site Conditions

The Mine is located in an area of poorly drained lowlands near the northwest coast of Hudson Bay. The dominant terrain in the area consists 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 (m asl) and a maximum relief of 20 meters.

The local overburden consists of a thin layer of topsoil overlying silty gravelly sandy 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 Mine 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 Mine 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, and has over 200 islands. Unlike most lakes, it has two outflows that drain into Hudson Bay through two 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 southwest 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 1,460 km^2.

Watersheds in the Mine 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 Mine 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 Mine 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 Mine 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, 2012b).

2.1.5 Local Hydrogeology

Continuous permafrost areas, in dominant presence in the Mine area, are subject to the following groundwater flow regimes characteristics:

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

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 within the active layer flows to local depressions and ponds that drain to larger waterbodies. The talik, or unfrozen ground, beneath large waterbodies will be open. Open talik define areas of connections between suprapermaforst groundwater and deep groundwater flow regime beneath the permafrost.

In a study investigating groundwater flow within the vicinity of the Meliadine site, Golder (2012a) identified that circular lakes with a minimum radius of 290 m or elongated lakes with minimum half width of 160 m, are subject to have underlying open taliks. Meliadine Lake and Lake B7 are likely to have open taliks connected to the deep groundwater flow regime.

2.2 Mine Development Plan

Agnico Eagle is currently mining the Tiriganiaq deposit with two open pits and one underground operation. The 2024 Water Licence Amendment extends the Life of Mine to 2031 with the open pit mining of F Zone, Wesmeg, Pump, and Discovery deposits. The approved Mine Plan is expected to produce approximately 37.5 million tonnes (Mt) of ore, 180 Mt of waste rock, 34.5 Mt of overburden waste, and 31.4 Mt of tailings. Agnico Eagle will continue exploration activities with the objective to extend mine life beyond 2031.

Mining facilities on surface include a plant site and accommodation buildings, ore stockpiles, a tailings storage facility (TSF), waste rock storage facilities (WRSFs), a water management system that includes collection ponds, water diversion channels, retention dikes/berms, and a series of water treatment plants. The general mine site layout plan is shown on Figure 2.

SECTION 3 • WATER MANAGEMENT CONTROLS AND STRUCTURES

There are three major sources of water at the Mine requiring management under the Mine water management system: freshwater pumped from Meliadine Lake, natural runoff from precipitation, and natural groundwater inflow to the Underground Mine. For the purpose of clarity and consistency, terminology and definitions are applied to these three main sources as follows below. These terms are applied throughout the remainder of the WMP.

- **Freshwater**: Water contained within natural water bodies (e.g., Meliadine Lake) which has not come into contact with the mine infrastructure.

- **Surface Contact Water**: Rain and snowmelt that has come into contact with the mine infrastructure and is collected within the collection ponds.

- **Saline Contact Water**: Saline groundwater which flows into the underground mine and comes into contact with the underground mine infrastructure.

A network of berms, dikes, collection ponds, channels, culverts and sumps are in place and maintained to facilitate water management. Design Reports and As-Built Reports have been submitted and approved for the water management structures discussed in this section, as applicable. This section is included to summarize design and as-built information.

3.1 Water Management Systems

The water management systems, as shown in Figure 5, required to support the additional deposits in the Meliadine Mine Plan per the latest Water Licence Amendment, include the following components:

- 11 water retention dikes including Dikes D-SP6North, D-SP6West, D-B5North, D-B5South, D-CP8North, D-CP8West, D-CP8South, D-CP8East, D-A8North, D-A8South, and D-A6;
- Six water collection ponds including contact water ponds CP7, CP8, CP9, CPD1, CPD2, and saline pond SP6;
- Dewatered waterbodies to be managed (A8, A6, J6, J7, B5, B6, B34, B59)
- Six water diversion channels including Channel 11, Channel 14, Channel 15, and Channel 17 to Channel 19;
- Two sumps including Sump F1, and Sump F2;
- Three thermal protection berms including Berm 4, Berm-CP7, and Berm-F2;
- Culverts as required;
- An effluent water treatment plant (EWTP);
- A saline effluent treatment plant (SETP);
- A water treatment complex (WTC) building – housing the EWTP and SETP;
- A sewage treatment plant (STP);

- A potable water treatment plant (WTP);
- A network of surface pumps and pipelines;
- A freshwater intake;
- Two jetties and pumping infrastructure (CP1 and CP5);
- An effluent diffuser located in Meliadine Lake; and
- An effluent diffuser located in Melvin Bay.

Surface contact water is intercepted, diverted and collected within various collection ponds prior to passive evaporation, treatment and/or discharge. Surface contact water collected in CP3 and CP4 is discharged into Culvert 2 where it flows to CP1. Surface contact water collected in CP5 is pumped into CP1. Surface contact water from the WRSF3 is collected in CP2 and CP6 ponds and then pumped into CP1. CP9 will be established using the Pump 01 pit and will collect contact water from the Pump area. Water collected in CP9 will be pumped to CP1. Surface contact water collected in CP1 is treated for total suspended solids (TSS) at the EWTP-WTC and discharged through the diffuser located in Meliadine Lake (Section 3.10).

Saline contact water from the Underground Mine is collected in underground sumps, transported to a clarification system, and subsequently recirculated for use in various underground operations. Excess saline contact water is pumped to surface where it is stored in Tiriganiaq Pit 2 (Tiri 02). Saline contact water that is not used for operations is treated at the Saline Effluent Treatment Plant (SETP). Further details are found in the Groundwater Management Plan.

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 already constructed at Meliadine Mine is presented in Table 1. Table 2 (Tetra Tech 2024) summarizes future water infrastructures proposed to support mining of all deposits included in the Mine Plan. Figure 5 shows the location of the respective structures over the development stages of the mine life. Final design details of these structures will also be provided to the Regulators for approval at least 60 days prior to construction, as per the Water Licence.

Table 1: Constructed Water Management Control Structures

Mine Phase	Infrastructure Name	Construction Status
Pre-Production Construction	Channel 1	Constructed
	Channel 2	Constructed
	Channel 3	Constructed
	Channel 4	Constructed
	Channel 5	Constructed
	Channel 6	TBD
	Channel 7	Constructed
	Channel 8	Constructed
	Culvert 1	Constructed
	Culvert 2	Constructed
	Culvert 3	Constructed
	Culvert 4	Constructed
	Culvert 5	TBD
	Culvert 6	TBD
	Culvert 7	Constructed
	Culvert 8	Constructed
	Culvert 10	Constructed
	Culvert 11	Constructed
	Culvert 13	Constructed
	Culvert 14	TBD
	Culvert 15	Constructed
	Culvert 16	Constructed
	Culvert 18	Constructed
	Culvert 19	TBD
	Culvert 20	Constructed
	CP1	Constructed
	CP3	Constructed
	CP4	Constructed
	CP5	Constructed
	D-CP1	Constructed
	Berm CP3	Constructed
	Berm CP4	Constructed

	D-CP5	Constructed
	CP1 Jetty	Constructed
	CP5 Jetty	Constructed
	Saline Pond (SP1)	Constructed
	Berm 1	Constructed
	Berm 2	Constructed
	Berm 3	Constructed
	Freshwater Intake Causeway & Pump Station	Constructed
	Submerged Diffuser	Constructed
	WTP Intake	Constructed
Current Operations	CP6 and Berm CP6	Constructed
	Saline Pond 3 (SP3)	Constructed
	Saline Pond 4 (SP4)	Constructed
	CP2 and Berm CP2	Constructed
	Channel 9	Constructed
	Channel 10	Constructed
	Channel 2 Berm	Constructed

Table 2:Water Management Control Structures to be Constructed

Water Management Infrastructure Type	**Nomenclature**	**Location and Operational Function**
Collection Pond	CP7	Located within the footprint of the dewatered lake A51 and A52, CP7 will be used to contain contact water from the F-Zone area.
	CP8	Located within the footprint of the dewatered lake B4, CP8 will be used to contain excess volume of contact water from the site.
	CP9	Located within the footprint of the dewatered lake B36 and the Pump01 pit, CP9 will be used to contain contact water from the Pump area.
	CPD1	Located south of WRSF9, CPD1 will be used to contain contact water from the WRSF9 within Discovery area.
	CPD2	Located south-west of Disc01, CPD2 will be used to contain contact water from the Disc01 pit within Discovery area.
	SP6	Located within the footprint of the dewatered lake B7, SP6 will be used to contain saline water from the dewatering of the underground mine and the saline water currently stored in Tiri02.
Dike	Dike D-SP6North	Located north of SP6. D-SP6North will be used to contain saline water from the TSF and prevent the saline water from flowing to the downstream receiving environment.
	Dike D-SP6West	Located in the narrow between SP6 and Lake B6. D-SP6West will be used to contain saline water from the TSF and prevent the saline water from flowing into downstream dewatered Lake B6.
	Dike D-B5North	Located north of WN01 open pit within dewatered Lake B5. D-B5North will be used to divert runoff from flowing into WN01 pit.

	Dike D-B5South	Located south of WN01 open pit within dewatered Lake B5. D-B5South will be used to collect runoff from B5 south catchment.
	Dike D-CP8North	Located in the narrow between CP8 and Lake B5. D-CP8North will be used to contain contact water stored within CP8 and prevent the contact from flowing to the dewatered Lake B5.
	Dike D-CP8South	Located within the narrow of CP8 and B45. D-CP8South will be used to contain contact water stored within CP8 and prevent the contact from flowing to the downstream receiving environment.
	Dike D-CP8West	Located in the narrow between CP8 and B3. D-CP8West will be used to contain contact water stored within CP8 and prevent the contact from flowing to the downstream receiving environment.
	Dike D-CP8East	Located west of PUM01 open pit. D-CP8East will be used to contain contact water stored within CP8 and prevent the contact from flowing into PUM01 open pit.
	Dike D-A8North	Located south of WES03 open pit. D-A8South will be used to divert runoff from flowing into WES03 open pit.
	Dike D-A8South	Located north of PUM02 and PUM04 open pits. D-A8South will be used to divert runoff from flowing into PUM02 and PUM04 open pits.
	Dike D-A6	Located southwest of FZO01 open pit. D-A6 will be used to divert contact water from Lake A6 from flowing into FZO01 open pit.
Berm	Thermal Berm CP9	Located west of future collection pond CP9, Thermal Berm CP9 is designed to preserve the permafrost foundation within the CP9 Thermal Berm footprint and to limit seepage from Lake B4 to CP9/Pump01 Pit. CP9 Thermal Berm may require a re-design to serve the purpose of Dike D-CP8 East (above).
	Berm-4	Located southeast of proposed WRSF6 and extending north in between B38 and B59, Berm 4 will be used to divert runoff water from WRSF6 to Channel 11 and CP9/Pump01 pit, and to prevent contact water from flowing into the receiving environment.
	Berm-CP7	Berm-CP7 will be used as a thermal protection berm for CP7 to reduce seepage to F Zone open pits from CP7.
	Berm-F2	Located between Lake A6 and Sump F2. Berm-F2 will be used as thermal protection berm for Sump F2.
Channel	Channels 11	Channels 11 will collect and divert the runoff water from the proposed WRSF6 catchment area to CP9/Pump01 Pit
	Channels 14 and 15	Channel 14 and Channel 15 to divert contact water from WRSF7 towards Sump F1.
	Channels 17, 19	Channels 17 and 19 to divert contact water from WRSF9 at discovery to CPD1, ore pad, industrial pad, and fuel pad towards the downstream SPD1.
	Channel 18	Channel 18 to divert contact water from industrial pad, and fuel pad at Discovery towards the downstream CPD2.
	Sump F1	Sump F1 to collect contact water from WRSF7 that has been diverted by Channel 14 and Channel 15.
	Sump F2	Sump F2 to collect portion of contact water from WRSF7 and laydown pad at F Zone.
Culverts	To be determined	Numerous culverts will be necessary for water conveyance through haul roads and access roads. Their exact location still needs to be confirmed based on the design of the road’s overs the next years.

3.2 Water Management Structures Design Criteria

The water management systems meet the following criteria:

- Treated surface contact water quality will meet regulatory criteria of the Licence and MDMER (described in the Water Quality and Flow Monitoring Plan).
- Treated saline water quality will meet MDMER criteria (described in the Water Quality and Flow Monitoring Plan).
- Design capacity of the EWTP is sufficient to ensure that D-CP1 and CP1 are 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 in combination with a 1:1000 return 24-hour extreme rainfall.
- D-CP5 and CP5 are able to manage the surface contact 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. This design is based on an allowable 3-day delay in initiation of pumping during a 7-day, 1:100 year freshet. Design capacity of pumping from CP5 to CP1 is sufficient to ensure that remaining freshet inflows to CP5 are managed via pumping to CP1.
- Storage capacity of each of the other water management ponds (CP2, CP3, CP4, CP6) is able to manage the surface contact water from their respective 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 ponds (CP2, CP3, CP4, CP5, CP6) is designed to have sufficient pumping capacity to handle the runoff surface contact 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).
- Storage capacity of water management infrastructure associated with the Pump, Wesmeg, F Zone, and Discovery mining areas are planned to allow for partial (3/7 days) or full (7/7 days) storage for the runoff volume from a 1:100 wet year, 7-day spring Freshet from each waterbody’s catchment area. The requirement for partial storage follows a similar design philosophy of CP2, CP3, CP4, and CP6 whereby, following 3 days of storage, water is actively pumped to a downstream collection pond for the remaining 4 days of a 7-day Freshet. The requirement for full storage follows a similar design philosophy of CP1 whereby the facility is able to store the entirety of the runoff from the lake’s catchment area. Detailed information regarding the storage capacities of these facilities will be provided following the detailed design of each facility.

Channel 2 to Channel 4 are in place to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 9.2 mm. Channels 9 and 10 were designed to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 5.0 mm. Channel 1 and Channel 5 to Channel 8 are designed as internal channels where any surface contact water overflowing the channels will remain within the catchment areas of various collection 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 surface contact water overflowing the channels can be safely managed by berms or temporarily stored in a lower basin nearby. For example, surface contact water overflowing Channel 5 can be contained by Berm 3. Water overflowing Channel 7 and Channel 8 can be stored in the lower basin in the drained Pond H13, and Berm 1 combined with a mass till backfill protects the Portal No.2 entrance from flooding. Furthermore, the MULTI-PLATE at Portal No. 2 is protected by compacted, engineered structural fill. Surface contact water overflowing Channel 1 will flow through the flat ground between the Stage 1 pad and Stage 2 pad of Ore Storage Pad 2 (OP2) into CP1. Table 3 presents the design parameters for CP1 and CP5. CP2, CP3, CP4 and CP6 were built through excavation of the original ground to increase water storage capacity and prevent water levels from reaching the thermal protection berms. The as-built parameters for CP2, CP3, CP4 and CP6 are provided in

Table ***4*** and are discussed in further detail within Tetra Tech (2022), Agnico Eagle (2019c), Agnico Eagle (2019d), and Tetra Tech (2020a).

Table 3: As-Built Parameters for CP1 and CP5

Pond	CP1	CP5
Pond Volume at Maximum Operating Elevation under Normal Operating Conditions and Mean Precipitation Years (m^3)	742,075	46,674
Maximum Operating Water Elevation (m)	66.2	66.0
Maximum Water Elevation during IDF (m)	66.6	66.3
Estimated Pond Volume for Water Elevation at Maximum Operating Water Elevation during IDF (m^3)	855,245	70,000
Dike for Pond	D-CP1	D-CP5
As-Built Crest Elevation of Dike Collection Element (liner system) (m)	67.37	66.72

Table 4: As-Built Parameters for CP2, CP3, CP4, and CP6

Pond	CP2	CP3	CP4	CP6
Elevated Pond Bottom Elevation (m)	41.4	53.3	51.0	51.1
Estimated Maximum Water Elevation during IDF (m)	52.0	63.0	63.0	62.0
Pond Volume at Estimated Maximum Water Elevation during IDF (m^3)	48,160	44,848	48,995	67,799
Thermal Berm for Pond	Berm-CP2	Berm-CP3	Berm-CP4	Berm-CP6

3.3 Water Collection ponds

Six planned water collection ponds (CP1, CP2, CP3, CP4, CP5, and CP6) have been constructed to date as part of the water management infrastructure. CP9 will be built over the winter of 2025 and will be in operation for the 2025 freshet. Table 5 presents the locations and the required operational period of the collection ponds. The locations of the six water collection ponds are shown in Figure 2.

Table 5: Location of Collection Pond and Required Operation Periods

Collection Pond	Relative Location	Required Operation Period
CP1	Pond H17 and H6	Year 2017 to Mine closure
CP3	North of Lake B7 and southwest of TSF	2019 to 2026 (covered by TSF)
CP4	Southeast of Lake B7 and south of WRSF1	2019 to 2026 (covered by WRSF1)
CP5	North of Tiriganiaq Pit 2	2017 to Mine Closure
CP6	Pond H19 and north of WRSF3	Year 2020 to Mine closure
CP2	East of WRSF3	Year 2022 to Mine closure
CP9/Pump01	Within the Pump01 and Lake B36 footprint	Year 2025 to Mine closure

3.4 P-Area Ponds

The P-area formerly consisted of three storage ponds as part of the saline contact water management system from 2016 to 2018.

Backfilling of the P-Area cells (P1 and P2) began in Q3 of 2020 and finished in Q3 of 2021 using waste rock obtained form the underground mine and open pits to promote permafrost aggradation.

In 2024, cell P3 was decommissioned and backfilled to serve as a laydown and storage pad. Design of the P3 backfilling included a ditch surrounding the pad and a 1.3 m deep sump excavated into the overburden at the west extremity of the pad. The ditch can safely pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 5.0 mm. Water levels within the sump are controlled by a level-indicator switch which provides a freeboard greater than 0.5 m below (66.8 m) the core elevation in the DP3-A berm (67.5 m) and the crest of the P3 laydown pad. Surface runoff to the sump is managed by pumping water over the DP3 containment structure into CP5. TDS monitoring in P3 over several years has demonstrated a sufficient degree of flushing has occurred such that the risk of salt contamination from the former presence of saline water in cell P3 is minimized and the subsequent downstream impact on CP5 TDS is negligible.

Table 6 presents the design criteria of the P3 sump. Figure 3 presents the layout of P3 pad.

Table 6: P3 Sump design criteria

Design criteria	Sump P3
Sump drainage area	23,560 m^2
1:100 24h rainfall event	59.9 mm
Total inflow	1,270 m^3
Minimum freeboard during IDF	0.5 m
Maximum Design Water Elevation	66.8 m
Sump Bottom Elevation	64.6 m
Storage Capacity	894 m^3
Minimum Pumping Rate	20 m^3/h
Level-Indicator Switch Elevation	65.5 m

3.5 Contaminated Snow Cell

A contaminated snow cell is used to store snow containing hydrocarbons (i.e., snow on which spills occur). The contaminated snow cell was constructed in 2017 (Agnico Eagle, 2017a) and is currently in place as a contingency measure for contaminated snow storage over the winter (refer to the Freshet Management Plan). Upon snowmelt, water within the contaminated snow cell is transferred to the Landfarm for treatment at the oil-water separator (Section 3.9.5).

The snow cell is lined with a polyethylene liner to avoid seepage of melting snow into the surrounding environment. The cell is designed to contain a volume of 1500 m^3 of snow and to contain 930 m^3 of water at a water surface elevation of 69.5 m.

3.6 Saline Ponds

3.6.1 Existing Saline Ponds

Saline Pond 1 (SP1) was constructed in Q3 2016 to accommodate excess saline contact water from the Underground Mine. SP1 is located north of CP5 (Figure 2). Table 7summarizes the Saline Pond capacity for storage and maximum designed operating water levels.

Saline Pond 2 (SP2) was constructed within the footprint of Tiriganiaq Pit 2 in Q2 2019 as a temporary saline contact water storage pond on site, accommodating excess saline contact water from the Underground Mine. In Q2 2020 SP2 was decommissioned to allow mining of Tiriganiaq Pit 2. Saline contact water stored in SP2 was emptied into Saline Pond 4 (SP4) which was commissioned in March of 2020.

Saline Pond 3 (SP3) was constructed within the footprint of P-Area Pond 3 (P3). Construction of SP3 was completed in Q2 2019. SP3 is part of the medium-term groundwater management strategy, that consists of treating groundwater from the Meliadine Underground with respect to quality standards and discharge the treated water effluent into Melvin Bay. SP3 is used to store the treated water exiting the former Saline Effluent Treatment Plant (SETP) (i.e., the SETP not within the WTC) before being discharged to sea.

Saline Pond 4 (SP4) was temporary in nature and allowed for the dewatering of SP2 to facilitate construction of Tiriganiaq Pit 2 while providing additional storage for saline contact water from the underground mine. SP4 was constructed in bedrock within the footprint of Tiriganiaq Pit 1 (Figure 4). SP4 was dewatered to Tiriganiaq Pit 2 in 2021 to facilitate mining beneath the facility and allow for mining to continue in Tiriganiaq Pit 1 in this area. In 2023, development of Tiriganiaq Pit 1 extended into SP4 and thus the pond no longer exists.

In Q3 2021, mining in Tiriganiaq Pit 2 was stopped and the pit was subsequently converted to a saline water storage facility. Tiriganiaq Pit 2 has a total saline water capacity of 1,616,554 m^3 and will be used to store the saline contact water pumped out of the underground mine. Further information on the saline contact water storage strategy is provided in the Groundwater Management Plan.

Groundwater from the underground mine is pumped to Tiriganiaq Pit 2 where it will remain in storage until it is treated for discharge to sea (see Section 3.11 or Groundwater Management Plan). Water stored in the saline ponds is isolated from the surface runoff collection system and will thus not be discharged to Meliadine Lake.

Table 7: Storage Capacities for Saline Pond 1 and Tiriganiaq Pit 2

Item	Saline Pond 1	Tiriganiaq Pit 2
Maximum Operational Water Elevation (m)	62.9	62.0
Maximum Water Capacity (m^3)	32,686*	1,616,554

* Tetra Tech (2017) maximum operating capacity, not including IDF storage

Saline pond water capacity in relation to stored volumes can be found in the Meliadine Mine Groundwater Management Plan.

3.6.2 Saline Pond 6 (SP6) to be Constructed

Once Lake B7 is dewatered, it will become Saline Pond 6 (SP6). SP6 will serve as the main global saline water collection pond to store the saline water from the underground mining and the saline contact water transferred from other local saline ponds. Dikes D-SP6North and D-SP6West are associated perimeter dikes to form the SP6 and to prevent the saline water stored in SP6 from flowing to the downstream receiving environment. The saline contact water stored in TIR02 pit will be transferred to SP6 to allow mining of TIR02 pit to resume later in the mine plan. All saline contact water collected in SP6 will be routed to the Saline Effluent Treatment Plant (SETP) where it will be treated for total suspended solids (TSS) and ammonia nitrogen (NH_3) prior to discharge to Itivia Harbour.

In 2021, treated effluent from the SETP was discharged into SP3. From SP3, the saline contact water was pumped into trucks which transported the water to Itivia Harbour, Rankin Inlet. Following the approval of the waterline for discharge to sea, Agnico Eagle made the decision to utilize onsite saline water storage capacity (TIR02 open pit) and to suspend the discharge to Itivia Harbour via trucking until the waterline is commissioned. From that point on, the waterline will be used to deliver effluent to Itivia Harbour via a diffuser.

3.7 Water Diversion Channels, Dikes and Berms

The following sections provides details on existing water management infrastructures currently required for mining the Tiriganiaq deposit. Water management infrastructures to be constructed to support the Mine Plan are summarized in Table 3. Details will be updated in the Water Management Plan as these structures progress into the detail design phase.

3.7.1 Water Diversion Channels

Nine water diversion channels (Channels 1 to 5, and 7 to 10) have been constructed and form part of the surface contact water management infrastructure. Construction of Channel 6 is tentative based on future water management strategies downstream of the P-area. Construction of Channels 9 and 10 was completed in Q2 2022. Channel 11 will be constructed in 2025 to collect and divert the runoff water from the proposed WRSF6 catchment area to CP9/Pump01 Pit. The as-built and design parameters for the water diversion channels are presented in Table 8.

Table 8: As-Built and Design Parameters for Channels

Channel	Approximate Total Length (m)	Bottom Width (m)	Side Slopes	Rip-rap Thickness (m)	Minimum Bottom Slope Gradient (%)
1 (As-built)	528	3	3(H):1(V)**	0.3 to 0.5	0.2
2 (As-built)	269.5	1.257	1.82(H):1(V)	0.277	0.30†
3 (As-built)	656	1.2 to 2.4 or 0.8 to 3.3*	1.8(H):1.0(V) to 3.5(H):1.0(V)	0.3†	5.3 (upper); 0.4 (lower)
4 (As-built)	930	1.0 to 1.7 or 0.8 to 4.5*	1.8(H):1.0(V) to 5.0(H):1.0(V)	0.37	2.1 to 5.3 (upper); 0.1 to 4.2 (lower)
5 (As-built)	429†	2.3 to 2.9	1.9(H):1(V)	0.2	0.17†
6	69	1	3(H):1(V)	0.3	0.44
7 (As-built)	240	2	3(H):1(V)	0.59	0.8 (Avg.)
8 (As-built)	114	2.4	3(H):1(V)	0.3	1.4 (Avg.)
9 (As-built)	713	1.55 to 3.13 (avg 2.41)	1.6(H) to 2.5(H):1(V)	0.48	0.7
10 (As-built)	200	2.03 to 3.27 (Avg 2.64)	1.7(H) to 2.7H:1(V)	0.34	1.5
11 (Design)	870	2.0	2.5(H):1.0V	0.3	2.0 (Avg.)

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

** Except from Sta. 0+050 to 0+130: 2(H):1(V)

† As-built parameter values not available; value displayed is from design

3.7.2 Water Retention Dikes and Berms

In general terms, "dikes" were constructed with impervious liner systems and "berms" are constructed with entirely till cores. With the extension of the mine within the Pump area, Berm 4 will be used to divert runoff water from WRSF6 to Channel 11 and CP9, and to prevent contact water from flowing into the receiving environment.

Water retention dikes D-CP1 and D-CP5 have been designed as a zoned earth fill dams with a geomembrane liner keyed into the permafrost foundation to limit the seepage through the dike and its foundation. The characteristics of the dikes and berms required for the WMP are summarized in Table 9.

Table 9: As-Built and Design Parameters for Water Retention Dike/Berm

Dike/Berm	Approximate Maximum Height (m)	Maximum Elevation (m)	Maximum Head of Water Retained (m)
D-CP1	6.6	68.5	3.6
Berm-CP2	5.07	58.6	0
Berm-CP3	4.9	69.9	0
Berm-CP4	5.0	69.1	0
D-CP5	3.3	67.3	1.4
Berm-CP6	6.0	68.0	0
DP1-A	3.7	70.5	68.5
DP1-B	3.4	70.7	68.7
DP2-A	4.0	69.5	67.5
DP3-A	3.4	69.0	67
Berm1	2.6	69.0	0
Berm2	1.5	varies	0
Berm3	2.76	67.37	0
Channel 2 Berm	1.7	71.0	1.5
Berm 4	1.5	74.0	0

3.7.2.1 Thermal Monitoring

Horizontal Ground Temperature Cables (GTCs) are installed along the key trenches of D-CP1 and D-CP5 at a depth of approximately 3 m below the original ground level. These installations are in place to verify that the foundations remain frozen and dike integrity is not compromised. D-CP1 and D-CP5 also contain vertical GTCs installed to an approximate depth of 15 m below the crest of each dike. Thermal berms of CP2, CP3, CP4 and CP6 contain vertical GTCs installed to approximately 8 m below original ground elevation to monitor the thermal performance of the foundation materials. Thermal records collected from these sensors provide temporal analysis of vertical temperature profiles to assess whether the structures are performing as designed.

D-CP1 and D-CP5 readings are obtained, recorded, and assessed weekly during open water season and monthly after freeze-up. Data loggers are set to record temperatures in the dikes every 12-hours. Reading frequency at the thermal berms is generally monthly during the first year following construction and quarterly thereafter. The measured readings are analyzed by an Agnico Eagle geotechnical engineer and are reported in the annual geotechnical inspection report.

In addition to thermal monitoring, visual geotechnical inspections of water management structures are currently performed, as described in Section 3.12 below.

3.8 Freshwater Intake

Freshwater usage at the Mine includes potable uses, fire suppression, make-up water for the mill, and other operational requirements, such as drilling water, dust suppression, paste backfill production, and use at the washbay. The main freshwater intake is located northeast of the industrial pad in Meliadine Lake, depicted in Figure 5. The intakes consist of vertical filtration wells fitted with vertical turbine pumps that supply water on demand. Both intake pipes are fitted with a screen of an appropriate mesh size to ensure that fish will not be entrained and shall withdraw water at a rate such that fish do not become impinged on the screen (NWB, 2021).

3.9 Water Treatment

Contact water will be treated (if necessary) to meet Licence requirements prior to being discharged to the environment. TSS mitigation techniques (i.e., attenuation ponds, silt screens, etc.), oil separation treatment, the STP, the SETP, the RO Plant, and the EWTP are used accordingly at various locations at the Mine prior to water being transferred to collection ponds and/or prior to effluent discharge to Meliadine Lake or Melvin Bay. Water quality criteria are discussed in Section 6 and in the Water Quality and Flow Monitoring Plan.

3.9.1 Freshwater Treatment Plant (WTP)

Freshwater from Meliadine Lake is treated in the WTP 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 WTP, freshwater is pumped through cartridge filters, then pumped through ultraviolet units, and finally treated with sodium hypochlorite (chlorine). The treated water is stored within a potable water tank. Potable water is monitored according to the Nunavut Health Regulations for total and residual chlorine and microbiological parameters. Operation and maintenance details for the WTP can be reviewed in the Operational & Maintenance Manual – Water Treatment Plant (Agnico Eagle, 2020a).

3.9.2 Sewage Treatment Plant (STP)

Wastewater from the accommodation complex and from satellite sewage tanks will be treated in the STP using a membrane bioreactor process 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, 2021a). Sludge is pressed using a volute dewatering unit and stored in the active deposition zone WRSF1 or WRSF3 to ensure coverage with waste rock.

3.9.3 Saline Water Treatment Plant (SWTP)

In 2018, Agnico Eagle constructed and commissioned a Saline Water Treatment Plant (SWTP) consisting of two evaporator-crystallizers (SaltMakers) to treat saline contact water. The SWTP removes total suspended solids (TSS), calcium chloride ($CaCl_2$), sodium chloride (NaCl), metals, phosphorous (P), and nitrogen compounds from the influent saline contact water. Further specifications of the SWTP can be found within the SWTP Design Report (Agnico Eagle 2018) and the SWTP As-Built Report (Agnico Eagle 2019a).

In March 2020, operation of the plant was suspended due to poor performance coupled with high energy consumption and plant safety concerns. The SWTP is not currently a component of the groundwater management strategy. More information regarding the groundwater management strategy can be found in the Groundwater Management Plan.

3.9.4 Water Treatment Complex (WTC)

The WTC is a building designed to house both the EWTP and SETP. The design rationale for the WTC is to address concerns with the stability of the concrete slab at the previous EWTP building location. Additionally, the WTC provides a centralized building for contact water treatment, allowing for improved operational synergy.

Construction of the WTC commenced in Q3 2020. Further information regarding the WTC can be found the As-Built Report (Agnico Eagle 2021b).

3.9.4.1 Effluent Water Treatment Plant (EWTP)

The installation of the EWTP within the WTC (EWTP-WTC) was completed in Q2 2021 to allow for discharge to Meliadine Lake during the open water season.

The purpose of the EWTP-WTC (Actiflo® model ACP-700R) is to reduce Total Suspended Solids (TSS) to a target maximum concentration of 15 mg/L from the influent surface contact water pumped from CP1 prior to its discharge through the diffuser into Meliadine Lake.

The EWTP is designed to meet the minimum required rate of 12,000 m^3/d per the design requirements of dike D-CP1 (Tetra Tech, 2016b). While EWTP equipment has an operational range up to 28,000 m^3/d, the current system is configured to operate a maximum discharge rate of 18,000 m^3/d to prevent over-pressuring in the HDPE line that conveys water from the EWTP to the diffuser.

Further information regarding EWTP-WTC operation can be found in the EWTP-WTC Operation and Maintenance Manual (Agnico Eagle 2021c).

Trigger limits for stopping discharge are in place at the EWTP-WTC as a component of TSS, TDS, and pH exceedance mitigation during periods of discharge. These trigger limits are derived from a regression analysis of TSS concentration as a function of turbidity, and TDS as a function of specific conductivity. The regressions are developed using MEL-14 grab sample laboratory measured specific conductivity and turbidity readings paired with corresponding TDS and TSS results. Rating curves are then applied to continuous *in situ* specific conductivity and turbidity readings taken from internal probes within the EWTP-WTC prior to discharge to approximate TDS and TSS, respectively. Trigger limits for pH also prevent the discharge of non-compliant effluent using internal probes measuring *in* *situ* pH. When a trigger limit is reached, the EWTP-WTC stops discharge immediately and begins recirculating treated water to CP1.

Agnico Eagle will continue to gather calibration/confirmatory paired samples in the future to actively increase the number of data points and strengthen the turbidity-TSS and conductivity-TDS correlations.

3.9.4.2 Saline Effluent Treatment Plant (SETP)

Prior to discharge of saline effluent to Itivia Harbour (see Section 3.11 and Groundwater Management Plan), saline contact water on site is stored in saline ponds (Section 3.6). Saline contact water as well as surface contact water is pumped to the SETP for ammonia nitrogen and total suspended solids treatment. Treated saline contact water will meet MDMER end-of-pipe discharge criteria. Initial treatment includes a clarification unit for TSS removal. Agnico Eagle is currently designing a treatment system for ammonia nitrogen to meet the MDMER, including acute toxicity testing on *A. tonsa*. This system will replace breakpoint chlorination for treatment of ammonia nitrogen levels, which are inferred to be the result of the use of explosives in the underground mine.

Commissioning of the TSS treatment component of the SETP within the WTC (SETP-WTC) is expected to take place in Q3 2025. Further information on the SETP-WTC design for the TSS treatment component can be found in Agnico Eagle (2021d). Operation of the SETP-WTC and subsequent discharge will occur following construction and commissioning of the waterline (more information can be found in the Groundwater Management Plan). Once SP6 becomes operational, all saline contact water collected in SP6 will be routed to the SETP-WTC where it will be used to treat TSS and ammonia nitrogen prior to discharge to Itivia Harbour. Prior to movement of saline water from the Meliadine Site to Itivia Harbour for discharge to sea over the open water season, Agnico Eagle will measure pH, total chlorine, free chlorine, ammonia nitrogen, turbidity, specific conductivity, and temperature of the effluent as a means to continually advise discharge operations and help ensure discharge parameters are met. Final discharge point (FDP) samples will be analyzed at an accredited laboratory as per MDMER requirements, as discussed within the Water Quality and Flow Monitoring Management Plan.

3.9.4.3 Sludge management

Sludge produced as part of the TSS removal processes at the WTC is discharged into saline water storage. Since its commissioning in 2021, the EWTP-WTC has discharged approximately 50 m^3/day of sludge in Tiriganiaq pit 2 (when in operation), consistent with the expected value presented in its design report (Tetra Tech, 2022a). According to the SETP-WTC design report, this plant is expected to produce an additional 450 m^3/day of sludge (when in operation). The sludge produced by the TSS removal area of the SETP-WTC will have similar characteristic to the sludge produced at the EWTP-WTC, considering the processes are the same.

The WTC sludge is sampled monthly for deleterious substances found in Table 1of Schedule 4 of the MDMER, to determine potential impact on the receiving saline ponds. Saline ponds are also sampled periodically for the same parameters.

Since 2021, available data suggests that none of the deleterious substances found in Table 1of Schedule 4 of the MDMER have increased in concentration in Tiriganiaq pit 2, except for Total Suspended Solids (TSS) and ammonia nitrogen. The loading of ammonia nitrogen in saline contact water is a known phenomenon at Meliadine, attributed to the dissolution of undetonated explosives from the underground mine. The increase of TSS in Tiriganiaq Pit 2 may in part be a consequence of discharging WTC sludge in saline water storage but is not deemed problematic. All saline water will be treated by the SETP-WTC for TSS removal prior to discharge to the Itivia Harbour.

3.9.5 Oil Separators

An oil-water separator is installed at the Landfarm. The oil-water separator located at the Landfarm is used to treat both direct precipitation to the Landfarm footprint and melt from snow containing hydrocarbons (i.e., snow on which spills occur) that is stored either in the Landfarm or the contaminated snow cell over winter (Section 3.4). Treated water is analyzed for benzene, toluene, ethylbenzene and xylene (BTEX), lead, and oil and grease prior to discharge to CP1 or used on the windrows to increase moisture content, as required. Hydrocarbons removed from water are stored and managed as hazmat.

A second oil water separator is applied to treat water from the maintenance shop wash bay, in which mining equipment from both surface and underground operations undergo cleaning (Section 4.1.6). Treated water is analyzed for BTEX, lead, and oil and grease prior to discharge to CP1 or saline ponds depending on *in situ* specific conductivity applied to approximate TDS concentrations. Hydrocarbons removed from water are stored and managed as hazmat.

3.9.6 Reverse Osmosis Plant (RO)

A reverse osmosis (RO) treatment plant is used to treat marginally saline runoff water captured by site water management infrastructure that would otherwise be directed to saline water storage. The application of the RO through these means is intended to reduce storage requirements of saline water on site until the Waterline is operational. Permeate water produced by the RO – treated water of low salinity that passes through the semi-permeable membranes – is directed to CP1. Brine water – high salinity water rejected by the semi-permeable membranes – is directed to saline storage.

Efficacy of treatment is generally dependent on the quality and homogeneity of water being treated. As TDS of influent water increases, pressure against the semi-permeable membranes increases, resulting in a lower recovery of treated permeate and a greater volume of rejected brine. However, the treatment flow rate can be lowered to reduce pressure and improve permeate recovery in feed water with a high concentration of TDS. Other water quality constituents such as the concentrations of TSS, organic content, and certain minerals in the feed water may also negatively affect performance of the RO. As size exclusion is the mechanism driving treatment, the concentration of TDS in the permeate generally remains below 1000 mg/L (average for 2022 was 447 mg/L), but can be influenced by feed water quality and treatment rates. Consequently, the TDS concentration in the brine by-product is primarily the difference in mass of feed water solutes and mass of permeate water solutes per unit of brine volume. Additionally, more stable quality conditions or homogeneity of the water source used to feed the RO allows a better adjustment of the treatment settings and thus an optimization of the recovery rate.

The treatment rate of the RO is primarily limited by the actual capacity and size of the plant, in addition to the influence of previously mentioned water quality factors. A rate of approximately 2000 m^3/day has been achieved with a recovery of 80% (i.e. 1600 m^3/d and 400 m^3/d of permeate and brine produced, respectively) where influent TDS was approximately 3500 mg/L. Depending on the objective of treatment (e.g. volume targets versus quality targets) a lower recovery rate may be used to ensure brine quality discharged to saline storage meets a desired TDS criteria, resulting in the allowance of feed water with much higher TDS while still treating water at an appreciable flow rate. For example, feed water with a TDS concentration of approximately 12,000 mg/L has been treated at a rate of approximately 1500 m^3/d with a permeate recovery rate of 53%.

In addition to the treatment of marginally saline runoff, the plant may also be used to treat stratified layers of low salinity water in the saline ponds. The cause of low salinity water in the saline ponds is assumed to be driven by the downward exclusion of TDS during ice formation in addition to poorly mixed runoff inflows. This results in a relatively homogeneous stratified layer of water with a lower concentration of TDS overlaying more saline water in storage. Removing the marginally saline water from saline storage increases storage capacity for saline contact water from the underground mine.

3.10 Meliadine Lake Discharge Diffuser

The discharge diffuser is the final surface contact water effluent discharge location for the Mine. 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, driven by wind during the open water period. The diffuser modelling was initially conducted by Golder Associates Ltd. (Golder, 2015) and updated design progress was reported by Tetra Tech EBA (Tetra Tech EBA, 2016). Further updates to the diffuser model were completed by Tetra Tech in support of the Water Licence Amendment (Tetra Tech, 2020).

3.11 Saline Water Discharge to Sea

Currently due to sufficient forecasted storage capacity until 2027, saline water on site is managed through storage and treatment of marginally saline water. The suspension of continuous hauling operation followed the approval of the waterline to discharge to sea (section 3.3.3) under the

Amendment 002 of the NIRB Project Certificate No. 006 issued on March 2nd. Once in operation, the waterline will be used in combination with the SETP-WTC to discharge treated saline water to Melvin Bay. Detailed information regarding treatment and discharge criteria are provided in the Groundwater Management Plan.

3.12 Water Management Structure Monitoring

Pursuant to Part E, Item 18 of the Licence, Agnico Eagle will carry out weekly inspections of all Water management structures during periods of flow and monthly thereafter. The records will be maintained for review upon request of an Inspector. More frequent inspections may be required at the request of an Inspector. Inspections will focus on structures and conditions detailed in Sections 3.12.1 to 3.12.5 to follow.

3.12.1 Culvert and Water Crossing Inspections

Culverts listed in Section 3.1, as well as culverts and water crossings along the All Weather Access Road (AWAR), Bypass Road, and at the Itivia site will be inspected for the following conditions. These inspections also satisfy the monitoring procedures outlined in the Sediment and Erosion Management Plan:

- Damage to the inlet or outlet of the culvert which may impede flow capacity;
- Bed erosion upstream and downstream of watercourse crossing structures;
- Scour under bridge abutments and abutment foundations;
- Erosion along cutslopes and fillslopes of embankments (rill and gully erosion);
- Blockages within the culvert including snow, ice, debris; and
- Snow cover or snow piles which would prevent routing of water towards the inlet of the culvert (only applicable prior to freshet).

In the case that any of the above conditions are observed, corrective actions will be taken to optimize culvert/water crossing function and integrity.

3.12.2 Collection Pond Inspections

Water collection ponds discussed in Section 3.3 and P3 pond discussed in Section 3.4 will be inspected for the following conditions:

- Laboratory water quality results as a trigger to implement mitigation actions;
- Unplanned inputs via surface runoff which are not part of the water management system; and

- Water level elevation above the operating manual maximum.

In the case that any of the above conditions are observed, corrective actions will be taken to prevent unaccounted for losses of available water capacity or potential compromise to dike integrity.

3.12.3 Dike and Thermal Berm Inspections

Dikes and thermal berms discussed in Section 3.6.2 are inspected to track natural (expected) movement of the structure. Pertaining to dikes, a “master” sketch of all the issues that were documented in the past is maintained as a means to spot any changes/new issues. Inspections focus on the upstream slope, the crest, the downstream slope, and downstream toe and observations include the following:

- New areas of movement/deterioration not previously documented;
- Changes to previously documented areas of movement/deterioration;
- Seepage through the downstream slope;
- Water presence in downstream channel/sump; and
- Areas of movement/deterioration of downstream channel/sump (where present).

Any issues or potential problems identified will be addressed accordingly by the Geotechnical Engineer in order to mitigate risks and maintain dike integrity.

3.12.4 Water Diversion Channel and Berm Inspections

In addition to the water management structures requiring inspections under the Water Licence, Agnico Eagle will carry out inspections of channels on site listed for the following conditions:

- Obstructions to flow (ice, debris);
- Inflows not part of the water management system;
- Structural failure of channel banks;
- Seepage through water diversion berms resulting in water movement to areas not planned within the water management system; and
- Erosion of diversion berms (i.e., undercutting, slope failure).

In the case that any of the above conditions are observed, corrective actions as directed by the Geotechnical Engineer will be taken if there is potential for compromise effectiveness of the channel function or potential for unplanned impact to water quality or quantity in associated collection ponds.

SECTION 4 • WATER MANAGEMENT STRATEGY

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

- Surface contact water from key mine infrastructure is diverted and/or collected in collection ponds (CP1, CP2, CP3, CP4, CP5, CP6, and the Saline Ponds).
- The collected surface contact water in CP2, CP3, CP4, CP5 and CP6 is pumped to CP1. Surface contact water collected in CP1 may be reused for operational purposes and/or treated by the EWTP-WTC prior to discharge via the diffuser into Meliadine Lake.
- Surface contact water in Tiriganiaq Pit 1 will be collected in a sump and, depending on salinity, pumped to a collection pond or to a saline pond.
- Saline contact water from the Underground Mine (i.e., saline groundwater) will be contained in underground sumps and the water storage stope and reused for mining operations. Excess saline contact water volumes will be stored in Tiriganiaq Pit 2, until SP6 and the waterline are commissioned and saline water can be treated for discharge to Itivia Harbour.
- Natural flooding of 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 workings will be allowed to naturally flood by groundwater seepage.
- Surface contact water collected by future mine infrastructure as approved under the 2024 Water Licence amendment will be pumped to CP1. Details regarding the collection facilities for new project areas will be described in future updates of the Water Management Plans as the mine plan advances.
- CP9 constructed within the footprint of PUMP01 will be used to capture the runoff from the PUMP area including WRSF6, future Pits from the PUMP area will also be pumped to PUMP01 prior to transfer to CP8.

The Meliadine Mine Freshet Management Plan includes the Freshet Action Procedure and the Snow Management Procedure for the Mine. Table 10 and Table 11 summarizes the overall contact water management plan for the existing and future key infrastructure respectively, with initial water collection locations and final water destinations. The plans for water management at key areas are described in the subsequent sections.

Table 10: Existing Water Management Infrastructures

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	
WRSF3 Area	CP2 and CP6	
Dry Stack TSF Area	CP1 and CP3	
Ore Storage Pad 2 (OP2)	CP1	
Landfill	CP1	
Landfarm (biopile)	Sump within Landfarm	To CP1 after oil separation
Maintenance Wash Bay	Retention Tank	CP1 or surface saline storage (based on effluent salinity) after oil separation
Tiriganiaq Pit 1	Open pit sumps	Salinity based - CP4, CP5, SP1, or Tiriganiaq Pit 2.
Tiriganiaq underground	Sumps in underground mine	Sumps in underground mine, Tiriganiaq Pit 2, then discharged to sea

Table 11: Water Management Infrastructures to be Constructed

Pond/ Treatment	Source Water	Receives Water From	Routes Water To
Collection Pond CP8	Contact Water	CP7 CP9/PUMP01 PUMP02 PUMP03 PUMP04 WN01 WES01 WES02 WES03 WES04 TIR03 A6 B34 A8-East A8-West B5-North B5-South Lake B6	CP1, which discharges (in order of priority) to Itivia Harbour via Waterline, then Meliadine Lake via EWTP
West-A8	Contact Water	Ore Pad 3	CP8
Saline Pond 6	Saline and Contact Water	CPD2 TIRI UG Tiriganiaq Saline WRSF TSF WRSF1	Waterline to Itivia Harbour
CP9/PUMP01 pit	Contact Water	WRSF6 PUMP Area Laydown	CP8

Pond/ Treatment	Source Water	Receives Water From	Routes Water To
CP7	Contact Water	FZONE01 FZONE02 FZONE03 SUMPF1 SUMPF2	CP8
SUMPF1	Contact Water	WRSF7	CP7
SUMPF2	Contact Water	WRSF7	CP7
CPD2	Contact Water	CPD1 Laydown Area (Discovery) Facilities Area (Discovery)	SP6
CPD1	Contact Water	WRSF9	CPD2

4.1 Key Water Management Activities

Current activities and planned construction schedule for water management infrastructures required for the WMP to support the Mine Plan are summarized in Table 12. Water management activities during closure are described in Section 7.

Table 12: Completed and Planned Key Water Management Activities

Mine Year	Major Water Management Activities and Sequence
Pre-Construction (2015)	• Started to re-use saline contact water • Dewatered top 0.5 to 1.0 m of fresh water in Pond H17 • Constructed Channel 2
Pre-Construction (2016)	• Dewatered H17 into Meliadine Lake • Started construction of D-CP1 to impound CP1 • Started construction of D-CP5 to impound CP5 • Dewatered Pond A54 in Q3 of Year -4 and pumped the water to CP1 • Constructed Saline Pond 1 (SP1) for additional saline contact water storage • Constructed and operated P-Area Containment Ponds • Started to store the excess saline contact water from the underground mine at surface • Implemented and tested evaporators at P-Area to reduce saline contact water volumes stored at surface • Constructed trenches down gradient from DP1-B and DP3-A to be able to pump collected water and pump back to P1 and P3, respectively • Constructed Channel 5 • Installed Culverts 3 and 4
Pre-Construction (2017)	• Completed construction of D-CP1, jetty and Pumping station CP1 • Completed construction of D-CP5, jetty and Pumping station CP5 • Started construction Channel 1 • Constructed Berm 3 • Constructed freshwater intake in Meliadine Lake and installed pumping station

Mine Year	Major Water Management Activities and Sequence
	• Constructed Lv75 water stope for additional underground saline contact water storage • Installed Culvert 13 • Started to treat sewage from Sewage Treatment Plant (STP) and pump the treated sewage from STP to CP1 • Started to pump the surface contact water from CP5 to CP1 for treatment (solids removal) • Started to pump water collected in trenches, down gradient from D-CP1, D-CP5, DP1 and DP3 to the associated containment pond • Started to pump the water from the Type A Landfarm to CP1 after oil/water separator treatment • Started to pump water from washbay to underground for storage until a biological treatment unit for hydrocarbon reduction/removal arrives at the site
Pre-Construction (2018)	• Completed construction of Channel 1 • Started construction Channel 3, Berm-CP3 and Pond CP3 • Installed Culverts 1, 2, 15 and 16 • Constructed Berm 2 • Started to pump the surface contact water from CP1 to EWTP for treatment prior to discharge via the diffuser to Meliadine Lake • Pumped the solids sludge from EWTP to CP1. To limit recirculation of the sludge within CP1, the discharge of the sludge was located away from the EWTP intake • Started diversion of surface contact water from industrial pad to CP1 via Channel 1 • Constructed and commissioned (in Q4) SWTP to discharge to CP1.
Pre-Construction (2019)	• Constructed Saline Pond 2 within footprint of Tiriganiaq Pit 2 and began storing excess saline contact water • Installed culverts 7, 8, 10, 11 and 20 • Constructed Channels 7 and 8 and Berm 1 • Completed construction of Channel 3, Berm-CP3 and Pond CP3 and started to collect surface contact water • Constructed Channel 4, Pond CP4 and Berm-CP4 and started to collect surface contact water • Started to pump the surface contact water in Ponds CP3 and CP4 to the partially drained Pond H13 where the water flows through Channel 1 into CP1 • Constructed, commissioned, and started discharge of saline water through the discharge to sea diffuser system • Partially dewatered Ponds H19 and H20 in Q3 of Year -1 by pumping water to the EWTP for discharge to Meliadine Lake • Started construction of Saline Pond 4 (SP4) within footprint of Tiriganiaq Pit 1
2020	• Completed construction of SP4 • Constructed Pond CP6 and Berm-CP6 • Transferred SP2 into SP4 • Decommissioning of evaporators • Started to pump surface contact water in CP6 to CP1 • Started to pump surface contact water collected in Tiriganiaq Pit 2 to CP5 • Started decommissioning of P1 and P2 (P-Area) by backfilling with waste rock • Decommissioning of SWTP
2021	• Start to pump surface contact water collected in Tiriganiaq Pit 1 to Tiriganiaq Pit 2

Mine Year	Major Water Management Activities and Sequence
	• Construct and commission EWTP within WTC (EWTP-WTC) • Complete conversion of Tiriganiaq Pit 2 to saline contact water storage facility • Dewater SP4 and SP1 into Tiriganiaq Pit 2 • Start pumping excess saline contact water from underground mine to Tiriganiaq Pit 2 • Finish decommissioning P1 and P2 (P-Area) by backfilling with waste rock • Pump EWTP and SETP sludge to saline contact water storage
2022	• Constructed Pond CP2 and Berm CP2 • Constructed Channels 9 and 10 • Store marginally saline water into SP1 • Pump water from Tiriganiaq Pit 1 to CPs, SP1, or Tiriganiaq Pit 2 • Operation of the RO plant for treatment of marginally saline water on site • Continued pumping saline contact water from underground mine to Tiriganiaq Pit 2 • SETP upgrade installation at the WTC
2023	• Water management plan similar to Year 3 • Channel 3 remediation work completed • Channel 2 outlet berm constructed • Waterline construction (AWAR KM 15 to 30)
2024	• Water management plan similar to Year 3 • Waterline construction (continued, AWAR KM6 to 15) • Dewatering of B36 • Fish out of B36, B37, B38, B60, B61, and B62
2025 (Planned Schedule)	• Continued waterline construction • Anticipated commissioning of the SETP-WTC • Construction of Channel 11, CP9 Thermal Berm, Berm 4 • Creation of CP9 within the footprint of PUMP01 pit • Dewatering of B38, A8, J6, J7, A35, A37 • Channel 1, 7 and 8 remediation work • Culverts installation/replacement
2026 (Planned schedule)	• Anticipated Waterline commissioning • SETP-WTC discharge through waterline • Construction of dikes D-A8South and D-A8North • Dewatering of A6 and other FZone lakes • Dewatering of B7 and B6 • Culverts – as required
2027 (Planned schedule)	• SETP-WTC discharge through waterline • Construction of Dikes D-A6, D-SP6North and D-SP6West • Construction of CP7 and SP6 • Construction of Berm CP7, Berm F2 • Construction of Sump F1 and F2 • Construction of Channel 14 and 15 • Dewatering of B4 and B5 • Culverts – as required

Mine Year	Major Water Management Activities and Sequence
2028 (Planned schedule)	• SETP-WTC discharge through waterline • Construction of Dikes D-CP8South, D-CP8West, D-CP8East, D-CP8North, D-B5North and D-B5South • Culverts – as required
2029 (Planned schedule)	• SETP-WTC discharge through waterline • Construction of CPD1 and CPD2 • Construction of Channels 17, 18 and 19 • Culverts – as required
2030+ (Planned schedule)	• SETP-WTC discharge through waterline • Start to fill the mined-out Tiriganiaq Pits 1 and 2 with active freshwater pumping from Meliadine Lake • Stop pumping excess saline contact water from underground when underground mine is completed • 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

The initial dewatering at Lake H17 and Lake A54 was conducted in 2016 prior to constructing CP1 and CP5, respectively. The water from these ponds was pumped to Meliadine Lake through a temporarily installed diffuser.

Preparation for construction of CP4 facility required dewatering of the two shallow ponds B8 and B9 into CP1. Preparation for CP3 did not require dewatering as B28 contained insufficient volumes to dewater.

In Q3 2019, partial dewatering of Ponds H19 and H20 to the EWTP took place, following the advanced timeline for the construction of CP6 and WRSF3. Specifically, H19 was partially dewatered to facilitate construction of Berm CP6, while H20 was partially dewatered to allow the placement of waste rock and overburden within the drained lake basin. Detailed information regarding the CP6 design and subsurface thermal analysis can be found in the CP6 and Berm Design Report (Tetra Tech, 2020).

In Q3 2022, lakes and ponds A9, A38, A40, B33, and B33A were dewatered to allow for the continued mining within the final footprint of Tiriganiaq Pit 1, as authorized by DFO in a letter on April 20, 2022 (file 21-HCAA-02733). Water was pumped into the site water management collection ponds before being treated by the EWTP and discharged to Meliadine Lake. The final dewatering report was provided by Agnico Eagle to KivIA and DFO on October 21st, 2022.

In Q3 2024, dewatering of lake B36 and partial dewatering of lakes and ponds B37, B38, B60, B61 and B62 to the EWTP took place to allow mining within the Pump area. Dewatering and fish-out authorizations were granted by DFO (file 24-HCAA-00842). The final dewatering report was provided by Agnico Eagle to DFO on December 12th, 2024.

As presented in Table 12, other waterbodies are planned to be dewatered to allow the construction of water management infrastructure and other developments of the mine plan. A total of 25 waterbodies were identified for potential dewatering under the 2024 Water Licence Amendment application. However, most of the volume of water planned to be dewatered is related to 6 lakes: A52, A6, A8, B4, B5 and B7. Table 13 summarizes the waterbodies dimensions and estimated dewatering timelines and volumes.

Dewatering of waterbodies may expose shoals composed of unconsolidated sediments, which may lead to local sedimentation within the impounded water. The introduction of sediments (TSS) into the water column will depend on the type of material exposed, material properties, slope gradient, prevailing weather conditions, dewatering timing and rate at which the waterbody is drawn down.

The quality of water pumped from each waterbody will be monitored daily to verify that it is acceptable for release to the receiving environment according to the Part D, Item 12 of the amended Water Licence (see Water Quality and Flow Monitoring Plan, section 3.1.2). Non-compliant water will be pumped to CP1 for TSS removal at the EWTP-WTC before discharge to the receiving environment (see section 3.9.4.1 and 3.9.4.4 for more details on treatment and sludge disposal). The FEIS (Golder, 2014b) estimated that at base case for the site conditions, 60% of the total dewatered water would be suitable to direct discharge to the receiving environment. However, based on the uncertainties in TSS generation during dewatering, a more conservative estimate of 50% of the planned dewatering volume is assumed to require TSS treatment at the EWTP-WTC prior to discharge.

Table 3 describes the water management infrastructure that will be built within the footprint of the dewatered waterbodies and Table 13 presents the planned water management strategy for dewatered waterbodies.

Among all planned dewatered waterbodies, only five (i.e., A8, A6, B5, J6, B34) will need to be included in the water management system and pumped to manage their water level. All other dewatered waterbodies that are not overlapped by infrastructure will naturally drain toward one of the aforementioned lakes. Dewatered waterbodies will be operated (pumped) to ensure sufficient storage for extreme events. Level in managed dewatered waterbodies will be lowered to ensure sufficient storage at freshet for extreme events without having to rely on pumping to CP1 to store the event water volume. Operating levels will be determined and dewatering of the waterbodies will be completed to allow partial (3:7) or full (7:7) storage of the drainage volume from a 1:100 wet year spring freshet.

Table 13: Planned Lakes and Ponds Dewatering Schedule Inventory

Pond / Lakes	Maximum Water Depth (m)	Average Water Depth (m)	Existing Pond Surface Area (m^2)	Dewatering Schedule	Total Lake Volume (m^3)	Planned Proportion of Lake Volume dewatered (%)	Estimated Total Volume of Water Dewatered (m^3)	50% of Volume of Water Dewatered (m^3)
A19*	0.7	0.1	8,143	2026	457	100%	457	228
A30*	1.2	0.2	22,523	2026	1,288	20%	258	129
A31*	2.4	0.4	16,734	2026	9,657	20%	1,931	966
A33*	0.3	0.1	7,814	2026	310	20%	62	31
A34*	0.2	0.1	2,374	2026	97	20%	19	10
A35*	0.1	0.0	2,282	2025	17	100%	17	9
A37*	0.3	0.1	7,921	2025	180	100%	180	90
A44*	0.3	0.1	7,022	2026	225	20%	45	22
A45*	0.3	0.1	14,939	2026	453	20%	91	45
A49*	0.6	0.2	4,673	2026	438	20%	88	44
A5*	0.9	0.2	18,299	2026	704	100%	704	352
A50*	0.1	0.1	400	2026	17	100%	17	8
A51*	0.3	0.1	3,749	2026	112	100%	112	56
A52*	8.8	1.8	68,430	2026	124,774	100%	124,774	62,387
A53*	0.3	0.1	324	2026	11	100%	11	5
A6	4.4	1.5	537,847	2026	780,527	100%	780,527	390,263
A7	1.3	0.5	20,969	2026	5,058	20%	1,012	506
A8	4.1	1.6	885,245	2025	1,239,371	100%	1,239,371	619,685
B34*	4.7	0.6	38,844	2027	21,773	20%	4,355	2,177
B4	2.3	0.9	844,131	2027	263,900	100%	263,900	131,950
B5	3.4	1.5	553,802	2027	473,085	100%	473,085	236,543
B6	3.7	1.4	113,203	2026	138,994	20%	27,799	13,899
B7	5.1	1.5	563,478	2026	666,073	100%	666,073	333,037

J6*	1.8	0.4	15,675	2025	1,871	100%	1,871	936
J7*	4.9	0.7	31,628	2025	19,730	100%	19,730	9,865

**** Waterbodies with no bathymetric data available, volumes are estimated from an extrapolation of the surrounding lake topography (Messager et al., 2016)***

4.1.2 Underground Water Management

The Underground Mine will extend approximately 650 m below the ground surface and part of the underground workings will be operated below the base of continuous permafrost. The underground excavations act as a sink for groundwater flow during mining, with water induced to flow through the bedrock to the Underground Mine workings below the base of the permafrost.

The underground water management system is designed to prevent water from affecting the workings or production. The system contains a series of sumps (generally one at the access of each level) designed to capture groundwater inflows and runoff from mining operations (i.e., drilling), a clarification system, and a pumping system to redistribute the clarified saline contact water. Excess saline contact water is pumped to surface to be stored in Tiriganiaq Pit 2. Temporarily inactive underground developments (similar to the water stope) are used for additional storage of excess underground water as required. Further details on the underground water management system are provided in the Groundwater Management Plan.

Beginning December 2018, the SWTP began treating groundwater to reduce stored saline contact water on site (See Section 3 for details). Furthermore, as part of the strategy to manage excess groundwater infiltration within the underground portion of the mine, Agnico Eagle received approval for marine discharge of saline water with the amended Project Certificate on February 26, 2019 (See Section 3.11 and Groundwater Management Plan for details). A new amendment (Amendment 002 of the NIRB Project Certificate No. 006) was received March 2nd, 2022, allowing the discharge of treated saline water through a waterline.

There are currently two numerical groundwater models used to provide the foundation for a qualitative and quantitative assessment of the operations and mine development:

1. An Operational Groundwater Model, based on the Updated Groundwater Modelling for Tiriganiaq Underground conducted by WSP (2024a).
2. A Water Licence Amendment (WLA) Groundwater Model, based on the Updated Hydrogeology Modelling conducted by WSP (2024b).

Table 14 presents the base case predicted groundwater inflow rates and TDS concentrations for the Operational Groundwater model and WLA Groundwater Model.

The Operational Groundwater Model is based on the Tiriganiaq underground mine plan developed under the previous Water Licence and was calibrated to align with historical groundwater inflow monitoring data collected between 2015 and 2023. This calibration approach included stricter adjustments to hydraulic conductivities to match predicted inflow rates and monitored data. Conversely, the WLA Groundwater Model was created to support the Water Licence Amendment application, incorporating an extended underground mine footprint and was calibrated more conservatively using historical groundwater inflow monitoring data collected between 2015 and 2022. Thus, the difference in model results as presented in Table 14 can be primarily explained by (a) the change on overall extent of the underground mine footprint and (b) the calibration approach used for each model which yields more conservative inflow predictions from the WLA Groundwater Model. Details pertaining to model inputs, model assumptions, and groundwater monitoring are found in the Groundwater Management Plan.

Both models are being described in this document as they are important inputs to the overall mine water balance model which, like the groundwater inflow model, was updated in support of the Water Licence Amendment. The site water balance model is discussed in Section 5.

Table 14: Predicted Groundwater Inflows to the Tiriganiaq Mine according to the Operational and WLA numerical groundwater inflows models.

Year	Operational Groundwater Model		Water Licence Amendment Groundwater Model	
	Predicted Groundwater Inflows (m^3/day)	*Predicted TDS (mg/L)*	*Predicted Groundwater Inflows (m^3/day)*	*Predicted TDS (mg/L)*
2023	300	58,500	575	58,000
2024	450	57,000	700	56,500
2025	450	57,000	975	53,500
2026	475	56,500	1,450	50,500
2027	475	56,500	1,625	50,500
2028	450	56,500	1,450	52,500
2029	475	54,000	1,400	54,000
2020	475	53,500	1,350	55,000
2031	475	53,500	1,450	54,500

Source: Table 5 from (WSP 2024a) and Table 6 from (WSP 2024b)

4.1.3 Water Management for Haul Road

A network of roads provide access to infrastructure at the Mine. The majority of the roadways servicing the mining area are located so that drainage is directed by berms, channels and culverts towards CP1, CP2, CP3, CP4, CP5, and CP6. Detailed information about water management on roads is described in the Meliadine Mine Roads Management Plan.

4.1.4 Water Management for Landfarm and Landfill

Any water that accumulates at the onsite Landfarm is pumped through an oil-water separator prior to discharge into CP1. Additional details for Landfarm water management are described in the Landfarm Management Plan.

Leachate from the Landfill is anticipated to be non-hazardous and non-toxic due to the controls put in place on the materials accepted for deposition in the Landfill. Annual Landfill operations involve clearing of snow prior to spring melt. 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, and sent to CP1, as per the Landfill Management Plan.

Internal runoff and drainage from the Landfill will gradually seep through the northeast perimeter berm towards pond H13. As per the Technical Memorandum for the Operation Landfill (Stage 4) Berm Raise Summary (Agnico Eagle, 2024c), the Operation Landfill (Stage 4) utilizes a pumping system to facilitate the removal of water ponded against the perimeter berm if the rate of seepage is insufficient for water removal. Water pumped from the Landfill is directed to Pond H13, which is the current location seepage from the Landfill flows towards. H13 is immediately upstream of Culvert 2, which is upstream of Channel 1 and ultimately CP1. Water collected in CP1 is treated at the EWTP-WTC prior to being discharged to Meliadine Lake.

Monitoring of seepage from the Landfill (between the Landfill and Pond H13) or water pumped from the Landfill and directed to Pond H13 is conducted as per the Water Licence at compliance monitoring station MEL-24.

4.1.5 Water Management for Emulsion Plant Area

Freshwater is trucked to the emulsion plant and used for manufacturing emulsion as well as for washing vehicles. Water within the emulsion plant is re-used when feasible, and excess water is collected and disposed of on site (i.e., STP) or stored and shipped south as hazmat.

4.1.6 Water Management for the Wash Bay

Water used in the Wash Bay is re-used when feasible and excess water is treated with an oil-water separator to reduce or remove hydrocarbons. Treated water is moved to CP1 or the surface saline ponds, depending on *in situ* specific conductivity applied to approximate TDS concentration. Solid waste from the treatment process is removed and disposed of appropriately (Landfarm, hazmat, or underground).

4.2 Freshwater and Sewage Management

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

4.2.1 Freshwater Management

Major freshwater usages on site include potable use, fire suppression, make-up water for the mill, and other operational needs, such as drilling and paste production for backfill. Freshwater is sourced from Meliadine Lake through a freshwater intake and pump system. For dust suppression, water is sourced from the freshwater intake system, ponded water located along the AWAR, or small ponds proximal to the road. Surface contact water from collection ponds may be used for dust suppression on areas that are within the site surface contact water system catchment.

Freshwater is pumped through an overland pipeline to potable water storage tanks and a fire water suppression tank. Under the Amended Licence, 1,100,296 m^3/year of freshwater is permitted during operation phase. Additionally, 8,676,481 m^3 of freshwater is permitted per year to fill the mined-out open pits during the mine closure. These quantities are inclusive of water needs for dust suppression.

The maximum design flow rate for the potable water for the main camp and accommodations (kitchen, laundry) is 216 m^3 per day. There is an onsite Potable Water Treatment System (Section 3.9.1). Treated potable water is piped to areas in the service complex and other facilities requiring potable water. Table 15 provides the updated freshwater consumption needs during the mine Operation phase in comparison to needs assessed for the 2014 FEIS and for the 2021 Water Licence.

Table 15: Freshwater Consumption for Meliadine Mine

Items	2014 FEIS		Amended Water Licence (2021)	Amended Water Licence (2024)
	provided in m^3/h	converted to m^3/yr	m^3/yr	m^3/yr
Camp Use	5.67	49,669	50,000	73,000
Truck Shop-Washbay	8.5	74,460	9,636	365
Paste Plant	5.5	48,180	105,120	157,000
Mill	107.2	939,072	424,860	652,000
Drilling Water	N/A	N/A	1,460	730
Dust Control	18	45,000	24,168	24,168
Emulsion Plant	1.6	14,016	1,520	1,950
Underground Washbay	50	438,000	2,200	2,200
Discovery Installation				5,500
Pit Production	1.5	12,000	N/A	
Sub-total	198	1,620,397	618,964	916,913
Contingency	**25%**		**20%**	**20%**
Total	**247.5**	**2,168,100**	**742,757**	**1,100,296**

4.2.2 Sewage Management

Sewage collected from the camp and MSB facilities is pumped to the STP. The objective of the STP is to treat sewage to an acceptable level for discharge to CP1 via a treated sewage water discharge pipeline. The STP is housed in a prefabricated (modular) structure, located at south-east of the service complex at the Industrial Pad, as shown in Figure 2. The system is designed to treat a maximum daily flow of 299 m^3 per day.

The STP for the camp facilities is designed to meet appropriate guidelines for wastewater discharge (Agnico Eagle, 2020c). Details regarding STP specifications and operation can be found in the Operation & Maintenance Manual Sewage Treatment Plant (Agnico Eagle, 2021a).

4.2.3 Process Water Management

Process water is required in the mill for ore processing and is primarily sourced from Meliadine Lake through the freshwater intake system. As per the Licence, reclaim of surface contact water for use at the Mill is maximized to the greatest practical extent.

4.3 Meliadine Lake Diffuser Effluent Flow Rates

The EWTP is designed to meet the minimum required rate of 12,000 m^3/d per the design requirements of dike D-CP1 (Tetra Tech, 2016b). While the EWTP equipment has an operational range up to 28,000 m^3/d, the current system is configured to operate a maximum discharge rate of 18,000 m^3/d to prevent over-pressuring in the HDPE line that conveys water from the EWTP to the diffuser.

The pump does not operate continuously at the maximum rate. The rate of discharge is determined during the open water season to meet the design criteria and performance objectives of D-CP1. The anticipated amount of effluent discharge each month per year can be found in the Water Balance and Water Quality Model (WBWQM) results in section 3.2 of the Annual Report. Details on the WBWQM setup and methods are discussed in section 5 of this document.

Discharge to Meliadine Lake is expected to be required on an annual basis. However, discharge of surface contact water through the waterline to Itivia Harbour will be conducted in accordance with the Adaptive Management Plan to minimize discharge to Meliadine Lake once the waterline is operational (Agnico Eagle, 2024a).

The anticipated amount of effluent requiring discharge over each year is based on the Water Balance and Water Quality Model (WBWQM). Updates to the WBWQM are conducted at a minimum of annually and results can be found in the most recent submission of the Annual Report.

SECTION 5 • WATER BALANCE

5.1 Site Water Balance Model

The site-wide water balance model is set-up to represent the interaction of the local climatic regime with the mine plan and water management plan, and based on these interactions, to predict the volumes of various water types (i.e., non-contact, surface contact and saline contact) requiring management, treatment and discharge to the receiving environment (Lorax 2024).

In 2014, a site 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 (Tetra Tech, 2014). The model focused specifically on contact water management infrastructure and areas that are affected by mining activities. The model applied a monthly site-wide water balance for CP1, CP3, CP4, CP5, CP6, Tiriganiaq open pit and underground mine operation, make-up water for the mill, water for the WTPs, and freshwater during mine construction to mine closure under mean precipitation years.

An update to the water balance was carried out by Golder (2020b) in support of the 2020 Water Licence Amendment application, including the incorporation of CP2. The water balance results were provided in the 2020 Water Licence Amendment Application and in the 2020 Annual Report.

In 2021, a revised Water Balance and Water Quality Model (WBWQM) was developed by Lorax Environmental Service Ltd. for Agnico Eagle. The main changes to the new model were the use of the GoldSim modelling platform with a revised framework and revised inputs from previous models. This model version was updated annually and results presented in the 2021 to 2023 Annual Reports (section 3.2). Per Part E, Item 13 of the Water Licence, the WBWQM is updated at minimum once every year and results are provided in the Annual Report.

A more recent update to the WBWQM was carried out by Lorax (2024) in support of the 2024 Meliadine Mine Water Licence Amendment application. This version of the WBWQM was also developed using the GoldSim platform and uses similar modelling assumptions as the 2021 model version. Thus, similar to the groundwater models discussed in section 4.1.2, this document describes two WBWQMs that form the basis for the water management assessment of the operations and mine development:

1. The Operational WBWQM, based on the GoldSim model version created by Lorax (2021).
2. The WLA WBWQM, based on the updated GoldSim model version created by Lorax (2024).

The Operational WBWQM was developed to model the operations phase (2019 to 2027) of the mine plan as approved under the previous Licence. This model was updated annually to include measurements of climatic inputs, pumping and treatment rates, pond levels, water quality, and any changes to the water management system. This allows for accurate forecasting of water balance and water quality based on year-to-year water management operations.

The WLA WBWQM was also developed using the GoldSim modeling platform and follows a similar framework and set of assumptions as the Operational WBWQM. The WLA WBWQM was submitted to support the 2024 Water Licence Amendment and is designed to provide predictions for future years of operations (2025-2031), active-closure (2032-2038), and post-closure (2039 onwards) for the expanded mine footprint, which includes the Pump, F Zone, Discovery, and Wesmeg deposits, as well as changes to the water management strategy outlined in the 2024 Water Licence Amendment. Since this model version begins in 2025, it does not allow for comparisons between observed and predicted water balance and water quality measurements for prior years. Therefore, both the Operational WBWQM and the WLA WBWQM are discussed in this document to ensure a more seamless transition to newer WLA WBWQM results.

The following sections outline the framework of the WBWQM, detailing the model setup and methods, and highlighting the differences between the Operational WBWQM and the updated WLA WBWQM.

5.2 Model Setup

The WBWQM is built in the GoldSim v14 software platform and is set-up to run on a daily time-step. The primary modelling objective is the prediction of water and solute load transfers within the mine site, and to the receiving environment. The GoldSim WBWQM is configured to predict the transfer of water and solute mass (loadings) from mined and non-contact areas into the relevant water management facilities. All mixing is assumed to occur instantly, and all mass is conserved throughout the model (i.e., no attenuation is applied to any of the parameters that are tracked).

5.3 Water Management Assumptions and Inputs

Details of the surface contact water management strategy are described in section 4, while the detailed saline groundwater management can be found in the Groundwater Management Plan (GWMP). The general flow network used in the WBWQM for the current state of the mine (2021 model version) is shown in Figure 6. The general flow network at the end of the life-of-mine in the most recent WLA WBWQM is shown in Figure 7.

5.3.1 Pond Pumping Rates

The Operational WQWBM model assumes pumping rates between CP2, CP3, CP4, CP5, and CP6 to CP1, as well as pumping rates between saline ponds such as SP1 and Tiri 02 are based on maximum designed pumping rates for each facility while factoring in historic pumping data. Pumping demand is assumed to occur continuously throughout the open water season, from the start of June to the end of October. Historical quantities of recorded pumping rates between surface ponds since 2018 are applied to the model.

The WLA WBWQM model is based on the same logic but includes rates between future water management ponds (i.e., CP7, CP8, CP9, sumps, and dewatered waterbodies [Section 4.1.1]), and the pumping of saline water to SP6 and through the waterline once operational.

5.3.2 Discharge to Itivia Harbour

Currently, saline water from the underground mine is stored in Tiriganiaq Open Pit 2 (Tiri 02), and as such, no discharge quantities are applied to the model until the waterline commissioning. Only previous discharges of saline water from SP4 to Itivia Harbour by trucking are applied to the Operational WBWQM.

The waterline operation presented in the WLA WBWQM assumed a discharge rate of 20,000 m^3/day beginning in 2025 with a seasonal discharge window from June 20th to September 29th. However, construction of the waterline will continue in 2025 and thus this assumption will be revised in the next update and submission of the model.

5.3.3 Discharge to Meliadine Lake

Currently, treated surface contact water effluent from the EWTP is discharged to Meliadine Lake via a diffuser. While EWTP equipment has an operational range up to 28,000 m^3/d, the current system is configured to operate a maximum discharge rate of 18,000 m^3/d to prevent over-pressuring in the HDPE line that conveys water from the EWTP to the diffuser. The allowable discharge period is assumed in the model spans June 1 to October 7 of each year.

The WLA WQWBM model is based on the same logic but considers a maximum discharge rate of 22,000 m^3/day due to improvement of the HDPE discharge line.

For both models, the guiding principle for discharge of site contact water (saline and surface) is to minimize the volumes discharged to Meliadine Lake to the extent practicable and maximize the discharge of surface contact water to Itivia Harbour via the waterline, while still effectively managing the site saline contact water balance as outlined in the Adaptive Management Plan for Water Management (Agnico Eagle, 2024a). However, the models assume surface contact water discharge to Meliadine Lake will take priority if the volume of water in CP1 reaches 30% of the maximum operating volume of the facility (i.e., the upstream toe elevation of the dike), or if the volume of water in CP1 is above the maximum freeze-up volume between the window of October 1st to October 7th. These conditions allow for minimization of surface contact water to Meliadine Lake while respecting the design criteria of D-CP1 and other infrastructure.

5.3.4 Underground Mine Dewatering

Groundwater inflows represent the largest portion of water pumped from the Tiriganiaq underground mine to Tiri 02. Predictions of future underground inflow rates to the underground mine are generated using a 3D groundwater model (WSP-Golder, 2022). The model was updated in early 2024 to consider updates to the underground Tiriganiaq mine development and to better reflect inflows estimated using measurements collected within the mine for the 2018-2023 period (WSP, 2024a). A moisture content percentage is applied to a mine plan forecast of the monthly tonnes of ore and waste rock removed from the underground mine to represent entrained moisture being removed from the mine. A fixed quantity of freshwater used for paste line flushing is assumed per month. Additionally, a percentage of bleed-water from paste backfill is assumed and applied to forecasted tonnes of paste backfill. These groundwater inflow rates are used in the Operational WBWQM.

Groundwater inflow rates used in the WLA WBWQM are based on the base case predicted inflows from the WSP Golder 3D groundwater model updated for the WLA (WSP, 2024b). Further losses to ore moisture (assumed to equal 2% of ore mass) are also applied. This model version also accounts for the underground mine developments in the Tiriganiaq mine approved under the recent water licence amendment. Groundwater inflow rates used in both WBWQM versions are detailed in section 4.1.2.

The WLA updated WBWQM considers that saline contact water originating from the underground mine will be pumped to saline storage on the surface (TIRI02) prior to 2026 and routed to SP6 in 2026 and onwards.

In addition to underground dewatering flows, both model versions also account for saline contact water that is generated by the ore pad, WRSF, and a portion of the TSF. All saline contact water will be eventually conveyed from TIRI02 or SP6 to the SETP, where it will be treated for total suspended solids (TSS) and ammonia (NH3) prior to discharge to the receiving environment (Itivia Harbour).

5.3.5 Consumptive Freshwater Uses

Consumptive freshwater uses (e.g., paste plant, potable water, mill makeup, dust control, etc.) are supplied by withdrawal from Meliadine Lake. They are not included as direct inputs to the water balance models, as this additional water is already incorporated in various components of the mine water balance, such as sewage treatment plant discharge, seepage from placed tailings and paste backfill bleed-water reporting to underground workings.

5.3.6 Sewage Treatment Plant Discharge

Both models consider that the sewage treatment plant (STP) is rated for a treatment rate of 299 m^3/day, and discharges to CP1. Estimated water use per person is 250 L/day, and camp capacity will be 800 persons, which equates to a total inflow to (and thus treated discharge rates from) the STP of 200 m^3/day, routed to CP1. During the active closure phase, the STP operation is considered for 6 months of the year (May to October), with a camp capacity of 75 persons.

5.3.7 Climate Inputs

The climate input series spans a 100-year period from 2020 to 2119, and consists of daily minimum, mean and maximum air temperature and precipitation values derived from the Rankin Inlet climate station, and adjusted to reflect future climate projections under the RCP4.5 representative concentration pathway (OKC, 2022a; 2022b). This station was shown to be representative of climate conditions as measured by the Meliadine climate station and given the much longer and more complete record at Rankin Inlet, this dataset was used to represent climate conditions at the Meliadine site (OKC, 2022a; 2022b). Mean annual precipitation in the RCP4.5 input series over the operations period is 412.3 mm, and on a monthly average basis, precipitation ranges from a minimum of approximately 17 mm in February to a maximum of 59 mm in September. The average annual air temperature is -10.4°C, with minimum and maximum mean temperatures of -30°C in January and 11°C in July, respectively. Both models are based on the same logic for climate series implementation.

Table 16: Average monthly climate conditions at Meliadine for the Operations Phase.

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Min. Temp. (°C)	-33.9	-33.7	-29.2	-20.4	-8.9	0.7	6.4	6.4	1.4	-7.1	-20.7	-29.1	-33.9
Avg. Temp. (°C)	-30.3	-30.1	-24.9	-15.9	-5.6	4.4	10.8	9.8	3.9	-4.5	-16.9	-25.3	-10.4
Max. Temp. (°C)	-26.7	-26.4	-20.6	-11.4	-2.3	8.1	15.1	13.2	6.4	-1.8	-13	-21.6	15.1
Precipitation (mm)	17.5	17.1	24.3	27	25.8	30	46.8	46	58.8	53	36.4	29.5	412.3
Rain (mm)	0	0	0	0.3	3.8	25.4	47	46.2	56.9	16.3	0.4	0.3	196.5
% Rain	0%	0%	0%	1%	15%	84%	100%	100%	94%	32%	1%	1%	36%
Snow (mm)	17.7	16.8	24.6	27	21.3	4.8	0	0	3.6	34.6	36.3	29.7	216.4
% Snow	100%	100%	100%	99%	85%	16%	0%	0%	6%	68%	99%	99%	64%

5.3.8 Waterbodies Dewatering

The most recent WLA update of the WBWQM accounts for lake dewatering necessary to accommodate construction of mine infrastructure the Meliadine Mine FEIS footprint. Lakes and ponds are dewatered in the year prior to the associated mine infrastructure coming online. The upper 50% of lake volume is expected to contain low levels of TSS, and thus will be discharged to the receiving environment without treatment. The lower 50% of each lake (by volume) is expected to contain higher levels of TSS, and therefore these volumes will be treated for TSS prior to discharge. The planned lake dewatering schedule has since been revised from when the WLA WBWQM was submitted and instead adheres to the activities as described in Section 4.

5.3.9 Water Quality Model Component

The water quality model component of the WBWQM is built upon the architecture of the water balance model, with water quality signatures assigned to non-contact (undisturbed) areas and to specific disturbed mine areas (e.g., infrastructure, stockpiles, tailing facilities, underground mine, open pits). Water quality inputs to the water quality component of the WBWQM, or source terms, are based on either a set of assumptions that reflect empirical observations from the operating mine site, data collected at analogue mine sites, or the results of various geochemical and metallurgical tests that have been undertaken to provide a basis for assigning likely future water quality associated with specific mine components. Conceptually, modelled flows and associated source terms are combined in the GoldSim platform to simulate predicted water quality estimates at key locations across the mine site (e.g., ponds, pit lakes) and the two receiving environment nodes (Itivia Harbour and Meliadine Lake) throughout the phases of the Meliadine Mine.

The Operational WBWQM is set-up to run on a daily time-step for the period of 2019 to 2027, consistent with the water balance sub-model. Concentrations of water quality parameters required by Type A Water Licence 2AM-MEL1631 Part F, Item 3 are modelled for all mine water management ponds and sumps, that receive runoff from the different mine areas. Water quality outputs are either compared on a daily time-step with the in-situ measured water quality values or aggregated on an annual time-step, and are screened against required water quality objectives (Water License Part E Section 13).

The WLA WBWQM is also set-up to run on a daily time-step but for the operational period of the mine (2025 to 2031), active-closure (2032-2038), and post-closure (2039-onwards).

5.4 Water Balance Model Methods

This section summarizes the approach, assumptions, conceptual model and inputs used to construct the site-wide water balance model.

5.4.1 Approach and Assumptions

The site-wide water balance model (WBM) is set-up to represent the interaction of the local climatic regime with the mine plan and WMP, and based on these interactions, to predict the volumes of various water types (i.e., non-contact, surface contact and saline contact) requiring management, treatment and discharge to the receiving environment. Given the potential for upset conditions to occur on sub-monthly time scales (i.e., high magnitude rainfall events, rapid freshet), and the operational necessity of managing mine contact waters on a daily basis, the WBM is set-up to run on a daily time-step.

5.4.2 Sub-Catchment Delineation

To generate water volume estimates from precipitation inputs, the delineation of both the natural and mine-altered watershed areas was necessary for modelling the locations of interest. The catchment areas by year from the beginning of the mine operation until now are presented in Table 17. Sub-catchment nomenclature was based on the water management feature that each mine component reports to via gravity drainage. For example, ‘CP1-Natural’ refers to the non-contact area drainage that reports to the CP1. The catchment areas by year used for the model projecting the mine operation and closure according to the Amended Water Licence WBWQM are presented in Table 18.

Table 17: Catchment area by facilities from the beginning of the mine operations until present.

Facility / Footprints (ha)	Runoff Types	Source Term	2019	2020	2021	2022	2023 - 2024
CP1-Facilities-1,2 and 3	Hard Surface	Mine Facilities	43.0	43.0	45.9	32.0	32.0
CP1-Landfill	Hard Surface	Mine Facilities	-	-	-	1.7	1.7
CP1-Laydown	Hard Surface	Mine Facilities	-	-	-	7.6	7.6
CP1-Natural (direct to CP1)	Natural	Baseline	6.7	6.7	6.7	6.7	6.7
CP1-Natural (to channel 1)	Disturbed	Disturbed	55.5	52.5	46.9	37.7	28.6
CP1-OP2	Waste Rock	Ore Stockpile	11.0	11.0	11.0	11.0	11.0
CP1-OP2-Ext	Waste Rock	Ore Stockpile	-	-	-	8.4	8.4
CP1-TSF	Tailings	TSF	8.7	9.4	9.8	9.8	12.7
CP1 - Collection Pond 1	Open Water	Precipitation	30.1	30.1	30.1	30.1	30.1
CP1-WRSF1	Waste Rock	WRSF1	2.8	4.7	10.6	10.6	10.6
CP1-Tem OVB	Disturbed	Disturbed	-	-	-	1.8	1.8
D-CP1	Disturbed	Disturbed	-	-	2.9	2.9	2.9
CP2-Natural	Natural	Baseline	-	-	-	7.6	7.6
CP2-Water	Open Water	Precipitation	-	-	-	2.6	2.6
CP2-WRSF3-EXT	Waste Rock	WRSF3	-	-	-	23.8	23.8
CP3-Disturbed	Disturbed	Disturbed	1.9	0.0	0.0	0.0	0.0
CP3-Berm	Hard Surface	Mine Facilities	1.4	1.4	1.4	1.4	1.4
CP3-Natural	Disturbed	Disturbed	20.9	18.6	17.3	17.3	9.2
CP3-TSF	Tailings	TSF	8.5	12.6	13.9	13.9	22.0
CP3 - Collection Pond 3	Open Water	Precipitation	1.7	1.7	1.7	1.7	1.7
CP4-Berm	Hard Surface	Mine Facilities	3.0	3.0	3.0	3.0	3.0
CP4-Natural	Disturbed	Disturbed	30.5	25.9	11.3	11.3	11.3
CP4-Collection Pond 4	Open Water	Precipitation	1.2	1.2	1.2	1.2	1.2
CP4-WRSF1	Waste Rock	WRSF1	3.5	8.6	17.3	17.3	17.3
CP5-Disturbed	Disturbed	Disturbed	22.2	21.5	20.6	20.6	20.6
CP5-Facilities	Hard Surface	Mine Facilities	20.6	18.4	18.1	18.1	18.1
CP5-Saline Ponds (water to Melvin Bay)	Open Water	Precipitation	1.9	1.9	1.9	1.9	1.9
CP5-Collection Pond 5	Open Water	Precipitation	5.1	5.1	5.1	5.1	5.1
CP5-WRSF1	Waste Rock	WRSF1	0.6	3.5	3.8	3.8	3.8
CP6-Berm	Hard Surface	Mine Facilities	0.0	2.8	2.8	3.9	3.9
CP6-Natural	Natural	Baseline	30.5	17.6	15.1	6.3	6.3
CP6-Collection Pond 6	Open Water	Precipitation	2.8	2.6	2.6	2.6	2.6
CP6-WRSF3	Waste Rock	WRSF3	0.0	21.7	24.0	33.0	33.0

Facility / Footprints (ha)	Runoff Types	Source Term	2019	2020	2021	2022	2023 - 2024
CP6-Disturbed	Disturbed	Disturbed	9.4	0.0	0.0	0.0	0.0
TIR01 Open Pit	Pit Wall	Tiri01 PIt Wall	-	-	13.6	13.6	26.6
TIR01-Natural	Disturbed	Disturbed	-	-	6.6	6.6	5.0
TIR01-SP4 Saline Storage	Open Water	Precipitation	-	-	5.4	5.4	0.0
TIR02 Open Pit	Pit Wall	Tiri 02 Pit Wall	-	-	8.3	8.3	8.3
TIR02-Natural	Disturbed	Disturbed	-	-	6.7	6.7	6.7
TIR02-Stockpiles	Waste Rock	WRSF3	-	-	5.4	0.0	0.0
J6-Sump-WR	Disturbed	Disturbed	-	-	3.9	0.0	0.0

Table 18: Catchment area by facilities for the projecting operations and closure.

Facility / Footprints (ha)	Runoff Types	Source Term	2025	2026	2027	2028	2029	2030	2031	2032-2038	2040+
WRSF1	Waste Rock	WRSF1	30.7	30.7	30.8	41.9	42.8	53.8	53.8	53.8	53.8
WRSF2	Waste Rock	WRSF2	-	-	-	-	-	-	-	-	-
WRSF3	Waste Rock	WRSF3	52.6	52.6	52.6	71.4	96.4	96.4	96.4	96.4	96.4
WRSF5	Waste Rock	WRSF5	13.0	25.8	60.3	60.3	60.3	60.3	60.3	60.3	60.3
CP1-Facilities	Hard Surface	Mine Facilities	105.1	105.1	105.2	110.5	110.5	110.5	110.5	110.5	109.5
CP1-Water	Open Water	Precipitation	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6
CP2-Natural	Natural	Baseline	11.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
CP2-US-WRSF3	Waste Rock	WRSF2	40.4	40.4	40.4	40.4	40.4	40.4	40.4	40.4	38.9
CP2-Disturbed	Disturbed	Disturbed	0.1	37.8	37.8	21.6	-	-	-	-	-
CP3-Water	Open Water	Precipitation	1.8	1.6	-	-	-	-	-	-	-
CP3-Natural	Natural	Baseline	11.1	10.3	-	-	-	-	-	-	-
CP5-Water	Open Water	Precipitation	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
CP5-Facilities	Hard Surface	Mine Facilities	41.2	41.2	41.2	41.2	41.2	41.2	41.2	41.2	41.2
CP6-Natural	Natural	Baseline	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	16.9
CP8-Natural	Natural	Baseline	209.3	209.3	209.3	208.3	207.1	207.1	207.1	207.1	207.1
CP8-Disturbed	Disturbed	Disturbed	18.6	13.6	-	-	-	-	-	-	-
B5-Natural	Natural	Baseline	79.3	79.3	79.3	79.3	79.3	79.3	79.3	79.3	79.3
B5-Disturbed	Disturbed	Disturbed	0.0	7.7	7.1	-	-	-	-	-	-
B5-South-Natural	Natural	Baseline	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1
B6-Natural	Natural	Baseline	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3
US-WRSF1	Waste Rock	WRSF1	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
SP6-Natural	Natural	Baseline	176.5	176.5	176.3	154.7	154.7	154.7	154.7	154.7	111.7

Facility / Footprints (ha)	Runoff Types	Source Term	2025	2026	2027	2028	2029	2030	2031	2032-2038	2040+
SP6-Disturbed	Disturbed	Disturbed	23.2	23.2	23.1	11.9	11.0	-	-	-	-
TSF	Tailings	TSF	35.1	37.5	65.3	65.3	65.3	65.3	65.3	65.3	107.1
SPW-Natural	Natural	Baseline	-	-	-	-	-	-	6.6	12.7	12.7
SPW-Orepad	Waste Rock	Ore Stockpile	-	-	-	-	-	-	1.2	2.3	2.3
SP4-Saltpile	Waste Rock	Saltpile	-	-	-	-	-	-	-	0.1	2.7
SPW-Saltpile-Natural	Natural	Baseline	-	-	-	-	-	-	9.6	18.6	18.6
SPW-Saltpile-Disturbed	Disturbed	Disturbed	-	-	-	-	-	-	1.4	2.5	-
WRSF8	Waste Rock	WRSF8	-	-	-	-	5.1	38.7	51.7	51.7	51.7
WRSF9	Waste Rock	WRSF9	-	-	-	-	2.4	22.3	32.9	32.9	32.9
CPD1	Open Water	Precipitation	-	-	-	-	0.6	0.6	0.6	0.6	0.6
CPD1-Natural	Natural	Baseline	-	-	-	-	4.9	4.9	4.9	4.9	4.9
CPD1-Disturbed	Disturbed	Disturbed	-	-	-	-	4.6	13.0	-	-	-
CPD2	Open Water	Precipitation	-	-	-	-	-	-	-	-	0.8
CPD2-Natural	Natural	Baseline	-	-	-	-	-	-	-	-	6.5
CPD2-Disturbed	Disturbed	Disturbed	-	-	-	-	-	-	-	-	-
DiscPit	Pit Wall	Pit Wall	-	-	-	-	5.4	28.5	28.5	28.5	28.5
DiscPit-Natural	Natural	Baseline	-	-	-	-	0.8	4.5	4.5	4.5	4.5
SPD-Facilities	Hard Surface	Mine Facilities	-	-	-	-	-	2.3	4.9	4.9	4.9
SPD-OrePad	Waste Rock	Ore Stockpile	0.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
SP3-Saltpile	Waste Rock	Saltpile	0.0	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
WRSF7	Waste Rock	WRSF7	0.0	0.0	0.0	0.0	5.8	39.6	49.5	49.5	49.5
CP7-Water	Open Water	Precipitation	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
CP7-Facilities	Hard Surface	Mine Facilities	45.8	45.8	45.8	45.8	41.1	20.9	20.9	20.9	20.9
CP7-Disturbed	Disturbed	Disturbed	-	-	-	-	1.2	3.3	-	-	-
CP7-SP2-Saltpile	Waste Rock	Saltpile	-	-	-	-	-	-	-	-	4.8
A22-Natural	Natural	Baseline	52.8	52.8	52.8	52.8	52.8	52.8	52.8	52.8	52.8
FZONE1	Pit Wall	Pit Wall	-	-	-	-	2.9	15.3	15.3	15.3	15.3
FZONE1-Natural	Natural	Baseline	39.5	39.5	39.5	35.4	27.0	14.6	14.6	14.6	14.6
FZONE2	Pit Wall	Pit Wall	-	-	-	-	1.7	9.2	9.2	9.2	9.2

Facility / Footprints (ha)	Runoff Types	Source Term	2025	2026	2027	2028	2029	2030	2031	2032-2038	2040+
FZONE2-Natural	Natural	Baseline	-	-	-	-	0.3	1.8	1.8	1.8	1.8
FZONE2-A19-Natural	Natural	Baseline	18.1	18.1	18.1	18.1	16.3	8.6	8.6	8.6	2.9
FZONE2-USA3-Natural	Natural	Baseline	6.1	6.1	6.1	6.1	5.5	3.0	3.0	3.0	1.3
FZONE3	Pit Wall	Pit Wall	-	-	-	-	2.2	11.5	11.5	11.5	11.5
FZONE3-Natural	Natural	Baseline	-	-	-	-	1.3	7.1	7.1	7.1	7.1
SUMPF1-Natural	Natural	Baseline	-	-	-	-	2.1	5.9	-	-	-
SUMPF1-Disturbed	Disturbed	Disturbed	-	-	-	-	1.8	4.9	-	-	-
SUMPF2-Natural	Natural	Baseline	-	-	-	-	2.5	13.0	13.0	12.7	7.8
SUMPF2-Disturbed	Disturbed	Disturbed	-	-	-	-	0.6	1.7	-	-	-
WRSF6	Waste Rock	WRSF6	-	-	-	8.3	22.7	37.4	37.4	37.4	37.4
SUMPP1-Natural	Natural	Baseline	-	-	0.1	7.9	-	-	-	-	-
SUMPP1-Disturbed	Disturbed	Disturbed	-	-	-	2.6	4.9	-	-	-	-
SUMPP2-Natural	Natural	Baseline	-	-	-	2.7	-	-	-	-	-
SUMPP2-Disturbed	Disturbed	Disturbed	-	-	-	2.3	4.4	-	-	-	-
SUMPP4-Saltpile-Disturbed	Disturbed	Disturbed	-	-	0.1	7.1	5.8	-	-	-	-
SUMPP4-Natural	Natural	Baseline	-	-	0.1	14.9	14.9	11.5	7.7	7.7	7.7
SUMPP5-Disturbed	Disturbed	Disturbed	-	-	-	2.8	5.4	-	-	-	-
PUMP1	Pit Wall	Pit Wall	-	-	-	-	1.6	8.4	8.4	8.4	8.4
PUMP1-Disturbed	Disturbed	Disturbed	10.6	7.8	-	-	-	-	-	-	-
PUMP1-Natural	Natural	Baseline	13.3	13.3	13.3	20.7	29.0	22.2	22.2	22.2	22.2
PUMP2	Pit Wall	Pit Wall	-	-	-	-	1.1	6.0	6.0	6.0	6.0
PUMP2-Natural	Natural	Baseline	-	-	-	-	0.8	4.3	4.3	4.3	4.3
PUMP3	Pit Wall	Pit Wall	-	-	-	3.2	7.5	7.5	7.5	7.5	7.5
PUMP3-Natural	Natural	Baseline	-	-	-	3.5	7.8	5.6	5.6	5.6	5.6
PUMP4	Pit Wall	Pit Wall	-	-	-	-	1.6	8.2	9.0	9.7	9.7
PUMP4-Natural	Natural	Baseline	-	-	-	-	0.7	3.5	3.5	3.5	3.5
B59-Natural	Natural	Baseline	40.3	40.3	40.3	30.7	20.7	20.7	20.7	20.7	20.7
B59-OrePad	Waste Rock	Ore Stockpile	-	-	-	-	-	-	-	-	-

Facility / Footprints (ha)	Runoff Types	Source Term	2025	2026	2027	2028	2029	2030	2031	2032-2038	2040+
WN01	Pit Wall	Pit Wall	-	1.8	23.3	23.3	23.3	23.3	23.3	23.3	23.3
WN01-Natural	Natural	Baseline	-	1.8	22.5	22.5	22.5	22.5	22.5	22.5	22.5
WN01-Disturbed	Disturbed	Disturbed	-	3.0	2.7	-	-	-	-	-	-
A6-Water	Open Water	Precipitation	55.4	55.4	55.4	53.0	49.9	49.9	49.9	49.9	49.9
A6-Natural	Natural	Baseline	238.8	238.8	238.8	232.2	221.8	214.3	214.3	214.3	214.3
A6-Disturbed	Disturbed	Disturbed	-	-	-	-	0.5	1.5	-	-	-
A8-East-Water	Open Water	Precipitation	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
A8-East-Natural	Natural	Baseline	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8
A8-West-Water	Open Water	Precipitation	54.9	54.9	54.9	54.9	54.9	54.9	54.9	54.9	30.7
A8-West-Natural	Natural	Baseline	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
CH22-Disturbed	Disturbed	Disturbed	9.1	6.7	-	-	-	-	-	-	-
A8-NorthBerm-Natural	Natural	Baseline	84.4	73.2	73.2	73.2	73.2	73.2	73.2	73.2	50.0
WES01	Pit Wall	Pit Wall	-	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2
WES02	Pit Wall	Pit Wall	-	-	-	-	6.5	34.1	34.1	34.1	34.1
WES02-Natural	Natural	Baseline	-	-	-	-	5.6	29.5	29.5	29.5	29.5
WES03	Pit Wall	Pit Wall	-	-	-	-	-	7.1	15.3	15.3	15.3
WES03-Natural	Natural	Baseline	-	-	-	-	-	-	-	0.2	4.0
WES04	Pit Wall	Pit Wall	-	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
WES04-Natural	Natural	Baseline	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
WES05	Pit Wall	Pit Wall	-	-	-	-	2.7	14.5	14.5	14.5	14.5
WES05-Natural	Natural	Baseline	-	-	-	-	3.9	20.5	20.5	20.5	20.5
TIR01	Pit Wall	Pit Wall	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6
TIR01-Disturbed	Disturbed	Disturbed	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
TIR02	Pit Wall	Pit Wall	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	7.9
TIR02-Natural	Natural	Baseline	6.8	6.8	7.0	7.3	7.3	7.3	7.3	7.3	7.3

5.4.3 Runoff Flow Factors and Seepage

Both model versions are based on a distributed catchment approach, where water volumes are estimated from water inputs (i.e., rainfall and snowmelt) and runoff coefficients calibrated for natural and mine altered areas.

For natural areas, a three-component flow system is used to simulate the delays in contribution from water inputs to surface waterbodies:

1. Quick flow: generated by storm or snowmelt events and often resulting in peak flow events. For tributaries local to the Meliadine Mine, water contributed via this mechanism may report to creeks in less than time than Interflow.
2. Interflow: this refers to the lateral movement of infiltrated meteoric water through the shallow overburden and active layer. Flow reporting to watercourses along this pathway is often referred to as vadose or unsaturated zone flow.
3. Baseflow: the portion of surface flow derived from groundwater discharge. At Meliadine, this flow component is understood to be negligible, and largely consists of water introduced via active layer melt.

The recharge of the Interflow and Baseflow components is governed by excess water from the previous component and a lag coefficient is applied to simulate the delayed response of the interflow and baseflow components. Quick flow and Interflow are considered as surface runoff while baseflow is considered as different components. Surface runoff computed for natural ground is adjusted using representative runoff coefficients for the altered mine areas. Future estimates of surface runoff, infiltration, interflow and basal seepage from the TSF and WRSFs were modelled by OKC (OKC 2022a; 2022b) for the RCP4.5 climate change scenario and provided at a daily time-step for direct input to the WBWQM. For some specific mine perturbed areas, only the quick flow component is used, and the natural runoff coefficient is adapted/calibrated to the characteristics of the perturbed surface.

5.4.4 Potential Evapotranspiration

Hargreaves-Samani method (Hargreaves and Samani 1985) was used to develop estimates of potential evaporation, using the long-term daily record of minimum, average and maximum daily temperatures, as well as factors related to potential solar insolation (e.g., latitude [63.08°] and day of year).

5.4.5 Lake Ice Growth and Ice Melt

A temperature-based ice algorithm was implemented to model cryo-concentration in CP1. Lake ice melt is handled by the Bilello equation (Bilello, 1980; Lotsari et al. 2019). The lake ice growth algorithm is not applied to any other facilities than CP1, including saline storage facilities (i.e., Tiri 02, SP1, SP6).

5.4.6 Closure and Post-Closure Assumptions

The last year of mining in the Meliadine Mine will occur in 2031. The Closure phase commences the following year (2032) and is expected to last for 7 years. The following assumptions are included in the modelling component of the WLA WQWBM:

- Any saline waste rock from the UG mine remaining on surface will be used within backfill in the underground workings.

- Ore pads, plant site, facilities areas and laydown areas will be reclaimed.
- Non-PAG waste rock covers will be progressively placed on the TSF and Discovery WRSF to limit the interaction of the active layer with the underlying tailings and waste rock, respectively.
- Pits will be filled with collected surface contact water, gravity drainage from the catchments surrounding the pits, and supplementary flows pumped from Meliadine Lake.
- All Operation phase water management infrastructure will remain in place for this period (pumping, treatment, discharge pipelines to Meliadine Lake and Itivia Harbour), no discharges to Meliadine Lake are planned.
- All remaining saline contact water will be pumped from SP6 to the underground void spaces from October 2031 onwards. SP6 will be actively refilled by pumping water from Meliadine Lake during the open water season of 2032 (384,000 m^3).

The post-Closure phase begins in 2039, and is characterized by the following activities:

- All water management infrastructure (i.e., channels, berms, ponds) will be decommissioned and pre-existing drainage patterns restored to the extent practical once surface contact water meets the relevant water quality criteria.
- All contact flows revert to pre-mining drainage patterns where possible.
- Mine area discharges reporting to the nearest downstream lake are assumed to fully mix in that lake.

5.5 Waterbody Inventory

Table 19 presents the waterbodies that are impacted by the Mine activities in Watersheds A, B, H and J. Lakes that are planned to be impacted by future mining activities are illustrated on Figure 2 and detailed in Table 13, section 4.1.1.

Table 19: 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	-	Pond removed for Tiriganiaq Pit 1 slope stability
	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	-	Pond removed for Tiriganiaq Pit 1 slope stability
	A39	0.48	0.12	-	Pond removed by development of Tiriganiaq Pit 2

Watershed	Waterbody	Maximum Lake Water Depth, m	Total Area (ha)	Water Volume (m^3)	Notes
	A40				Pond removed for Tiriganiaq Pit 1 slope stability
	A54	1.3	5.99	34,545	Dewatered for CP5
	A58	0.50	0.43	-	Covered by Laydown Area
B	B8	0.8	1.43	-	As part of CP4/Berm-CP4
	B9	1.40	0.64	-	Dewatered for CP4
	B10	0.8	0.33	-	Pond removed by development of Tiriganiaq Pit 1
	B28	N/A	0.45	-	As part of CP3/D-CP3
	B33				Pond removed for Tiriganiaq Pit 1 slope stability
	B33A				Pond removed for Tiriganiaq Pit 1 slope stability
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 OP2
	H10	0.11	0.10	-	Partially covered by 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 OP2
	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
J	J6				Flow regime impacted by partial pad covering

"-" indicates that data not available or not applicable; Ponds drained (grey shading); Ponds dewatered (beige shading)

SECTION 6 • WATER QUALITY

Water quality monitoring is an important part of the Water Management Plan to verify the predicted water quality trends, conduct adaptive management should differing trends be observed, and to ensure all water quality limits at discharge points are met (i.e., effluent to Meliadine Lake and Itivia Harbour). Water quality results and water transfers (i.e., origin, destination, rate) at the Mine are monitored and documented pursuant the Licence.

Water quality monitoring was initiated at the pre-development stage, continued through construction into operations, and will continue into closure and post-closure. Monitoring occurs at four levels:

1. Regulated discharge monitoring that occurs at monitoring points specified in the Licence or MDMER regulations.
2. Verification monitoring that is undertaken for operational and water management purposes by Agnico Eagle.
3. General monitoring that is commonly included in the Licence, specifying what is to be monitored according to a schedule. General monitoring is subject to change as directed by an Inspector, or by the Licensee, subject to approval by the NWB.
4. Event Monitoring that addresses the site-specific monitoring that is required following any accidental release. The EM program is designed to verify whether contamination of the surface soil and/or any nearby receiving environment and active zone has occurred as a result of an accidental release of a hazardous material or contaminated water. A “release” may be caused by spills, including unidentified seepage or emergencies.

Water quality monitoring include quality assurance/quality control procedures that are implemented as per current Quality Assurance/Quality Control Plan. Appendix D of the Meliadine Mine Water Quality and Flow Monitoring Plan provides details of the Monitoring Program Stations on site and at Itivia. Figure 8and Figure 9 depict the Monitoring Program Stations on site and at Itivia.

6.1 Summary of Regulatory Guidelines

Water quality results are compared to MDMER criteria and effluent quality limits listed in the Licence. Water quality pertaining to MEL-14 will be compliant to Part F, Item 3 of the Licence prior to discharging to Meliadine Lake. All surface runoff and/or discharge from drainage management systems associated with the Mine, including laydown areas and All-Weather Access Road, where flow may directly or indirectly enter a Water body, shall not exceed the Effluent quality limits listed in Part D, Item 18 of the Licence. Furthermore, all waters from natural water body dewatering activities shall be directed to Meliadine Lake and shall not exceed the Effluent quality limits listed in Part D, Item 12.

Post-closure discharge water quality will be compared to Canadian Council of Ministers of the Environment Water Quality Guidelines (CCME-WQG) guidelines or the Meliadine SSWQO developed for aluminum, fluoride, and iron (Golder 2013a, 2013b, 2014). The Meliadine SSWQO criteria was developed as a conservative protection to the aquatic receiving environment and was developed by Golder (2013a, 2014) to assess whether waste rock consisted of a deleterious substance according to Environment Canada (2013). The outcome of the assessment was that Meliadine waste rock is not a deleterious substance (Environment Canada 2014).

6.2 Water Quality Monitoring - Licence Amendment

As a component the Emergency Amendment (2020) and in support of the Water Licence Amendment Application (Amendment No. 1, 2021), additional regulated discharge monitoring was carried out in 2020, as described in the Meliadine Mine Water Quality Management and Optimization Plan (WQ-MOP). The purpose of the WQ-MOP sampling program was both to assess conditions experienced in Meliadine Lake during the 2020 discharge event and for the application as a science-based framework to support the determination of acceptable effluent quality conditions (EQCs) and Site-Specific Water Quality Objectives (SSWQOs). Further information regarding the WQ-MOP, including specifics of the 2020 sampling program, application of monitoring data, adaptive management measures and thresholds for the development of SSWQOs for chloride can be found in Meliadine Mine Water Quality Management and Optimization Plan Progress Update (Golder 2021).

6.3 Water Quality Modelling and Forecasts

Water quality for past and current (2024) operation of the mine is simulated using the Operational version of the WBWQM, whereas updated water quality predictions for future operations (2025+), closure and post-closure periods are conducted using the WLA WBWQM (Lorax, 2024). Concentrations of water quality parameters required by the Type A Water Licence 2AM-MEL1631 under Part F, Item 3 are modelled for all mine water management ponds and sumps.

As per the amended Water Licence, the water quality forecast will be updated annually. Future updates to the water quality forecast will be provided in the Annual Report.

6.4 Post-Closure

As per the 2014 Final Environmental Impact Statement (FEIS) water quality model provided in Agnico Eagle (2015b), long-term, post-closure water quality in the collection ponds and in the flooded open pit lakes are anticipated to meet MDMER limits and CCME-WQG for the protection of aquatic life or the SSWQO developed for the Mine for aluminum, fluoride, and iron. Water quality is predicted to improve in Closure when mining activities cease, and pit lakes are flooded with Meliadine Lake water. Detailed water quality predictions at Post-Closure are included in the Meliadine Mine Water Balance and Water Quality Model Technical Report (Lorax, 2024).

SECTION 7 • WATER MANAGEMENT DURING CLOSURE

The detailed Mine closure and reclamation activities are provided in the Meliadine Mine Interim Closure and Reclamation Plan. Water management during closure and reclamation will involve flooding the open pits using precipitation and freshwater from Meliadine Lake, flooding the Tiriganiaq Underground Mine workings 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 20. Figure 10 illustrate the water management layout after Mine closure. Additional details for the activities are described in the following sections.

Table 20: Key Water Management Activities during Mine Closure

Phase	Figure	Key Water Management Activities and Sequence
Active Closure (2032 to 2038)	5	• Flooding of mined out pits • Continue to collect and manage the contact water in collection ponds • Continue to pump the contact water in CP1 to EWTP, if required, for treatment before being discharged to the outside environment • Remove non-essential site infrastructure • Pump the underflow sludge water from EWTP to CP1 • Continue natural flooding of Tiriganiaq Underground Mine with groundwater seepage • Remove Meliadine Lake pumping system
Post-Closure (2039+)	6	• Treat the contact water until water quality meet direct discharge criteria and then decommission the water management system • Continue natural flooding of Tiriganiaq Underground • Breach water retention dikes and thermal berms once water quality monitoring results meet discharge criteria to allow water to naturally flow to outside environment • Remove culverts and breach remaining water retention berms (pending the demonstration of acceptable water quality)

7.1 Mine Flooding

During closure, all saline water will be pumped to the underground and surface contact water, as well as local runoff and precipitation will be stored in the mined out pits to enhance reflooding activities. Active reflooding will be conducted with water to be pumped from Meliadine Lake. Refilling of the mine out pits is anticipated to take seven years, with pumping of Meliadine Lake water at a maximum of 8.5 Mm^3/year over six years, reducing to 2.6 Mm^3 in the last year of Active Closure (Lorax, 2024). There will be no discharge into Meliadine Lake or to Itivia Harbour during this phase.

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.

More details are provided in the Meliadine Mine Water Balance and Water Quality Model Technical Report (Lorax 2024).

7.3 Collection Ponds, Dikes and Berms

The collection ponds, dikes and berms will remain in place to collect the surface runoff water and seepage from the Mine until the water quality meets discharge criteria. Once the water quality meets discharge criteria, dikes/berms will be breached to allow runoff to follow natural (topographically induced) flow paths. Dikes/berms breaching will involve the removal of a portion of the dikes to a minimum depth of 1 m below average water level or back to original ground levels. Consideration will be given to breach staging, with the above water portions of the dike/berm in the breach area removed during winter periods, when there will be little surface water flow, thereby minimizing the potential release of sediments to the neighbouring waterbodies. The remainder of the breach would be conducted during the open water season following freshet. Turbidity curtains would be deployed to minimize any potential sediment release to surface water.

7.4 Channels and Sumps

Once monitoring results have indicated that contact water conveyed in channels and sumps meets acceptable water quality, the infrastructure will be graded 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.

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FIGURES

Figure 1 General Mine Site Location Plan

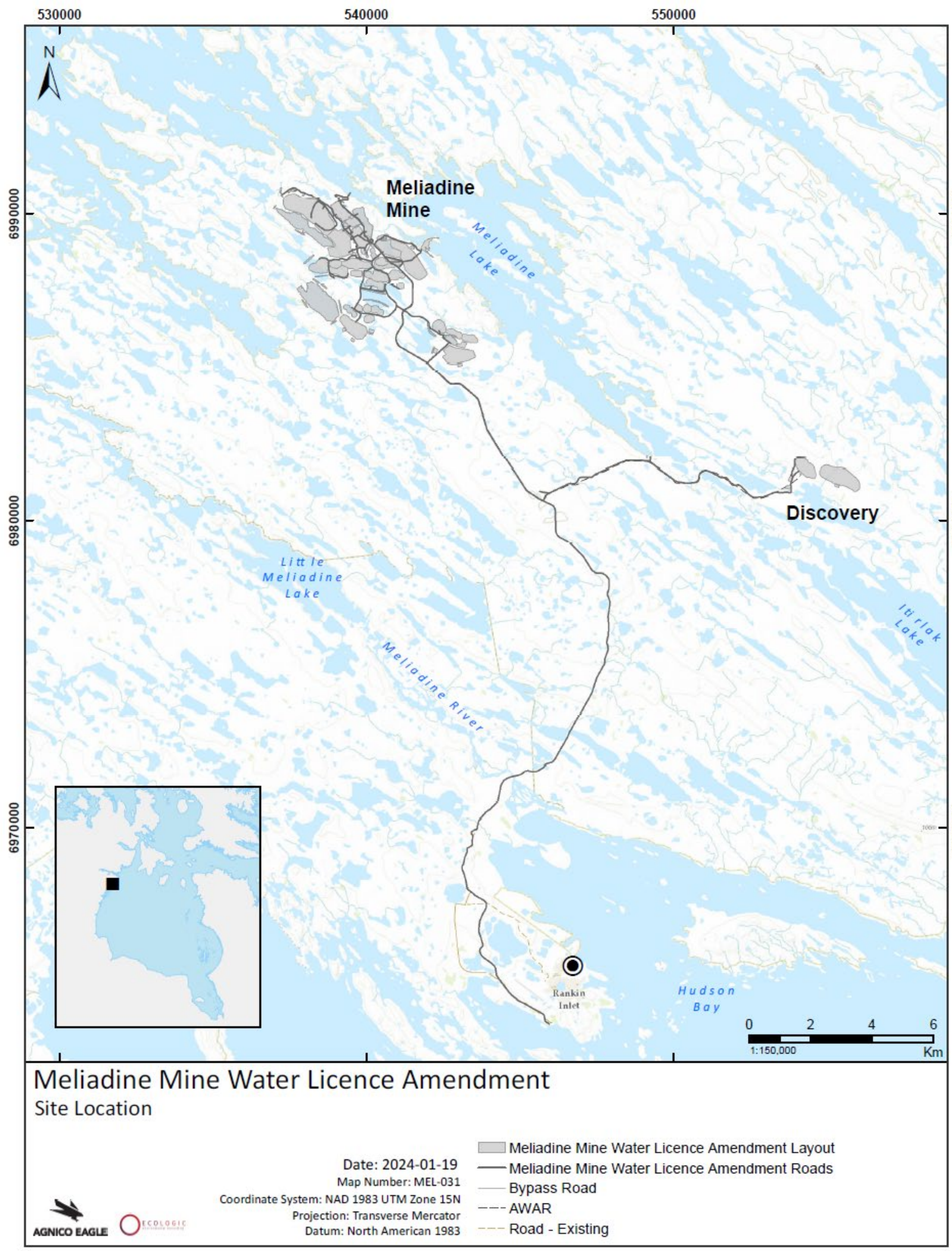

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Figure 2 General Mine Site Plan Layout

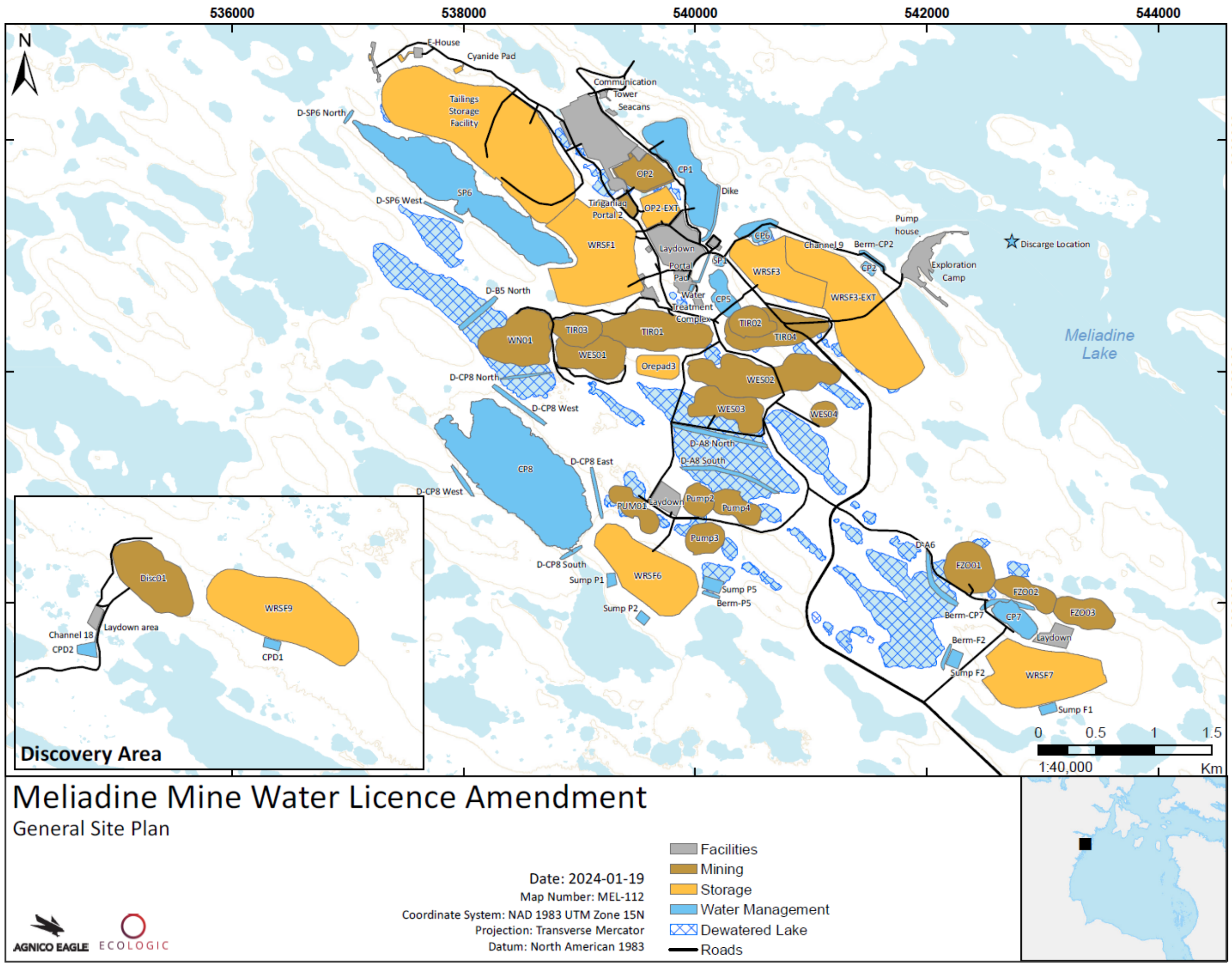

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Figure 3 P-Area Plan View and Design of the P3 Pad

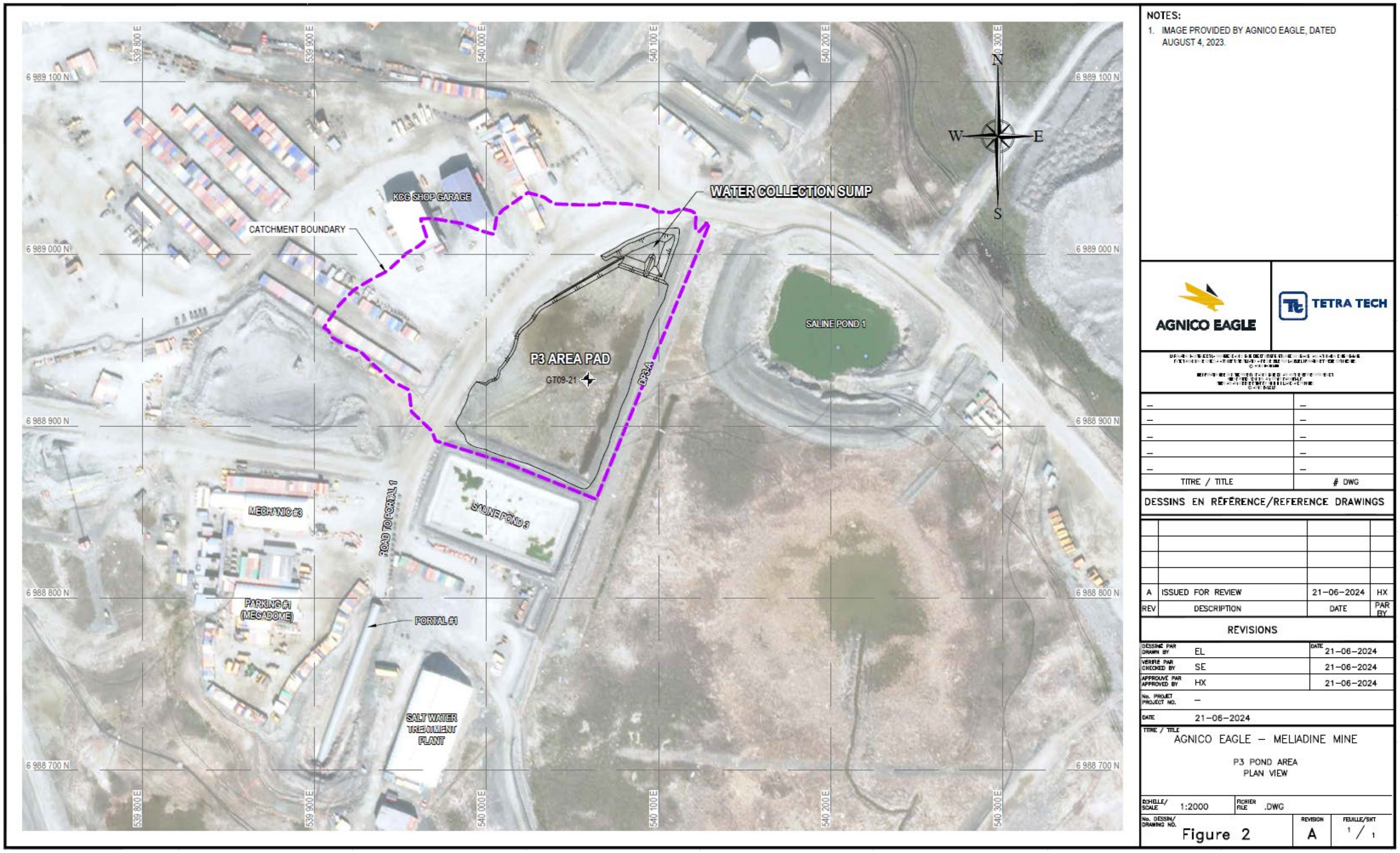

Figure 4 Location and Design of Saline Pond 4 (SP4) within Tiriganiaq Pit 1

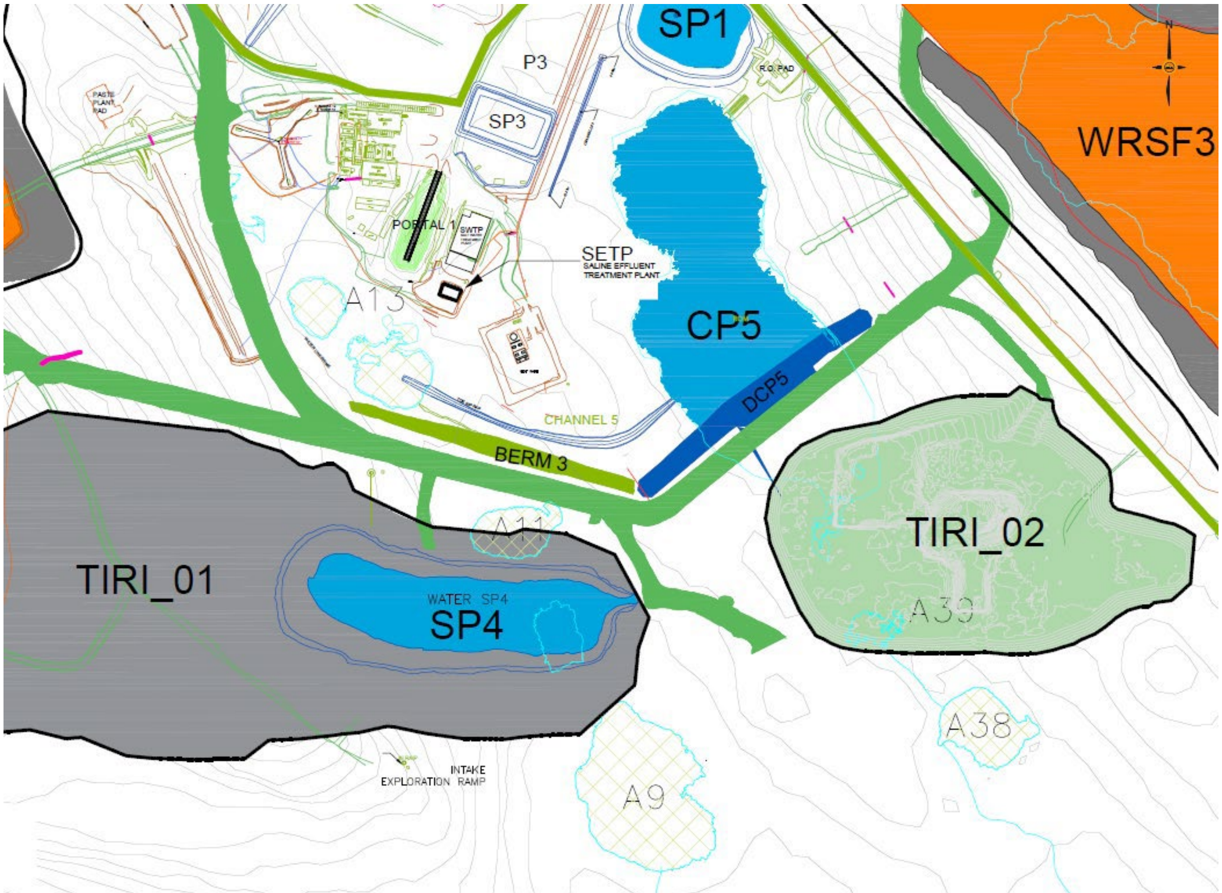

Figure 5 Mine Site Layout at 2031

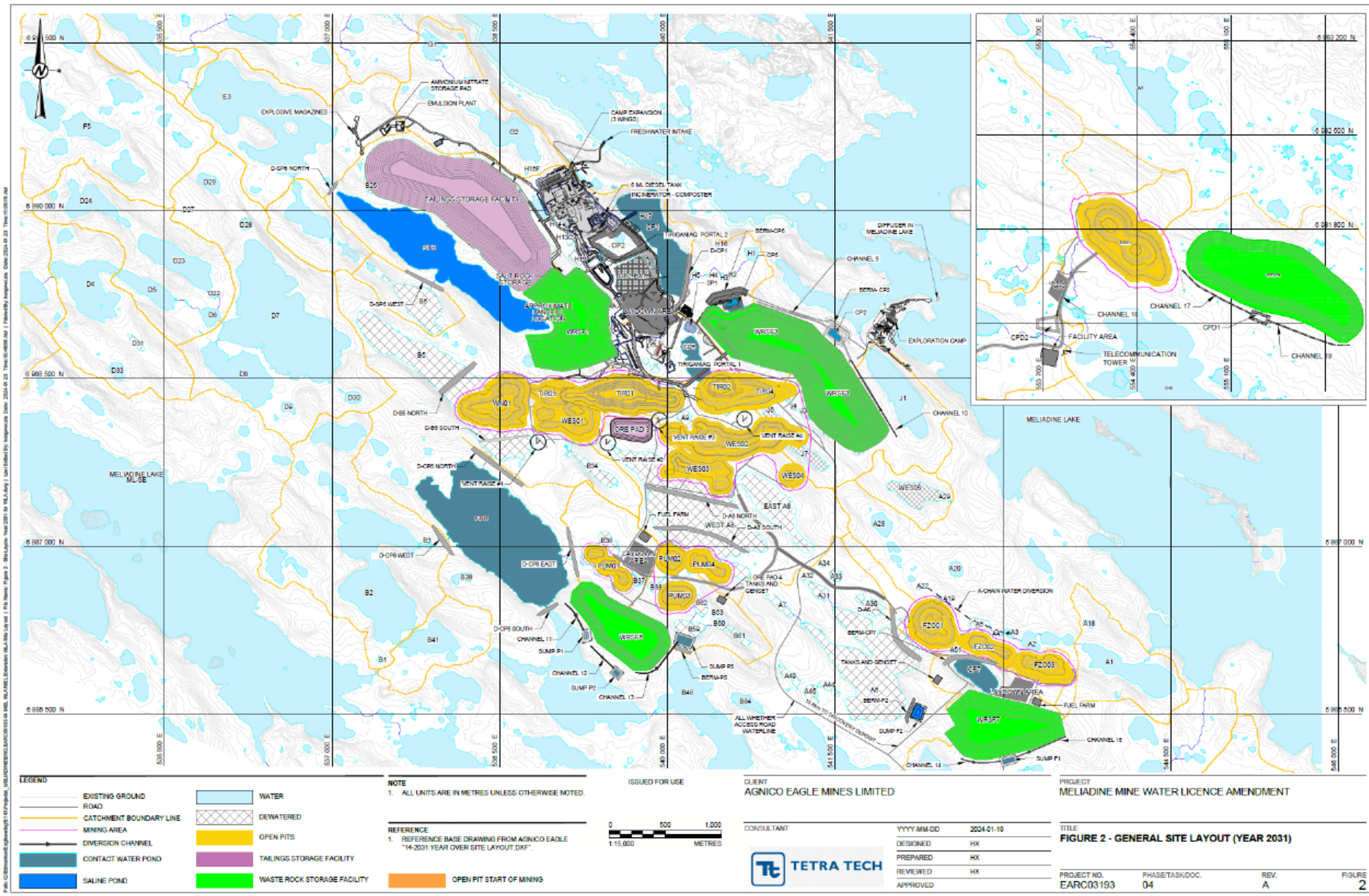

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Figure 6 Conceptual Site Water Management Flow Diagram for the Site.

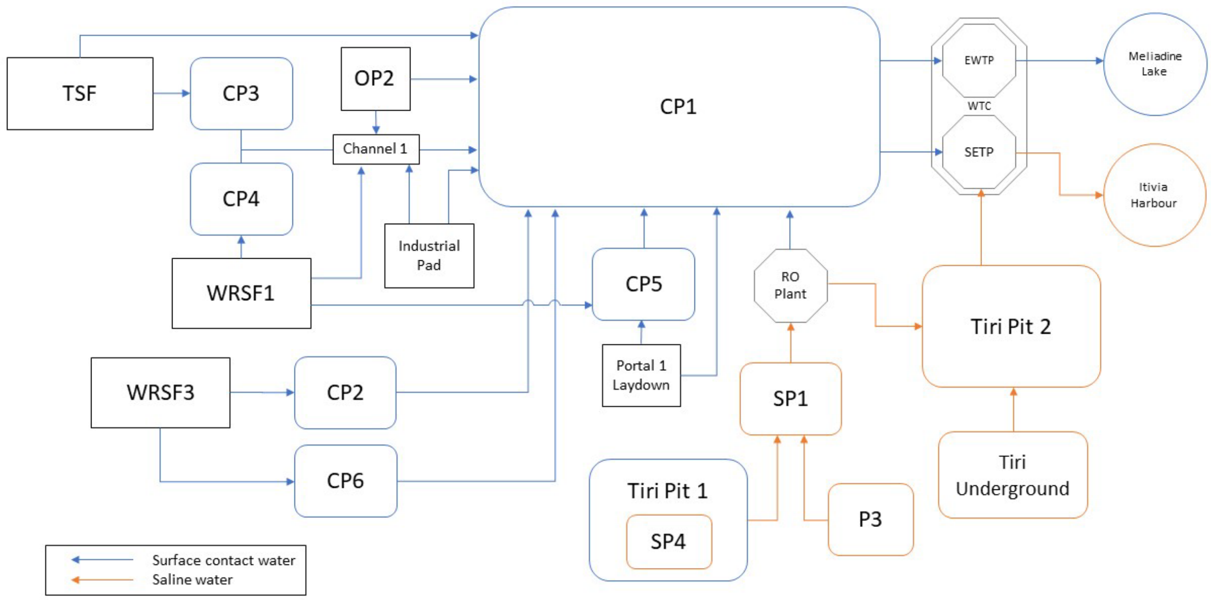

Figure 7 Conceptual Site Water Management Fow Diagram as Planned at the End of the Life of Mine

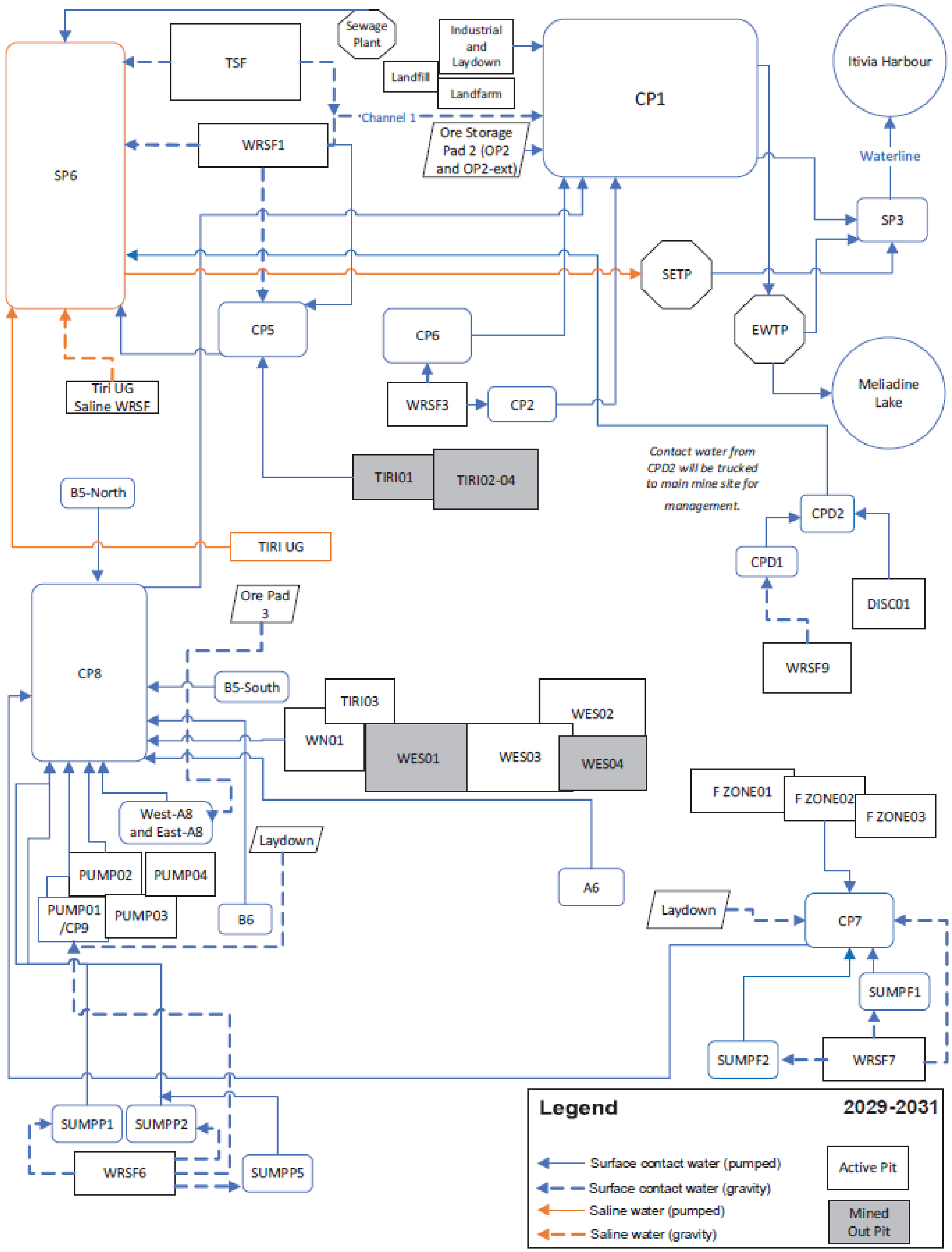

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Figure 8 Water Quality Monitoring Locations on Site

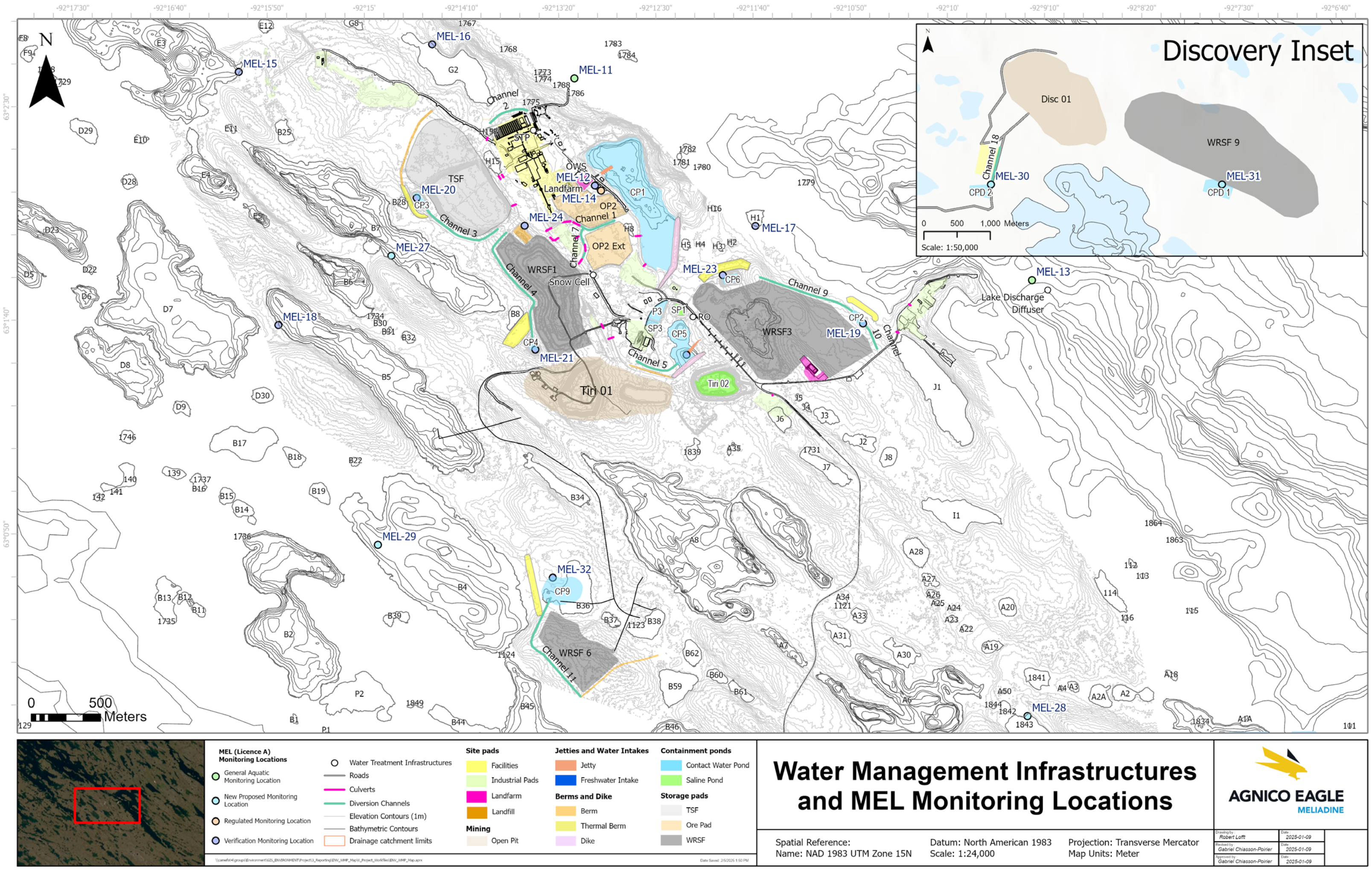

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Figure 9 Water Quality Monitoring Locations at Itivia

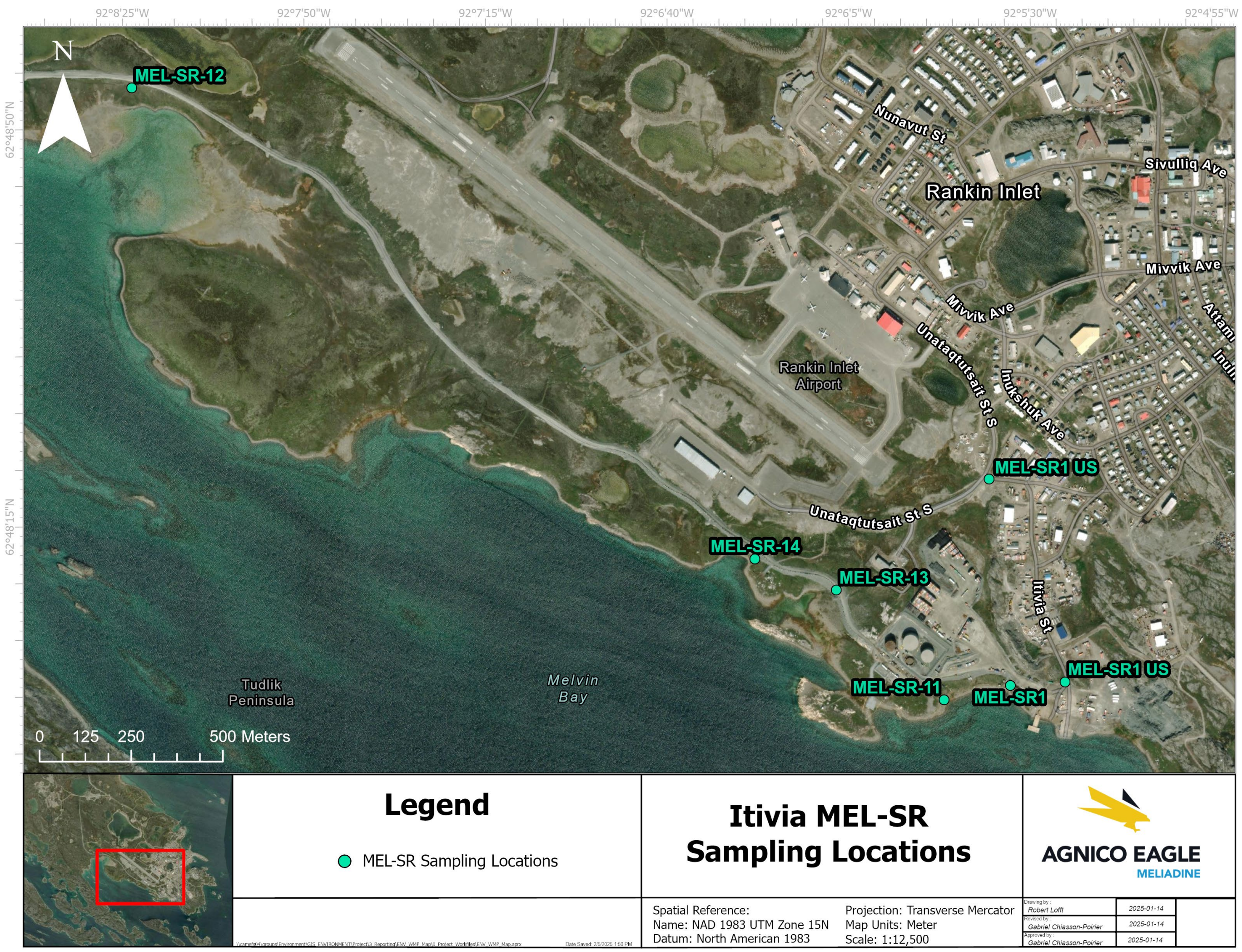
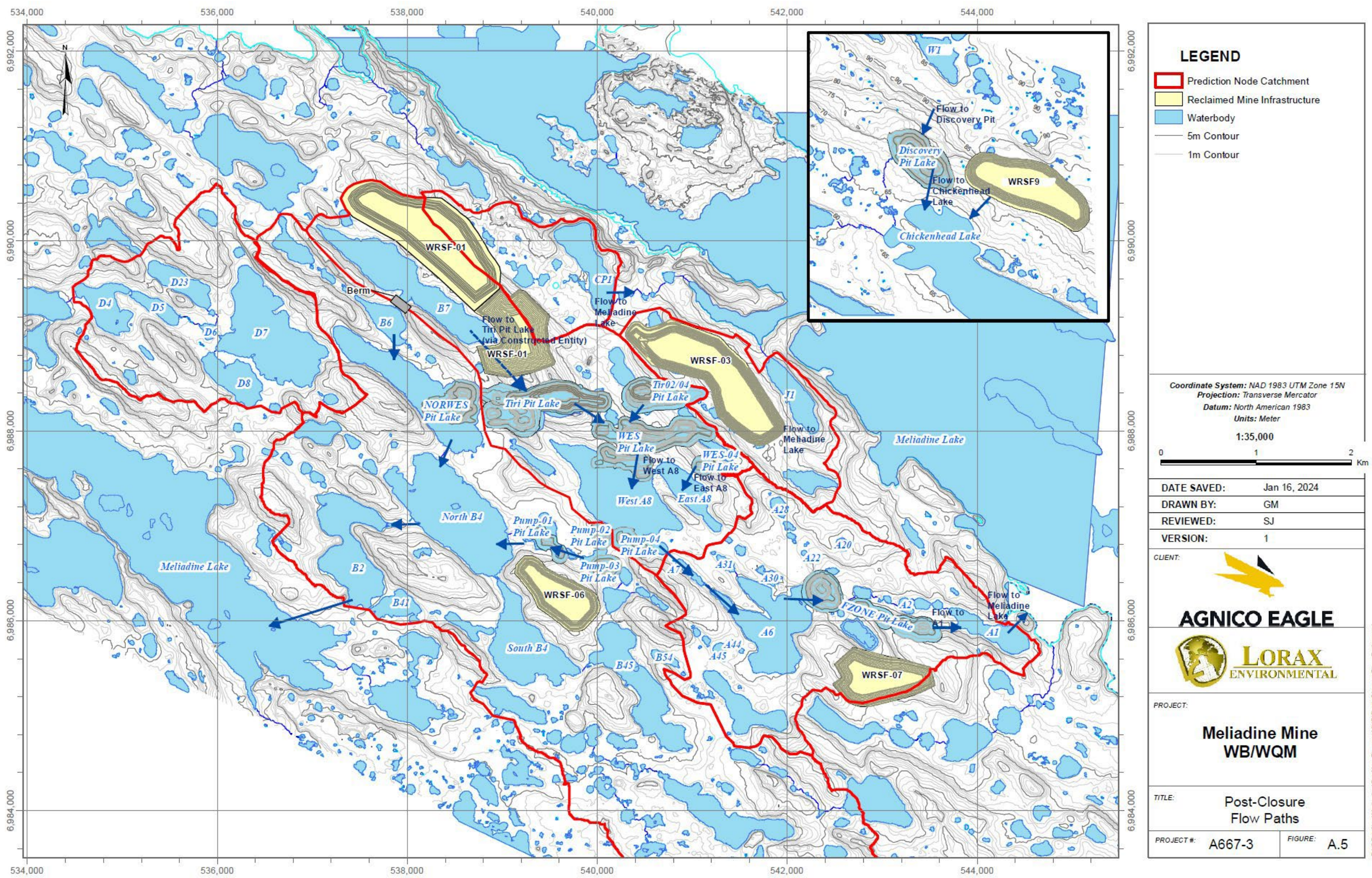


Figure 10 Mine Site Layout After Closure



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