WHALE TAIL PIT

Water Quality and Flow Monitoring Plan

Prepared by:
Golder and Agnico Eagle Mines Limited – Meadowbank Division

Version 2
May 2017

EXECUTIVE SUMMARY

The purpose of this Water Quality and Flow Monitoring Plan is to establish the program to be implemented and followed by Agnico Eagle's environmental management team to monitor the performance of the waste and water management systems at the Whale Tail Pit Project.

The Plan is one component of the *Aquatic Effects Management Program* (AEMP) and is closely associated with the *Water Management Report and Plan*. The Plan summarizes the monitoring locations, sampling frequency, monitoring parameters, compliance discharge criteria and an adaptive management plan for water quality at the Whale Tail Pit and Haul Road project (Project).

Section 2 in this Plan includes an overview of the monitoring programs and mine development schedule. Section 3 provides specific details (including sampling locations and parameters to be measured) for the compliance monitoring program, along with general guidance for the event monitoring program. An adaptive management program is described for both regulated discharges and non-regulated discharges in Section 3 as well. Requirements of the flow monitoring program are described in Section 4, and an overview of the reporting requirements in Section 5.

IMPLEMENTATION SCHEDULE

This Plan will be implemented immediately, subject to any modifications proposed by the NWB as a result of the review and approval process.

DISTRIBUTION LIST

Environmental Superintendent
Environmental Coordinators
Environmental Technicians

DOCUMENT CONTROL

Version	Date (YMD)	Section	Page	Revision
1	January 2017			Comprehensive plan for Whale Tail Pit project.
2	May 2017	1.0	1	Updated to include sampling station during post-closure (based on Commitment #2 from the Technical Meeting April 28-May 2, 2017)
	May 2017	Figure 2.4		Updated to include sampling station during post-closure (based on Commitment #2 from the Technical Meeting April 28-May 2, 2017)
	May 2017	Table 3-1		Updated to include sampling station during post-closure (based on Commitment #2 from the Technical Meeting April 28-May 2, 2017) – additions within text shown in red

Prepared by:

Golder Associates & Agnico Eagle Mines Limited - Meadowbank Division

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SECTION 1. INTRODUCTION

The Water Quality and Flow Monitoring Plan (the Plan) has been prepared to meet Type A water licence requirements. The Plan is one component of the *Aquatic Effects Management Program* (AEMP) and is closely associated with the *Water Management Report and Plan*. The Plan summarizes the monitoring locations, sampling frequency, monitoring parameters, compliance discharge criteria and an adaptive management plan for water quality at the Whale Tail Pit Project (Project).

The purpose of this Water Quality and Flow Monitoring Plan is to establish the program to be implemented and followed by Agnico Eagle's environmental management team to monitor the performance of the waste and water management systems for the Project. The program includes:

- Verifying and validating the predicted water quality values with empirical measurements of the mine site water quality and flows;
- A comparison of measured water quality data to compliance requirements; and
- A framework for adaptive management that allows the identification and rectification, where necessary, of unexpected trends or non-compliance in water quality and flows.

The Plan provides information on the locations of the monitoring stations at the various stages of mining. These monitoring locations are used to evaluate the performance of the mine waste and water management system.

The objectives of the monitoring program are:

1) to track the chemistry of the contact and non-contact water prior to and during discharge;
2) to assist in identifying if water treatment is required prior to discharge; and
3) to minimize the potential impacts of mining activities on the surrounding environment.

Additional locations outside the footprint of the Amaruq property (and outside the scope of this Plan) may be monitored under the *Aquatic Effects Management Program* and the *Core Receiving Environmental Monitoring Plan (November 2015*). (FEIS, Volume 8, Appendix 8-E.2).

Agnico Eagle has adapted its Water Quality and Flow monitoring program to include a station in Whale Tail Lake (North Basin) during post-closure.

For the Whale Tail Project, there are three main surface water quality monitoring programs designed for the monitoring and protection of the receiving environment:

- Water Quality Monitoring and Management Plan for Dike Construction Dewatering
- Water Quality and Flow Monitoring Plan
- Core Receiving Environment Monitoring Program

Through these combined programs, water quality will be monitored at various locations (including two reference lakes), annually, and during all phases of the Project.

SECTION 2. OVERVIEW

2.1 OVERVIEW OF SITE WATER MANAGEMENT PLAN

Details of overall water management are discussed in the *Whale Tail Pit Water Management Plan* (November 2016) which is updated as needed to reflect changes in operation and/or technology or as otherwise required by a water licence. All contact water from the mine facilities including Whale Tail Pit waste rock storage facility, open pit, and other disturbed areas will be directed by pumping or berms and other surface diversions to either of the following:

- Sumps from which the water will be pumped to the Whale Tail Pit Attenuation Pond; or
- The open pit during re-flooding and after mining activity has ceased.

As specified in the *Water Management Plan*:

> *"All contact water will be intercepted, contained, analyzed, treated, if required, and discharged to the receiving environment only when water quality meets the discharge criteria."*

2.2 MONITORING PROGRAMS

The Water Quality and Flow Monitoring Plan has been divided into two levels of monitoring to characterize the range of impacts between the sources of contact water in the individual mine facilities and the point of discharge or release to the receiving environment. The two levels of monitoring include:

1) compliance monitoring; and
2) event monitoring.

2.2.1 Compliance Monitoring Program (CM)

The compliance monitoring (CM) sites are those stipulated in a water license; these sites vary from contact water collection ditches and attenuation ponds to sampling in areas prior to discharge to the receiving environment. The requirements of the water license including water quality limits will be applied at the applicable mine discharge points identified in the CM program.

The CM program provides a mechanism to assess water quality at specified sites, to confirm and to document compliance of discharge with regulatory requirements. As part of adaptive water management, these internal monitoring stations provide protection to the receiving water environment, provide data to predict pit re-flooding water quality and ensure exceedances of predicted or regulated levels are appropriately managed or mitigated to reduce impacts.

2.2.2 Event Monitoring Program (EM)

The EM sites result from unexpected events such as spills, accidents, and malfunctions. The response programs for such events are discussed in greater detail in the following documents:

- Spill Contingency Plan (FEIS, Volume 8, Appendix 8-D.6);
- Emergency Response Plan (FEIS, Volume 8, Appendix 8-D.3); and
- Whale Tail Pit Water Management Plan (January 2016)

Each accidental release will require mobilization of site equipment to stabilize the release, procedures to contain, neutralize, and dispose of the discharge, and recommendations for monitoring the site following the incident.

2.3 OVERVIEW OF MINE DEVELOPMENT SCHEDULE

The Whale Tail Pit and Haul Road Project (Project), is a satellite deposit located on the Amaruq property, to

extend mine operation and milling at the Meadowbank Mine. The proposed open pit mine, mined by truck-and-shovel operation, will produce 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock, and 5.6 Mt of overburden waste. Figures 2-1, 2-2, 2-3 and 2-4 show the sequence of staged development of Whale Tail Pit, from the pre-development and construction, operations, closure, and post-closure phases, respectively. These figures show the water quality monitoring location by mine phase. The actual configuration of the pit may change as mining progresses. As a result, the monitoring program (Section 3.0) accommodates changes in the pit design.
The staged development of the mine facilities has been divided into four phases for monitoring purposes. The four phases include:

- Pre-development and Construction phase;
- Operations phase;
- Closure phase; and
- Post-closure phase.

A summary of site activities and water quality monitoring issues during these phases is provided below.

2.3.1 Pre-development and Construction Phase

The principal impacts resulting from construction activities may be the increase in turbidity and TSS from the release of particulates during dike construction, surface runoff, the disturbance of lake sediments and the dewatering of future mining zones. Management and monitoring of these impacts are discussed in the AEMP and the Water Quality Monitoring and Management Plan for Dike Construction and Dewatering. Construction of the Whale Tail Pit site will begin as soon as approval and permits are received (anticipated for early 2018).

2.3.2 Operations Phase

During the operations phase, mining will occur in the Whale Tail Pit. Most of the waste rock generated from the pit will be deposited in the waste rock storage facility (WRSF), however some NPAG waste rock may be used for construction of mine infrastructure (roads, dikes), and potentially some for fish habitat structures. Milling and tailings will be regulated under the 2AM-MEA1525 Type A Water Licence. During the early operations phase, mine water from the individual pit sumps including dike seepage will be pumped to the Attenuation Pond. Water from the Attenuation Pond was discharged to Mammoth Lake during open water season on an annual basis thru a diffusor. This water was treated for TSS removal prior to being discharged.

The operations phase will span three to four years, from Year 1 (2019) to Year 4 (2022).

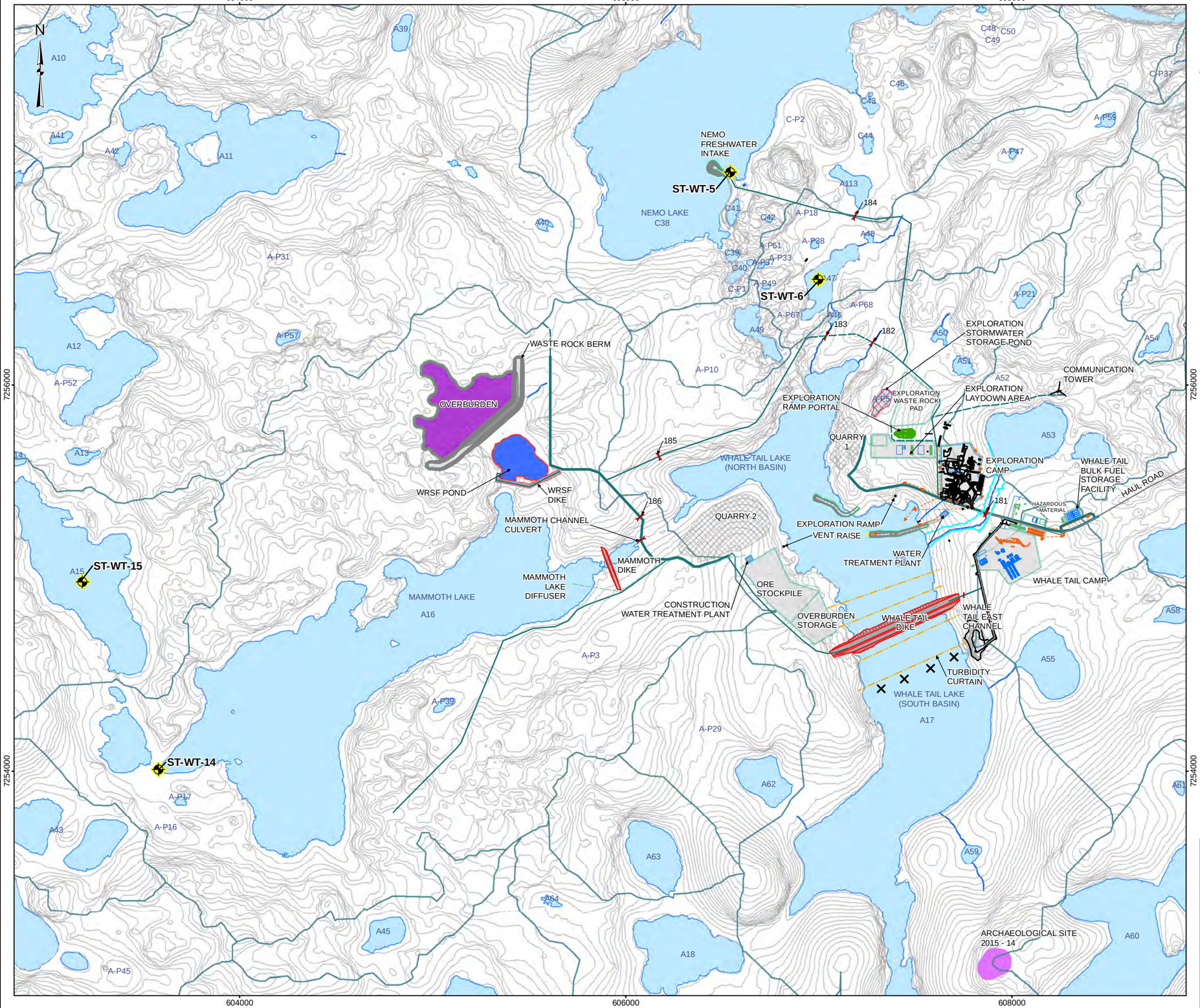
2.3.3 Closure Phase

Mining activities are currently expected to end during Year 4 (2022). Closure will occur from Year 4 (2022) to Year 11 (2029) after the completion of mining and will include removal of the non-essential site infrastructure and flooding of the mined-out open pit, as well as reestablishment of the natural Whale Tail Lake water level.

2.3.4 Post Closure Phase

Activities during the post-closure phase are primarily monitoring of selected mine facilities including flooded pit lakes and the reclaimed WRSF area. The Dikes will be breached once water quality within the pit lakes meets discharge criteria – CCME guideline for the Protection of Aquatic Life and background levels for parameters not listed in the CCME guideline.

Post-closure monitoring to confirm physical and chemical stability is planned until 2038.



LEGEND

- TURBIDITY MONITORING STATION
- WATER QUALITY MONITORING STATION
- ROAD
- TEMPORARY ROAD
- COLLECTION CHANNEL
- CULVERT
- CONTACT WATER PUPE
- FRESHWATER PIPE
- TURBIDITY CURTAIN
- DIKE
- OVERBURDEN
- QUARRY
- STORM WATER STORAGE POND
- NATURAL WATERSHED
- POND/SUMP
- ARCHAEOLOGICAL SITE
- WATERBODY
- WATERCOURSE

REFERENCE

1. INFRASTRUCTURE OBTAINED FROM AGNICO EAGLE MINES LIMITED FROM 6108-600-210-001_R2(2018)s.dwg.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM PHOTOSAT
DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

400 0 400
METRES

PROJECT
AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION
WHALE TAIL PIT PROJECT

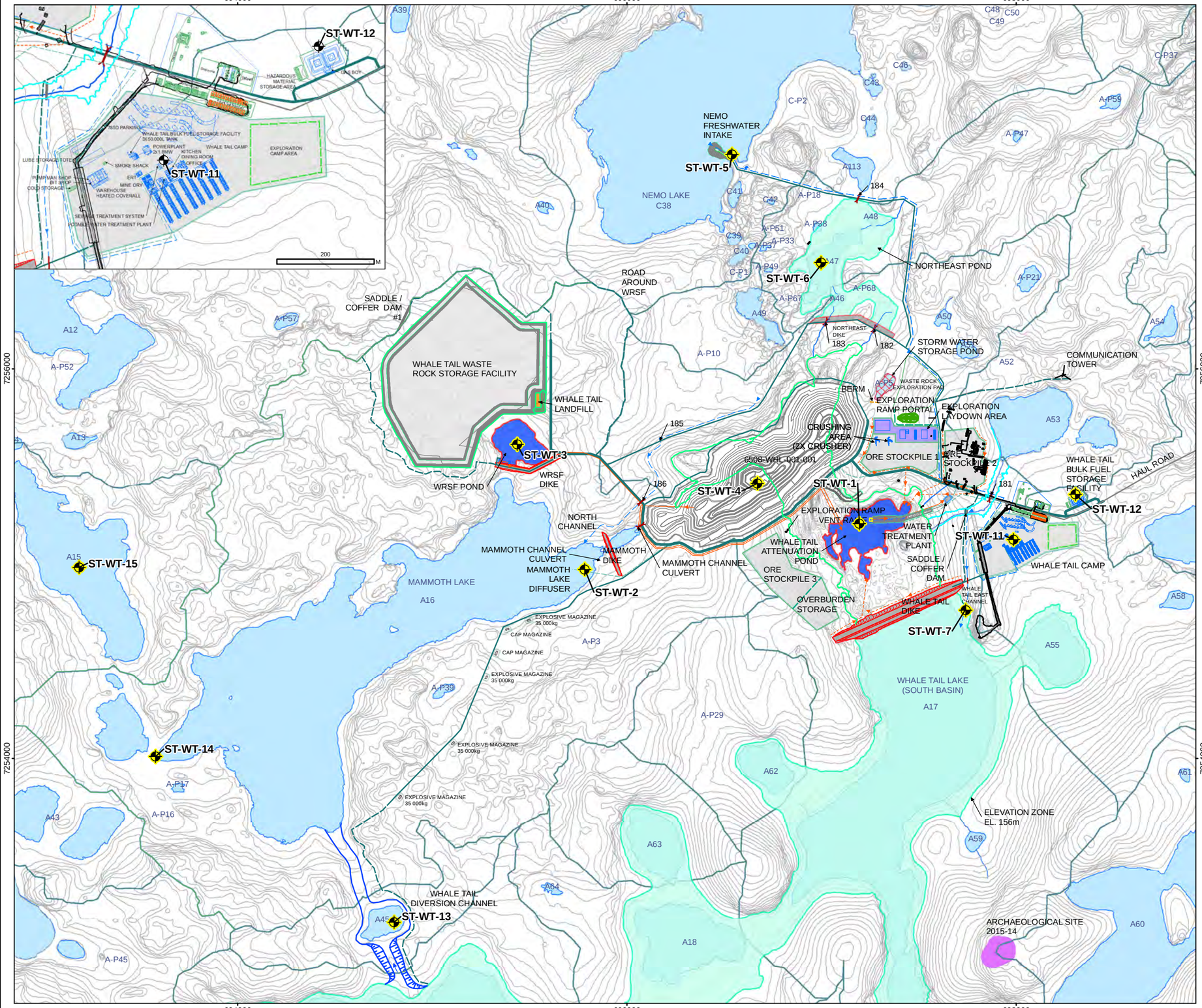
TITLE
SITE LAYOUT AND MONITORING PLAN (YEAR -1: 2018)

Golder Associates

PROJECT		1541520	FILE No.	
DESIGN	CP	17 May 2017	SCALE AS SHOWN	REV. 0
GIS	MH	17 May 2017		
CHECK	JR	17 May 2017		
REVIEW	CP	17 May 2017		

FIGURE 2-1

Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\99_PROJECTS\1541520_FEIS\02_PRODUCTION\FEIS\MXD\2300_Water_QualityReport\2017\1541520_FIG_2-1_SITE_LAYOUT_MONITORING_PLAN_2018.mxd



LEGEND

- WATER QUALITY MONITORING STATION
- FINAL WHALE TAIL WASTE ROCK STORAGE FACILITY
- WHALE TAIL LAKE (SOUTH BASIN) FLOODED LIMIT (WATER LEVEL 156.0m)
- NATURAL WATERSHED
- DIKE
- POND/SUMP
- ARCHAEOLOGICAL SITE
- ROAD
- TEMPORARY ROAD
- DIVERSION CHANNEL
- COLLECTION CHANNEL
- CULVERT
- INTAKE WATER PIPE
- CONTACT WATER PIPE
- FRESHWATER PIPE
- WATERCOURSE
- WATERBODY

REFERENCE

1. INFRASTRUCTURE OBTAINED FROM AGNICO EAGLE MINES LIMITED FROM 6108-600-210-002_R2(2019)s.dwg.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM PHOTOSAT
DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

400 0 400
METRES

PROJECT
AGNICO EAGLE

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION
WHALE TAIL PIT PROJECT

TITLE

SITE LAYOUT AND MONITORING PLAN (YEAR 1: 2019)

Golder Associates

PROJECT		1541520	FILE No.	
DESIGN	CP	17 May 2017	SCALE AS SHOWN	REV. 0
GIS	MH	17 May 2017		
CHECK	JR	17 May 2017		
REVIEW	CP	17 May 2017		

FIGURE 2-2

Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\99_PROJECTS\1541520_FEIS\02_PRODUCTION\FEIS\MXD\2300_Water_QualityReport\20171541520_FIG_2-2_SITE_LAYOUT_MONITORING_PLAN_2019.mxd

Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\99_PROJECTS\1541520_FEIS\02_PRODUCTION\FEIS\MXD\2300_Water_Quality\Report\2017\1541520_FIG_2-3_SITE_LAYOUT_MONITORING_PLAN_2022.mxd

604000 606000 608000

7256000 7254000

N

A41 A42 A11 A40 A12 A13 A14 A15 A16 A17 A18 A20 A43 A45 A62 A63 A64 A59 A60 A53 A54 A55 A52 A50 A49 A48 A47 A46 A113 C46 C43 C44 C41 C42 C39 C40 C38 C-P2 C-P1 C-P37

A-P31 A-P57 A-P52 A-P10 A-P18 A-P38 A-P51 A-P33 A-P37 A-P49 A-P67 A-P68 A-P59 A-P47 A-P21 A-P3 A-P39 A-P29 A-P17 A-P16 A-P45 A-P1 A-P54 A-P23

NEMO LAKE C38

MAMMOTH LAKE

WHALE TAIL LAKE (NORTH BASIN)

WHALE TAIL LAKE (SOUTH BASIN)

ROAD AROUND WRSF

SADDLE / COFFER DAM #1

CLOSED WHALE TAIL WASTE ROCK STORAGE FACILITY

WHALE TAIL LANDFILL

WRSF POND

WRSF DIKE

SUMP

NORTH CHANNEL

MAMMOTH DIKE

MAMMOTH CHANNEL CULVERT

MAMMOTH LAKE DIFFUSER

WHALE TAIL DIVERSION CHANNEL

ST-WT-3 ST-WT-6 ST-WT-8 ST-WT-9 ST-WT-10 ST-WT-11 ST-WT-12 ST-WT-13 ST-WT-14 ST-WT-15

182 183 185 186 181

EXPLORATION STORMWATER STORAGE POND

EXPLORATION RAMP PORTAL

EXPLORATION LAYDOWN AREA

COMMUNICATION TOWER

ORE STOCKPILE 1

ORE STOCKPILE 2

ORE STOCKPILE 3

WHALE TAIL BULK FUEL STORAGE FACILITY

HAUL ROAD

WATER TREATMENT PLANT

WHALE TAIL CAMP

WHALE TAIL EAST CHANNEL

OVERBURDEN STORAGE

WHALE TAIL DIKE

WHALE TAIL FRESHWATER INTAKE

ARCHAEOLOGICAL SITE 2015 - 14

LEGEND

- WATER QUALITY MONITORING STATION
- ROAD
- TEMPORARY ROAD
- SCARIFIED ROAD AND ACCESS
- DIVERSION CHANNEL
- COLLECTION CHANNEL
- CULVERT
- CONTACT WATER PUPE
- FRESHWATER PIPE
- DIKE
- CLOSED FACILITY
- EXPLORATION LAYDOWN AREA
- STORM WATER STORAGE POND
- POND/SUMP
- NATURAL WATERSHED
- ARCHAEOLOGICAL SITE
- WATERBODY
- WATERCOURSE

REFERENCE

1. INFRASTRUCTURE OBTAINED FROM AGNICO EAGLE MINES LIMITED FROM 6108-600-210-003_R2(2022)s.dwg.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM PHOTOSAT
DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

400 0 400
METRES

PROJECT
AGNICO EAGLE

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION
WHALE TAIL PIT PROJECT

TITLE

SITE LAYOUT AND MONITORING PLAN (YEAR 4: 2022)

Golder Associates

PROJECT		1541520	FILE No.	
DESIGN	CP	17 May 2017	SCALE AS SHOWN	REV. 0
GIS	MH	17 May 2017		
CHECK	JR	17 May 2017		
REVIEW	CP	17 May 2017		

FIGURE 2-3

604000
606000
608000
7256000
7254000
N
A39
A11
A40
A-P31
A-P57
NEMO LAKE
C38
C-P2
C41
C42
A-P18
A-P51
A-P38
A48
C39
A-P33
C40
C-P37
C-P1
A-P49
A47
A-P67
A46
A49
A-P10
A-P68
A-P21
A50
A54
A51
A52
A-P5
A53
A-P44
A-P25
A56
A58
A55
A16
A-P3
A-P39
A-P29
WHALE TAIL LAKE
(SOUTH BASIN)
A17
A62
A61
A-P17
A-P16
A63
A64
A59
A45
A18
A60
ARCHAEOLOGICAL SITE
2015 - 14
C48
C50
C49
C46
C-P36
C-P37
A-P59
A-P47
A113
ROAD
AROUND
WRSF
SADDLE /
COFFER
DAM #1
CLOSED WHALE
TAIL WASTE
ROCK STORAGE
FACILITY
WASTE ROCK
STORAGE
FACILITY
WHALE TAIL
LANDFILL
ST-WT-3
WRSF POND
WRSF
DIKE
WATER
TREATMENT
PLANT
185
183
182
181
WHALE TAIL LAKE
(NORTH BASIN)
ST-WT-10
CLOSED
FACILITIES
WATER
TREATMENT
PLANT
HAUL ROAD
ST-WT-9
MAMMOTH CHANNEL
CULVERT
MAMMOTH
DIKE
MAMMOTH
LAKE
DIFFUSER
MAMMOTH LAKE

LEGEND

- WATER QUALITY MONITORING STATION
- CLOSED FACILITY
- ROAD
- TEMPORARY ROAD
- SCARIFIED ROAD AND ACCESS
- CULVERT
- FRESHWATER PIPE
- DIKE
- POND/SUMP
- ARCHAEOLOGICAL SITE
- NATURAL WATERSHED
- WATERBODY
- WATERCOURSE

REFERENCE

1. INFRASTRUCTURE OBTAINED FROM AGNICO EAGLE MINES LIMITED FROM 6108-600-210-004_R2(2029)s.dwg.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM PHOTOSAT
DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

400 0 400
METRES

PROJECT
AGNICO EAGLE

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION
WHALE TAIL PIT PROJECT

TITLE

SITE LAYOUT AND MONITORING PLAN (YEAR 11: 2029)

Golder Associates

PROJECT		1541520	FILE No.	
DESIGN	CP	17 May 2017	SCALE AS SHOWN	REV. 0
GIS	MH	17 May 2017		
CHECK	JR	17 May 2017		
REVIEW	CP	17 May 2017		

FIGURE 2-4

Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\99_PROJECTS\1541520_FEIS\02_PRODUCTION\FEIS\MXD\2300_Water_QualityReport\20171541520_FIG_2-4_SITE_LAYOUT_MONITORING_PLAN_2029.mxd

SECTION 3. MONITORING PROGRAM

The monitoring program is presented in three sections; requirements of the CM program, an overview of the event monitoring program, and then details of the adaptive management program for monitoring results.

3.1 COMPLIANCE MONITORING PROGRAM

The CM program monitors the chemistry of mine contact water and diverted water at specified locations prior to the release into the receiving water environment in order to confirm and document compliance with regulatory requirements. The types of water and the timing of the CM program include:

- non-contact water discharged from diversion ditches during operations, and closure phases of the mine and eventually non-contact water from dike seepage;
- mine contact water directed to and discharged from the Whale Tail Pit Attenuation Pond during the operations phase of the mine;
- monitoring points located within the pit lakes before and after the dikes have been breached during the post-closure phase of the mine life; and
- runoff from Waste Rock Storage Pond prior to discharge from Mammoth Lake. .

The CM sampling program has multiple monitoring stations across the project site, with sampling at different stages of the mine life. All of the CM stations, a description of their location, parameters to be monitored and sampling frequency are listed in Table 3-1. Specific details for the monitoring parameter groups are provided in Table 3-2 and are the same as 2AM-MEA1525 Type A Water Licence Schedule I, Table 1. In summary, 5 groups of parameters include:

- Group 1 – mine site monitoring parameters;
- Group 2 – receiving environment parameters consistent with the CREMP and applied to all AEMP stations (including ground water monitoring); includes dissolved metals for hydrogeological monitoring and to be protective of the aquatic environment;
- Group 3 – sampling prior to discharge; includes MMER parameters plus sulphate, turbidity and Aluminum;
- Group 4- sampling prior to discharge at secondary containment fuel storage areas; and
- MMER

Figures 2-1 to 2-4 show the approximate location of the sampling sites at the Whale Tail Pit area. The actual location of each sampling site is determined by access and safety considerations and will be marked by a stake that defines the exact location of the collection point for sampling events with appropriate attached signage in English, Inuktitut and French.

GPS coordinates for all compliance monitoring stations will be confirmed with the INAC water inspector.

3.1.1 General Sampling and Analysis Program

Samples are collected in clean laboratory-supplied containers and preserved as directed by the analytical laboratory. During all phases, samples are analyzed offsite at an accredited commercial lab (ALS in Burnaby BC, Maxxam Analytics in Montreal or Multi-Lab Direct in Val d'Or).

Table 3-3 summarizes the minimum sample volumes, container, preservation, and holding times for each analyte. This information is from the *USEPA Methods for Chemical Analysis of Water and Waste Water* (*EPA-600/4-79-020, 1979*).

Table 3-1: Monitoring Program

Station	Description	Phase	Monitoring Parameters	Frequency
ST-DC-1 to TBD	Monitoring stations during dike construction as defined in the Whale Tail Water Quality Monitoring and Management Plan for Dike Construction and Dewatering (November 2016)	Construction	As defined in Final Water Quality Monitoring and Management Plan for Dike Construction and Dewatering referred to in Part D, Item 5	As defined in Final Water Quality Monitoring and Management Plan for Dike Construction and Dewatering referred to in Part D, Item 5
ST-DD-1 to TBD	Monitoring stations during dike construction as defined in the Whale Tail Water Quality Monitoring and Management Plan for Dike Construction and Dewatering (November 2016)	Construction	As defined in Final Water Quality Monitoring and Management Plan for Dike Construction and Dewatering referred to in Part D, Item 5	As defined in Final Water Quality Monitoring and Management Plan for Dike Construction and Dewatering referred to in Part D, Item 5
ST-S-1 to TBD	Seeps (to be determined)	Operations	1	Monthly or as found
		Closure	1	Monthly or as found
ST-GW-1 to TBD	Groundwater wells (to be determined) as required under Groundwater Monitoring Plan (FEIS, Volume 8, Appendix 8-E.3)	Operations	2	Annually
		Closure	2	Annually
ST-WT-1	Attenuation Pond, pre-treatment	Operations	1	Four times per calendar year
ST-WT-2	Attenuation Pond, post-treatment; last point of control before discharge	Operations	Volume (m^3)	Weekly during discharge
			Field Measurements	Weekly during discharge
			1	Weekly during discharge
			1-MMER effluent characterization	Four times per calendar year
			3-MMER acute toxicity	Once per month during discharge
			3-MMER sublethal toxicity	Two times per calendar year
ST-WT-3	WRSF Pond prior to pumping to Attenuation Pond	Operations	1	Four times per calendar year, when water is present
		Closure	1	Four times per calendar year, when water is present
	WRSF Pond prior to discharge to Mammoth Lake	Post-closure	1	Four times per calendar year, when water is present
ST-WT-4	Whale Tail Pit or pit sump	Operation	1	Four times per calendar year, when water is present
ST-WT-5	Water intake from Nemo Lake	Construction	Volume (m^3)	Monthly
		Operations	Volume (m^3)	Monthly
ST-WT-6	Lake A47	Construction	2	Monthly during open-water
		Operations	2	Monthly during open-water
		Closure	2	Monthly during open-water
ST-WT-7	East diversion channel	Operations	3	Three times (freshet, summer, fall) per calendar year
ST-WT-8	Water intake from Whale Tail Lake	Closure	Volume (m^3)	Monthly
ST-WT-9	North Whale Tail Lake (as the basin fills and when it is connected to the south basin and prior to or when connected to the downstream environment)	Closure	1	Four times per calendar year
		Post-closure	2	Four times per calendar year, when water is present
ST-WT-10	Pit Lake (as the pit fills)	Closure	2	Four times per calendar year
		Post-closure	2	Four times per calendar year

Station	Description	Phase	Monitoring Parameters	Frequency
ST-WT-11	Sewage treatment plant	Operations	1	Four times per calendar year
		Closure	1	Four times per calendar year
ST-WT-12	Secondary containment at Whale Tail Bulk Fuel Storage Facility	Operations	4	Prior to discharge or transfer of effluent
		Closure	4	Prior to discharge or transfer of effluent
ST-WT-13	Lake A45	Operations	3	Flow, Monthly during open-water
		Closure	3	Flow, Monthly during open-water until water levels have returned to baseline levels
ST-WT-14	Lake A16 outlet	Construction	2	Monthly during open-water
		Operations	2	Monthly during open-water
		Closure	2	Monthly during open-water
ST-WT-15	Lake A15	Construction	2	Monthly during open-water
		Operations	2	Monthly during open-water
		Closure	2	Monthly during open-water

Table 3-2: Monitoring Parameters

Group	Parameters
1	pH, turbidity, hardness, alkalinity, ammonia nitrogen, total metals (aluminum, arsenic, barium, cadmium, chloride, chromium, copper, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, nitrite, nitrate, selenium, silver, thallium, zinc), sulphate, total dissolved solids (TDS), TSS, total cyanide. If CN total is detect in an analysis result; further analysis of CN Free and CN WAD will be trigger.
2	**Total and Dissolved metals:** aluminum, antimony, arsenic, boron, barium, beryllium, cadmium, copper, chromium, iron, lithium, manganese, mercury, molybdenum, nickel, lead, selenium, tin, strontium, titanium, thallium, uranium, vanadium and zinc **Nutrients:** Ammonia-nitrogen, total kjeldahl nitrogen, nitrate nitrogen, nitrite-nitrogen, ortho-phosphate, total phosphorous, total organic carbon, total dissolved organic carbon and reactive silica; **Conventional Parameters:** bicarbonate alkalinity, chloride, carbonate alkalinity, conductivity, hardness, calcium, potassium, magnesium, sodium, sulphate, pH, total alkalinity, TDS, and TSS, turbidity; Total cyanide and free cyanide. If CN total is detect above 0.05 mg/L in an analysis result for monitoring station in receiving environment; further analysis of CN WAD will be trigger.
3	MMER parameters (total cyanide, arsenic, copper, lead, nickel, zinc, radium 226, total suspended solids, pH), sulphate, turbidity and total aluminum.
4	Total Arsenic, Total Copper, Total Lead, Total Nickel, TSS, Benzene, Toluene, Ethylbenzene, Xylene, TPH, pH
MMER	Total cyanide, arsenic, copper, lead, nickel, zinc, radium 226, total suspended solids, pH, effluent volumes and flow rate of discharge, acute toxicity (Rainbow Trout and Daphnia magna) and environmental effects monitoring (EEM).

Table 3-3: Summary of Sampling Requirements for each Analyte

Parameter	Minimum Volume (ml)	Bottle Type	Preservation	Holding Time
pH	250	250 mL, glass or plastic, filled to the top	4˚C	Analyze immediately
Conductivity	125	250 mL, glass or plastic	4˚C	28 days
Hardness	250	250 mL plastic, filled to the top	4˚C, HNO_3	6 months
Oil and Grease (total)	1000	1 L amber glass	4˚C, H_2SO_4	28 days
Turbidity	125	250 mL, glass or plastic	4˚C	48 hours
Total Dissolved Solids (TDS)	125	250 mL glass	4˚C	7 days
Total Suspended Solids (TSS)	125	250 mL glass	4˚C	7 days
Total Alkalinity	250	250 mL, glass or plastic, filled to the top	4˚C	14 days
Bicarbonate Alkalinity	250	250 mL, glass or plastic, filled to the top	4˚C	14 days
Carbonate Alkalinity	250	250 mL, glass or plastic, filled to the top	4˚C	14 days
Total Cyanide	125	250 mL, glass or plastic	4˚C, NaOH	14 days
Free Cyanide	125	250 mL, glass or plastic	4˚C, NaOH	14 days
Benzene, Toluene, Ethylbenzene & Xylene (BTEX)	40 (per vial)	3 X 40 mL, glass, filled to the top	4˚C	7 days
Total Petroleum Hydrocarbons(TPH)	1000	1L, glass	4˚C, H_2SO_4	28 days
Total Metals (ICP-MS) (Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Cadmium, Cobalt, Copper, Chromium, Iron, Lithium, Manganese, Mercury, Molybdenum, Nickel, Lead, Selenium, Tin, Strontium, Titanium, Thallium, Uranium, Vanadium, Zinc, Potassium, Magnesium, Sodium)	125	250 mL plastic	4˚C, HNO_3	6 months
Dissolved Metals (Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Cadmium, Cobalt, Copper, Chromium, Iron, Lithium, Manganese, Mercury, Molybdenum, Nickel, Lead, Selenium, Tin, Strontium, Titanium, Thallium, Uranium, Vanadium, Zinc)	125	250 mL plastic	4˚C, Filtered on-site, HNO_3	6 months
Ammonia-nitrogen	250	250 mL, glass or plastic, filled to the top	4˚C, H_2SO_4	28 days
Total kjeldahl nitrogen	250	250 mL, glass or plastic, filled to the top	4˚C, H_2SO_4	28 days
Nitrate nitrogen	125	250 mL, glass or plastic	4˚C	48 hours
Nitrite nitrogen	125	250 mL, glass or plastic	4˚C	48 hours
Ortho-phosphate	125	250 mL, glass or plastic	4˚C	14 days
Total phosphorous	125	250 mL, glass or plastic	4˚C, H_2SO_4	28 days
Total organic carbon	125	250 mL glass	4˚C, H_2SO_4	28 days
Dissolved organic carbon	125	250 mL glass	4˚C, H_2SO_4	28 days
Chloride	125	250 mL, glass or plastic	4˚C	28 days
Fluoride	125	250 mL plastic	4˚C	28 days

Parameter	Minimum Volume (ml)	Bottle Type	Preservation	Holding Time
Sulphate	125	250 mL, glass or plastic	4˚C	28 days
Radium 226	500	1L plastic	4˚C, HNO_3	1 month
Reactive Silica	250	500 mL, plastic	4˚C	28 days

3.1.2 Compliance Monitoring Stations and Discharge Criteria

Consistent with similar mining operation (i.e. Meadowbank Mine) further details of the specific CM stations and discharge criteria will be established for Whale Tail Pit Project according to hte .

3.1.2.1 *Construction and Dewatering Activities*

In order to mine the Whale Tail Pit, a series of dikes will be built to isolate the pit from the surrounding water bodies. The document "*Whale Tail Pit Project Water Quality Monitoring and Management Plan for Dike Construction and Dewatering"* (January 2016) will be followed for the Project to specifically address the monitoring requirements for these activities (Refer to Section 3 of that plan).

3.1.2.2 *Erosion Control and Water Collection System*

A water collection system comprised of ditches, sumps, attenuation pond, and open pit is proposed to control surface water for the Project. Water that may potentially come into contact with waste rock or contaminated material is segregated from non-contact water and collected in the Attenuation Pond and treated, if necessary, prior to discharge into the receiving environment.

The design of the ditches is based on the assumption that drainage can be achieved by gravity flow; the design for the sumps and ponds assumes that all inflows can be collected by gravity. As a result, this infrastructure is considered as low maintenance. However, regular monitoring during freshet (the snowmelt, thawing) and during heavy or prolonged rainfall to identify any erosional or stability issues with regards to:

- The configuration or structure of channels, due to localized thawing, local ground instabilities, subsidence and transport of fine particles;
- The free flow of water, due to an accumulation of ice, sediments and other debris; and
- Potential damage to retention structures and monitoring of seepage.

Maintenance operations consist of cleaning accumulated sediments and debris from the ditches and culverts, and repairing damaged areas as soon as possible.

During pit flooding, samples will be taken in representative locations of the pit that is being re-flooded. It is likely that the sampling sites will change based on mine sequencing and as the water level in the pits rise in response to flooding.

The following is a list of the various areas of the water collection system where samples for the compliance monitoring program will be collected:

- Whale Tail Pit area ditches, sumps, ponds, and pit lake (ST-WT-1, ST-WT-3, ST-WT-4, ST-WT-7, ST-WT-10, ST-WT-13).

Effluent discharged from the Whale Tail Pit Attenuation Pond at CM station ST-WT-2 is directed to Mammoth Lake through the Whale Tail Pit diffuser. Agnico Eagle proposes that discharge from Mammoth Lake shall not exceed the proposed effluent quality limits stipulated Table 3.4 based on criteria established in 2AM-MEA1525 Type A Water License.

Table 3-4: Proposed Effluent Criteria

Parameter	Maximum Average Concentration	Maximum Allowable Grab Sample Concentration
pH	6.0 to 9.0	6.0 to 9.0
TSS (mg/L)	15	30
TDS (mg/L)	1400	1400
Turbidity (NTU)	15	15
Total (T)-Al (mg/L)	1.5	3.0
Dissolved (D)-Al (mg/L)	1.0	2.0
T-As (mg/L)	0.1	0.2
T-Cd (mg/L)	0.002	0.004
T-Cu (mg/L)	0.1	0.2
T-Hg (mg/L)	0.004	0.008
NH_3-N (mg/L)	20	40
T-Ni (mg/L)	0.2	0.4
T-NO_3-N (mg/L)	50	100
T-Pb (mg/L)	0.10	0.20
T-P (mg/L)	1.5	3.0
T-Zn (mg/L)	0.2	0.4
T-Cl- (mg/L)	500	1000

Effluent discharged from CM station ST-WT-2 shall be demonstrated to be non-acutely lethal, as stipulated in Schedule 1 of the water license. The following are the toxicity tests that are performed:

- Reference Method for Determining Acute lethality of Effluents to Rainbow Trout EPS 1/RM/13 Second Edition December 2000 (with May 2007 amendments); and
- Biological Test Method; Acute Lethality Test Using Daphnia spp. EPS 1/RM/11 July 1990 (with May 1996 amendments).

All water collected within the non-contact water diversion system during operations at CM stations ST-WT-7 and ST-WT-13 shall not exceed the effluent quality limits presented in Table 3-5.

Table 3-5: TSS Criteria at CM Statons ST-WT-7 and SW-WT-13

Parameter	Maximum Average Concentration (mg/L)	Maximum Allowable Grab Sample Concentration (mg/L)
TSS	15	30

3.1.2.3 *Waste Rock Storage Facility*

Waste rock from the open pit not used for site development purposes will be trucked to the Whale Tail Pit Waste Rock Storage Facility. This area will be re-flooded at closure. Monitoring in these areas is included in the CM water collection system discussed in Section 3.1.2.2.

Samples will be collected at Whale Tail Pit waste rock storage facility if water is observed at these areas (ST-WT-4) for the compliance monitoring program

3.1.2.4 *Support Facilities*

Whale Tail Pit Camp and Site

A sewage treatment plant will be in operation at the Whale Tail Camp. Discharge from the plant will be directed to the Whale Tail Pit Attenuation Pond and then discharged through the Whale Tail Pit Diffuser. Water quality monitoring for this facility is included in the CM water collection system.

Construction debris and domestic waste generated on-site to be disposed of to the on-site landfill located in the Whale Tail WRSF.

Fuel storage at the Whale Tail site will be similar to that at Meadowbank Mine. There will be one above ground storage tank with approximately 500,000 litres capacity. The Whale Tail Bulk Fuel Storage Facility will be located east of the Whale Tail Camp adjacent to the mine operations haul road. Water collected within the fuel containment facilities will be discharged to land, when necessary, in a controlled manner. It is proposed that Effluent from the fuel containment facilities being discharged to land (sampled as ST-WT-11) shall not exceed the effluent quality limits presented, as stipulated in Part F, Item 8 of the 2AM-MEA1525 Type A Water License.

3.1.2.5 *Whale Tail Pit Haul Road and Quarries*

Whale Tail Pit Haul Road and Quarries

The 64.1 km long exploration access road from Vault to the Amaruq exploration camp site will be expanded in width (from 6.5 m to 9.5 m) and upgraded to a haul road. Road surfacing will be constructed using non-potentially acid generating (NPAG) Vault waste rock and aggregates from the quarry sites and esker material. Approved borrow sources will be used for construction of the access road and will be used to expand the access road to a haul road; some of these will remain open for the duration of the mine to service the road. Monitoring procedures along the Whale Tail Pit Haul Road and quarries include visual inspections of infrastructure and water quality sampling.

Visual Inspections

The watercourse crossing visual inspection and maintenance program is designed to identify issues relating to watercourse crossings structural integrity and hydraulic function. It has two main objectives:

1) Visual inspection of its infrastructure to identify defects, cracks or any other risks to structural integrity. Particular attention will be paid to the inlet and outlet structures of culverts, and to bridge abutments and their foundations, as required. This inspection is conducted annually by a geotechnical engineer.

2) Visual inspection to identify sediment or other debris accumulation impeding the free flow of water through the crossings. Maintenance operations will consist of hand removal of accumulated debris and repairing damages as soon as possible. Visual inspection of upstream and downstream channels to identify bed erosion or scour around the watercourse crossing structure. Particular attention is to be paid to bridge abutments and abutment foundations as they are vulnerable to scour and erosion. This inspection is conducted weekly during freshet and post freshet season, by a member of the environmental team.

Results of these inspections are reported in the Agnico Eagle annual report.

Water Quality Monitoring

In 2014 and 2016, a geochemical characterization study was completed for esker material from potential

borrow source locations between Vault and Whale Tail Pit, as well as NPAG waste rock from the Vault WRSF. The results indicate that the materials tested are suitable for construction use and are not expected to cause any adverse water quality issues. Vault waste rock with a total sulphur content below 0.2% will be selected in order to avoid use of PAG material.

If issues are observed or a spill occurred near a water course during the winter a full suite of water quality sampling is conducted along the Whale Tail Pit Haul Road at areas of concern. This includes:

- Any significant water seeps and/or water ponded in contact with the road. Other criteria for selecting a sampling location include: areas of evident rock staining (rust color particularly) and areas where an accidental spill has previously occurred.
- Upstream and downstream from the major road stream crossings in order to confirm there are no water quality issues resulting from these crossings or the adjacent road rock fill.

Should the results indicate a significant change in water quality from previous years or elevated risks to aquatic life, further water quality monitoring will be conducted at those specific locations to determine the cause and notification will be provided to regulatory authorities. An action plan will be developed and implemented should the results indicate issues. The results for all access road water quality monitoring are reported in the Agnico Eagle Annual Report to regulators.

3.1.2.6 *Groundwater*

The *Groundwater Monitoring Plan* (FEIS, Volume 8, Appendix 8-E.3) describes the groundwater monitoring plan for the Project. Water quality in the groundwater wells will be monitored in accordance with the sampling requirements for CM stations ST-GW-1 to TBD. Groundwater data is used to predict the quality of water accumulating in open pits, and to determine any effects of mining on groundwater quality.

3.1.2.7 *Receiving Environment*

Receiving water quality monitoring is discussed in Section 1A of the A*quatic Effects Management Program (AEMP) (November 2015*). Within the AEMP are numerous monitoring programs: of greatest emphasis for the protection of the aquatic environment are the core receiving environment monitoring program (CREMP), Environmental Effects Monitoring studies and targeted monitoring programs (FEIS, Volume 8, Appendix 8-E.2).

The core monitoring program includes three areas of sampling stations that surround each of the mine developments (near field, mid field and far field) for early detection of mine-related impacts. The monitoring program is summarized in Table 6.1 of the CREMP and includes: water quality, sediment chemistry, benthos, periphyton, phytoplankton, and fish monitoring (as part of EEM and fish habitat compensation monitoring), the parameters to be measured, sampling locations, sampling frequency, sampling methods, and criteria for data evaluation. Targeted studies are limited in scope and intended to address “specific questions related to particular components of mine development during construction and operation.”

Monitoring locations for the effluent diffuser for Mammoth Lake will be located at the edge of the diffuser mixing zone either within the CREMP core near-field sampling zones or as separate monitoring locations, depending upon the final location of the diffuser.

3.2 EVENT MONITORING

The Event Monitoring (EM) program addresses the site specific monitoring that is required following any accidental release. A “release” may be caused by:

- Spills, including unidentified seepage (Spill Contingency Plan; FEIS, Volume 8, Appendix 8-D.6); or
- Emergencies (Emergency Response Plan; FEIS, Volume 8, Appendix 8-D.3);

The EM program is designed to verify whether contamination of the surface soil, nearby receiving environment and active zone has occurred as a result of an accidental release of a hazardous material or contaminated water, through monitoring of surface runoff and nearby receiving environment following remediation of any release. It is anticipated that owing to the presence of permafrost beneath most of the mine footprint, there will be minimum impact to groundwater. A complete list of hazardous materials use during operations of the mine is provided in the *Hazardous Materials Management Plan* (FEIS, Volume 8, Appendix 8-D.4).

The EM plan is developed on a site specific basis subsequent to a spill or other incident, and considers the type of product spilled, the potential receptors and the potential for any remaining contamination after clean up. The plan is done in coordination with the Environmental Superintendent as described in the *Spill Contingency Plan (*FEIS, Volume 8, Appendix 8-D.6*).*

In the event of an accidental release, the water quality of the downstream receptor and possibly upstream of the receiving point, if any, is to be sampled (during the ice-free season) and analyzed. Should the spill have happened over snow cover, water and possibly soil sampling is to take place at the earliest feasible time after thaw to verify if there has been any impact to the receiving water or soil quality. The specific parameters monitored as part of the EM program will depend on the nature of the spill, and will be determined for the specific hazardous material released.

EM monitoring will occur following the clean-up of a release and the frequency of sampling will depend on the type of material spilled (wet or dry spill), the environment into which the chemical was released (surface water body or soil; frozen or thawed), the quantity of spill material and the status of remediation/clean up measures that were initiated. The EM program for a particular spill will cease upon obtaining satisfactory analytical results (within 20% of background level, to accommodate for analytical accuracy) from the potentially affected areas or as required by regulators.

3.3 ADAPTIVE MANAGEMENT PROGRAM

Results of the water quality monitoring are to be reviewed by the Environmental Department and chemical trends of constituents of interest are tracked for mine site monitoring and in the AEMP data (including the CREMP) to allow early detection of significant changes in water quality within the mine site prior to discharge, or if thresholds and triggers are exceeded in the receiving environment. Action plans are then to be implemented to ensure that environmental protection objectives are met.

An adaptive management program has been designed for the Project to evaluate the monitoring data and provide a framework for action, if necessary. This program is consistent with the program in use at the Meadowbank Mine. The program has two levels - a trigger level to compare the monitoring data against, and an action plan of mitigative measures for identified exceedances.

The adaptive management program is divided into two sections, one for parameters with regulated discharge criteria at specific monitoring locations, as specified in the water license and by the Metal Mining Effluent Regulations (MMER). The second section is for measured parameters for which no discharge limits have been identified in the water license (i.e. CREMP monitoring).

3.3.1 Adaptive Management Program for Regulated Discharge

3.3.1.1 *Action Plan*

In the case of an exceedance of an NWB license limit or MMER discharge limit an action plan will be implemented. The adaptive management program requires that if one or more of the key monitored parameters exceed the respective limits, a staged sequence of responses will follow. Table 3-6 summarizes the staged adaptive action plan for the CM program for regulated discharge. Figure 3-1 is a logic diagram showing the decision path for evaluating analytical results for regulated discharge.

Should the TSS value (measured value or calculated from turbidity measurements) of non-contact water at any time during the construction, operation, or closure phases at the Portage mining area exceed regulatory guidelines, the water will be discharged to the TSF South Cell until the cause of the exceedance can be identified and the situation rectified.

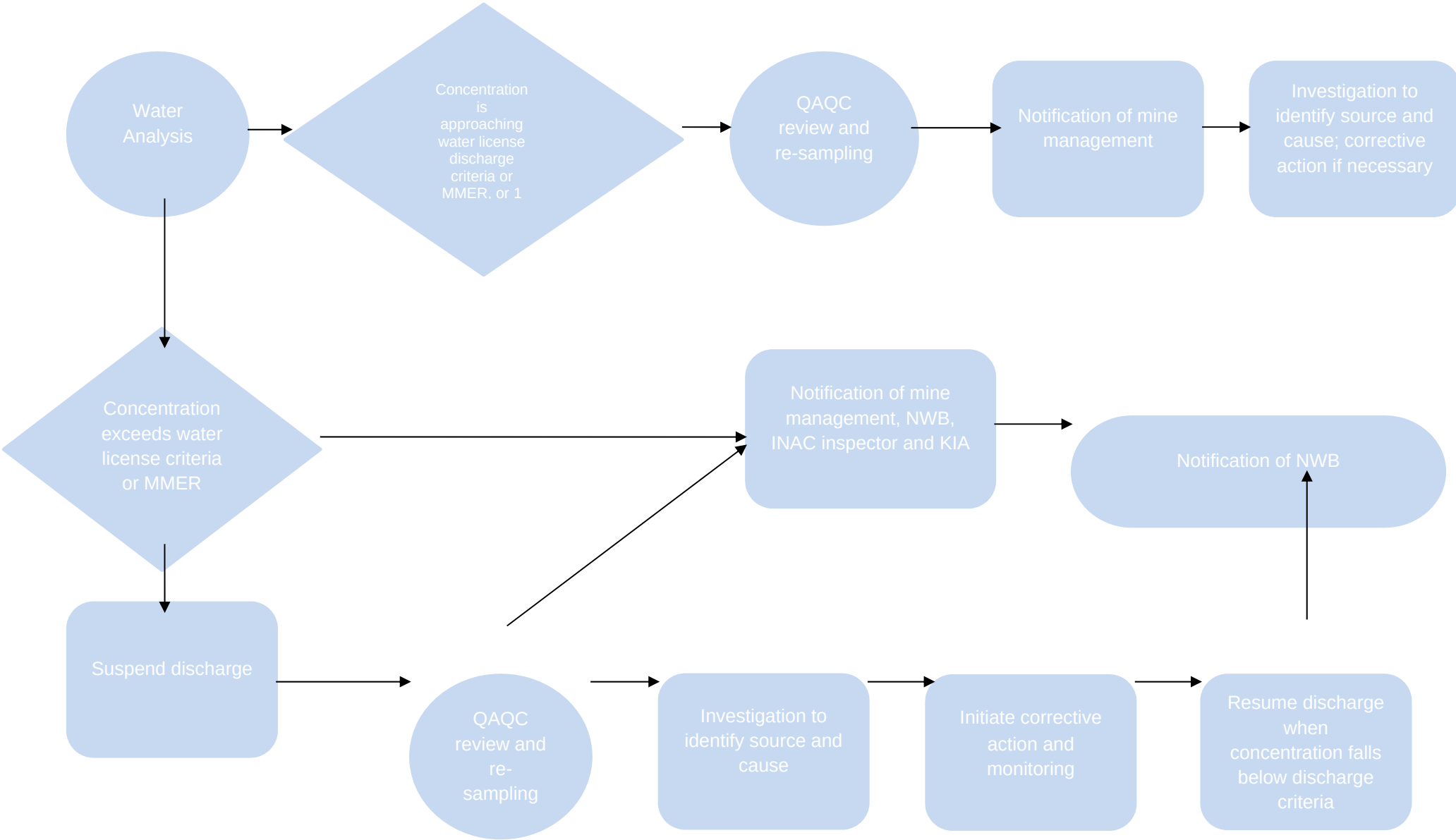
In addition to the mitigative measures listed above, a number of other possible alternatives are available to reduce or treat contaminants. These mitigation measures include:

- Best management practices for sediment and erosion control would be employed to reduce TSS concentrations, i.e. flow control, sedimentation basin construction, etc;
- Addition of a coagulant for the reduction of TSS in pond water;
- Use of geotextile or re-armoring of banks to filter and reduce TSS in pond/ditch water;
- Deployment of absorbent booms and/or barriers within ponds to isolate surface petroleum hydrocarbon films for removal and/or treatment;
- Adjustments to on-site sewage treatment for the reduction of BOD and E. coli concentrations;
- Injection of oxygen or aeration for the reduction of ammonia;
- Addition of lime to increase a low pH value or reduce metal concentrations; and/or
- Removal of the offending source rock or the prevention of surface waters coming into contact with the offending source rock in the case of ARD.
- Development and Implementation of a Whale Tail Pit specific *Freshet Action Plan* to proactively identify any additional seeps around areas of concern; conduct additional monitoring, and control and contain seepage on site.

Table 3-6: Action Plan for Regulated Discharge

Example	Action Plan
Exceeds water license discharge criteria or MMER	- Suspension of discharge activities; - QA/QC review and analysis, and re-sample water at the particular location if necessary; - Notification of mine management (General Mine Manager and Environment Superintendent) and the Nunavut Water Board, the INAC Water Resources water license inspector and the Kivalliq Inuit Association; - Investigation to identify possible source(s) and cause(s) of the exceedance; - Initiation of corrective actions or water treatment, and follow up monitoring; and - Resumption of discharge when concentrations are below the discharge criteria

Figure 3-1: Logic Diagram for Regulated Discharge



3.3.2 Adaptive Management Program for Non-Regulated Discharge

Aside from targeted monitoring studies (i.e. “Effects Assessment Studies”) such as those commissioned following dike construction, the CREMP is the main program aimed at measuring and assessing potential impacts of contaminants in the receiving aquatic environment that are not regulated under MMER or NWB.

This program was designed to take an integrated, ecosystem-based approach that links mitigation and monitoring of physical/chemical effects on key ecological receptors in the receiving environment. It addresses key issues identified in the Environment Assessment (i.e., mining-related activities with the potential to affect water quality, fish habitat and fish populations). Monitoring results are intended to inform the “adaptive management” process, supporting the early identification of potential problems and development of mitigation options to address them by comparing results to established threshold and trigger levels.

3.3.2.1 *CREMP Threshold and Trigger Levels*

As described in the CREMP 2015 Design Document (Azimuth, 2015) trigger levels were developed to facilitate adaptive management of potential water quality issues in the receiving environment. These criteria were developed with the assumption that action will be considered before certain monitored parameters reach levels that cause or have the potential to cause adverse effects to aquatic biota. The criteria for action provide an early warning framework under which management responses may be considered, taking into account findings from other AEMP component programs. Two types of criteria were developed:

- Thresholds are legal requirements, regulatory guidelines (e.g., CCME), or other discrete benchmarks, below which unacceptable adverse effects are not expected and above which adverse effects may occur. If effects-based thresholds do not exist or are not warranted for a particular variable, then early warning triggers (based on statistical criteria) will be developed without thresholds.
- Triggers are early warning criteria that may lead to action. Exceedance of a trigger value does not necessarily imply that an adverse effect may be expected. For variables with a threshold, the trigger was set as the maximum of either the value halfway between the baseline median and the threshold, or the 95th centile of the baseline data. For variables without thresholds, triggers were set equal to the 95th centile of the baseline data except in cases where less than 5% of the data exceeded the current detection limit (DL), in which case the trigger was set to two times the DL.

Thresholds were established for 22 variables based on water quality guidelines (e.g. CCME). Variables include total metals, dissolved metals, nutrients and conventional parameters.

Water chemistry data is collected up to six months per year (April, May, July, August, September and November/December) for the annual period of paired sampling to support Before/After Control/Impact statistical analyses, recognizing that in any given year the actual number of samples collected may range from four to six depending on logistical constraints (e.g. snow and ice). Sampling is limited to open water months only for PDL (reference station) and Baker Lake stations. Two randomly located subsamples are collected at each station each month and all samples are 3 m from the surface. In addition, basic water quality data is collected at key near-field areas at least once mid-winter to reduce uncertainty regarding the potential occurrence of change over winter.

Annual average concentrations (6-month mean) are compared to trigger values to determine need for action (rather than results from individual sampling events).

Further information on the development of thresholds and triggers is provided in the CREMP 2015 Design Document (Azimuth, 2015). Thresholds and triggers were also established for sediment chemistry and critical effect sizes were established for biological variables under the CREMP program.

3.3.2.2 *Action Plan*

A management response plan (MRP) has been developed for the AEMP (Azimuth, 2015), of which the CREMP is one component. The general MRP for the AEMP is shown in Figure 3.2. Following the integration of the results from each independent program, the response actions are based on the cumulative results of all programs. Therefore, while we expect management actions to be taken in cases where criteria for action are exceeded, the specific actions are not linked to outcomes of the CREMP alone because the CREMP is only one of the monitoring programs under the AEMP. In other words, it is not possible or appropriate to describe the specific management actions that will be taken when CREMP triggers or thresholds are exceeded.

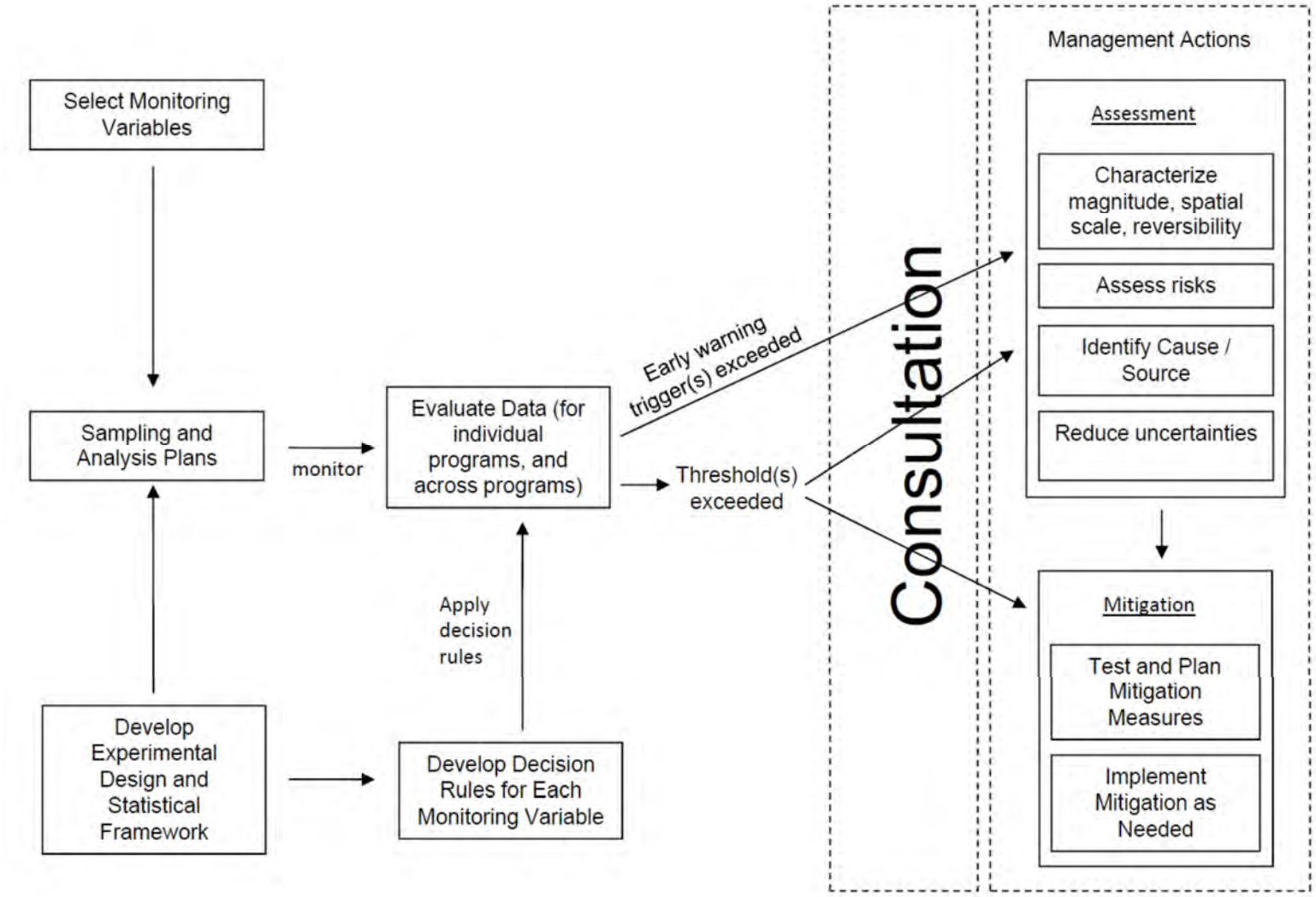
Nevertheless, there are two general classes of management actions – those aimed at further assessment and those aimed at mitigation. In general, exceedance of early warning triggers will trigger further assessment, which may then lead to mitigation, whereas exceedances of thresholds could possibly lead directly to mitigation. It is expected that CREMP triggers will be exceeded occasionally due to chance (given the large number of variables that are monitored, particularly for water chemistry), therefore further assessment will almost always be important.

The specific management action that would be appropriate in a given case depends on the underlying cause. For example, if a metal becomes elevated in receiving water, the identification of options for further assessment and/or mitigation options would be different if the source of the metal is groundwater versus effluent versus dust. The timing of management actions is also case-specific. In cases where further assessment is warranted, that assessment should begin as soon as practically possible. In cases where mitigation is considered, mitigation should begin as soon as the weight of evidence indicates that mitigation is warranted, and the benefits of commencing mitigation immediately outweigh the disadvantages of waiting for further information. Consultation with regulators and stakeholders is important for determining management actions (see Azimuth, 2015).

Further details on the integrated aquatic effects action plan are provided in Azimuth, 2015.

The general staged sequence of responses for triggered parameters is summarized in Figure 3.2 below.

Figure 3-2: Logic Diagram for Non-Regulated Discharge



SECTION 4. FLOW VOLUMES

Flow volumes within the mine footprint will be measured daily during periods of discharge. Flow volume measurements will be conducted using volumetric flow meters attached to applicable pumps. For permanent pumping arrangements, these flows will be measured using permanent in-line flow meters, such as fresh and reclaim water pumping systems. For periodic batch discharges, such as secondary containment sumps, portable flow meters or calculated pump time and capacity methods will be used. If needed, seepage collection ditches flows may be measured using either flow measuring weirs or using stream gauging methods.

Detailed pump records are maintained including date, pond/sump number, receiving location of pumped water, pump ID, duration of pumping, and total volume pumped. The average flow rates, total discharge per event and total cumulative discharge will be reported annually.

Monitoring locations of the Whale Tail Pit area will be determined based on conditions of the water licence. Monitoring locations for water flow volumes may include:

- The volume of fresh water obtained from any source for domestic, industrial, or re-flooding;
- The volume of effluent and fresh water transferred to the pits lakes;
- The volume of water discharged from the Attenuation Pond to a diffuser;
- The flow during periods of discharge from the sewage treatment plant, area sumps collecting contact water, the landfills and waste Rock Storage Facility; and
- The volume of water discharged from the marshalling area bulk fuel storage facility.
- Volume of influent water to the pits during re-flooding – estimated freshet inflow

The intervals of pumping for contact water at Whale Tail Pit are listed in Table 4-1 below.

Table 4-1: Intervals of pumping for Surface Water, Mine Operation Period

Pumped from	Pumped to
Whale Tail Industrial Sector (Year 1 to Year 4)	Whale Tail Attenuation Pond
Whale Tail Ore Stockpile (Year 1 to Year 4)	Whale Tail Attenuation Pond
Whale Tail Waste Rock Storage Facility Pond (Year 1 to Year 4)	Whale Tail Attenuation Pond
Whale Tail Open Pit Sumps (Year 1 to Year 4)	Whale Tail Attenuation Pond

SECTION 5. REPORTING

Reporting of water quality results is to be conducted on two levels a) monthly and annually with the results of the monitoring program and per MMER requirements and b) in response to exceedances.

5.1 ANNUAL REPORTING

All water quality monitoring results will be compiled into a brief monthly report, and sent to the Nunavut Water Board (NWB), the Indigenous and Northern Affairs Canada (INAC) Water License Inspector and to the Kivalliq Inuit Association (KIA). These reports are due within 30 days of the end of the month being reported on.

An annual report is to be submitted to the NWB, KIA, Department of Fisheries and Oceans, Indigenous and Northern Affairs, Nunavut Impact Review Board, Government of Nunavut, and other interested parties by March 31st of the following year. The report is to summarize the following:

- Monitoring results for each sampling station during the year and for the life of mine (construction to end of closure); activities during the year at each station; and any exceedances at stations, the action plan applied to the exceedance, and the results of the action plan;
- Annual seep water chemistry results; including location of the samples, sources of the water collected, and results of chemical analyses of the samples;
- Annual groundwater monitoring results; activities during the year at each well site and record of well operations, well replacement, and proposed drilling for the next year; and installation details of new wells and identification of any abandoned or destroyed wells.
- Receiving water monitoring results;
- Spills and any accidental releases; event monitoring activities conducted following containment, remediation, and reclamation; and the results of EM program, any exceedance in EM results, and the action plan following the exceedance;
- Measured flow volumes;
- Effluent flow rates, volumes and calculated chemical loadings following the requirements of MMER; and
- Results of QA/QC analytical data.

5.2 EXCEEDANCE REPORTING

Any measured concentration at a CM station exceeding a regulated discharge criterion stipulated in the water license or MMER will be reported to the NWB and Environment Canada upon receipt of the analysis. In addition, results of the action plan will be reported and, where necessary, mitigation options identified within 90 days after receipt of the analyses.

Exceedances in the concentration of a parameter in receiving water will be reported as specified in the AEMP and EEM – MMER accordingly.