Prepared for:

AGNICO EAGLE

WHALE TAIL PIT EXPANSION PROJECT

Attenuation Pond Alternatives Assessment Report

December 2019

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Agnico Eagle Mines Limited

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ERM
Suite 2010
120 Adelaide Street West
Toronto, ON
Canada M5H 1T1
T: (416) 646-3608
F: (416) 642-1269

EXECUTIVE SUMMARY

This report presents the results of the assessment of attenuation pond alternatives undertaken by Agnico Eagle Mines Ltd. (Agnico Eagle) for the proposed Whale Tail Pit Expansion Project. The proposed expansion is subject to an environmental assessment by the Nunavut Impact Review Board pursuant to Part 5 of the Nunavut Agreement. The review of the Final Environmental Impact Statement (FEIS) Addendum for the proposed Expansion Project has been completed and the NIRB Reconsideration and Recommendations Report was submitted to the federal Minister of the Environment on October 18, 2019.

The location for the IVR Attenuation Pond is the subject of this alternatives assessment. The Project area includes fish-bearing waterbodies. Conversion of a fish-bearing waterbody to an attenuation pond would require a Schedule 2 amendment and a robust evaluation of alternatives. A separate alternatives assessment for the location of the IVR WRSF was also completed (Appendix D). The preferred alternatives for both assessments from the basis for one Schedule 2 amendment, and one fish habitat compensation plan for both the IVR Attenuation Pond and the IVR WRSF.

An attenuation pond is required to annually store up to 750,000 m^3 of contact water between October and May, prior to water treatment and discharge into the receiving environment during ice-free conditions. The stored water would include deleterious substances (i.e., mine contact water containing suspended solids and arsenic). While fish-bearing waterbodies are normally avoided, it is challenging to find feasible sites that would meet Agnico Eagle's objective to locate the attenuation pond within sub-watersheds that contain approved mine infrastructure for the Whale Tail Pit Project and proposed infrastructure for the Whale Tail Pit Expansion Project. Therefore fish-bearing waterbodies are being considered to meet this objective.

A regulatory amendment to Schedule 2 of the Metal and Diamond Mining Effluent Regulations (MDMER) under the *Fisheries Act* is required because the Whale Tail Expansion Project is proposing to use a natural waterbody frequented by fish as an attenuation pond for mine-contact water. To support an application for a Schedule 2 Amendment, proponents must demonstrate that the use of natural waterbody frequented by fish is the most appropriate option based on environmental, technical and socio-economic considerations. This assessment of alternatives for the Whale Tail Pit Expansion Project has followed the transparent and standardized process described in Environment and Climate Change Canada's Guidelines for the Assessment of Alternatives for Mine Waste Disposal (ECCC 2016).

The initial step in the assessment process identified nine potential alternatives that met three threshold criteria: must be located within watersheds already affected by the Whale Tail Pit Project; must provide sufficient storage capacity; and must align with existing guiding principles for water management. Next, a critical flaw assessment screened the remaining alternatives to eliminate those that would present material engineering and safety risks; fail to avoid areas of high environmental, cultural and/or archeological value; sterilize mineral resources; or contradict the approved mine plan. Five alternatives were carried through to the characterization stage and a Multiple Accounts Analysis (MAA):

- New attenuation pond at Lake A53 (fish-bearing);

- New attenuation pond at Lake A53 and expand existing Whale Tail Attenuation Pond;
- New attenuation pond at Lake A54 (non-fish-bearing);
- New attenuation pond at Mammoth Lake (fish-bearing); and
- Expansion of existing Whale Tail Attenuation Pond (land-based).

The characterization criteria for each of the alternatives were considered in the development of relevant, meaningful, and differentiating sub-accounts and indicators, which were used to create the multiple accounts ledger for the assessment. Thirteen (13) project-specific sub-accounts were identified for the assessment, under the following Accounts: Technical; Biophysical Environment; Human Environment; Project Economics. A total of 36 indicators were documented in a multiple accounts ledger and each alternative was scored for each indicator using six-point scales tailored to this assessment. A weighting component accounted for the fact that some indicators and accounts are more important to the decision-making process than others. The rationale for scores and weightings are outlined in the report, in accordance with the recommendations provided in the ECCC Guidelines. The biophysical environment account was afforded the highest weight.

Inuit Qaujimajatuqangit (IQ) was incorporated throughout the alternatives assessment, including in the baseline setting description, critical flaw assessment, characterization of alternatives, in the development of meaningful indicators for the MAA, and in the determination of value-based weightings. Consultation with Elders and community members in Baker Lake and Chesterfield Inlet also highlighted traditional values, areas of use, and concerns related to the water attenuation alternative, that were incorporated in the assessment of alternatives.

The results of the MAA indicate that Alternative I: A53 has the highest merit rating, followed by Alternative V: Expansion of the existing Whale Tail Attenuation Pond. Alternative IV: Mammoth Lake is the lowest rated alternative. The results of the MAA were tested using a sensitivity analysis, designed to identify areas where a change in weightings may significantly influence the results. A total of 10 sensitivity scenarios were considered. Overall, Alternative I (use of Lake A53) maintained its rating as either the highest or second-highest alternative across all scenarios.

Based on the outcomes of the MAA—considering technical, environmental, human, and economic factors—the preferred alternative for the attenuation pond is Lake A53. This alternative proposes to store contact water for the Whale Tail Pit Expansion Project in a new IVR attenuation pond, with a storage capacity of 646,638 m^3, supplemented by the existing Whale Tail Attenuation Pond with a storage capacity of 133,232 m^3. The advantages of this alternative include a relatively small footprint, reduced need for surface water management infrastructure, reduced complexity over the life of the pond, and reduced consequences in the event of dam failure or overtopping.

Lake A53 is a fish-bearing waterbody and its use as an attenuation pond will require a regulatory amendment to Schedule 2 of the MDMER. Pursuant to ECCC's '*Streamlining the Approvals Process for Metal Mines with Tailings Impoundment Areas*', Agnico Eagle has completed the following steps to support a streamlined Schedule 2 amendment process:

- Conducted an assessment of attenuation pond alternatives, including the costs and benefits of alternatives, as part of its Environmental Impact Statement for the Nunavut Impact Review Board;
- Proposed a fish habitat compensation plan associated with the attenuation pond, which outlines the habitat losses and gains in relation to the use of Lake A53; and
- Presented the attenuation pond alternatives during consultations in Baker Lake and Chesterfield Inlet in July 2018 and in Baker Lake in March 2019, including impacts on fish and fish habitat, and proposed mitigation and compensation measures.

The NIRB's review of Agnico Eagle's FEIS has provided further opportunities for Inuit, Inuit organizations, the public and regulatory agencies to comment on the alternatives assessment and proposed fish habitat compensation plan pertaining to the Expansion Project.

In summary, the Expansion Project proposes to use four fish-frequented waterbodies as part of the mine operations: the use of A53 as the IVR Attenuation Pond; and the overprinting of A50, A51, and A52 as part of the IVR WRSF. The use of all waterbodies was the result of the assessment of alternatives according to ECCC Guidelines (2016), and fish habitat losses and gains are outlined in one fish habitat compensation plan for the overall Expansion Project.

WHALE TAIL PIT EXPANSION PROJECT
Attenuation Pond Alternatives Assessment Report

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GLOSSARY AND ABBREVIATIONS

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

Agnico Eagle	Agnico Eagle Mines Ltd.
accounts	Broad categories providing the foundation for the multiple accounts analysis. The ECCC Guidelines recommend four accounts: environment, technical, socio-economic, and project economics.
approved project	The approved Whale Tail Pit Project, as defined in the Whale Tail Pit Project Proposal (NIRB File No.: 16MN056), Project Certificate 008 and NWB Type A Water Licence 2AM-WTP1826.
CCME	Canadian Council of Ministers of the Environment
characterization criteria	Project-specific criteria used to describe and compare alternatives.
critical flaw	A characteristic that is so unfavourable or severe that, if taken singly, it would be sufficient to eliminate an alternative.
CEQG	Canadian Environmental Quality Guidelines
ECCC Guidelines	*Guidelines for the Assessment of Alternatives for Mine Waste Disposal*, Environment and Climate Change Canada, 2016.
expanded project / the expansion	The proposed expansion of the Whale Tail Pit Project.
feasible	Constructible and operable within precedents of existing designs and prudent engineering practice guidelines, considering technical, risk, and economic factors.
FEIS	Final Environmental Impact Statement
indicator	Allows for the qualitative or quantitative measurement of an impact (i.e., benefit or loss) or other element of a sub-account. Sub-accounts by nature are often not directly measurable, and need to be sufficiently decomposed to allow measurability; this decomposition takes the form of indicators.
IQ	Inuit Qaujimajatuqangit
MAA	Multiple Accounts Analysis – This is a multi-criteria decision making tool used to conduct assessments of alternatives for mine waste disposal and other mining related decision processes.

masl	metres above sea level
MDMER	Metal and Diamond Mining Effluent Regulations (https://laws-lois.justice.gc.ca/PDF/SOR-2002-222.pdf)
mine site, the	Whale Tail Pit mine site (site of the Whale Tail Pit Project)
screening criteria	Yes-or-no questions designed to identify critical flaws.
sensitivity analysis	Analysis designed to test the degree to which results may change based on the weightings assigned in the value-based decision-making process, to improve transparency of the assessment. Different weightings are assigned to accounts, sub-accounts, and/or indicators, and results are compared. Significant differences in results can indicate areas of bias and subjectivity and show how conclusions may be representative of different value systems.
sub-account	Sub-accounts, also referred to as evaluation criteria, consider the material impact (i.e., benefit or loss) associated with any of the alternatives being evaluated. Sub-accounts should be impact-driven, differentiating, relevant, understandable, non-redundant, and judgementally independent.
threshold criteria	Basic conditions that must be met by any alternative for inclusion in the MAA. These criteria are project-specific, should be as broad as possible, and must be fully described and rationalized to ensure transparency.
weighting	Applies a weighting factor to each indicator, subaccount, and account based on its relative importance to the overall decision-making process.
WRSF	Waste Rock Storage Facility
WTAP	Whale Tail Attenuation Pond

1. INTRODUCTION

1.1 REPORT PURPOSE

This purpose of this report is to present the assessment of attenuation pond alternatives undertaken by Agnico Eagle Mines Ltd. (Agnico Eagle) for the proposed Whale Tail Pit Expansion Project, and to identify the most suitable alternative. For the purposes of evaluating water management options through multiple accounts analysis (MAA), the proposed expansion of the Whale Tail Pit Project requires an attenuation pond to annually store up to 750,000 m^3 of water between October and May so that water can be treated and discharged during ice-free conditions between June and September. The evaluation of locations for the Expansion Project Waste Rock Storage Facility (WRSF) was subject to a separate Alternatives Assessment, outlined in Appendix D of this report.

In Canada, the *Fisheries Act* applies to any development project with potential impacts to a natural body of water frequented by fish and prohibits the deposit of any deleterious substance into natural fish-bearing waterbodies. Under the Act, a deleterious substance is defined as a substance that alters or degrades water quality to the point where it becomes harmful to fish, fish habitat, or human use of fish. The regulatory context governing the Whale Tail Pit Expansion Project alternatives assessment process is briefly outlined below and described further in Section 1.3.

Amendments to Schedule 2 of the Metal and Diamond Mining Effluent Regulations (MDMER) authorize the use of water frequented by fish for mine waste disposal. Before an amendment can be recommended by the Minister of the Environment, proponents must demonstrate that mine waste disposal in water frequented by fish is the most appropriate option based on environmental, technical and socio-economic considerations by conducting an assessment of alternatives for mine waste disposal for review by Environment and Climate Change Canada (ECCC). The assessment of alternatives should be prepared in accordance with ECCC's *Guidelines for the Assessment of Alternatives for Mine Waste Disposal*, and the alternatives assessment should take into consideration concerns raised by local communities, Indigenous peoples and stakeholders. Based on an impact assessment, adverse environmental effects resulting from the deposit of mine waste (i.e., a loss of fish habitat) are offset by the implementation of a fish habitat compensation plan.

Agnico Eagle is undertaking all of the steps above to develop the proposed expansion of the Whale Tail Pit Project. This report presents the results of the assessment of alternatives for siting the attenuation pond. Agnico Eagle has followed the transparent and standardized process described in Environment and Climate Change Canada *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (the ECCC Guidelines; ECCC 2016). These Guidelines delineate the alternatives assessment process required to identify, assess, evaluate, rank, and select the best overall location for an attenuation pond.

1.2 PROJECT PROPONENT

Agnico Eagle is a publically-traded (Toronto stock exchange, TSE:AME) Canadian-based gold producer with operating mines in Canada, Finland and Mexico and exploration and development activities extending to the United States.

1.3 REGULATORY CONTEXT

The proposed Whale Tail Pit Project Expansion is subject to an environmental assessment (EA) by the Nunavut Impact Review Board (NIRB) pursuant to Part 5 of the Nunavut Agreement. The proposed expansion requires an attenuation pond to annually store up to 750,000 m^3 of water between October and May so that water can be treated and discharged during ice-free conditions between June and September. The stored water would include deleterious substances (i.e., mine contact water containing suspended solids and arsenic). The Expansion Project would also require additional WRSF locations.

While fish-bearing waterbodies are normally avoided, it is challenging to find feasible sites that would meet Agnico Eagle's objective to locate the attenuation pond within sub-watersheds that contain approved mine infrastructure for the Whale Tail Pit Project and proposed infrastructure for the Whale Tail Pit Expansion Project. Therefore fish-bearing waterbodies are being considered to meet this objective.

1.3.1 Streamlined Schedule 2 Amendment Approvals Process

The ECCC document *Streamlining the Approvals Process for Metal Mines with Tailings Impoundment Areas* (ECCC, 2012) describes the approach to streamline timelines for Governor in Council decisions authorizing the deposition of mine waste into water bodies frequented by fish. Amendments are eligible for streamlining if all the required documents are submitted and consulted on (Assessment of Alternatives and Fish Habitat Compensation Report) and all conditions for those documents are met. The streamlined process can shorten the approval time by exempting pre-publication of the Schedule 2 amendment in *Canada Gazette*, Part 1, which makes public the text of the proposed regulations and the associated regulatory impact statement. ECCC have further implemented a Streamlining Policy for projects meeting certain criteria and by shortening internal approval timelines of regulatory packages. Timelines may be quicker than the average 12-18 months but these are assessed on a case by case basis.

Pursuant to ECCC's streamlined Schedule 2 approvals process, Agnico Eagle has taken the following steps to go directly to *Canada Gazette*, Part 2 publication:

- Conducted an assessment of attenuation pond alternatives, including the costs and benefits of the alternatives, as part of its Final Environmental Impact Statement (FEIS) submitted to NIRB;
- Conducted an assessment of WRSF locations (Appendix D, this report);
- Proposed a fish habitat compensation plan associated with the preferred attenuation pond alternative, which outlines the habitat losses and gains in relation to the use of Lake A53 and other waterbodies affected by the Expansion Project; and
- Conducted consultations on the attenuation pond alternatives as described in Section 1.4.2.

The NIRB's review of Agnico Eagle's Final Environmental Impact Statement has provided further opportunities for Inuit, Inuit organizations and the public to comment on the assessment of attenuation pond alternatives and proposed fish habitat compensation plan pertaining to Lake A53, as well as Lakes A50, A51, and A52.

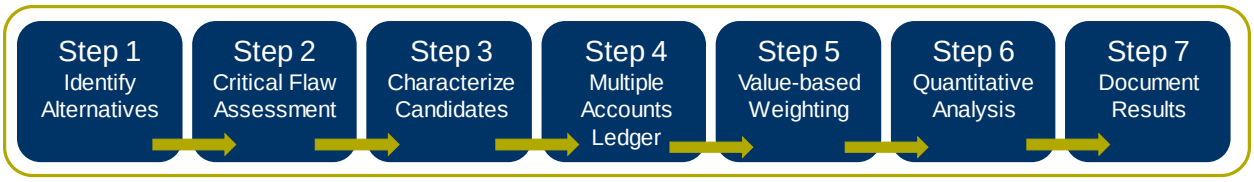
1.3.2 ECCC Guidelines for the Assessment of Alternatives for Mine Waste Disposal

The ECCC Guidelines describe the process that must be undertaken when a proponent is proposing to deposit a deleterious substance into a natural waterbody frequented by fish. The process is designed to be robust, transparent, and replicable, and address issues of bias and subjectivity in decision-making. **Appendix A** includes a Table of Concordance which provides cross references to identify where the requirements in the ECCC Guidelines have been addressed in this report.

Section 2 of the ECCC Guidelines sets out a seven-step process by which to identify, screen, and evaluate alternatives for mine waste disposal, including options relating to location selection, design, and other factors. The Guidelines include multiple accounts analysis (MAA), which is the decision-making method used to identify the most suitable or advantageous alternative from a list of alternatives by weighing the relative advantages and disadvantages of each. The ECCC Guidelines advise that the assessment include at least one alternative that does not impact a natural waterbody that is frequented by fish.

Consistent with ECCC's seven-step process, this alternatives assessment: identifies reasonable, conceivable, and realistic alternatives for the attenuation pond at the Whale Tail Pit Expansion Project (Steps 1 and 2); characterizes the alternatives and identifies relevant indicators by which to compare and contrast them (Steps 3 and 4); systematically evaluates the alternatives using quantitative and qualitative factors (Steps 5 and 6); and transparently documents the results (Step 7). Figure 1-1 illustrates the seven-steps, each of which is described in further detail below.

Figure 1-1. Seven Steps of Alternatives Assessment



Step 1: Identification of Alternatives

This step identifies a list of possible WRSF locations that are reasonable, conceivable, and realistic alternatives for the Expansion Project. At this step it is imperative that no *a priori* judgement be made about any of the alternatives. Threshold criteria can be used to establish regional boundaries for selecting the candidate alternatives. The Threshold criteria should be as broad as possible and described and rationalized to ensure transparency. The level of detail is highly conceptual but in principle be sufficiently thorough to allow an understanding of the concept.

Step 2: Critical Flaw Assessment

At this step, the alternatives are screened to identify and eliminate alternatives with critical flaws. A critical flaw is a flaw that is so unfavourable that it alone is sufficient to eliminate an alternative from further consideration as it would render the attenuation pond, or other aspects of the Whale Tail Pit Project inoperable or unachievable.

Screening criteria are yes-or-no questions designed to identify critical flaws. Screening question are defined to reflect the specific context of a project; there is no standard set of questions. If a critical flaw is identified, the alternative is not considered further and the rationale for elimination is documented. Alternatives without critical flaws are carried forward to the characterization of alternatives in Step 3.

Step 3: Characterization

This step involves characterizing each remaining alternative within four broad categories, or *accounts*, based on technical design and execution (*technical account*), potential biophysical effects (*biophysical environment account*), potential effects on people (*human environment account*), and financial costs (*project economics account*). This characterization is based on the candidate design concepts and the environmental and social baseline information relevant to each candidate.

Step 4: Multiple Accounts Ledger

Based on the characterization in the previous step, relevant and differentiating sub-accounts and indicators are identified in Step 4. A multiple accounts ledger is prepared to describe the indicators. Rating scales are developed for each indicator, using a scale of one to six, against which each alternative is scored.

Step 5: Value-based Weighting

The value-based weighting step acknowledges that some accounts, sub-accounts, or indicators are more or less important to the decision-making process than others, and provides an opportunity to weight them accordingly. Weightings are assigned on a scale of one (less important) to six (more important).

Step 6: Quantitative Analysis

This step uses the calculations stipulated in the ECCC Guidelines to calculate the weighted merit rating of each candidate based on the scores and weightings identified for each indicator in Step 5. The results are compared, and alternatives with a higher weighted merit rating are preferred. A sensitivity analysis is then conducted to explore the influence of the weighting regime and identify potential areas of bias and subjectivity.

Step 7: Documentation and Reporting

In this step, the alternatives assessment process is summarized and the results are described. Input from communities, Indigenous groups, and other stakeholders is highlighted, and the sensitivity of the results is discussed. A thorough and transparent description of the process and results is a fundamental requirement of the ECCC Guidelines.

1.4 INCORPORATING INUIT QAUJIMAJATUQANGIT AND CONSULTATION

Agnico Eagle makes efforts to incorporate IQ (*Inuit Qaujimajatuqangit*) in all aspects of planning and developing the Whale Tail Pit Project and the Whale Tail Pit Expansion Project, and to engage and consult with potentially affected communities (including Baker Lake, Nunavut) and land users to seek their feedback and answer questions. The following sections describe how IQ has been considered in the alternatives assessment.

1.4.1 Inuit Qaujimajatuqangit

Inuit Qaujimajatuqangit encompasses not only traditional knowledge (TK) about land and resources, but also the skills to apply this knowledge to livelihoods, and a value system that is founded upon respect, sharing, collaboration, collective decision-making, skills development, and the responsible use of resources.

Agnico Eagle has considered TK and IQ in this alternatives assessment. Existing information—including the *Inuit Qaujimajatuqangit Baseline Report* compiled for the Whale Tail Pit Project[1]—has been reviewed and incorporated in the baseline setting description (Section 3), in the critical flaw assessment (Section 5), in the characterization of alternatives (Section 6), in the development of meaningful indicators for the MAA (Section 7), and in the determination of value-based weightings (Section 8). Consultation with Elders and community members in Baker Lake and Chesterfield Inlet also highlighted traditional values, areas of use, and concerns related to the attenuation pond alternatives, and these have likewise been incorporated in relevant sections of this report.

In addition to reviewing TK and IQ as related to the understanding of the baseline biophysical and human environment, and potential impacts on the environment and land users, the principles of IQ is also integrated into the methodology of this alternatives assessment.

Finally, the alternatives assessment process is designed to be aligned with IQ guiding principles, including:

- **Fostering good spirit by being open, welcoming and inclusive**: Agnico Eagle welcomes, and has sought, input to the alternatives assessment through consultation with stakeholder groups in Baker Lake and Chesterfield Inlet.
- **Decision-making through discussion and consensus**: Agnico Eagle facilitated discussion about the alternatives, and the balance of impacts and benefits, in consultation with stakeholders in Baker Lake and Chesterfield Inlet. Further discussion and dialogue will include subject matter experts, and—as a decision-making process—MAA is transparent and reproducible.
- **Working together for a common cause**: Through consultation with community stakeholders including Elders, land users, youth, women, and local government, Agnico Eagle has endeavoured to work collaboratively with stakeholders in order to identify the best possible alternative.

[1] *Inuit Qaujimajatuqangit Baseline Report*. June 2016. Included as Appendix 7-A of the Whale Tail Pit Project: Final Environmental Impact Statement (FEIS).

- **Respect and care for the land, animals and the environment**: Agnico Eagle is committed to developing the Whale Tail Pit Project and expansion project in a way that will minimize impacts on land, animals, and the environment.

1.4.2 Consultation

Agnico Eagle presented the attenuation pond alternatives in the Baker Lake and Chesterfield Inlet communities in July 2018 (Table 1-1) and in Baker Lake in March 2019 (Table 1-2). Agnico Eagle also described: the alternatives assessment; how input from participants would be incorporated; and impacts on fish and fish habitat, and proposed mitigation and compensation measures. Agnico Eagle also provided other information about the Whale Tail Pit Expansion Project, as well as updates on the Whale Tail Pit Project and possible projects for fish habitat compensation in relation to the expansion project. Agnico Eagle also planned meetings in Chesterfield Inlet in March 2019 but they had to be cancelled due to a snow blizzard restricting air travel.

Table 1-1. July 2018 Consultation Program

Event	Baker Lake	Chesterfield Inlet
Community meetings	• Presentation and open house at Baker Lake community hall (July 10, 2018)	• Presentation and open house at Chesterfield Inlet Hamlet Chambers (July 12, 2018)
Focus groups	• Women (July 11, 2018) • Youth (July 10, 2018) • Elders (July 11, 2018)	
Meetings	• Hamlet of Baker Lake (July 11, 2018) • Baker Lake Hunters and Trappers Organization (HTO)(July 11, 2018) • Kivalliq Inuit Association (July 11, 2018)	• Hamlet of Chesterfield Inlet (July 12, 2018) • Chesterfield Inlet HTO (July 13, 2018)

Table 1-2. March 2019 Consultation Program

Event	Baker Lake
Community meeting	• Presentation and open house at Baker Lake community hall (March 26, 2019)
Focus groups	• Women (March 28, 2019) • Youth (March 26, 2019) • Elders (March 26, 2019)
Meetings	• Hamlet of Baker Lake (March 26, 2019) • Kivalliq Inuit Association (March 29, 2019)

The outcomes of the July 2018 and March 2019 consultations are summarized in Section 6.5.5. In addition, more broadly relating to the Amaruq mine site, feedback provided in the final hearing for the Whale Tail Pit Project (NIRB 2017) included concerns for potential adverse impacts (from the mine and haul road) on caribou, as well as other wildlife, fish, water quality, and the aquatic environment. The hearing also highlighted support for training, employment, and economic opportunities, and a recognition that the Whale Tail Pit Project will enable the continuation of these opportunities after Meadowbank mine production ceases.

Agnico Eagle met with ECCC representatives on June 27, 2019 and DFO representatives on July 3, 2019 to discuss the MAA and proposed fish habitat compensation plan. This final report incorporates comments from ECCC received on July 31, 2019 and comments from ECCC on November 21, 2019. **Appendix B** includes a table summarizing Agnico Eagle's responses to ECCC comments, and any revisions made to the report to address ECCC comments.

1.5 STRUCTURE OF THIS REPORT

An overview of the Whale Tail Pit Project is provided in Section 2, with a focus on relevant water management infrastructure and processes. Section 3 describes the baseline setting of the physical environment, biological environment, and human environment as it relates to the Whale Tail Pit Project.

Sections 4 through 10 of this report present the alternatives assessment process, based on ECCC Guidelines as described in Section 1.3:

- Section 4: Identification of Alternatives (Step 1);
- Section 5: Critical Flaw Assessment (Step 2);
- Section 6: Characterization of Alternatives (Step 3);
- Section 7: Multiple Accounts Ledger (Step 4);
- Section 8: Value-based Weighting (Step 5);
- Section 9: Quantitative Analysis (Step 6); and
- Section 10: Conclusions.

The report as a whole represents Step 7: Documentation of Results.

2. PROJECT DESCRIPTION AND LOCATION

2.1 CONTEXT

Agnico Eagle operates the Meadowbank Gold Mine, located on Inuit-owned lands approximately 70 km north of the hamlet of Baker Lake in the Kivalliq Region of Nunavut (Figure 2-1). The Meadowbank mine began commercial production in 2010 and has been producing gold from open pits at the Meadowbank site, which is scheduled to cease operations in 2019. All other facilities will be operational for the approved Whale Tail Pit and proposed Expansion Project.

Agnico Eagle is constructing and preparing to mine a satellite mineral property (the Amaruq property) located approximately 50 km northwest of the Meadowbank Mine and 150 km north of Baker Lake (Figure 2-1). The development of the Amaruq property commenced with the 2018 approval[2] of the Whale Tail Pit Project. Construction of the Whale Tail Pit Project began in 2018, and mining is scheduled to begin in 2019.

The Whale Tail Pit Expansion Project will expand mining operations at the Whale Tail Pit mine site. The approved Whale Tail Pit Project and the proposed Expansion Project are summarized below, with a focus on water management plans and infrastructure. Figure 2-2 provides a timeline of the development.

2.2 MINE ACTIVITIES AND COMPONENTS

2.2.1 Whale Tail Pit Project (Approved Project)

Ore will be extracted from the Whale Tail Pit and transported by truck via a 65 km haul road to the Meadowbank mine site for processing using the existing mill. The project will also use the Meadowbank tailings management infrastructure, worker accommodations, all-weather access road connecting Baker Lake and the Meadowbank site, and existing marine shipping/resupply infrastructure in Baker Lake.

The major mine components and facilities of the approved Whale Tail Pit Project mine site are shown in Figure 2-3, and include:

- Open pit (Whale Tail Pit);
- Waste rock storage facility (WRSF);
- Overburden storage facilities;
- Ore stockpiles;
- Landfill;

[2] Positive recommendation provided by NIRB on November 6, 2017. Ministerial Decision received on February 15, 2018. Nunavut Water Board Type A Licence received July 11, 2018.

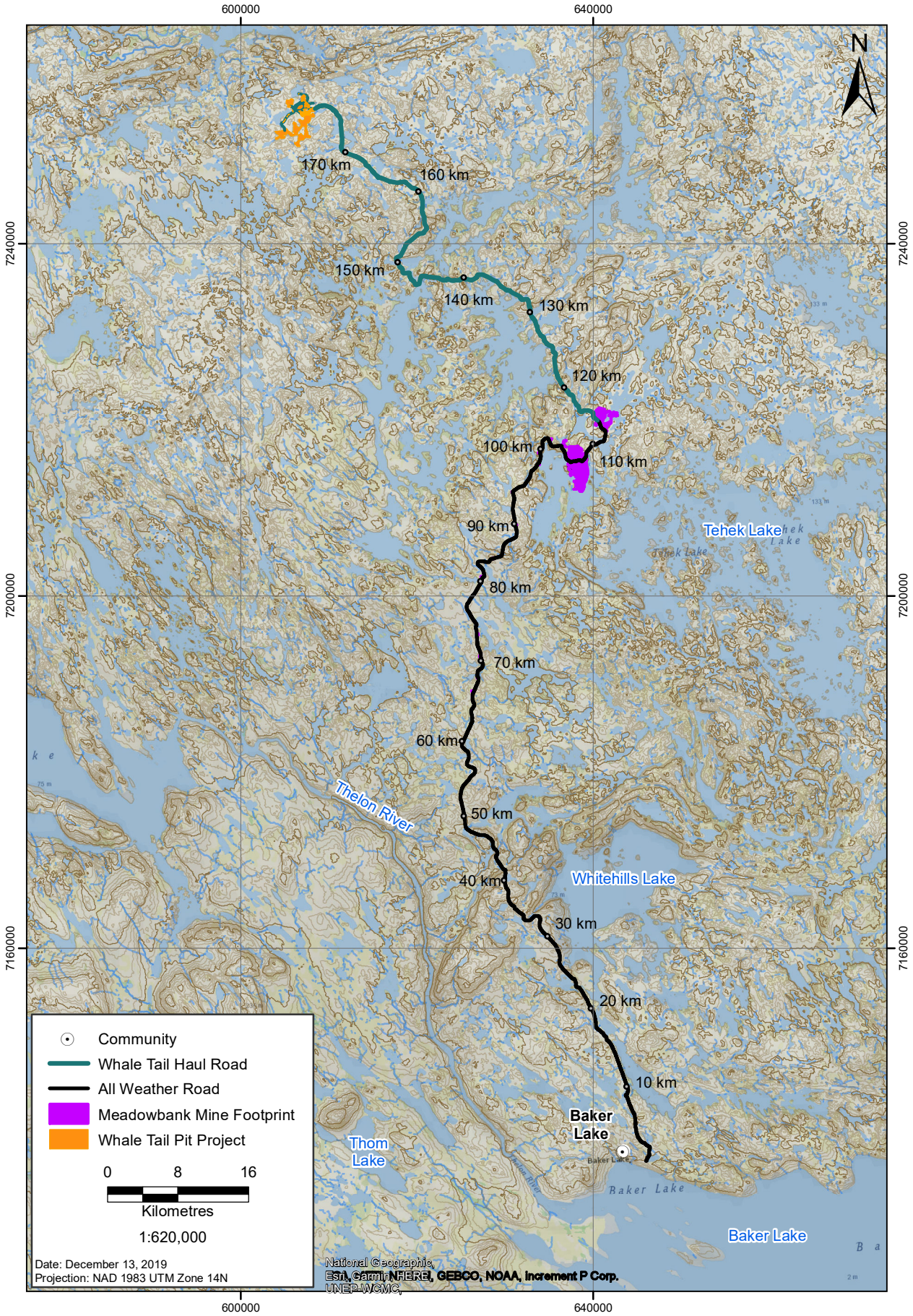
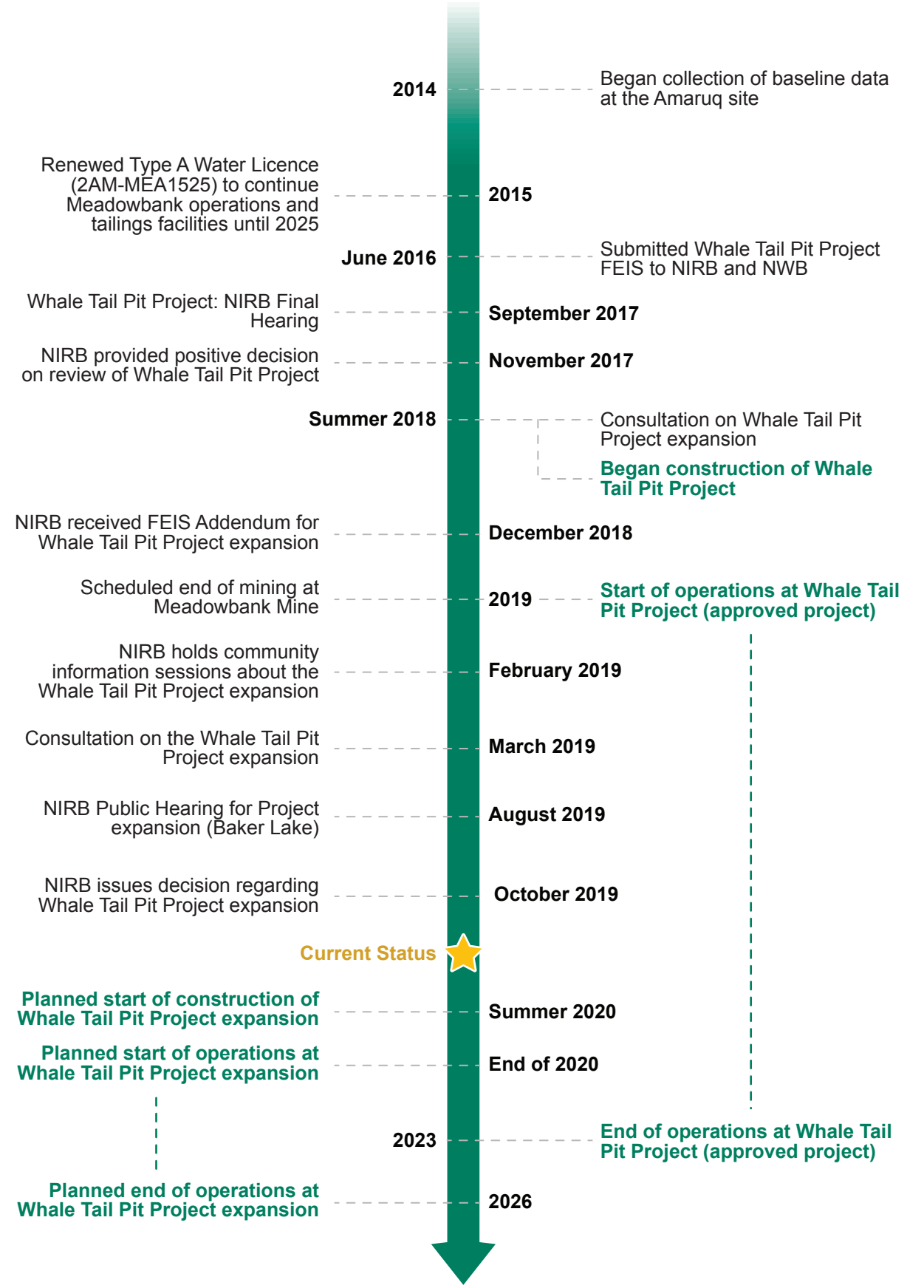


Figure 2-1: Location of Meadowbank Gold Mine and Whale Tail Pit Project

Figure 2-2
Whale Tail Pit Project Timeline



- Haul road and access roads;
- Industrial area (including accommodation camp and garage); and
- Water management infrastructure.

Development of the Whale Tail Pit Project will produce an estimated 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock and 5.6 Mt of overburden. Construction is expected to employ up to 500 people, and 931 workers are expected to be employed on rotation during operations.

2.2.2 Whale Tail Pit Expansion Project

The Expansion Project includes:

- expanding the Whale Tail Pit;
- expanding the Whale Tail WRSF;
- developing an additional pit (the IVR Pit);
- developing an underground mine;
- developing an additional WRSF (the IVR WRSF); and
- developing an additional water attenuation pond (the IVR Attenuation Pond).

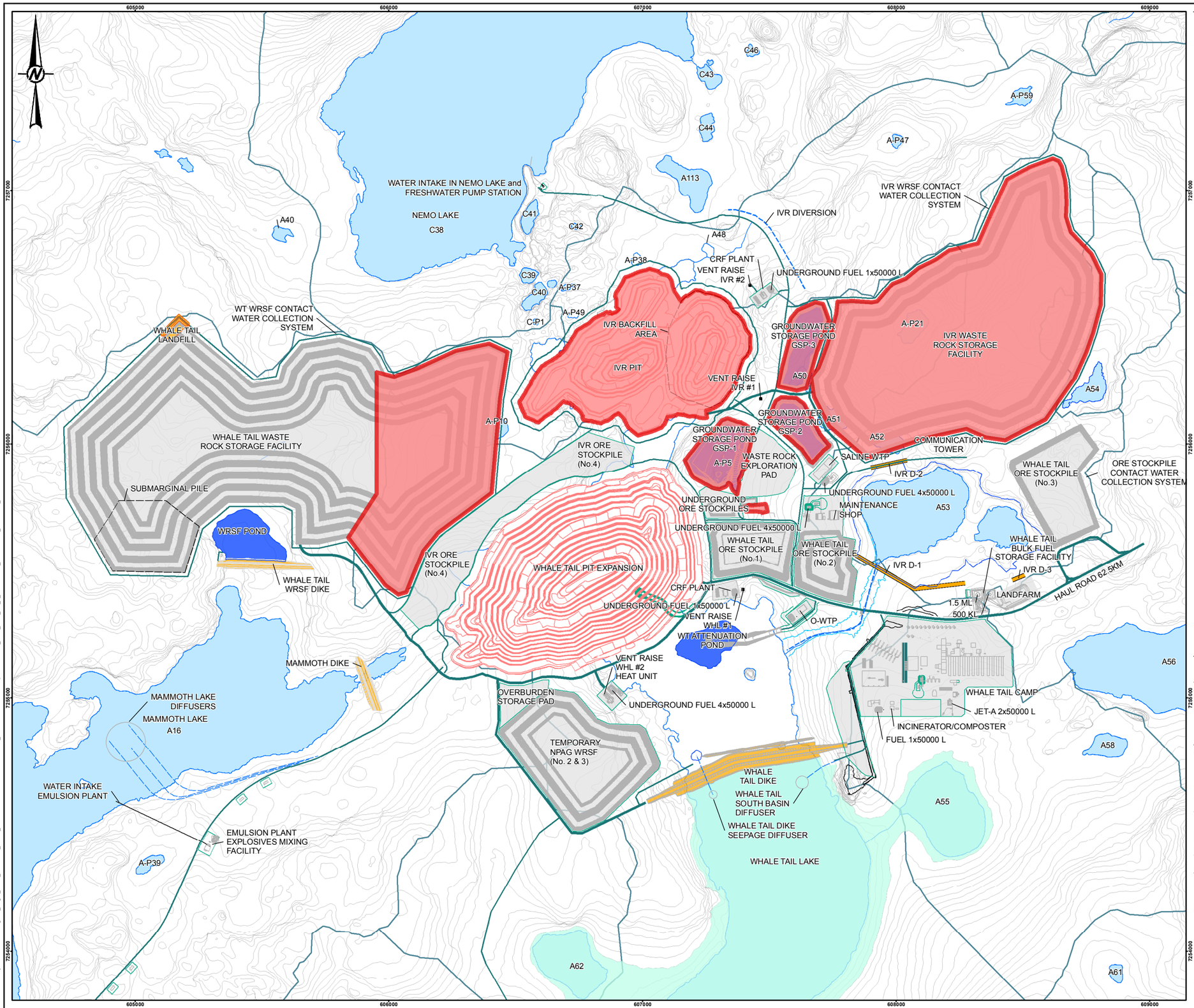
The above infrastructure, also illustrated in Figure 2-3, will expand and extend mining at the Whale Tail Pit mine site by up to four years.[3] The proposed expansion is designed to provide a compact site footprint within and around the approved infrastructure, and to allow for potential future growth and expansion. As in the approved project, ore from the Whale Tail Pit Expansion Project will continue to be transported to the Meadowbank mine site for processing.

2.3 SCHEDULE

Construction of the Whale Tail Pit Project began in 2018 (Figure 2-2). Dewatering of Whale Tail Lake commenced in 2019. Operations commenced in 2019 and continue until 2023, with closure until 2030.

Construction of the Whale Tail Pit Expansion Project will occur concurrently with operation of the approved Whale Tail Pit Project, including dewatering activities to support the development of the IVR Pit and other infrastructure. Mining of the expanded pits and underground works is expected to commence by the end of 2020 and continue until 2026. At the end of operations, closure activities would occur until approximately 2040, followed by post-closure monitoring.

[3] The total gold resource for the Whale Tail Pit Expansion Project will extend the life of mine for 3 to 4 years (i.e., operation of expanded Whale Tail Pit, IVR Pit, and for underground operations to 2025 to 2026).



LEGEND

- EXPANSION INFRASTRUCTURE
- WHALE TAIL WASTE ROCK STORAGE FACILITY
- WHALE TAIL LAKE (SOUTH BASIN) FLOODED LIMIT (WATER LEVEL 156.0m)
- NATURAL WATERSHED
- DIKE
- POND/SUMP
- ROAD
- WATERCOURSE
- WATERBODY

0 300 600

1:15,000 METRES

REFERENCE(S)

1. MEADOWBANK INFRASTRUCTURE AND PROPOSED WHALE TAIL HAUL ROAD ALIGNMENT OBTAINED FROM AGNICO EAGLE MINES LIMITED.
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

CLIENT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT - EXPANSION PROJECT

Figure 2-3

TITLE

APPROVED PROJECT AND EXPANSION PROJECT INFRASTRUCTURE

CONSULTANT

GOLDER

YYYY-MM-DD	2019-09-20
DESIGNED	JR
PREPARED	CDB
REVIEWED	JR
APPROVED	JR

PROJECT NO.	CONTROL	REV.	FIGURE
19127573	2000/2020	0	PD-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

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PATH: Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\19_PROJECTS\19127573\2000\2020\02_PRODUCTION\MXD\Report\19127573_2000_2020_PD_1_APPROVED_EXPANSION_PROJECT_INFRASTRUCTURE.mxd PRINTED ON: 2019-09-20 AT: 11:20:14 AM

2.4 WATER MANAGEMENT

The information in this section is derived from the Water Management Plan for the approved Whale Tail Pit Project (Agnico Eagle 2017; 2018), the project description as part of the Whale Tail Pit Expansion Project FEIS, and an updated mean annual water balance for the Whale Tail Pit Expansion Project (Golder 2018). This section focuses on water management related to the attenuation, treatment, and discharge of water at the approved Whale Tail Pit Project (Section 2.4.2) and the proposed expansion (Section 2.4.3).

2.4.1 Water Management Strategy

Water management at the Whale Tail Pit Project is designed to limit and/or avoid surface water run-off into the pit and is guided by the following principles:

- minimizing the amount of contact water[4] by diverting clean water around the site, and containing contact water within the site;
- separating contact water, non-contact water, and freshwater to the extent practicable;
- minimizing freshwater consumption by recycling and reusing contact water to the extent practical; and
- treating contact water and meeting discharge criteria before treated water is released to the downstream environment.

Based on the above principles, Agnico Eagle's water management plan for the approved Whale Tail Pit Project (Agnico Eagle 2018) is based on the strategies described in Table 2-1.

Table 2-1. Key Water Management Strategies

Strategy	Description
Limit catchment disturbance	Two levels of catchment disturbance have been defined for the mine site, namely undisturbed and disturbed. Areas that have been disturbed by mine development are disturbed catchments, while areas that are unaffected by mine development are undisturbed catchments.
Minimize contact water	For mine water management, run-off from undisturbed areas is considered non-contact water, while run-off from disturbed catchment areas is considered contact water. Surface water that is diverted around mine facilities, or groundwater that does not emerge into a mine facility, is considered non-contact water. Any non-contact water that mixes with contact water becomes contact water. Non-contact water will be intercepted and directed away from disturbed areas by natural catchment boundaries and/or man-made diversion structures and will be allowed to flow to neighbouring waterbodies.
Contain contact water	Conveyance and storage of contact water will be controlled by channels and containment structures (i.e., sumps and ponds). Sumps will be installed in the open pit and in low points surrounding the open pit. Contact water will be diverted and collected in sumps and water collection ponds and conveyed to the attenuation pond.

[4] Water that has been in contact with mining, including components such as open pit, underground works, waste rock storage facilities, or other infrastructure.

Strategy	Description
Treat contact water	Collected water will be treated if the water quality does not meet discharge criteria in the Type A Water Licence 2AM-WTP1826 and Schedule 4 of the MDMER (before and after the coming into force of amendments on June 1, 2021)
Minimize use of freshwater	Treated water will be reused as much as possible to minimize the freshwater requirements. The excess treated water will be discharged into Mammoth Lake through a submerged diffuser.

Source: Agnico Eagle (2018)

2.4.2 Approved Whale Tail Pit Project

Water management and water treatment infrastructure for the approved project is summarized in this section. Further details about water management infrastructure is provided in the Whale Tail Pit Water Management Plan (Agnico Eagle 2017) and Type A Water Licence 2AM WTP1826 (NWB 2018). Water balance calculations and resulting infrastructure are based on conservative assumptions about climatic conditions, summer runoff levels, and surface hydrology.

Freshwater for camp drinking water will be obtained from Nemo Lake, in the watershed north of the mine site. The site footprint is designed so that run-off from the mine site is contained within the disturbed catchments (as described in Table 2-1). Non-contact water will be diverted from the site through channels and dikes.

Contact Water Management

Contact water, including water from surface run-off and groundwater infiltration, will be collected at various locations around the mine site, contained in an attenuation pond, and treated before it is discharged to the receiving environment. Water from all sectors ultimately reports to the Whale Tail Attenuation Pond, which is located in a deep section of the drained North Basin of Whale Tail Lake. The design basis of the approved attenuation pond is to store a mean annual volume of 455,000 m^3 of water.

Water Treatment and Discharge

During operations, the contact water treatment plant will be located approximately 250 m west of the Whale Tail Attenuation Pond. Treated water will be piped from the water treatment plant along the south side of the Whale Tail Pit to a submerged diffuser at Mammoth Lake. Treatment and discharge of water will occur annually between June and September; for the rest of the year (i.e., in freezing conditions), water will be held in the attenuation pond pending treatment and discharged in the summer. The mean annual volume of contact water to be treated and discharged in the approved Whale Tail Pit Project is approximately 420,000 m^3.

Whale Tail Dike Construction

To allow for development of the Whale Tail Pit, a dike will be constructed across the north end of Whale Tail Lake. The North Basin of the lake (i.e., north of the dike) will be dewatered in the first year of operations; prior to dewatering, a fish-out program was completed in September 2018. Once dike construction is completed, water from the North Basin will be either pumped directly to the South Basin of Whale Tail Lake (if it meets discharge criteria), or pumped to the water treatment plant prior

to discharge to Mammoth Lake. The Whale Tail Dike will also raise the water level of Whale Tail Lake (South Basin), and a diversion channel will be constructed at the south end of the lake so that the lake will discharge into Mammoth Lake.

Mammoth Dike Construction

A dike will be constructed across the small northeast arm of Mammoth Lake. This dike is required for dewatering the Whale Tail Pit area and to limit the flow of water from Mammoth Lake into the pit during storm events.

2.4.3 Whale Tail Pit Expansion Project

Contact Water Management

In addition to the sources of contact water described in Section 2.4.2, sources of contact water associated with the Whale Tail Pit Expansion Project will include:

- expanded Whale Tail Pit;
- expanded Whale Tail WRSF;
- underground mine works;
- IVR Pit; and
- IVR WRSF.

Water management for the Whale Tail Pit Expansion Project will align with the approved water management plan described in Section 2.4.2 in that contact water will be collected, treated, and discharged. Contact water from across the site will be collected and pumped (or diverted) to an attenuation pond. Water from the attenuation pond will be reused for mine operations and treated at the contact water treatment plant. Treated water will be pumped via the discharge pipeline for discharge during the open water season.

The Whale Tail Pit Expansion Project will increase the surface area (and therefore catchment area) of the mine site, and the expanded pits and underground works will increase the volume of groundwater infiltration. As a result, the expansion will require a greater volume of contact water to be stored over winter: for the purposes of the MAA, this is expected to be up to 750,000 m^3. The expanded Whale Tail Pit perimeter will also constrain the Whale Tail Attenuation Pond, reducing its storage capacity from 455,000 m^3 to 133,000 m^3. Thus, an additional attenuation pond is required to accommodate at least 617,000 m^3 (providing a cumulative 750,000 m^3 storage capacity required for the Whale Tail Pit expansion). The location and design of the attenuation pond for the expansion (referred to as the IVR Attenuation Pond) is the subject of this alternatives assessment.

Water Management Infrastructure

The IVR Attenuation Pond is planned to be operational by no later than spring of 2022. This pond will receive all contact water from other sectors of the site, with the exception of the local catchment area for the Whale Tail Attenuation Pond which will continue to report to that pond.

The IVR Attenuation Pond will discharge to the water treatment plant during the summer. The approved water treatment plant will continue to be used. The point of discharge for treated water from the water treatment plant will change with the Whale Tail Expansion Project. Treated effluent will be discharged to Whale Tail Lake (South Basin) and an alternative discharge location (Lake D1 and D5, adjacent to the access road), and discharge to Mammoth Lake will cease.

Figure 2-4 identifies and Table 2-2 explains the planned management of contact water at the site during the expansion project. Further detail is provided in the mean annual water balance for the Whale Tail Pit Expansion Project (Golder 2018). Contact water from the underground mine will be collected, stored, and treated separately; as underground contact water will not report to the Whale Tail or IVR attenuation ponds, it is not subject to this alternatives assessment.[5]

Alternatives Assessment

The location for the IVR Attenuation Pond is the subject of this alternatives assessment. The Project area includes fish-bearing waterbodies and conversion of a fish-bearing waterbody to an attenuation pond would require a Schedule 2 amendment and a robust evaluation of alternatives. A separate alternatives assessment for the location of the IVR WRSF was also completed (Appendix D). The preferred alternatives for both assessments for the basis for one Schedule 2 amendment.

Agnico Eagle is committed to conduct its operations, including the Whale Tail Pit Project, in an environmentally and socially responsible manner and to avoid significant adverse effects on the environment and people who use the land and resources. As such, this alternatives assessment evaluates alternative locations and design concepts for the IVR Attenuation Pond.

2.4.4 Water Quality and Discharge Criteria

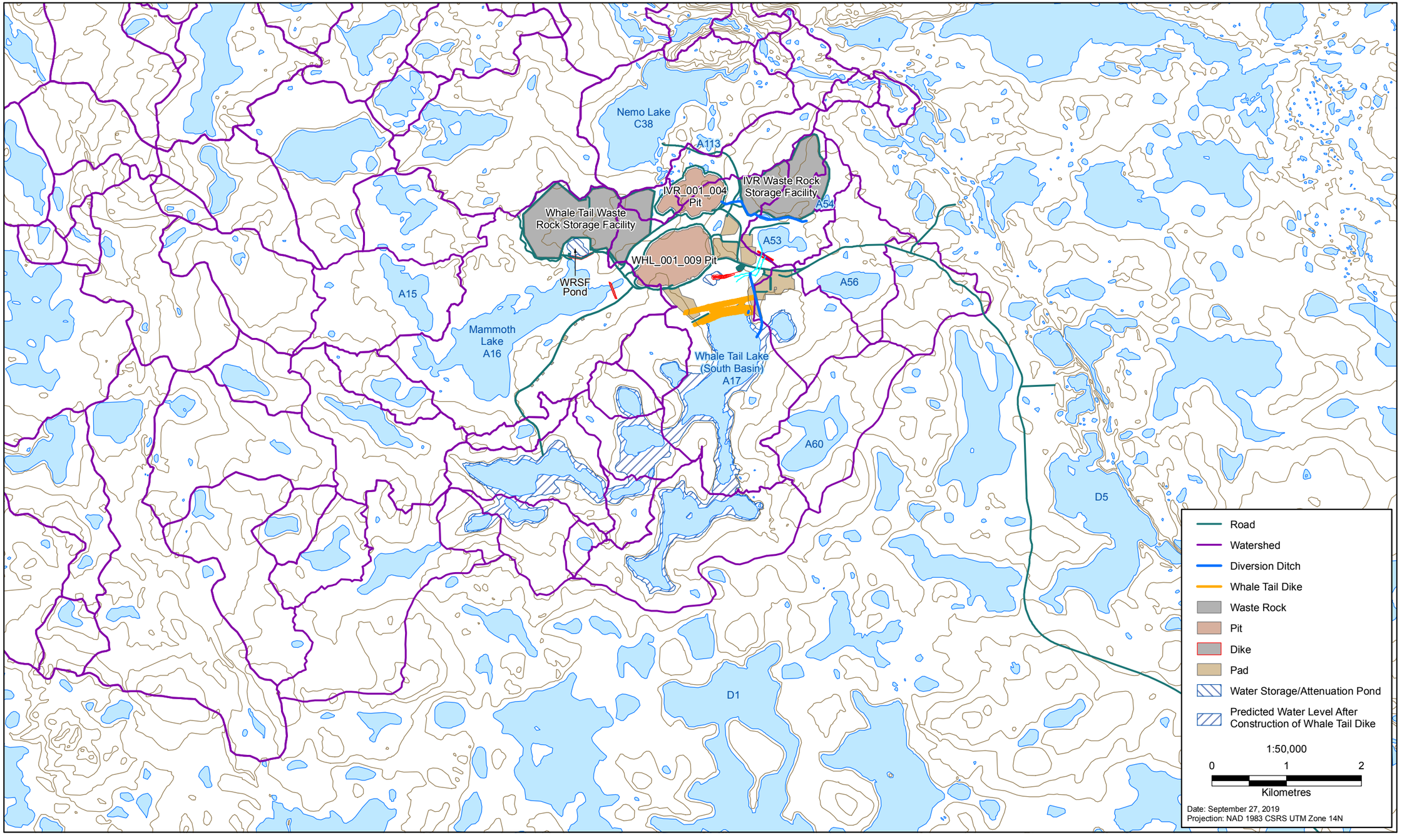
Table 2-3 summarizes water quality discharge criteria established in the Type A Water Licence 2AM-WTP1826, as well as other parameters included in Agnico Eagle's water monitoring program. For reference, the Canadian Council of Ministers of the Environment (CCME) water quality guidelines for the protection of aquatic life (long-term; CCME 1999) and Schedule 4 of the MDMER (before and after the coming into force of amendments on June 1, 2021) are provided for applicable parameters.

Agnico Eagle has modelled the anticipated water quality for all water collection, attenuation, and discharge components of the Whale Tail Pit Expansion Project, and modelling results are provided in the FEIS. Relevant results are highlighted below:

- **Whale Tail WRSF**: exceeds discharge criteria for arsenic after July 2019, with predicted concentrations ranging up to 3.8 mg/L; short-term exceedances of chromium and phosphorus are also identified.

[5] Saline water from the underground mine will be collected within the ground-water storage ponds. Treated water from the plant will be discharged to Whale Tail Lake (South Basin), while brine will be directed to the Stormwater Storage Pond. Water from the underground mine will be managed and treated separately from surface mine infrastructure.

Figure 2-4
Planned Water Management Infrastructure (Expansion Project, excluding IVR Attenuation Pond)



- **IVR WRSF**: exceeds discharge criteria for arsenic in July and August 2020, and from July 2021 and later, with predicted concentrations ranging up to 4.1 mg/L; short-term exceedances of chromium and phosphorus are also identified.
- **Stormwater Storage Pond (AP-5)**: exceeds discharge criteria for following parameters:
  - TDS after June 2020, with concentrations peaking at 78,475 mg/L;
  - Arsenic in November and December 2020, and from July 2021 and later, with predicted concentrations ranging up to 0.53 mg/L;
  - Phosphorus from December 2020, with predicted concentrations up to 0.6 mg/L;
  - Nickel from July 2024, with predicted concentrations up to 0.32 mg/L;
  - Zinc from July 2020, with predicted concentrations up to 1.7 mg/L; and
  - Ammonia from July 2020, with predicted concentrations up to 649 mg-N/L.
- **Whale Tail Pit**: exceeds discharge criteria for arsenic annually from 2019, between June/July and September/October (three to five months per year), with predicted concentrations up to 0.86 mg/L.
- **IVR Pit**: exceeds discharge criteria for arsenic in August 2020, August to October 2021, and June to October from 2022 to 2025, with predicted concentrations up to 2.2 mg/L.
- **Whale Tail Attenuation Pond**: exceeds discharge criteria for arsenic between July and September 2019 and 2020, and between June and September/October from 2022 to 2025. Also exceeds Canadian Environmental Quality Guideline (CEQG) concentrations for a number of parameters including chloride
- **IVR Attenuation Pond**[6]: exceeds discharge criteria for arsenic between July and October annually, from 2022 to 2025.

Table 2-2. Management of Contact Water – Expansion Project

Sector	Description	Destination (Approved Project)	Destination (Expansion Project)[1]
Mine Sectors and Components			
Whale Tail WRSF	• Contact water from the WRSF sector (including WRSF and landfill) will be collected at the Whale Tail WRSF Pond, which will report to the IVR Attenuation Pond.	Whale Tail Attenuation Pond	IVR Attenuation Pond
Industrial Sector	• The industrial sector and crushing area will be graded to direct surface run-off water towards a collection channel. • Run-off from the industrial sector as well as the ore stockpile, overburden material, and other areas within the local catchment area for the Whale Tail Attenuation Pond will continue to report to the Whale Tail Attenuation Pond. • Surface run-off from the camp will continue to be directed to the Whale Tail Attenuation Pond.	Whale Tail Attenuation Pond	Whale Tail Attenuation Pond

[6] The water quality model assumed that the IVR attenuation pond will be located at Lake A53.

Sector	Description	Destination (Approved Project)	Destination (Expansion Project)[1]
Sewage	• Treated sewage effluent will report to the IVR Attenuation Pond.	Whale Tail Attenuation Pond	IVR Attenuation Pond
Whale Tail Pit and North Sector	• Surface run-off and groundwater infiltration will be directed to the IVR Attenuation Pond.	Whale Tail Attenuation Pond	IVR Attenuation Pond
IVR Pit	• Surface run-off and groundwater infiltration at the IVR Pit will be directed to the IVR Attenuation Pond.	n/a	IVR Attenuation Pond
IVR WRSF	• Contact water from the IVR WRSF will be collected at the IVR WRSF Pond, which will report to the IVR Attenuation Pond.	n/a	IVR Attenuation Pond
Water Attenuation and Treatment			
Whale Tail Attenuation Pond	• In the approved project, the Whale Tail Attenuation Pond receives contact water from other sectors. Water from the pond will be pumped to the water treatment plant. • In the expansion project, most sectors will report to the IVR Attenuation Pond. The Whale Tail Attenuation Pond will continue to receive water from its own catchment including the main camp, industrial sector, ore stockpiles, and seepage from Whale Tail Dike. • In the expansion project, water from the Whale Tail Attenuation Pond will be pumped to the IVR Attenuation Pond prior to treatment and discharge.	Treatment and discharge to Mammoth Lake	IVR Attenuation Pond
IVR Attenuation Pond	• The IVR Attenuation Pond will be constructed as part of the expansion. It will receive contact water from most sectors (other than the direct catchment of Whale Tail Attenuation Pond). • Water from the IVR Attenuation Pond will be pumped to water treatment plant for treatment.	n/a	Water treatment plant
Discharge of Treated Water			
Discharge	• In the approved project, treated water is discharged via submerged diffuser to Mammoth Lake during the open water season. • In the expansion project, treated water will be discharged to Whale Tail Lake (South Basin) and an alternative discharge location (Lake D1 and D5). Discharge will continue to occur via submerged diffuser during the open water season.	Mammoth Lake	Whale Tail Lake (South Basin) and Alternative Discharge Location (Lake D1 and D5)

Source: Golder (2018)

[1] Destination for the expansion project is provided for the period of May 2022 until the end of operations; the IVR Attenuation Pond is planned to be operational in May 2022. Prior to this time, contact water will be directed to the Whale Tail Attenuation Pond.

The predicted quality of effluent from the water treatment plant will be below authorized discharge criteria for all parameters.

The water quality predictions outlined above confirm that the quality of water to be collected and contained at the Whale Tail Pit mine site is deleterious and must be treated before it can be discharged

to the environment. With the seasonal restrictions on treatment and discharge (i.e., limited to ice-free conditions), the need for a suitable contact water attenuation pond is also confirmed.

Table 2-3. Water Quality Monitoring Parameters including Discharge Criteria in Water Licence 2AM-WTP1826 and Schedule 4 of the MDMER

Parameter	Unit	Maximum Concentration (Whale Tail Pit Project)[1]	CCME 1999 Guidelines (long-term)	Maximum Concentration (Schedule 4 of the MDMER)[2]
Conventional Constituents				
Acidity (pH)	n/a	6.0 to 9.5	-	-
Total suspended solids (TSS)	mg/L	15	-	15.00
Total dissolved solids (TDS)	mg/L	1400	-	-
Nutrients				
Total ammonia (NH_3-N)	mg-N/L	16	-	-
Un-ionized Ammonia[3]	mg-N/L	-	-	0.50
Total nitrate (NO_3)	mg-N/L	-	2.93	-
Total phosphorus (P)	mg-P/L	0.3	0.01	-
Metals				
Aluminum (Al)	mg/L	0.5	0.1	-
Arsenic (As)	mg/L	0.1	0.025	0.30
Boron (B)	mg/L	-	1.5	-
Cadmium (Cd)	mg/L	0.002	0.000040	-
Chromium (Cr)	mg/L	0.02	0.001	-
Copper (Cu)	mg/L	0.1	0.002	0.30
Iron (Fe)	mg/L	1.0	0.3	-
Lead (Pb)	mg/L	0.05	0.001	0.10
Mercury (Hg)	mg/L	0.004	0.000026	-
Nickel (Ni)	mg/L	0.25	0.038	0.50
Selenium (Se)	mg/L	-	0.001	-
Silver (Ag)	mg/L	-	0.0001	-
Thallium (Tl)	mg/L	-	0.0008	-
Uranium (U)	mg/L	-	0.015	-
Zinc (Zn)	mg/L	0.1	0.03	0.50
Other				
Total petroleum hydrocarbons (TPH)	mg/L	3.0		-
Chloride (Cl)	mg/L	-	120	-
Fluoride (F)	mg/L	-	0.12	-
Cyanide	mg/L	-	-	0.50
Radium 226	Bq/L	-	-	0.37

[1] Maximum monthly mean concentrations authorized for discharge to Mammoth Lake, as defined in Water Licence No. 2AM-WTP1826.

[2] Maximum authorized monthly mean concentration, as defined in Table 2 of Schedule 4 of the MDMER.

*[3] Calculated as: [total ammonia] * (1/(1 + 10^(pKa-pH))), where pH is the pH of the effluent sample, and pKa is a dissociation constant (0.09018 + 2729.92/T, where T is the temperature of the effluent sample in kelvin).*

3. SETTING

This section describes the general setting of the Amaruq property and Whale Tail Pit Project, including the physical environment (Section 3.1), biological environment (Section 3.2), and human environment (Section 3.3).

The information in this section is derived from the Water Management Plan (Agnico Eagle 2017) for the approved Whale Tail Pit Project, Water Licence 2AM WTP1826 (NWB 2018), and relevant sections of the Whale Tail Pit Project FEIS (Agnico Eagle 2016). Baseline studies at the Amaruq property began in 2014 and described in reports included in the FEIS. The incorporation of IQ and traditional land use information has been obtained from the *Inuit Qaujimajatuqangit Baseline Report*[7] unless otherwise indicated.

3.1 PHYSICAL ENVIRONMENT

The following sections are based on baseline site conditions described in the Water Management Plan for the approved Whale Tail Pit Project.

Climate

The mine site is located at the southern limit of the Northern Arctic ecozone, in an arid Arctic environment that experiences extreme winter conditions. Monthly mean temperatures range between -31.3°C in January, and 11.6°C in June. Mean temperatures are above freezing in June, July, August, and September. During this short summer season, ice on lakes usually breaks up in mid- to late-June and begins to form again in October. The property receives 249 mm annual mean precipitation (59% rain, 41% snow).

Climate change in the Arctic is occurring more rapidly than at mid-latitudes, and recent models predict that spring and autumn temperatures could increase by 3 to 5°C and 7 to 13°C, respectively, by 2100. IQ from land users indicates that weather patterns have changed in the past two decades, including alterations to the length and timing of traditional Inuktitut seasons. The effects of these changes to terrestrial, aquatic and marine ecosystems, and the social and economic systems of the Arctic are an active area of research, but are likely to be negligible within the life of the Whale Tail Pit Project.

Terrain and Geology

The regional landscape is typified by an abundance of waterbodies surrounded by vegetated uplands. Open water includes rivers, streams, lakes and ponds. The Whale Tail Pit Project is located within the Rae domain of the Western Churchill geological province of the Canadian Shield. The local geology is characterized by Archean-age volcanic and sedimentary rocks, including mafic volcanic rocks and felsic intrusive rocks.

[7] *Inuit Qaujimajatuqangit Baseline Report*. June 2016. Included as Appendix 7-A of the Whale Tail Pit Project: Final Environmental Impact Statement.

The general topographic landscape has a flat relief and elevations varying between 150 m and 200 m above sea level. Land features are typical of glaciated areas, with a permafrost terrain characterized by the presence of low, gently rolling hills, a few large boulder field areas, and numerous lakes and rivers.

Overburden thickness in the vicinity of Whale Tail Lake can be up to 10 m thick overlying bedrock, and moraine/till is the predominant material. The till comprises a silty sand matrix with clasts varying in size from granule gravel to large boulders. Stones are found both within the till and on the surface. There are glaciofluvial and bedrock surfaces north and east of Nemo Lake.

The area has a relatively low seismic risk.

Permafrost

The Whale Tail Pit Project is located in an area of continuous permafrost, although taliks[8] are expected to exist under lakes greater than 2 m in depth. Permafrost underlies more than 90% of the landscape, at a depth of 450 to 550 m depending on proximity to lakes. The active layer (i.e., seasonally thawed) is typically within 1.0 and 1.5 m of the surface.

Groundwater Hydrology

Two groundwater regimes are identified at the site: there is a deep flow regime beneath the base of the permafrost, and a shallow flow regime located within the active layer close to the surface. Within the active layer, the water table generally parallels the surface topography, flowing to local depressions and ponds that drain to larger lakes. Flow velocities range from 0.004 m/day to 0.080 m/day.

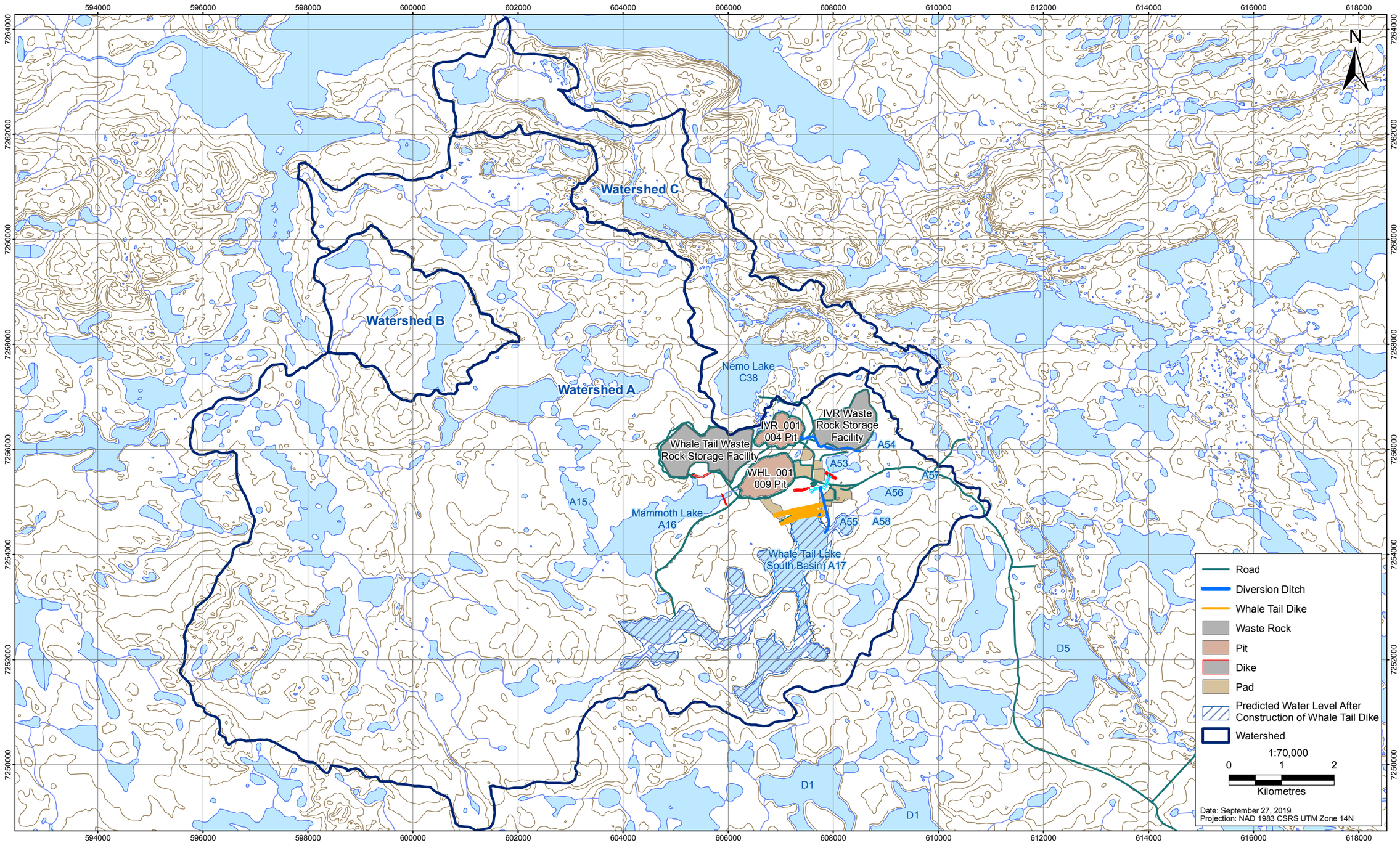
Surface Hydrology

Surface waterbodies around the Whale Tail Pit Project are nominally denoted by watershed, each with an alpha-numeric indicator (Figure 3-1). The Whale Tail Pit Project is located is located between Whale Tail Lake (Lake A17, in Watershed "A"), Mammoth Lake (Lake A16, in Watershed "A"), and Nemo Lake (Lake C38, in Watershed "C"). Watersheds A and C both drain north to the Meadowbank River, Back River, and to the Arctic Ocean southwest of the Boothia Peninsula.

The region comprises an extensive network of lakes, ponds, and interconnecting streams. Lakes make up 16% of the total surface area of Watershed A. Shorelines are typical of morainal terrain, with boulder gardens mixed with cobble. Surface soils or organic materials are limited. There are also limited areas of bedrock and some sandy shorelines. Between lakes, water typically flows through areas of large boulders or below the surface, making flow measurements difficult.

[8] Taliks are areas of unfrozen ground that exist year-round within permafrost areas. They often occur beneath lakes and rivers.

Figure 3-1
Watersheds Adjacent to the Approved Project and Expansion Project



The depth of lakes in Watershed A ranges from around 2 to 25 m. Whale Tail and Mammoth lakes are some of the deeper lakes in the watershed. Whale Tail Lake has a maximum baseline depth of 18.3 m (mean 5.1 m), and Mammoth Lake has a maximum depth of 17.2 m (mean 3.9 m).

Snowmelt typically peaks from late-May to mid-June, and rapidly declines in July. There is a secondary peak resulting from rainfall events in September, but otherwise surface discharges remain low until freezing in October/November. All watercourses are frozen over the winter.

Surface Water Quality

Conventional water quality parameters (pH, major ions, nutrients, metal concentrations, etc.) indicate that the surface water quality of the Whale Tail Pit Project study area, prior to any influence of mineral exploration, is pristine with low levels of contaminants. The majority of water chemistry parameters were below the analytical detection limit, and thus well below water quality guidelines for the protection of aquatic life[9] and drinking water[10]. IQ indicates that drinking water is good quality based on temperature, clarity, and other factors.

In general (i.e., not specific to the study area), consultation with youth in Baker Lake indicated that dust deposition and colour changes to water can lead to concerns about surface water quality. These concerns have arisen in relation to some waterbodies close to the community.

Lake waters are characteristic of low productivity headwater lakes in the Arctic, with soft water, low alkalinity, low turbidity, and low total suspended solids. There is a minor thermal stratification in some deeper lakes; water columns are generally well oxygenated, and pH is neutral-to-slightly acidic. Tributaries are also well oxygenated, with low conductivity and neutral-to-slightly alkaline pH.

3.2 BIOLOGICAL ENVIRONMENT

Fish and Aquatic Habitat

Both IQ and western scientific baseline[11] studies indicate the presence of three fish species—lake trout (*Salvelinus namaycush)*, Arctic char (*Salvelinus alpinus*), and round whitefish *Prosopium cylindraceum)* in the Whale Tail Pit study area, which includes Whale Tail, Mammoth, and Nemo lakes. The latter baseline studies also found burbot (*Lota lota)*, slimy sculpin (*Cottus cognatus*), and ninespine stickleback (*Pungitius pungitius*). Arctic grayling (*Thymallus arcticus*) is also present downstream from these waterbodies, but migration barriers prevent them from moving upstream. Arctic char in the system are land-locked. Consultation with Elders and community members in Baker Lake, and IQ, indicates that Arctic char and lake trout are the preferred species harvested for food.

Of the larger fish species, lake trout is the most abundant and widely distributed species found in Whale Tail Lake and Mammoth Lake, followed by round whitefish and Arctic char. Low numbers of juvenile Arctic char and lake trout are found in some of the tributaries of Whale Tail Lake. The smaller

[9] Canadian Council of Ministers of the Environment (CCME). 1999. Canadian Environmental Quality Guidelines. Updated 2016.
[10] Health Canada. 2017. Guidelines for Canadian Drinking Water Quality.
[11] Summary from Volume 6 (Freshwater Environment) of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle, June 2016.

fish species (ninespine stickleback and slimy sculpin) are widely distributed in larger lakes and tributaries. There are several isolated (or nearly isolated) ponds and small lakes in which no fish were captured during baseline studies.

Channels or streams connecting lakes are characterized as wide and flat, with shallow (or subsurface) flows and extensive boulder gardens. These features may prevent fish from accessing headwater lakes. Movements of large-bodied fish (including adult Arctic char and lake trout) between lakes may therefore be limited to the spring freshet period. However, juveniles may use stream connections for foraging and migration habitat. In consultation with Baker Lake Elders in June 2018, they noted that Arctic char run from the middle to the end of August, and spawn later in October after the ice forms.

Phytoplankton, benthic invertebrate, and water quality characteristics in the vicinity of the Whale Tail Pit mine site, during the open water season, are typical of water in subarctic regions:

- Phytoplankton taxonomic richness is variable, and generally ranges from 30 to 40. Phytoplankton density is typically greater than 1.5 million individuals per litre, with total biomass ranging from 100 mg/m^3 to 440 mg/m^3.
- Benthic invertebrate abundance and richness is typically low.
- Periphyton growth is generally sparse-to-moderate (July), low-to-moderate (August), and moderate-to-high (September).

Terrestrial Ecology

IQ identifies moss, lichen, Arctic cotton, willow, heather, liquorice root, lousewort, mountain sorrel, purple mountain saxifrage, crowberry, blueberry, blackberry, red berry, and cloudberries as occurring in the area of the Whale Tail Pit Project. In addition to these plants, field studies indicate that the vegetation of the area is typical of the Arctic environment, including dwarf shrubs, sedges, and grasses. Habitats are primarily lichen and rock in the uplands and wet graminoid-dominated lowlands, with tundra of varying moisture regimes in between. A variety of flowers are seen during the short summer, including fireweed and wintergreen.[12]

Ecological land classifications within the local study area (1.5 km of the Whale Tail Pit Project) are typical of upland tundra habitat, including Lichen/Rock Complex (27%), Heath Upland (19%), Health Tundra (12%), Boulder/Gravel (7%), Lichen/Tundra (5%), and Water (21%). All other classification types represented less than 2% of the area. High-quality caribou habitat include Lichen/Rock Complex and Health Upland units, which together comprise nearly half of the local study area. During consultation for the Meadowbank mine, Elders also highlighted the importance of lichen and other plants for the diet of caribou.[13]

The majority of land is typified by low-diversity vascular plant communities, dominated by fewer than ten species. The most common and widespread vascular plant species is the northern Labrador-tea

[12] Summary from Volume 5 (Terrestrial Environment) of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle, June 2016.
[13] *Ib id*.

(*Rhododendron tomentosum*) and mountain cranberry (*Vaccinium vitis-idea*). Poorly drained areas are predominantly characterized by graminoid tussock-hummock communities, with low shrub communities occurring along riparian areas adjacent to stream, ponds, and lakes.

Two federally listed plant species have been identified in Nunavut[14], and neither of these species—or suitable habitat—has been identified at the Whale Tail Pit Project. No sensitive, rare, or endangered species or communities have been identified during baseline studies in the area.

Wildlife[15]

Barren-ground caribou, Arctic ground squirrel, and muskox are the most commonly observed mammals in the vicinity of the Whale Tail Pit Project, while the most commonly observed birds are the Lapland longspur, horned lark, redpolls (common and hoary), and snow goose.

Caribou are a valued species throughout the Arctic, and are an important part of Nunavut's traditional economy and culture. Five migratory barren-ground caribou herds (Beverly, Ahiak, Wager Bay, Lorillard, and Qamanirjuaq) are identified throughout the Kivalliq Region. Inuit Elders have expressed concerns that there are fewer caribou in the region than in the past.

Collar data for the five herds indicates that all herds spend time in the regional study area (including Meadowbank and Amaruq properties and connecting road, with a 25 km buffer), although the amount of time is less than 1% of the total time spent within the area annually. Caribou were most commonly recorded in the area in the winter and fall rut. No calving activity or calving ground locations have been identified in the regional study area; traditional knowledge and IQ has also indicated that there are no caribou calving grounds near the Whale Tail Pit Project, and that the nearest calving ground is over 100 km away.

The mine site is in the vicinity of caribou migration corridors in spring and fall. The spring corridor is clearly delineated as caribou move towards calving grounds west of the mine site. The fall migration to wintering grounds is more diffuse and widely distributed. IQ indicates that the spring migration typically travels north of the mine site (west to east), whereas the fall migration travels east to west, generally south of the mine site although it may cross in proximity to the Meadowbank mine and the Amaruq (Whale Tail) haul road.

All esker features are considered to have high suitability for mammal denning (including Arctic wolf and fox), as well as bird nesting and wildlife movements. Wolves and wolf dens have been identified in the vicinity of the mine site, and wolves can be expected to be present alongside caribou during seasonal migrations. IQ also indicates that the occurrence of grizzly bears has increased in the area between Baker Lake and Back River. Wolverine are also observed in the vicinity of the mine site.

Five species of raptors (short-eared owl, snowy owl, rough-legged hawk, peregrine falcon, and gyrfalcon) are believed to be present in the regional study area. Peregrine falcon are known to nest in cliffs created

[14] Porsild's bryum (*haplodontium macrocarpum*) and felt-leaf willow (*Salix siliciola*).
[15] Summary from Volume 5 (Terrestrial Environment) of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle, June 2016.

by quarries. Water birds include ducks, geese, swans, and loons, and are generally not common in the area. Various species of upland breeding birds are present and utilize a wide range of land types including heath upland, heath tundra, and rockier landscapes such as eskers and lichen/rock complex.

There are five wildlife species of concern with breeding or wintering ranges overlapping the Whale Tail Pit Project, including grizzly bear, wolverine, red-necked phalarope (water bird), and peregrine falcon and short-eared owl (raptors). Both raptors are listed on Schedule 1 of the federal *Species at Risk Act*.

3.3 HUMAN ENVIRONMENT

Socio-Economics[16]

The hamlet of Baker Lake is the nearest community to the Whale Tail Pit Project. The hamlet is located on the north shore of Baker Lake near the mouth of the Thelon River, approximately 150 km south of the Whale Tail Pit Project. The next closest communities are Rankin Inlet, Whale Cove, and Chesterfield Inlet.

The population of Baker Lake in 2016 was 2,069, the majority of whom (92%) identify as Inuit[17]. There are approximately 580 households, and the population grew by 10.5% between 2011 and 2016. Traditionally, the Inuit of Baker Lake were highly nomadic, moving seasonally with caribou.

Nunavummiut represent approximately one-third of the workforce at the existing Meadowbank mine, and over half of these workers reside in Baker Lake. Employment incomes for these positions are relatively high compared to local and regional averages, and the median income in Baker Lake has risen 59% since the beginning of mine operations. Residents report that employment income from the mine has enhanced the quality of life by improving financial access to food, hunting equipment, and consumer goods, and enabling workers to assist their extended families.

Land and Resource Use[18]

Traditional land use studies confirm the importance of caribou, fur bearers, birds, fish, and plants/berries in the traditional Inuit land use and way-of-life. Cultural and spiritual areas—including historic trails, camps, caches, and graves—are also highlighted for their importance in the transfer of traditional knowledge and IQ between generations. Traditional land use activities including fishing and hunting also have importance for subsistence livelihoods, retention of traditional skills, values, and language, and other elements of IQ.[19]

[16] Summary from Volume 7 (Human Environment) of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle, June 2016.
[17] Statistics Canada, 2017. *Baker Lake (Hamlet): Census Profile*. 2016 Census of Canada.
[18] Summary from Volume 7 (Human Environment) of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle, June 2016.
[19] *Inuit Qaujimajatuqangit Baseline Report*. June 2016. Included as Appendix 7-A of the Whale Tail Pit Project: Final Environmental Impact Statement.

The practice of subsistence land use activities—including hunting, trapping, fishing, and gathering—is an important component of livelihoods and the household economy, and is also tied to retention of traditional skills, values, and language. Harvest study data indicate low harvest rates from hunting and trapping in the vicinity of the Whale Tail Pit Project, likely as a result of limited access and the long distance from the hamlet of Baker Lake.[20] There is also a relatively low abundance of harvest species, although caribou herds migrate through the region.

Elders and hunters from Baker Lake have reported traditional caribou hunting areas in the vicinity of the Whale Tail Pit Project. Since the development of the all-weather road connecting Baker Lake with the Meadowbank mine, hunting within 50 km of the road has increased. Inuit elders have indicated that they may travel beyond Meadowbank to hunt caribou, as the caribou in these areas are considered to be in better health.

Trapping (furbearers) has generally declined in recent years due to the low price of furs, and generally occurs in areas closer to Baker Lake. Fish are an important subsistence food source, after caribou, and fishing occurs year-round. Preferred fishing grounds include several lakes and rivers close to Baker Lake, and preferred catch includes Arctic char and lake trout.

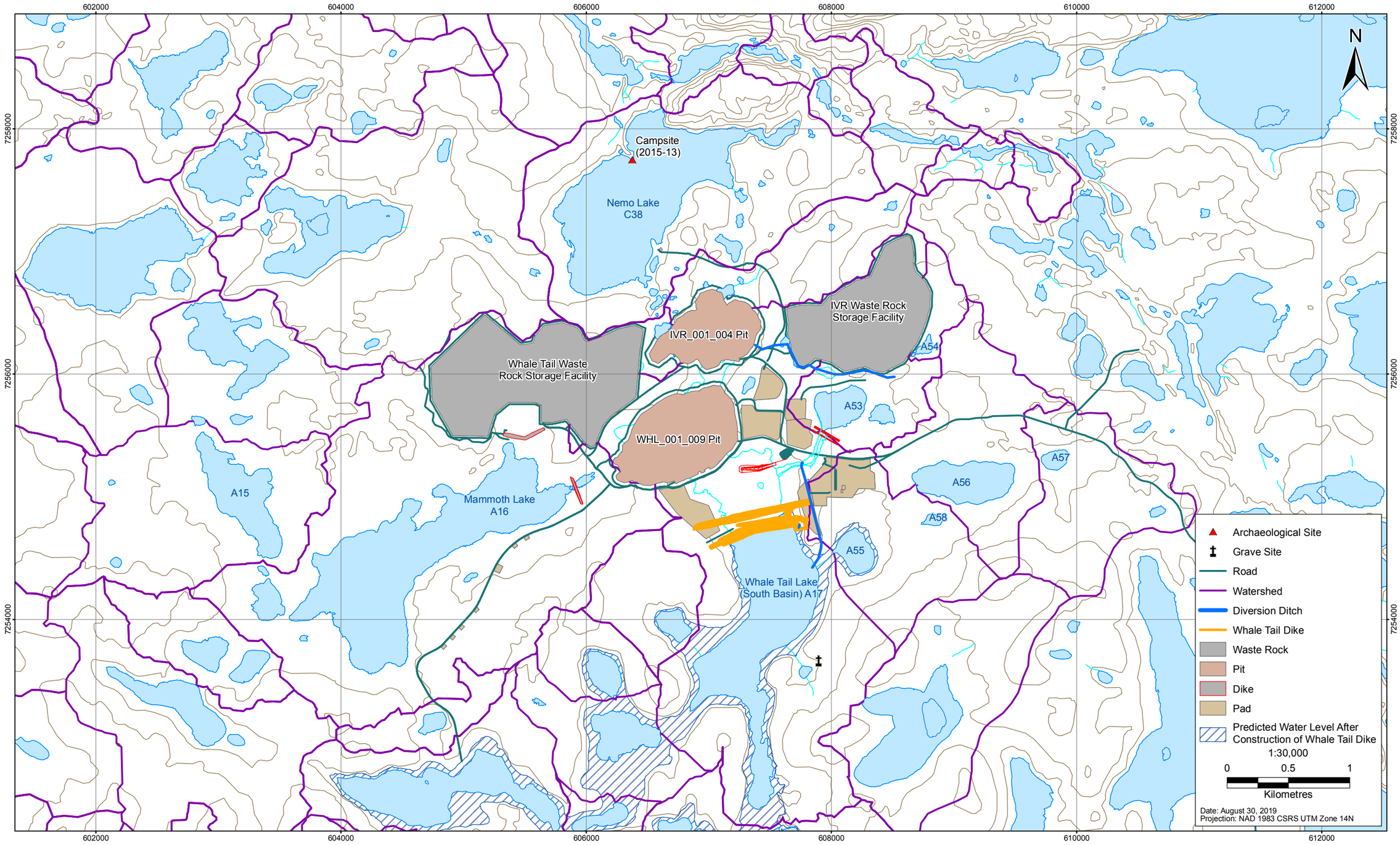
A traditional travel corridor passes in proximity to the Whale Tail Pit Project, used by Inuit travelling overland between Baker Lake in the south, and the Back River and Gjoa Haven in the north. Opportunistic hunting, fishing and other harvesting is reported to occur during travel.[21] Camping areas and food caches were identified in proximity to the Whale Tail haul road, but are relatively distant from the mine site.

Cultural and Heritage Resources[22]

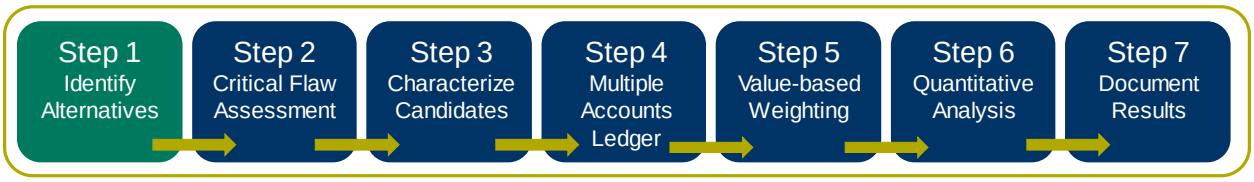
The presence of archaeological sites in the vicinity of the Whale Tail Pit Project highlights the long history of land use in the region by Inuit peoples. One known grave site (including burial cairn and other artefacts) is located approximately 1.5 km south of the Whale Tail Dike on a hill on the east shore of Whale Tail Lake. A historic campsite is north of Nemo Lake. Agnico Eagle has committed to avoiding impacts on these sites. These sites are identified in Figure 3-2.

[20] *Terrestrial Baseline Characterization Report*. November 2015. Included as Appendix 5-C of the Whale Tail Pit Project: Final Environmental Impact Statement.
[21] Feedback from community consultation in Baker Lake, July 2018. Also reported in Volume 7 (Human Environment), Section 7.3 (Traditional Land and Resource Use / *Inuit Qaujimajatuqangit*) of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle, June 2016.
[22] Summary from Volume 7 (Human Environment), of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle, June 2016.

Figure 3-2
Cultural and Archaeological Sites



4. IDENTIFICATION OF ALTERNATIVES (STEP 1)



4.1 OBJECTIVE

Based on the methodology described in Section 1.3.2 and the process established by the ECCC Guidelines, the first step of the alternatives assessment involves identification of reasonable, conceivable, and realistic options for water attenuation at the Whale Tail Pit Project to accommodate the increased volume of contact water associated with the proposed expansion. Threshold criteria are established to frame the basic requirements that must be met for an alternative to be within reason. Evaluation of feasibility is not considered at this stage; rather, alternatives are considered in terms of their capacity to address the basic needs of the project.

4.2 THRESHOLD CRITERIA

Threshold criteria that were considered in the identification of the alternatives for water attenuation included the approved and expansion project footprint. Agnico Eagle is committed to minimizing the footprint of the Whale Tail Pit Project (including approved and expansion projects) in order to minimize and confine environmental impacts.

To avoid extending potential environmental impacts to areas otherwise undisturbed by physical infrastructure, the attenuation pond alternatives were located within the sub-watersheds that will contain the approved and planned mine infrastructure. The approved Whale Tail Pit Project and Whale Tail Pit Expansion Project overlap with the sub-watersheds of Mammoth Lake, Whale Tail Lake (North Basin), Lake A53, Lake A54, and other waterbodies within the expanded mine site (including A46, A47, A59, A50). The study area boundary defined by the affected sub-watersheds is shown in Figure 4-1.

4.3 IDENTIFICATION OF ALTERNATIVES

Within the study area identified in Figure 4-1, Agnico Eagle identified nine potential alternatives for the water attenuation pond (Table 4-1). In accordance with the ECCC Guidelines, this list includes alternatives that would not impact natural waterbodies frequented by fish, including alternatives using man-made structures located within, or are adjacent to, existing mine components; as well as alternatives located in non-fish-bearing waterbodies.

Figure 4-1
Alternatives Assessment Study Area

ERM

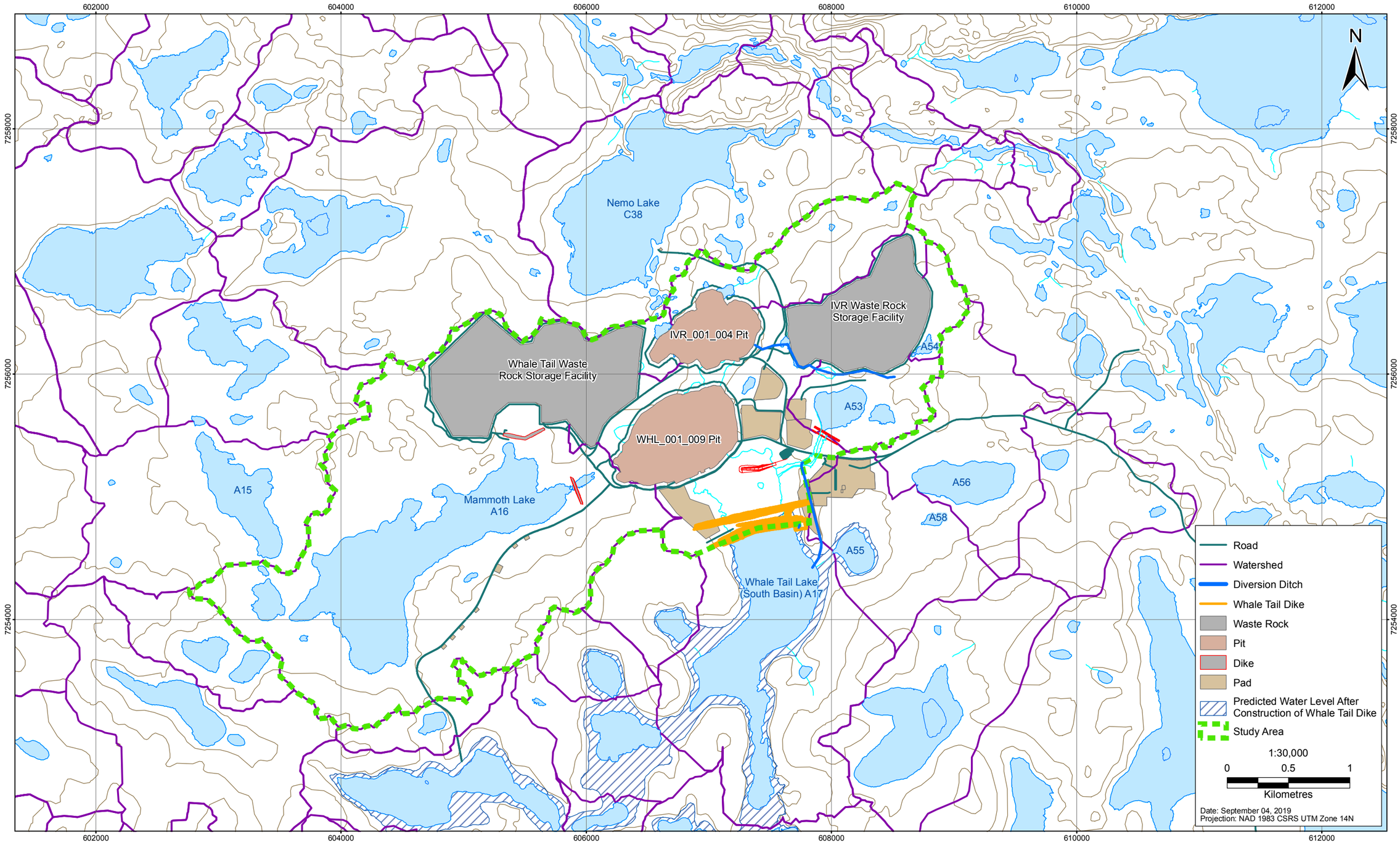


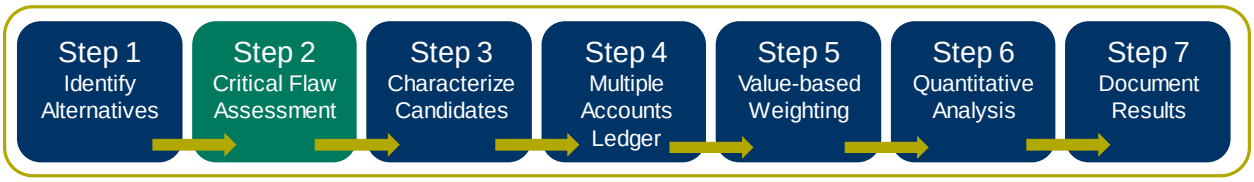
Table 4-1. Preliminary Water Attenuation Pond Alternatives

Alternative	Description	Minimum Capacity	Fish-bearing Waterbodies
A. Expand existing Whale Tail Attenuation Pond (relocate Whale Tail Dike)	The Whale Tail Dike would be moved south, or a second dike constructed, to increase the available area within the North Basin.	• Whale Tail Attenuation Pond would be expanded from 133,000 m^3 to at least 750,000 m^3	Yes – Whale Tail Lake
B. Expand existing Whale Tail Attenuation Pond (northern containment feature)	Containment feature would be constructed along the north side of the Whale Tail Attenuation Pond, which would be enlarged within the drained North Basin of Whale Tail Lake.	• Whale Tail Attenuation Pond would be expanded from 133,000 m^3 to at least 750,000 m^3	None
C. Expand existing Whale Tail WRSF Pond	The WRSF Dike would be elevated to increase the capacity of the Whale Tail WRSF Pond and provide storage within the footprint of a flooded WRSF.	• Whale Tail Attenuation Pond would provide capacity for 133,000 m^3 • Whale Tail WRSF Pond will be expanded from 11,600 m^3 to at least 617,000 m^3	None
D. Expand existing Whale Tail WRSF Pond *and* existing Whale Tail Attenuation Pond	The Whale Tail WRSF Dike would be elevated to increase the capacity of the Whale Tail WRSF Pond; however, the pond would not be increased to a level where waste rock would be in contact with the pond. In addition, a containment feature would be constructed along the north side of the Whale Tail Attenuation Pond, which would be enlarged within the drained North Basin of Whale Tail Lake.	• The combined capacity of Whale Tail Attenuation Pond and Whale Tail WRSF Pond would be expanded from 144,600 m^3 to at least 750,000 m^3	None
E. New attenuation pond at Lake A53	Containment feature(s) would be constructed at Lake A53 to enlarge the existing waterbody.	• Whale Tail Attenuation Pond would provide capacity for 133,000 m^3 • Lake A53 will be expanded to at least 617,000 m^3	Yes – Lake A53
F. New attenuation pond at Lake A54	Containment feature(s) would be constructed at Lake A54 to enlarge the existing waterbody.	• Whale Tail Attenuation Pond would provide capacity for 133,000 m^3 • Lake A54 will be expanded to at least 617,000 m^3	None
G. New attenuation pond at Mammoth Lake	A dam would be constructed to isolate the northern section of Mammoth Lake.	• Whale Tail Attenuation Pond would provide capacity for 133,000 m^3 • The north portion of Mammoth Lake would be isolated to provide capacity for at least 617,000 m^3	Yes – Mammoth Lake

Alternative	Description	Minimum Capacity	Fish-bearing Waterbodies
H. New attenuation pond at Lake A53 *and* expand existing Whale Tail Attenuation Pond	Containment feature(s) would be constructed at Lake A53 to enlarge the existing waterbody. In addition, a containment feature would be constructed along the north side of the Whale Tail Attenuation Pond, which would be enlarged within the drained North Basin of Whale Tail Lake.	• The combined capacity of Whale Tail Attenuation Pond and Lake A53 would be expanded to at least 750,000 m^3	Yes – Lake A53
I. Sequential mining and/or quarry development	Sequential mining and/or quarry development in order to use pits and quarries as temporary attenuation ponds. For example, water would be stored in the Whale Tail Pit while ore is extracted from the IVR Pit, and then pumped to the IVR Pit while the Whale Tail Pit is enlarged.	• The combined capacity of the Whale Tail Attenuation Pond and sequential use of pits and quarries would provide capacity for at least 750,000 m^3	None

Note:
Volume estimates derived from the mean annual water balance for the Whale Tail Pit Expansion Project (Golder 2018): Whale Tail Attenuation Pond – 133,232 m^3; Whale Tail WRSF Pond – 11,631 m^3.

5. CRITICAL FLAW ASSESSMENT (STEP 2)



5.1 OBJECTIVE

The second step of the alternatives assessment screens the remaining alternatives to identify and eliminate those with critical flaws. Critical flaws are defined as un-mitigatable and unavoidable issues that are so unfavourable as to eliminate an alternative as a viable option. This step ensures that the decision-making process is focused on realistic and sufficiently detailed alternatives, each of which could conceivably be implemented as a preferred alternative.

5.2 SCREENING CRITERIA

Screening criteria are yes-or-no questions designed to identify critical flaws. A candidate with one or more critical flaws (i.e., answering *yes* to any of the screening questions) is eliminated from further study.

There is no universal list of screening criteria, and they are developed on a project-specific basis to reflect the needs, constraints, and priorities of the project and proponent. The following screening criteria are identified in regard to the attenuation pond for the Whale Tail Pit Expansion Project:

1. **Engineering and Safety Risks**: Would the design, construction, operation, or closure of the attenuation pond introduce material engineering and/or safety risks?
2. **Sterilization of Mineral Resources or Areas with High Mineral Potential:** Would the attenuation pond sterilize mineral resources or areas with high mineral potential?
3. **Overlap with Areas of High Value:** Would the attenuation pond overlap with lands or waters designated as having high environmental, cultural, and/or archaeological value?
   - High environmental value: includes important areas for caribou (calving and post-calving areas, and water crossings) and other areas determined to be of high importance to wildlife, protected plant and animal species, or otherwise critical for ecosystem function.
   - High cultural value: includes culturally or spiritually important places as identified through consultation, TK, and/or IQ.
   - High archaeological value: includes known archaeological sites such as burial sites.
4. **Contradiction with mine plan:** Would construction, operation, or closure of the attenuation pond contradict the approved mine plan for the Whale Tail Pit Project?
5. **Sufficient storage capacity**: Does the attenuation pond have the capacity to store up to 750,000 m^3 of contact water?

6. **Alignment with Water Management Guiding Principles**: Would construction, operation, or closure of the attenuation pond contradict the approved water management plan for the Whale Tail Pit Project?

5.3 CRITICAL FLAW ASSESSMENT

5.3.1 Analysis

Engineering and Safety Risks

Engineering or safety risks that cannot be mitigated, and create unreasonable risks for the environment and/or personnel, are not acceptable to Agnico Eagle and are unlikely to be permitted by regulators.

No material engineering or safety risks are identified for any of the remaining seven candidates, although some candidates are noted to have higher risks than others.[23] In particular, alternatives B and H involve the development of an expanded attenuation pond in the drained North Basin of Whale Tail Lake. This waterbody would be adjacent to the south wall of the Whale Tail Pit and ramp, as well as workers and equipment operating in the pit. However, comparable water retaining features have been successfully maintained at other operating mines, and this risk is not considered to be material.

Sterilization of Mineral Resources or Areas with High Mineral Potential

Sterilization of mineral resources, such that an alternative would preclude future mineral exploration or development, is considered to be a critical flaw. The Whale Tail Pit Expansion Project is located on Inuit Owned Land (IOL); under the Nunavut Agreement, and Nunavut Tunngavik Incorporated (NTI) holds title to subsurface resources on IOL, on behalf of the Inuit. Agnico Eagle is afforded the right to explore and extract minerals from the property though a mineral exploration agreement with NTI. Sterilization of mineral resources or areas with high mineral potential would effectively remove these resources from future use by, and/or for the benefit of, the Inuit.

Based on Agnico Eagle's understanding of the proven and inferred mineral resources at the Whale Tail Pit Project, none of the seven alternatives would sterilize mineral resources or areas with high mineral potential.

Overlap with Areas of High Value

The remaining alternatives are located in close proximity to the approved Whale Tail Pit Project mine site to minimize the footprint of the proposed expansion and avoid impacts on areas of high environmental, cultural, or archaeological values. Previous baseline studies have investigated areas of high value within and around the mine site:

[23] Alternative C (eliminated in Section 4.4 as it does not align with Agnico Eagle's guiding principles for water management) would also present material engineering and safety risks in regard to the flooding of the Whale Tail WRSF and the resulting geochemical and physical stability risks.

- **Important areas for caribou:** Animals on designated calving grounds are protected from May 15 to July 15, and cows and calves are sensitive to disturbance for three weeks after calving. The Whale Tail Pit Expansion Project will not affect calving or post-calving areas, which are located at a considerable distance from the RSA. Water crossings are also important during the annual migration of caribou as caribou follow natural landscape features and congregate at water crossings; activities within 5 km of designated water crossings are prohibited from May 15 to September 1. No designated water crossings will be affected by the Whale Tail Pit Expansion Project. [24]
- **Protected plant and animal species:** No sensitive, rare, or endangered species or communities have been identified during baseline studies in the vicinity of the alternatives.
- **Archaeological sites:** Two indigenous historic sites are identified in the vicinity of the Whale Tail Pit Expansion Project, each designated as having a perceived 'high' significance. One site is a historic campsite approximately 600 m north of the freshwater intake at Nemo Lake, and the other is a burial cairn (with human remains) over 1.5 km south of the Whale Tail Dike on the east bank of Whale Tail Lake. [25]
- **Areas of cultural or spiritual value**: The protection of trails, camps, cabins, caching sites, gravesites, and other culturally important sites, and the maintenance of traditional travel routes, is important to the Baker Lake Elders as these areas are valued for transferring knowledge to future generations and to educate youth.[26] No historic sites or travel routes are identified in relation to any of the remaining alternatives.

Therefore, no areas of high environmental, cultural, or archaeological value are expected to be overlapped or otherwise affected by any of the remaining seven alternatives.

Contradiction with Approved Mine Plan

At the time of writing, the approved Whale Tail Pit Project is under construction per an approved mine plan. It is important that alternatives align with the approved mine plan in order to reduce engineering risks and environmental disturbance, schedule delays, and related implications. Contradiction with the mine plan for the approved Whale Tail Pit Project would be a critical flaw.

Two of the preliminary alternatives contradict the approved mine plan:

- Alternative A would enlarge the existing Whale Tail Attenuation Pond by moving the Whale Tail Dike further south (within Whale Tail Lake [South Basin]) or constructing a second dike south of the existing dike. Construction of the Whale Tail Dike began in the summer of 2018 and redesign of the dike is not possible. On this basis, Alternative A is eliminated.

[24] *Terrestrial Baseline Characterization Report*. November 2015. Included as Appendix 5-C of the Whale Tail Pit Project: Final Environmental Impact Statement.
[25] Volume 7 (Human Environment), Section 7.2 (Heritage Resources) of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle. June 2016.
[26] Volume 7 (Human Environment), Section 7.4 (Socio-Economics) of *Whale Tail Pit Project: Final Environmental Impact Statement*. Agnico Eagle. June 2016.

- Alternative I would require sequential mining and/or quarry development in order to utilize the pits and quarries as temporary attenuation ponds. Development of the Whale Tail Pit Expansion Project is based on extraction of ore from both pits (Whale Tail Pit and IVR Pit) simultaneously. Alternative I is not aligned with the approved mine plan as it would prevent simultaneous extraction from the Whale Tail and IVR pits, resulting in negative life-of-project economics. On this basis, Alternative I is eliminated.

Must provide sufficient storage capacity

For the purposes of the MAA, the Whale Tail Pit Expansion Project will require storage of up to 750,000 m^3 of contact water. Therefore, the attenuation pond (or combination of ponds) must have the capacity to store 750,000 m^3 of water. The current water management plan includes storage of approximately 133,000 m^3 of water in the Whale Tail Attenuation Pond; therefore, an additional attenuation pond is required to store at least 617,000 m^3.

Contradiction with water management guiding principles

Agnico Eagle has a water management plan for the approved Whale Tail Pit Project (Agnico Eagle 2019). This plan is based on controlling and minimizing contact water, storing water over the winter (October through May), and treating and discharging treated water in the open water season (June to September). The water management plan is guided by the following principles, further described in Section 2.4.1:

- keep different water types (i.e., contact, non-contact, and freshwater) separated to the extent practical;
- control and minimize contact water through diversion and containment;
- minimize freshwater usage by recycling and reusing the contact and process water to the extent practical; and
- meet discharge criteria before any site contact water is released to the downstream environment.

These principles provide the operational basis for the approved project and the proposed project expansion, and align with good industry practice for water management. Ultimately, Agnico Eagle does not support alternatives that would not align with the Whale Tail Pit Project's water management plan, including alternatives that would require or result in unnecessary exposure of waste rock to water such that the volume or quality of contact water would be adversely affected.

Treatment and discharge of contact water is approved and permitted for the Whale Tail Pit Project and includes a water treatment plant located east of the Whale Tail Attenuation Pond, a discharge pipeline running east-west along the south perimeter of the Whale Tail Pit, and a submerged discharge diffuser at Mammoth Lake. Due to seasonal constraints, water will be collected and contained year-round for treatment and discharge during ice-free conditions (June to September).

5.3.2 Results

Table 5-1 summarizes the results of the critical flaw assessment. A critical flaw is identified for four alternatives:

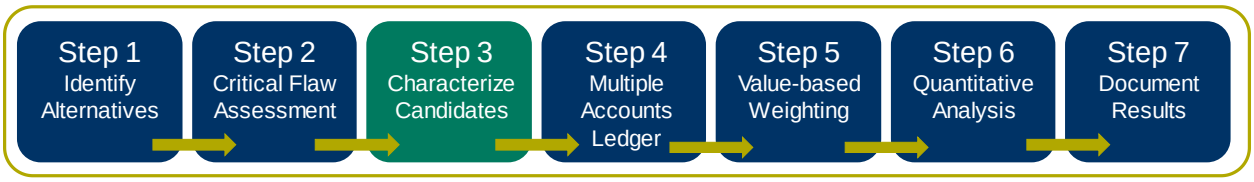
- **Alternative A: Enlarging the existing Whale Tail Attenuation Pond** by moving the Whale Tail Dike further south or constructing a second dike south of the existing dike would contradict the approved mine plan for the Whale Tail Pit Project as it would require adjustment of the Whale Tail Dike, which is already under construction.
- **Alternative C: Enlarging the existing WRSF Pond** by raising the water level to store water within the WRSF does not align with Agnico Eagle's water management plan (or guiding principles for water management) as it would increase exposure of waste rock to water such that the quality of contact water would be adversely affected (Agnico Eagle 2017b).
- **Alternative D: Expand the existing Whale Tail WRSF Pond *and* existing Whale Tail Attenuation Pond** would not provide sufficient capacity. The Whale Tail WRSF Pond can only be enlarged to a small degree without flooding the WRSF. As such, the vast majority of water volume would be contained with the expanded Whale Tail Attenuation Pond. This alternative is eliminated as it is not significantly different from Alternative B.
- **Alternative I: Sequential mining and/or quarry development** would contradict the approved mine plan for the Whale Tail Pit Project as it would prevent the extraction of ore from both pits simultaneously.

The remaining five alternatives (B, E, F, G, and H) are further characterized in Step 3.

Table 5-1. Critical Flaw Assessment

Alternative	Screening Criteria					
	Would the design, construction, operation, or closure of the attenuation pond introduce material engineering and/or safety risks?	Would the attenuation pond sterilize ore, or areas of known or high potential mineralization?	Would the attenuation pond overlap with lands or waters designated as having high environmental, cultural, and/or archeological value?	Would construction, operation, or closure of the attenuation pond contradict the approved mine plan for the Whale Tail Pit Project?	Does the attenuation pond have insufficient capacity to store up to 750,000 m^3 of contact water?	Would construction, operation, or closure of the attenuation pond contradict the approved water management plan for the Whale Tail Pit Project?
A. Expand existing Whale Tail Attenuation Pond (adjust Whale Tail Dike)	No	No	No	Yes – construction of the Whale Tail Dike is already underway, and cannot be adjusted	No	No
B. Expand existing Whale Tail Attenuation Pond (northern containment feature)	No	No	No	No	No	No
C. Expand existing Whale Tail WRSF Pond	No	No	No	No	No	Yes – this alternative does not align with Agnico Eagle's guiding principles for water management
D. Expand existing Whale Tail WRSF Pond and existing Whale Tail Attenuation Pond	No	No	No		Yes – expanding the WRSF Pond without flooding the WRSF does not provide sufficient storage capacity	No
E. New attenuation pond at Lake A53	No	No	No	No	No	No
F. New attenuation pond at Lake A54	No	No	No	No	No	No
G. New attenuation pond at Mammoth Lake	No	No	No	No	No	No
H. New attenuation pond at Lake A53 *and* expand existing Whale Tail Attenuation Pond	No	No	No	No	No	No
I. Sequential mining and/or quarry development	No	No	No	Yes – mining sequentially rather than simultaneously would contradict the approved mine plan	No	No

6. CHARACTERIZATION OF ALTERNATIVES (STEP 3)



6.1 OBJECTIVE

This step characterizes the remaining alternatives to prepare for the MAA, which compares the alternatives at a detailed level and ensures that the necessary information is available to support this comparison.

6.2 NOMENCLATURE

At this stage, the remaining alternatives are developed in further detail. To support a clear and concise comparison of the remaining alternatives. Table 6-1 provides revised nomenclature for each alternative.

Table 6-1. Naming of Remaining Alternatives

No.	Name	Former Name	Description
I.	**A53**	Alternative E: New attenuation pond at Lake A53	Storage provided by the existing Whale Tail Attenuation Pond and a new pond at Lake A53.
II.	**A53/WT-Ex**	Alternative H: New attenuation pond at Lake A53 and expand existing Whale Tail Attenuation Pond	Storage provided by an expanded Whale Tail Attenuation Pond and a new pond at Lake A53.
III.	**A54**	Alternative F: New attenuation pond at Lake A54	Storage provided by the existing Whale Tail Attenuation Pond and a new pond at Lake A54.
IV.	**MAM**	Alternative G: New attenuation pond at Mammoth Lake	Storage provided by the existing Whale Tail Attenuation Pond and a new pond created by isolating the northern section of Mammoth Lake.
V.	**WT-Ex**	Alternative B: Expansion of existing Whale Tail Attenuation Pond (northern containment feature)	Storage provided by expanding the existing Whale Tail Attenuation Pond.

6.3 APPROACH

Based on the ECCC Guidelines, characterization is conducted for the following four categories (referred to as "accounts"):

- **Technical Account**, including considerations relating to design, engineering, construction, operation and closure;
- **Biophysical Environment Account**, including valued components of the physical and biological environment;

- **Human Environment Account**, including valued components relating to socio-economic, land use, and community and Inuit well-being; and
- **Project Economics Account**, including project costs relating to the design, construction, operation, and closure of the attenuation pond alternatives.

The five remaining alternatives are described and characterized for each of the four accounts, based on available baseline data and/or design information, in Section 6.5. As noted previously and illustrated in Figure 6-1, Agnico Eagle has also looked to TK and IQ to inform the characterization of the biophysical and human environments. Within the four accounts, Section 6.6 identifies and describes specific criteria that characterize each of the alternatives.

Agnico Eagle included the attenuation pond alternatives in consultation activities in Baker Lake and Chesterfield Inlet in July 2018. During these consultations, four of the five remaining alternatives were presented,[27] along with an explanation of the alternatives assessment process and how inputs from the communities would be incorporated into the assessment. The outcomes of these consultations are summarized in Section 6.5.5.

6.4 SCOPE

The characterization of the alternatives assumes that the following water management processes will apply:

- an identical volume and quality of contact water will be stored in the winter for each of the alternatives, and the sources of the contact water will be the same;
- the existing Whale Tail Attenuation Pond will continue to be utilized, either at its design capacity of 133,232 m^3, or enlarged (depending on the alternative); and
- contact water will be transported from the attenuation pond to the water treatment plant (as for the approved project) and treated water will be discharged via the discharge pipeline and diffuser to Whale Tail Lake (South Basin) for all alternatives.

As these processes apply to all alternatives, the conceptual design and technical characterization of the alternatives is limited to (1) the storage of water in the attenuation pond(s), and (2) the transport of contact water to and from the attenuation pond (from source to attenuation pond, and from attenuation pond to water treatment plant).

6.5 CHARACTERIZATION OF ALTERNATIVES

The five remaining alternatives are summarized in Table 6-2, and design concepts are illustrated in Figure 6-2 through Figure 6-6.

[27] Alternative II (A53/WT-Ex) was developed as a possible optimization of Alternative I (A53) following consultations in July 2018. Although this alternative was not included in the July 2018 consultations, both components (use of Lake A53 and expansion of the Whale Tail Attenuation Pond) were addressed.

Figure 6-1
Incorporation of Traditional Knowledge and IQ in Characterization of Alternatives

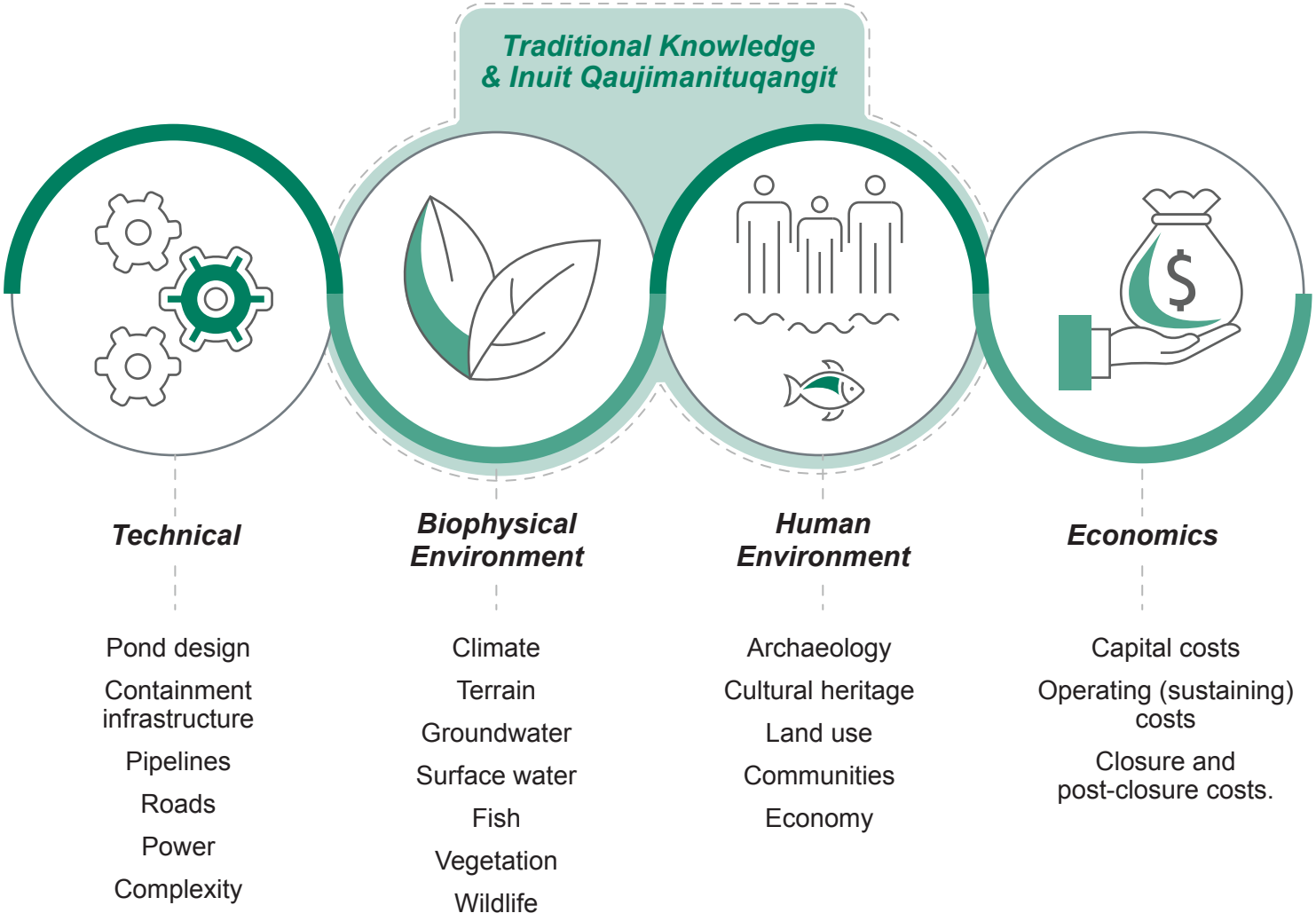


Table 6-2. Attenuation Pond Alternatives: Design Concept

Alternative	Description	Fish-Bearing
I. A53	• Three (3) dams would be constructed at Lake A53 to enlarge the existing waterbody to store a maximum capacity of 646,638 m^3. One dam would cross the southwest channel (formerly connecting Lake A53 to the North Basin of Mammoth Lake). Two smaller dams would be constructed at the northwest and southeast sections of the lake. • The existing Whale Tail Attenuation Pond would be utilized as currently designed, with a maximum storage capacity of 133,232 m^3.	Yes
II. A53/WT-Ex	• Three (3) dams would be constructed: o Two (2) dams would be constructed at Lake A53 to enlarge the existing waterbody to store a maximum volume of 473,300 m^3. o One dam would be constructed at the Whale Tail Attenuation pond to enlarge this pond to store a maximum capacity of 288,666 m^3.	Yes
III. A54	• Two (2) dams would be constructed at Lake A54 to enlarge the surface area of the existing waterbody by approximately 2,000%, to a maximum storage capacity of 622,040 m^3. The primary dam would be U-shaped, containing the waterbody on the east, west, and south sides. The pond would abut the east side of the IVR WRSF. • The existing Whale Tail Attenuation Pond would be utilized as currently designed, with a maximum storage capacity of 133,232 m^3.	No
IV. MAM	• One (1) dam would be constructed across the northwest arm of Mammoth Lake. The northwest section of the lake would be isolated from the rest of the lake for use as the attenuation pond, with a maximum storage capacity of 762,942 m^3. • The existing Whale Tail Attenuation Pond would be utilized as currently designed, with a maximum storage capacity of 133,232 m^3.	Yes
V. WT-Ex	• One (1) dam would be constructed adjacent to the south wall of the Whale Tail Pit (set back by 85 m) to enlarge the Whale Tail Attenuation Pond, with a maximum storage capacity of 758,870 m^3.	No

At this stage, each standalone design concept would provide the required capacity of 750,000 m^3. The following sections describe the five remaining alternatives in terms of their technical, biophysical, human, and project economic aspects. As recommended in the ECCC Guidelines, two of the alternatives would not impact natural fish-bearing waterbodies.

6.5.1 Technical Account

Table 6-3 summarizes the basic design and technical elements of each alternative. A brief description of each alternative is provided below.

Figure 6-2
Alternative I: A53

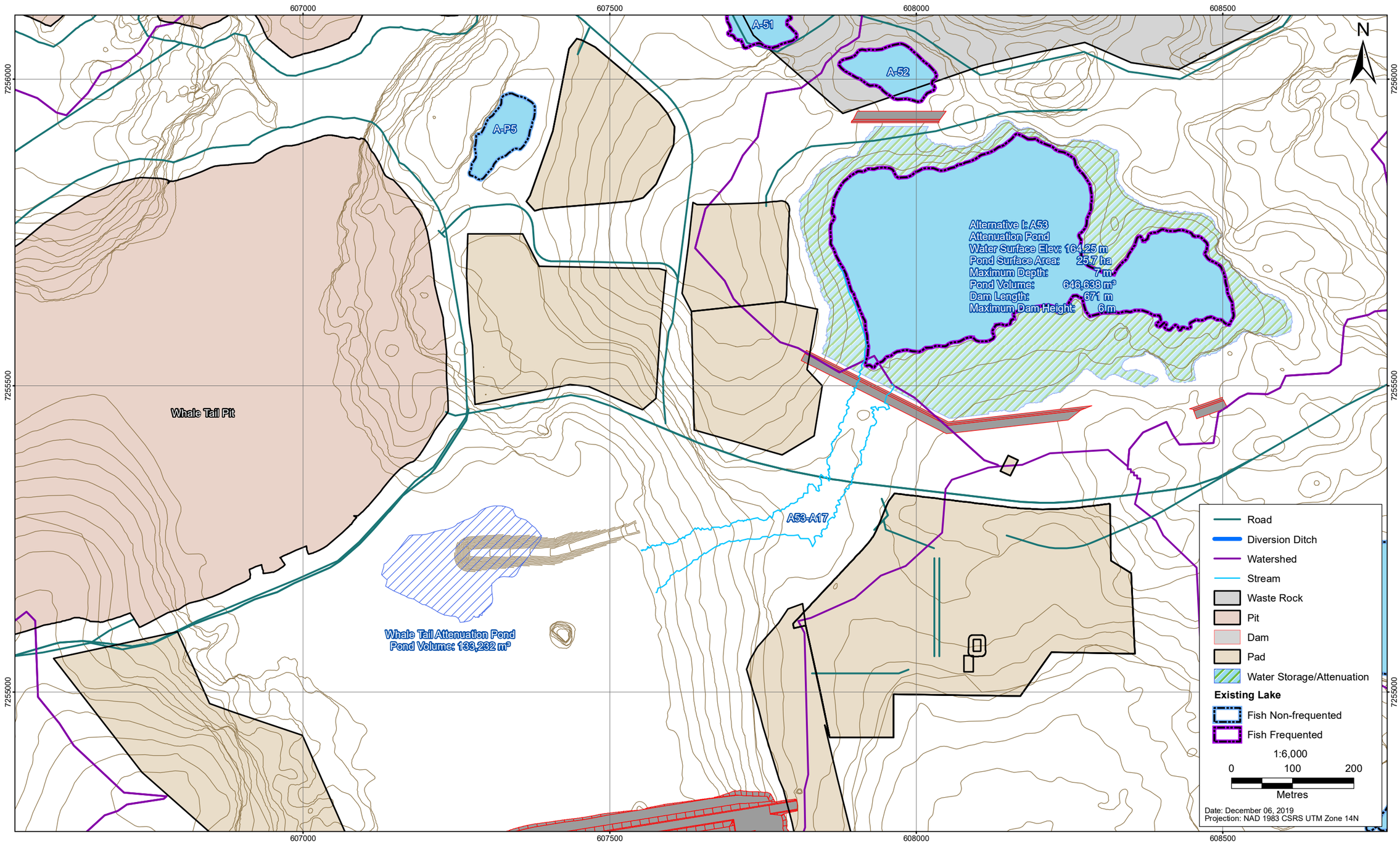


Figure 6-3
Alternative II: A53/WT-Ex

ERM

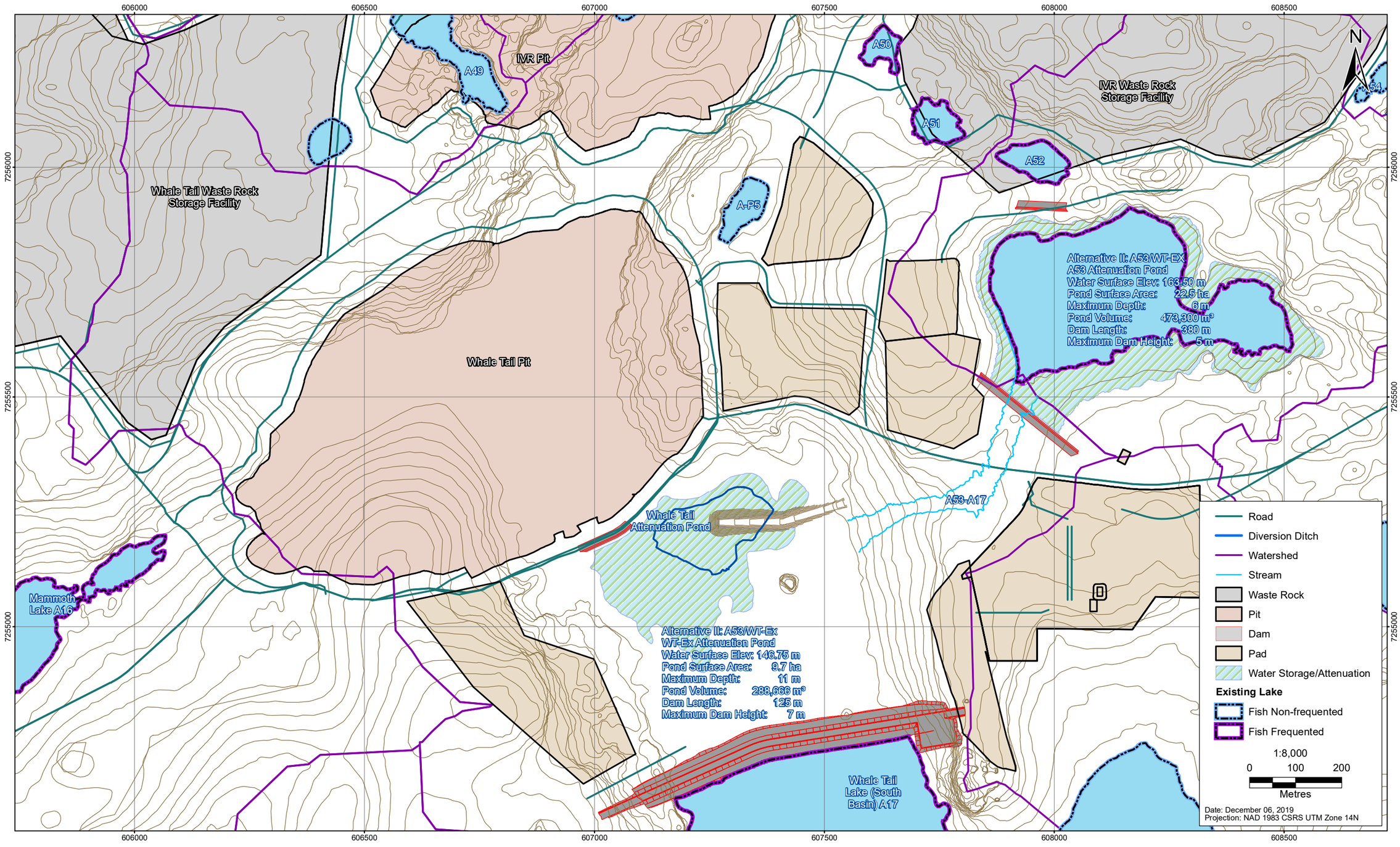


Figure 6-4
Alternative III: A54

ERM

606000 606500 607000 607500 608000 608500 609000 609500

7256500 7256000 7255500 7255000

N

Nemo Lake
C388

C41
C39
C40
C-P1
A-P37
A-P38
A48
A47
A49
IVR Pit
A50
A51
A52
IVR Waste Rock
Storage Facility
A54
Alternative III: A54
A54 Attenuation Pond
Water Surface Elevation: 172.50 m
Pond Surface Area: 20.5 ha
Maximum Depth: 6 m
Pond Volume: 622,040 m³
Dam Length: 2,422 m
Maximum Dam Height: 12 m
A-P5
A53
Whale Tail Waste Rock
Storage Facility
Whale Tail Pit
A53-A17
Whale Tail Attenuation Pond
Pond Volume: 133,232 m³
Mammoth
Lake A16
A56
A58
Whale Tail
Lake (South
Basin) A17

Road
Diversion Ditch
Watershed
Stream
Waste Rock
Pit
Dam
Pad
Water Storage/Attenuation
Existing Lake
Fish Non-frequented
Fish Frequented

1:10,000
0 200 400
Metres

Date: December 06, 2019
Projection: NAD 1983 CSRS UTM Zone 14N

Figure 6-5
Alternative IV: MAM

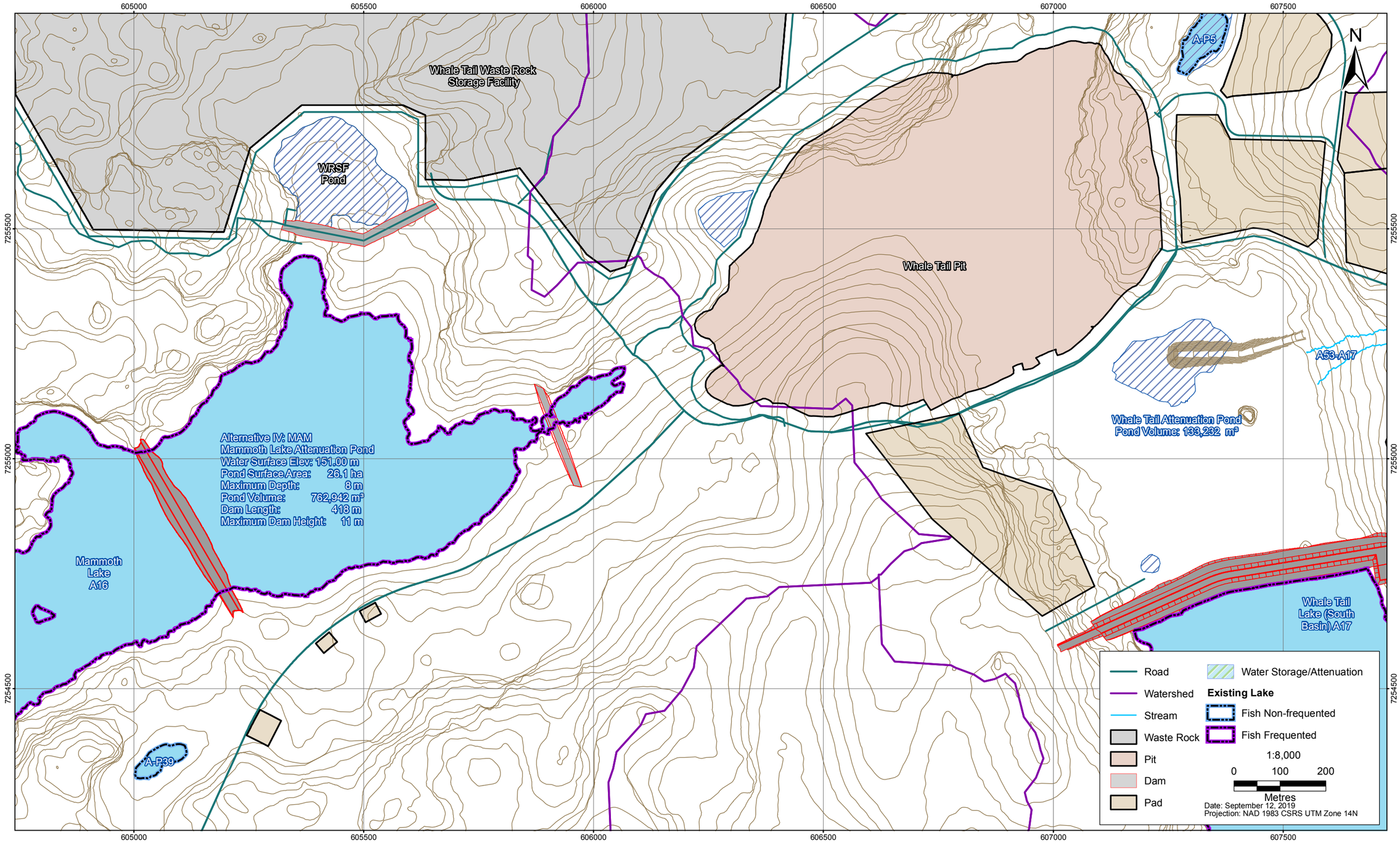


Figure 6-6
Alternative V: WT-Ex

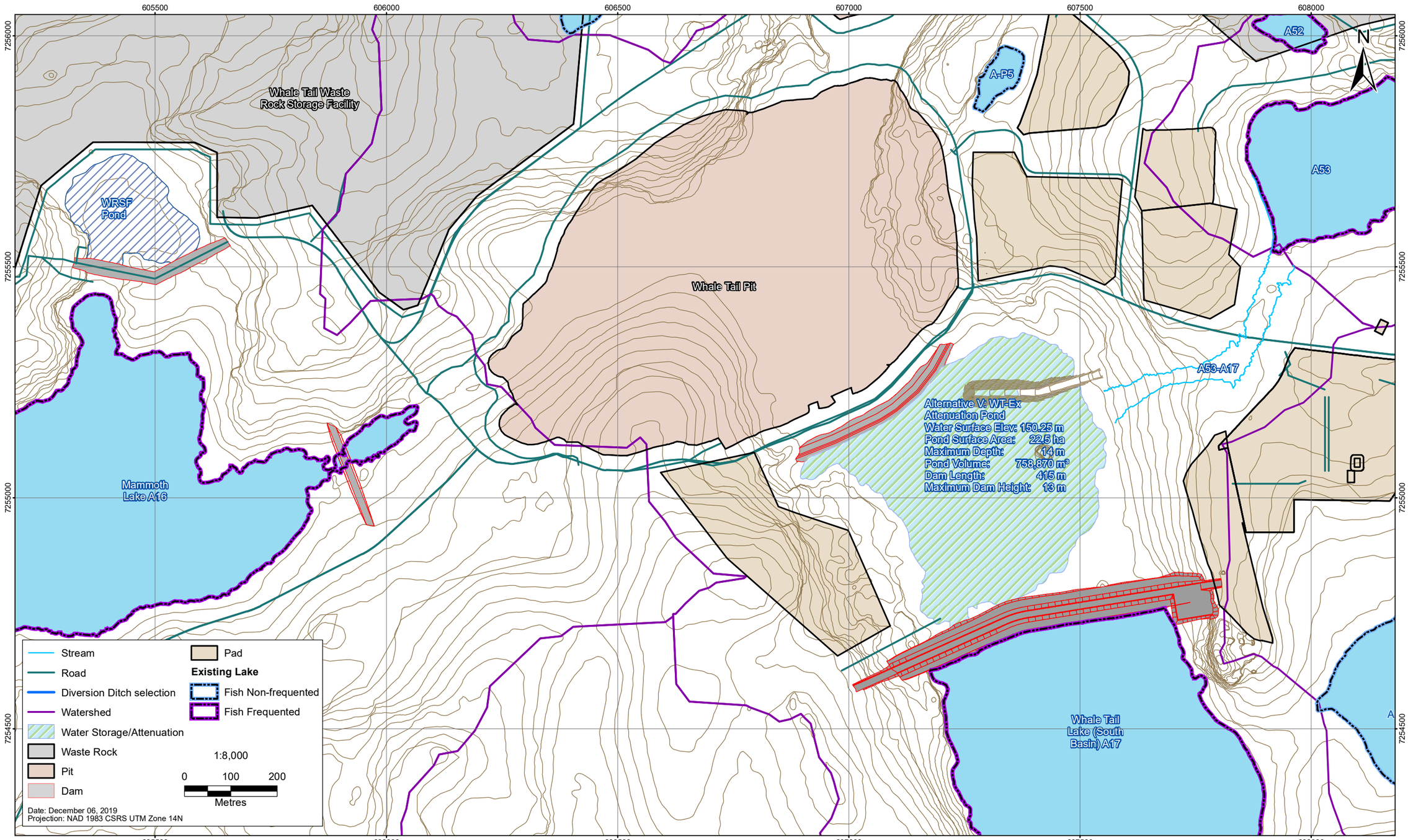


Table 6-3. Technical Account Comparison of Alternatives

	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Attenuation Pond Characteristics					
Maximum storage capacity[1]	646,638 m^3	473,300 m^3 (A53) 288,666 m^3 (WT-Ex)	622,040 m^3	762,942 m^3	758,870 m^3
Maximum water depth	7 m	6 m (A53) 11 m (WT-EX)	6 m	8 m	14 m
Water surface elevation	164.25 masl	163.50 masl (A53) 146.75 masl (WT-Ex)	172.50 masl	151.00 masl	150.25 masl
Water surface area	25.7 ha	22.5 ha (A53) 9.7 ha (WT-EX)	20.5 ha	26.1 ha	22.5 ha
Catchment area	2.9 km^2	4.1 km^2	0.4 km^2	2.7 km^2	2.9 km^2
Containment Characteristics					
Number of dams	3 (A53)	2 (A53) / 1 (WT-Ex)	2 (A54)	1 (MAM)	1 (WT-Ex)
Total dam length (combined)	671 m	380 m (A53) 125 m (WT-Ex)	2,422 m	418 m	415 m
Dam height (max.)	6 m	5 m (A53) 7 m (WT-Ex)	12 m	11 m	13 m
Elevation at top of dam[2]	165.25 masl	164.50 masl (A53) 149.75 masl (WT-Ex)	175.50 masl	154.00 masl	153.25 masl
Freeboard	1.0 m	1.0 m (A53) 3.0 m (WT-Ex)	3.0 m	3.0 m	3.0 m
Typical dam top width	18.8 m	18.8 m	18.8 m	18.8 m	18.8 m
Estimated dam fill quantity[3]	29,423 m^3	14,495 m^3 (A53) 10,789 m^3 (WT-Ex)	322,029 m^3	80,144 m^3	97,646 m^3
Dam foundation conditions	On land	On land (A53) Lake bed (WT-Ex)	On land	Lake bed	Lake bed

	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Ancillary Infrastructure					
Length of pipeline transporting contact water from source to attenuation pond	8,221 m	8,221 m	13,164 m	12,416 m	5,388 m
Length of pipeline from attenuation pond to water treatment plant	411 m	411 m	1,943 m	2,497 m	398 m
Overall length of pipeline (estimated)	10,642 m	10,642 m	17,117 m	18,669 m	7,796 m
Cumulative elevation head differential between contact water sources and attenuation pond	461 m	457 m	511 m	382 m	377 m
Other					
Availability of required construction material	IVR Pit and Whale Tail Pit	IVR Pit and Whale Tail Pit	IVR Pit and Whale Tail Pit	IVR Pit and Whale Tail Pit	IVR Pit and Whale Tail Pit
Distance to closest construction material source	0.7 km	0.7 km	1.3 km	1.8 km	0.3 km

Notes:

[1] All alternatives include use of the existing Whale Tail Attenuation Pond at a volume of 133,232 m^3 unless otherwise specified.

[2] Elevation at the top of dam assumes specified freeboard.

[3] Conceptual estimate only. Fill quantity includes dam fill side slopes; excavation or fill materials below grade are excluded and may vary based on geotechnical and other factors.

Alternative I: A53

Alternative I would require construction of three frozen core dams on land to the north and south of the pond. The largest dam would be 6 m high and approximately 500 m long. The foundation of the dams is expected to be competent and frozen. The water level[28] would be raised from 162.00 masl to 164.25 masl, increasing the surface area of the lake from 14 ha to 26 ha; and the volume of the waterbody would increase from approximately 140,000 m^3 to 646,638 m^3. In addition, 133,232 m^3 of capacity would be provided by the Whale Tail Attenuation Pond.

Lake A53 is situated within the site layout of the Whale Tail Pit Expansion Project, with the IVR WRSF located to the north; the haul road, mine camp and industrial area to the south; and the Whale Tail and IVR open pits to the west. Thus, the lake is surrounded on three sides by mine infrastructure. Lake A53 is a fish-bearing waterbody. Therefore, fish would need to be removed prior to construction of the attenuation pond.

Alternative I would require no additional surface water management infrastructure as the design relies on natural drainage to convey water from the IVR WRSF to the attenuation pond. Seepage from the attenuation pond at A53 would be directed to the Whale Tail Attenuation Pond; no new infrastructure would be required. Compared to the approved Whale Tail Pit Project, there would be a reduction in the volume of water inflow to the Whale Tail Pit.

Alternative II: A53/WT-Ex

Alternative II would result in a smaller increase in the size of Lake A53 (compared to Alternative I), complemented by an increase in the planned capacity of the Whale Tail Attenuation Pond.

At Lake A53, two frozen core dams would be constructed on land to the north and south of the pond. The largest dam would be approximately 5 m high and 280 m long. The foundation of the dams is expected to be competent and frozen. The water level would be raised from 162.00 masl to 163.50 masl, increasing the surface area of the lake from 14 ha to 22.5 ha; and the volume of the waterbody would increase from approximately 140,000 m^3 to 473,300 m^3.

Alongside development of the attenuation pond at Lake A53, the capacity of the Whale Tail Attenuation Pond would be increased to 288,666 m^3. This would require construction of a 7 m high, 125 m long dam at the north end of the pond. This concrete secant pile dam, with grouting, would be set back 85 m from the south wall of the Whale Tail Pit. The foundation provided by the drained lake bed (i.e., Whale Tail Lake [North Basin]) is expected to be unfrozen and highly fractured.

Lake A53 is situated within the site layout of the Whale Tail Pit Expansion Project, as described for Alternative I. Lake A53 is a fish-bearing waterbody, and fish would need to be removed prior to construction of the attenuation pond.

[28] *2015 Hydrology Baseline Report*. January 2016. Included as Appendix 6-C of the Whale Tail Pit Project: Final Environmental Impact Statement.

Alternative II would require no additional surface water management infrastructure as the design relies on natural drainage to convey water from the IVR WRSF to the attenuation pond. Seepage from the attenuation pond at A53 would be directed to the Whale Tail Attenuation Pond; no new infrastructure would be required. Compared to the approved Whale Tail Pit Project, there would be increased volume of water inflow to the Whale Tail Pit due to increased hydraulic head created by the expanded Whale Tail Attenuation Pond, and additional in-pit pumping would be required to manage this inflow.

Alternative III: A54

Alternative III involves the use of Lake A54 as the attenuation pond and would require construction of a large, U-shaped dam around the east, south, and west sides of the pond, plus a smaller dam to the north of the pond. The water level would be raised from 167.00 masl to 172.50 masl, increasing the surface area from approximately 1 ha to 20.5 ha. The volume of the waterbody would increase from 4,040 m^3 to 622,040 m^3. In addition, 133,232 m^3 of storage capacity would be provided by the Whale Tail Attenuation Pond.

Alternative III would require the construction of two high-volume frozen core dams on land, almost fully enclosing the attenuation pond. The largest of the dams would be 12 m high and approximately 2,040 m long. The foundation of the dams is assumed to be competent and frozen. The attenuation pond would abut the IVR WRSF for approximately 750 m along the northwestern edge of the pond.

Lake A54 is a natural waterbody that is not fish-bearing. It is located on the eastern edge of the mine site, adjacent to the IVR WRSF.

Alternative III would require additional surface water management infrastructure to convey contact water from the IVR WRSF to the attenuation pond (approximately 1 km distance). This would likely be accomplished through large excavation of a channel, and pumping would be required. Similarly, seepage from the large dam A54 would need to be collected. Compared to the approved Whale Tail Pit Project, there would be a reduction in the volume of water inflow to the Whale Tail Pit.

Alternative IV: MAM

Alternative IV involves construction of a dam across the northeastern arm of Mammoth Lake so that the area north of the dam can be isolated for use as an attenuation pond. The attenuation pond would be built within the natural high water line. The water level would be roughly maintained at 151.00 masl, with a surface area of 26 ha and pond volume of 762,942 m^3. In addition, 133,232 m^3 of capacity would be provided by the Whale Tail Attenuation Pond.

A linear, concrete secant pile dam (no grouting) would be constructed across the lake, with a length of 418 m and maximum height of 11 m. The dam placement would be located to minimize the distance and volume of required material by taking advantage of the lake's contours and bathymetry. Foundation conditions on the lake bed are expected to be unfrozen and uncertain.

Mammoth Lake is a fish-bearing lake. Therefore, fish would need to be removed from the north section of the lake prior establishing the lake as an attenuation pond for mine contact water.

Alternative IV would require additional surface water management infrastructure, including an approximately 1.5 km bermed road designed to redirect non-contact water away from the attenuation pond. Seepage collection infrastructure would be required around the dam. Compared to the approved Whale Tail Pit Project, there would be a reduction in the volume of water inflow to the Whale Tail Pit.

Alternative V: WT-Ex

Alternative V involves enlarging the Whale Tail Attenuation Pond, which would require construction of a dam at the north end of the Whale Tail Attenuation Pond (i.e., between the pond and the south wall of the Whale Tail Pit). The Whale Tail Attenuation Pond is a man-made waterbody used for storage of mine contact water.

A 13 m high and 415 m long dam would contain the water on the north side of the pond, with an 85 m setback from the south wall of the pit. The dam would be constructed on the unfrozen lake bed (previously drained for the approved Whale Tail Pit Project), and foundation conditions are expected to be highly fractured. The structure would be very complex construction of concrete secant pile with grouting.

A large area of the North Basin would be flooded, raising the water level from 144.00 masl (for the Whale Tail Attenuation Pond as currently designed) to 150.25 masl. The volume of the pond would increase from 133,232 to 758,870 m^3. The increased volume of water at the surface is expected to increase the hydraulic gradient and significantly increase groundwater infiltration to the Whale Tail Pit.

Alternative V would require no additional surface water management infrastructure as the design relies on natural drainage to convey water from the IVR WRSF to the attenuation pond. However, compared to the approved Whale Tail Pit Project, there would be a significant increase in the volume of water inflow to the Whale Tail Pit due to increased hydraulic head at the Whale Tail Attenuation Pond.

6.5.2 Biophysical Environment Account

Alternative I: A53

Lake A53 is a natural, fish-bearing waterbody with a mean depth of 1.3 m and maximum depth of 3.8 m.[29] Lake A53 currently discharges to Whale Tail Lake (North Basin). After dewatering, outflow from Lake A53 would be diverted to the South Basin. The existing outlet channel is well-defined and vegetated (grasses) with a high width to depth ratio. The outlet bed comprises cobbles, silt, sand, and organics, while the bank of the outlet comprises grass, sand, silt, and organics.[30]

Lake A53 is connected to two other waterbodies: upstream to Lake A54 and downstream to Whale Tail Lake (Lake A17). The stream connecting Whale Tail Lake and Lake A53 (Stream A53-A17) is 577 m long, and has surface flow (i.e., is passable by fish) during the open water season. The stream

[29] *Bathymetry Baseline Report*. 2015. Included as Appendix 6-M of the Whale Tail Pit Project: Final Environmental Impact Statement.
[30] *2015 Hydrology Baseline Report*. January 2016. Included as Appendix 6-C of the Whale Tail Pit Project: Final Environmental Impact Statement.

connecting Lake A54 and Lake A53 (Stream A54-A53) is of similar length but it is characterized by interstitial flow through boulder and cobbles. It is not passable by fish.

Baseline sampling conducted in 2015, 2016 and 2018 determined that the waterbody supports the following fish species: Arctic char; ninespine stickleback; lake trout, and burbot. The Arctic char and lake trout captured were juveniles only, and in low abundance. In 2018, sampling of the shoreline of A53 found slimy sculpin and one juvenile burbot. Under-ice water quality (field parameters) were taken in 2018 and found that water was not frozen to the bottom, and that dissolved oxygen was sufficient to support aquatic life. The waterbody may therefore support juvenile rearing throughout the year.

The terrain surrounding Lake A53 comprises morainal/till surficial material.[31] The summary for the Whale Tail Pit Project study area provided in Section 3.2 outlines the terrestrial environment surrounding Lake A53. This alternative would not affect rare plant species or habitat types, and it is not located near caribou calving grounds or other areas known to be important for caribou.

With the proposed Whale Tail Pit Expansion Project, Lake A53 would be surrounded by the mine site on the north, west, and south sides. Adjacent infrastructure would include various roads and surface infrastructure, the IVR WRSF (north), Whale Tail open pit (west), and the Whale Tail Camp (south).

Alternative II: A53/WT-Ex

The biophysical environment baseline description provided for Alternative I also applies to this alternative in regard to the environment of Lake A53. The biophysical environment baseline description provided for Alternative V also applies to this alternative in regard to the environment of the Whale Tail Attenuation Pond.

Alternative III: A54

Site-specific biophysical data for Lake A54 is limited. The waterbody is isolated, approximately 500 m northeast of its nearest neighbour (Lake A53). Hydrological studies assume that the pond freezes to the bottom in the winter. During baseline sampling in 2015 and 2016, no fish were caught in A54 (C. Portt & Associates 2018). The dominant substrate is boulder, and the flow characteristics are interstitial, with no defined channel visible.

The terrain surrounding Lake A54 comprises morainal/till surficial material[32]. The summary for the Amaruq property provided in Section 3.2 applies to Lake A54. This alternative would not affect rare plant species or habitat types, and is not located near caribou calving grounds or other areas known to be important for caribou.

With the proposed Whale Tail Pit Expansion Project, Lake A54 would be adjacent to the eastern edge of the IVR WRSF.

[31] *Terrain, Permafrost and Soils Baseline Report*. May 2016. Included as Appendix 5-A of the Whale Tail Pit Project: Final Environmental Impact Statement.

[32] *Terrain, Permafrost and Soils Baseline Report*. May 2016. Included as Appendix 5-A of the Whale Tail Pit Project: Final Environmental Impact Statement.

Alternative IV: MAM

Mammoth Lake is a large fish-bearing lake southwest of the mine site. It has a mean depth of 3.9 m, and a maximum depth of 17.2 m. The lake outlet is at the southwest corner of the lake where the water flows to Lake A15. The lake was previously fed by the North Basin of Whale Tail Lake; however, construction of the Whale Tail Dike will remove this inflow and raise the water level of the South Basin so that Whale Tail Lake will drain into Mammoth Lake via the South Whale Tail diversion channel.

The outlet channel of Mammoth Lake is a poorly defined channel, approximately 45 m wide and comprising large boulders. Water flows through or under the boulders. The bank is made up of large boulders and cobbles, and vegetation (grasses) is very limited.[33]

Mammoth Lake supports all six fish species that are found in the WhaleTail Pit Project area: four large-bodied fish (lake trout, Arctic char, round whitefish, burbot); and two small-bodied fish: slimy sculpin, and ninespine stickleback.

As outlined in the approved Whale Tail Pit Project Fish Habitat Offsetting Plan (C. Portt 2018), small habitat changes will occur in Mammoth Lake during operations of the approved Whale Tail Pit Project as a result of diking and dewatering. Fish habitat losses from the Project will be offset by installing a sill in the connection between Mammoth Lake and Whale Tail Lake, which will increase elevation and create new habitat through flooding of terrestrial areas around the periphery of Whale Tail Lake, the connecting channel between Whale Tail Lake and Mammoth Lake, as well as around the portion of Mammoth Lake that is east of the sill.

The terrain surrounding Mammoth Lake comprises morainal/till surficial material.[34] The rocky shoreline of Mammoth Lake has lower densities of waterfowl and other wildlife, compared to some of the surrounding lakes. This alternative would not affect rare species or habitat types, and is not located near caribou calving grounds or other areas known to be important for caribou.

With the Whale Tail Pit Expansion Project, Mammoth Lake would cease to be the receiving environment for the discharge of treated contact water. The northern section of Mammoth Lake is located south of the expanded Whale Tail WRSF and the WRSF Pond, and west of the Whale Tail Pit.

Alternative V: WT-Ex

The Whale Tail Attenuation Pond is a man-made contact water collection pond designed and constructed as part of the approved Whale Tail Pit Project. This pond is enclosed by mine infrastructure (including the Whale Tail Pit and Whale Tail Dike), and has no natural hydrological, fisheries, or aquatic values.

The baseline for this alternatives assessment assumes that the Whale Tail Pit Project is fully constructed in accordance with Figure 2-3, the expanded footprint is within the area of mine

[33] *2015 Hydrology Baseline Report*. January 2016. Included as Appendix 6-C of the Whale Tail Pit Project: Final Environmental Impact Statement.
[34] *Terrain, Permafrost and Soils Baseline Report*. May 2016. Included as Appendix 5-A of the Whale Tail Pit Project: Final Environmental Impact Statement.

disturbance. This alternative would not affect rare species or habitat types, and is not located near caribou calving grounds or other areas known to be important for caribou.

6.5.3 Human Environment Account

In terms of the human environment—including socio-economics, land and resource use, and cultural heritage—the four alternatives do not differ substantially. The amount of labour required during construction may vary depending on the size and complexity of structure(s) to be constructed, but as these jobs would be short-term they are not considered to be a material factor.

Potential employment during operations is assumed to be the same for all alternatives as the same quantity and quality of water will be managed regardless of the location of the attenuation pond. As socio-economic factors do not differentiate the alternatives, the following sections highlight site-specific information relating to land and resource use and/or cultural heritage resources.

The IQ baseline study[35] for the Whale Tail Pit Project provides general information about the area, including:

- Lake trout and Arctic char are the preferred fish species harvested for food, and these species can be found in several lakes in vicinity of the Whale Tail Pit Project.
- Although fish are found throughout the region, the lakes near Whale Tail Pit are not commonly fished as there are other preferred lakes.

Information about land use and cultural heritage resources was also informed by consultation with community members and Elders in Baker Lake and Chesterfield Inlet (as described in Section 6.5.5) as well as IQ and traditional land use information presented in the FEIS (Agnico Eagle 2016).

Alternative I: A53

Traditional use of the area between Baker Lake and Back River is known to encompass hunting, fishing, and other harvesting, as well as travel routes, all of which have importance for Inuit well-being and IQ. The area around Lake A53 is included in this regional understanding, although no specific sites or activities are identified in relation to this waterbody.

Lake A53 is a fish-bearing waterbody, and supports Arctic char and lake trout; the lake could therefore be fished. However, based on available IQ and consultations, the lake does not appear to be distinguishable from the other small lakes and ponds that are prevalent throughout the landscape, and fishing from this lake is believed to be unlikely. Information from Elders and residents of Baker Lake (Section 6.5.5) and IQ reports indicate that Lake A53 and other small lakes are not likely destinations for fishing or harvesting as there are many other preferred lakes in the region.

With respect to the visual environment, Alternative I includes construction of a moderately sized dam (approximately 6 m high, 500 m long) plus two smaller dams (approximately 50 m and 120 m) at Lake

[35] *Inuit Qaujimajatuqangit Baseline Report*. June 2016. Included as Appendix 7-A of the Whale Tail Pit Project: Final Environmental Impact Statement.

A53. This would result in a 110% increase to the natural water surface area. Lake A53 is surrounded on 3 sides by the mine site.

Alternative II: A53/WT-Ex

The baseline description provided for Alternative I, regarding the use of Lake A53, also applies to this alternative. The baseline description provided for Alternative V, regarding the expansion of Whale Tail Attenuation Pond, also applies to this alternative.

With respect to the visual environment, Alternative II includes construction of a moderately sized dam (approximately 5 m high, 280 m long) plus one small dam at Lake A53 (approximately 100 m long); and an additional dam at the WTAP (7 m high, 125 m long). This would result increase the natural water surface area of Lake A53 by 78%. Lake A53 is surrounded on 3 sides by the mine site.

Alternative III: A54

Traditional use of the area between Baker Lake and Back River is known to encompass hunting, fishing, and other harvests, as well as travel routes, all of which have importance for Inuit well-being and IQ. The area around Lake A54 is included in this regional understanding, although no specific sites or activities are identified.

As Lake A54 is naturally non-fish-bearing, there is no fishing activity at this lake. Based on available IQ and consultation outcomes, the lake does not appear to be distinguished from the many other small lakes and ponds that are prevalent throughout the landscape.

With respect to the visual environment, Alternative III includes construction of a large, horseshoe shaped dam (approximately 12 m tall and 2,040 m long), plus a small dam (380 m long). This would increase the water surface area of Lake A54 by over 20 times its size. The pond is on the east edge of the mine site.

Alternative IV: MAM

Traditional use of the area between Baker Lake and Back River is known to encompass hunting, fishing, and other harvesting, as well as travel routes, all of which have importance for Inuit well-being and IQ. The area around the Mammoth Lake is included in this regional understanding, although no specific sites or activities are identified in relation to this waterbody.

Mammoth is a moderately sized fish-bearing lake containing lake trout, Arctic char, round whitefish, and burbot. Based on available IQ and consultations, no fishing activity has been reported, and the lake does not appear to be distinguishable from other lakes and ponds that are prevalent throughout the landscape. Fishing from this lake may occur opportunistically but is believed to be unlikely as there are other preferred lakes.

With respect to the visual environment, Alternative IV includes construction of a 418 m long dam across Mammoth Lake. The water surface area would be largely unchanged from the baseline though it will be transected by the dam. The pond is on the west edge of the mine site.

Alternative V: WT-Ex

A grave site has been identified on the east shore of Whale Tail Lake, more than 1.5 km south of the existing Whale Tail Attenuation Pond. The Whale Tail Attenuation Pond comprises man-made infrastructure within the mine site, and no other archaeological or historic resources have been identified[36].

Traditional use of the area between Baker Lake and Back River is known to encompass hunting, fishing, and other harvesting, as well as travel routes, all of which have importance for Inuit well-being and IQ. The areas around the Whale Tail Pit Project (including WRSF Pond and Whale Tail Attenuation Pond) are included in this regional understanding, although no specific sites or activities are identified.

With respect to the visual environment, Alternative V includes construction of a 13 m high and 415 m long dam on the south side of the open pit. The pond will be surrounded on all sides by the mine site, located within the footprint of the first phase of the Whale Tail Pit Project.

6.5.4 Project Economics Account

Capital costs for the development of the attenuation pond are based on costs associated with comparable infrastructure for the Whale Tail Pit Project, estimated at $0.7 million per 100 m of frozen core dam, and $3.6 million per 100 m of secant pile dam. Capital cost estimates include procurement and construction of supporting infrastructure and materials required for the operation of the structure. At the scale of the dams required for the attenuation pond alternatives, the type of containment structure, foundation preparation, and dam length are the primary factors influencing the cost. Based on these assumptions, the estimated capital costs are summarized in Table 6-4.

Other costs associated with the attenuation pond are estimated qualitatively, relative to each other to costs for the approved Whale Tail Pit Project.

Table 6-4. Estimated Capital Costs

Alternative	Dam Type	Length	Total Estimated Cost
I. A53	Frozen core	671 m	$4.7 million
II. A53/WT-Ex	Frozen core Secant pile	380 m 125 m	$7.2 million
III. A54	Frozen core	2,422 m	$17.0 million
IV. MAM	Secant pile	418 m	$15.0 million
V. WT-Ex	Secant pile	415 m	$14.9 million

[36] As these and other facilities at the mine site are constructed, and ongoing exploration is underway, Agnico Eagle is committed to avoiding archaeological sites in this area. If known or suspected archaeological sites are identified, acceptable mitigation measures will be formulated in consultation with Agnico Eagle, their archaeological consultants, the Department of Culture and Heritage (Government of Nunavut [GN]), and the community of Baker Lake (specifically elders and the HTO Members).

Expected fish offsetting costs would vary between the five alternatives based on the extent of fish habitat loss. Alternatives I and II would result in loss of Lake A53 as a fish-bearing waterbody, requiring compensation for the loss of 14 ha of fish habitat in the lake and less than half a hectare of stream habitat from an unnamed stream to the south. Alternative IV would require compensation for the loss of 26 ha of fish habitat. Alternatives III and V would not affect fish-bearing waterbodies and therefore no fish habitat compensation would be required.

Operating costs that differentiate the alternatives include the need for additional pumping and monitoring. Additional manpower will not be required for any alternative. Alternatives II and V, each of which would expand the Whale Tail Attenuation Pond, are expected to incur the highest operating costs due to the need for pumping to address a significant increase in seepage to Whale Tail Pit, along with high monitoring costs. Alternative III has the longest dam (over 2 km) and would therefore require a larger monitoring effort and associated cost.

Closure cost estimates assume that the closure concept for the approved Whale Tail Pit Project will be applied to the Whale Tail Pit Expansion Project; this assumes that accumulated solids in the Whale Tail Attenuation Pond would not require additional mitigation at closure. Other considerations include dam breaching, removal of pumps and piping, dam removal and drainage systems. Alternatives I and II would entail a relatively small incremental cost (less than 10% of total closure costs) for the closure of Lake A53 and connection with the reclaimed Whale Tail/Mammoth Lake watershed. Alternative III has the largest dam and would require extensive reclamation of this feature to ensure positive drainage and to divert water flows from the IVR WRSF to avoid Lake A53; the incremental cost increase would be high (more than 20% of total closure costs). Alternatives IV and V are expected to have a moderate incremental cost increase to address the need to breach dams on incompetent ground.

Post-closure costs estimates consider the need for long-term water management and monitoring. Alternatives IV and V would effectively form part of the reclaimed Whale Tail/Mammoth Lake watershed after closure; no active water management is expected although monitoring may be required for up to 10 years. Closure of the A53 portions of alternatives I and II may require active water treatment for up to 10 years. Alternative III has the highest expected post-closure cost as a drainage system will need to be maintained to divert contact water from the IVR WRSF, and active water treatment may be required for up to 20 years.

6.5.5 Consultation on Attenuation Pond Alternatives

Agnico Eagle presented Alternatives I, III, IV and V to the Baker Lake and Chesterfield Inlet communities in July 2018, and the five alternatives (Alternative I, II, III, IV and IV) in the Baker Lake community in March 2019 as described in Section 1.4. There were diverse opinions about the benefits and drawbacks of each attenuation pond alternative,[37] as follows:

- Alternative III (Lake A54) involves a large containment dam. Some people expressed concern that this would be a significant feature on the landscape due to the enlarged lake and a 10 m-high dam, which could interfere with caribou migration and the movements of other wildlife.

[37] Notes from Whale Tail Pit Amendment Consultation, July 2018.

- Elders and community members generally agreed that the attenuation pond should avoid impacting fish and fish habitat if possible. Three of the alternatives (Alternatives I, II and IV) would result in the loss of fish habitat and would require fish to be relocated prior to construction.
- Elders generally did not support relocating fish (which would be required for Alternatives I, II and IV), and indicated that moving a fish from one waterbody to another would change the fundamental nature (i.e., being or spirit) as well as the taste of the fish. They were also concerned that it would be hard to capture all fish, as they can hide to avoid being caught.
- Using an area already affected by the mine (i.e., Alternative V) was generally viewed as favourable as it would avoid impacts on other waterbodies, whether they are fish-bearing or not.
- Alternative IV (Mammoth Lake) was generally viewed as unfavourable as it would impact a large, fish-bearing lake. However, some people also identified a benefit in that this lake is at the lowest elevation compared to the other alternatives, so it might be easier to contain the water compared to the alternatives at higher elevations.

Many of the participants (especially Elders) were familiar with the Whale Tail Pit Project site in general, as it is in the region between Baker Lake and the Back River and hamlet of Gjoa Haven. Inuit from Baker Lake have traditionally travelled to Back River and Gjoa Haven in the winter for hunting and to visit family, and continue to do so today. Although many participants had spent time on the land in the vicinity of the project, they were not familiar with (or did not recall details of) the mine site specifically. They noted that the smaller waterbodies are plentiful and not particularly memorable, and that it is difficult to recall areas from maps (rather than experiencing a place in person).

Participants described various routes of travel between Baker Lake and the Back River, and noted that travel typically occurs in the winter as the frozen landscape provides easier access along lakes and rivers. Two travel corridors are described in the IQ baseline for the Whale Tail Pit Project[38], and align with routes discussed in the consultations:

- The primary route heads north from Baker Lake along Uiguklik Lake (west of the Meadowbank Mine) and Nutipilik Lake (north and west of the Amaruq haul road); from here, it either follows an esker northeast of the Amaruq haul road, or travels east and north along Tahinajuk Lake, Piqunaniup Tasigik Isua Lake, and north along other lakes to the Back River.
- The second route is located further east, and travels along the west side of the Meadowbank Mine, through Tasirjuaraajuk Lake, Qugiilik Lake, Haninajuq Lake, Kivgajulik Lake, and Hiatuuq Lake.

Participants noted that routes vary depending on snow and weather conditions.

6.5.6 Comparison of Alternatives

Table 6-5 compares the advantages and disadvantages of each alternative.

[38] *Inuit Qaujimajatuqangit Baseline Report*. June 2016. Included as Appendix 7-A of the Whale Tail Pit Project: Final Environmental Impact Statement (FEIS).

Table 6-5. High-Level Comparison of Alternatives

Alternative	Advantages	Disadvantages
I. A53	• Lake A53 is located within the drainage of the approved mine site • Design utilizes natural drainage to collect and convey contact water and seepage	• Impacts to fish and fish habitat • Need to relocate fish prior to construction
II. A53/WT-Ex	• Lake A53 is located within the drainage of the approved mine site • Design utilizes natural drainage to collect and convey contact water and seepage • Slightly smaller footprint compared to Alternative I	• Impacts to fish and fish habitat • Need to relocate fish prior to construction • High construction and operational complexity due to presence of dam and pond above open pit, and increase in seepage of groundwater into pit
III. A54	• No impacts to fish or fish habitat	• Requires construction of large U-shaped dam, approximately 2 km in length • Requires large area of land to be flooded (more than 20x the size of the natural waterbody) • Consultation indicated concern that the dam/pond would be an obstruction on the landscape, and could adversely affect caribou and other wildlife species as they travel through the area • Pumping requirements to convey water to attenuation pond at Lake A54, and from attenuation pond to water treatment plant • Challenges to divert contact water from Lake A53
IV. MAM	• Landscape and water level would be largely the same as baseline (with addition of dam across the lake)	• Requires construction of dam across lake • High construction and operational complexity • Challenges to divert contact water from Lake A53 • Impacts to fish and fish habitat • Need to relocate fish prior to construction • Alteration of large lake may challenge public acceptance
V. WT-Ex	• No impacts to fish or fish habitat • Generally supported in community consultation as attenuation pond is within affected footprint of approved mine site	• High construction and operational complexity due to presence of dam and pond above open pit, and increase seepage of groundwater into pit • Challenges to divert contact water from Lake A53 • May require change to closure plan for North Basin

6.6 CHARACTERIZATION CRITERIA

The ECCC Guidelines note that every project is unique and the characterization criteria must be developed with consideration to the impacts, concerns, and Indigenous, stakeholder and regulatory interests relevant to the project.

Based on the information presented in Section 6.5, Table 6-6 identifies characterization criteria to describe the alternatives, and summarizes each alternative in regard to these characterization criteria. Criteria were determined with consideration of the reasonable questions that could be asked (by

regulators and/or stakeholders) to compare or differentiate the alternatives. Some of the characterization criteria may overlap, may not differentiate the alternatives, or may not be relevant to the decision-making process; these issues will be addressed in Step 4.

Table 6-6. Characterization of Alternatives

Criteria	Rationale	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Technical Account						
Number of dams	More dams are more complex to manage and pose greater risks for construction, operation and maintenance.	3	3	2	1	1
Maximum height of dam(s)	Higher dams are more complex, pose greater risks, and require a larger footprint.	6 m	7 m	12 m	11 m	13 m
Length of dam(s)(combined)	Longer dams are more complex, pose greater risks, and require a larger footprint.	671 m	505 m	2,422 m	418 m	415 m
Estimated dam fill quantity	Dams requiring larger volumes of material require more construction effort.	29,423 m^3	25,284 m^3	322,029 m^3	80,144 m^3	97,646 m^3
Source of construction materials	The required volume and type of construction materials may be a limiting factor for construction.	Local borrow materials are available				
Complexity of containment infrastructure	Alternatives with fewer dams and/or dams of lower technical complexity have lower operational risk and require less effort for monitoring and maintenance.	Requires 3 dams to contain water within one pond, with a maximum dam height of 6 m and a combined length of 671 m.	Requires 3 dams to contain water within 2 ponds, with a maximum dam height of 7 m and a combined dam length of 505 m. One dam (7 m high and 125 m long) adjacent to the south wall of the Whale Tail Pit.	Requires 2 dams to contain water within one pond, with a maximum dam height of 12 m and combined length of 2,422 m. Largest dam over 2 km long, horseshoe-shaped, and adjacent to the IVR WRSF.	Requires 1 dam to contain water within one pond. Dam would transect Mammoth Lake at a narrow point, with a total length of 418 m and maximum height of 11 m.	Requires 1 dam to contain water within one pond. Dam adjacent to the south side of the Whale Tail Open Pit, with a total length of 415 m and maximum height of 13 m.
Maximum water volume (combined)	Maximum water storage capacity may provide flexibility for future expansion.	779,870 m^3	761,966 m^3	755,272 m^3	896,174 m^3	758,870 m^3
Maximum water depth	Deeper attenuation ponds may pose greater risk in the event of dam failure.	7 m	11 m	6	8 m	14 m
Pond surface area (combined)	Larger surface areas have a larger overall physical footprint, and larger area to be reclaimed at closure.	25.7 ha	32.2 ha	20.5 ha	26.1 ha	22.5 ha
Type of dam	Type of dam is influenced by location and foundation conditions, which influences design and constructability.	On land, frozen core dam	On land (A53), frozen core dam Drained lake bed (WT-Ex), highly fractured foundation conditions, complex structure with concrete secant pile and grouting	On land, frozen core dam, very large volumes	Uncertain foundation conditions. Complex structure with concrete secant pile (no grouting)	Drained lake bed, highly fractured foundation conditions, complex structure with concrete secant pile and grouting
Length of pipeline (source to attenuation pond)	Longer pipelines are more complex and have higher risk of failure.	8,221 m	8,221 m	13,164 m	12,416 m	5,388 m
Length of pipeline (attenuation pond to water treatment plant)	Longer pipelines are more complex and have higher risk of failure.	411 m	411 m	1,943 m	2,497 m	398 m
Length of pipeline (combined)	Longer pipelines are more complex and have higher risk of failure.	10,642 m	10,642 m	17,117 m	18,669 m	7,796 m
Cumulative head differential	Higher head differential between source and the attenuation pond requires more energy for pumping.	461 m	457 m	511 m	382 m	377 m
Number of additional pumps required	Greater number of pumps requires more energy for pumping.	1 additional pump for 1 additional pond	2 additional pumps for 1 additional pond plus increased seepage into pit	1 additional pump for 1 additional pond	1 additional pump for 1 additional pond	2 additional pumps for significantly increased seepage into pit
Surface water management infrastructure required	More complex surface water management systems pose greater risk of failure.	None - relies on natural drainage	None - relies on natural drainage	IVR WRSF contact water collection (~ 1km) requires drilling and blasting of channel(s), with large excavation, and pumping needs	Surface water can be redirected with bermed road (~1.5 km)	None - relies on natural drainage

Criteria	Rationale	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Seepage collection infrastructure required	More complex systems to collect and convey seepage have higher pumping requirements.	Seepage directed to Whale Tail Attenuation Pond (i.e., existing infrastructure). No new infrastructure required. Reduction of water inflow to pit.	Increased water inflow to pit (limited head) - additional in-pit pumping required.	Seepage collection infrastructure required around dam. Reduction of water inflow to pit.	Seepage collection infrastructure required around dam (downstream side of in-lake dam). Reduction of water inflow to pit.	Significant seepage to pit (high head) - additional in-pit pumping required.
Length of new roads required	More extensive road networks have a larger physical footprint.	No new roads				
Design requirements	Alternatives that require additional baseline data/geotechnical studies and/or modelling to inform the design will require more time to develop.	Limited geotechnical studies required. Utilizes standard design basis. Proven structures.	Expansion of the Whale Tail Attenuation Pond would require geotechnical studies re: increased water head at pit crest. Anticipate incompetent foundation conditions, therefore complex engineering. Sensitive receptors (i.e., workers) in pit, down-gradient of dam. A53 component utilizes standard design and proven structures.	Additional geotechnical studies required for large dam structure adjacent to WRSF. Utilizes standard design basis. Proven structures.	In-water geotechnical study required. Baseline data does not currently exist. Anticipate incompetent foundation conditions, therefore complex engineering.	Requires geotechnical studies re: increased water head at pit crest. Anticipate incompetent foundation conditions, therefore complex engineering. Sensitive receptors (i.e., workers) in pit, down-gradient of dam. Underground mine workings under pond.
Construction complexity	More complex construction (based on foundation, excavation, etc.) pose higher risk. Higher risk associated with incompetent foundation and/or in-water works, and larger dam size (by footprint and/or fill volume).	On-land construction of dam structure with competent foundation conditions. 44 m^3 fill material per m of dam length. Overall low complexity of construction.	Very high complexity of design requires specialized contractors, engineering oversight, and robust QA/QC program during construction. Incompetent foundation conditions on drained lake bed for WT-Ex component. 86 m^3 fill material per m of WT-Ex dam length.	On-land construction of dam structure with competent foundation conditions reduces complexity of construction; but large length of dam structure (2,422 m) increases time to construct and risk for construction errors. 133 m^3 fill material per m of dam length. Overall moderate complexity.	Highly complex design with in-water work requires specialized contractors, environmental controls, engineering oversight and robust QA/QC program during construction. Incompetent foundation and in-water works. 192 m^3 fill material per m of dam length.	Very high complexity of design requires specialized contractors, engineering oversight, and robust QA/QC program during construction. Incompetent foundation on drained lake bed. 235 m^3 fill material per m of dam length.
Operational complexity	More complex operations and maintenance (based on number of ponds and dams, size of dam, seepage collection, freeboard, etc.) pose higher risk.	• Attenuation pond within the gravity catchment area of the IVR WRSF and therefore also serves to manage this contact water without additional pumping. • Primary storage location for contact water is located in close proximity to the existing water treatment plant. • 1.0 m of freeboard.	• Attenuation pond within the gravity catchment area of IVR WRSF and therefore also serves to manage this contact water without additional pumping. • Primary storage location for contact water is located in close proximity to the existing water treatment plant. • Smaller A53 pond (compared to Alternative I) requires management of a spillway and gravity channel to direct water in excess of 473,000 m^3 to WTEx for temporary storage. • 1.0 m of freeboard (A53); 3.0 m of freeboard (WT-EX).	• Attenuation pond has large perimeter dam structure (> 2 km), increasing the level of monitoring for seepage and the requirement for collection and pump back systems. • Attenuation pond location requires up-gradient diversion of non-contact water to reduce its catchment area and to be consistent with the water management philosophy (i.e. keep clean water clean). • A54 is located the furthest distance away from the IVR pit which is the largest source of water requiring winter storage. Location of A54 will require pumping of contact water from IVR waste rock runoff. • Maintaining A53 as a clean water pond requires additional infrastructure to capture and relocate contact water. • 3.0 m of freeboard.	• Operationally equivalent to current use of Whale Tail attenuation pond in drained basin of existing lake. • Requires capture and pump back of clean water infiltrating attenuation pond to reduce the volume of water to be treated. • Located the furthest distance away from the water treatment plant, requiring management of additional pipeline length and pumping equipment. • Maintaining A53 as a clean water pond requires additional infrastructure to capture and relocate contact water. • 3.0 m of freeboard.	• No change in location of attenuation pond from current operations. • An increase in the volume of the attenuation pond increases its operational complexity as a result of the requirement for a dam structure adjacent to the pit and the need to actively manage seepage entering the pit. • During the winter, ice wall formations in the pit more prominent and need to be managed to maintain safe access. • Storing a large volume of water up-gradient of the mining pit increases risk to worker safety requiring more robust operating procedures. • Maintaining A53 as a clean water pond requires additional infrastructure to capture and relocate contact water. • 3.0 m of freeboard.

Criteria	Rationale	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Closure complexity	More complex closure requirements (e.g. dredging, pumping) have higher risks.	• Location of attenuation pond enables reclamation activities to be completed largely independent from other domains. • Contact water can be monitored and controlled until closure completion criteria have been met. • Management of solids accumulated in the pond may be required either by covering or removing. • Dam requires breaching to reintroduce water to the reclaimed Whale Tail - Mammoth Lake watershed.	• A53 portion is the same as Alternative I. • WT-Ex portion of attenuation pond requires no additional work as returned to the natural watershed with the breach of the dam. • Closure of WT-Ex becomes more complex if management of solids is required by either covering or removing. • Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure.	• Lengthy dam structure requires reclamation. • Extensive drainage system required at closure to divert water flows from IVR Waste Rock Storage Facility around A53 with discharge to the reclaimed Whale Tail Lake. • Reclamation of former attenuation pond area required so it is free draining and land is reclaimed to meet closure land use. • Management of solids accumulated in the pond may be required either by covering or removing. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure.	• Attenuation pond reclaimed by breaching a portion of the dam between the pond and Mammoth Lake. • No pumping required as the former attenuation pond reintroduced as part of the Whale Tail - Mammoth watershed with the creation of the pit lake. • Closure plan currently assumes that solids in the Whale Tail Attenuation Pond will not require additional mitigation at closure.	• Attenuation pond reclaimed by breaching the dam structure between the attenuation pond and the Whale Tail Pit. • No pumping is required as former attenuation pond reintroduced as part of the Whale Tail - Mammoth watershed with the creation of the pit lake. • Closure plan currently assumes that solids in the Whale Tail Attenuation Pond will not require additional mitigation at closure.
Post-closure complexity	More complex post-closure water management (e.g., active water treatment) have higher risks.	Passive water treatment with minimal annual maintenance. Water from former attenuation pond will flow by gravity to receiving environment. Controlled release is easily established if post-closure water management is needed for run-off from IVR waste rock storage area. Monitoring may be required for up to 10 years.	Passive water treatment with minimal annual maintenance. Water from A53 portion of former attenuation pond will flow by gravity to receiving environment. WT-Ex will form part of reclaimed lake, requiring no additional post-closure management. Monitoring may be required for up to 10 years	Active water treatment and management will be required for up to 20 years post closure. Water from former attenuation pond will flow by gravity to receiving environment. Drainage system for contact water from IVR WRSF to the Whale Tail lake will require long-term post closure management (i.e., snow clearing).	Attenuation pond will form part of reclaimed lake, requiring no active post-closure management, although monitoring may be required for up to 10 years.	Attenuation pond will form part of reclaimed lake, requiring no active post-closure management, although monitoring may be required for up to 10 years.
Operational consequence of overtopping or dam failure	Dam overtopping or dam failure may result in consequences for operations including provisions to ensure the safety of workers.	Overflow or dam failure from A53 would be directed to Whale Tail Attenuation Pond by gravity. If volume of water released from breach exceeded capacity of Whale Tail Attenuation Pond (A53 is approximately 3x the volume of Whale Tail Attenuation Pond) then water would report to Whale Tail pit, posing a potential risk to operations. Depending on the volume, disruption may range from temporary to short-term operational delays.	Overflow or dam failure from A53 would be directed to Whale Tail Attenuation Pond by gravity. Any overtopping or breach of dam at WT-Ex would report to Whale Tail Pit, posing risk to production. Depending on the volume, disruption may range from temporary to short-term operational delays.	Overtopping or dam failure would not result in risks to operations, although resources may be reallocated to address physical and environmental impacts.	Overtopping or dam failure downstream of alternative IV would report to the Whale Tail Pit. There are no redundant containment structures down-gradient of the MAM dam. May lead to short-term cessation of operations.	Overtopping or dam failure would report to Whale Tail Pit. There are no redundant containment structures down-gradient of the WT-Ex dam. May result in short-term cessation of operations.

Criteria	Rationale	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Biophysical Environment Account						
Meteorological conditions	Meteorological conditions may influence design and impact of attenuation pond.	Arid, Arctic environment				
Influence on climate change	Storage of water may influence local temperatures or precipitation.	Pond size not expected to influence temperatures nor precipitation patterns				
Susceptibility to climate change	Attenuation pond may be influenced by temperature or precipitation changes related to climate change.	Not expected over the life of mine				
Air emissions	Construction and operation of the attenuation pond may result in emissions to air including fugitive dust and greenhouse gases.	During construction, 29,423 m^3 of borrow materials would be sourced primarily from Whale Tail Pit, a distance of 0.7 km away by road. During operation, 1 additional diesel pump would be required.	During construction, 25,284 m^3 of borrow materials would be sourced primarily from Whale Tail Pit, a distance of 0.7 km away by road from A53, and 0.3 km from Wt-Ex. During operation, 2 additional diesel pumps would be required.	During construction, 322,029 m^3 of borrow materials would be sourced primarily from IVR Pit, a distance of 1.3 km away by road. During operation, 1 additional diesel pump would be required.	During construction, 80,144 m^3 of borrow materials would be sourced primarily from IVR Pit, a distance of 1.8 km away. During operation, 1 additional diesel pump would be required.	During construction, 97,646 m^3 of borrow materials would be sourced primarily from Whale Tail Pit, a distance of 0.3 km away. During operation, 2 additional diesel pumps would be required.
Topography	Topographic features may influence design of attenuation pond.	Baseline shoreline has gradual slopes.	Baseline shoreline has gradual slopes.	Baseline shoreline is generally shallow with steeper slopes on the east shore	Located in a low-lying area west of the Whale Tail Pit with shallow shoreline slopes	Relatively flat topography
Dominant surficial material	Surface material may influence the design and construction of attenuation pond.	Morainal/till				
Dominant soil subgroup	Soil type may influence the design and construction of attenuation pond.	Orthic dystric turbic cryosol				
Permafrost (presence, depth)	Permafrost depth and extent may influence the design and construction of attenuation pond.	Depth of active layer ranges from 1.3 m in areas with shallow overburden, to 4 m adjacent to lakes				
Depth of overburden	Overburden depth may influence the design and construction of attenuation pond.	Overburden can be up to 10 m thick				
Seismic conditions	Seismic conditions may influence the design and construction of attenuation pond.	Low seismic risk area				
Affected surface waterbodies (loss)	Loss of surface waterbodies may influence fisheries, birds, terrestrial wildlife, ecosystem function, and Inuit land use. Inflows and outflows will be reconfigured to avoid impacts on upstream and downstream waterbodies.	Lake A53	Lake A53	Lake A54	Mammoth Lake	No natural waterbodies
Affected downstream catchment areas	Changes to downstream catchment areas may influence downstream hydrology including water quality and quantity.	No new catchments affected. All alternatives will report to the water treatment plant and subsequently discharge treated water to Whale Tail Lake (South Basin)				
Wetlands	Changes to wetlands may influence fisheries, birds, terrestrial wildlife, ecosystem function, and Inuit land use.	No wetlands affected				
Downstream water quality	Changes to downstream water quality may influence fisheries, birds, terrestrial wildlife, ecosystem function, and Inuit land use (including drinking water).	No expected change to downstream water quality (water quality will be treated to same standard before discharge)				
Groundwater	Changes to quality or quantity of groundwater may influence regional hydrology	No expected change to regional groundwater regime (although there may be local changes in regard to groundwater infiltration to pit)				

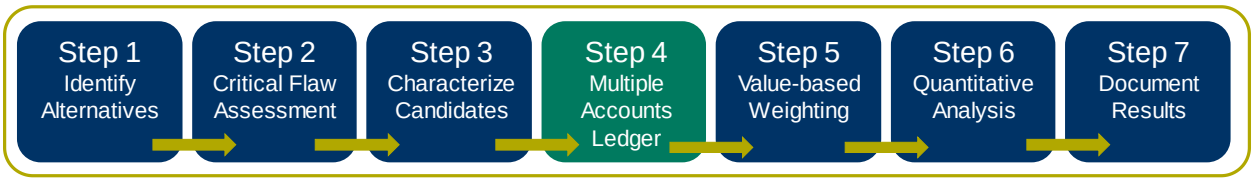
Criteria	Rationale	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Risks of surface water quality impacts external to the attenuation pond	Considering the configuration of the mine site in relation to natural water bodies, some configuration will provide better ability to manage surface water quality impacts, and/or reduce potential impacts on surface water quality, for fish-bearing waterbodies, aside from use as an attenuation pond, and will therefore will minimize external environmental impacts.	Use of Lake A53 as an attenuation pond would leverage natural drainage pathways, without affecting other waterbodies outside the mine site. Whale Tail Lake (South Basin) would receive treated discharge from the water treatment plant.	Use of Lake A53 as an attenuation pond would leverage natural drainage pathways, without affecting other waterbodies outside the mine site. Whale Tail Lake (South Basin) would receive treated discharge from the water treatment plant.	Surface runoff from the IVR WRSF naturally drains towards Lake A53. Lake A53 would be surrounded on 3 sides by the mine site. If Lake A53 is not used for an attenuation pond, extensive diversion infrastructure and other water management strategies would be required to avoid impacts on Lake A53, and the risk of water quality impacts to Lake A53 is increased. Whale Tail Lake (South Basin) would receive treated discharge from the water treatment plant.	Surface runoff from the IVR WRSF naturally drains towards Lake A53. Lake A53 would be surrounded on 3 sides by the mine site. If Lake A53 is not used for an attenuation pond, extensive diversion infrastructure and other water management strategies would be required to avoid impacts on Lake A53, and the risk of water quality impacts to Lake A53 is increased. Whale Tail Lake (South Basin) would receive treated discharge from the water treatment plant.	Surface runoff from the IVR WRSF naturally drains towards Lake A53. Lake A53 would be surrounded on 3 sides by the mine site. If Lake A53 is not used for an attenuation pond, extensive diversion infrastructure and other water management strategies would be required to avoid impacts on Lake A53, and the risk of water quality impacts to Lake A53 is increased. Whale Tail Lake (South Basin) would receive treated discharge from the water treatment plant.
Fish-bearing waterbodies	The number of affected fish-bearing waterbodies influences the overall impact on fish and fish habitat.	1	1	0	1	0
Fish habitat area	The area of affected fish habitat influences the overall impact on fish and fish habitat.	Lake A53 is fish-bearing and has a baseline surface area of 14 ha. An additional 0.3 ha of an unnamed stream to the south of Lake A53 would also be overprinted by the pond.	Lake A53 is fish-bearing and has a baseline surface area of 14 ha. An additional 0.4 ha of an unnamed stream to the south of Lake A53 would also be overprinted by the pond.	This alternative does not affect fish habitat	Mammoth Lake is fish-bearing, with affected surface area of 26 ha	This alternative does not affect fish habitat
Diversity of fish community	The diversity of fish in affected waterbodies influences the overall impact on fish and fish habitat.	Five (5) fish species are found in Lake A53: Arctic char, lake trout, burbot, slimy sculpin, and ninespine stickleback	Five (5) fish species are found in Lake A53: Arctic char, lake trout, burbot, slimy sculpin, and ninespine stickleback	This alternative does not affect fish habitat	Six (6) fish species are found in Mammoth Lake: lake trout, Arctic char, round whitefish, burbot, slimy sculpin, and ninespine stickleback	This alternative does not affect fish habitat
Abundance of fish community	The abundance of fish in affected waterbodies influences the overall impact on fish and fish habitat.	Low abundance	Low abundance	This alternative does not affect fish habitat	Moderate abundance	This alternative does not affect fish habitat
Diversity of benthic community	The diversity of aquatic organisms in affected waterbodies influences the overall impact on fish and fish habitat.	Low presence and diversity of benthic invertebrates.				No natural waterbodies
Terrestrial habitat	Changes to terrestrial habitat may influence impacts on terrestrial wildlife and vegetation	14.4 ha of habitat typical of the region	10.2 ha of habitat typical of the region	27.1 ha of habitat typical of the region	No loss of terrestrial habitat (4.38 ha will be gained by decreased water level)	No loss of terrestrial habitat (area is within mine infrastructure)
Habitat fragmentation	Habitat fragmentation (due to roads, pipelines, and other infrastructure) can impact the movement and migration of caribou and other wildlife in the area.	All alternatives are within or adjacent to the footprint of the approved project and will not require new roads, pipelines or other infrastructure that may fragment habitat.				
Rare or listed plant species	Avoiding loss of rare or listed plant species is a conservation objective.	No rare or listed plant species, or suitable habitat for these species, have been identified in the vicinity of the mine site.				
Bird habitat	The area of affected bird habitat influences the overall impact on birds including waterfowl.	Birds, including waterfowl, are found throughout the area. However, no important bird habitat has been identified in relation to any of the alternatives.				
Caribou and muskox habitat	The area of affected caribou/muskox habitat influences the overall impact on caribou/muskox.	There are no caribou calving grounds near the mine site, and no areas of particular importance to caribou or muskox have been identified in relation to any of the alternatives.				
Carnivore habitat	The area of affected carnivore habitat influences the overall impact on carnivores.	No dens have been identified in relation to any of the alternatives.				

Criteria	Rationale	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Environmental consequence of overtopping or dam failure	Dam overtopping or dam failure may result in consequences for the downstream environment	Overflow or dam failure from A53 would be directed to Whale Tail Attenuation Pond by gravity and would not be expected impact the downstream environment.	Overflow or dam failure from A53 would be directed to Whale Tail Attenuation Pond by gravity and would not be expected impact the downstream environment.	Overtopping or dam failure would result in contact water reporting to the natural receiving environment (outside the mine site) and could result in environmental impact.	A breach of the dam within Mammoth Lake could impact Mammoth Lake.	Overtopping or dam failure would report to Whale Tail Pit, and would not be expected to impact the downstream environment
Human Environment Account						
Proximity to communities	Impacts on communities and land use may be influenced by proximity to the attenuation pond.	All alternatives are located over 150 km north of the hamlet of Baker Lake.				
Economic benefits	Construction and operation of the attenuation pond may create additional jobs and business opportunities.	No significant difference in the number or type of jobs (to construct and operate the attenuation pond), procurement, or business opportunities is expected.				
Risk to downstream communities	Real to community safety and security of downstream communities may influence well-being and community acceptance of the project. .	Considering community's physical distance from the alternatives, the alternatives represent negligible health risks and threat to inhabitants' physical safety.				
Community perception of risks/impacts	Perception of risks and impacts may influence well-being and community acceptance of the project	Concern expressed regarding relocation of fish, loss of fish habitat, and fish potentially not captured (prior to construction).	Concern expressed regarding fish relocation and loss of fish habitat.	Concern expressed regarding size of above-ground containment feature, which could obstruct landscape and interfere with caribou movements. Favourable perception regarding avoidance of impacts on fish habitat.	Concern expressed regarding impact to large fish-bearing lake, relocation of fish, loss of fish habitat, and fish potentially not captured (prior to construction). Favourable perception regarding low elevation of Mammoth Lake and thus potentially easier containment of water.	Favourable perception regarding avoidance of impacts on fish habitat by using an area already affected by the Whale Tail Pit Project.
Risks to workers in pit	Real or perceived risks to workers related to the attenuation pond may influence worker safety and/or well-being.	No significant risks identified.	Real and/or perceived risk to workers in pit due to presence of water-retaining dam above pit and ramp.	No significant risks identified.	No significant risks identified.	Real and/or perceived risk to workers in pit due to presence of water-retaining dam above pit and ramp.
Areas used for hunting	Changes to hunting areas may influence the practice of traditional hunting activities, harvests, household subsistence, and well-being.	No hunting destinations have been identified in relation to any of the alternatives.				
Areas used for fishing	Changes to fishing areas may influence the practice of traditional fishing activities, harvests, household subsistence, and well-being.	Lake A53 contains Arctic char. No fishing activity has been reported at Lake A53 through consultations, traditional land use studies, or other feedback.. Consultations indicated this small lake is unremarkable and there are other areas preferred for fishing.	Lake A53 contains Arctic char. No fishing activity has been reported at Lake A53 through consultations, traditional land use studies, or other feedback. Consultations indicated this small lake is unremarkable and there are other areas preferred for fishing.	None	Mammoth Lake contains lake trout and Arctic char. No fishing activity has been reported at Mammoth Lake through consultations, traditional land use studies, or other feedback.. Consultations indicated this moderately sized lake is unremarkable and, although it could be used for fishing, there are other areas preferred for fishing.	None

Criteria	Rationale	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Disruption of landscape	Visual disruption of the natural landscape during mine operations may influence the practice of traditional land use activities and well-being.	Includes construction of a moderately sized dam (approx. 6 m high, 500 m long) plus two smaller dams (approx. 50 m and 120 m) at Lake A53. This would result in a 110% increase to the natural water surface area. The pond is surrounded on 3 sides by the mine site.	Includes construction of a moderately sized dam (approx. 5 m high, 280 m long) plus one small dam at Lake A53 (approx. 100 m long); and an additional dam at the WTAP (7 m high, 125 m long). This would result increase the natural water surface area of Lake A53 by 78%. Lake A53 is surrounded on 3 sides by the mine site.	Includes construction of a large, horseshoe shaped dam (approx. 12 m tall and 2,040 m long), plus a small dam (380 m long). This would increase the water surface area of Lake A54 by over 20 times its size. The pond is on the east edge of the mine site.	Includes construction of a 418 m long dam across Mammoth Lake. The water surface area would be largely unchanged from the baseline though it will be transected by the dam. The pond is on the west edge of the mine site.	Includes construction of a 13 m high and 415m long dam on the south side of the open pit. The pond will be surrounded on all sides by the mine site, located within the footprint of the first phase of the Whale Tail Pit Project.
Areas used for trapping	Changes to trapping areas may influence traditional trapping activities, harvests, household subsistence, and well-being.	No trapping areas have been identified in relation to any of the alternatives.				
Areas used for vegetation/berry harvesting	Changes to vegetation harvesting areas may influence traditional gathering activities, harvests, household subsistence, and well-being.	No harvested species (e.g., crowberry, blueberry, blackberry, red berry, cloudberry) are identified in the vicinity of any alternative.				
Culturally or spiritually significant areas	Changes to culturally or spiritually important areas may influence traditional land use and well-being.	No trails, camps, cabins, caching sites, gravesites, traditional travel routes or other culturally important sites identified in the vicinity of the alternatives.				
Travel corridor between Baker Lake and the Back River	Residents of Baker Lake travel overland (in winter) to the Back River. Environmental or aesthetic changes could affect travellers.	The western route described in Section 6.5.5 is approximately 6-7 km east of the Amaruq mine site. None of the alternatives are significantly closer to, or would have an effect on, this travel corridor.				
Archaeological or historic sites/resources	Management and conservation of archaeological and historic resources is included in the Nunavut Agreement, which acknowledges the importance of the archaeological record to Inuit.	There is a grave site (including burial cairn and other artefacts) about 1.5 km south of the Whale Tail Dike on a hill on the east shore of Whale Tail Lake and a historic campsite exists north of Nemo Lake. None of the alternatives overlap with these or other archeological or historic resources.				
Consequence of failure for land users	Dam overtopping or dam failure may result in consequences for the land users, including safety of people harvesting or travelling in the area, and real or perceived contamination of harvested flora and fauna.	Water from A53 would report to Whale Tail Attenuation Pond. If volume of water released from breach exceeded capacity of Whale Tail Attenuation Pond (A53 is approximately 3x the volume of Whale Tail Attenuation Pond) then water would enter Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.	Water from A53 would report to WT-Ex. If volume of water released exceeds capacity of WT-Ex then water would enter Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.	Water from A54 would report to the natural receiving environment including areas south and east of the mine site. Affected areas have not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur. Considering the length and height of the containment dam, dam failure is likely to result in impacts to fish-bearing waterbodies, and perception of widespread environmental impacts including contamination potential harvests.	Failure at the east dam at MAM would result in water reporting to Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur. However, failure of the structure dividing Mammoth Lake would impact the fish-bearing west basin of Mammoth Lake. Mammoth Lake is not known for regular or special land use, but perceived impacts may extend to a broader area.	Water from WT-Ex would report to Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.

Criteria	Rationale	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Project Economics Account						
Capital costs	Capital costs for construction of the attenuation pond may influence the economic feasibility of the Whale Tail Pit Expansion Project.	Estimated $4.7 million	Estimated $7.2 million	Estimated $17.0 million	Estimated $15.0 million	Estimated $14.9 million
Operating (sustaining) costs	Operating costs for the attenuation pond may influence the economic feasibility of the Whale Tail Pit Expansion Project.	High monitoring requirements, additional pump required, no seepage pumping, no additional manpower required.	High monitoring requirements, moderate increase in seepage to Whale Tail Pit resulting in additional pumping costs, additional pump required, no additional manpower required.	High monitoring requirements, additional pump required, no seepage pumping, no additional manpower required.	High monitoring requirements, additional pump required, no seepage pumping, no additional manpower required.	High monitoring requirements and large increase in seepage to Whale Tail Pit resulting in additional pumping costs, no additional manpower required.
Closure costs	Costs for closure and reclamation of the attenuation pond may influence the economic feasibility of the Whale Tail Pit Expansion Project.	Location of attenuation pond enables reclamation activities to be completed largely independent from other zones of the mine site which can reduce cost and provide flexibility in timing. Management of solids accumulated in the pond may be required either by covering or removing. Dam will require breaching to reintroduce water to the reclaimed Whale Tail - Mammoth Lake watershed. Pumps and piping will be removed and the channel between A53 will require upgrading to support final closure. Closure cost for this facility estimated to be <10% total closure cost.	A53 portion is the same as Alternative I. WTEX portion of attenuation pond requires the dam to be breached. The cost of removal is higher for dams constructed on incompetent ground (as for WT-Ex) compared to structures on land. The higher costs will be more than offset because only a portion of WT-Ex will be removed. Closure of WT-Ex becomes more costly if management of solids is required by either covering or removal. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure. Closure cost for this facility estimated to be <10% total closure cost.	Long dam structure will need to be reclaimed. Reclamation will require dams to be re-contoured or removed to ensure positive drainage. An added cost to this option will be required to construct a drainage system to divert water flows from IVR WRSF around A53 with discharge to the reclaimed Whale Tail Lake. Management of solids accumulated in the pond may be required either by covering or removing. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure. Closure cost for this facility estimated to be >20% total closure cost.	A portion of the dam between the pond and Mammoth Lake will be breached. The cost of removal is higher for dams constructed on incompetent ground (as for this alternative) compared to structures on land. The higher costs will be more than offset because only a portion of the dividing dam will be removed. The dam structure between the attenuation pond and the Whale Tail pit will also be breached. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure. Closure cost for this facility estimated to be 10-20% total closure cost.	A portion of the dam structure between the attenuation pond and the Whale Tail Pit will be breached. The cost of removal is higher for dams constructed on incompetent ground (as for WT-Ex) compared to structures on land. The higher costs will be more than offset because only a portion of WT-Ex will be removed. Closure plan currently assumes that solids in WT-Ex will not require additional mitigation at closure. Closure cost for this facility estimated to be 10-20% total closure cost.
Post-closure costs	Costs for post-closure water management monitoring of the attenuation pond may influence the economic feasibility of the Whale Tail Pit Expansion Project.	Active water treatment may be required for up to 10 years	Active water treatment may be required for up to 10 years	Active water treatment may be required for up to 20 years	No active water treatment; monitoring required for up to 10 years	No active water treatment; monitoring required for up to 10 years
Fish habitat offsetting costs	Costs to compensation for fish habitat losses, if applicable, may influence the economic feasibility of the Whale Tail Pit Expansion Project.	Compensation for loss of 14 ha fish habitat. Cost estimate $1.0-1.4 million.	Compensation for loss of 14 ha fish habitat. Cost estimate $1.0-1.4 million.	No fish habitat compensation required	Compensation for loss of 26 ha fish habitat. Cost estimate in excess of $2.0 million.	No fish habitat compensation required

7. MULTIPLE ACCOUNTS LEDGER (STEP 4)



7.1 OBJECTIVE

In Step 4, the characterization criteria identified in Section 6.6 are considered in the development of relevant, meaningful, and differentiating sub-accounts and indicators, which are used to create the multiple accounts ledger for the assessment. While Step 3 focused on characterizing (i.e., describing) each alternative, Step 4 provides the basis for evaluation by identifying the elements that differentiate the alternatives.

7.2 SUB-ACCOUNTS

Sub-accounts are also known as *evaluation criteria* and are developed to consider material benefits (advantage) or losses (disadvantages) associated with the remaining alternatives. Sub-accounts are considered and defined on a project-specific basis, and sub-accounts used in one assessment may not be relevant to another assessment.

To ensure that the sub-accounts are useful in the evaluation, the ECCC guidelines identify the following characteristics for sub-accounts:

- **Impact-driven**: must be linked to an impact (advantage or disadvantage) rather than simply a statement of fact;
- **Differentiating**: must define an aspect that distinctly differentiates one or more of the alternatives, in a way that is meaningful to the decision (i.e., if a factor is the same for all alternatives, then that factor is not important in the comparison;
- **Relevant**: must be a factor that is relevant to the decision-making process;
- **Understandable**: must be defined unambiguously, so that external parties (e.g., reviewers) cannot interpret the preferred state differently;
- **Non-redundant**: must be unique within the multiple accounts analysis (i.e., to avoid consideration of the same criteria in different sub-accounts); and
- **Independent**: must be judgementally independent such that the outcome for one criteria cannot depend on the outcome of another criteria.

Table 7-1 summarizes the ten sub-accounts identified for the assessment of the five attenuation pond alternatives, including the rationale and preferred state of each sub-account. The definition of sub-accounts considered the characterization criteria described in Section 6.6. It was also informed

through consultation with the communities of Baker Lake and Chesterfield Inlet in July 2018, in which Elders and community members highlighted the importance of fish and the broader biophysical environment as a key element in the comparison of alternatives.

Table 7-1. List of Sub-Accounts and Rationale

Sub-Account	Rationale
Technical Account	
Containment Infrastructure	Larger and more complex containment construction and operation of infrastructure is associated with increased engineering and safety risks. Smaller and less complex infrastructure is preferred.
Ancillary Infrastructure	More extensive and complex ancillary infrastructure (e.g., pipelines and water management infrastructure) is associated with increased engineering and safety risks. Smaller and less complex ancillary systems are preferred.
Technical Complexity	Alternatives with more complex design, construction, operating and closure requirements are generally most costly and have a higher likelihood of failure. Simple and proven systems are preferred.
Operational consequences of failure	In the unlikely event of a failure, alternatives that can continue or resume safe operations expediently are preferred.
Biophysical Environment Account	
Air Quality	Alternatives that produce more emissions (including greenhouse gas emissions) are less desirable as they contribute to negative impacts on air quality locally, as well as climate change more broadly. Alternatives with less potential to impact climate change and local air quality are preferred.
Surface Water	Alternatives with greater potential effects to surface water hydrology are less desirable due to potential downstream effects on the availability and/or quality of water, which could affect ecosystem function, fish and wildlife, and human use/health. Alternatives that minimize potential impacts to surface water are preferred.
Fish and Aquatic Habitat	Alternatives with greater potential effects to fish and aquatic habitat are less desirable as these resources are important for ecosystem function, traditional land use and food security (fish). Alternatives that result in extensive loss of high value fish habitat may be difficult to permit. Alternatives that minimize potential impacts to fish and aquatic habitat are preferred.
Terrestrial Habitat	Alternatives with greater potential effects to terrestrial habitat are less desirable as these resources are important for ecosystem function, wildlife, and vegetation. Impacts to terrestrial habitat may also lead to impacts on traditional land use and food security (game). Alternatives that minimize potential impacts to terrestrial habitat are preferred.
Environmental consequences of failure	In the unlikely event of a failure, alternatives that contain water within the mine site, and avoid potential environmental impacts on the natural environment, are preferred.
Human Environment Account	
Inuit Land Use	Inuit land use includes hunting, fishing, trapping, and vegetation harvesting, as well as cultural and spiritual use and value of the land. Alternatives that minimize potential impacts to Inuit land use are preferred.
Workforce	The well-being of workers is a priority for Agnico Eagle, and is influenced by both real and perceived risks. Alternatives that promote worker safety and well-being are preferred.
Land use consequences of failure	In the unlikely event of a failure, alternatives that contain water within the mine site, and avoid potential impacts on areas known or valued for land use (including harvesting and travelling), are preferred.
Project Economics Account	
Attenuation Pond Costs	Alternatives with lower costs over the life of the attenuation pond are preferred.

Other topics were also considered, but were not included as sub-accounts for this alternatives assessment as they did not meet the characteristics stipulated above (e.g., they were not differentiating, or were not meaningful to the selection of an alternative). For example, impacts to archaeological resources are not included as this is not a differentiating factor.

7.3 INDICATORS

Indicators are also known as *measurement criteria* as they provide for the qualitative or quantitative measurement within each sub-account, thus allowing for direct comparison between alternatives. As for the sub-accounts, indicators are defined on a project-specific basis and must also be impact-driven, differentiating, relevant, understandable, non-redundant, and independent. Table 7-2 lists the indicators identified for each sub-account, with a total of 31 indicators.

Table 7-2. List of Indicators and Rationale

Sub-Account	Indicators	Rationale
Technical Account		
Containment Infrastructure	Maximum dam height	Alternatives with lower dam height have lower head, lower complexity of management, and lower consequence of dam failure, and are preferred.
	Length of dam(s) (combined)	Alternatives with shorter length of dam require less construction material, have lower complexity of management, and are preferred.
	Pond surface area (combined)	Alternatives with a smaller surface area have a lower overall physical footprint and a smaller area to be reclaimed at closure, and are preferred.
	Type of dam and foundation	Alternatives that involve frozen core dams, of smaller size, and constructed on competent and frozen foundation with lower hydraulic head, are preferred.
Ancillary Infrastructure	Length of pipeline (combined)	Alternatives with shorter length of pipeline transporting contact water (source, to attenuation, to water treatment plant) are preferred.
	Surface water management infrastructure	Alternatives that require less surface water management infrastructure are preferred (i.e., surface runoff including WRSFs).
	Seepage collection infrastructure	Alternatives that require less seepage collection infrastructure have less pumping requirements and are preferred (i.e., seepage from containment infrastructure).
Technical complexity	Design requirements	Alternatives that require less collection of baseline data (i.e., geotechnical studies) and/or engineering modelling (e.g., permafrost degradation, seepage, slope stability, etc.) are preferred.
	Construction complexity	Alternatives with less complex construction (i.e., more stable foundation, less material to be excavated, smaller foundation area) are preferred.
	Operational complexity	Alternatives with less complex operation and maintenance (i.e., fewer dams, fewer ponds, smaller area of dam face, few points for seepage collection and pumping requirements).

Sub-Account	Indicators	Rationale
	Closure complexity	Alternatives with less complex closure requirements (i.e. fewer complex activities such as dredging, pumping) during the closure phase are preferred.
	Post-closure complexity	Alternatives with less complex (i.e. more passive) water management requirements following closure are preferred.
Operational consequences of Failure	Operational consequence of overtopping	Alternatives with lower operational consequences (i.e., ability to continue safe operations) of an overtopping event are preferred.
	Operational consequence of dam failure	Alternatives with lower operational consequences (i.e., ability to continue safe operations) of a dam failure event are preferred.
Biophysical Environment Account		
Air quality	GHG and dust emissions during construction	Alternatives that require fewer truck trips to transport construction materials (estimated by considering both haul distances and dam fill volumes) are preferred.
	GHG emissions during operation	Alternatives that require use of fewer additional diesel-powered pumps are preferred.
Surface water	Loss of natural waterbodies	Alternatives that avoid direct loss of natural waterbodies, or affect fewer natural waterbodies, are preferred.
	Risk of impacts to surface water quality external to the attenuation pond	Alternatives that provide greater ability to manage surface water quality impacts, and/or reduce potential impacts on surface water quality (for Lake A53, Mammoth Lake, or other fish-bearing waterbodies), aside from use as an attenuation pond, are preferred.
Fish and aquatic habitat	Number of fish-bearing waterbodies	Alternatives that avoid, or minimize impacts to fish-bearing waterbodies are preferred.
	Diversity of affected fish community	Alternatives that affect fewer fish species are preferred.
	Extent of fish habitat loss	Alternatives that minimize the area of fish habitat loss are preferred.
	Abundance of affected fish community	Alternatives that affect waterbodies with lower abundance of fish are preferred.
Terrestrial habitat	Terrestrial habitat loss	Alternatives that minimize the area of terrestrial habitat loss are preferred.
Environmental consequences of failure	Environmental consequence of dam overtopping	Alternatives with lower downstream consequences of an overtopping event are preferred
	Environmental consequence of dam failure	Alternatives with lower downstream consequences of a dam failure event are preferred
Human Environment Account		
Inuit land use	Loss of waterbody used for fishing	Alternatives that avoid or minimize impacts to fishing activities, or waterbodies used for fishing, are preferred.
	Relocation of fish	Alternatives that avoid relocation of fish from one waterbody to another are preferred (due to local Elders' concerns related to intangible/ spiritual effects on fish).

Sub-Account	Indicators	Rationale
	Disruption of landscape	Alternatives that minimize visual disruption of the natural landscape during operations are preferred.
Workforce	Worker well-being	Alternatives that minimize real and/or perceived risks to worker well-being are preferred.
Land use consequences of failure	Land use consequence of dam overtopping	Alternatives with lower consequence for land use (including safety of land users and/or real or perceived impacts on access or contamination of harvests) related to an overtopping event are preferred.
	Land use consequence of dam failure	Alternatives with lower consequence for land use (including safety of land users and/or real or perceived impacts on access or contamination of harvests) related to a dam failure event are preferred.
Project Economics Account		
Attenuation pond costs	Capital costs	Alternatives with lower capital costs (considering construction material and type of construction) are preferred.
	Fish habitat offsetting costs	Alternatives with lower costs for fish habitat offsetting (compensation) are preferred. Offsetting costs compared to those for the approved Whale Tail Pit Project.
	Operating / sustaining costs	Alternatives with lower operating (or sustaining) costs – compared to the base case (i.e., Whale Tail Pit Project) are preferred.
	Closure and reclamation costs	Alternatives with low costs for closure and reclamation are preferred
	Long-term post-closure costs	Alternatives with lower costs for active water treatment or other activities post-closure are preferred.

7.4 MULTIPLE ACCOUNTS LEDGER

The indicators listed in Table 7-2 are tabulated in the multiple accounts ledger (**Appendix C)**, along with the applicable measurement parameter (e.g., length) and unit of measurement (e.g., metres). Each alternative is described, factually and objectively, in regard to each indicator.

7.4.1 Indicator Scales and Scoring

To provide a consistent approach to scoring both quantitative and qualitative indicators, six-point value scales are developed for each indicator. Scales range from one (1) to six (6), with higher scores indicating a higher degree of preference (e.g., less adverse impact, less risk, greater certainty). Scales are defined to cover the range of values embodied by the remaining candidates as well as other realistically conceivable alternatives. In most cases, the end points define the realistic best- and worst-case scenarios, even if these end points are beyond the bounds of the remaining alternatives. For example, the best case for habitat loss would be 'no habitat loss', regardless of whether any of the remaining alternatives would result in 'no habitat loss'.

In accordance with the ECCC Guidelines, the six-point scales should be developed to be:

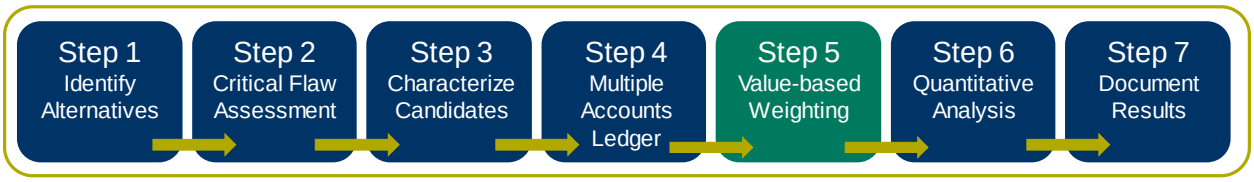
- **Operational**, such that the scale should be relevant and able to accommodate any other realistically conceivable alternative that may be added at a later time;
- **Reliable**, in that different parties should arise at the same score given the same scale and background information;
- **Relevant** to the indicator being scored; and
- **Justifiable**, so that any external party should agree that the scale is reasonable.

For each indicator, the information provided for each alternative is considered against the applicable indicator's scale, and each alternative is assigned the appropriate score from one (1) to six (6). For a given indicator, candidates with higher scores are preferred over those with lower scores. In accordance with the ECCC Guidelines, the robust and transparent characterization of each candidate within the ledger supports scoring that is clear and easily reproducible so that any external party would arrive at the same conclusions.

7.4.2 Ledger

The multiple accounts ledger—including indicators, measurement parameters/units, definition for each alternative, six-point scale, and score for each alternative—is provided in its entirety in **Appendix C**. Where qualitative value scales are used to score an indicator, these scales are defined within the ledger.

8. VALUE-BASED WEIGHTING (STEP 5)



The weighting component of the MAA is used to account for the fact that some indicators, sub-accounts, and/or accounts are considered to be more important to the decision-making process than others. Weightings are provided on a scale of one (1) to six (6), where a weight of six indicates that a criteria is six-times as important as a comparable criteria with a weight of one.

Tables 8-1 to 8-3 provide the weightings used for the accounts, sub-accounts, and indicators in this assessment. Weightings are only relevant in comparison to a given criteria's peers; in other words, all indicators within a given sub-account are weighted against each other, and the indicators in a separate sub-account are considered separately. The boxes outlined in the tables clearly denote how accounts, sub-accounts, and indicators are grouped and weighted.

Weightings are value-based and inherently subjective; as such, different parties may apply different weightings reflective of their value systems. Weightings were developed in consultation with Agnico Eagle's technical consultants and taking into account feedback received during community consultations, including concerns and perceptions expressed during meetings and focus groups. Justification for the weightings is provided below, with the objective that external parties will understand the rationale behind weightings, even if they would weight things differently.

Weightings are consistent across all candidates; in other words, a given criteria cannot be considered more or less important for one candidate compared to the others.

8.1 ACCOUNTS

The weighting of accounts (Table 8-1) is based on the recommendation provided in the ECCC Guidelines. The biophysical environment is afforded the highest weight (6), and project economics (i.e., costs associated with each alternative) is weighted 1.5.

Table 8-1. Weighting of Accounts

Account	Weight
Technical	3
Biophysical environment	6
Human environment	3
Project economics	1.5

8.2 SUB-ACCOUNTS

Sub-accounts are weighted within each account (Table 8-2). Of the technical sub-accounts, the consequence of failure and technical complexity is given the highest weight (6) as these aspects are critical to the successful operation of the attenuation pond. In the biophysical environment account, fish and aquatic habitat is given the greatest weight (6) due to its importance to both Inuit and regulators, and to reflect Agnico Eagle's commitment to avoiding unnecessary impacts on fish. Surface water, terrestrial habitat, and the environmental consequences of failure are closely connected with fish habitat and weighted 5, 4, and 4 respectively. Considering the scale of air emissions for other mine components (e.g., mill), and the unpopulated region, and the low potential for cumulative air quality impacts, the potential emissions associated with the attenuation pond are considered to be less significant, and therefore air quality is given a weight of 2.

Table 8-2. Weighting of Sub-Accounts

Account	Sub-Account	Weight
Technical	Containment infrastructure	4
	Ancillary infrastructure	3
	Technical complexity	6
	Operational consequences of failure	6
Biophysical Environment	Air quality	2
	Surface water	5
	Fish and aquatic habitat	6
	Terrestrial habitat	4
	Environmental consequences of failure	4
Human Environment	Inuit land use	6
	Workforce	4
	Land use consequence of failure	5
Project Economics	Attenuation pond costs	1

The human environment account includes Inuit land use, which is afforded the highest weight (6) in recognition of the importance of the land for life and culture in Nunavut, and the influence that real or perceived changes in the environment can have on land use activities and cultural well-being. Similarly, the unplanned and unlikely impacts on land use that may be consequences of a dam failure event is afforded a slightly lower weight (5), noting that high values for land use (i.e., resources that are not easily accessed in other areas) have not been identified in the vicinity of the project. The workforce sub-account is given the lowest weight (4), but overall the three human environment sub-accounts are weighted closely as they are all recognized to be important to overall well-being. The project economics account has only one sub-account; in this case, the sub-account weighting have no bearing on the results, and is nominally afforded a weight of 1.

8.3 INDICATORS

Indicators are weighted against other indicators within the same sub-account (Table 8-3). Overall, the influence of an indicator in the MAA will be driven by not only its weight, but also the weight of the applicable sub-account and account; as such, the weights of indicators cannot be directly compared between sub-accounts (i.e., an indicator with a weight of 3 in a sub-account with a weight of 3 will have greater influence than an indicator with a weight of 3 in a sub-account with a weight of 2).

Table 8-3. Weighting of Indicators

Account	Sub-Account	Indicator	Weight
Technical	Containment Infrastructure	Maximum dam height	6
		Length of dam(s) (combined)	4
		Pond surface area (combined)	2
		Type of dam and foundation	6
	Ancillary Infrastructure	Length of pipeline (combined)	4
		Surface water management infrastructure	6
		Seepage collection infrastructure	5
	Technical Complexity	Design requirements	6
		Construction complexity	4
		Operational complexity	3
		Closure complexity	3
		Post-closure complexity	6
	Operational Consequences of Failure	Operational consequence of overtopping	4
		Operational consequence of dam failure	6
Biophysical Environment	Air Quality	GHG and dust emissions during construction	3
		GHG and dust emissions during operation	6
	Surface Water Quality	Loss of natural waterbodies	1
		Risk of impacts to surface water quality external to the attenuation pond	4
	Fish and Aquatic Habitat	Number of fish-bearing waterbodies	5
		Diversity of affected fish community	3
		Extent of fish habitat loss	6
		Abundance of affected fish community	2
	Terrestrial Habitat	Terrestrial habitat loss	1
	Environmental Consequences of Failure	Environmental consequence of dam overtopping	4
		Environmental consequence of dam failure	6

Account	Sub-Account	Indicator	Weight
Human Environment	Inuit Land Use	Loss of waterbody used for fishing	4
		Relocation of fish	6
		Disruption of landscape (operations)	4
	Workforce	Worker well-being	1
	Land Use Consequences of Failure	Land use consequence of dam overtopping	3
		Land use consequence of dam failure	6
Project Economics	Attenuation Pond Costs	Capital costs	1
		Fish habitat offsetting costs	1
		Operating / sustaining costs	1
		Closure and reclamation costs	1
		Long-term post closure costs	1

For sub-accounts that only have one indicator, the indicator weight has no bearing on the results and is nominally appointed a weight of 1.

Technical Account

In the containment infrastructure sub-account, the height of dam and type of foundation are afforded the highest weight (6) as these indicators speak to the attenuation ponds overall complexity and consequence of failure. The length of dam is also important (4) as it influences seepage management and monitoring requirements. In the ancillary infrastructure sub-account, surface water management infrastructure (including infrastructure required to keep clean water clean, in accordance with the overarching water management strategy) carries the highest weight (6), followed by seepage management infrastructure (5) including management of contact water from the WRSFs.

In the technical complexity sub-account, design requirements are appointed a weight of 6 considering the challenges of local foundation conditions and seepage management that will need to be addressed by the design, and the fact that design provides the foundation for all later phases. Post-closure complexity is also given a weight of 6 as long-term environmental sustainability, and support for passive water treatment post-closure, is a priority of Agnico Eagle's existing closure concept.

In the operational consequence of failure sub-account, the potential consequence of dam failure (i.e., dam breach) is afforded a slightly higher weight than that of dam overtopping due to the volume of stored water that could be released and the magnitude of mitigation that could be required.

Biophysical Environment Account

In the air quality sub-account, dust was noted as a concern during consultation, and therefore the indicator for construction is given twice the weight of the indicator for mine operation (6 and 3, respectively).

In the surface water sub-account, the ability to effectively manage potential water quality impacts to fish-bearing waterbodies (external to the potential use as an attenuation pond) is a priority for Agnico Eagle. The mine site has been designed within a compact footprint, taking advantage of natural drainage patterns to minimize environmental impact; therefore, this indicator is weighted 4. The number of natural waterbodies is weighted 1 due to the prevalence of small ponds and lakes throughout the landscape.

In the fish sub-account, Agnico Eagle's priority is to minimize the loss of fish habitat. The extent of the fish habitat loss is the most important indicator as habitat availability is important for healthy fisheries. For this reason, the extent of fish habitat loss is weighted as 6. The number of fish-bearing waterbodies is weighted as 5 to reflect the importance of minimizing loss of fish habitat, but recognizing that the indicator 'extent of fish habitat loss' will capture total habitat; for example, the loss of five small waterbodies, may not be more important if the loss of one waterbody provides a greater extent of fish habitat. The Project's location in the Arctic means that, in general, fish species diversity and abundance is relatively low across all waterbodies. The indicator of diversity of affected fish communities is relatively more important than fish abundance, and is weighted 3 to reflect that more diverse fish community reflects varied and productive habitat. The abundance of affected fish community is weighted 2 as this is not considered a key differentiator between waterbodies in the Arctic environment.

For the environmental consequences of dam failure, the consequence of overtopping (4) is afforded a slightly lower weight than the consequence of dam failure (6) because effects of dam overtopping are expected to be more readily managed or remediated compared to dam failure.

Human Environment Account

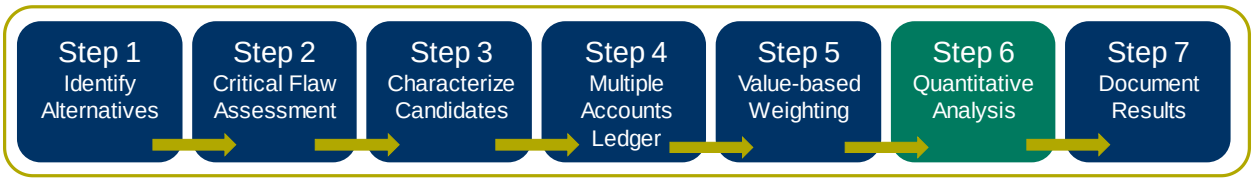
Inuit land use indicators consider potential impacts on fishing and the Inuit in relation to the land. In consultation with Inuit Elders and community members in Baker Lake, the potential need to relocate fish (i.e., to proceed with construction at a fish-bearing lake) was highlighted as point of concern related to spiritual changes to the fish. As such, the relocation of fish is given the highest weight (6). The loss of a waterbody used for fishing is weighted somewhat lower (4) as waterbodies for fishing are plentiful throughout the landscape. The potential disruption of the attenuation pond on the landscape during mine operations, which could affect the appreciation of land use activities and/or the environment, was not a significant concern raised during consultation and is also weighted 4.

In the land use consequences of failure sub-account, the potential consequence of dam failure (6) is given twice the weight of the indicator for dam overtopping (3) because the larger scale of a failure event could have far-reaching implications in terms of perceived impacts, which can change land use behaviours.

Project Economics Account

The economics indicators describe costs associated with various phases and/or activities of the Whale Tail Pit Expansion Project. All costs are weighted equally, and are nominally appointed a weight of 1.

9. QUANTITATIVE ANALYSIS (STEP 6)



9.1 CALCULATIONS

The ECCC Guidelines describe the calculation of merit ratings for each candidate based on the relevant scores and weightings. Merit ratings for are calculated per the calculations in Table 9-1. The resulting "alternative merit rating" is a number between 1.0 and 6.0, where higher numbers indicate a greater degree of preference. The alternative, account, and sub-account merit ratings can be compared across alternatives.

Table 9-1. Merit Rating Calculations

Parameters			
Indicator score (S)	Indicator weight (W_I)	Sub-account weight (W_S)	Account weight (W_A)
Calculations			
Indicator merit score	($S \times W_I$)		
Sub-account merit rating	$R_S = \sum(S \times W_I)/\sum W_I$	*(for all indicators within the sub-account)*	
Account merit rating	$R_A = \sum(R_S \times W_S)/\sum W_S$	*(for all sub-accounts within the account)*	
Alternative merit rating	$R_C = \sum(R_A \times W_A)/\sum W_A$	*(for all accounts)*	

9.2 PRELIMINARY RESULTS

Table 9-2 provides the overall merit ratings for each of the five alternatives. Ratings are shaded from yellow to green; lower ratings are shaded yellow, higher ratings are shaded green, and darker green indicates a higher rating.

Table 9-2. Merit Ratings of Alternatives

Candidate	Description	Merit Rating
I. A53	Storage provided by the existing Whale Tail Attenuation Pond and a new pond at Lake A53.	4.21
II. A53/WT-Ex	Storage provided by an expanded Whale Tail Attenuation Pond and a new pond at Lake A53.	3.59
III. A54	Storage provided by the existing Whale Tail Attenuation Pond and a new pond at Lake A54.	3.31
IV. MAM	Storage provided by the existing Whale Tail Attenuation Pond and a new pond created by isolating the northern section of Mammoth Lake.	3.17
V. WT-Ex	Storage provided by expanding the existing Whale Tail Attenuation Pond.	3.97

The results indicate that Alternative I: A53 has the highest merit rating (4.21) followed by Alternative V: WT-Ex (3.97). Alternative IV: Mammoth Lake is the lowest rated alternative (3.17). Figure 9-1 further illustrates the merit ratings for the five alternatives.

Investigating the results further, Table 9-3 and Figure 9-2 show how each alternative performs in regard to each of the five accounts. Alternative I has the highest rating for the technical account, where its rating of 4.02 exceeds the other alternatives (all 3.50 or lower). Alternative I is also rated highest in the project economics account (3.80) although the difference between alternatives is less, ranging from 3.00 to 3.80. Alternative I has the highest rating for the human environment account (4.47), followed by Alternative V (4.22), whereas Alternative V has the highest rating in the biophysical environment account (4.57) followed by Alternative I (4.28). The weighted results can be further disaggregated by sub-account, as shown in Table 9-4.

Table 9-3. Account Merit Ratings for Each Alternative

Alternative	Technical	Biophysical Environment	Human Environment	Project Economics
I. A53	4.02	4.28	4.47	3.80
II. A53/WT-Ex	3.01	3.97	3.51	3.40
III. A54	3.50	2.95	3.87	3.20
IV. MAM	2.99	3.10	3.57	3.00
V. WT-Ex	2.68	4.57	4.22	3.60

Table 9-4. Sub-account Merit Ratings for Each Alternative

	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Technical Account					
Containment Infrastructure	4.11	2.67	2.67	3.00	2.33
Ancillary Infrastructure	5.47	4.13	2.00	3.93	4.33
Technical Complexity	4.86	3.41	3.32	3.50	2.77
Operational Consequences of Dam Failure	2.40	2.40	5.00	2.00	2.00
Biophysical Environment					
Air Quality	4.67	3.33	3.00	4.00	3.00
Surface Water	4.80	4.80	2.40	2.60	2.80
Fish and Aquatic Habitat	3.44	3.44	6.00	1.88	6.00
Terrestrial Habitat	4.00	4.00	1.00	6.00	6.00
Environmental Consequences of Dam Failure	5.00	4.00	1.00	2.20	4.00
Human Environment					
Inuit Land Use	3.00	3.29	4.57	2.71	6.00
Workforce	6.00	2.00	6.00	6.00	1.00
Land Use Consequences of Failure	5.00	5.00	1.33	2.67	4.67
Project Economics					
Attenuation Pond Costs	3.80	3.40	3.20	3.00	3.60

Figure 9-1. Alternative Merit Ratings

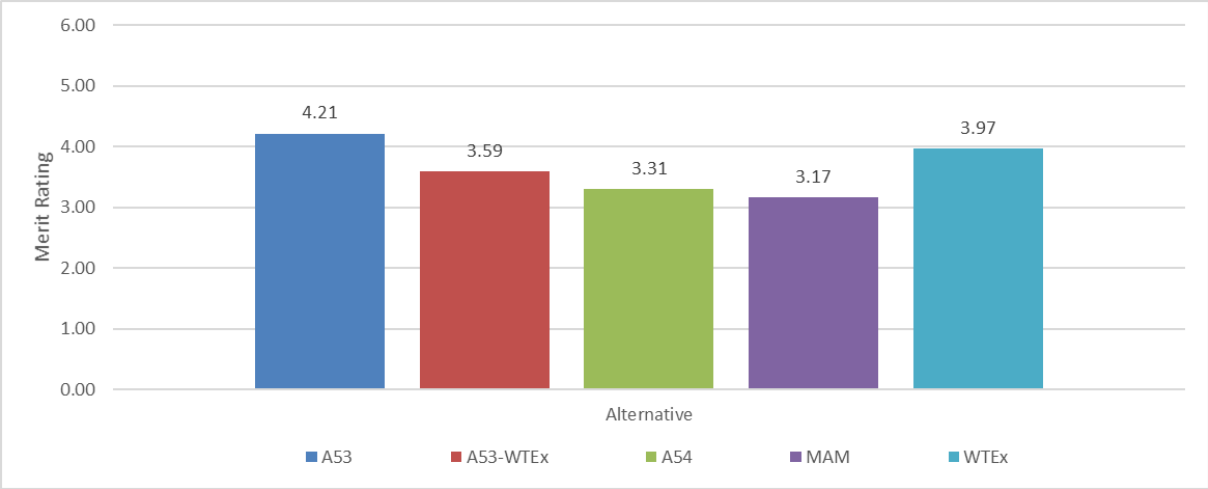
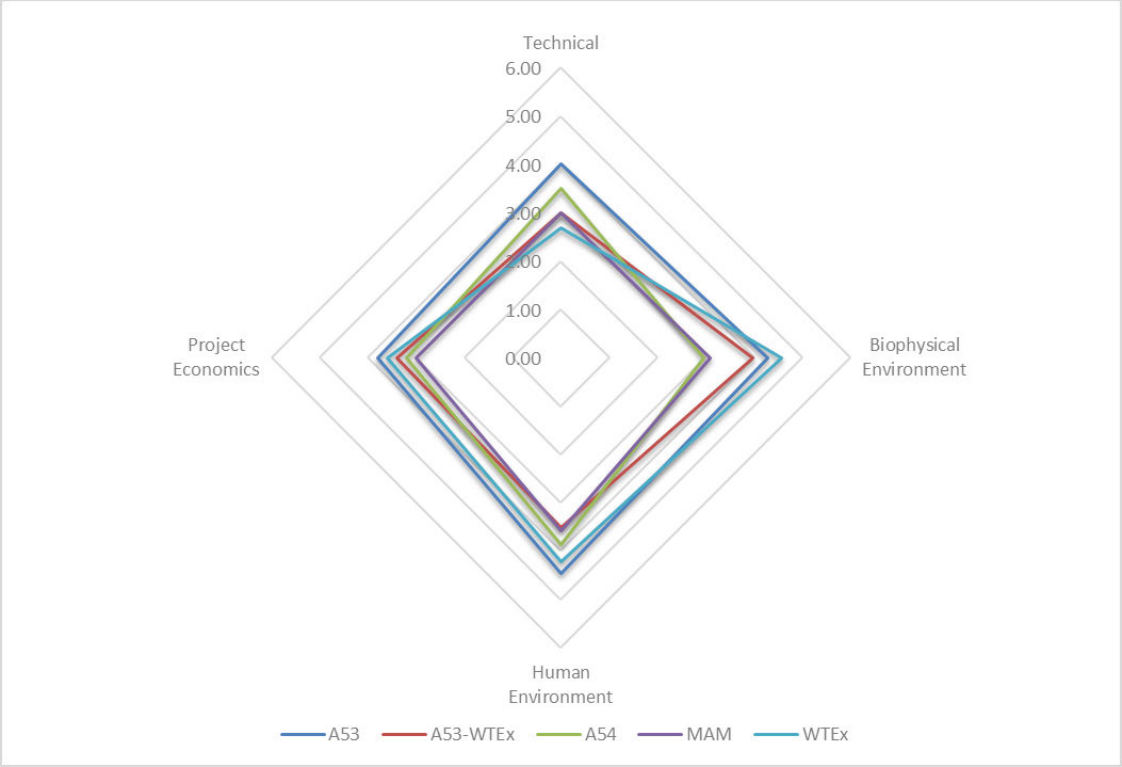


Figure 9-2. Account Merit Ratings



Considering the results, the following factors are highlighted:

- Impacts to fish-bearing waterbodies are unavoidable for Alternatives I, II, and IV and drive the ratings in the fish and aquatic habitat sub-account.

- Alternative V's high rating in the biophysical account is driven by the fact that this alternative is located entirely within the existing mine footprint.
- The ability to manage potential impacts to surface water outside the attenuation pond is an advantage of Alternatives I and II in the surface water sub-account.
- Alternative I's high rating for air quality is due to its moderate dam size and proximity to the source of dam fill material during construction, combined with a lower level of seepage into the pit during operations.
- Alternative III's poor results for the environmental and land use consequences of dam failure sub-accounts is related to its location, wherein failure or overtopping is less likely to be contained by mine infrastructure.
- However, Alternative III performs well in terms of Inuit land use reflecting Inuit Elders' preference to avoid impacts on fish (and relocation of fish), and in regard to perceived risks to workforce as it avoids a water-retaining dam adjacent to the Whale Tail Pit.
- The ratings of the Inuit land use sub-account are driven by feedback from consultation with Elders and residents of Baker Lake, who indicated a preference to avoid impacts to fish-bearing lakes.
- The workforce sub-account addresses real and perceived risks to the well-being of workers in the Whale Tail Pit. Alternatives I, III and IV do not include a water-retaining dam adjacent to the pit and are favoured in this sub-account.

9.3 SENSITIVITY ANALYSIS

The sensitivity analysis is designed to test the strength of the results and identify areas where a change in weightings may significantly influence the results. Considering the results of the preliminary quantitative analysis in Section 9.2, the objective of the sensitivity analysis is to understand possible sources of bias and subjectivity in the preceding calculations. This is achieved by changing the value-based weightings and examining the results. Although the "scores" are fact-based and therefore not subject to variation, the weightings of accounts, sub-accounts, and indicators may vary between stakeholders and could have a significant impact on the results.

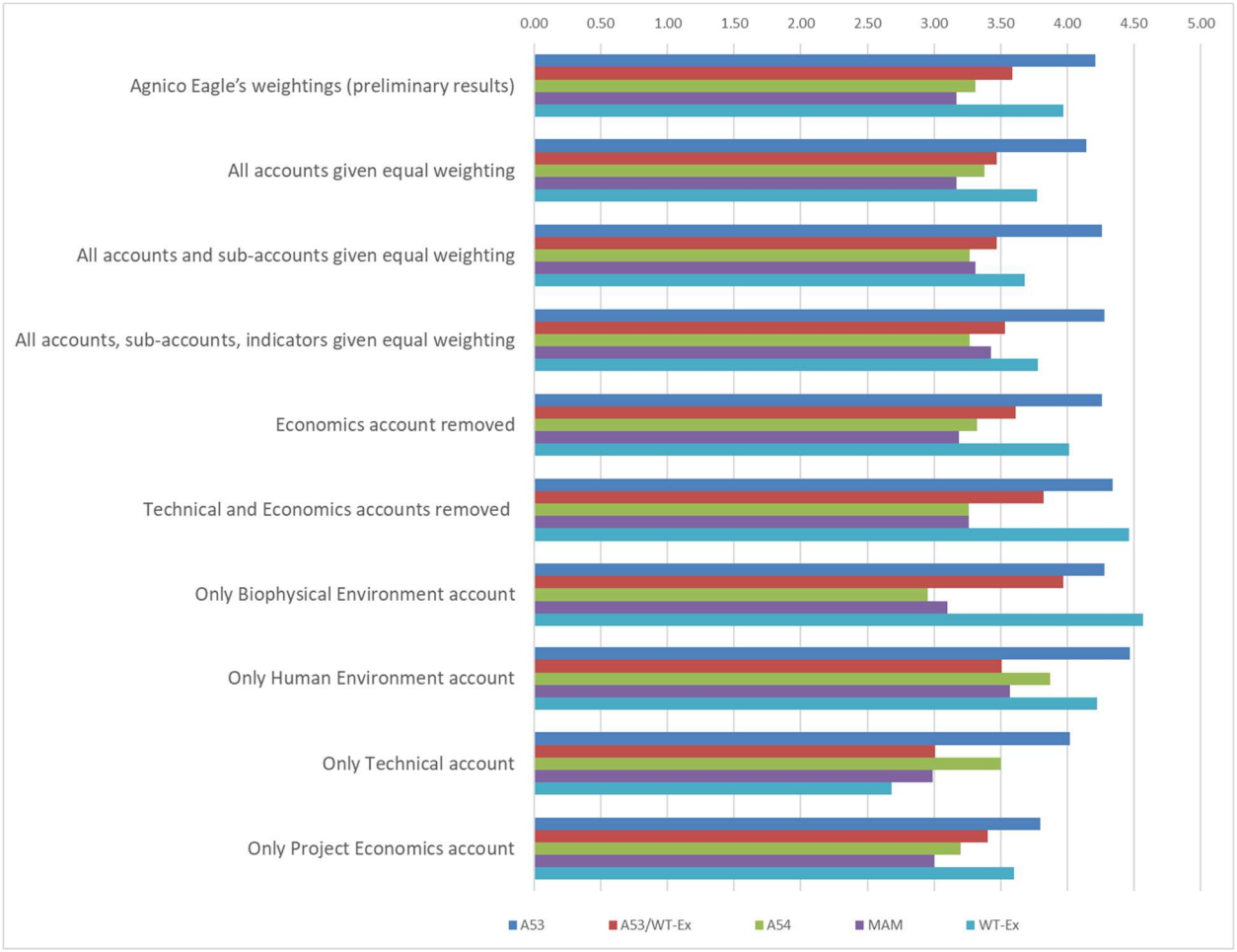
A total of 10 sensitivity scenarios were considered, as summarized in Table 9-5 and Figure 9-3. Overall, Alternative I (i.e., use of Lake A53 as the attenuation pond) is either the highest or second-highest rated alternative across all scenarios.

- Alternative V (i.e., expanding the Whale Tail Attenuation Pond) receives the highest rating when the biophysical environment account is considered, as this alternative does not affect any natural water bodies. However, the technical risks (including human safety) of this alternative are highlighted in other scenarios.
- Alternative II (i.e., use of Lake A53 combined with an expanded Whale Tail Attenuation Pond), Alternative III (i.e., use of Lake A54 as the attenuation pond) and Alternative IV (i.e., isolation of a portion of Mammoth Lake) offer no clear advantage over the other alternatives.

Table 9-5. Sensitivity Analysis (Alternative Merit Ratings)

Scenario	I. A53	II. A53/WT-Ex	III. A54	IV. MAM	V. WT-Ex
Agnico Eagle's weightings (preliminary results)	4.21	3.59	3.31	3.17	3.97
Equal weighting for all accounts	4.14	3.47	3.38	3.17	3.77
Equal weighting for all accounts and sub-accounts	4.26	3.47	3.27	3.31	3.68
All accounts, sub-accounts, indicators given equal weighting	4.28	3.53	3.27	3.43	3.78
Economics Account removed	4.26	3.61	3.32	3.19	4.01
Technical and Economics Accounts removed	4.34	3.82	3.26	3.26	4.46
Only Biophysical Environment Account	4.28	3.97	2.95	3.10	4.57
Only Human Environment Account	4.47	3.51	3.87	3.57	4.22
Only Technical Account	4.02	3.01	3.50	2.99	2.68
Only Project Economics Account	3.80	3.40	3.20	3.00	3.60

Figure 9-3. Sensitivity Analysis (Alternative Merit Ratings)



10. CONCLUSIONS

Based on the outcomes of the quantitative analysis described in Section 9, including consideration of the sensitivity analysis, the preferred attenuation pond alternative is Alternative I (Lake A53). This alternative would store contact water for the Whale Tail Pit Expansion Project in a new attenuation pond to be constructed at Lake A53, with a storage capacity of 646,638 m^3, supplemented by the existing Whale Tail Attenuation Pond with a storage capacity of 133,232 m^3.Lake A53 is a fish-frequented waterbody and use of this lake as an attenuation pond will require an amendment to Schedule 2 of the MDMER. The advantages of this alternative include a relatively small footprint, reduced need for surface water management infrastructure, reduced complexity over the life of the pond, reduced consequences in the event of dam failure or overtopping. This alternative also facilitates effective management of surface water quality impacts at the mine site as natural drainage conditions support the collection of contact water from the IVR WRSF at Lake A53, and the downstream environment is restricted to other sectors of the mine site.

The alternatives assessment has considered other options for the attenuation pond, including two alternatives that do not involve use of fish-bearing waterbodies as an attenuation pond. However, the disadvantages of these alternatives based on technical, environmental, and safety considerations are highlighted in the results.

Pursuant to ECCC's '*Streamlining the Approvals Process for Metal Mines with Tailings Impoundment Areas*', Agnico Eagle has completed the following steps to support a streamlined Schedule 2 amendment process:

- Conducted an assessment of attenuation pond alternatives, including the costs and benefits of alternatives, as part of its Environmental Impact Statement (EIS) for the Nunavut Impact Review Board (NIRB);
- Proposed a fish habitat compensation plan associated with the attenuation pond, which outlines the habitat losses and gains in relation to the use of Lake A53; and
- Presented the attenuation pond alternatives during consultations in Baker Lake and Chesterfield Inlet in July 2018 and in Baker Lake in March 2019, including impacts in fish and fish habitat, and proposed mitigation and compensation measures.

The NIRB's review of Agnico Eagle's FEIS has provided further opportunities for Inuit, Inuit organizations, the public and regulatory agencies to comment on the alternatives assessment and proposed fish habitat compensation plan pertaining to the Expansion Project.

Based on the outcomes of the quantitative analysis described in Appendix D, the preferred location for the WRSF is Alternative A, which would overprint three additional fish-frequented waterbodies (Lakes A50, A51, A52). The advantages of this alternative include a relatively small footprint, reduced need for surface water management infrastructure, reduced complexity during operations, reduced consequences in the event of water management operational failure. This alternative also facilitates

effective management of surface water quality impacts at the mine site as natural drainage conditions support the collection of contact water from the IVR WRSF to the IVR Attenuation Pond.

In summary, the Expansion Project proposes to use four fish-frequented waterbodies as part of the mine operations: the use of A53 as the IVR Attenuation Pond; and the overprinting of A50, A51, and A52 as part of the IVR WRSF. The use of all waterbodies was the result of the assessment of alternatives according to ECCC Guidelines (2016), and fish habitat losses and gains are outlined in one fish habitat compensation plan for the overall Expansion Project.

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Appendix A

Table of Concordance with ECCC Guidelines

APPENDIX A. TABLE OF CONCORDANCE WITH ECCC GUIDELINES

The left-hand column of the following table is populated with text taken from the *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (ECCC 2016; Chapter 2: Requirements of Alternatives Assessment, Sections 2.2 to 2.8). The original Guidelines included examples in bulleted lists and tables to illustrate the described requirements, details associated with specific types of mining components that are not relevant to the alternatives considered in this report, and narrative discussion of general concepts in and approaches to multiple accounts analysis. For the sake of brevity and simplicity, these portions of the Guidelines have been omitted from this Table of Concordance. Instances of omitted text are indicated by ellipses.

ECCC Guideline Requirements	Report Section
2.2 Step 1: Identify Candidate Alternatives	Section 4.3.2
The first step in the alternatives assessment process entails developing a list of all possible (i.e., reasonable, conceivable and realistic) candidate mine waste disposal alternatives for the site. This should include different mine waste disposal technologies, different disposal storage options, and different disposal locations. At this time it is imperative that no a priori judgements be made about any of the alternatives.	
It may be appropriate to establish a basic set of threshold criteria to establish the regional boundaries for selecting candidate alternatives. These threshold criteria should be as broad as possible and must be fully described and rationalized to ensure transparency…	Section 4.2
2.3 Step 2: Pre-Screening Assessment	Section 5
The process of screening, called the pre-screening assessment in these guidelines, entails excluding those alternatives that are "non-compliant" in that they do not meet certain unique minimum specifications which have been developed for the project. This process is often referred to as a "fatal-flaw analysis" in the context of mine waste disposal alternatives assessments. A fatal flaw is defined as any site characteristic that is so unfavourable or severe that, if taken singly, it would eliminate that site as a candidate mine waste disposal alternative. In simple terms, these would be considered the "show-stoppers".	
There is not a "master list" that qualifies as pre-screening criteria. These criteria need to be uniquely developed for each project, and a thorough qualification and justification of the rationale must be provided. The selection of pre-screening criteria and its rationale needs to be carefully considered since the objective at this time is to provide a transparent process for potentially eliminating the majority of alternatives from detailed analysis and assessment. Therefore, it should be clear to external reviewers that the pre-screening criteria, when evaluated singly, are sufficiently important to eliminate an alternative from further consideration. The level of detail required to support that conclusion has to be evaluated on a case-by-case basis, and it may have to be extensive to be sufficiently supportive.	Section 5.2
Pre-screening criteria should be formulated such that there is a simple "YES" or "NO" response to whether the alternative complies with the set criteria. Most importantly, it must be clear to the external reviewer that there would be no reasonable mitigation strategy that would convert a "YES" into a "NO". […] Results of the pre-screening assessment are best presented in the form of a summary table that lists each alternative against the pre-screening criteria (and associated rationale) set for the project…	Section 5.3, Table 5-1

ECCC Guideline Requirements	Report Section
2.4 Step 3: Alternative Characterization […] Site specific characterization criteria should be developed for each project. To facilitate smooth transition towards the next more rigorous steps of the evaluation process these criteria should be categorized into four broad categories, or "accounts" in the context of these guidelines, that consider the entire project life cycle. This means that both short and long term environmental, technical and socio-economic aspects associated with construction through operation, mine closure and ultimately post-closure maintenance and monitoring need to be considered. The "accounts" can be summarized as follows:	Section 6
• Environmental characterization: This account focuses on characterizing the local and regional environment surrounding the proposed TIA. These include elements such as climate, geology, hydrology, hydrogeology, water quality and potential impacts on aquatic, terrestrial and bird life.	Section 6.5.2
• Technical characterization: This focuses on characterization of the engineered elements of each alternative such as storage capacity, dam size and volume, diversion channel size and capacity, dumping techniques, haul distances, sedimentation and pollution control dam requirements, tailings discharge methods, pipeline grades and routes, closure design, discharge and/or water treatment infrastructure and supporting infrastructure such as access roads.	Section 6.5.1
• Project economic characterization: The focus of this account is to characterize life of project economics. All aspects of the mine waste management plan need to be considered including investigation, design, construction (inclusive of borrow development and royalties where applicable), operation, closure, post closure care and maintenance, water management, associated infrastructure (including transport and deposition systems), compensation payments and land use or lease fees.	Section 6.5.4
• Socio-economic characterization: This account focuses on how a proposed TIA may influence local and regional land users. Elements that are considered here include characterization and valuation of land use, cultural significance, presence of archaeological sites and employment and/or training opportunities…	Section 6.5.3
• The deliverable for this step should ideally be a series of summary tables that list the selected characterization criteria for each account for each of the alternatives under consideration. The table should include a concise summary of the rationale behind each criterion. This format allows an external reviewer to easily compare the factual characteristics across alternatives…	Section 6.6
2.5 Step 4: Multiple Accounts Ledger […] In order to evaluate alternatives using the MAA decision making tool, it is necessary to develop a multiple accounts ledger. This ledger seeks to identify those elements that differentiate alternatives, and provides the basis for scoring and weighting as described in Step 5, which is necessary to complete the evaluation. The multiple accounts ledger consists of the following two elements: (1) sub-accounts, known as evaluation criteria, and (2) indicators, known as measurement criteria.	Section 7

ECCC Guideline Requirements	Report Section
2.5.1 Sub-Accounts Sub-accounts (evaluation criteria) are developed using the characterization criteria selected during Step 3. The fundamental difference between these sets of criteria is that characterization criteria are factual and have been developed with no a priori judgements being made regarding any of the alternatives being considered, while evaluation criteria consider only the material impact (i.e., benefit or loss) associated with any of the alternatives being evaluated… The choice of sub-accounts must be carefully considered so that only those sub-accounts that truly differentiate mine waste disposal alternatives are presented for evaluation. To facilitate this, sub-accounts should comply with the following guidelines: • Impact driven: The evaluation criteria must, as far as practicable, be linked to an impact as opposed to merely being a factual element. For example, the size of an impacted lake in itself is not a relevant sub-account, but if the size of the lake is linked to its value or potential habitat loss, then the sub-account is appropriate. • Differentiating: The sub-account must define an aspect which distinctly differentiates one alternative from another, and that difference is expected to have a material effect on the final selection of an alternative. For example, land ownership may be an important evaluation criterion, if different alternatives fall on ground with different ownership. Conversely, if all the mine waste disposal alternatives under consideration were on land belonging to a single owner, then there really is no need to consider this sub-account in the analysis. • Value relevance: A sub-account must be relevant in the context of the alternatives being evaluated. For example, the size of dams in itself is not a relevant sub-account unless it is linked to a relevant context such as increased long-term risk of failure or increased maintenance and inspection requirements. • Understandability: Sub-accounts must be unambiguously defined, such that two external reviewers cannot interpret the outcome differently. For example, distance between the TIA and the mill complex may be a sub-account with the understanding that greater distances pose greater technical and environmental risk. However, someone may assume that because there is a significant dust hazard associated with a proposed alternative, a greater distance could be advantageous due to reduced worker health and safety risks. • Non-redundancy: There should not be more than one sub-account that measures the same evaluation criteria. If individual sub-accounts measure similar criteria, consideration should be given to combining those criteria. • Judgemental independence: Sub-accounts should be judgementally independent, which means that preferences with respect to a single criteria, or trade-offs between criteria, cannot depend on the value of another. For example, assume "traditional land use" is one sub-account and another is "landowner perception". It may be concluded that for one alternative "hunting" will be impacted which would result in a negative impact on "traditional land use". However, if "landowner perception" is influenced by a decrease in hunting then judgemental independence does not exist… The deliverable at this stage in the process will be a summary table which lists the sub-accounts complete with the rationale behind each. Appropriate supporting documentation will likely have to be clearly referenced…	Section 7.2 Table 7-1

ECCC Guideline Requirements	Report Section
2.5.2 Indicators To allow qualitative or quantitative measurement of the impact (i.e., benefit or loss) associated with each alternative for any given sub-account, the sub-account needs to be measurable. Sub-accounts by nature are often not directly measurable, and need to be sufficiently decomposed to allow measurability. This decomposition takes the form of sub-sub-accounts, which in the language of MAA are called indicators, or measurement criteria. […] These indicators may be different for the different life-cycle stages of the project (i.e., construction, operation and closure) and, where appropriate, may be divided into separate time periods. When selecting indicators thought should be given to the parameter that will be used to define measurability. This measurability is required in order to continue to Step 5, which is the value-based decision process. Assigning measurability is relatively simple for sub-accounts that readily lend themselves to parametric terms such as "water quality" or "capital costs". The challenge comes when measurability needs to be assigned to sub-accounts that do not readily lend themselves to parametric terms such as "traditional land use" which must be supplemented by indicators such as "effects on hunting". This problem can be overcome by constructing qualitative value scales. […] In order to develop a qualitative value scale it is necessary to define at least two points on the scale (usually the end points). The points on the scale are defined descriptively and draw on multiple concepts in the definition of the indicator. […] Qualitative value scales should be developed to have the following characteristics: • Operational: The decision maker should be able to rate alternatives that were not specifically used to define the scale, i.e., should another TIA be added for evaluation at a later time, the scale developed previously should still be relevant. • Reliable: Different external reviewers should be able to rate an alternative according to the value scale and assign the same score. • Value relevant: The value scale must be directly relevant to the indicator being scored. • Justifiable: Any external reviewer should reach the conclusion that the value scale is reasonable and representative. The deliverable for this part of the process will be the expansion of the sub-accounts summary table to include indicators. As previously stated, this collective information is also known as the multiple accounts ledger…	Section 7.3 Table 7-2 Section 7.4 Appendix C
2.6 Step 5: Value-Based Decision Process At the conclusion of Step 4, the multiple accounts evaluation is complete and the value-based decision process begins. This process entails taking the list of accounts, sub-accounts and indicators and assessing the combined impacts for each of the alternatives under review. This entails scoring and weighting of all indicators, sub-accounts and accounts and quantitatively determining merit ratings for each alternative. These three processes are described in the following sections.	Section 8 Table 8-3
2.6.1 Scoring […] Scoring is done by developing qualitative value scales for every indicator, including those which appear to be readily measurable. […] By following this procedure, it is abundantly obvious to the external reviewer why a particular indicator score has been assigned to an alternative, and since the qualitative value scale has been developed collaboratively, with input from stakeholders, there is built in confidence that the scoring is appropriate…	Section 8.2 Section 8.3

ECCC Guideline Requirements	Report Section
2.6.2 Weighting At this time the analyst, with input from stakeholders, needs to have the ability to introduce their value bias between individual indicators. This is done by applying a weighting factor to each indicator. […] It is important to bracket the weighting factor, and in the context of these guidelines, it is recommended that the weighting factors range from 1 through 6. This means that any one indicator can be considered to be up to 6 times more significant than another. […] Considering the inherent subjectivity of weighting, there is a natural tendency to want to standardize or prescribe weighting factors. This would result in a fixed value bias, which reflects the value bias of the imposing guidelines with no consideration of site specific conditions, rather than allowing the analyst with input from stakeholders, to set value bias relevant to their project. Notwithstanding this, within the framework of these guidelines, it is proposed that the Base Case of the alternatives assessment use the following weightings for accounts: • Environment - 6 • Technical - 3 • Project Economics - 1.5 • Socio-Economic - 3 The analyst is still encouraged to assign other weightings to accounts and demonstrate their effect on the assessment outcome, as described in Step 6…	Section 8.3 Table 8-3
2.6.3 Quantitative Analysis The quantitative analysis is relatively simple, and given the potentially large amount of accounts, sub-accounts, and indicators this analysis is well suited to using a spreadsheet type approach. For each indicator, the indicator value (S) of each alternative is listed in one column. The weighting factor (W) is listed in another column and the combined indicator merit score (S × W) is calculated as the product of these values. […] At this time it is possible to compare alternative merit ratings for all mine waste disposal alternatives evaluated and the preferred option will be the one which has the highest merit rating. The deliverable at this point in the process will be summary tables […]. It is, however, very important that justification is provided for all the weightings used along every step of the process. An external reviewer should be able to review the weightings, and conclude that they are reasonable, even though he may not agree with them.	Section 9.2 Table 9-2
2.7 Step 6: Sensitivity Analysis […] The way to test the sensitivity of the value based decision making process is to assign different weightings to those indicators, sub-accounts and accounts according to a range of value systems representative of the perceived disparity. The level and type of sensitivity analysis that should be carried out is not set, and should not be prescriptive. It is entirely project specific and to a large extent will be based on feedback received from stakeholders throughout the alternatives assessment process. […] The merit rating of each alternative is compared to the base case analysis to determine if the results of the sensitivity analysis are likely to lead to a different decision about which alternative may be the preferred option. […] The deliverable for this step would be a well-documented summary of the sensitivity analysis that was carried out. This may be presented in summary tables similar to those presented in Step 5 […].	Section 9.3
2.8 Step 7: Document Results The final step in the alternatives assessment process entails thorough documentation of the results. This is best done through a comprehensive technical report, which systematically describes the outcome of each of the steps as recommended in these guidelines. The primary technical alternatives assessment report should be a concise summary of the findings of each step, using comparative summary tables and descriptive definitions which make the results immediately apparent to the external reviewer. Detailed supporting information related to elements such as cost estimate breakdowns, or geochemical assessment should be presented in appendices, or if stand-alone reports have been produced, these should be properly referenced and made available for review.	Sections 4 to 9

Appendix B

Response to ECCC Comments

Appendix B1

ECCC Comments on the Assessment of Alternatives Report for the Whale Tail Expansion Project, July 26, 2019

Appendix B1: ECCC Comments on the Assessment of Alternatives Report for the Whale Tail Expansion Project, July 26, 2019

Key Comments

1. ECCC's determination as to whether or not an amendment to Schedule 2 of the *Metal and Diamond Mining Effluent Regulations* (MDMER) is required

Lake A53

The proponent is proposing to use Lake A53 as an attenuation pond in order to store up to 750 000 m^3 of mine contact water during the operations of the Whale Tail Pit Expansion Project.

The proponent acknowledges in its Assessment of Alternatives (AA) report, and in its Final Environment Impact Statement (FEIS) submission package, that Lake A53 is fish frequented. Field investigations have indicated the presence of at least five (5) fish species, including arctic char. ECCC agrees with the proponent's characterization of Lake A53 as a fish-frequented waterbody.

The proponent also mentions in its AA report that the stored mine contact water (effluent) would include deleterious substances. This was reiterated during the June 27, 2019 meeting where the proponent stated that the effluent is predicted to be deleterious during operations and early closure with seasonal exceedances of arsenic and total suspended solids.

Using a water body frequented by fish for mine waste disposal requires an amendment to the MDMER. In light of the information provided thus far by the proponent, ECCC confirms that an amendment to Schedule 2 of the MDMER will be required prior to any deposit of a deleterious substance in Lake A53.

Waterbodies A-P10, A-P5, Lake A50, Lake A51, Lake A52 and AP-21

The proponent has identified in its AA report Lake A53 as the sole waterbody within the project development area that is fish frequented and that will be used for the deposit of effluent, thus requiring a Schedule 2 amendment process. While other waterbodies have been identified as overprinted by mine waste, the proponent considered at the time of the report waterbodies A-P10, A-P5, Lake A50, Lake A51, Lake A52 and AP-21 and associated streams to be non-fish bearing waters.

The proponent has since completed additional field investigations and preliminary results confirmed that stickleback is present in Lakes A50, A51 and A52[1], suggesting that these waterbodies may be considered fish frequented, regardless of their low abundance and lack of fish diversity.

In light of these findings, ECCC has requested DFO's expert advice in regards to whether any additional waterbodies should be considered waters frequented by fish per the *Fisheries Act* (FA). Upon receipt of DFO's advice[2], ECCC will make a determination on whether or not any of these waterbodies will trigger the requirement for a Schedule 2 MDMER listing.

2. Rehabilitation of Lake A53 at closure

The proponent is proposing to return Lake A53 to fish habitat at closure by breaching the dam when the water quality of the effluent has improved, and by reintroducing the water to the Whale Tail – Mammoth Lake watershed. This approach is detailed in the AA report and has received positive feedback from the Kivalliq Inuit Association. The proponent is however questioning whether this initiative is possible considering that Lake A53 would remain on Schedule 2 of the MDMER at closure.

The MDMER do not preclude a waterbody listed on Schedule 2 from being rehabilitated. Mine site rehabilitation is encouraged, including in publications such as ECCC's *Environmental Code of Practice for Metal Mines*, which recommends best environmental management practices for metal mining, providing that any such rehabilitation complies with applicable legislation.

3. Compliance with the *Fisheries Act* and its regulations

It is the proponent's responsibility to comply with the FA and its regulations, including the MDMER, throughout the lifecycle of the mine, including during the implementation of the closure plan and activities involving the reconnection of Lake A53 to the natural environment. Subsection 36(3) of the FA states that:

> [...] no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish **or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious may enter such water.**
>
> (bold emphasis added)

[1] Deck entitled: Whale Tail Expansion Project: Meeting with Fisheries and Oceans Canada July 3, 2019.
[2] DFO is currently reviewing all the information submitted by the proponent.

4. Regulatory context section of the assessment of alternatives report

The proponent has included, in the introduction of its AA report, a section on the report purpose and on the regulatory context of the project. These sections present the *Fisheries Act*, the MDMER and the policy for S*treamlining the Approvals Process for Metal Mines with Tailings Impoundment Areas*.

While the objective of these sections is to ensure an external reader would understand the purpose of the project and the regulatory context in which it operates, some of the interpretation of the FA and the MDMER may be inaccurate, incomplete or too restrictive.

While it is recommended to keep these sections in the report, it is suggested to only concentrate on how their requirements apply to the project at hand and avoid any broad interpretation of the FA and the MDMER.

Response: The AA Report has been edited to avoid broad interpretation of the FA and MDMER e.g., see Section 1.3

5. Technical comments on the assessment of alternatives report

ECCC has reviewed the AA report and prepared technical comments as shown in Table 1. The proponent is invited to revise the report based on these comments. The proponent should also make the necessary adjustments to the MAA calculations, sensitivity analysis, conclusion and executive summary.

Table 1: Technical Comments on the Assessment of Alternatives Report

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the September 2019 Version of the Report
1	11	viii	Glossary and abbreviations	*Metal and Diamond Mining Effluent Regulations:* ~~*Under the MDMER, the use of a natural body of water frequented by fish is only possible by an amendment to Schedule 2 of the Regulation. MDMER impose limits on the releases of arsenic, copper, cyanide, lead, nickel, zinc, suspended solids, and radium-226, and prohibit discharge into waterbodies of effluent that is acutely lethal to fish.*~~ Please remove this description of the MDMER as it contains a few inaccuracies. It is recommended to provide a link to the *Regulations* instead: https://laws-lois.justice.gc.ca/PDF/SOR-2002-222.pdf	Addressed in the Glossary and Abbreviations section of the Report.
2	19	2-1	Subsection 2.2.1 Whale Tail Pit Project	The report includes a figure showing mine site infrastructures (Figure 2-3). However, it does not clearly show major mine components and facilities mentioned in the report, such as: • Overburden storage facility • Crusher • Landfill • Industrial area • Water management infrastructure Please provide more details and features on the figure by showing major mine components and facilities identified in this section.	Figure 2-3 has been updated to identify the mine components and facilities mentioned in the text.
3	25	2-8	Subsection 2.4.1 Water Management Strategy	Table 2-1 shows the water management strategy including the treatment of contact water. While collected water must meet discharge criteria in the Type A Water License 2AM-WTP1826, effluent must also meet the requirements of Schedule 4 of the MDMER before and after the coming into force of amendments on June 1, 2021. Please revise the statement accordingly.	Addressed in Table 2-1 of the Report.
4	27	2-10	Subsection 2.4.3 Whale Tail Pt Expansion Project	The section describes the water management infrastructure, including the possible effluent discharge locations (South Basin of Whale Tail Lake and Lakes D1 and D5). To facilitate the review of this section and Table 2-2, it is recommended to show on a map or figure the different main contact water management components and facilities, including the dikes and the WRSF pond.	A new figure has been added (Figure 2-4) to illustrate contact water management components and facilities.
5	28	2-11	Subsection 2.4.3 Whale Tail Pt Expansion Project	Table 2-2 describes the different contact water management sectors and components, including the IVR Attenuation Pond. It is mentioned that the treatment discharge pipe from that pond will be connected to the Mammoth Lake diffuser, where discharge is to occur. This statement seems inaccurate. According to the current expansion plan, the treated water would actually be redirected to the Whale Tail Lake and alternative discharge. Please provide clarifications or revise the statement.	Addressed in Table 2-2 of the Report.

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the September 2019 Version of the Report
6	28	2-11	Subsection 2.4.3 Whale Tail Pt Expansion Project	Under Alternatives Assessment, the proponent already reveals which alternative is preferred. It is recommended not to say which alternative is selected until section 10 of the report (Conclusions). This ensures that readers keep an open mind during the assessment of alternatives and can arrive at the same conclusions without bias or *a priori* judgements having influenced them. It is suggested removing any reference to the preferred alternative at this stage of the assessment. This comment also applies to subsection 6.5.1 (Alternative I:A53) at page 6-4.	Addressed in Table 2-2, Alternatives Assessment (p 2-11), and Alternative I: A53 (p. 6-4). Have also changed references to the IVR Attenuation Pond in section 2.4 to “Expansion Project Attenuation Pond” for which the location and design are the subject of this alternatives assessment. Figure 2-3 has also been revised to remove IVR Attenuation Pond as Expansion Infrastructure.
7	29	2-12	Subsection 2.4.4 Water Quality and Discharge Criteria	Subsection 2.4.4 and Table 2-3 describe the predicted quality of the effluent and how it should meet the discharge criteria of the Water Licence AM-WTP1826. It should be noted that effluent must also meet the requirements of Schedule 4 of the MDMER before and after the coming into force of amendments on June 1, 2021. Please revise the subsection accordingly and include Schedule 4 of the MDMER in Table 2-3 (including Radium-226 and un-ionized ammonia).	Addressed in Section 2.4.4 and Table 2-3 of the Report.
8	32	3-2	Subsection 3.1 Physical Environment	The report describes the Surface Hydrology of the project development area (PDA), including the surrounding watersheds. Considering impacted watersheds are part of a threshold criterion in Section 4 of the report, it is recommended to clearly identify the watersheds (A, B, C and D) to facilitate the review of subsequent sections of the report. These additions can be included in Figure 4-1 or in a stand-alone figure.	Figure 3-1 identifies watersheds A and C. Watersheds B and D are not referenced in the Report.
9	33	3-3	Subsection 3.1 Physical Environment	The report describes the Surface Water Quality of the project development area (PDA), including concerns from youth in Baker Lake about the deposition and colour changes to water. This concern was not identified in subsequent sections (as a characterization criteria or an indicator). Please provide a rationale as to why.	This comment provided a general observation and was not made in regard to the Project area or concerns about project impacts. It arose from a discussion related to waterbodies located in and around the community of Baker Lake. The text in Section 3.1 has been amended to clarify this point. Surface water quality is considered as a characterization criteria in Section 6.6 but found to be non-differentiating. On this basis, it was not included as an indicator in the MAA.
10	36	3-6	Subsection 3.3 Human Environment	The report describes the human characteristics of the PDA, including Traditional Land and Resource Use as well as Cultural and Heritage Resources. Considering valued cultural and/or archeological sites are part of a screening criterion, it is recommended to clearly identify the high value sites to facilitate the review of subsequent sections of the report. These additions can be included in Figure 4-1 or in a stand-alone figure.	Figure 3-2 has been included to show the campsite (Nemo Lake) and grave site (Whale Tail Lake).
11	38	4-1	Subsection 4.2 Threshold Criteria	According to the *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (herein, the *Guidelines*), the first step in the alternatives assessment process entails developing a list of all possible (i.e., reasonable, conceivable and realistic) candidate mine waste disposal alternatives for the site. The proponent must establish a basic set of threshold criteria to establish the regional boundaries for selecting candidate alternatives. When exclusion areas have been identified, the proponent can then select the location of alternatives that would be outside of these boundaries. Subsection 4.2 presents criteria but some of them do not qualify as threshold criteria (Step 1) based on the aforementioned description. They are:	ECCC’s comments suggest that geographic thresholds are the only constraints of relevance at this stage. However, a review of other comparable alternative assessment reports indicates that other criteria have been used including technological precedent, geological criteria, storage capacity, and undefined ‘technical limitations’.

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the September 2019 Version of the Report
				• Must align with existing water management strategy • Must provide sufficient storage capacity • Must not contradict the mine development plan These criteria, while not appropriate at Step 1 of the assessment, may still be relevant for the analysis. The proponent may want to consider them at a later stage of the assessment (Step 2). However note that the criterion Must align with existing water management strategy can only be considered a pre-screening criteria if it defines a site characteristic that is so unfavourable or severe that, if taken singly, it would eliminate that site as a candidate mine waste disposal alternative. The proponent mentions that the project has an approved and permitted water management strategy, and to ensure consistency, the proponent must work within the boundaries of its Type A Water License 2AM WTP1826. If the permitted strategy is immutable, as the proponent alludes to, it can indeed be considered a fatal-flaw. However, the rationale goes on to say that the project must reduce operational risks to the downstream environment, as well as to human health and safety. While it is important, risk management cannot be considered a fatal-flaw since mitigation measures can be put in place to prevent risks to the environment and the population. Please ensure the rationale complies with the requirements of the *Guidelines*. The criterion Must be confined within the area already affected by the Whale Tail Pit Expansion Project, appears to contain two (2) distinctive regional boundaries. The proponent may want to separate them into two (2) threshold criteria: • Exclusion based on distance (2 km buffer around pits) • Minimize and confine environmental impacts (within already impacted watersheds) However note that the criterion Exclusion based on distance can only be considered a pre-screening criteria if it defines a site characteristic that is so unfavourable or severe that, if taken singly, it would eliminate that site as a candidate mine waste disposal alternative. The proponent mentions that the project must not unnecessarily expand the geographic extent of the footprint and proposed a 2 km buffer, which is 50% of the width of the mine. This value seems arbitrary. It is not clear how an alternative would be considered unreasonable if it went beyond this distance. Is it driven on economics? Please document this rationale with relevant data. Note that the criterion Minimize and confine environmental impacts can only be considered a pre-screening criteria if it defines a site characteristic that is so unfavourable or severe that, if taken singly, it would eliminate that site as a candidate mine waste disposal alternative. While the proponent is committed to minimizing and confining the environmental impacts to one watershed, it cannot be considered a fatal-flaw criterion. It is not clear why an alternative located outside of the watershed would necessarily have detrimental impacts to the environment. Please ensure the rationale complies with the requirements of the *Guidelines*. Lastly, a pre-screening criteria, identified in Section 5 of the report, qualifies more as a threshold criterion and should be considered during Step 1:	The evaluation of alternatives for the proposed expansion project should also be considered in terms of the nature of this specific project. This is not a greenfield site, it is an amendment to an approved mine plan and as such inherits Agnico Eagle's commitments and management practices. Some of these commitments are fundamental to Agnico Eagle's management of the site and potential environmental and social impacts, in line with ECCC's guidance that "*exclusion based on corporate [sustainability] policies*" may justifiably eliminate an alternative in Step 1. **Threshold Criteria:** **1. Must align with existing water management strategy**: This threshold criteria has been reframed as "must align with water management guiding principles". The following text has been deleted as suggested: "*and reduce operational risks to the downstream environment and human health and safety*"; this aspect does not meet the requirement of a threshold or screening criteria and has therefore removed. Agnico Eagle considers the company's water management principles, a key element of the company's sustainability commitments and founded on industry good practice for mine waste management, to be of paramount importance. Agnico Eagle does not support alternatives that would require or result in unnecessary exposure of waste rock to water such that the volume or quality of contact water would be adversely affected. Agnico Eagle considers alignment with these water management principles to be a requirement for the identification of reasonable and realistic alternatives. **2. Must provide sufficient storage capacity**: Agnico Eagle considers storage capacity to be a threshold criteria because it is necessary to the development of conceptual candidates. Considering the low profile of the landscape around the Project, and the fact that this analysis is limited to the storage of contact water (no tailings or waste rock, etc.), the capacity to store

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the September 2019 Version of the Report
				• Overlap with Areas of High Value The proponent is invited to revisit all these criteria and revised the threshold analysis, if required, to ensure the review is thorough and complete.	the required volume of water (alone or in combination) is the driving factor behind the development of realistic, conceivable and achievable concepts. No change has been made. **3. Must not contradict the mine plan:** as suggested, Agnico Eagle has moved this item to the screening criteria. **4. Must be confined within the area already affected by the WTP expansion project:** This has been reframed to focus on the watersheds already affected by mine infrastructure, and the criteria related to distance has been removed. While this may not be a threshold for larger mine facilities such as a TSF, in this particular situation Agnico Eagle believes this to be an important threshold. The footprint of the approved and expanded project are relatively small and intentionally compact as the Whale Tail Project will make use of existing mine infrastructure at the Meadowbank Mine. Similarly, the attenuation pond comprises a relatively small volume and footprint relative to other mine components. There is no need or value to extend mine infrastructure further afield, particularly when there is a low degree of variation in the landscape that would present unique or beneficial features for an attenuation pond. **Screening Criteria:** Regarding the final point suggesting that screening criteria “Overlap with areas of high value” would be more appropriately framed as a threshold criteria, Agnico Eagle has reviewed comparable assessments and notes that similar screening criteria are often presented. The ECCC Guidelines state that protected areas may be excluded if it is known that mine waste disposal would “under no circumstances be allowed”. The high-value areas considered under this screening criteria are not parks or other designated protected areas, and therefore do not meet this definition. While development of an attenuation pond may not be strictly prohibited, Agnico Eagle recognizes the importance of these areas for local Inuit

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the September 2019 Version of the Report
					populations. Agnico Eagle would consider this a critical flaw in regard to the social licence that the company has earned through respectful engagement and dialogue with local communities and land users. No change has been made.
12	42	4-6	Subsection 4.4 Threshold Analysis	Table 4-1 presents the preliminary alternatives. Alternative A would require the construction of a second dike in Whale Tail Lake, which is frequented by fish according to section 3.2 of the AA report. The proponent is therefore invited to provide justification as to why “None” was selected when referencing impacted fish-frequented waterbodies.	Addressed in Table 4-1 of the Report.
13	45	5-1	Subsection 5.2 Screening Criteria	The *Guidelines* state that the process of screening entails excluding those alternatives that are “non-compliant” in that they do not meet certain unique minimum specifications which have been developed for the project. A fatal flaw is defined as any site characteristic that is so unfavourable or severe that, if taken singly, it would eliminate that site as a candidate mine waste disposal alternative. Two (2) criteria identified in the report do not qualify as fatal-flaws. The proponent can, however, provide supporting details to justify keeping them as showstoppers. <u>Engineering and Safety Risks</u> The *Guidelines* state that “it must be clear to the external reviewer that there would be no reasonable mitigation strategy that would convert a YES into a NO.” Considering risk management is an intricate part of any engineering project of this scale and that mitigation measures can be put in place to alleviate some of the engineering and safety risks, this criterion cannot be considered a fatal-flaw. It is moreover the case considering the example given in subsection 5.3.1, which mentions that the construction of a second dike in a waterbody has been successfully executed at other operating mines. The proponent should either revisit this pre-screening criterion or remove it from its analysis. <u>Economic Feasibility</u> According to the *Guidelines*, While "it is justifiable to exclude a TIA from further consideration if they would result in an overall negative life of project economics, […] the proponent needs to be careful to not evaluate the mine waste disposal economics in isolation of the total project economics”. According to the *Guidelines* “it should be clear to external reviewers that the pre-screening criteria, when evaluated singly, are sufficiently important to eliminate an alternative from further consideration, […] and it may have to be extensive to be sufficiently supportive”. It is recommended that the proponent provides rationale to demonstrate when a project would become economically infeasible.	**Screening Criteria** **1. Engineering and safety risks**: This screening criterion, as presented in the report, focuses on material engineering and/or safety risks that cannot be mitigated. Agnico Eagle maintains that such risks would be critical flaws. However, as clearly noted in the assessment provided in Section 5.3, no such circumstances are identified in this case, and therefore no candidates are eliminated on the basis of this criteria. The example cited in subsection 5.3.1 provides the rationale for why a critical flaw has <u>not</u> been identified in these cases (noting that the ‘construction of a second dike’ is not the criteria in question). No change has been made. **2**. **Economic feasibility**: This screening criterion has been reconsidered and revised integrated with “Contradiction of Mine Plan”.
14	50	6-2	Subsection 6.3 Approach	The report states that four (4) of the five (5) remaining alternatives were presented in Baker Lake and Chesterfield Inlet, along with an explanation of the alternatives assessment process and how inputs from the communities would be incorporated into the assessment. The alternative that was not presented to the communities is Alternative II: A53/WT-Ex. Is there a reason why the proponent did not consult on this alternative, and would the communities have reacted positively to this option if it had been presented?	Alternative II (A53/WT-Ex) was developed as a possible optimization of Alternative I (A53) following consultations in July 2018. Although this alternative was not included in the July 2018 consultations, both components (use of Lake A53 and expansion of the Whale Tail Attenuation Pond) were presented. This explanation has been added to Section 6.3.

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				Please provide clarifications.	Agnico Eagle is confident that Alternative II would have been received positively because is makes use of an area already affected by the approved project and—in doing so—reduces the disturbance of new areas.
15	50	6-2	Subsection 6.5 Characterization of Alternatives	In this subsection, the proponent begins the characterization of the five (5) alternatives that are moving forward to the multiple accounts analysis (Step 3). For that purpose, the proponent provides a figure for each alternative being assessed (Figures 6-2 to 6-6). However, the figures do not clearly show the waterbodies and watercourses frequented by fish that would be overprinted by the mine disposal facilities. It is recommended to amend the figures to show the fish frequented waters that will be overprinted by mine waste disposal facilities.	Figures 6-2 to 6-6 have been revised to identify overprinted fish-frequented waterbodies and watercourses.
16	58	6-15	Subsection 6.5.1 Technical Account	Table 6-3 summarizes the basic design and technical characteristics for all alternatives that have remained after the pre-screening assessment (Step 2). However, there seems to be a few discrepancies between information included in the table and information presented in the technical description of each alternative and/or Figures 6-2 to 6-6. The proponent is invited to provide clarifications on the following elements, and when required, make the necessary modifications: • There are small discrepancies on water surface elevation for Alternative I, IV and V. • Footnote 2 of the table states that the elevation at the top of the dam assumes 3 m of freeboard which contradicts information included in the table for Alternative I and Alternative II. • Footnote 3 mentions the fill quantity does not include the fill side slopes which can account for a significant amount of material. If accounted, would the ranking change from the alternatives requiring the most material to the least material or would it remain the same?	Bullet 1: Addressed in Section 6.5.1 of the Report. Bullet 2: Addressed in footnote to Table 6-6 of the Report. Bullet 3: Footnote 3 was in error and has been corrected. The fill quantity does include fill side slopes. The estimates do not include excavation or fill materials below the proposed finished ground surface. This volume may vary based on thermal regime, depth to bedrock, and other geotechnical and related factors. However, the level of geotechnical information at each alternative, and the conceptual basis of design, do not afford further estimation. Therefore, Agnico Eagle used a consistent approach to estimate fill quantity above the ground surface.
17	63	6-20	Subsection 6.5.2 Biophysical Environment Account	For Alternative II: A53/WT-Ex, the proponent fails to identify the biophysical environment baseline for the expansion of Whale Tail pond. The proponent could reference the information provided under Alternative V. Please revise the paragraph accordingly.	Addressed in Section 6.5.2 of the Report.
18	63	6-20	Subsection 6.5.2 Biophysical Environment Account	For Alternative IV: MAM, the proponent mentions Lake A15 but it is not possible to locate it on a figure. Is it possible to identify the location of this lake on a map or figure? The proponent also mentions that “with the proposed Whale Tail Pit Expansion Project, Mammoth Lake would continue to be the receiving environment for the discharge of treated contact water“. This statement is in contradiction with Table 2-2: Management of Contact Water – Expansion Project, which mentions that all treated water will be discharged in the south basin of the Whale Tail Lake. This contradiction is also present in Table 6-6 under Ability to Manage Surface Water Quality Impacts External to the Attenuation Pond. Please provide clarifications or revise the statement/tables.	Figure 4-1 now includes Lake A15. Text in 6.5.2: changed to indicate that Mammoth Lake will cease to be the receiving environment. Text in Table 6-6: Changed discharge reference from Mammoth Lake to Whale Tail Lake (South Basin).

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the September 2019 Version of the Report
19	65	6-22	Subsection 6.5.3 Human Environment Account	For Alternative II: A53/WT-Ex, the proponent fails to identify the human environment characteristics for the expansion of Whale Tail attenuation pond. The proponent could reference the information provided under Alternative V. Please revise the paragraph accordingly.	Addressed in Section 6.5.3 of the Report.
20	66	6-23	Subsection 6.5.4 Project Economics Account	The proponent evaluates the capital costs by estimating the cost for the dam construction (frozen core dam or secant pile dam). The proponent assumes a fixed unit cost, regardless of the height of the dams, which vary from 5 m to 13 m depending on the alternatives. Is this a fair assessment? For the secant pile dam construction, would the use of grouting make a difference in the unit cost? Please provide clarification. The capital cost also fails to consider the cost for the procurement and installation of pipeline, maintenance roads, pumps, collection ditches, etc. If accounted for, would t have an impact? Would the ranking change from the most expensive alternative to the least expensive one?	The type of structure, foundation preparation, and length of dam are the driving factors in the cost estimation. Although there is a difference in height (5 to 13 m), all heights are in the same order of magnitude and the height differential is not material to the cost. Unit costs also include an assumed 10 m grout curtain for secant pile alternatives. Capital cost estimates include procurement and construction of supporting infrastructure and materials required for the operation of the structure. This includes cost for the procurement and installation of pipeline, maintenance roads, pumps, collection ditches, etc. The above factors have been clarified in Section 6.5.4.
21	67	6-24	Subsection 6.5.4 Project Economics Account	The proponent mentions "Alternatives I and II would result in loss of Lake A53 as a fish-bearing waterbody, requiring compensation for the loss of 14 ha of fish habitat." This statement is in contradiction with Table 6-6, which mentions the loss of fish habitat to be of 15 ha under the criterion Fish Habitat Area. Please revise the statement or Table 6-6.	Table 6-6 has been corrected to state 14 ha.
22	71	6-28	Subsection 6.6 Characterization Criteria	The proponent has completed the characterization of the five (5) alternatives and provided additional information in Table 6-6. However this section does not always meet the requirements of Section 2.4 of the *Guidelines*: • Mine waste disposal alternatives have been characterized from a technical, environmental, socio-economic and project economics perspective. While the review that has been done can be considered adequate, the proponent is invited to consider other meaningful characterization criteria that may be valuable to stakeholders and Indigenous communities based on expressed concerns: **Environmental Characterization** ✓ Overprinted watercourses (if any) – could be combined with Fish Habitat Area ✓ Habitat fragmentation that affects the migration of caribou and the movement of other wildlife (caused by pipelines, roads, infrastructures, etc.) ✓ Dust and the emission of greenhouse gases caused by the transportation of borrow material, the construction and the operation of the attenuation pond. ✓ Short-term and long-term environmental impact of dam failure / overflow spills (for example: the extent of watersheds, lakes, rivers, parks, wetlands that would be affected, etc.) **Technical Characterization** ✓ Freeboard – could be combined with Operational Complexity	Only Alternatives I and II overprinted watercourses; calculations of the area overprinted have been added to Fish Habitat Area, as suggested. Habitat fragmentation has been added to the characterization and shown to be non-differentiating. The potential for GHG and dust emissions during construction and operation of the pond, have been added to the characterization and carried forward through the subsequent analysis steps. Consideration of freeboard requirements combined with technical characterization, as suggested. The environmental, land use, and human safety consequences of overtopping or dam breach,

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				Socio-Economic Characterization ✓ Short-term and long-term environmental impact of dam failure / overflow spills (for example: impact on fishing, trapping and/or hunting activities, safety and health risks for workers, landscape disturbance, roads blocked, etc.) • According to the *Guidelines*, "the characterization must remain factual, or where statements of judgement, risk and uncertainty are made, that they be explicitly defined and qualified". The proponent sometimes qualifies the information as "low complexity" or "very high complexity". Whenever possible, the proponent should choose measurable criteria that lend themselves to parametric terms.	which were originally captured along with risks to production in the technical characterization, have been broken out separately in the environmental and socio-economic characterizations and carried forward through the subsequent analysis.
23	71	6-28	Subsection 6.6 Characterization Criteria	Table 6-6 identifies characterization criteria to describe the remaining alternatives. Please provide clarifications for the following elements and when necessary, revise them: • The Maximum Water Volume (Combined) for Alternative I: A53 should be 779,870 m^3 and not 799,870 m^3. • Under Design Complexity for Alternative II: A53/WT-Ex, the proponent fails to mention if this description is for the dam at Lake A53 or the expansion of the Whale Tail attenuation pond. • The characterization criterion Affected Surface Waterbody, according to this rationale, should also include indirectly impacted waterbodies. For example, in the case of Alternative I, Lake A53 is connected upstream to Lake A54 and downstream to Whale Tail Lake, which could affect them if Lake A53 is reconfigured. The proponent should provide clarifications or revise the table. • It is said that the characterization criterion Catchment Areas is non-differentiating amongst alternatives as there is "no new catchments affected". This statement seems to be in contradiction with Table 6-3, which estimates the affected catchment area for each alternative. Please provide clarifications or revise the table. • The proponent has included in Table 6-6, under Biophysical Environment Account, a characterization criterion called Ability to Manage Surface Water Quality Impacts External to the Attenuation pond. However, the rationale for this criterion is more appropriate under the technical account, as opposed to the environmental account. The surface water management strategies and diversion infrastructures required to do so would fall under design and operational complexity. The proponent should revisit this criterion by concentrating on environmental impacts, such as Flow Reduction to Watersheds, Seepage Risks, etc. Please also adjust the subsequent Steps if required (Multiple Accounts Ledger, Value-Based Decision Process, and Sensitivity Analysis).	Bullet 1: Addressed in Table 6-6 of the Report Bullet 2: Addressed in Table 6-6 of the Report Bullet 3: Addressed in Table 6-6 of the Report (definition adjusted to focus on "loss of water body") Bullet 4: Catchment area defined in Table 6-3 relates to the upstream catchment of each alternative (i.e., the amount of water that may need to be managed). Have clarified the indicator in Table 6-6. Bullet 5: This indicator addresses environmental risk associated with the operational complexity of water management, acknowledging patterns of drainage both to the attenuation pond and to other waterbodies. Agnico Eagle is committed to managing water quality impacts and considers this to be an important and differentiating environmental risk factor. The indicator has been reframed to clarify.
24	82	8-1	Section 8 Value-Based Weighting (Step 5)	The report specifies that "Agnico Eagle developed weightings in consultation with its technical consultants." While the views of the communities of Baker Lake and Chesterfield Inlet were identified during engagement activities and incorporated in the characterization of each alternative, it isn't clear in the report if the public has been directly engaged in the scoring and weighting of sub-accounts and indicators. The proponent is invited to provide clarifications as to the extent of the external stakeholder's participation in the actual calculation during the MAA.	Community members were engaged in discussion about their views on important and differentiating characteristics of the alternatives. They were not directly engaged in weighting of sub-accounts and indicators. While Agnico Eagle and its consultants were prepared to discuss weightings in the meetings and focus groups, this did not align with the interests of participants. Therefore, Agnico Eagle engaged in diverse discussions about the alternatives, the Project area, and the environment and land use. Qualitative input from these discussions was useful and informed relevant weightings. For example, the concern of Elders regarding fish relocation was afforded a

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					high weighting to reflect the importance of this matter for the community. This was also reflected in the scale for this indicator.
25	100	App. B	Multiple Accounts Ledger	As required for Step 4 and Step 5, a multiple accounts ledger has been prepared, which includes indicators, measurement parameters/units, a rationale, a scale for each indicator and a score for each alternative. However, this table does not always meet the requirements of Sections 2.5 and 2.6 of the *Guidelines*. The *Guidelines* state that "a good rule of thumb would be to target a six-point scale. This provides for sufficient capacity to differentiate, without being overly onerous, and also by providing an even number scale […] Qualitative value scales should be developed to have the following characteristics: operational, reliable, value relevant, justifiable". The scale of the following indicators do not meet these requirements because the scale is incomplete (for example, the scale jumps from value "1", "2" directly to "5" and "6" with no way of assigning a "3" or "4" score value). It disproportionally affects alternatives over others. Please provide clarifications or revise the scales by making them proportionate and adjust subsequent MAA calculations for the following indicators: • Type of Dam and Foundation • Additional pumps • Ability to Manage Surface Water Quality Impacts External to the Att. Pond • Loss of Waterbodies Used for Fishing • Worker Well-Being	Scales have been adjusted in the MAA Ledger. Minor adjustments to scores have been made to align with revised updated scales.
26	100	App. B	Multiple Accounts Ledger	As required for Step 4 and Step 5, a multiple accounts ledger has been prepared, which includes indicators, measurement parameters/units, a rationale, a scale for each indicator and a score for each alternative. However, this table does not always meet the requirements of Sections 2.5 and 2.6 of the *Guidelines*. The *Guidelines* state that "the scales need to be justifiable, i.e. that any external reviewer should reach the conclusion that the value scale is reasonable and representative. The scale must also be reliable, meaning that different external reviewers should be able to rate an alternative according to the value scale and assign the same score". Using terms like "high complexity", "low complexity" and "moderate changes", to name a few, as the sole description for each score value, is subjective; these scales are therefore not considered reliable and justifiable. However, the proponent can still use these terms if they are accompanied by an explanation that helps an external reviewer reach the same score (for example, the indicator Consequence of Dam failure). Please provide clarifications or revise the scales and adjust subsequent MAA calculations for the following indicators: • Type of Dam and Foundation • Design Complexity • Construction Complexity • Operational Complexity • Closure Complexity • Consequence of Overtopping • Disruption of Landscape • Closure and Reclamation Costs	Definitions to qualitative value scales have been included in the MAA Ledger. Minor adjustments to scores have been made to align with revised updated scales.

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the September 2019 Version of the Report
27	100	App. B	Multiple Accounts Ledger	On multiple occasions, new information on alternative is presented in Appendix B, which wasn't discussed nor assessed in Step 3. The proponent must ensure the information/data discussed during the MAA be first presented and assessed in Section 6 of the report. It is the case for the following parameters: • Construction Complexity • Consequence of Overtopping • Loss of Waterbody Used for Fishing • Disruption of Landscape • Operating /Sustainable Costs • Closure and Reclamation Costs	Addressed in Section 6.5 and Table 6-6 of the Report.
28	100	App. B	Multiple Accounts Ledger	As required for Step 4 and Step 5, a multiple accounts ledger has been prepared, which includes indicators, measurement parameters/units, a rationale, a scale for each indicator and a score for each alternative. However, this table does not always meet the requirements of Sections 2.5 and 2.6 of the *Guidelines*. The *Guidelines* state that "the scales need to be value relevant, meaning that the value scale must be directly relevant to the indicator being scored". In some cases, scales are too big or too small to provide sufficient capacity to differentiate alternatives. Please provide clarifications or revise the scales and adjust subsequent MAA calculations for the following indicators: • Loss of Natural Waterbodies – moreover when compared with indicator Number of Fish-bearing Waterbodies • Extent of Fish Habitat Loss – moreover when compared with indicator Terrestrial habitat Loss	**Loss of Natural Waterbodies** Scale has been adjusted to reflect both full and partial loss of natural waterbodies. **Number of fish-bearing waterbodies** While the scale used does not provide the option to select a score of 4 or 5, Agnico Eagle believes this appropriately reflects the importance of fish habitat. The difference between 0 waterbodies and 1 is more realistically represented as scores of 6 and 3, respectively, as opposed to 6 and 5. In the latter example, the influence of this criteria on the MAA results is diminished to 20%. Agnico Eagle would argue that avoiding impacts to fish-bearing waterbodies is at least 100% improved over impacts to 1 waterbody, and consultation has indicated that our community stakeholders also feel strongly in this regard. **Extent of fish habitat loss** The large scales were intended to reflect the fact that all alternatives have relatively small footprints in the context of both the surrounding landscape as well as the scale of mine waste management infrastructure. Nonetheless, the scales have been adjusted to increase differentiation between candidates. Change to scales have resulted in adjustment to scores for alternatives I, II, IV.

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the September 2019 Version of the Report
29	101	App. B	MAA Ledger: Technical Account	The *Guidelines* state that "qualitative value scales should be developed to have the following characteristics: be operational, reliable, value relevant and justifiable". For the indicator Type of Dam and Foundation, the description provided for each alternative does not align with the scale. While the descriptions only mention the type of foundation and dam, the scale also references hydraulic head. It is therefore difficult to make the difference between a score of "1" and a score of "2". Please provide clarifications or revise the scales and adjust subsequent MAA calculations if necessary.	Adjusted descriptions and scale to clarify. Change to scales have resulted in adjustment to scores for alternatives III, IV.
30	102	App. B	MAA Ledger: Technical Account	The descriptions provided for each alternative under the indicator Post-Closure Complexity do not match the descriptions provided for the indicator Long-Term Post Closure Costs and subsection 6.5.4 of the report. Also the score provided for Alternatives IV and V appear to be incorrect based on the scale. Considering both alternatives do not require any post-closure management, the score of these alternatives should be "6" and not "3". Please provide clarifications or adjust subsequent MAA calculations if necessary.	Addressed in Post-Closure Complexity indicator in the MAA Ledger. Change to scales have resulted in adjustment to scores for alternative III. Scores for Alternatives IV and V have been corrected.
31	103	App. B	MAA Ledger: Technical Account	The descriptions provided for Alternatives I and II under the indicator Consequence of Overtopping raise some questions. The report mentions that overtopping from Lake A53 would be contained in the Whale Tail attenuation pond, which is of smaller volume when compared to the IVR attenuation pond. Depending on the water level in the Whale Tail attenuation pond at the time of overtopping, there seems to be a risk that effluent would not be contained there either and would report to the Whale Tail pit where workers are present. Safety to workers is paramount and the rating should reflect it. The freeboard for this alternative is also only 1 m compared to other alternatives having a freeboard of 3 m, which increases the chance of overtopping. Please provide clarifications or revise the scale and adjust subsequent MAA calculations if necessary.	Addressed in descriptions for Consequence of Overtopping indicators in the MAA Ledger. Change to scales have resulted in adjustment to scores for alternatives I, II, III.
32	103	App. B	MAA Ledger: Technical Account	The *Guidelines* state that "qualitative value scales should be developed to have the following characteristics: be operational, reliable, value relevant and justifiable". For the indicator, Consequence of Overtopping, the scale does not seem to take into consideration if an alternative poses a risk to human safety, which could have serious consequences. Thus, the scale may not be justifiable, meaning that any external reviewer should reach the conclusion that the value scale is reasonable and representative. Please provide clarifications or revise the scales and adjust subsequent MAA calculations if necessary.	In response to Comment 22, the Consequence of Failure sub-account has been split across the accounts, forming new subaccounts for: • Operational consequences of failure • Environmental consequences of failure • Land use consequences of failure. Each of these subaccounts include indicators for overtopping and dam failure. Thus, the response to this comment is explicitly addressed through the new indicator for 'Safety consequence of overtopping'.

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33	103	App. B	MAA Ledger: Technical Account	The *Guidelines* state that "qualitative value scales should be developed to have the following characteristics: be operational, reliable, value relevant and justifiable". For the indicator, Consequence of Dam Failure, the scale makes a subtle distinction between an alternative "likely to result in impacts to workers" and an alternative "that may result in impacts to workers". The description provided for each alternative does not allow the external reviewer to make this distinction. It is therefore difficult to make the difference between a score of "1" and a score of "2". The scale must be value relevant, meaning that the value scale must be directly relevant to the indicator being scored. Please provide clarifications or revise the scales and adjust subsequent MAA calculations if necessary.	In response to Comment 22, the Consequence of Failure sub-account has been split across the accounts, forming new subaccounts for: • Operational consequences of failure • Environmental consequences of failure • Land use consequences of failure. Safety for workers is addressed in the "operational consequences of failure" subaccount, and the scales have been updated to provide additional clarification.
34	105	App. B	MAA Ledger: Human Environment Account	The score provided for Alternatives I and II, under the indicator Loss of Waterbody Used for Fishing, appears to be incorrect based on the scale. Considering both alternatives could technically be used for fishing (both containing arctic char), the score of these alternatives should be "4" and not "6". Please provide clarifications or adjust subsequent MAA calculations if necessary.	Adjusted the scales and scores in the Loss of Waterbody Used for Fishing in the MAA Ledger.
35	105	App. B	MAA Ledger: Project Economics Account	The *Guidelines* state that "scales should be developed to have the following characteristics: be operational, reliable, value relevant and justifiable". For the indicator Fish Habitat Offsetting Costs, the description provided for each alternative does not align with the scale. While the descriptions include the number of hectares of fish habitat to compensate, the scale only references cost figures ($ millions). The scale must be value relevant, meaning that the value scale must be directly relevant to the indicator being scored. Please provide clarifications or revise the scales and adjust subsequent MAA calculations if necessary.	Addressed in the Fish Habitat Offsetting Costs indicator in the MAA Ledger.
36	105	App. B	MAA Ledger: Project Economics Account	The description provided for Alternative I: A53 under the indicator Operating/Sustaining Costs do not match the information provided in Table 6-6. It says in Appendix B that the alternative requires low operating cost whereas Table 6-6 says the alternative has high monitoring requirements under the criteria Operating/Sustaining Costs. Please provide clarifications or revise the scales and adjust subsequent MAA calculations if necessary.	Addressed in Operating/Sustaining Costs indicator in the MAA Ledger. The ledger has been updated to align with Table 6-6.

Suggested Edits on the Report Itself

Number	PDF Page	Page in report	Section in report	Comment
1	25	2-8	Subsection 2.4.2	"The site footprint is designed so that run-off from the mine site **is ~~would be~~** contained within the disturbed catchments (as described in Table 2-1)."
2	72	6-29	Subsection 6.6	Under Operation Complexity for Alternative V: "Storing a large volume of water up-gradient of the mining pit increases **risk to worker safety ~~safety to workers~~** requiring more robust operating procedures."
3	90	9-4	Subsection 9.3	"Although the "scores" are **~~be~~** fact-based and therefore not subject to variation, the weightings of accounts, sub-accounts, and indicators may …"
4	90	9-4	Subsection 9.3	"A total of 10 sensitivity scenarios were considered, as summarized in **~~Table 9-4~~ Table 9-5** and Figure 9-2."

Appendix B2

ECCC Comments on the Assessment of Alternatives Report for the Whale Tail Expansion Project, November 21, 2019

Appendix B2: ECCC Comments on the Revised Assessment of Alternatives Report for the Whale Tail Expansion Project, November 21, 2019

Table 1: Key Comments on the Assessment of Alternatives Report

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the December 2019 Version of the Report
1	38	4-1	Subsection 4.2 Threshold Criteria	According to the *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (*Guidelines*): • "The first step in the alternatives assessment process entails developing a list of all possible (i.e., reasonable, conceivable and realistic) candidate mine waste disposal alternatives for the site". • "Generally, it is not too difficult to develop a substantial list of alternatives during Step 1 of the process. However, this list of alternatives should be screened during Step 2 to allow the decision process to be carried out on an appropriate and manageable set of sufficiently detailed alternatives." • "It may be appropriate to establish a basic set of threshold criteria to establish the regional boundaries for selecting candidate alternatives. These threshold criteria should be as broad as possible and must be fully described and rationalized to ensure transparency". As aforementioned, the objective of this Step is to identify all possible alternatives within reason by applying threshold criteria. While the proponent has identified a reasonable amount of alternatives, no alternatives should be screened out at this stage. Table 4-2 should therefore be reconsidered. The proponent has also taken step to selecting threshold criteria. They are meant to limit the number of candidate alternatives to a reasonable amount. The proponent rightly mentions that not only geographical thresholds can be used but also other criteria pertaining for example, to geological considerations or technical limitations can be selected. However, some of the criteria described in the report are structured more as pre-screening criteria – Step 2 – rather than threshold criteria. For example, the threshold criterion identified as "Must Align with Management Guiding Principles", while very important, is structured more as a show-stopper; its description states that "Agnico Eagle does not support alternatives that would not align with the Whale Tail Project's water management plan". The proponent is reminded that, it is at Step 2 of the process outlined in the Guidelines, and not at Step 1, that pre-screening criteria are formulated such that a simple "YES" or "NO" determines whether the alternative complies with said criteria. This criterion could nonetheless be restructured as a threshold by highlighting the guiding principles of AEM's water management plan. For example: all alternatives that would prevent using specific infrastructures (ex.: current water treatment system) are excluded, all alternatives within a specific area are excluded per the approved water management plan, etc. A reference to the water management plan would also be useful (as well as for the approved mine plan for subsection 5.2). The proponent should revisit the criteria of Step 1 to ensure they are clearly defined as threshold and not show-stoppers. Vice-versa, the proponent may also want to re-examine the pre-screening criteria of Step 2 to make sure they are not actually threshold criteria.	The description of Step 1 (Section 1.3.2) has been revised accordingly. Section 4.2 has been updated and text moved to Section 4.3 to support the critical flaw assessment (Step 2). Table 4.2 has been deleted.

Table 2: New Comments and Suggested Edits on the Assessment of Alternatives Report

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the December 2019 Version of the Report
1	NA	NA	All Report	In light of data gathered during the 2019 field season, which confirmed the presence of Ninespine Stickleback in three (3) lakes: A50, A51 and A52, the proponent recently stated that the "… previously described non-fish bearing Lake 50, Lake 51, and Lake 52 were reclassified as fish-bearing lakes based on the Ninespine Stickleback observations in summer 2019". The site layout shows these waterbodies as being overprinted by either effluent or waste rock. The proponent should revisit relevant sections of the report, as well as Figures 6-2 to 6-6, to reflect its new position and describe these waterbodies, and associated waterways, as fish frequented.	Appendix D describes these waterbodies and Figures 6-2 to 6-6 have been updated to reflect their fish bearing status.
2	NA	1-2	Subsection 1.3-1	The report states that "The streamlined process shortens the approval time to 5-6 months by exempting pre-publication of the Schedule 2 amendment in *Canada Gazette,* Part 1, which makes public the text of the proposed regulations and the associated regulatory impact statement." It is important to state that amendments are only eligible for streamlining if all the required documents are submitted and consulted on (Assessment of Alternatives (AA) and Fish Habitat Compensation Plan (FHCP) reports) and all conditions outlined in the aforementioned document are met. To note, the Department has brought the average time to complete a Tailings Impoundment Area (TIA) down from 24-36 month to 12-18 months by further implementing the Department's Streamlining Policy for projects meeting certain criteria and by shortening internal approval timelines of regulatory packages. Timelines may be quicker but these are done on a case-by-case basis. Please revisit the statement in the report.	The paragraph in Section 1.3.1 has been edited to reflect this comment.
3	18	1-6	Subsection 1.4-2	The report states that "the construction of the Baker Lake Fuel Farm was discussed during the March 2019 consultations" as a possible compensation. Please note that any fish habitat offsets will be evaluated based on the information provided in the FHCP. Any mention of fish habitat offsetting in the AA report cannot be construed as an approval by ECCC.	The statement "the construction of the Baker Lake Fuel Farm…" was removed from this section.
4	30	2-13	Subsection 2.4.4: Water Quality and Discharge Criteria	Please expand the acronym "CEQG" or include it in the Glossary and Abbreviations section.	CEQG (Canadian Environmental Quality Guidelines) have been expanded in the text in Section 2.4.4.
5	32	2-15	Table 2-3	Table 2-3 summarizes the water quality discharge criteria for the effluent. Column 4 shows the maximum authorized monthly mean concentrations under the *Metal and Diamond Mining Effluent Regulations* for a number of parameters. The proponent is invited to address the following elements: • For the parameter Zinc, the monthly mean concentration should be of 0,5 mg/L and not 0,4 mg/L. • In Note 3, the empirical formula is incorrect. It should read: *[total ammonia] * (1/(1 + 10^(pKa-pH))); or [total ammonia] * (1/(1 + 10^{pKa-pH}))*	Table 2-3 has been edited with the correct MDMER Maximum Concentration for zinc and the correct formula for the calculation of un-ionized ammonia.

Number	PDF Page	Page in Report	Section in Report	Comment	Response and Edits Made in the December 2019 Version of the Report
6	58	6-5	Subsection 6.5: Characterization of Alternatives Figures 6-2 to 6-6	According to Figures 6-2 to 6-6, Lakes A50 and A52 remain intact; they are not impacted by any mine structures. However, it is contradictory to the site layout, presented in Figure 2-3, which shows these waterbodies as overprinted by the IVR Waste Rock Storage Facility and the Groundwater Storage Pond (GSP-2). Please correct Figures 6-2 to 6-6.	Figures 6-2 to 6-6 have been updated with the Expansion Footprint as identified in Figure 2-3.
7	65	6-17	Subsection 6.5.1: Technical Account	The report states, under Alternatives I and II, that "the water level would be raised from 162.00 masl to 164.25 masl, increasing the surface area of the lake from 10 ha to 26 ha". It is believed the current surface of the lake is 14 ha and not 10 ha, as mentioned in section 6.5.4 and in Table 6-6. Please revise the statement or provide additional clarifications.	The relevant text has been updated to state lake surface area is 14 ha.
8	88	7-4	Table 7-2 and Table 8-3	In AEM's *Response to ECCC Comments* presented in Appendix B, the indicator Ability to Manage Surface Water Quality Impact was changed for Risk of Impacts to Surface Water Quality External to the Attenuation Pond (under sub-account Surface Water). However, this change was not incorporated into Table 7-2 and Table 8-3. Please revise both tables or provide additional clarifications.	Tables 7-2 and Table 8-3 have been revised to include the indicator 'Risk of Impacts to Surface Water Quality External to the Attenuation Pond'
9	90	7-6	Subsection 7.4.2: Ledger	The report states that "The multiple accounts ledger […] is provided in its entirety in Appendix B". It should read "Appendix C".	The text has been edited to read Appendix C
10	97	9-2	Table 9-4	Table 9-4 presents the sub-account merit ratings for each alternative. There however seems to be a calculation error for Alternative V under the sub-account Surface Water. The rating should be "2.8" and not "2.4". Please revise the MAA ledger and update all affected sections (text of subsection 9.2, Table 9-2, Table 9-3, Table 9-4, Table 9-5, Figure 9-1, and Figure 9-2).	Tables 9-2, 9-3, 9-4 and 9-5 have been edited to reflect the correct merit rating for Surface Water for Alternative V. Figures 9-1 and 9-2 have also been updated.
11	100	9-5	Table 9-5	Table 9-5 presents the alternatives' merit ratings calculated during the sensitivity analysis. The first line shows the ratings using Agnico-Eagle's weightings (preliminary results). The values presented are those calculated in the original report. It should read Alternative I: 4.21, Alternative II: 3.6, Alternative III: 3.31, Alternative IV: 3.13 and Alternative V: 3.92). Please revise the table and update all affected sections (namely, Figure 9-3).	Table 9-5 has been updated to values presented in the December 2019 report including changes to reflect the sub-account Surface rating identified in ECCC Comment#10
12	127	App C	MAA Ledger	It appears there may be errors in the scoring of alternatives for two (2) indicators, when compared with information within the MAA Ledger. Please review the indicator values for the following alternatives and make any revision if necessary: • Closure Complexity (Alternative II) • Operational Consequence of Dam Failure (Alternatives IV and V)	The scoring of alternatives for the Closure Complexity (Alternative II, Score = 3), and Operational Consequence of Dam Failure (Alternatives IV and, Score = 2). Revisions have been made to the tables and figures in Section 9.2 and 9.3, accordingly.

Appendix B3

Additional Edits from own Initiative on the Assessment of Alternatives Report for the Whale Tail Expansion Project, December 2019

Appendix B3: Additional Edits from own Initiative on the Assessment of Alternatives Report for the Whale Tail Expansion Project, December, 2019

Table 1: Additional Edits from own Initiative on the Assessment of Alternatives Report

Number	PDF Page	Page in Report	Section in Report	Edits Made in the December 2019 Version of the Report
1	6	i-iii	Executive Summary	Text updated to reflect that a new Alternatives Assessment on Waste Rock Storage Facility was appended to the report, and to provide a summary of ,all fish-frequented waterbodies that will require a Schedule 2 Amendment
2	17	1-1	Introduction	Text updated to reflect that a new Alternatives Assessment on Waste Rock Storage Facility was appended to the report.
3	18	1-3	Regulatory Context	Text updated to reflect that a new Alternatives Assessment on Waste Rock Storage Facility was appended to the report.
4	28	2.2.1	Whale Tail Pit Project (approved project)	Text updated to reflect numbers in v5 of the Water Management Plan that 8.3 Mt of ore, 46.1 Mt of waste rock and 5.6 Mt of overburden will be produced.
5	34	2.4.3	Alternatives Assessment	Text updated to reflect that a new Alternatives Assessment on Waste Rock Storage Facility was appended to the report.
6	127-128	10	Conclusions	Text updated to reflect that a new Alternatives Assessment on Waste Rock Storage Facility was appended to the report and to provide a summary of ,all fish-frequented waterbodies that will require a Schedule 2 Amendment

Appendix C

Multiple Accounts Ledger

MAA Ledger: Technical Account

Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
Containment Infrastructure														
Maximum dam height	Alternatives with lower dam height have lower head, lower complexity of management, and lower consequence of dam failure, and are preferred.	Height (m)	6 m	7 m	12 m	11 m	13 m	1	15.0 m or more	4	3	2	2	2
								2	11 m to 14 m					
								3	7 m to 10 m					
								4	3 m to 6 m					
								5	2 m or less					
								6	No dams					
Length of dam(s) (combined)	Alternatives with shorter length of dam require less construction material, have lower complexity of management, and are preferred.	Length (m)	671 m	505 m	2,422 m	418 m	415 m	1	1,501 m or more	3	3	1	4	4
								2	1,001 m to 1,500 m					
								3	501 to 1000 m					
								4	101 to 500 m					
								5	100 m or less					
								6	No dams					
Pond surface area (combined)	Alternatives with a smaller surface area have a lower overall physical footprint and a smaller area to be reclaimed at closure, and are preferred.	Area (ha)	25.7 ha	32.2 ha	20.5 ha	26.1 ha	22.5 ha	1	50.0 ha or more	4	3	4	4	4
								2	40.0 ha to 49.9 ha					
								3	30.0 ha to 39.9 ha					
								4	20.0 ha to 29.9 ha					
								5	10.0 ha to 19.9 ha					
								6	9.9 ha or less					
Type of dam and foundation	Alternatives that involve frozen core dams, of smaller size, and constructed on competent and frozen foundation with low hydraulic head, are preferred.	Qualitative scale	On land, frozen core dam (671 m). Competent and frozen foundation. Low hydraulic head.	A53: On land, frozen core dam (380 m). Competent and frozen foundation. Low hydraulic head. WT-Ex: Drained lake bed, unfrozen, highly fractured foundation conditions. Complex structure (125 m) with concrete secant pile + grouting. WT-Ex has high hydraulic head due to construction on drained lake bed adjacent to Whale Tail Lake (South Basin).	On land, frozen core dam (2,422 m), very large volumes. Competent and frozen foundation. Low hydraulic head.	Lake bed, unfrozen. Uncertain foundation conditions. Complex structure (418 m) with concrete secant pile (no grouting). High hydraulic head due to construction on drained lake bed adjacent to the remaining portion of Mammoth Lake.	Drained lake bed, unfrozen, highly fractured foundation conditions. Complex structure (415 m) with concrete secant pile + grouting. High hydraulic head due to construction on drained lake bed adjacent to Whale Tail Lake (South Basin).	1	Incompetent (or unknown) and unfrozen foundation with high hydraulic head. Concrete secant pile dam >150, with grouting.	5	2	4	3	1
								2	Incompetent (or unknown) and unfrozen foundation with high hydraulic head. Concrete secant pile dam <150 m, with grouting.					
								3	Incompetent (or unknown) and unfrozen foundation with high hydraulic head. Concrete secant pile dam (no grouting).					
								4	Frozen core dam. Competent and frozen foundation with low hydraulic head. Dam length >1,000 m.					
								5	Frozen core dam. Competent and frozen foundation with low hydraulic head. Dam length <1,000 m.					
								6	No dam required.					
Ancillary Infrastructure														
Length of pipeline (combined)	Alternatives with shorter length of pipeline transporting contact water (source, to attenuation, to water treatment plant) are preferred.	Length (m)	10,642 m	10,642 m	17,117 m	18,669 m	7,796 m	1	16,000 m or more	4	4	1	1	6
								2	14,000 to 15,999 m					
								3	12,000 to 13,999 m					
								4	10,000 to 11,999 m					
								5	8,000 to 9,999 m					
								6	7,999 m or less					
Surface water management infrastructure	Alternatives that require less surface water management infrastructure (surface runoff including WRSFs) are preferred.	Qualitative scale	None - relies on natural drainage	None - relies on natural drainage	IVR WRSF contact water collection (~ 1km) - drill and blast channel(s), large excavation, need to pump	Redirect surface water with bermed road (~1.5 km)	None - relies on natural drainage	1	Drill and blast, with pumping requirement and large channel excavation	6	6	1	5	6
								2	Drill and blast, with pumping requirement or large channel excavation					
								3	Drill and blast channel, no pumping requirement, small excavation					
								4	Above-grade berm required: new build, no existing infrastructure					
								5	Above-grade berm required: alongside existing linear infrastructure					
								6	None					
Seepage collection infrastructure	Alternatives that require less seepage collection infrastructure (i.e., seepage from containment infrastructure) have less pumping requirements and are preferred.	Qualitative scale	Seepage directed to WTAP (i.e., existing infrastructure). No new infrastructure required. Reduction of water inflow to pit.	Increased water inflow to pit (limited head) - additional in-pit pumping required.	Seepage collection infrastructure required around dam. Reduction of water inflow to pit.	Seepage collection infrastructure required around dam (downstream side of in-lake dam). Reduction of water inflow to pit.	Significant seepage to pit (high head) - additional in-pit pumping required.	1	Significant increase in water inflow to pit; in-pit pumping required	6	2	4	5	1
								2	Increase in water inflow to pit; in-pit pumping required					
								3	No material change in water inflow to pit; no additional infrastructure required					
								4	Reduction of water inflow to pit; contact water collection infrastructure required					
								5	Reduction of water inflow to pit; non-contact water collection require					
								6	Reduction of water inflow to pit; no additional infrastructure required.					

Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
Technical Complexity														
Design requirements	Alternatives that require less collection of baseline data (i.e., geotechnical studies) and/or engineering modelling (e.g., permafrost degradation, seepage, slope stability, etc.) are preferred.	Qualitative scale	Limited geotechnical studies required. Utilizes standard design basis. Proven structures.	Additional geotechnical studies required re: increased water head at pit crest. Anticipate incompetent foundation conditions, therefore complex engineering. Sensitive receptors (i.e. workers) in pit, down-gradient of dam.	Additional geotechnical studies required for large dam structure (2,422 m) adjacent to WRSF. Utilizes standard design basis. Proven structures.	Highly complex (in-water) geotechnical study required. Baseline data does not currently exist. Anticipate incompetent foundation conditions, therefore complex engineering.	Requires geotechnical studies re: increased water head at pit crest. Anticipate incompetent foundation conditions, therefore complex engineering. Sensitive receptors (i.e., workers) in pit, down-gradient of dam. Underground mine workings under pond.	1	Very high complexity: Design needs to account for incompetent foundation, workers down-gradient of dam, and underground mine workings beneath attenuation pond. Extensive geotechnical studies and engineering modelling required to support design.	5	1	4	2	1
								2	High complexity: Design needs to account for incompetent foundation on drained lake bed. Geotechnical studies and engineering modelling required to support design and studies will require in-water works.					
								3	Moderate-to-high complexity: Design needs to account for incompetent foundation conditions, on land. Geotechnical studies and engineering modelling required.					
								4	Moderate complexity: Design based on competent foundation, on land. Utilizes standard design basis and proven structures, and >1,000 m length and/or additional geotechnical studies required.					
								5	Low complexity: Design based on competent foundation, on land. Utilizes standard design basis and proven structures, and <1,000 m length. Competent foundation and land-based construction and limited geotechnical studies required.					
								6	No dam required					
Construction complexity	Alternatives with less complex construction (i.e., more stable foundation, less material to be excavated, smaller foundation area and smaller volume of fill material by length) are preferred.	Qualitative scale	On-land construction of dam structure with competent foundation conditions. 44 m^3 fill material per m of dam length. Overall low complexity of construction.	WT-Ex component requires specialized contractors, engineering oversight, and robust QA/QC program during construction. Incompetent foundation conditions on drained lake bed for WT-Ex component. 86 m^3 fill material per m of WT-Ex dam length. Overall moderate-to-high complexity.	On-land construction of dam structure with competent foundation conditions reduces complex construction; large length of dam structure (2,422 m) increases time to construct and risk for construction errors. 133 m^3 fill material per m of dam length. Overall moderate complexity.	Highly complex with in-water work requires specialized contractors, environmental controls, engineering oversight and robust QA/QC program during construction. Incompetent foundation and in-water works. 192 m^3 fill material per m of dam length.	Very high complexity requires specialized contractors, engineering oversight, and robust QA/QC program during construction. Incompetent foundation on drained lake bed. 235 m^3 fill material per m of dam length.	1	Very high complexity: Structure constructed on incompetent foundation. Fill volume/m >200 or structure exceeds 1,000 m in length. Construction will require specialized contractors to address foundation conditions and/or in-water works.	5	3	4	2	1
								2	High complexity: Structure constructed on incompetent foundation. Fill volume/m 100-200. Construction will require specialized contractors to address foundation conditions and/or in-water works.					
								3	Moderate-to-high complexity: Structure constructed on incompetent foundation. Fill volume/m <100. Construction will require specialized contractors to address foundation conditions and/or in-water works.					
								4	Moderate complexity: Competent foundation and land-based construction. Fill volume/m >200 or structure exceeds 1,000 m length.					
								5	Low complexity: Competent foundation and land-based construction. Fill volume/m <200.					
								6	No dam required					
Operational complexity	Alternatives with less complex operation and maintenance (i.e., fewer dams, fewer ponds, smaller area of dam face, few points for seepage collection and pumping requirements)	Qualitative scale	Attenuation pond is within the gravity catchment area of the IVR waste rock storage area and therefore also serves to manage this contact water without additional pumping. Primary storage location for contact water is located in close proximity to the existing water treatment plant. Low complexity overall.	Attenuation pond is within the gravity catchment area of the IVR waste rock storage area and therefore also serves to manage this contact water without additional pumping. Primary storage location for contact water is located in close proximity to the existing water treatment plant. Smaller A53 pond (compared to Alternative I) will require management of a spillway and gravity channel to direct water in excess of 473,000 m^3 to WT-Ex for temporary storage. Low-to-moderate complexity overall.	Attenuation pond has the longest perimeter dam structure of all options, increasing the level of monitoring for seepage and the requirement for collection and pump back systems. Attenuation pond location requires up-gradient diversion of non-contact water to reduce its catchment area and to be consistent with the water management philosophy (i.e. keep clean water clean). A54 is located the furthest distance away from the IVR pit which is the largest source of water requiring winter storage. Location of A54 will require pumping of contact water from IVR waste rock runoff. Maintaining A53 as a clean water pond will require additional infrastructure to capture and relocate contact water. Moderate-to-high complexity overall.	Operationally equivalent to current use of Whale Tail attenuation pond with contact water stored within a portion of an existing lake. Will require capture and pump back of clean water infiltrating attenuation pond to reduce the volume of water to be treated. MAM is located the furthest distance away from the water treatment plant, requiring management of additional pipeline length and pumping equipment. Maintaining A53 as a clean water pond will require additional infrastructure to capture and relocate contact water. Moderate complexity overall.	No change in location of attenuation pond from current operations. An increase in the volume of the attenuation pond increases its operational complexity as a result of the requirement for a dam structure adjacent to the pit and the need to actively manage seepage that will enter the pit. During the winter, ice wall formations in the pit will be more prominent and need to be managed to maintain safe access. Storing a large volume of water up-gradient of the mining pit increases risk to worker safety requiring more robust operating procedures. Maintaining A53 as a clean water pond will require additional infrastructure to capture and relocate contact water. High complexity overall.	1	Very high complexity: Active seepage management will be required as the position of the attenuation pond will significantly increase seepage in pit. Expect prominent ice wall formation in pit, and related management. Pond is located adjacent to pit with workers down-gradient. Additional water management infrastructure required to manage impacts to Lake A53. Additional infrastructure required to actively collect and transport water to attenuation pond.	6	5	3	4	2
								2	High complexity: Active seepage management will be required as the position of the attenuation pond will significantly increase seepage in pit. Expect prominent ice wall formation in pit, and related management. Pond is located adjacent to pit with workers down-gradient. Additional water management infrastructure required to manage impacts to Lake A53. No additional infrastructure required to collect and transport water to attenuation pond.					
								3	Moderate-to-high complexity: Additional infrastructure required to actively collect and transport water to attenuation pond, and to manage seepage from IVR waste rock. Additional water management infrastructure required to manage impacts to Lake A53. Seepage into pit not expected to increase. No workers located down-gradient of pond.					

Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
								4	Moderate complexity: Additional infrastructure required to actively collect and transport water to attenuation pond. Additional water management infrastructure required to manage impacts to Lake A53. Seepage into pit not expected to increase. No workers located down-gradient of pond.					
								5	Low-to-moderate complexity: Gravity drainage supports contact water collection without requirement for pumping. Seepage into pit may required additional pumping. No additional water management infrastructure required to manage impacts to Lake A53.					
								6	Low complexity: Gravity drainage supports contact water collection without requirement for pumping. Seepage into pit not expected to increase. No workers located down-gradient of pond. No additional infrastructure required					
Closure complexity	Alternatives with less complex closure requirements (i.e. fewer complex activities such as dredging, pumping) during the closure phase are preferred.	Qualitative scale	Location of attenuation pond enables reclamation activities to be completed largely independent from other domains. Contact water can be monitored and controlled until closure completion criteria have been met. Management of solids accumulated in the pond may be required either by covering or removing. Dam will require breaching to reintroduce water to the reclaimed Whale Tail - Mammoth Lake watershed. Overall moderate-to-high complexity.	A53 portion is the same as Alternative I. WT-Ex portion of attenuation pond requires no additional work as it will be returned to the natural watershed with the breach of the dam. Closure of WT-Ex becomes more complex if management of solids is required by either covering or removing. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure. Overall moderate-to-high complexity.	Long dam structure will need to be reclaimed. Extensive drainage system will be required at closure to divert water flows from IVR Waste Rock Storage Facility around A53 with discharge to the reclaimed Whale Tail lake. Reclamation of former attenuation pond area will be required so it is free draining and land is reclaimed to meet closure land use. Management of solids accumulated in the pond may be required either by covering or removing. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure. Overall high complexity.	Attenuation pond is easily reclaimed by breaching a portion of the dam between the pond and Mammoth Lake. No pumping is required as the former attenuation pond will be reintroduced as part of the Whale Tail - Mammoth watershed with the creation of the pit lake. Closure plan currently assumes that solids in the Whale Tail Attenuation Pond will not require additional mitigation at closure. Overall low-to-moderate complexity.	Attenuation pond is easily reclaimed by breaching the dam structure between the attenuation pond and the Whale Tail Pit. No pumping is required as the former attenuation pond will be reintroduced as part of the Whale Tail - Mammoth watershed with the creation of the pit lake. Closure plan currently assumes that solids in the Whale Tail Attenuation Pond will not require additional mitigation at closure. Overall low-to-moderate complexity.	1	Very high complexity: Requires reclamation of large containment structure (>1,000 m) and reclamation of pond area. Will certainly require dredging and removal of sediments.	3	3	2	5	5
								2	High complexity: Requires reclamation of large containment structure (>1,000 m) and reclamation of pond area. Requires construction of extensive gravity drainage system to divert water around A53. May require dredging and removal of sediments.					
								3	Moderate-to-high complexity: Requires reclamation of containment structure (<1,000 m) and reclamation of pond area. May require dredging and removal of sediments (all sediments, i.e., where one pond has contained all contact water). Containment will be breached to reconnect watershed after closure criteria for pond have been met.					
								4	Moderate complexity: Requires reclamation of containment structure (<1,000 m) and reclamation of pond area. May require dredging and removal of sediments (partial, i.e., contact water has been split between more than one pond). Containment will be breached to reconnect watershed after closure criteria for pond have been met					
								5	Low-to-moderate complexity: Containment will be breached to reclaim waterway. No pumping required. Additional mitigation of sediments in attenuation pond is not required.					
								6	Low complexity: No active reclamation required, structural alteration, or pumping required.					
Post-closure complexity	Alternatives with less complex (i.e. more passive) water management requirements following closure are preferred.	Qualitative scale	Passive water treatment with minimal annual maintenance. Water from former attenuation pond will flow by gravity to receiving environment. Controlled release is easily established if post-closure water management is needed for run-off from IVR waste rock storage area. Monitoring may be required for up to 10 years.	Passive water treatment with minimal annual maintenance. Water from A53 portion of former attenuation pond will flow by gravity to receiving environment. WT-Ex will form part of reclaimed lake, requiring no additional post-closure management. Monitoring may be required for up to 10 years	Active water treatment and management will be required for up to 20 years post closure. Water from former attenuation pond will flow by gravity to receiving environment. Drainage system for contact water from IVR WRSF to the Whale Tail lake will require long-term post closure management (i.e., snow clearing).	Attenuation pond will form part of reclaimed lake, requiring no active post-closure management, although monitoring may be required for up to 10 years.	Attenuation pond will form part of reclaimed lake, requiring no active post-closure management, although monitoring may be required for up to 10 years.	1	Active water management and/or treatment in perpetuity	5	5	3	5	5
								2	Active water management and/or treatment for >20 years					
								3	Active water treatment and management for 10-20 years					
								4	Active water treatment and management for <10 years					
								5	Passive water management with monitoring and minimal annual maintenance					
								6	No post closure management or monitoring required					

Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
Operational Consequences of Failure														
Operational consequence of overtopping	Alternatives with lower operational consequences of an overtopping event are preferred.	Qualitative scale	Overflow will be directed to Whale Tail Attenuation Pond by gravity. If volume of water released from overtopping exceeds the capacity of the Whale Tail Attenuation Pond then water would enter Whale Tail Pit where workers are present. Overflow would introduce operational complexity but would be manageable. Potential to result in temporary cessation of operations.	Overflow of A53 would be directed to WT-Ex by gravity. Any overtopping of WT-Ex would report to the Whale Tail Pit where workers are present. Overflow would introduce operational complexity but would be manageable. Potential to result in temporary cessation of operations.	Overtopping would report to the natural receiving environment without a risk to mine operations, although resources may be reallocated to address physical and environmental impacts.	Overtopping would report to the Whale Tail Pit. There are no redundant containment structures down-gradient of the MAM dam. Overflow has the potential to result in short-term cessation of operations.	Overtopping would report to the Whale Tail Pit. There are no redundant containment structures down-gradient of the WT-Ex dam. Overflow has the potential to result in short-term cessation of operations.	1	High: Expected to require cessation of operations. Overflow water will flow directly into the pit and will require lasting hold of operations to ensure safety of workers.	3	3	5	2	2
								2	Moderate-to-High: May require short-term cessation of operations as overflow water will flow directly into the pit. Cessation of operations for safety of workers is likely to be temporary, and operations will be re-established in the short term.					
								3	Moderate: May result in temporary cessation of operations as overflow water will flow directly into the pit. Smaller volumes and redundant structures mean that cessation of operations for safety of workers is likely to be temporary, and operations will be quickly re-established.					
								4	Low-to-Moderate: Operational complexity would result as overflow water may indirectly flow into the pit, requiring adjustment of operations. The situation will be manageable and would not require cessation of operations.					
								5	Low: Re-allocation of resources required. Overflow water would flow to receiving environment and would not directly affect pit operations, although other mine activities may be affected through re-allocation of resources.					
								6	No consequence: no change to operations as overflow water would be fully contained by existing mine infrastructure without material impact to mine operations.					
Operational consequence of dam failure	Alternatives with lower operational consequences of a dam failure event are preferred.	Qualitative scale	Dam failure at A53 would result in water reporting to Whale Tail Attenuation Pond. Under normal operating conditions, Whale Tail Attenuation Pond will store up to 133,232 m^3. If volume of water released from breach exceeded capacity of Whale Tail Attenuation Pond (A53 is approximately 3x the volume of Whale Tail Attenuation Pond) then water would enter Whale Tail pit, posing a risk to safe operations. Potential to result in short-term cessation of operations until backup water storage can be configured if needed.	Dam failure at A53 would result in water reporting to the expanded Whale Tail Attenuation Pond (W--Ex). Under normal operating conditions, WT-Ex will store up to 288,666 m^3. If volume of water released from breach exceeds capacity of WT-Ex then water would enter Whale Tail pit. Dam failure at WT-Ex would also result in water entering Whale Tail pit. Both scenarios would pose a risk to safe operations. Potential to result in short-term cessation of operations until backup water storage can be configured if needed.	Dam failure would report to the natural receiving environment without a risk to mine operations, although resources may be reallocated to address physical and environmental impacts.	Dam failure would result in water reporting to Whale Tail pit. There are no redundant containment structures down-gradient of the MAM dam. Overflow has the potential to result in short-term cessation of operations.	Dam failure would result in water reporting to Whale Tail pit. There are no redundant containment structures down-gradient of the WT-Ex dam. Overflow has the potential to result in short-term cessation of operations.	1	High: Expected to require cessation of operations. Overflow water will flow directly into the pit and will require lasting hold of operations to ensure safety of workers.	2	2	5	2	2
								2	Moderate-to-High: May require short-term cessation of operations as overflow water will flow directly into the pit. Cessation of operations for safety of workers is likely to be temporary, and operations will be re-established in the short term.					
								3	Moderate: May result in temporary cessation of operations as overflow water will flow directly into the pit. Smaller volumes and redundant structures mean that cessation of operations for safety of workers is likely to be temporary, and operations will be quickly re-established.					
								4	Low-to-Moderate: Operational complexity would result as overflow water may indirectly flow into the pit, requiring adjustment of operations. The situation will be manageable and would not require cessation of operations.					
								5	Low: Re-allocation of resources required. Overflow water would flow to receiving environment and would not directly affect pit operations, although other mine activities may be affected through re-allocation of resources.					
								6	No consequence: no change to operations as overflow water would be fully contained by existing mine infrastructure without material impact to mine operations.					

MAA Ledger: Biophysical Environment Account

Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
Air														
GHG and dust emissions during construction	Alternatives that require fewer haul truck trips to transport construction materials (estimated by considering both haul distances and dam fill volumes) are preferred.	Thousand m^3 of fill by kilometres of transport from source (thousand m^3km)	20.60 thousand m^3km (29,423 m^3, 0.7 km)	13.38 thousand m^3km (14,495 m^3, 0.7 km; plus 10,789 m^3, 0.3 km)	418.64 thousand m^3km (322,029 m^3, 1.3 km)	144.26 thousand m^3km (80,144 m^3, 1.8 km)	29.29 thousand m^3km (97,646 m^3, 0.3 km)	1	More than 400 thousand m^3km	6	6	1	4	5
								2	300 to 399 thousand m^3km					
								3	200 to 299 thousand m^3km					
								4	100 to 199 thousand m^3km					
								5	25 to 99 thousand m^3km					
								6	Less than 24 thousand m^3km					
GHG and dust emissions during operation	Alternatives that require use of fewer additional diesel-powered pumps are preferred.	Additional pumps (#)	1 additional pump (attenuation pond) at full capacity	2 additional pumps (attenuation pond + increased seepage into Whale Tail Pit) at full capacity	1 additional pump (attenuation pond) at full capacity	1 additional pump (attenuation pond) at full capacity	2 additional pumps (attenuation pond + increased seepage into Whale Tail Pit) at full capacity	1	More than 2 pumps	4	2	4	4	2
								2	2 pumps running at full capacity					
								3	2 pumps running at partial capacity					
								4	1 pump running at full capacity					
								5	1 pump running at partial capacity					
								6	0 pumps					
Surface Water														
Loss of natural water bodies	Alternatives that avoid impacts to natural water bodies, or affect fewer natural water bodies, are preferred.	Number of water bodies (#)	1 – loss of Lake A54	1 – loss of Lake A54	1 – loss of Lake A54	1 – partial loss of Mammoth Lake	None	1	Loss of 4 or more natural waterbodies	4	4	4	5	6
								2	Loss of 3 natural waterbodies					
								3	Loss of 2 natural waterbodies					
								4	Loss of 1 natural waterbody					
								5	Reconfiguration or partial loss of 1 natural waterbody					
								6	No natural waterbodies are affected					
Risk of impacts to surface water quality external to the attenuation pond	Alternatives that reduce risk/magnitude of potential impacts on surface water quality for natural waterbodies external to the mine site (i.e., Lake A53, Lake A54, Mammoth Lake, or other existing waterbodies), aside from use as an attenuation pond, are preferred.	Qualitative scale	The use of Lake A53 as an attenuation pond will leverage natural drainage pathways, without affecting other water bodies outside the mine site. No additional impact on fish-bearing waterbodies (including Mammoth Lake) are expected.	The use of Lake A53 as an attenuation pond will leverage natural drainage pathways, without affecting other water bodies outside the mine site. No additional impact on fish-bearing waterbodies (including Mammoth Lake) are expected.	Surface runoff from the IVR WRSF naturally drains towards Lake A53. Lake A53 will be surrounded on 3 sides by the mine site. Extensive diversion infrastructure and other water management strategies will be required to avoid impacts on Lake A53, and the risk of water quality impacts to Lake A53 is increased. However, impacts to other fish-bearing waterbodies (including Mammoth Lake) are not expected.	Surface runoff from the IVR WRSF naturally drains towards Lake A53. Lake A53 will be surrounded on 3 sides by the mine site. Extensive diversion infrastructure and other water management strategies will be required to avoid impacts on Lake A53, and the risk of water quality impacts to Lake A53 is increased. However, impacts to other fish-bearing waterbodies (including the west basin of Mammoth Lake) are not expected.	Surface runoff from the IVR WRSF naturally drains towards Lake A53. Lake A53 will be surrounded on 3 sides by the mine site. Extensive diversion infrastructure and other water management strategies will be required to avoid impacts on Lake A53, and the risk of water quality impacts to Lake A53 is increased. However, impacts to other fish-bearing waterbodies (including Mammoth Lake) are not expected.	1	The quality of water in natural waterbodies adjacent to the mine site will be directly affected by effluent discharge or other anticipated impacts.	5	5	2	2	2
								2	Diversion systems will be required to divert contact water from the WRSF and mine site away from a natural waterbody that is surrounded on 3 sides by the mine site, and receives natural drainage from the mine site.					
								3	Diversion systems will be required to divert contact water from the WRSF and mine site away from a natural waterbody that is surrounded on 2 sides by the mine site, and receives natural drainage from the mine site.					
								4	Diversion systems will be required to divert contact water from the WRSF and mine site away from a natural waterbody that is abutted by the mine site on one side, and receives natural drainage from the mine site.					
								5	Natural drainage and landscape features will be used to divert contact water from WRSF and mine site away from natural waterbodies adjacent to the mine site.					
								6	No potential water quality impacts to Lake A53, Mammoth Lake, or other external fish-bearing water bodies are not anticipated.					
Fish and Fish Habitat														
Number of fish-bearing water bodies	Alternatives that avoid, or minimize impacts to fish-bearing water bodies are preferred	Number of water bodies (#)	1	1	0	1	0	1	3 or more	3	3	6	3	6
								2	2					
								3	1					
								4	-					
								5	-					
								6	0					
Diversity of affected fish community	Alternatives that affect fewer fish species are preferred.	Number of species (#)	5 species	5 species	0 species	6 species	0 species	1	6 or more species	2	2	6	1	6
								2	4 or 5 species					
								3	3 species					
								4	2 species					
								5	1 species					
								6	0 species					

Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
Extent of fish habitat loss	Alternatives that minimize the area of fish habitat loss are preferred.	Area (ha)	Loss of Lake A53, with area of 14 ha	Loss of Lake A53, with area of 14 ha	No fish habitat affected.	Loss of Mammoth Lake (North Basin) with area of 26 ha	No fish habitat affected.	1	25 ha or more	4	4	6	1	6
								2	20 to 24 ha					
								3	15 to 19 ha					
								4	10 to 14 ha					
								5	9 ha or less					
								6	Zero – no fish habitat is affected					
Abundance of affected fish community	Alternatives that affect waterbodies with lower abundance of fish are preferred.	Qualitative Scale	Low abundance	Low abundance	None	Moderate abundance	None	1	High abundance	5	5	6	3	6
								2	Moderate-to-high abundance					
								3	Moderate abundance					
								4	Low -to-moderate abundance					
								5	Low abundance					
								6	None - no fish habitat is affected					
Terrestrial Habitat														
Terrestrial habitat loss	Alternatives that minimize the area of terrestrial habitat loss are preferred.	Area (ha)	14.4 ha	10.2 ha	27.1 ha	No loss of terrestrial habitat (4.38 ha will be gained by decreased water level)	No loss of terrestrial habitat (area is within mine infrastructure)	1	25 ha or more	4	4	1	6	6
								2	20 to 24 ha					
								3	15 to 19 ha					
								4	10 to 14 ha					
								5	5 to 9 ha					
								6	4 ha or less					
Environmental Consequences of Failure														
Environmental consequence of overtopping	Alternatives with lower downstream consequences of an overtopping event are preferred.	Qualitative scale	Overflow will be directed to Whale Tail Attenuation Pond by gravity. If volume of water released from overtopping exceeds the capacity of the Whale Tail Attenuation Pond then water would enter Whale Tail pit. Releases to the downstream environment would not result.	Overflow of A53 would be directed to WT-Ex by gravity. Any overtopping of WT-Ex would report to the Whale Tail pit. Releases to the downstream environment would not result.	Overtopping would report to the natural receiving environment with no secondary or redundant containment. The release of contact water could result in environmental impact.	Overtopping would report to the Whale Tail pit. Releases to the downstream environment would not result.	Overtopping would report to the Whale Tail pit. Releases to the downstream environment would not result.	1	High: overflow water would not be contained by mine infrastructure and would be released to natural receiving environment, with potential impacts to fish-bearing waterbodies.	5	4	1	4	4
								2	Moderate-to-high: overflow water would not be contained by mine infrastructure and would be released to natural receiving environment, with potential impacts to non-fish-bearing waterbodies.					
								3	Moderate consequence: overflow water would be partially contained by existing mine infrastructure but may also be released to receiving environment. Potential effect to waterbodies that are not fish-bearing.					
								4	Low-to-moderate: overflow would be fully contained by existing mine infrastructure					
								5	Low consequence: overflow water would be partially contained within infrastructure designed to collect and store water and fully contained by existing mine infrastructure.					
								6	No consequence: overflow water would be fully contained by existing mine infrastructure designed to collect and store water.					
Environmental consequence of dam failure	Alternatives with lower downstream consequences of a dam failure event are preferred.	Qualitative scale	Dam failure at A53 would result in water reporting to Whale Tail Attenuation Pond. Under normal operating conditions, this pond will store up to 133,232 m^3. If volume of water released from breach exceeded capacity of Whale Tail Attenuation Pond (A53 is approximately 3x the volume of Whale Tail Attenuation Pond) then water would enter Whale Tail pit. Releases to the environment would not result.	Dam failure at A53 would result in water reporting to the expanded Whale Tail Attenuation Pond (WT-Ex). Under normal operating conditions, this pond will store up to 288,666 m^3. If volume of water released from breach exceeds capacity of WT-Ex then water would enter Whale Tail pit. Dam failure at WT-Ex would also result in water entering Whale Tail pit. Releases to the downstream environment would not result.	Dam failure at A54 would result in water reporting to the natural receiving environment. Under normal operating conditions, this pond will store up to 622,040 m^3. There are no secondary or redundant containment features. The release could result in environmental impact.	Dam failure would result in water reporting to Whale Tail pit. Under normal operating conditions, this pond will store up to 762,942 m^3. Releases to the downstream environment would not result. A breach of the structure dividing Mammoth Lake could result in an environmental impact to Mammoth Lake itself.	Dam failure would result in water reporting to Whale Tail pit. Under normal operating conditions, this pond will store up to 758,870 m^3. Releases to the downstream environment would not result.	1	High: water would not be contained by mine infrastructure and would be released to natural receiving environment, with potential impacts to fish-bearing waterbodies.	5	4	1	1	4
								2	Moderate-to-high: water would not be contained by mine infrastructure and would be released to natural receiving environment, with potential impacts to non-fish-bearing waterbodies.					
								3	Moderate consequence: water would be partially contained by existing mine infrastructure but may also be released to receiving environment. Potential effect to waterbodies that are not fish-bearing.					
								4	Low-to-moderate: water would be fully contained by existing mine infrastructure					
								5	Low consequence: water would be partially contained within infrastructure designed to collect and store water and fully contained by existing mine infrastructure.					
								6	No consequence: water would be fully contained by existing mine infrastructure designed to collect and store water.					

MAA Ledger: Human Environment Account

Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
Inuit Land Use														
Loss of waterbody used for fishing	Alternatives that avoid or minimize impacts to fishing activities, or waterbodies used for fishing, are preferred.	Qualitative Scale	No fishing activity has been reported at Lake A53 through consultation, traditional land use studies, or other feedback. The lake is small and unremarkable, and there are many other lakes more suitable for fishing throughout the area.	No fishing activity has been reported at Lake A53 through consultation, traditional land use studies, or other feedback. The lake is small and unremarkable, and there are many other lakes more suitable for fishing throughout the area.	No fish-bearing waterbodies are affected.	No fishing activity has been reported at Mammoth Lake through consultation, traditional land use studies, or other feedback. The lake is moderately sized and could be used for fishing although there are many other lakes more suitable for fishing throughout the area.	No fish-bearing waterbodies are affected.	1	Affected waterbody is reported to be a destination for fishing and used frequently	5	5	6	4	6
								2	Affected waterbody is reported to be a destination for fishing and used regularly					
								3	Affected waterbody is reported to be fished opportunistically					
								4	Affected waterbodies are not known to be used for fishing, and consultation with local land users indicates fishing is unlikely due to the availability of better fishing lakes					
								5	Affected waterbodies are not known to be used for fishing, and consultation with local land users indicates fishing is unlikely due to the size and nature of the lake					
								6	Affected waterbodies (if any) are not fish bearing					
Relocation of fish	Alternatives that avoid relocation of fish from one waterbody to another are preferred (due to local Elders' concerns related to intangible/spiritual effects on fish).	Qualitative Scale	Lake A53 is fish-bearing. Use of this lake will require fish to be relocated.	Lake A53 is fish-bearing. Use of this lake will require fish to be relocated.	Lake A54 is not fish-bearing. Therefore, relocation of fish is not required.	Mammoth Lake is fish-bearing. Use of this lake will require fish to be relocated.	No fish-bearing waterbodies are affected. Therefore, relocation of fish is not required.	1	Relocation of fish is required	1	1	6	1	6
								2	-					
								3	-					
								4	-					
								5	-					
								6	Relocation of fish is not required					
Disruption of landscape	Alternatives that minimize visual disruption of the natural landscape during mine operations are preferred.	Qualitative Scale	Includes construction of a moderately sized dam (approx. 6 m high, 500 m long) plus two smaller dams (approx. 50 m and 120 m) at Lake A53. This would result in a 110% increase to the natural water surface area. However, considering that the pond is surrounded on 3 sides by the mine site, the overall change in the landscape as a result of the attenuation pond is expected to be minor.	Includes construction of a moderately sized dam (approx.5 m high, 280 m long) plus one small dam at Lake A53 (approx. 100 m long); and an additional dam at the WTAP (7 m high, 125 m long). This would result increase the natural water surface area of Lake A53 by 78%. Considering that Lake A53 is surrounded on 3 sides by the mine site, the overall change in the landscape is expected to be minor.	Includes construction of a large, horseshoe shaped dam (approx. 12 m tall and 2,040 m long), plus a small dam (380 m long). This would increase the water surface area of Lake A54 by over 20 times its size. The pond is on the east edge of the mine site. The overall change in the landscape is expected to be moderate-to-major.	Includes construction of a 418 m long dam across Mammoth Lake. The water surface area would be largely unchanged from the baseline though it will be transected by the dam. The pond is on the west edge of the mine site. The overall change in the landscape is expected to be minor-to-moderate.	Includes construction of a 13 m high and 415m long dam on the south side of the open pit. The pond will be surrounded on all sides by the mine site, located within the footprint of the first phase of the Whale Tail Pit Project. No additional effect on the natural landscape is expected.	1	The attenuation pond will result in major changes to the natural landscape: individual dams exceed 1,500 m in length; or more than 10x increase in water surface area. Changes are adjacent to or distinct from the mine site.	4	5	1	4	6
								2	The attenuation pond will result in moderate-to-major changes to the natural landscape: individual dams exceed 1,500 m in length; or more than 10x increase in water surface area. Changes are encompassed by the mine site.					
								3	The attenuation pond will result in moderate changes to the natural landscape: individual dams between 501-1,500 m long; or 2x to 10x increase in natural water surface area. Changes are encompassed by mine site or blend with baseline boundaries of waterbodies.					
								4	The attenuation pond will result in minor-to-moderate changes to the natural landscape: individual dams between 301-500 m long; or 100-200% increase in natural water surface area. Changes are encompassed by mine site or blend with baseline boundaries of waterbodies.					
								5	The attenuation pond will result in minor changes to the natural landscape: individual dams less than 300 m long, and less than 100% increase in natural water surface area. Changes are encompassed by mine site or blend with baseline boundaries of waterbodies.					
								6	The attenuation pond will not alter the natural landscape.					
Workforce														
Worker well-being	Alternatives that minimize real or perceived risks to worker well-being are preferred.	Qualitative Scale	Includes existing Whale Tail Attenuation Pond with capacity of 133,232 m^3. No water-retaining dam at the Whale Tail Attenuation Pond.	Includes expanded Whale Tail Attenuation Pond with capacity of 288,666 m^3. There is a 7 m high water retaining dam at the expanded Whale Tail Attenuation Pond, adjacent to Whale Tail Pit. The dam would create a perception of risk for workers in the pit.	Includes existing Whale Tail Attenuation Pond with capacity of 133,232 m^3. No water-retaining dam at the Whale Tail Attenuation Pond.	Includes existing Whale Tail Attenuation Pond with capacity of 133,232 m^3. No water-retaining dam at the Whale Tail Attenuation Pond.	Includes expanded Whale Tail Attenuation Pond with capacity of 758,870 m^3. There is a 13 m high water retaining dam at the expanded Whale Tail Attenuation Pond, adjacent to Whale Tail Pit. The dam would create a perception of risk for workers in the pit.	1	Water-retaining dam (>10 m high) above workers in pit.	6	2	6	6	1
								2	Water-retaining dam (6-10 m high) above workers in pit.					
								3	Water-retaining dam (3-5 m high) above workers in pit.					
								4	Water-retaining dam (1-2 m) above workers in pit.					
								5	Water-retaining dam (<1 m) above workers in pit. -					
								6	No water-retaining dam above workers in pit.					

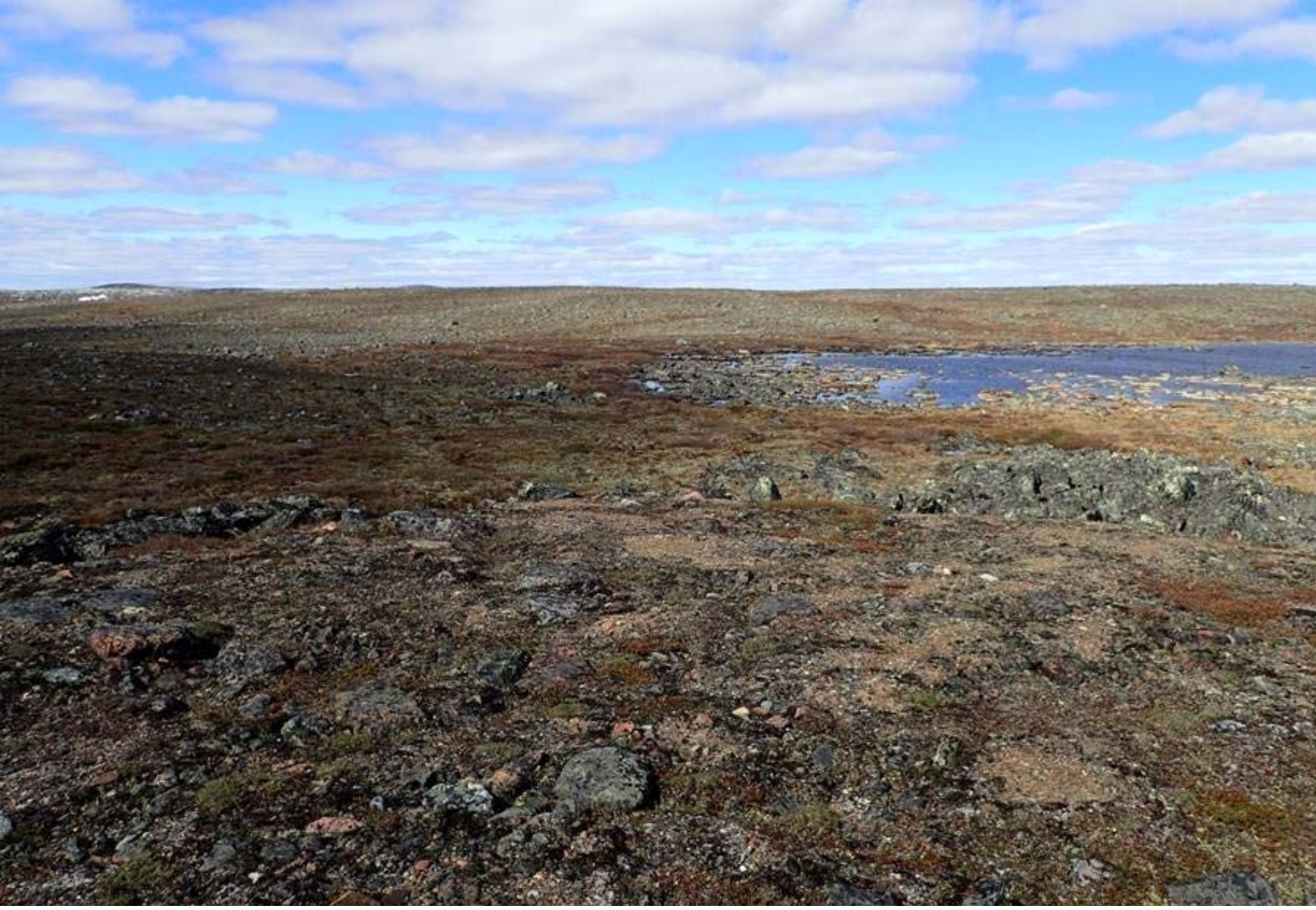
Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
Land Use Consequences of Failure														
Land use consequence of overtopping	Alternatives with lower consequence for land use (including safety of land users and/or real or perceived impacts on access or contamination of harvests) related to an overtopping event are preferred.	Qualitative scale	Overflow from A53 will be directed to Whale Tail Attenuation Pond by gravity. If volume of water released from overtopping exceeds the capacity of the Whale Tail Attenuation Pond then water would enter Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.	Overflow from A53 will be directed to WT-Ex by gravity. If volume of water released from overtopping exceeds the capacity of WT-Ex then water would enter Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.	Overtopping of A54 could result in water reporting to the natural receiving environment including areas south and east of the mine site. Affected areas have not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur. Considering the length and height of the containment dam, overtopping may result in perceptions of contamination across a broader area outside the mine site.	Overflow from MAM would report to the Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.	Overtopping of WT-Ex would report to the Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.	1	High consequence: overflow water would not be contained by mine infrastructure and would be released to natural receiving environment. Real and perceived impacts may be widespread including fish-bearing water bodies, or affected areas are known to be regularly used for harvesting or travel, or present land use resources not available elsewhere.	5	5	2	4	4
								2	Moderate-to-high consequence: overflow water would not be contained by mine infrastructure and would be released to natural receiving environment. Affected areas are not regularly used for harvesting or travel, and do not present land use resources available elsewhere. Perception of contamination or other impacts may extend to a broader area.					
								3	Moderate consequence: overflow water would not be contained by mine infrastructure and would be released to natural receiving environment. Affected areas are not regularly used for harvesting or travel, and do not present land use resources available elsewhere. Impacts likely to be contained close to the mine site and perception of downstream contamination is not expected.					
								4	Low-to-moderate: overflow water would be partially contained by other existing mine infrastructure and would pose no risk to land users or harvesting areas outside the mine site.					
								5	Low consequence – overflow water would be partially contained by existing mine infrastructure designed to collect and store water and fully contained by other mine infrastructure, and would pose no risk to land users or harvesting areas outside the mine site.					
								6	No consequence – overflow water would be fully contained by existing mine infrastructure designed to collect and store water, and would pose no risk to land users or harvesting areas outside the mine site.					
Land use consequence of dam failure	Alternatives with lower consequence for land use (including safety of land users and/or real or perceived impacts on access or contamination of harvests) related to a dam failure event are preferred.	Qualitative scale	Dam failure at A53 would result in water reporting to Whale Tail Attenuation Pond. If volume of water released from breach exceeded capacity of Whale Tail Attenuation Pond (A53 is approximately 3x the volume of Whale Tail Attenuation Pond) then water would enter Whale Tail pit, Water would not be discharged to the environment and impact to land users would not occur.	Dam failure at A53 would result in water reporting to WT-Ex. If volume of water released from breach exceeds capacity of WT-Ex then water would enter Whale Tail pit. Dam failure at WT-Ex would also result in water entering Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.	Dam failure at A54 would result in water reporting to the natural receiving environment including areas south and east of the mine site. Affected areas have not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur. Considering the length and height of the containment dam, dam failure is likely to result in impacts to fish-bearing waterbodies, and perception of widespread environmental impacts including contamination potential harvests.	Dam failure at the east dam at MAM would result in water reporting to Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur. However, failure of the structure dividing Mammoth Lake would impact the fish-bearing west basin of Mammoth Lake. Mammoth Lake is not known for regular or special land use, but perceived impacts may extend to a broader area.	Dam failure at WT-Ex would result in water reporting to Whale Tail pit. Water would not be discharged to the environment and impact to land users would not occur.	1	High consequence: water would not be contained by mine infrastructure and would be released to natural receiving environment. Real and perceived impacts likely to be widespread including fish-bearing water bodies, or impacts to areas known to be regularly used for harvesting or travel, or that present resources not available elsewhere.	5	5	1	2	5
								2	Moderate-to-high consequence: water would not be contained by mine infrastructure and would be released to natural receiving environment. Affected areas are not regularly used for harvesting or travel, and do not present land use resources available elsewhere. Perception of contamination or other impacts may extend to a broader area.					
								3	Moderate consequence: water would not be contained by mine infrastructure and would be released to natural receiving environment. Affected areas are not regularly used for harvesting or travel, and do not present land use resources available elsewhere. Impacts likely to be contained close to the mine site and perception of downstream contamination is not expected.					
								4	Low-to-moderate: water would be partially contained by other existing mine infrastructure and would pose no risk to land users or harvesting areas outside the mine site.					
								5	Low consequence: water would be partially contained by existing mine infrastructure designed to collect and store water and fully contained by other mine infrastructure, and would pose no risk to land users or harvesting areas outside the mine site.					
								6	No consequence: water would be fully contained by existing mine infrastructure designed to collect and store water, and would pose no risk to land users or harvesting areas outside the mine site.					

MAA Ledger: Project Economics Account

Indicator	Rationale	Parameter (Unit)	I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex	Scale		I: A53	II: A53/WT-Ex	III: A54	IV: MAM	V: WT-Ex
Attenuation Pond Costs														
Capital costs	Alternatives with lower capital costs (considering type and size of construction) are preferred.	Estimated Cost ($)	671 m long; 29,423 m^3; Frozen core dam Estimated cost: $4.7 M	505 m long; 25,284 m^3; frozen core and secant pile dams Estimated cost: $4.5 M (secant) + $2.7 M (frozen core) = $7.2 M	2,422 m long; 322,029 m^3; frozen core dam Estimated cost: $17.0 M	418 m long; 80,144 m^3; secant pile. Estimated cost: $15.0 M	415 m long; 97,646 m^3; secant pile. Estimated cost $14.9 M	1	More than $20 million	5	4	2	3	3
								2	$16 to $20 million					
								3	$11 to $15 million					
								4	$6 to $10 million					
								5	$1 to $5 million					
								6	<$1 M					
Fish habitat offsetting costs	Alternatives with lower costs for fish habitat offsetting (compensation) are preferred. Offsetting costs compared to those for the approved Whale Tail Pit Project.	Estimated Cost ($)	Offsetting costs higher than base case as need to compensate for 14 hectares of fish habitat for all of Lake A53, resulting in costs ranging between $1.0 million and $1.4 million.	Offsetting costs higher than base case as need to compensate for 14 hectares of fish habitat for all of Lake A53, resulting in costs ranging between $1.0 million and $1.4 million.	No fish habitat offsetting required	Offsetting costs higher than base case and Lake A53 as need to compensate for 26 hectares of north basin of Mammoth Lake, resulting in costs in excess of $2 million.	No fish habitat offsetting required	1	$2 million or more	3	3	6	1	6
								2	$1.5 million to $1.9 million					
								3	$1.0 million to $1.4 million					
								4	$0.5 million to $0.9 million					
								5	Less than$0.5 million					
								6	No fish habitat offsetting costs					
Operating / sustaining costs	Alternatives with lower operating (or sustaining) costs, compared to the approved Whale Tail Pit Project, are preferred.	Estimated Cost ($)	Operational costs higher than base case (additional pump required); no seepage pumping; high monitoring costs; no additional manpower required.	Operational costs higher than base case (additional pump required); pumping costs in WT Pit will increase with increased seepage; high monitoring costs; no additional manpower required.	Operational costs higher than base case (additional pump required); no seepage pumping; higher monitoring costs with longer infrastructure; no additional manpower required.	Operational costs higher than base case (additional pump required); no seepage pumping; high monitoring costs; no additional manpower required.	Operational costs similar to base case; highest monitoring costs; pumping costs in WT Pit will increase with increased seepage; no additional manpower required.	1	One additional pump, high increase in seepage in pit, high monitoring requirements.	3	2	3	3	1
								2	One additional pump, moderate increase in seepage in pit, high monitoring requirements.					
								3	One additional pump, high monitoring requirements.					
								4	High monitoring requirements.					
								5	Low monitoring requirements.					
								6	No change from base case (Whale Tail Project)					
Closure and reclamation costs	Alternatives with lower costs for closure and reclamation are preferred.	Estimated Cost ($)	Location of attenuation pond enables reclamation activities to be completed largely independent from other domains which can reduce cost and provide flexibility in timing. Management of solids accumulated in the pond may be required either by covering or removing. Dam will require breaching to reintroduce water to the reclaimed Whale Tail - Mammoth Lake watershed. Pumps and piping will be removed and the channel between A53 will require upgrading to support final closure. Overall incremental cost increase is expected to be <10% of the total cost of closure for the water management system, with a high certainty (>90%) that closure works will be completed within budget.	A53 portion is the same as Alternative I. WTEX portion of attenuation pond requires the dam to be breached. The cost of removal is higher for dams constructed on incompetent ground (as for WT-Ex) compared to structures on land. The higher costs will be more than offset because only a portion of WT-Ex will be removed. Closure of WT-Ex becomes more costly if management of solids is required by either covering or removing. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure. Overall incremental cost increase is expected to be small. Overall incremental cost increase is expected to be <10% of the total cost of closure for the water management system, with a high certainty (>90%) that closure works will be completed within budget.	Long dam structure will need to be reclaimed. Reclamation will require dams to be re-contoured or removed to ensure positive drainage. Added cost to this option to construct a drainage system to divert water flows from IVR Waste Rock Storage Facility around A53 with discharge to the reclaimed Whale Tail Lake. Management of solids accumulated in the pond may be required either by covering or removing. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure. Overall incremental cost increase is expected to be high. Overall incremental cost increase is expected to be >20% of the total cost of closure for the water management system, with a high certainty (>90%) that closure works will be completed within budget.	A portion of the dam between the pond and Mammoth Lake will be breached. The cost of removal is higher for dams constructed on incompetent ground (as for MAM) compared to structures on land. The higher costs will be more than offset because only a portion of MAM will be removed. The dam structure between the attenuation pond and the Whale Tail pit will also be breached. Closure plan currently assumes that solids in Whale Tail Attenuation Pond will not require additional mitigation at closure. Overall incremental cost increase is expected to be moderate to high. Overall incremental cost increase is expected to be 10-20% of the total cost of closure for the water management system, with a moderate certainty (60-90%) that closure works will be completed within budget.	A portion of the dam structure between the attenuation pond and the Whale Tail Pit will be breached. The cost of removal is higher for dams constructed on incompetent ground (as for WT-Ex) compared to structures on land. The higher costs will be more than offset because only a portion of WT-Ex will be removed. Closure plan currently assumes that solids in WT-Ex will not require additional mitigation at closure. Overall incremental cost increase is expected to be moderate to high. Overall incremental cost increase is expected to be 10-20% of the total cost of closure for the water management system, with a moderate certainty (60-90%) that closure works will be completed within budget.	1	Incremental cost increase (>20% of the total cost of closure for the water management system). Low cost certainty (<60% probability of completing closure and reclamation within budget).	4	4	2	3	3
								2	Incremental cost increase is high (>20% of the total cost of closure for the water management system). High or moderate certainty for closure of this option (>60% probability of completing closure and reclamation within budget).					
								3	Incremental cost increase is moderate to high (10-20% of the total cost of closure for the water management system). Moderate cost certainty for closure of this option (60-90% probability of completing closure and reclamation within budget).					
								4	Incremental cost increase is small (<10% of the total cost of closure for the water management system). High cost certainty for closure of this option (>90% probability of completing closure and reclamation within budget).					
								5	Incremental cost increase is small (<10% of the total cost of closure for the water management system) for removal of pumping equipment and to breach portions of dam structures.					
								6	No incremental cost difference - No incremental changes to closure beyond the approved Whale Tail Pit Project closure plan.					
Long-term post closure costs	Alternatives with lower costs for active water treatment or other activities post-closure are preferred.	Estimated Cost ($)	Water from former attenuation pond will flow by gravity to receiving environment. Controlled release is easily established if post-closure water treatment is needed for run-off from IVR waste rock storage area. Active water treatment may be required for less than 10 years.	Water from A53 portion of former attenuation pond will flow by gravity to receiving environment. WT-Ex will form part of reclaimed lake, requiring no additional post-closure management. Active water treatment may be required for less than 10 years.	Water from former attenuation pond will flow by gravity to receiving environment. Drainage system for contact water from IVR WRSF to the Whale Tail lake will require long-term post closure management (i.e., snow clearing). Active water treatment may be required for up to 20 years.	Attenuation pond will form part of reclaimed lake, requiring no additional post-closure management. Monitoring may be required for up to 10 years.	Attenuation pond will form part of reclaimed lake, requiring no additional post-closure management. Monitoring may be required for up to 10 years.	1	Active water treatment and management required in perpetuity.	4	4	3	5	5
								2	Active water treatment and/or management will be required and time period is undetermined					
								3	Active water treatment and/or management for <20 years					
								4	Active water treatment and/or management may be required <10 years					
								5	Post closure monitoring required for <10 years					
								6	No post-closure monitoring required					

Appendix D

IVR Waste Rock Storage Facility Alternatives Assessment Report



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Whale Tail Pit Expansion Project

IVR Waste Rock Storage Facility Alternatives Assessment Report

December 2019

Project No.: 0459286

The business of sustainability

ERM

Signature Page

December 2019

Whale Tail Pit Expansion Project Project

IVR Waste Rock Storage Facility IVR Waste Rock Storage Facility Alternatives Assessment Report

Tonia Robb
Senior Consultant

Nicola Lower
Principal Consultant

Reviewed by:

Anne Currie
Senior Partner

ERM Consultants Canada Ltd.

120 Adelaide Street West, Suite 2010
Toronto, ON
Canada M5H 1T1

T: +1 416 646 3608
F: +1 416 642 1269

EXECUTIVE SUMMARY

This report present the results of the assessment of IVR Waste Rock Storage Facility (WRSF) alternatives undertaken by Agnico Eagle Mines Ltd. (Agnico Eagle) for the proposed Whale Tail Expansion Project. The proposed expansion is subject to an environmental assessment by the Nunavut Impact Review Board pursuant to Part 5 of the Nunavut Agreement. The review of the Final Environmental Impact Statement (FEIS) Addendum for the proposed Expansion Project has been completed and the NIRB Reconsideration and Recommendations Report was submitted to the federal Minister of the Environment on October 18, 2019.

The location of the IVR WRSF is the subject of this alternative assessment because the proposed location indicated in the FEIS Addendum overprints fish-frequented waterbodies. Overprinting a fish-frequented waterbody requires a Schedule 2 amendment of the Metal and Diamond Effluent Regulations (MDMER). While fish-bearing waterbodies are normally avoided, it is challenging to find feasible sites that would meet Agnico Eagle's objective to locate the IVR WRSF within sub-watersheds that contain approved mine infrastructure for the Whale Tail Pit Project and the Expansion Project infrastructure. Therefore fish-bearing waterbodies are being considered to meet this objective.

This assessment of alternatives for the Whale Tail Pit Expansion Project has followed the transparent and standardized process described in Environment and Climate Change Canada's Guidelines from the Assessment of Alternative for Mine Waste Disposal (ECCC 2016).

A total of thirteen candidate alternative locations were initially identified using two threshold criteria: storage capacity, and a location that will minimize potential environmental impacts to areas otherwise undisturbed by physical infrastructure. Three alternatives (including the alternative proposed in the FEIS Addendum) were included for further assessment following the pre-screening assessment.
The pre-screening criteria asked the following questions:

Would the location of the IVR WRSF sterilize mineral resources or areas with high mineral potential?

Would the IVR WRSF overprint lands or water designated as having high environmental, cultural, and/or archaeological value?

Would the IVR WRSF be inconsistent with the approved mine plan for the Whale Tail Pit Project?

Is the IVR WRSF located outside the approved Project and Expansion Project footprint (i.e., within the watersheds impacted by the project)?

Would the haul distance from IVR Pit to the IVR WRSF render the project economically infeasible?

Can runoff and seepage from the IVR WRSF be effectively managed to reduce the risks to downstream waterbodies through operations and closure?

The characterization criteria for each of the remaining alternatives were considered in the development of relevant, meaningful, and differentiating sub-accounts and indicators, used to create the multiple accounts ledger for the assessment. Twelve project-specific sub-accounts were identified for assessment, under the following Accounts: Technical, Environment, Socio-Economic, and Economic. A total of 31 indicators were documented in a multiple accounts ledger and each alternative was scored for each indicator using a six-point scale tailored to the assessment. A weighting component accounted for the indicators and accounts that were more important to the value-based decision-making process. The rationale for scores and weightings are provided and are in accordance with the recommendations in the ECCC Guidelines.

The results of the quantitative analysis indicated that Alternative A: The IVR WRSF location indicated in the FEIS Addendum had the highest merit rating. The results of the MAA were tested using a sensitivity analysis, designed to identify the best solution independent of project costs and technical complexity.

The advantages of this alternative include a relatively small footprint, reduced need for surface water management infrastructure, reduced complexity during operations, and reduced consequences in the event of water management operational failure. This alternative also facilitates effective management of surface water quality impacts at the mine site as natural drainage conditions support the collection of contact water from the IVR WRSF to the preferred IVR Attenuation Pond. Pursuant to ECCC's '*Streamlining the Approvals Process for Metal Mines with Tailings Impoundment Areas*', Agnico Eagle has completed the following steps to support a streamlined Schedule 2 amendment process:

- Conducted an assessment of the IVR WRSF alternative locations, including the costs and benefits of the alternatives (this report);
- Proposed a fish habitat compensation plan associated with the preferred attenuation pond alternative, which outlines the habitat losses and gains in relation to the use of waterbodies A50, A51, and A52; and
- Conducted consultations on the WRSF alternatives.

The NIRB's review of Agnico Eagle's Final Environmental Impact Statement has provided further opportunities for Inuit, Inuit organizations and the public to comment on the assessment of attenuation pond alternatives and proposed fish habitat compensation plan pertaining to waterbodies A50, A51, and A52. The location of the alternative and the waterbodies proposed to be overprinted by the IVR WRSF are provided in Figure 1.

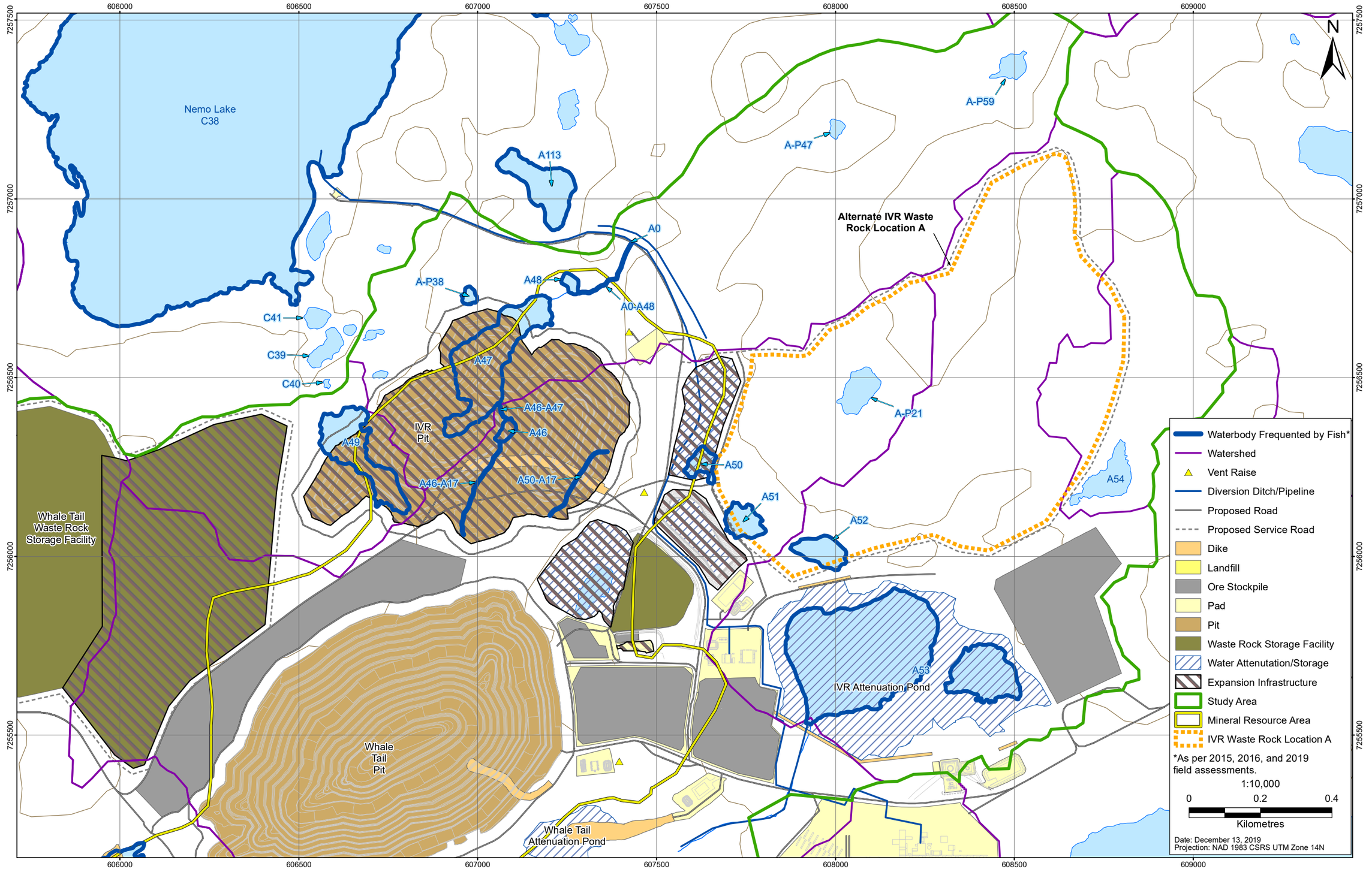

Figure 1: Alternative IVR Waste Rock Storage Facility Location (Alternative A)

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ACRONYMS AND ABBREVIATIONS

Agnico Eagle	Agnico Eagle Mines Ltd.
accounts	Broad categories providing the foundation for the multiple accounts analysis. The ECCC Guidelines recommend four accounts: environment, technical, socio-economic, and economic.
approved project	The approved Whale Tail Pit Project, as defined in the Whale Tail Pit Project Proposal (NIRB File No.: 16MN056), Project Certificate 008 and NWB Type A Water Licence 2AM-WTP1826.
CCME	Canadian Council of Ministers of the Environment
characterization criteria	Project-specific criteria used to describe and compare alternatives.
critical flaw	A characteristic that is so unfavourable or severe that, if taken singly, it would be sufficient to eliminate an alternative.
ECCC Guidelines	*Guidelines for the Assessment of Alternatives for Mine Waste Disposal*, Environment and Climate Change Canada, 2016.
expanded project / the Expansion Project	The proposed expansion of the Whale Tail Pit Project.
feasible	Constructible and operable within precedents of existing designs and prudent engineering practice guidelines, considering technical, risk, and economic factors.
FEIS	Final Environmental Impact Statement
indicator	Allows for the qualitative or quantitative measurement of an impact (i.e., benefit or loss) or other element of a sub-account. Sub-accounts by nature are often not directly measurable, and need to be sufficiently decomposed to allow measurability; this decomposition takes the form of indicators.
IQ	Inuit Qaujimajatuqangit
Main Report	Whale Tail Pit Expansion Project: Attenuation Pond Alternatives Assessment Report, December 2019
MAA	Multiple Accounts Analysis – This is a multi-criteria decision making tool used to conduct assessments of alternatives for mine waste disposal and other mining related decision processes.
Masl	metres above sea level
MDMER	Metal and Diamond Mining Effluent Regulations (https://laws-lois.justice.gc.ca/PDF/SOR-2002-222.pdf)
mine site, the	Whale Tail Pit mine site (site of the Whale Tail Pit Project)

NWB	Nunavut Water Board
screening criteria	Yes-or-no questions designed to identify critical flaws.
sensitivity analysis	Analysis designed to test the degree to which results may change based on the weightings assigned in the value-based decision-making process, to improve transparency of the assessment. Different weightings are assigned to accounts, sub-accounts, and/or indicators, and results are compared. Significant differences in results can indicate areas of bias and subjectivity and show how conclusions may be representative of different value systems.
sub-account	Sub-accounts, also referred to as evaluation criteria, consider the material impact (i.e., benefit or loss) associated with any of the alternatives being evaluated. Sub-accounts should be impact-driven, differentiating, relevant, understandable, non-redundant, and judgementally independent.
threshold criteria	Basic conditions that must be met by any alternative for inclusion in the MAA. These criteria are project-specific, should be as broad as possible, and must be fully described and rationalized to ensure transparency.
weighting	Applies a weighting factor to each indicator, subaccount, and account based on its relative importance to the overall decision-making process.
Water Licence	Type A Water Licence 2AM-WTP1826
WRSF	Waste Rock Storage Facility

1. INTRODUCTION

1.1 Report Purpose

This report presents an alternatives assessment to identify the most suitable location for the IVR Waste Rock Storage Facility (WRSF) for the Whale Tail Pit Expansion Project. It has been prepared in accordance with Environment and Climate Change Canada (ECCC) *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (hereafter referred to as the ECCC Guidelines; ECCC 2016).

1.2 Structure of this Report

The organization of the report follows the template provided by ECCC (ECCC 2019). Where applicable, reference to the '*Whale Tail Pit Expansion Project: Attenuation Pond Alternatives Assessment Report*' (hereafter referred to as the Main Report) is made within relevant sections of this report (e.g., Section 3.4 Setting). The Main Report provides a comprehensive assessment of attenuation pond alternatives for the What Tail Pit Expansion Project, including many of the same geophysical, environmental, and Project-related features discussed herein.

Section 2 provides an overview of the approved Whale Tail Pit Project and Whale Tail Pit Expansion Project, with a focus on waste rock management. Section 3 provides background information for the alternatives assessment including the incorporation of *Inuit Qaujimajatuqangit* and consultation outcomes, the regulatory context, summary of the all the key steps as per the ECCC Guidelines, and the baseline setting of the physical environment, biological environment, and human environment.

Sections 4 through 10 of this report present the alternatives assessment process and results:

- Section 4: Identify Candidate Alternatives (Step 1);
- Section 5: Pre-Screening Assessment (Step 2);
- Section 6: Alternatives Characterization (Step 3);
- Section 7: Multiple Accounts Ledger (Step 4);
- Section 8: Value-based Decision Process (Step 5);
- Section 9: Sensitivity Analysis (Step 6); and
- Section 10: Conclusions.

This report as a whole represents Step 7: Documentation of Results, as defined by the ECCC Guidelines.

1.3 Project Proponent

Agnico Eagle Mines Ltd. is a publicly traded (Toronto stock exchange, TSE:AME) Canadian-based gold producer with operating mines in Canada, Finland and Mexico and exploration activities extending to the United States and Sweden.

2. PROJECT DESCRIPTION AND LOCATION

Agnico Eagle operates the Meadowbank Gold Mine, located on Inuit-owned lands approximately 70 km north of the hamlet of Baker Lake in the Kivalliq Region of Nunavut (Figure 2-1). The Meadowbank mine began commercial production in 2010 and has been producing gold from open pits at the Meadowbank site. The Meadowbank open pits are scheduled to cease operations in 2019. All other facilities will be operational for the approved Whale Tail Pit and proposed Expansion Project.

Agnico Eagle is constructing and preparing to mine a satellite mineral property (the Amaruq property) located approximately 50 km northwest of the Meadowbank Mine and 150 km north of Baker Lake (Figure 2-1). The development of the Amaruq property commenced with the 2018 approval of the Whale Tail Pit Project. Construction of the Whale Tail Pit Project began in 2018, and mining operation began in 2019, as scheduled (Figure 2-2).

The Whale Tail Pit Expansion Project (Expansion Project) will expand mining operations at the Whale Tail Pit mine site including the development of an additional open pit and an underground mine. The proposed Expansion Project will extract 167.8 million tonnes (Mt) of waste rock which will be used for construction (58.4 Mt) or stored in the existing, expanded Whale Tail WRSF (81.8 Mt), and the proposed IVR WRSF (27.6 Mt) (Agnico Eagle 2019a). An area of approximately 240 ha is required to store waste rock from the Expansion Project.

2.1 Mine Plan

2.1.1 Whale Tail Pit Project (Approved Project)

Ore is extracted from the Whale Tail Pit and transported by truck via a 65 km haul road to the Meadowbank mine site for processing using the existing mill. The project also uses the Meadowbank tailings management infrastructure, worker accommodations, all-weather access road connecting Baker Lake and the Meadowbank site, and existing marine shipping/resupply infrastructure in Baker Lake.

The major mine components and facilities of the approved Whale Tail Pit Project mine site are shown in Figure 2.1-1, and include:

- Open pit (Whale Tail Pit);
- Waste rock storage facility (Whale Tail WRSF);
- Overburden storage facilities;
- Ore stockpiles;
- Landfill;
- Haul road and access roads;
- Industrial area (including accommodation camp and garage); and
- Water management infrastructure.

Development of the Whale Tail Pit Project will produce an estimated 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock and 5.6 Mt of overburden. The construction is expected to employ up to 500 people, and 931 workers are expected to be employed on rotation during operations.

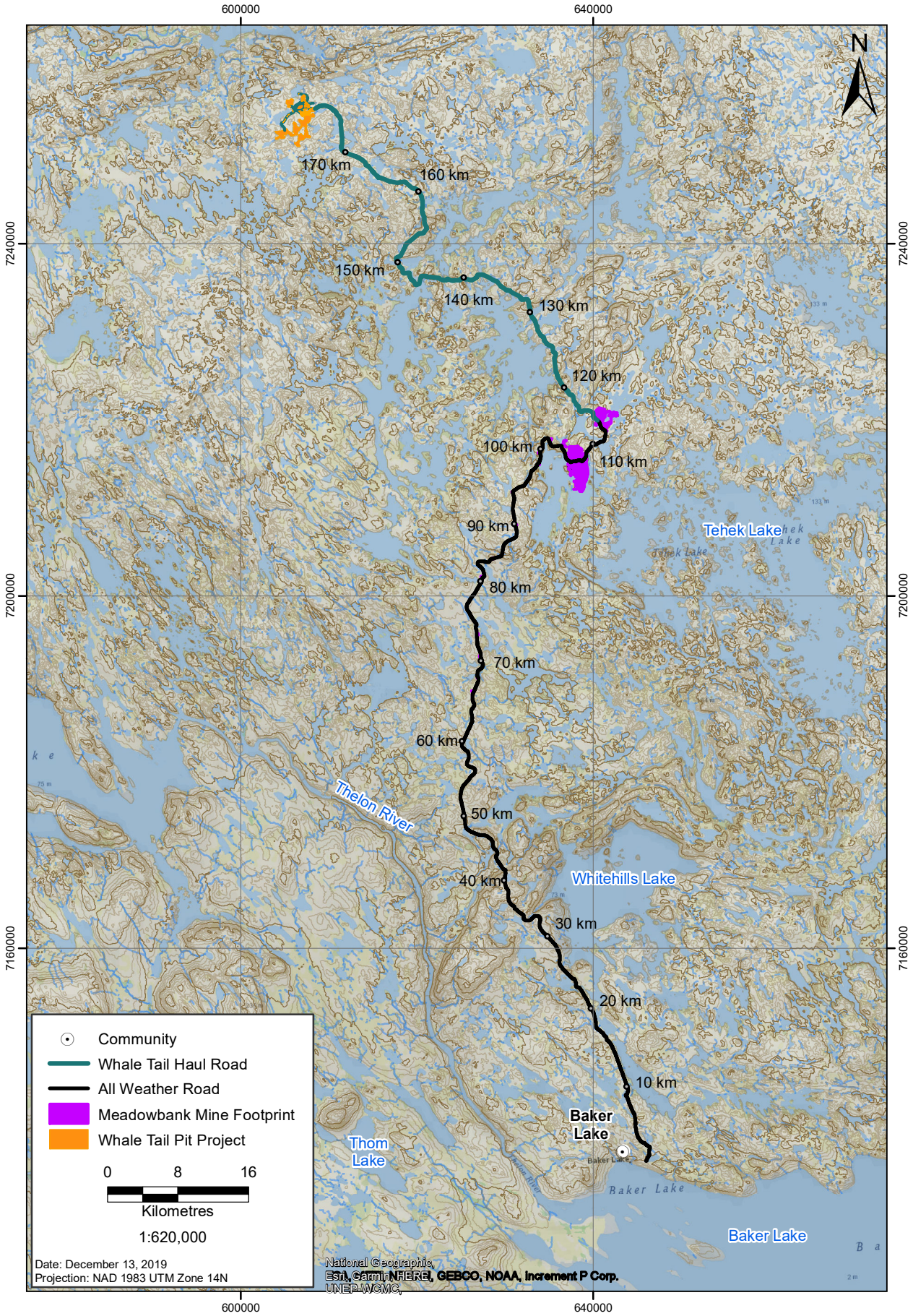
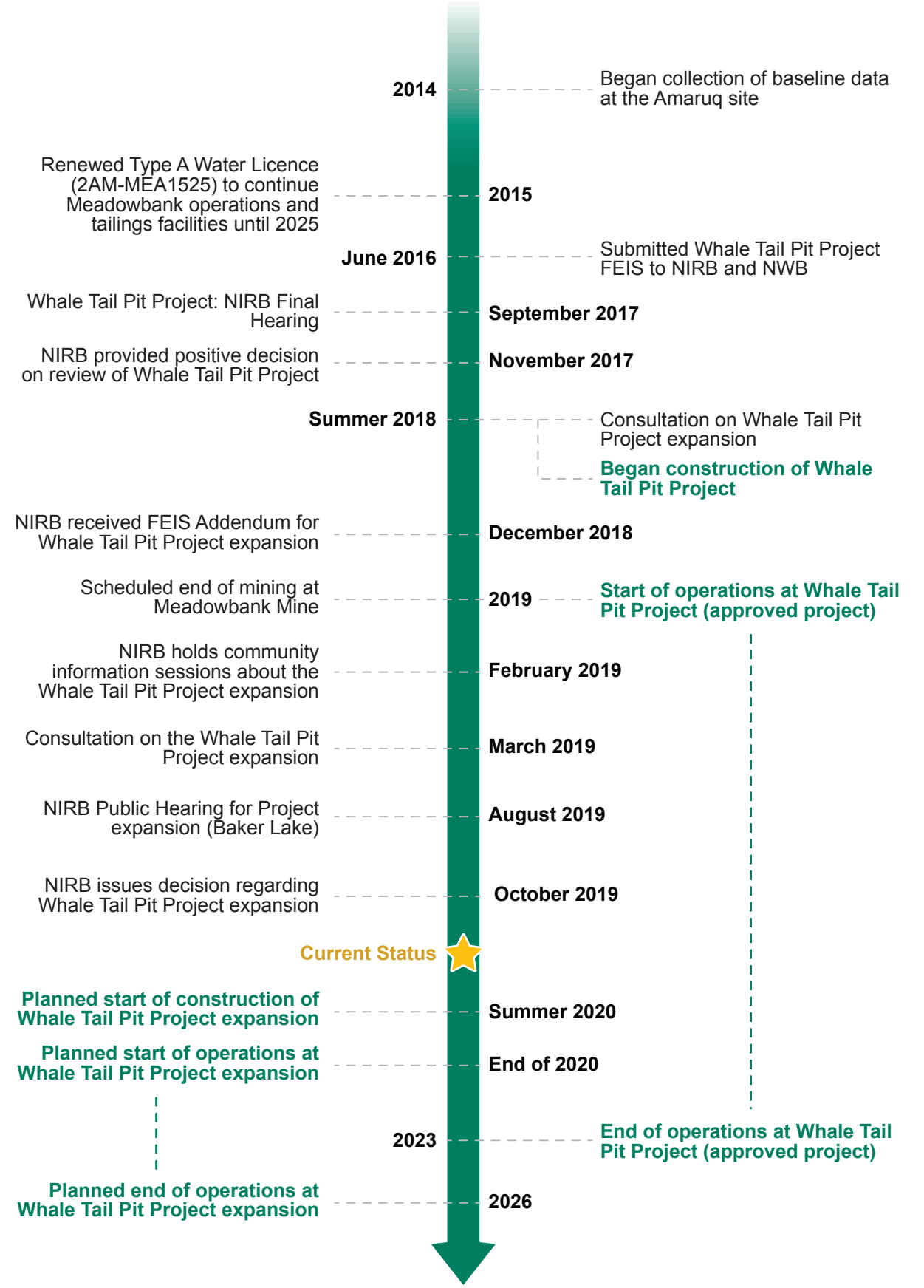


Figure 2-1: Location of Meadowbank Gold Mine and Whale Tail Pit Project

Figure 2-2
Whale Tail Pit Project Timeline



2.1.2 Whale Tail Pit Expansion Project

The proposed Expansion Project includes:

- expanding the Whale Tail Pit;
- expanding the Whale Tail WRSF;
- developing an additional pit (the IVR Pit);
- developing an underground mine;
- developing an additional WRSF (the IVR WRSF, the focus of this alternatives assessment); and
- developing an additional water attenuation pond (the IVR Attenuation Pond – see the Main Report).

The Expansion Project is designed to provide a compact footprint within and around the approved infrastructure of the Whale Tail Pit Project, and to allow for potential future growth and expansion (Figure 2.1-1). Ore from the Whale Tail Pit Expansion Project will be transported to the Meadowbank mine site for processing.

2.2 Waste Rock Management

The information in this section is derived from the *Waste Rock Management Plan*, Version 5.0_NWB for the approved Whale Tail Pit Project (Agnico Eagle 2019a), the project description from the Whale Tail Pit Expansion Project Final Environmental Impact Statement (FEIS) Addendum (Agnico Eagle 2018a), and the Type A Water Licence 2AM WTP1826 (Water Licence) amendment application (May 2019).

The location of the Whale Tail WRSF has been approved and the proposed expansion of this WRSF will not overprint fish-bearing waterbodies (see Figure 2.2-1; Lake A-P10 is not fish-bearing).
Upon completion, the crest elevation of the Whale Tail WRSF will be approximately at 250 masl (maximum height of approximately 95 m) in an environment where the adjacent topography elevation varies between 154 and 170 masl. The expanded Whale Tail WRSF is not discussed further in this report.

The proposed location of the IVR WRSF is presented in the FEIS Addendum (Agnico Eagle 2018a; Figure 2.2-1). Fisheries assessments in support of the FEIS Addendum concluded the proposed IVR WRSF would not overprint fish-bearing waterbodies (see Figure 6.5-1 of the FEIS Addendum; Agnico Eagle 2018a). Subsequent to the submission of the FEIS Addendum, fisheries studies completed in June and August 2019 for the Expansion Project confirmed the proposed location of the IVR WRSF would overprint three fish-bearing waterbodies (Lakes A50, A51, and A52) and one non-fish-bearing waterbody (Lake A-P21; Figure 2.1-2; Portt and Associates in prep). The waterbodies/ watercourses frequented by fish were confirmed by ECCC based on expert advice from Fisheries and Oceans Canada (DFO; See **Attachment A**, ECCC letter dated November 8, 2019). Therefore, an alternatives assessment is required in relation to the location of the IVR WRSF (see Section 3.2 Regulatory Context).

Agnico Eagle has designed the IVR WRSF to minimize impacts on the environment and to optimize geotechnical and geochemical stability. Surface runoff and seepage water from the facility will be collected in water collection ponds as part of the site's water management strategy. If water quality does not meet discharge criteria in the water licence, the collected water will be treated prior to being discharged to the outside environment.

The proposed location of the IVR WRSF takes into account the following environmental, social, economic, and technical considerations for waste rock management (Agnico Eagle 2019a):

- minimize the overall footprint to the extent practicable while maintaining the short-term and long-term stability of the facilities;

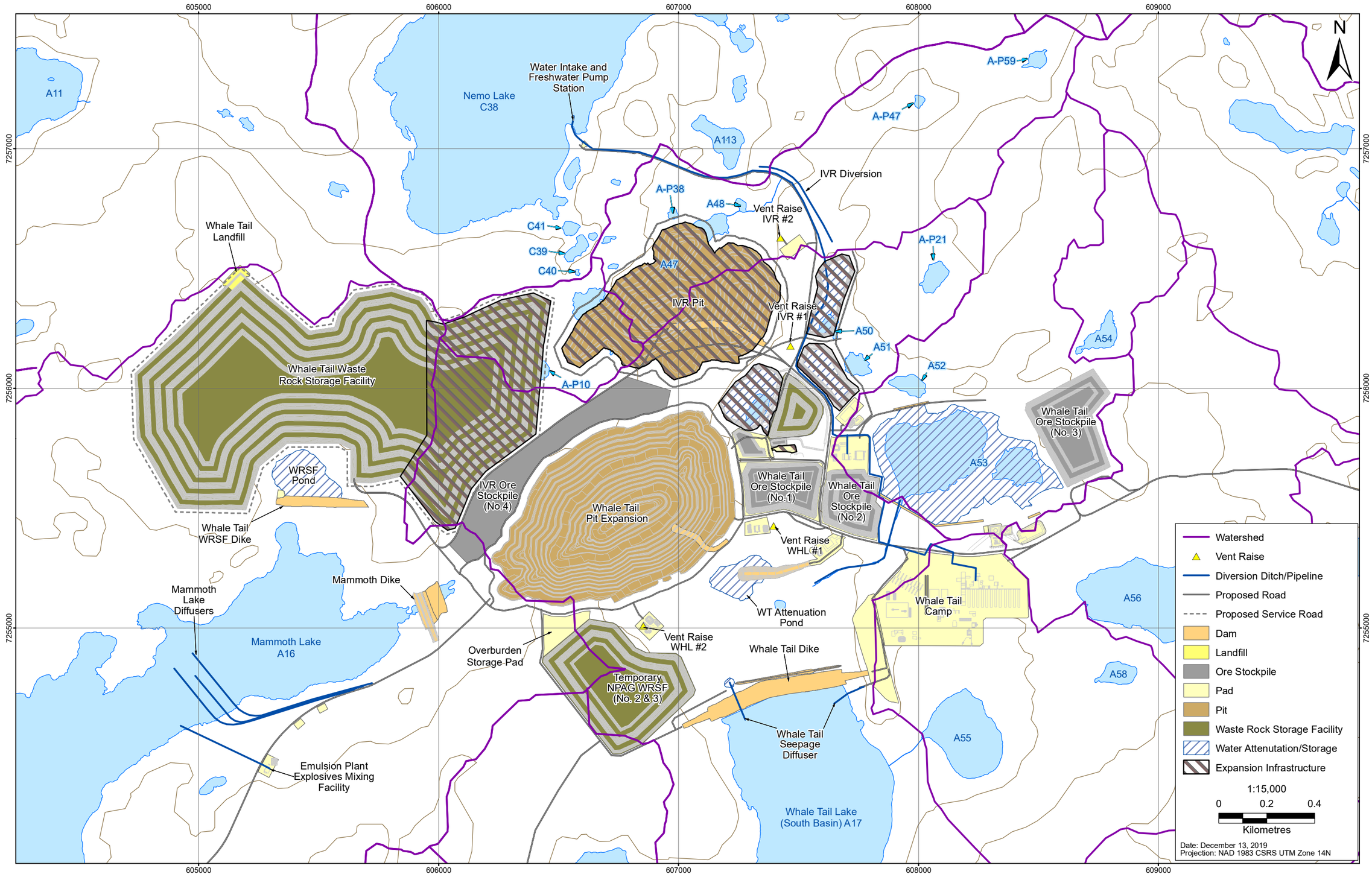


Figure 2.1-1: Whale Tail Pit Expansion Project – Approved Project and Expansion Project Infrastructure

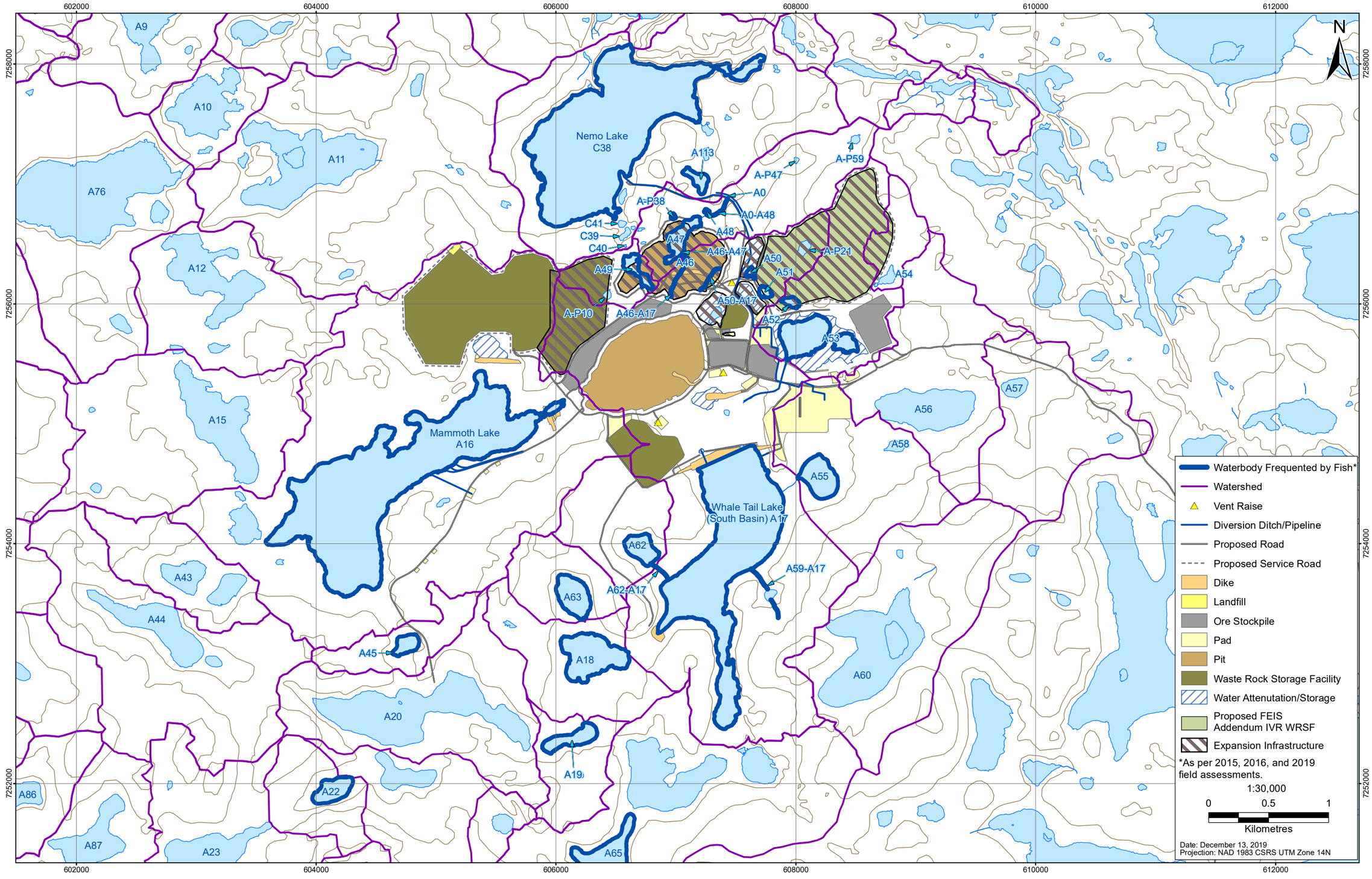


Figure 2.2-1: Waterbodies Frequented by Fish and Proposed Location of the IVR WRSF

- avoid or minimize impacts to adjacent fish-bearing lakes;
- minimize the distance to haul waste rock from the open pits and underground;
- minimize the number of water catchment areas potentially affected by drainage;
- when feasible, divert natural non-contact run-on water away from the IVR WRSF; and
- facilitate the collection and management of contact water during mining to avoid impacts on the receiving environment.

Waste rock produced by the Expansion Project will be managed in accordance with the Whale Tail Pit Waste Rock Management Plan (Agnico Eagle 2019a), as per Part F, Condition 19 of Water Licence 2AM-WTP1826. Mine waste will be segregated during operations and its placement in the storage facility will be determined by acid rock drainage (ARD) and metal leaching (ML) potential. Waste rock that meets defined threshold values for both non-potentially acid generating (NPAG) and non-metal leaching (NML) will be used as construction material and for capping the WRSFs at closure.

Table 2.2-1 provides waste rock and overburden volume estimates, uses and destinations for the Expansion Project. At closure, the IVR WRSF will be covered with NPAG and NML waste rock to promote freezing as a control strategy against acid generation and migration of contaminants. Thermistors will be installed within the WRSF to monitor permafrost development.

Table 2.2-1: Estimated Mine Waste and Destination, Whale Tail Pit Expansion Project

Mine Waste Stream	Estimated Quantity (Mt)	Waste Use and Destination
Overburden	11.3	■ Temporary storage west of Whale Tail Lake (approximately 0.1 Mt for operations) ■ Co-disposed with waste rock in Whale Tail WRSF
Total PAG and/or Moderate to High Arsenic Leachability Waste	109.4	■ Underground backfill material ■ Whale Tail and IVR WRSFs
Total NPAG and or Low Arsenic Leachability Waste	58.4	■ Construction material ■ Closure and site reclamation
Total Waste Rock Excavated (excluding overburden)	*167.8*	-

Mt = million tonnes; WRSF = waste rock storage facility; PAG = potentially acid generating; ML = metal leaching; NPAG = non-potentially acid generating; ML = non-= metal leaching.
Source: Agnico Eagle 2019

Waste rock and overburden will be placed in layers and spread using a bulldozer to minimize the footprint. Each bench of 20 m maximum height will be composed of 4 layers of 5 m thickness, and each bench toe will start at a setback distance of 20 m from the crest of the previous bench. Based on the current design, the overall side slope angle of the IVR WRSF will be 2.5H:1V, an angle generally considered stable for such a facility (Agnico Eagle 2019a). Slope stability analyses will be performed to determine the final design. The WRSF can be modified should there be a need for additional capacity.

Design criteria for the proposed IVR WRSF are provided in Appendix K – Project Design Considerations of the NWB Type A Water Licence application (May 2019). The crest elevation of the IVR WRSF in the currently proposed footprint will be approximately 221 masl with a maximum height of approximately 60 m.

Water balance model estimates of runoff, interflow and basal seepage rates from the IVR WRSF through operations have been completed (Appendix A in Agnico Eagle 2019a). Runoff from the WRSF is expected to occur as a result of spring melt with minor contributions through the unfrozen period (Agnico

Eagle 2019a). Basal seepage rates are anticipated to be negligible with the base layer of the WRSF consistently frozen at the time of placement. Interflow will occur with infiltration along the slope of the WRSF resulting in a small proportion of the incident precipitation (less than 1%) expected to exit the WRSF. However interflow does not interact with PAG and ML waste rock.

During operations, runoff and seepage (basal seepage and interflow) will be managed by a combination of water retention dikes and water collection ponds (IVR WRSF contact water collection systems, Whale Tail and IVR attenuation ponds, and groundwater storage ponds). Water in the collections systems and ponds will be monitored in accordance with the amended Water Licence 2AM-WTP1826. Contact water that does not meet the discharge criteria defined in the Water Licence will be treated at the Whale Tail Operation Water Treatment Plant (O-WTP) prior to discharge to the receiving environment.

The IVR WRSF will be covered with a 4.7 m thick closure cover of NPAG/NML waste rock. The cover will be completed progressively through operations and is intended to maintain a temperature below freezing and mitigate the acid generating reactions and migration of contaminants beneath the cover. The IVR WRSF water management infrastructure will remain in place until mine closure is completed and monitoring results demonstrate that contact water quality from the WRSF meet discharge criteria. At post-closure, water from the IVR WRSF contact water collection system will flow directly to Mammoth Lake. This system will be decommissioned at closure and with the current proposed placement, the natural drainage patterns towards Whale Tail Lake (North Basin) via IVR Pit would be re-established.

2.3 Schedule

Construction of the approved Whale Tail Pit Project began in 2018 (Figure 2-2). Operations began in 2019 and continue until 2023, with a closure period of 2023 to 2029.

Construction of the Whale Tail Pit Expansion Project will occur concurrently with operation of the approved Whale Tail Pit Project, including dewatering activities to support the development of the IVR Pit and other infrastructure. Mining of the expanded pits and underground works is expected to commence by the end of 2020 and continue until 2026. At the end of operations, closure activities would occur until approximately 2042, followed by post-closure monitoring.

3. BACKGROUND FOR THE ASSESSMENT OF ALTERNATIVES

3.1 Incorporating Inuit Qaujimajatuqangit and Consultation

Agnico Eagle makes efforts to incorporate IQ (*Inuit Qaujimajatuqangit*) in all aspects of planning and developing the Whale Tail Pit Project and the Whale Tail Pit Expansion Project, and to engage and consult with potentially affected communities (including Baker Lake, Nunavut) and land users to seek their feedback and answer questions. The following sections describe how IQ has been considered and incorporated in this alternatives assessment.

3.1.1 Inuit Qaujimajatuqangit

Inuit Qaujimajatuqangit encompasses not only traditional knowledge (TK) about land and resources, but also the skills to apply this knowledge to livelihoods, and a value system that is founded upon respect, sharing, collaboration, collective decision-making, skills development, and the responsible use of resources.

Agnico Eagle has considered TK and IQ in this alternatives assessment for the IVR WRSF location. Existing information—including the *Inuit Qaujimajatuqangit Baseline Report* compiled for the Whale Tail Pit Project (Agnico Eagle 2016) —has been reviewed and incorporated in the critical flaw assessment (Section 5), in the characterization of alternatives (Section 6), in the development of meaningful indicators for the Multiple Accounts Analysis (MAA; Section 7), and in the determination of value-based weightings (Section 8).

In addition to the value of TK and IQ as part of understanding of the baseline biophysical and human environment, and potential impacts on the environment and land users (see Section 3.3 of the Main Report), the principles of IQ are also integrated throughout the methodology of this alternatives assessment. Namely, the alternatives assessment process is designed to be aligned with IQ guiding principles including:

- **Fostering good spirit by being open, welcoming and inclusive**: Agnico Eagle welcomes, and has sought, input to the alternatives assessment through consultation with stakeholder groups in Baker Lake and Chesterfield Inlet.
- **Decision-making through discussion and consensus**: Agnico Eagle facilitated discussion about the alternatives, and the balance of impacts and benefits, in consultation with stakeholders in Baker Lake and Chesterfield Inlet. Further discussion and dialogue will include subject matter experts, and—as a decision-making process—MAA is transparent and reproducible.
- **Working together for a common cause**: Through consultation with community stakeholders including Elders, land users, youth, women, and local government, Agnico Eagle has endeavoured to work collaboratively with stakeholders in order to identify the best possible alternative.
- **Respect and care for the land, animals and the environment**: Agnico Eagle is committed to developing the Whale Tail Pit Project and expansion project in a way that will minimize impacts on land, animals, and the environment.

3.1.2 Consultation

During consultation activities related to the attenuation pond in July 2018 and March 2019 (see Section 1.4.2 of the Main Report and Tables 3.1-1 and 3.1-2), Agnico Eagle also provided other information about the Whale Tail Pit Expansion Project, as well as updates on the Whale Tail Pit Project and possible projects for fish habitat compensation in relation to the Expansion Project. The outcomes of the July 2018 and March 2019 consultations are summarized in Section 6.5.5 of the Main Report.

In addition, more broadly relating to the Amaruq mine site, feedback provided in the final hearing for the Whale Tail Pit Project (NIRB 2017) included concerns for potential adverse impacts (from the mine and haul road) on caribou, as well as other wildlife, fish, water quality, and the aquatic environment. The hearing also highlighted support for training, employment, and economic opportunities, and a recognition that the Whale Tail Pit Project will enable the continuation of these opportunities after Meadowbank mine production ceases.

Table 3.1-1: July 2018 Consultation Program

Event	Baker Lake	Chesterfield Inlet
Community Meetings	■ Presentation and open house at Baker Lake community hall (July 10, 2018)	■ Presentation and open house at Chesterfield Inlet Hamlet Chambers (July 12, 2018)
Focus Groups	■ Women (July 11, 2018) ■ Youth (July 10, 2018) ■ Elders (July 11, 2018)	
Meetings	■ Hamlet of Baker Lake (July 11, 2018) ■ Baker Lake Hunters and Trappers Organization (HTO; July 11, 2018) ■ Kivalliq Inuit Association ■ (July 11, 2018)	■ Hamlet of Chesterfield Inlet (July 12, 2018) ■ Chesterfield Inlet HTO (July 13, 2018)

Table 3.1-2: March 2019 Consultation Program[1]

Event	Baker Lake
Community Meetings	■ Presentation and open house at Baker Lake community hall (March 26, 2019)
Focus Groups	■ Women (March 28, 2019) ■ Youth (March 26, 2019) ■ Elders (March 26, 2019)
Meetings	■ Hamlet of Baker Lake (March 26, 2019) ■ Kivalliq Inuit Association (March 29, 2019)

[1] Agnico Eagle planned a similar series of meetings in Chesterfield Inlet in March 2019, but these meetings were cancelled due to a snow blizzard which restricted air travel.

3.2 Regulatory Context

3.2.1 Assessment of Alternatives for Mine Waste Disposal

The Whale Tail Pit Project Expansion is subject to an environmental assessment (EA) by the Nunavut Impact Review Board (NIRB) pursuant to Part 5 of the Nunavut Agreement. The proposed expansion requires Whale Tail WRSF to be expanded and an additional WRSF (IVR WRSF) to store waste material.

While fish-bearing waterbodies are normally avoided, it is challenging to find feasible sites that would meet Agnico Eagle's objective to locate the IVR WRSF within sub-watersheds that contain approved mine infrastructure for the Whale Tail Pit Project and proposed infrastructure for the Whale Tail Pit Expansion Project. Therefore fish-bearing waterbodies are being considered to meet this objective.

In Canada, the *Fisheries Act* applies to development projects that have the potential to impact a natural body of water frequented by fish and prohibits the deposit of any deleterious substance into natural fish-bearing waterbodies. Under the Act, a deleterious substance is defined as a substance that alters or degrades water quality to the point where it becomes harmful to fish, fish habitat, or human use of fish.

An amendment to Schedule 2 of the Metal and Diamond Mining Effluent Regulations (MDMER) of the *Fisheries Act* is required to authorize the use of water frequented by fish for mine waste disposal including overprinting. Before an amendment can be recommended by the Minister of the Environment, a proponent must demonstrate that mine waste disposal in water frequented by fish is the most appropriate option based on environmental, technical and socio-economic considerations by conducting an assessment of alternative locations for mine waste disposal for review by ECCC. The assessment of alternatives should be prepared in accordance with the ECCC's Guidelines, and the alternatives assessment should take into consideration concerns raised by local communities, Indigenous peoples and stakeholders.

3.2.2 Streamlined Schedule 2 Amendment Approvals Process

The ECCC document *Streamlining the Approvals Process for Metal Mines with Tailings Impoundment Areas* (ECCC 2012) describes the approach to streamline timelines for Governor in Council decisions authorizing the deposition of mine waste into water bodies frequented by fish. Streamlining the approval process requires that all documents required for a Schedule 2 Amendment are submitted and consulted on and all conditions for those documents are met. The streamlined process can shorten the approval time following consultations for projects meeting the *Streamlining Policy* from 6 to 12 months.

Pursuant to ECCC's streamlined Schedule 2 approvals process, Agnico Eagle has taken the following steps to go directly to Canada Gazette, Part 2 publication:

- Conducted an assessment of the IVR WRSF alternative locations, including the costs and benefits of the alternatives (this report);
- Proposed a fish habitat compensation plan associated with the preferred attenuation pond alternative, which outlines the habitat losses and gains in relation to the use of waterbodies A50, A51, and A52; and
- Conducted consultations on IVR WRSF alternatives as described in Section 3.1.2

The NIRB's review of Agnico Eagle's Final Environmental Impact Statement has provided further opportunities for Inuit, Inuit organizations and the public to comment on the assessment of IVR WRSF alternatives and proposed fish habitat compensation plan pertaining to waterbodies A50, A51, and A52.

3.3 ECCC Guidelines for the Assessment of Alternatives

The ECCC Guidelines describe the process that must be undertaken when a proponent is proposing to deposit a deleterious substance into a natural waterbody or overprinting a natural waterbody frequented by fish. The process is designed to be robust, transparent, and replicable, and address issues of bias and subjectivity in decision-making. **Attachment B** includes a Table of Concordance which provides cross references to identify where the requirements in the ECCC Guidelines have been addressed in this report.

Section 2 of the ECCC Guidelines sets out a seven-step process by which to identify, screen, and evaluate alternatives for mine waste disposal, including options relating to location selection, design, and other factors. The Guidelines include MAA, which is the decision-making method used to identify the most suitable or advantageous alternative from a list of alternatives by weighing the relative advantages and disadvantages of each. The ECCC Guidelines advise that the assessment include at least one alternative that does not impact a natural waterbody that is frequented by fish.

Consistent with ECCC's seven-step process, this alternatives assessment: identifies reasonable, conceivable, and realistic alternatives for the location of the IVR WRSF at the Whale Tail Pit Expansion Project (Steps 1 and 2); characterizes the alternatives and identifies relevant indicators by which to compare and contrast them (Steps 3 and 4); systematically evaluates the alternatives using quantitative and qualitative factors (Steps 5 and 6); and transparently documents the results (Step 7). Figure 3.3-1 illustrates the seven-steps, each of which is described in further detail below.

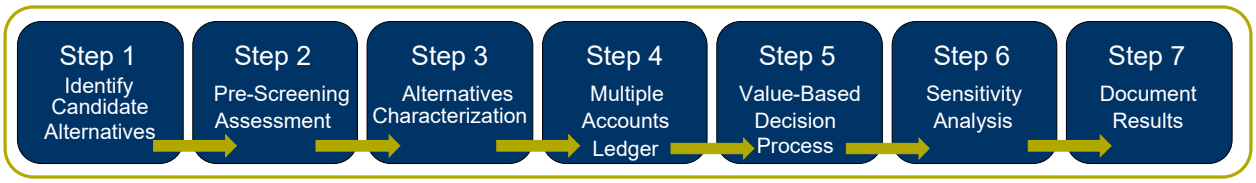


Figure 3.3-1: Seven Steps of Alternatives Assessment

Step 1: Identify Candidate Alternatives

This step identifies a list of possible WRSF locations that are reasonable, conceivable, and realistic alternatives for the Expansion Project. At this step it is imperative that no *a priori* judgement be made about any of the alternatives. Threshold criteria can be used to establish regional boundaries for selecting the candidate alternatives. The threshold criteria should be as broad as possible and described and rationalized to ensure transparency. The level of detail is highly conceptual but in principle be sufficiently thorough to allow an understanding of the concept.

Step 2: Pre-Screening Assessment

At this step, the alternatives are screened to identify and eliminate alternatives with critical flaws. A critical flaw is a flaw that is so unfavourable that it alone is sufficient to eliminate an alternative from further consideration as it would render the placement of the IVR WRSF, or other aspects of the Whale Tail Pit Project inoperable or unachievable.

Screening criteria are yes-or-no questions designed to identify critical flaws. Screening questions are defined to reflect the specific context of a project; there is no standard set of questions. If a critical flaw is identified, the alternative is not considered further and the rationale for elimination is documented. Alternatives without critical flaws are carried forward to the characterization of alternatives in Step 3.

Step 3: Alternatives Characterization

This step involves characterizing each remaining alternative within four broad categories, or *accounts*, based on technical design and execution (*technical account*), potential biophysical effects (*environment account*), potential effects on people (*socio-economic account*), and financial costs (*economics account*). This characterization is based on the candidate design concepts and the environmental and social baseline information relevant to each candidate.

Step 4: Multiple Accounts Ledger

Based on the characterization in the previous step, relevant and differentiating sub-accounts and indicators are identified in Step 4. A multiple accounts ledger is prepared to describe the indicators.

Step 5: Value-Based Decision Process

The value-based decision process includes both objective (“scoring”) and subjective (“weighting”) components. Rating scales are developed for each indicator, using a scale of one to six, against which each alternative is scored. Next, the value-based weighting step acknowledges that some accounts, sub-accounts, or indicators are more or less important to the decision-making process than others, and provides an opportunity to weight them accordingly. Weightings are assigned on a scale of one (less important) to six (more important). Finally, this step uses the calculations stipulated in the ECCC Guidelines to calculate the weighted merit rating of each candidate based on the scores and weightings identified for each indicator. The results are compared, and alternatives with a higher weighted merit rating are preferred.

Step 6: Sensitivity Analysis

A sensitivity analysis is then conducted to explore the influence of the weighting regime and identify potential areas of bias and subjectivity.

Step 7: Documentation and Reporting

In this step, the alternatives assessment process is summarized and the results are described. Input from communities, Indigenous groups, and other stakeholders is highlighted, and the sensitivity of the results is discussed. A thorough and transparent description of the process and results is a fundamental requirement of the ECCC Guidelines.

3.4 Setting

The general setting of the Amaruq property and Whale Tail Project are described in the Main Report as follows: physical environment (Section 3.1), biological environment (Section 3.2) and human environment (Section 3.3).

4. STEP 1: IDENTIFY CANDIDATE ALTERNATIVES

A total of 13 candidate alternative locations for the IVR WRSF are identified. The threshold criteria for identifying these candidates include:

- Storage capacity: the alternatives must have the capacity to store up to approximately 109.1 Mt of waste rock;
- Distance: the alternatives would be located within or directly adjacent to the sub-watersheds that contain the approved and planned mine infrastructure to avoid potential environmental impacts to areas otherwise undisturbed by physical infrastructure.

The alternatives are briefly described in Table 4-1 along with how the alternative would apply through each of the pertinent phases of the project. Alternatives A through M are indicated on Figure 4-1 along with the Whale Tail Project infrastructure including the proposed Expansion Project.

Table 4-1: Candidate Alternatives for IVR Waste Rock Storage Facility

Alternative	Description	Construction Approach	Operational Approach	Closure Approach
A	Alternative A is situated at the location presented in the FEIS Addendum and Waste Rock Management Plan (Agnico Eagle 2018a; Agnico Eagle 2019a). It overprints four waterbodies A50, A51, A52, and A-P21 and is located in multiple sub-watersheds.	Construction will begin with temporary water management infrastructures around the WRSF location followed by material placement within the footprint.[1]	Waste rock will be disposed of in accordance with the Waste Rock Management Plan.[2] A contact water collection system will be used to collect seepage and runoff from the IVR WRSF (captured by perimeter ditches). Contact water will be pumped to Whale Tail Attenuation Pond prior to water treatment until IVR attenuation becomes available. Contact water will be treated in the Whale Tail WTP prior to discharge to the receiving environment.	Progressive cover with NPAG/non-ML waste rock throughout operations. Runoff and seepage will be collected in the designated collection ponds and allowed to flow passively from Whale Tail WRSF to Mammoth Lake and from IVR WRSF to Whale Tail Pit.[3]
B	Alternative B is situated northwest of Alternative A to avoid overprinting waterbodies A50, A51, A52, and A-P21. It overprints two small unnamed waterbodies in the northwest corner of the facility and is located in multiple sub-watersheds.			
C	Alternative C is situated just north of waterbodies A113 and A0 and is partially located in the Nemo Lake watershed. The alternative overprints two unnamed waterbodies.			
D	Alternative D is situated to north of the approved Whale Tail WRSF footprint within a single sub-watershed. The sub-watershed includes waterbody A11 and the facility would overprint three small waterbodies.			
E	Alternative E is situated within the Mammoth Lake sub-watershed and to the west of the approved Whale Tail WRSF footprint. The alternative does not overprint waterbodies.			

Alternative	Description	Construction Approach	Operational Approach	Closure Approach
F	Alternative F is situated primarily within the Mammoth Lake sub-watershed and to the south of Mammoth Lake. To provide sufficient capacity, it is likely that the storage facility would also extend towards the sub-watersheds to the south of Mammoth Lake. The alternative does not overprint waterbodies.			
G	Alternative G is situated primarily within the Mammoth Lake sub-watershed and to the southwest of Mammoth Lake. To provide sufficient capacity, it is likely that the facility would also extend towards the sub-watersheds to the south. The alternative does not overprint waterbodies.			
H	Alternative H is the furthest from the Whale Tail Project infrastructure and located at the southwest corner of Mammoth Lake. The WRSF is located within multiple sub-watersheds and overprints one small waterbody.			
I	Alternative I is situated southeast of the Whale Tail Project Infrastructure, adjacent to the access road. The footprint of the WRSF would overprint a large waterbody A56 and is in a single sub-watershed.			
J	Alternative J is situated to the east of Lake A53 and the ore stockpile. The WRSF would overprint waterbody A54 and is situated within three sub-watersheds.			
K	Alternative K is situated southwest of Alternative A to avoid overprinting waterbodies A50, A51, A52. It overprints waterbody A-P21 and is located in multiple sub-watersheds.			

Alternative	Description	Construction Approach	Operational Approach	Closure Approach
L.	Alternative L involves expansion of the Whale Tail WRSF without the development of a second WRSF. This alternative includes expanding the Whale Tail WRSF both east and west of the approved WRSF footprint. As previously noted, expansion of the WRSF to the east will not overprint fish-bearing waterbodies. The expansion to the west will not overprint waterbodies and be located within the Mammoth Lake sub-watershed.	Construction will begin with temporary water management infrastructures around the WRSF location, followed by material placement within the prescribed area. Expansion of the approved Whale Tail WRSF footprint would require additional construction to the west of the approved footprint and use of the topography to prevent potentially contaminated contact water from seeping into the receiving environment.[1]	Waste rock will be disposed of in accordance with the Waste Rock Management Plan.[2] Seepage and runoff from expansion to the east and west of the approved footprint will be captured and conveyed to the Whale Tail WRSF Pond and pumped to Whale Tail Attenuation Pond. Contact water will be treated in the Whale Tail WTP prior to discharge to the receiving environment.	Progressive cover with NPAG/non-ML waste rock throughout operations. Runoff and seepage will be collected in the designated collection ponds and and allowed to flow passively from Whale Tail WRSF to Mammoth Lake and from IVR WRSF to Whale Tail Pit.[3]
M.	Alternative M involves storage of waste rock from the IVR Pit in the exhausted Whale Tail Pit. This alternative would require sequential (rather than concurrent) mining of pits.	Prior to construction the capacity of Whale Tail Pit would be confirmed.	Waste rock will be disposed of in accordance with the Mine Waste Rock Management Plan.[2]	Updates to the closure plan would be required to exclude or modify the flooding of Whale Tail Pit. Revisions to the engineering work proposed for the closure of Whale Tail Pit would be required to meet closure objectives and criteria.

[1] Construction will be in accordance with the design report for the approved Whale Tail WRSF (Agnico Eagle 2018b), Waste Rock Management Plan (Agnico Eagle 2019a), and amended Water Licence conditions (NWB-2AM-WTP1826).
[2] See Section 2.2
[3] Mine closure and reclamation activities as provided in the Whale Tail Pit Interim Closure and Reclamation Plan (Agnico Eagle 2019c).

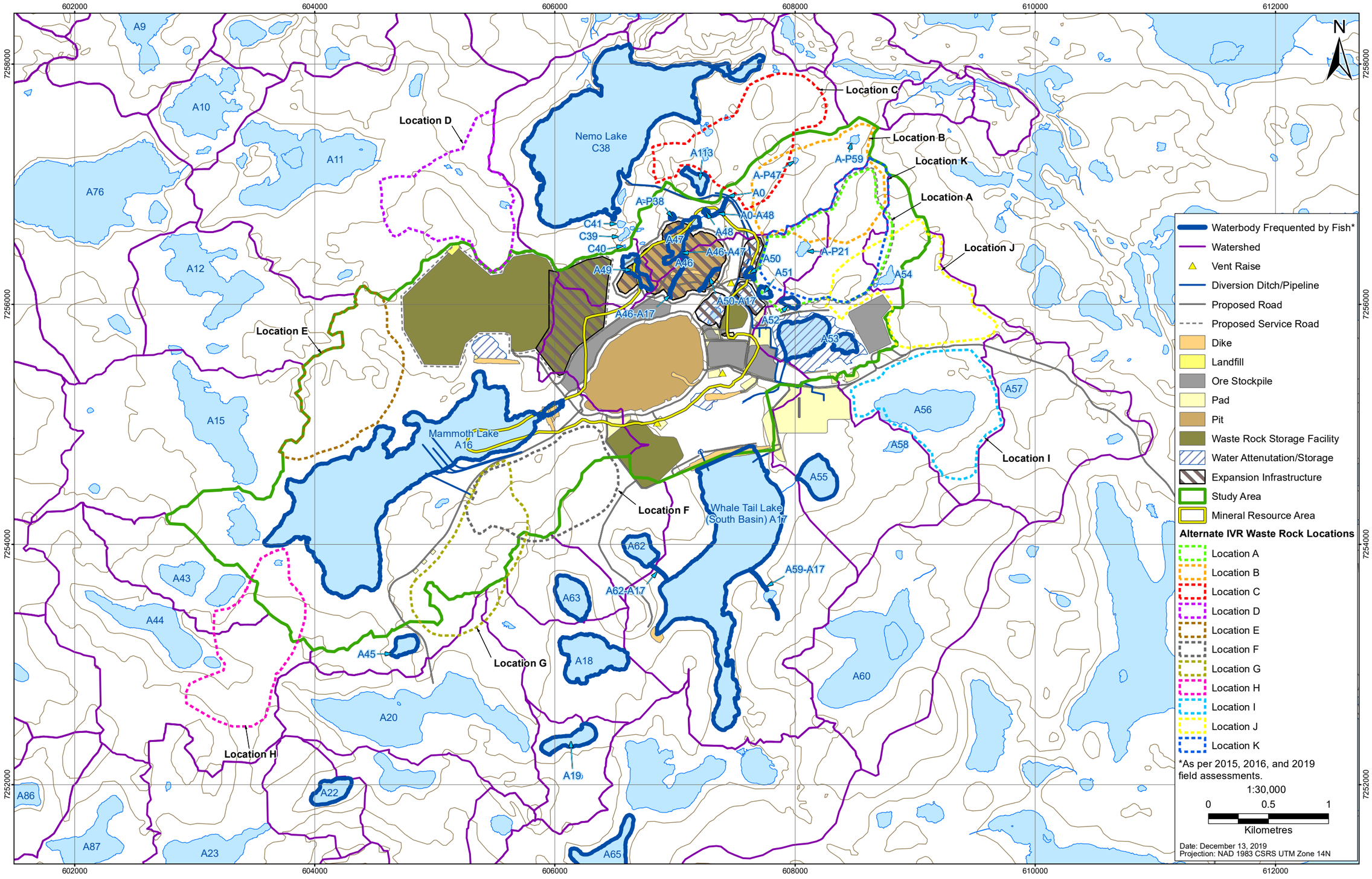


Figure 4-1: Alternative IVR Waste Rock Storage Facility Locations

5. STEP 2: PRE-SCREENING ASSESSMENT

5.1 Pre-Screening Criteria and Rationale

Six screening criteria were identified. Affirmative responses to any of these questions indicates that an alternative is critically flawed, and therefore eliminated as a viable alternative, The 13 candidate alternatives identified in Section 4 were screened using these criteria, and the results are summarized in Section 5.2-1.

Would the location of the IVR WRSF sterilize mineral resources or areas with high mineral potential?

Sterilization of mineral resources, such that an alternative would preclude future mineral exploration or development, is considered to be a critical flaw. The Whale Tail Pit Expansion Project is located on Inuit Owned Land (IOL). Under the Nunavut Agreement, and Nunavut Tunngavik Incorporated (NTI) holds title to subsurface resources on IOL, on behalf of the Inuit. Agnico Eagle is afforded the right to explore and extract minerals from the property though a mineral exploration agreement with NTI. Sterilization of mineral resources or areas with high mineral potential would effectively remove these resources from future use by, and/or for the benefit of, the Inuit. The Mineral Resource Area indicating areas with high mineral potential is indicated in Figure 4-1.

Would the IVR WRSF overprint lands or waters designated as having high environmental, cultural, and/or archaeological value?

- High environmental value: includes important areas for caribou (calving and post-calving areas, and water crossings) and other areas determined to be of high importance to wildlife, protected plant and animal species, or otherwise critical for ecosystem function.
- High cultural value: includes culturally or spiritually important places as identified through consultation, TK, and/or IQ.
- High archaeological value: includes known archaeological sites such as burial sites.

Previous baseline studies have investigated areas of high value within and around the mine site and are detailed in Section 5.3.1 of the Main Report. These include important areas for caribou, protected plant and animal species, Archeological sites, and areas of cultural or spiritual value.

Would the IVR WRSF be inconsistent with the approved mine plan for the Whale Tail Pit Project?

The approved Whale Tail Pit Project is under construction as per the mine plan. It is important that alternatives align with the mine plan in order to reduce engineering risks, environmental disturbance, schedule delays, and related implications. The purpose of the Expansion Project will be to ‘bridge’ the approved project to maintain ore in the mill and extend the life of the mine at Meadowbank and slight changes to the mine plan will render the Expansion Project unfeasible. Therefore contradiction with the mine plan for the approved Whale Tail Pit Project would be a critical flaw.

Is the IVR WRSF located outside the approved Project and Expansion Project footprint (i.e., within the sub-watersheds impacted by the project)?

As part of the approved Whale Tail Project and proposed Expansion Project, Agnico Eagle has committed to the community to minimize the project footprint. Agnico Eagle does not support alternatives that would expand the footprint of the approved and expanded Whale Tail Pit Project to an otherwise undisturbed watershed. A study area boundary defined by the affected sub-watersheds is provided in Figure 4-1.

Would the haul distance from IVR Pit to the IVR WRSF render the project economically infeasible?

As outlined in the Waste Rock Management Plan (Agnico Eagle 2019a), the location of WRSFs and/or the hauling roads should minimize the footprint for the proposed Expansion Project. Based on the costs of haul road construction for the Whale Tail Pit Project, Agnico Eagle has determined 1.5 km to be the maximum haul distance for feasible construction and operation of haul roads and minimizing the potential environmental impacts related to the haul road footprint. Table 5.1-1 provides the distance to IVR Pit for each of the alternatives to provide the estimated distance waste rock would need to be transported.

Can runoff and seepage from the IVR WRSF be effectively managed to reduce the risks to downstream waterbodies through operations and closure?

Similar to the approved Whale Tail WRSF location, the location of the IVR WRSF should consider the natural topography to avoid contamination of the sub-watersheds. Conditions must also be amenable to construct access roads, embankments and/or cut-off walls to create stable structures that can effectively manage runoff and seepage. Catchment area (km^2) and number of sub-watersheds that report to each alternative are indicated in Table 5.1-1 to provide an estimated indication of the relative level of effort required to manage runoff and seepage from the WRSF. Water quality models suggest that, at closure, Mammoth Lake will be sensitive to changes in water quality related Whale Tail WRSF seepage quality entering the lake (Agnico Eagle 2019c). Thus the location of the WRSF must also consider management of water through closure. Locations that would exacerbate the effect on Mammoth Lake water quality (i.e., create additional contact water flow within the Mammoth Lake sub-watershed other than that proposed) at closure should be excluded from further analysis.

Table 5.1-1: Candidate Alternatives for IVR Waste Rock Storage Facility

Alternative	Distance to IVR Pit (km)	Sub-Watersheds	Catchment Area (km^2)
A.	1.3	3	7.4
B.	1.3	3	8.2
C.	1.1	2	4.8
D.	1.9	1	5.8
E.	2.9	1	6.8
F.	2.2	3	8.1
G.	3.0	5	10.6
H.	4.8	3	10.0
I.	2.5	2	2.9
J.	2.0	3	3.0
K.	1.2	3	7.8
L.	1.5	1	13.1
M.	0.9	NA	NA

NA = Not Applicable

5.2 Pre-Screening Results

The candidate IVR WRSF alternatives were screened for each of the criteria and Table 5.2-1 provides a summary of the results.

Table 5.2-1: Results of the Pre-Screening Assessment

Pre-Screening Criteria	Rationale	Alternative												
		A	B	C	D	E	F	G	H	I	J	K	L	M
Would the location of the IVR WRSF sterilize mineral resources or areas with high mineral potential?	Agnico Eagle is afforded the right to explore and extract minerals from the property though a mineral exploration agreement with NTI. Sterilization of mineral resources or areas with high mineral potential would effectively remove these resources from future use by, and/or for the benefit of, the Inuit. Mineral reserves are located north of Mammoth Lake and IVR Pit.	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Would the IVR WRSF overprint lands or waters designated as having high environmental, cultural, and/or archaeological value?	Agnico Eagle recognizes the importance of areas of high environmental, cultural, or archaeological value for local Inuit populations. Overprinting of these areas with the IVR WRSF is considered a critical flaw.	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Would the IVR WRSF be inconsistent with the approved mine plan for the Whale Tail Pit Project?	Alternatives should align with the approved mine plan in order to reduce engineering risks, environmental disturbance, schedule delays, and related implications.	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
Is the IVR WRSF located outside the approved Project and Expansion Project footprint (i.e., within the watersheds impacted by the project)?	The location of WRSFs for the Expansion Project is guided by minimization of footprint and watersheds affected (including haul roads), avoiding or minimizing the impact to adjacent fish-bearing lakes, and the ability to divert clean natural non-contact runoff away from WRSFs.	NO	NO	YES	YES	NO	NO	NO	YES	YES	YES	NO	NO	NO
Would the haul distance from IVR Pit to the IVR WRSF render the project economically infeasible?	Agnico Eagle has determine 1.5 km to be the maximum haul distance for feasible construction and operation of haul roads and minimizing the potential environmental impacts related to the haul road footprint.	NO	NO	NO	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO
Can runoff and seepage from the IVR WRSF be effectively managed to reduce the risks to downstream waterbodies through operations and closure?	Conditions must also be amenable to construct access roads, embankments and/or cut-off walls to create stable structures that can effectively manage runoff and seepage. The location of the WRSF must also consider management of water through closure. Locations that would exacerbate the effect on Mammoth Lake (i.e., create additional contact water flow within the Mammoth Lake sub-watershed other than that proposed) at closure should be excluded from further analysis.	NO	NO	NO	NO	YES	YES	YES	YES	NO	NO	NO	YES	NO
Should the alternative be assessed further?		**YES**	**YES**	NO	NO	NO	NO	NO	NO	NO	NO	**YES**	NO	NO

Would the location of the IVR WRSF sterilize mineral resources or areas with high mineral potential?

None of the alternatives overlap with known mineral resources or areas of high mineral potential.

Would the IVR WRSF overprint lands or waters designated as having high environmental, cultural, and/or archaeological value?

None of the alternatives overprint lands or waters designated as having high environmental, cultural, and/or archaeological value.

Would the IVR WRSF be inconsistent with the approved mine plan for the Whale Tail Pit Project??

Simultaneous extraction from the Whale Tail and IVR pits, would result in negative life-of-project economics therefore Alternative M is excluded from further analysis.

Is the IVR WRSF located outside the approved Project and Expansion Project footprint (i.e., within the watersheds impacted by the project)?

Although Alternative C lies partially within the Expansion Project study area, there is a portion of the footprint that would require water management infrastructure to mitigate effects in the Nemo Lake watershed (Figure 4-1). Nemo Lake is also a freshwater source for the duration of the Whale Tail Pit Project operations. This contradicts community consultation concerns regarding a mine plan that minimizes the potential effects to the environment (and in this case Nemo Lake). Alternatives D, H, I, and J will also be excluded from subsequent analysis for the same reason (water management infrastructure to avoid potential effects to watersheds not already affected by the approved or Expansion Project).

Would the haul distance from IVR Pit to the IVR WRSF render the project economically infeasible?

Alternatives D, E, F, G, H, I and J range from 1.9 to 4.8 km from the IVR Pit and, thereby not adhering to Agnico Eagle's waste rock management strategy nor maintaining economic feasibility of the Expansion Project.

Can runoff and seepage from the IVR WRSF be effectively managed to reduce the risks to downstream waterbodies through operations and closure?

Placement of IVR waste rock through the expansion of the Whale Tail WRSF to the east of the approved WRSF footprint (Alternative L) or placing an additional separate WRSF within Mammoth Lake's watershed boundary (Alternatives E, F, G, and H) would exacerbate the effect on Mammoth Lake at closure. Therefore these alternatives should not be considered for further analysis.

6. STEP 3: ALTERNATIVES CHARACTERIZATION

At this stage, the remaining alternatives are developed in further detail to support a clear and concise comparison of the remaining alternatives. Table 6-1 provides brief summary for each alternative.

Table 6-1: Naming of Remaining Alternatives

Name	Description
Alternative A	Location identified in FEIS addendum and Waste Management Plan, overprints three waterbodies frequented by fish.
Alternative B	Northwest of Location A, unknown if overprints waterbodies frequented by fish.[1]
Alternative K	Northeast of Location A, does not overprint waterbodies frequented by fish.

[1] *For the purpose of the alternatives analysis it was assumed that overprinted waterbodies supported fish populations similar to that of A50, A51, and A52.*

Based on the ECCC Guidelines, the remaining alternatives are characterized using the following categories:

- Technical Account, including considerations relating to design, engineering, construction, operation and closure;
- Environmental Account, including valued components of the physical and biological environment;
- Socio-Economic Account, including valued components relating to socio-economic, land use, and community and Inuit well-being; and
- Economic Account, including project costs relating to the design, construction, operation, and closure.

The ECCC Guidelines notes that every project is unique and the characterization criteria must be developed with consideration to the impacts, concerns, and Indigenous, stakeholder and regulatory interests relevant to the project.

Criteria were determined with consideration of the reasonable questions that could be asked (by regulators and/or stakeholders) to compare or differentiate the alternatives. Some of the characterization criteria may overlap, may not differentiate the alternatives, or may not be relevant to the decision-making process; these issues will be addressed in Step 4.

Figures 6-1, 6-2, and 6-3 provide the location of the remaining alternatives relative to mine infrastructure.

6.1 Technical Account

The characterization of the alternatives assumes:

- An identical volume of waste rock will be stored, and the footprint of the WRSF will be the same area for each of the alternatives;
- The source of the waste rock stored in IVR WRSF will primarily be from IVR Pit and will be covered at Closure with NPAG/NML waste rock material to prevent metal leaching and ensure geochemical stability; and
- Seepage and runoff from the IVR WRSF will be captured at the perimeter of the facility and conveyed to IVR WRSF contact water collection system prior to being conveyed to an attenuation pond (either the Whale Tail Attenuation Pond or the IVR Attenuation Pond when constructed in freshet 2022).

An initial conceptual design has been completed for Alternative A and detailed in Section 2.2. As these processes will generally apply to all alternatives, the conceptual design and technical characterization of

the alternatives is limited to (1) the transport of contact water to the Whale Tail Attenuation Pond (until freshet 2022) and the preferred IVR Attenuation Pond (see Main Report; freshet 2022 to closure) and (2) the transport of waste rock from the pit to the each alternative via a haul road.

Table 6.1-1 identifies the criteria and summarizes the technical elements of each alternative.

6.2 Environment Account

The three alternative locations are within watershed A (see Figure 3-1 in the Main Report) thus they do not differ substantially in terms of the environmental criteria discussed in Table 6.2-1.

6.3 Socio-Economic Account

The Socio-Economic Account includes socio-economics, land and resource use, and cultural heritage (Table 6.3-1). The amount of labour required during construction may vary depending on the complexity of the water management infrastructure, but as these jobs would be short-term they are not considered to be a material factor.

Information about land use and cultural heritage is detailed in Section 6.5.3 of the Main Report.

6.4 Economic Account

Capital costs for the construction of the WRSF are based on the costs associated with comparable infrastructure for the Whale Tail Pit Project, estimated at $22,028 per 100 m of pipeline, $500,000 per booster pump station, and $2,750 per 100 m^3 of haul road. Capital cost estimates include procurement and construction of supporting infrastructure and materials required for the operation of the structure. Based on these assumptions, the estimated capital costs are summarized in Table 6.4-1.

Other costs associated with the IVR WRSF alternatives are estimated qualitatively relative to each other (Table 6.4-2).

Expected fish offsetting costs would vary between the three alternatives based on the extent of fish habitat loss. Alternative A would result in loss of Lake A50, A51, and A52 as a fish-bearing waterbodies, requiring compensation for the loss of 2.64 ha of fish habitat in the lakes. Alternative B is not anticipated to affect fish-bearing waterbodies (fisheries assessments have not been completed on A-P59 or A-P47), and Alternative K would not affect fish-bearing waterbodies. Fish habitat compensation would be required for a loss of 0.64 ha if determined to be fish-bearing for Alternative B and for Alternative K no fish habitat compensation is required.

Operating costs that differentiate the alternatives include the need for pumping to the IVR Attenuation Pond, additional water management infrastructure (other than the contact water collection system including diversions), and monitoring. Alternatives B and K are expected to incur the highest operating costs due to the need for pumping contact water to the IVR Attenuation Pond.

Closure cost estimates assume that at closure the Expansion Project WRSFs will be covered with NPAG/NML waste rock. The runoff and seepage from the IVR WRSF will continue to be collected in the IVR Attenuation Pond. Thus similar to operations, those alternatives requiring active pumping and monitoring (alternatives B and K) will have greater costs. When runoff and seepage water quality are considered acceptable for direct discharge, all water management systems will be decommissioned to allow water to naturally flow to the receiving environment.

Periodic inspections will be performed for stability and performance of the WRSF through post-closure. Thermistor data will be monitored to determine thermal conditions. Water quality from controlled discharge points will be monitored to confirm that drainage is performing as predicted. Seepage will be identified and monitored. Post-closure costs estimates consider the need for long-term water management and monitoring. The alternatives are not anticipated to change at post-closure other than if active pumping to the IVR Attenuation Pond is required at post-closure.

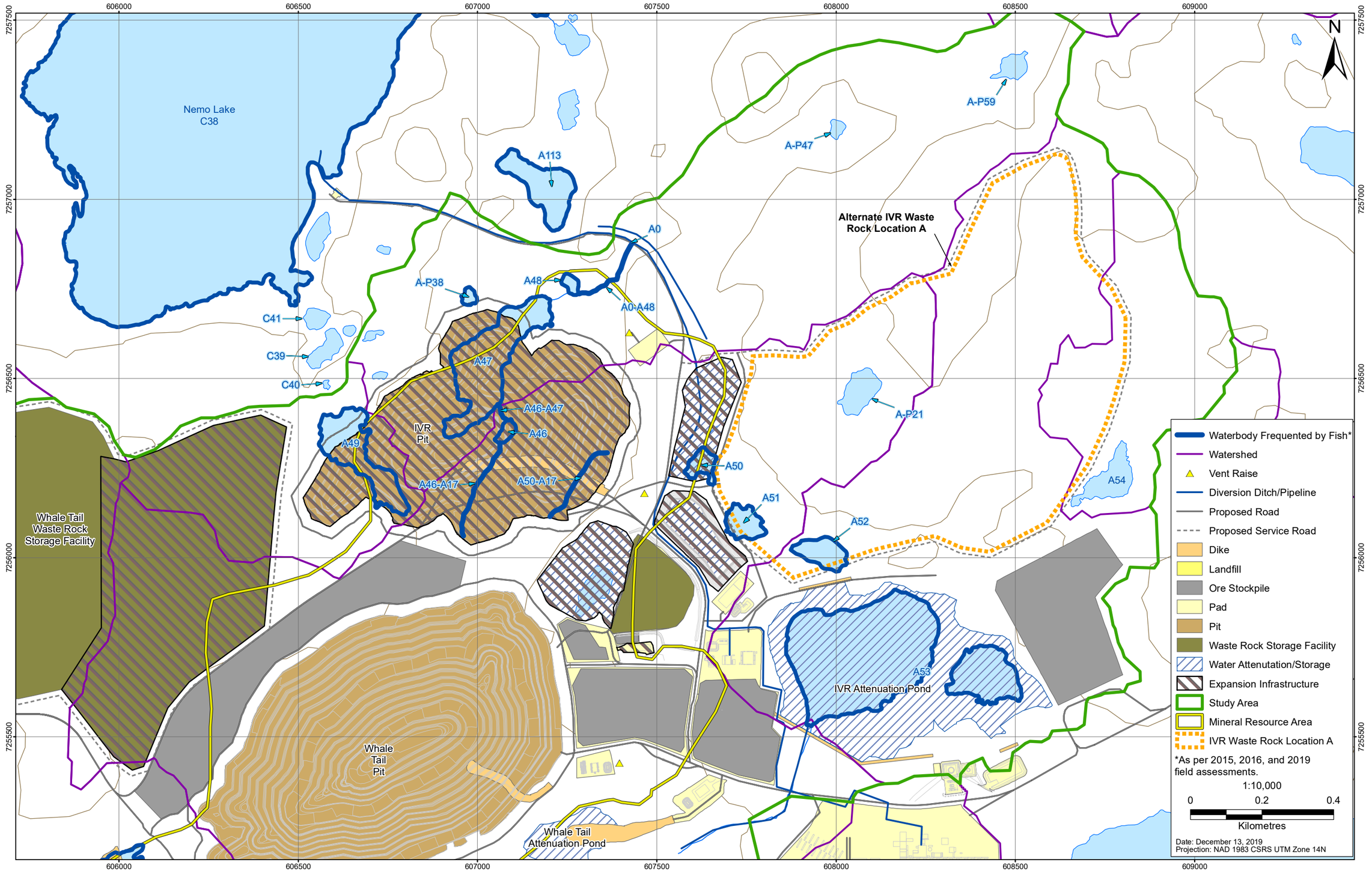


Figure 6-1: Alternative IVR Waste Rock Storage Facility Location (Alternative A)

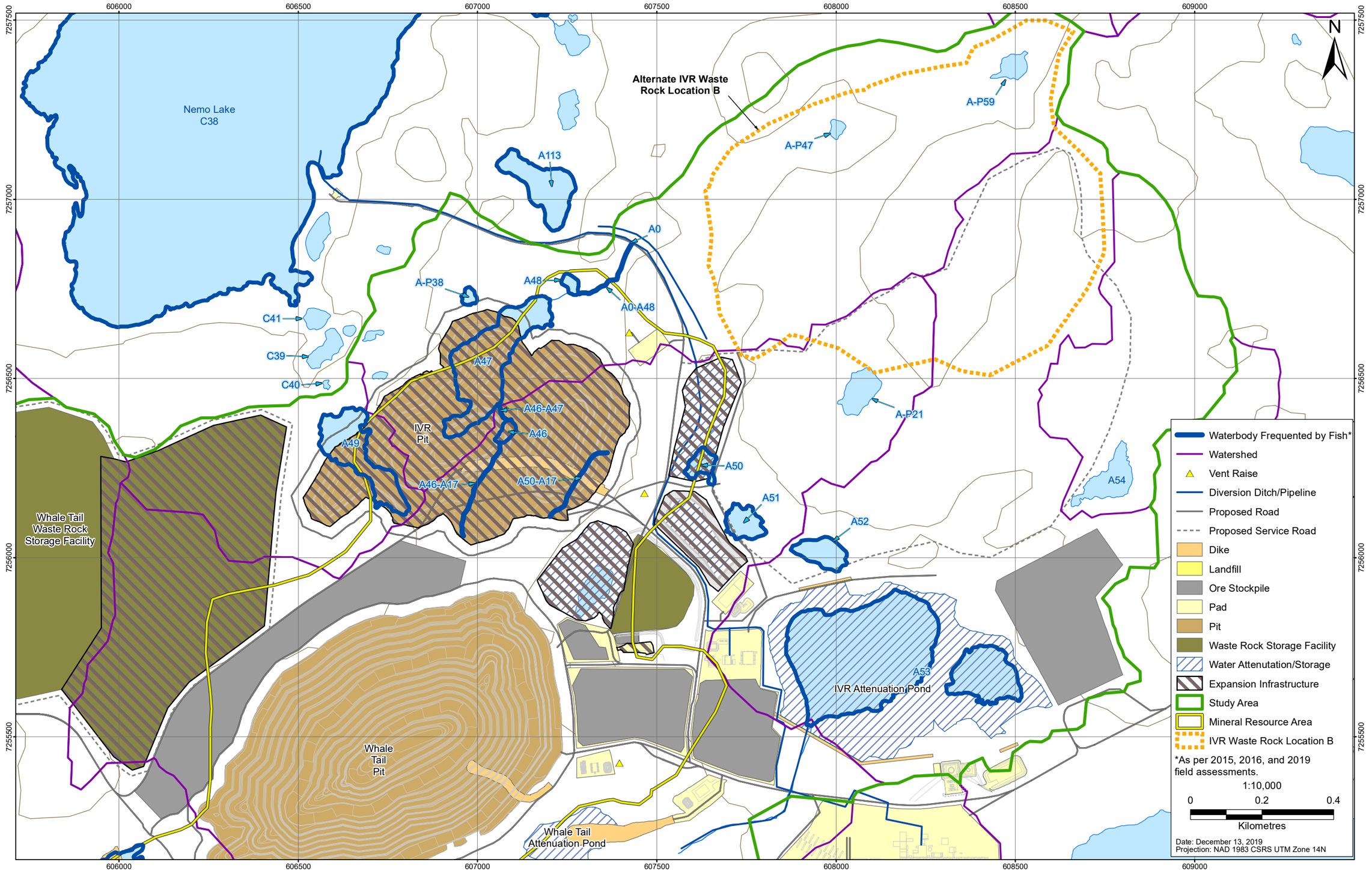


Figure 6-2: Alternative IVR Waste Rock Storage Facility Location (Alternative B)

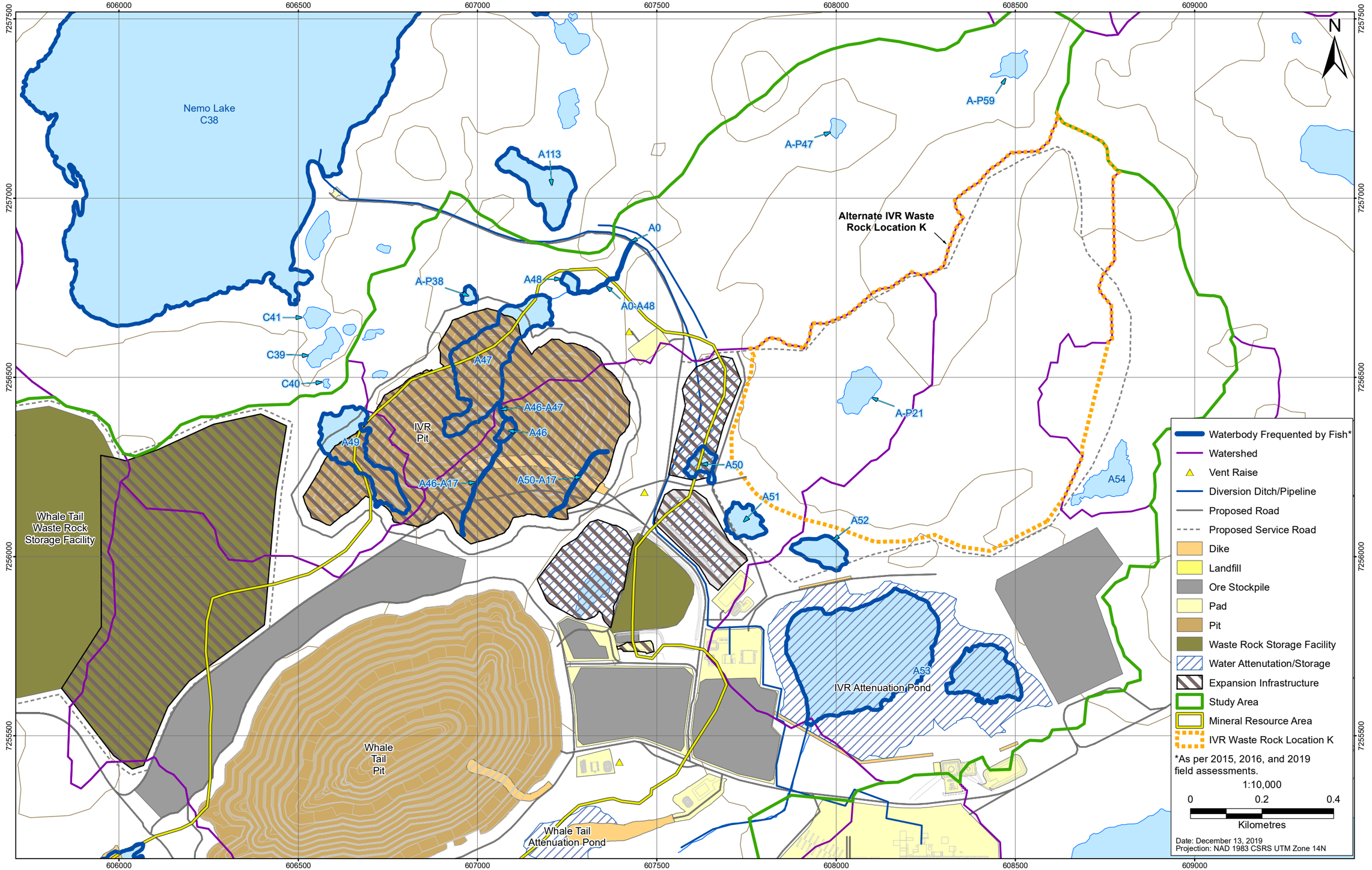


Figure 6-3: Alternative IVR Waste Rock Storage Facility Location (Alternative K)

Table 6.1-1: Technical Account Comparison of Alternatives

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Source of construction materials	The required volume and type of construction materials may be a limiting factor for construction.	Local borrow materials are available for all alternatives.		
Design complexity	Alternatives requiring additional condemnation drilling pose greater cost and schedule risk. More complex designs (e.g., staged approach for water management similar to the Whale Tail WRSF) pose a greater cost and schedule risk.	No additional condemnation drilling required. Current design does not require additional water management (other than contact water) during construction of the IVR WRSF.	No additional condemnation drilling required. If a preferred alternative, the current design require review to confirm no additional water management (other than contact water) during construction of the IVR WRSF.	No additional condemnation drilling required. If a preferred alternative, the current design require review to confirm no additional water management (other than contact water) during construction of the IVR WRSF.
Expandability	Operational flexibility to expand footprint.	All alternatives are anticipated to have sufficient capacity to store waste rock for the duration of the Expansion Project and there is area for footprint expansion and design considerations should additional waste rock need to be accommodated.		
Complexity of contact water management system	More complex contact water management infrastructure pose greater risk of failure.	No additional contact water management infrastructure to pump water to IVR Attenuation Pond	Requires pipeline to move water from contact collection system to IVR Attenuation Pond. Will require additional pumps for perimeter contact water collection to avoid contact water from entering the Nemo Lake sub-watershed.	Requires pipeline to move water from contact collection system to IVR Attenuation Pond. May require additional sumps for perimeter contact water collection.
Complexity of surface water management	More non-contact water to divert from the IVR WRSF poses greater risk of failure.	Overlaps 3 sub-watershed with a catchment area of 7.4 km^2. No infrastructure required to divert non-contact water away from the facility.	Overlaps 3 sub-watershed with a catchment area of 8.2 km^2. Infrastructure will be required to divert non-contact water away from the WRSF and divert water from entering mine infrastructure.	Overlaps 3 sub-watershed with a catchment area of 7.8 km^2. Infrastructure will be required to divert non-contact water away from the WRSF and divert water from entering mine infrastructure. Construction of the facility will likely restrict water inflow to waterbodies A51 and A52.

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Length of pipeline (IVR WRSF to IVR Attenuation pond and IVR WRSF to Whale Tail Attenuation Pond)	Longer pipelines are more complex and have higher risk of failure.	Gravity flow to IVR Attenuation Pond; 1.6 km to Whale Tail Attenuation Pond	1.3 km to IVR Attenuation Pond; 2.0 km to Whale Tail Attenuation Pond	0.7 km to IVR Attenuation Pond; 1.6 km to Whale Tail Attenuation Pond
Length of haul roads required	More extensive road networks have a larger physical footprint and greater construction and operational costs.	1.3 km	1.3 km	1.2 km
Number of waterbodies to be dewatered	Dewatering and placement of waste rock in lake bed requires additional planning and design	4 (total estimated 3.58 ha)	2 (total 0.64 ha)	1 (total 0.94 ha)
Operational complexity	More complex operations and maintenance (based on potential runoff and seepage to manage etc.) pose higher risk.	The preferred IVR Attenuation Pond location is within the gravity catchment area of the IVR WRSF.	The preferred IVR Attenuation Pond location requires contact water to be pumped from the contact water collection system (to avoid impacts to lakes A50, A51, and A52). Additional water management infrastructure (pumping) will be required to divert contact water due to close proximity to mine infrastructure and Nemo Lake sub-watershed.	The preferred IVR Attenuation Pond location requires contact water to be pumped from the contact water collection system (to avoid impacts to lakes A50, A51, and A52). However, it is likely that inflows to lakes A51 and A52 will be greatly reduced resulting the waterbodies drying up. Additional water management infrastructure will be required to divert contact water due to close proximity to mine infrastructure. Proximity to mine infrastructure and waterbodies will limit the available space to install proper water diversion to limit the amount non-contact water with the IVR WRSF.

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Closure complexity	More complex closure requirements (e.g. active pumping/monitoring of contact water) have higher risks.	The preferred IVR Attenuation Pond is within the gravity catchment area of IVR WRSF and therefore also serves to manage this contact water without additional pumping. Closure cover material (NPAG/NML waste rock) will be placed through operations and completed at closure. Water will be monitored for 16 years (during flooding of the pits) until results demonstrate that water quality in IVR WRSF meet discharge criteria in the amended Water Licence.	The preferred IVR Attenuation Pond location requires contact water to be pumped to avoid entering the Nemo Lake sub-watershed and pumping of the contact water collection system (to avoid impacts to lakes A50, A51, and A52).. Closure cover material (NPAG/NML waste rock) will be placed through operations and completed at closure. Water will be monitored for 16 years (during flooding of the pits) until results demonstrate that water quality in the IVR WRSF meet discharge criteria in the amended Water Licence.	The preferred IVR Attenuation Pond location requires contact water to be pumped from the contact water collection system (to avoid impacts to lakes A50, A51, and A52). Closure cover material (NPAG/NML waste rock) will be placed through operations and completed at closure. Water will be monitored for 16 years (during flooding of the pits) until results demonstrate that water quality conditions in IVR WRSF meet discharge criteria in the amended Water Licence.
Post-closure complexity	More complex post-closure water management (e.g., active water treatment) have higher risks.	If post-closure water management is required for IVR WRSF, the IVR Attenuation Pond can be easily managed to control water release.	If post-closure water management is required for IVR WRSF, the IVR Attenuation Pond can be easily managed to control water release. However, active pumping from the Nemo-Lake sub-watershed and contact water collection system (to avoid impacts to lakes A50, A51, and A52) will continue to be maintained.	If post-closure water management is required for the WRSF, the IVR Attenuation Pond can be easily managed to control water release. However, active pumping from the contact water collection system (to avoid impacts to lakes A50, A51, and A52) will continue to be maintained.

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Non-performance of water management risk and consequence	If the contact water management system does not perform as planned, then facilities requiring active water management will have higher risk.	The IVR Attenuation Pond is within the gravity catchment area of the IVR WRSF and therefore no pumping of contact water is required.	The IVR Attenuation Pond location requires contact water to be pumped from the contact water collection system. Failure of pumping will result in contact water flowing towards mine infrastructure and natural waterbodies.	The IVR Attenuation Pond location requires contact water to be pumped from the contact water collection system. Failure of pumping will result in contact water flowing towards mine infrastructure and natural waterbodies.
Non-performance of slope stability risk and consequence	If slope stability is reduced through the life of the IVR WRSF then facilities with lack of appropriate foundation, do not aggrade permafrost as expected will have higher risk.	All alternatives have suitable geotechnical stability for an appropriate foundation and placement of waste rock will be the same to promote freezing and maintain stability.		

Table 6.2-1: Environment Account Comparison of Alternatives

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Air emissions	Construction and operation of IVR WRSF may result in air emissions including fugitive dust and greenhouse gases.	Waste rock will be placed in layers spread using a bulldozer to minimize the footprint and dust. Overburden will be placed at the base of the WRSF and surrounded by waste rock to stabilize the material. Alternatives have similar haul distances thereby creating similar wind erosion and dust and generation of GHG emissions during operations. Pumping for the purpose of water management will require diesel-powered pumps.		
Topography	Topographic features may influence water management to minimize the potential effect to the aquatic environment.	Topography elevation varies between 154 and 170 masl.		
Dominant surficial material	Surface material may be influenced by the construction of IVR WRSF.	till/overburden		
Permafrost (presence, depth)	Permafrost depth and extent may be influenced by the construction of the WRSF.	Depth of active layer ranges from 1.3 m in areas with shallow overburden, to 4 m adjacent to lakes. Alternatives are designed to promote permafrost (freezing) through closure.		
Affected surface waterbodies (loss)	Loss of surface waterbodies may influence fisheries, birds, terrestrial wildlife, ecosystem function, and Inuit land use.	Lakes A50, A51, A52, A-P21	Lake A-P59 and A-P47	Lake A-P21. Construction is likely to reduce inflow to Lakes A50 and A51.
Affected downstream catchment areas	Changes to downstream catchment areas may influence downstream hydrology including water quality and quantity.	No new catchment areas affected. IVR WRSF contact water will report to the IVR Attenuation Pond and then to the WTP (if does not meet Water Licence discharge criteria). Treated water to be discharged to Whale Tail Lake (South Basin)		
Wetlands	Changes to wetlands may influence fisheries, birds, terrestrial wildlife, ecosystem function, and Inuit land use.	No wetlands affected		
Downstream water quality	Changes to downstream water quality may influence fisheries, birds, terrestrial wildlife, ecosystem function, and Inuit land use (including drinking water).	No expected change to downstream water quality (water will be treated to same standard before discharge).		

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Groundwater	Changes to quality or quantity of groundwater may influence regional hydrology	No expected change to regional groundwater regime.		
Fish-bearing waterbodies	The number of affected fish-bearing waterbodies influences the overall impact on fish and fish habitat.	3	Unknown (A fisheries assessment has not been completed in waterbodies A-P59 and A-P47).	0
Fish habitat area	The area of affected fish habitat influences the overall impact on fish and fish habitat.	Lakes A50 (0.49 ha), A51 (0.91 ha), and A52 (1.24 ha) are fish-bearing and have a total baseline surface area of 2.64 ha.	Unknown. A fisheries habitat assessment has not been completed in waterbodies A-P59 (0.47 ha) and A-P47 (0.17 ha).	This alternative does not overprint fish habitat however reduce inflow to lakes A50 and A51 are likely.
Diversity of fish community	The diversity of fish in affected waterbodies influences the overall impact on fish and fish habitat.	One (1) fish species is found in lakes A50, A51, and A52: ninespine stickleback	Unknown. A fisheries assessment has not been completed in waterbodies A-P59 and A-P47.	This alternative does not directly affect fish community.
Abundance of fish community	The abundance of fish in affected waterbodies influences the overall impact on fish and fish habitat.	Low abundance	Unknown. A fisheries habitat assessment has not been completed in waterbodies A-P59 and A-P47.	This alternative does not directly affect fish community.
Diversity of benthic community	The diversity of aquatic organisms in affected waterbodies influences the overall impact on fish and fish habitat.	Low presence and diversity of benthic invertebrates		
Terrestrial habitat	Changes to terrestrial habitat may influence impacts on terrestrial wildlife and vegetation	78 ha of habitat typical of the region.	Current design suggests 78 ha of habitat however additional habitat maybe disrupted once a final design is detailed. Water management infrastructure (pipelines) will increase the footprint in comparison to Alternative A.	Current design suggests 78 ha of habitat however additional habitat maybe disrupted once a final design is detailed. Water management infrastructure (pipelines) will increase the footprint in comparison to Alternative A.

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Habitat fragmentation	Habitat fragmentation (due to roads, pipelines, and other infrastructure) can impact the movement and migration of caribou and other wildlife in the area.	Alternatives are within the footprint of the approved project and will not require new roads, pipelines or other infrastructure that may fragment habitat.		
Rare or listed plant species	Avoiding loss of rare or listed plant species is a conservation objective.	No rare or listed plant species, or suitable habitat for these species, have been identified in the vicinity of the mine site		
Bird habitat	The area of affected bird habitat influences the overall impact on birds including waterfowl.	Birds, including waterfowl, are found throughout the area. However, no important bird habitat has been identified in relation to any of the alternatives.		
Caribou and muskox habitat	The area of affected caribou/muskox habitat influences the overall impact on caribou/muskox.	There are no caribou calving grounds near the mine site, and no areas of particular importance to caribou or muskox have been identified in relation to any of the alternatives as the caribou migrate to the calving areas north and east of the project area.		
Carnivore habitat	The area of affected carnivore habitat influences the overall impact on carnivores.	No dens have been identified in relation to any of the alternatives.		
Environmental consequence of IVR WRSF failure	Failure of the WRSF to manage and contain the contact water (water enters the receiving environment) may result in potential impacts to aquatic resources.	Contact water would report to the IVR Attenuation Pond therefore no effect to the aquatic environment.	Contact water would report to the natural receiving environment and mine infrastructure. Contact water entering natural receiving environments would have local (limited to the waterbody) effects to aquatic resources.	Contact water would report to the natural receiving environment and mine infrastructure. Contact water entering natural receiving environments would have local (limited to the waterbody) effects to aquatic resources.
Environmental consequence of Slope Failure	Slope failure may impact the fish-bearing waterbodies.	No fish-bearing waterbodies in close proximity should sloughing occur.	In close proximity to three fish-bearing waterbodies (A50, A51, and A52) that may be affected if sloughing occurs.	In close proximity to three fish-bearing waterbodies (A50, A51, and A52) that may be affected if sloughing occurs.

Table 6.3-1: Socio-Economic Account Comparison of Alternatives

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Proximity to communities	Impacts on communities and land use may be influenced by proximity to IVR WRSF.	All alternatives are located over 150 km north of the hamlet of Baker Lake.		
Economic benefits	Construction and operation of the IVR WRSF may create additional jobs and business opportunities.	No significant difference in the number or type of jobs (to construct and operate IVR WRSF), procurement, or business opportunities is expected.		
Risk to downstream communities	Real or perceived community safety and security of downstream communities may influence well-being and community acceptance of the project.	Considering community's physical distance from the alternatives, the alternatives expected to have negligible health risks and threats to inhabitants' physical safety.		
Community perception of risks/impacts	Perception of risks and impacts may influence well-being and community acceptance of the project	Concern expressed regarding relocation of fish, loss of fish habitat, and fish potentially not captured (prior to construction).	Concern expressed regarding relocation of fish, loss of fish habitat, and fish potentially not captured (prior to construction).	Favourable perception regarding avoidance of impacts on fish habitat by using an area already affected by the Whale Tail Pit Project.
Risks to workers	Real or perceived risks to workers related to IVR WRSF may influence worker safety and/or well-being.	No significant risks identified.		
Areas used for hunting	Changes to hunting areas may influence the practice of traditional hunting activities, harvests, household subsistence, and well-being.	No hunting destinations have been identified in relation to any of the alternatives.		

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Areas used for fishing	Changes to fishing areas may influence the practice of traditional fishing activities, harvests, household subsistence, and well-being.	Lakes A50, A51, and A52 do not contain Arctic char. No fishing activity have been reported at these lakes through consultations, traditional land use studies, or other feedback. Consultations indicated smaller lakes such as the nearby Lake A53 are unremarkable and there are other areas preferred for fishing.	It is not known if lakes A-P59 and A-P47 contain fish. However, no fishing activity have been reported at these lakes through consultations, traditional land use studies, or other feedback. Consultations indicated smaller lakes such as the nearby Lake A53 are unremarkable and there are other areas preferred for fishing.	None
Disruption of landscape	Visual disruption of the natural landscape during mine operations may influence the practice of traditional land use activities and well-being.	The estimated height of all alternatives is 60 m. All alternatives are situated to the east of mine infrastructure.		
Areas used for trapping	Changes to trapping areas may influence traditional trapping activities, harvests, household subsistence, and well-being.	No trapping areas have been identified in relation to any of the alternatives.		
Areas used for vegetation/berry harvesting	Changes to vegetation harvesting areas may influence traditional gathering activities, harvests, household subsistence, and well-being.	No harvested species (e.g., crowberry, blueberry, blackberry, red berry, cloudberry) are identified in the vicinity of any alternative.		
Culturally or spiritually significant areas	Changes to culturally or spiritually important areas may influence traditional land use and well-being.	No trails, camps, cabins, caching sites, gravesites, traditional travel routes or other culturally important sites identified in the vicinity of the alternatives.		
Travel corridor between Baker Lake and the Back River	Residents of Baker Lake travel overland (in winter) to the Back River. Environmental or aesthetic changes could affect travelers.	The western route described in Section 6.5.5 of the Main Report is approximately 6 to 7 km east of the Amaruq mine site. None of the alternatives are significantly closer to, or would have an effect on, this travel corridor.		

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Consequence of failure for land users	Failure of the WRSF (instability) or to manage and contain the contact water (water enters the receiving environment) may result in consequences for the land users, including safety of people travelling in the area and real or perceived contamination of harvested flora and fauna.	Contact water would report to the IVR Attenuation Pond and therefore no impact to land users. The affected area has not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur.	Contact water would report to the natural receiving environment and mine infrastructure. The affected area has not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur. Considering the size of the fish-bearing waterbodies potentially affected, the perception would be a limited environmental effect and no contamination of potential harvest.	Contact water would report to the natural receiving environment and mine infrastructure. The affected area has not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur.

Table 6.4-1: Estimated Capital Costs

Alternative	Infrastructure	Unit of Measure	Estimated Quantity	Total Estimated Cost[1]
A	Haul Road	m^3	1,277	$1,818,586
	Pipeline[2]	m	1,605	$1,803,598
	Pumping Equipment[3]	Number (#)	1	$500,000
B	Haul Road	m^3	1,349	$1,921,121
	Pipeline[2]	m	3,248	$3,488,721
	Pumping Equipment[3]	Number (#)	1	$1,000,000
K	Haul Road	m^3	1,239	$1,764,470
	Pipeline[2]	m	2,300	$2,516,416
	Pumping Equipment[3]	Number (#)	1	$1,000,000

[1] *Haul Road costs assume cost per cubic metre (15 m wide x 1.5 m high road x Estimated Length in m)*

[2] *Includes pipeline to IVR Attenuation Pond and Whale Tail Attenuation Pond.*

[3] *Assumes at minimum one booster pump station for pumping to Whale Tail Attenuation Pond.*

Table 6.4-2: Economic Account Comparison of Alternatives

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Economic Account				
Capital costs	Capital costs for construction of the IVR WRSF may influence the economic feasibility of the Whale Tail Pit Expansion Project.	Estimated $4.1 million	Estimated $6.4 million	Estimated $5.2 million
Operating (sustaining) costs	Operating costs for the IVR WRSF may influence the economic feasibility of the Whale Tail Pit Expansion Project.	Operating costs consider the management of the contact water system.	Operating costs consider the management of the contact water system in addition to operation of pumps to convey water to the IVR Attenuation Pond, pumps to avoid contact water from entering the Nemo Lake sub-watershed, and/or diversion of non-contact surface water management.	Operating costs consider the management of the contact water system in addition to operation of pumps to convey water to the IVR Attenuation Pond and/or diversion of non-contact surface water management.
Closure costs	Costs for closure and reclamation of the IVR WRSF may influence the economic feasibility of the Whale Tail Pit Expansion Project.	Contact water will be conveyed to the IVR Attenuation Pond until water quality demonstrates that water flowing from the facility is acceptable for direct release to the environment.	Contact water will be conveyed to the IVR Attenuation Pond until water quality demonstrates that water flowing from the facility is acceptable for direct release to the environment. This will require the use of pumps to manage contact water.	Contact water will be conveyed to the IVR Attenuation Pond until water quality demonstrates that water flowing from the facility is acceptable for direct release to the environment. This will require the use of pumps to manage contact water.

Criteria	Rationale	Alternative A	Alternative B	Alternative K
Post-closure costs	Costs for post-closure water management monitoring of the IVR WRSF may influence the economic feasibility of the Whale Tail Pit Expansion Project.	No active pumping to the IVR Attenuation Pond through post-closure.	If contact water quality does not meet Water Licence criteria, active pumping will be required to convey water to the IVR Attenuation Pond.	If contact water quality does not meet Water Licence criteria, active pumping will be required to convey water to the IVR Attenuation Pond.
Fish habitat offsetting costs	Costs to compensation for fish habitat losses, if applicable, may influence the economic feasibility of the Whale Tail Pit Expansion Project.	Compensation for loss of 2.64 ha fish habitat. Cost estimate $200,000 to $300,000.	Fish habitat compensation as a result of overprinting has not been confirmed.	No fish habitat compensation required as a result of overprinting.

7. STEP 4: MULTIPLE ACCOUNTS LEDGER

7.1 Sub-Accounts

Sub-accounts are also known as evaluation criteria and are developed to consider material benefits (advantage) or losses (disadvantages) associated with the remaining alternatives. Sub-accounts are considered and defined on a project-specific basis, and sub-accounts used in one assessment may not be relevant to another assessment.

To ensure that the sub-accounts are useful in the evaluation, the ECCC Guidelines identify the following characteristics for sub-accounts:

- Impact-driven: must be linked to an impact (advantage or disadvantage) rather than simply a statement of fact;
- Differentiating: must define an aspect that distinctly differentiates one or more of the alternatives, in a way that is meaningful to the decision (i.e., if a factor is the same for all alternatives, then that factor is not important in the comparison;
- Relevant: must be a factor that is relevant to the decision-making process;
- Understandable: must be defined unambiguously, so that external parties (e.g., reviewers) cannot interpret the preferred state differently;
- Non-redundant: must be unique within the multiple accounts analysis (i.e., to avoid consideration of the same criteria in different sub-accounts); and
- Independent: must be judgementally independent such that the outcome for one criteria cannot depend on the outcome of another criteria.

Table 7.1-1 summarizes the twelve sub-accounts identified for the assessment of the three IVR WRSF alternatives, including the rationale and preferred state of each sub-account. The definition of sub-accounts considered the characterization criteria described in Section 6, and was informed through consultation with the communities of Baker Lake and Chesterfield Inlet in 2018 and 2019, in which Elders and community members highlighted the importance of fish, caribou, and the broader environment.

Table 7.1-1: List of Sub-Accounts and Rationale

Sub-Account	Rationale
Technical Account	
WRSFs (Design, Construction, Operation, and Closure)	Considers the geotechnical stability and distance of IVR Pit to the IVR WRSF.
Water Management Infrastructure	More extensive and complex water management infrastructure (e.g., pipelines and diversions) is associated with increased engineering and safety risks. Smaller and less complex water management infrastructure in terms of operating costs and closure requirements are preferred.
Operational consequences of failure	In the unlikely event of a failure, alternatives that can continue or resume safe operations expediently are preferred.

Sub-Account	Rationale
Environment Account	
Air Quality	Alternatives that produce more emissions (including greenhouse gas emissions) are less desirable as they contribute to negative impacts on air quality locally, as well as climate change more broadly. Air quality can have a local effect on vegetation, and wildlife. Alternatives with less potential to impact climate change and local air quality are preferred.
Surface Water	Alternatives with greater potential effects to surface water hydrology and quality are less desirable due to potential downstream effects on the availability and/or quality of water, which could affect ecosystem function, fish and wildlife, and human use/health. Alternatives that minimize potential impacts to surface water are preferred.
Fish and Aquatic Habitat	Alternatives with greater potential effects to fish and aquatic habitat are less desirable as these resources are important for ecosystem function, traditional land use and food security (fish). Alternatives that result in extensive loss of high value fish habitat may be difficult to permit. Alternatives that minimize potential impacts to fish and aquatic habitat are preferred.
Terrestrial Habitat	Alternatives with greater potential effects to terrestrial habitat are less desirable as these resources are important for ecosystem function, wildlife, and vegetation. Impacts to terrestrial habitat may also lead to impacts on traditional land use and food security (game). Alternatives that minimize potential impacts to terrestrial habitat are preferred.
Environmental Consequences of Failure	In the unlikely event of a failure, alternatives that contain and manage contact water or maintain slope stability and avoid potential environmental impacts on the natural environment, are preferred.
Socio-Economic Account	
Inuit Land Use	Inuit land use includes hunting, fishing, trapping, and vegetation harvesting, as well as cultural and spiritual use and value of the land. Alternatives that minimize potential impacts to Inuit land use are preferred.
Land Use Consequence of Failure	In the unlikely event of a failure, alternatives that are located within the mine site, and avoid potential impacts on areas known or valued for land use (including harvesting and travelling), are preferred.
Economic Account	
IVR WRSF Costs	Alternatives with lower costs for construction, operation, fish habitat offsetting, closure, and post-closure of the IVR WRSF are preferred.

7.2 Indicators

Indicators are also known as measurement criteria as they provide for the qualitative or quantitative measurement within each sub-account, thus allowing for direct comparison between alternatives. As for the sub-accounts, indicators are defined on a project-specific basis and must also be impact-driven, differentiating, relevant, understandable, non-redundant, and independent. Table 7.2-1 lists the indicators identified for each sub-account, with a total of 31 indicators.

Table 7.2-1: Indicators Identified for each Sub-Account

Sub-Account	Indicators	Rationale
Technical Account		
WRSFs (Design, Construction, Operation, and Closure)	Length of Haul Road	Shorter haul distance will have less environmental impact (less terrestrial impact during construction and less noise and pollution during operation). Less material is required for construction of shorter haul roads.
	Requirement for Additional Drilling/Design	No additional drilling is required however more complex construction (based on need for a staged approach for water management similar to the Whale Tail WRSF) poses a higher risk.
Water Management Infrastructure	Length of pipeline (combined)	Alternatives with shorter length of pipeline transporting contact water to the Whale Tail Attenuation Pond or IVR Attenuation Pond are preferred.
	Contact Water Collection Infrastructure	Alternatives that require less contact water collection infrastructure (including perimeter collection sumps) and have less pumping requirements (i.e., able to use gravity flow to convey water to the contact water collection) are preferred.
	Surface water management infrastructure	Alternatives that require less management of non-contact surface water away from the IVR WRSF are preferred.
	Number of Waterbodies to fishout	Fewer impacted fish-bearing waterbodies will require less time for fishout and overall less fish habitat loss will be preferred.
	Area of Overprinted Waterbodies	Placement of the WRSF in location that requires lake dewatering and infilling for construction will require additional time and material.
	Closure Complexity	Alternatives with less complex closure requirements (i.e,. fewer complex activities such as maintenance and operation of pumps) during the closure phase are preferred.
	Post-Closure Complexity	Alternatives with less complex (i.e., more passive) water management requirements following closure are preferred.
Operational consequences of failure	Operational Consequence IVR WRSF failure	Alternatives with lower operational consequences (i.e., ability to continue safe operations should contact water systems overflow) of the water management system are preferred.

Sub-Account	Indicators	Rationale
Environment Account		
Air Quality	GHG and Dust Emissions During Construction of the IVR WRSF	Alternatives that require fewer truck trips to transport waste rock (estimated by considering both haul distances and estimated waste rock volume) are preferred.
	GHG Emissions During Operation of Water Management Infrastructure	Alternatives that require use of fewer additional diesel-powered pumps are preferred.
Surface Water	Loss of Natural Waterbodies	Alternatives that avoid direct loss of natural waterbodies, or affect fewer natural waterbodies, are preferred.
	Ability to Manage Surface Water Quality Impact	Alternative that provide greater ability to divert surface water away from the WRSF, and reducing surface water quality impacts are preferred.
Fish and Aquatic Habitat	Number of Fish-Bearing Waterbodies	Alternatives that avoid, or minimize impacts to fish-bearing waterbodies are preferred.
	Diversity of Affected Fish Community	Alternatives that affect fewer fish species are preferred.
	Extent of Fish Habitat Loss	Alternatives that minimize the area of fish habitat loss are preferred.
	Abundance of Affected Fish Community	Alternatives that affect waterbodies with lower abundance of fish are preferred.
Terrestrial Habitat	Terrestrial habitat loss	Alternatives that minimize the area of terrestrial habitat loss are preferred.
Environmental consequence of IVR WRSF failure	Environmental consequence of IVR WRSF failure	Alternatives less likely to affect aquatic receiving environments or natural waterbodies if water management systems fail are preferred.
	Environmental consequence of Slope Failure to Fish-bearing water bodies	Alternatives that are not in close proximity to fish-bearing waterbodies are preferred.
Socio-economic Account		
Inuit Land Use	Loss of Waterbody Used For Fishing	Alternatives that avoid or minimize impacts to fishing activities, or waterbodies used for fishing, are preferred.
	Relocation of Fish	Alternatives that avoid relocation of fish from one waterbody to another are preferred (due to local Elders' concerns related to intangible/ spiritual effects on fish).
Land Use Consequence of Failure	Land Use Consequence of Failure of Water Management Infrastructure	Alternatives with lower consequence for land use (including safety of land users and/or real or perceived impacts on access or contamination of harvests) related to failure of water management infrastructure are preferred.

Sub-Account	Indicators	Rationale
Economic Account		
IVR WRSF Costs	Capital Costs	Alternatives with lower capital costs (considering construction material and type of construction) are preferred.
	Fish Habitat Offsetting Costs	Alternatives with lower costs for fish habitat offsetting (compensation) are preferred. Offsetting costs compared to those for the approved Whale Tail Pit Project.
	Operating/Sustaining Costs	Alternatives with lower operating (or sustaining) costs—compared to the base case (i.e., Whale Tail Pit Project) are preferred.
	Closure and Reclamation Costs	Alternatives with low costs for closure and reclamation are preferred.
	Long-Term Post-Closure Costs	Alternatives with lower costs for active water treatment or other activities post-closure are preferred.

7.3 Multiple Accounts Ledger

The indicators listed in Table 7.2-1 are tabulated in the multiple accounts ledger (Table 7.3-1), along with the applicable measurement parameter (e.g., length) and unit of measurement (e.g., metres).
Each alternative is described, factually and objectively, in regard to each indicator.

Table 7.3-1: Multiple Accounts Ledger

Sub-Account	Indicators	Scale Metric (Unit)	Alternative A	Alternative B	Alternative K
Technical Account					
WRSFs (Design, Construction, Operation, and Closure)	Length of Haul Road	Length (km)	1.3 km	1.3 km	1.2 km
	Requirement for Additional Drilling/Design	Qualitative Scale	No additional drilling and initial designs for the WRSF have been developed.	No additional drilling and modifications of the initial designs to fit within footprint and topography will be confirmed.	No additional drilling and modifications of the initial designs to fit within footprint and topography will be confirmed.
Water Management Infrastructure	Length of pipeline (combined)	Length (km)	1.6 km	3.3 km	2.3 km
	Contact Water Collection Infrastructure	Qualitative Scale	System is designed to collect water from all perimeter sumps and situated in a location to for gravity flow to the Attenuation Pond.	System designed to collect water from all perimeter sumps and pumping is required to convey water to IVR Attenuation Pond and avoid contact water entering the Nemo Lake sub-watershed and fish-bearing waterbodies.	System designed to collect water from all perimeter sumps and pumping is required to convey water to IVR Attenuation Pond and avoid contact water entering fish-bearing waterbodies. Additional water management infrastructure will be required to divert contact water due to close proximity to mine infrastructure.

Sub-Account	Indicators	Scale Metric (Unit)	Alternative A	Alternative B	Alternative K
	Surface water management infrastructure	Qualitative Scale	Overlaps 3 sub-watershed with a catchment area of 7.4 km^2. No diversion of non-contact surface water around the WRSF required.	Overlaps 3 sub-watershed with a catchment area of 8.2 km^2. Requires at least one diversion of surface water around the WRSF.	Overlaps 3 sub-watershed with a catchment area of 7.8 km^2. Requires at least one diversion of surface water around the WRSF. Proximity to mine infrastructure and waterbodies will limit the available space to install proper water diversion to limit the amount non-contact water to the IVR WRSF.
	Number of Waterbodies to fishout	Number (#)	4	2 potential	0
	Area of Overprinted Waterbodies	Total hectares (ha)	3.58 ha	0.64 ha	0.94 ha
	Closure Complexity	Qualitative Scale	Use of gravity flow to convey water to the IVR Attenuation Pond. Monitoring contact water quality will be required until Water Licence criteria are met.	Operation of pumps will be required to convey water to IVR Attenuation Pond and prevent water from entering the Nemo Lake sub-watershed. Monitoring contact water quality will be required until Water Licence criteria are met.	Operation of pumps will be required to convey water to IVR Attenuation Pond. Monitoring contact water quality will be required until Water Licence criteria are met.

Sub-Account	Indicators	Scale Metric (Unit)	Alternative A	Alternative B	Alternative K
	Post-Closure Complexity	Qualitative Scale	Use of gravity flow to convey water to the IVR Attenuation Pond thus continued operation of pumps not required. Monitoring contact water quality will be required until Water Licence criteria are met.	Operation of pumps will be required to convey water to IVR Attenuation Pond and prevent water from entering the Nemo Lake sub-watershed. Monitoring contact water quality will be required until Water Licence criteria are met.	Operation of pumps will be required to convey water to IVR Attenuation Pond. Monitoring contact water quality will be required until Water Licence criteria are met.
Operational consequences of failure	Operational Consequence IVR WRSF failure	Qualitative Scale	Overflow of contact water collection system would be contained in the IVR Attenuation Pond.	Overflow of contact water collection system would enter mine infrastructure (IVR Pit) however the amount of water is likely to be minimal and manageable resulting in no cessation of operations.	Overflow of contact water collection system would flow to receiving environment and would not directly affect mine operations.

Sub-Account	Indicators	Scale Metric (Unit)	Alternative A	Alternative B	Alternative K
Environment Account					
Air Quality	GHG and Dust Emissions During Construction of the IVR WRSF	Thousand m^3 of waste rock by kilometres of transport from source (thousand m^3km)	60,840 thousand m^3km (46,800,000 m^3, 1.3 km)	60,840 thousand m^3km (46,800,000 m^3, 1.3 km)	56,160 thousand m^3km (46,800,000 m^3, 1.2 km)
	GHG Emissions During Operation of Water Management Infrastructure	Additional pumps (#)	0	1	1
Surface Water	Loss of Natural Waterbodies	Number of waterbodies (#)	4	2	1
	Ability to Manage Surface Water Quality Impact	Qualitative Scale	No diversion system required to divert non-contact surface water from the WRSF.	Pipeline system required to convey contact water and avoiding impacts to waterbodies A50, A51, and A52 and prevent water from entering the Nemo Lake sub-watershed. Requires at least one diversion of surface water around the WRSF to minimize effects to surface water quality.	Pipeline system required to convey contact water and avoiding impacts to waterbodies A50, A51, and A52. Construction of the facility will likely reduce inflow into lakes A51 and A52. Requires at least one diversion of surface water around the WRSF to minimize effects to surface water quality.
Fish and Aquatic Habitat	Number of Fish-Bearing Waterbodies	Number of waterbodies (#)	3	2- potential	0 (as a result of overprinting)
	Diversity of Affected Fish Community	Number of species (#)	1	1- potential	0 (as a result of overprinting)
	Extent of Fish Habitat Loss	Area (ha)	Loss of waterbodies A50, A51, A52 total 2.64 ha	Potential loss of A-P59 and A-P47 total 0.64 ha	0 ha (as a result of overprinting)

Sub-Account	Indicators	Scale Metric (Unit)	Alternative A	Alternative B	Alternative K
	Abundance of Affected Fish Community	Qualitative Scale	low	low - potential	none
Terrestrial Habitat	Terrestrial habitat loss	Area (ha)	78 ha	78 ha in addition to linear pipeline habitat loss	78 ha in addition to linear pipeline habitat loss
Environmental consequence of IVR WRSF failure	Environmental consequence of IVR WRSF failure	Qualitative Scale	Overflow of contact water collection system would be contained in the IVR Attenuation Pond.	Overflow of contact water collection system would enter mine infrastructure but may also be released to the receiving environment (waterbodies A50, A51, and A52).	Overflow of contact water collection system may also be released to the receiving environment (waterbodies A50, A51, and A52).
	Environmental consequence of Slope Failure to Fish-bearing water bodies	Number (#) of fish-bearing waterbodies in close proximity	0	3	3
Socio-economic Account					
Inuit Land Use	Loss of Waterbody Used For Fishing	Qualitative Scale	No fishing activity has been reported at waterbodies A50, A51, A52 through consultation, traditional land use studies, or other feedback. The lake is small and unremarkable (i.e., no Arctic char), and there are many other lakes more suitable for fishing throughout the area.	No fishing activity has been reported at waterbodies A-P59 and A-P47 through consultation, traditional land use studies, or other feedback. The lake is small and unremarkable (i.e., likely no Arctic char), and there are many other lakes more suitable for fishing throughout the area.	No fish-bearing waterbodies are affected.

Sub-Account	Indicators	Scale Metric (Unit)	Alternative A	Alternative B	Alternative K
Inuit Land Use *(cont'd)*	Relocation of Fish	Qualitative Scale	Waterbodies A50, A51, A52 are fish-bearing. Overprinting of these waterbodies will require fish to be relocated.	Waterbodies A-P59 and A-P47 have not been determined to be fish-bearing. Overprinting of these waterbodies will require fish to be relocated, if found to be fish-bearing.	Waterbody A-P21 is not fish-bearing. Therefore, relocation of fish is not required.
	Disruption of Landscape (Operations)	Qualitative Scale	The IVR WRSF will cover an area of 78 ha with an estimated height of 60 m (crest elevation 221 m in a natural topography elevation between 154 and 170 m).	The IVR WRSF will cover an area of 78 ha with an estimated height of 60 m (crest elevation 221 m in a natural topography elevation between 154 and 170 m). Pipeline (linear disruption) will result in additional disruption of landscape.	The IVR WRSF will cover an area of 78 ha with an estimated height of 60 m (crest elevation 221 m in a natural topography elevation between 154 and 170 m). Pipeline (linear disruption) will result in additional disruption of landscape.
Land Use Consequence of Failure	Land Use Consequence of Failure of Water Management Infrastructure	Qualitative Scale	Contact water would report to the IVR Attenuation Pond and therefore not impact land users. The affected area has not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur.	Contact water would report to the natural receiving environment and mine infrastructure. The affected area has not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur. Considering the size of the fish-bearing waterbodies potentially affected, the perception would be limited environmental effect and no contamination of potential harvest.	Contact water would report to the natural receiving environment and mine infrastructure. The affected area has not been identified as destinations or travel routes for land users, although irregular or opportunistic use may occur. Considering the size of the fish-bearing waterbodies potentially affected, the perception would be limited environmental effect and no contamination of potential harvest.

Sub-Account	Indicators	Scale Metric (Unit)	Alternative A	Alternative B	Alternative K
Economic Account					
IVR WRSF Costs	Capital Costs	Estimated Cost ($)	Estimated $4.1 million	Estimated $6.4 million	Estimated $5.2 million
	Fish Habitat Offsetting Costs	Estimated Cost ($)	Compensation for loss of 2.64 ha fish habitat. Cost estimate $200,000 to $300,000.	Fish habitat compensation has not been confirmed but would be less than Alternative A.	No fish habitat compensation required (as a result of overprinting).
	Operating/Sustaining Costs	Qualitative	Low monitoring requirements of runoff and seepage. Minimal pumping or no pumps to convey contact water to the attenuation pond.	High monitoring requirements of runoff and seepage. One or more pumps to convey contact water to the attenuation pond and avoid contact water from entering the Nemo Lake sub-watershed.	High monitoring requirements of runoff and seepage. One or more pumps to convey contact water to the attenuation pond.
	Closure and Reclamation Costs	Qualitative	Incremental cost increase is small (<10% of the total cost of closure for the water management system). High cost certainty for closure of this option (>90% probability of completing closure and reclamation within budget).	Incremental cost increase is moderate to high (10-20% of the total cost of closure for the water management system). Moderate cost certainty for closure of this option (60-90% probability of completing closure and reclamation within budget).	Incremental cost increase is moderate to high (<10-20% of the total cost of closure for the water management system). Moderate cost certainty for closure of this option (60-90% probability of completing closure and reclamation within budget).
	Long-Term Post-Closure Costs	Qualitative	Active water treatment may be required. Water management does not require pumping to IVR Attenuation Pond.	Active water treatment may be required. Water management requires pumping to IVR Attenuation Pond.	Active water treatment may be required. Water management requires pumping to IVR Attenuation Pond.

8. STEP 5: VALUE-BASED DECISION PROCESS

8.1 Scoring

To provide a consistent approach to scoring both quantitative and qualitative indicators, six-point value scales are developed for each indicator (Table 8.1-1). Scales range from one (1) to six (6), with higher scores indicating a higher degree of preference (e.g., less adverse impact, less risk, greater certainty). Scales are defined to cover the range of values embodied by the remaining candidates as well as other realistically conceivable alternatives. In most cases, the end points define the realistic best- and worst-case scenarios, even if these end points are beyond the bounds of the remaining alternatives. For example, the best case for habitat loss would be 'no habitat loss', regardless of whether any of the remaining alternatives would result in 'no habitat loss'.

In accordance with the ECCC Guidelines, the six-point scales should be developed to be:

- Operational, such that the scale should be relevant and able to accommodate any other realistically conceivable alternative that may be added at a later time;
- Reliable, in that different parties should arise at the same score given the same scale and background information;
- Relevant to the indicator being scored; and
- Justifiable, so that any external party should agree that the scale is reasonable.

For each indicator, the information provided for each alternative is considered against the applicable indicator's scale, and each alternative is assigned the appropriate score from one (1) to six (6). For a given indicator, candidates with higher scores are preferred over those with lower scores. In accordance with the ECCC Guidelines, the robust and transparent characterization of each candidate within the ledger supports scoring that is clear and easily reproducible so that any external party would arrive at the same conclusions.

8.2 Weighting

The weighting sensitivity component of the MAA is used to account for the fact that some indicators, sub accounts, and/or accounts are considered to be more important to the decision-making process than others. Weightings are provided on a scale of one (1) to six (6), where a weight of six indicates that a criteria is six-times as important as a comparable criteria with a weight of one.

Weightings are consistent across all candidates; in other words, a given criteria cannot be considered more or less important for one candidate compared to the others. The weighting of accounts (Table 8.2-1) is based on the recommendation provided in the ECCC Guidelines. The environment account is afforded the highest weight (6), and economics account (i.e., costs associated with each alternative) is weighted 1.5.

Sub-accounts are weighted within each account (Table 8.2-2). Of the technical sub-accounts, the consequence of failure is given the highest weight (6) as it is critical to the successful operation of the IVR WRSF. In the environment account, fish and aquatic habitat is given the greatest weight (6) due to its importance to both Inuit and regulators, and to reflect Agnico Eagle's commitment to avoiding unnecessary impacts on fish. Surface water, terrestrial habitat, and the environmental consequences of failure are closely connected with fish habitat and weighted 5, 4, and 4 respectively. Considering the scale of air emissions for other mine components (e.g., mill), and the unpopulated region, and the low potential for cumulative air quality impacts, the potential emissions associated with the IVR WRSF are considered to be less significant, and therefore air quality is given a weight of 2.

The socio-economic account includes Inuit land use, which is afforded the highest weight (6) in recognition of the importance of the land for life and culture in Nunavut, and the influence that real or

perceived changes in the environment can have on land use activities and cultural well-being. Similarly, the unplanned and unlikely impacts on land use that may be consequences of contact water management failure event is afforded a slightly lower weight (5), noting that high values for land use (i.e., resources that are not easily accessed in other areas) have not been identified in the vicinity of the project. The economic account has only one sub-account; in this case, the sub-account weighting have no bearing on the results, and is nominally afforded a weight of 1.

Indicators are weighted against other indicators within the same sub-account (Table 8.2-3). Overall, the influence of an indicator in the MAA will be driven by not only its weight, but also the weight of the applicable sub-account and account; as such, the weights of indicators cannot be directly compared between sub-accounts (i.e., an indicator with a weight of 3 in a sub-account with a weight of 3 will have greater influence than an indicator with a weight of 3 in a sub-account with a weight of 2).

For sub-accounts that only have one indicator, the indicator weight has no bearing on the results and is nominally appointed a weight of 1.

In the WRSF (Design, Construction, Operation, and Closure) sub-account, design requirements and length of haul road are appointed a weight of 5 and 3 considering the importance short transport distances of waste rock to the WRSF and less risk to schedule should additional drilling be required to complete the design.

In the water management infrastructure sub-account, the surface water management and length of pipeline are afforded the highest weight (6) as these indicators speak to the overall complexity and consequence of failure for contact water management. Post-closure complexity is also given a weight of 6 as long-term environmental sustainability, and support for passive water treatment post-closure, is a priority of Agnico Eagle's existing closure concept.

In the air quality sub-account, dust was noted as a concern during consultation, and therefore the indicator for construction is given twice the weight of the indicator for mine operation (6 and 3, respectively).

In the surface water sub-account, the ability to effectively manage potential water quality impacts to fish-bearing waterbodies (external to the overprinting) is a priority for Agnico Eagle. The mine site has been designed within a compact footprint, taking advantage of natural drainage patterns to minimize environmental impact; therefore, this indicator is weighted 4. The number of natural waterbodies is weighted 1 due to the prevalence of small ponds and lakes throughout the landscape.

In the fish and aquatic habitat sub-account, Agnico Eagle's priority is to minimize the loss of fish habitat. The extent of the fish habitat loss is the most important indicator as habitat availability is important for healthy fisheries. For this reason, the extent of fish habitat loss is weighted as 6. The number of fish-bearing waterbodies is weighted as 5 to reflect the importance of minimizing loss of fish habitat, but recognizing that the indicator 'extent of fish habitat loss' will capture total habitat; for example, the loss of 5 small waterbodies, may not be more important if the loss of one waterbody provides a greater extent of fish habitat. The Project's location in the Arctic means that, in general, fish species diversity and abundance is relatively low across all waterbodies. The indicator of diversity of affected fish communities is relatively more important than fish abundance, and is weighted 3 to reflect that more diverse fish community reflects varied and productive habitat. The abundance of affected fish community is weighted 2 as this is not considered a key differentiator between waterbodies in the Arctic environment.

Table 8.1-1: Indicator Scales

Sub-Account	Indicators	Scale Metric (Unit)	Score					
			1	2	3	4	5	6
Technical Account								
WRSF (Design, Construction, Operation, and Closure)	Length of Haul Road	Length (km)	≥ 2.5 km	> 2.0 km and ≤ 2.5 km	> 1.5 km and ≤ 2.0 km	> 1.0 km and ≤ 1.5 km	> 0.5 km and ≤ 1.0 km	≤ 0.5 km
	Requirement for Additional Drilling/Design	Qualitative Scale	Requires significant drilling to determine geotechnical stability and changes to the initial design are required.	-	Requires some additional drilling to determine geotechnical stability and minor changes to the initial design are required.	-	No additional drilling to determine geotechnical stability and potential changes to the initial design may be required.	No drilling required and initial design can be used.
Water Management Infrastructure	Length of pipeline (combined)	Length (km)	≥ 5.5 km	> 4.5 km and ≤ 5.5 km	> 3.5 km and ≤ 4.5 km	> 2.5 km and ≤ 3.5 km	>1.5 km and ≤ 2.5 km	≤ 1.5 km
	Contact Water Collection Infrastructure	Qualitative Scale	Very complex: The perimeter contact water system has two collection points to convey water to the contact water collection point. Requires the use of more than one sump and specialized equipment. Pumping system requires more than one pump to convey water to the IVR Attenuation Pond or to avoid contact water from entering a sub-watershed not already impacted by the Expansion Project.	-	Moderately complex: The perimeter contact water system has two collection points to convey water to the contact water collection point. Requires the use of at least one sump and specialized equipment to mitigate potential effect on fish-bearing waterbodies. Pumping system requires one pump to convey water to the IVR Attenuation Pond.	-	Simple: The perimeter contact water system relies on only one collection point to convey water to the contact water collection point. No specialized equipment required and uses gravity flow to convey water to the IVR Attenuation Pond.	No perimeter contact water collection or contact water collection system.
	Surface water management infrastructure	Qualitative Scale	Very complex: Require multiple diversions of surface water around the WRSF.	-	Moderately complex: Requires at least one diversion of surface water around the WRSF.	-	-	No diversions of water from catchment area to avoid the WRSF.
	Number of Waterbodies to fishout	Number (#)	> 8	7 to 8	5 to 6	3 to 4	1 to 2	0
	Area of Waterbodies Overprinted	Total hectares (ha)	> 20 ha and ≤25 ha	> 15 ha and ≤20 ha	> 10 ha and ≤15 ha	> 5 ha and ≤ 10 ha	> 1 ha and ≤ 5 ha	≤ 1 ha
	Closure Complexity	Qualitative Scale	High complexity: Requires reclamation of more than one water diversion structure and multiple collection systems for seepage and runoff. Operation of pumps will be required to convey contact water to IVR Attenuation Pond. Monitoring and pumping of contact water quality through closure until Water Licence criteria are met (no defined end to monitoring).	-	Moderate complexity: Requires reclamation of one water diversion structure and multiple collection systems for seepage and runoff. Operation of pumps will be required to convey contact water to IVR Attenuation Pond. Monitoring and pumping of contact water quality through closure until Water Licence criteria are met (no defined end to monitoring).	-	Simple complexity: Requires reclamation of contact water collection systems collection systems for seepage and runoff. No pumping is required to convey contact water to the IVR Attenuation Pond. Monitoring of contact water quality through closure until Water Licence criteria are met (no defined end to monitoring).	Low complexity: No active reclamation, structural alteration, or pumping required. Contact water at closure is predicted to meet Water Licence criteria allowing water to be discharged to the receiving environment.

Sub-Account	Indicators	Scale Metric (Unit)	Score					
			1	2	3	4	5	6
Water Management Infrastructure *(cont'd)*	Post-Closure Complexity	Qualitative Scale	Active water management and/or treatment in perpetuity	Active water management and/or treatment for > 20 years	Active water treatment and management for 10-20 years	Active water treatment and management for < 10 years	Passive water management with monitoring and minimal annual maintenance	No post closure management or monitoring required
Operational consequences of failure	Operational Consequence IVR WRSF failure	Qualitative Scale	High: Expected to require cessation of operations. Overflow of contact water will flow directly to mine infrastructure and will require lasting hold of operations to ensure safety of workers.	Moderate-to-High: May require short-term cessation of operations as overflow of contact water will flow directly to mine infrastructure. Cessation of operations for safety of workers is likely to be temporary, and operations will be re-established in the short term.	Moderate: May result in temporary cessation of operations as overflow of contact water will flow directly to mine infrastructure. Smaller volumes and redundant structures mean that cessation of operations for safety of workers is likely to be temporary, and operations will be quickly re-established.	Low-to-Moderate: Overflow of contact water may indirectly flow to mine infrastructure, requiring adjustment of operations. The situation (minor volumes and flow) will be manageable and would not require cessation of operations.	Low: Re-allocation of resources required. Overflow of contact water would flow to receiving environment and would not directly affect pit operations, although other mine activities may be affected through re-allocation of resources.	No consequence: no change to operations as overflow of contact water would be fully contained by existing water containment without material impact to mine operations.
Environment Account								
Air Quality	GHG and Dust Emissions During Construction of the IVR WRSF	Thousand m^3 of fill by kilometres of transport from source (thousand m^3km)	More than 400 thousand m^3km	300 to 399 thousand m^3km	200 to 299 thousand m^3km	100 to 199 thousand m^3km	25 to 99 thousand m^3km	Less than 24 thousand m^3km
	GHG Emissions During Operation of Water Management Infrastructure	Additional pumps (#)	More than 2 pumps to convey water to IVR Attenuation Pond	2 pumps running at full capacity to convey water to IVR Attenuation Pond	2 pumps running a partial capacity to convey water to IVR Attenuation Pond	1 pumps running at full capacity to convey water to IVR Attenuation Pond	1 pumps running a partial capacity to convey water to IVR Attenuation Pond	0 pumps to convey water to IVR Attenuation Pond
Surface Water	Loss of Natural Waterbodies	Number of waterbodies (#)	Loss of 4 or more natural waterbodies	Loss of 3 natural waterbodies	Loss of 2 natural waterbodies	Loss of 1 natural waterbody	Reconfiguration or partial loss of 1 natural waterbody	No natural waterbodies are affected
	Ability to Manage Surface Water Quality Impact	Qualitative Scale	More than one diversion system will be required to divert contact water from the WRSF and a water management system is required to convey water to the IVR Attenuation Pond to avoid impacts to fish-bearing waterbodies.	-	One diversion system will be required to divert contact water from the WRSF and a water management system is required to convey water to the IVR Attenuation Pond to avoid impacts to fish-bearing waterbodies.		Natural drainage and landscape features will be used to divert contact water from WRSF and no water management system is required to avoid impact to fish-bearing waterbodies.	Potential water quality impacts to Mammoth Lake, or other external fish-bearing water bodies are not anticipated.

Sub-Account	Indicators	Scale Metric (Unit)	Score					
			1	2	3	4	5	6
Fish and Aquatic Habitat	Number of Fish-Bearing Waterbodies	Number of waterbodies (#)	3 or more	2	1	-	-	0
	Diversity of Affected Fish Community	Number of species (#)	6 or more species	4 or 5 species	3 species	2 species	1 species	0 species
	Extent of Fish Habitat Loss	Area (ha)	25 ha or more	20 to 24 ha	15 to 19 ha	10 to 14 ha	9 ha or less	Zero – no fish habitat is affected
	Abundance of Affected Fish Community	Qualitative Scale	High abundance	Moderate-to-high abundance	Moderate abundance	Low -to-moderate abundance	Low abundance	None - no fish habitat is affected
Terrestrial Habitat	Terrestrial habitat loss	Area (ha)	Significant impact: extensive pipeline and water management structures in addition to the footprint of the WRSF	-	Medium impact: pipeline and water management structures in addition to the footprint of the WRSF	-	Low impact: perimeter and contact water management structures only in addition to the footprint of the WRSF	Very Low impact: only the footprint of the WRSF
Environmental Consequences of Failure	Environmental Consequence of Failure of Water Management Infrastructure	Qualitative Scale	High: overflow of contact water would not be contained by contact water collection system or attenuation pond and would be released to natural receiving environment, with potential impacts to fish-bearing waterbodies.	Moderate-to-high: overflow of contact water would not be contained by contact water collection system or attenuation pond and would be released to natural receiving environment, with potential impacts to non-fish-bearing waterbodies.	Moderate consequence: overflow of contact water would be partially contained by existing mine infrastructure but may also be released to receiving environment. Potential effect to waterbodies that are not fish-bearing.	Low-to-moderate: overflow of contact water would be fully contained by existing mine infrastructure.	Low consequence: overflow of contact water would be partially contained within contact water collection system or attenuation pond and fully contained by existing mine infrastructure.	No consequence: overflow of contact water would be fully contained by existing mine contact water collection system or attenuation pond.
	Environmental consequence of Slope Failure to Fish-bearing water bodies	Number of fish-bearing waterbodies (#)	1 or more	-	-	-	-	0
Socio-Economic Account								
Inuit Land Use	Loss of Waterbody Used For Fishing	Qualitative Scale	Affected waterbody (either overprinted or there is a potential for impact to the waterbody as a result of the WRSF) is reported to be a destination for fishing and used frequently	Affected waterbodies (either overprinted or there is a potential for impact to the waterbody as a result of the WRSF) is reported to be a destination for fishing and used regularly	Affected waterbodies (either overprinted or there is a potential for impact to the waterbody as a result of the WRSF) is reported to be fished opportunistically	Affected waterbodies are not known to be used for fishing, and consultation with local land users indicates fishing is unlikely due to the availability of better fishing lakes	Affected waterbodies are not known to be used for fishing, and consultation with local land users indicates fishing is unlikely due to the size and nature of the lake	Affected waterbodies (if any) are not fish-bearing
	Relocation of Fish	Qualitative Scale	Relocation of fish is required	-	-	-	-	Relocation of fish is not required
	Disruption of Landscape (Operations)	Qualitative Scale	Major: The IVR WRSF is located outside the current changes to the natural landscape. Changes are adjacent to or distinct from the mine site.	-	Moderate: The IVR WRSF will result in changes to the natural landscape. Changes are encompassed by mine site.	-	Minor: The IVR WRSF will result in changes to the natural landscape. Changes are encompassed by mine site or blend with baseline boundaries of waterbodies.	The IVR WRSF will not alter the natural landscape.

Sub-Account	Indicators	Scale Metric (Unit)	Score					
			1	2	3	4	5	6
Land Use Consequence of Failure	Land Use Consequence of Failure of Water Management Infrastructure	Qualitative Scale	High consequence: overflow of contact water would not be contained by mine infrastructure and would be released to natural receiving environment. Real and perceived impacts may be widespread including fish-bearing water bodies, or affected areas are known to be regularly used for harvesting or travel, or present land use resources not available elsewhere.	Moderate-to-high consequence: overflow of contact water would not be contained by mine infrastructure and would be released to natural receiving environment. Affected areas are not regularly used for harvesting or travel, and do not present land use resources available elsewhere. Perception of contamination or other impacts may extend to a broader area.	Moderate consequence: overflow of contact water would not be contained by mine infrastructure and would be released to natural receiving environment. Affected areas are not regularly used for harvesting or travel, and do not present land use resources available elsewhere. Impacts likely to be contained close to the mine site and perception of downstream contamination is not expected.	Low-to-moderate: overflow of contact water would be partially contained by other existing mine infrastructure and would pose no risk to land users or harvesting areas outside the mine site.	Low consequence: overflow of contact water would be partially contained by existing mine infrastructure designed to collect and store water and fully contained by other mine infrastructure, and would pose no risk to land users or harvesting areas outside the mine site.	No consequence: overflow of contact water would be fully contained by existing mine infrastructure designed to collect and store water, and would pose no risk to land users or harvesting areas outside the mine site.
Economic Account								
IVR WRSF Costs	Capital Costs	Estimated Cost ($)	More than $10 million	$8 to $10 million	$6 to $8 million	$4 to $6 million	$1 to $4 million	< $1 million
	Fish Habitat Offsetting Costs	Estimated Cost ($)	More than $1 million	-	$500,000 to $1 million	-	Less than $500,000	No fish habitat offsetting costs
	Operating/Sustaining Costs	Qualitative Scale	One additional pump, high increase in seepage in pit, high monitoring requirements.	One additional pump, management of surface water diversion and high monitoring requirements of runoff and seepage.	One additional pump, high monitoring requirements of runoff and seepage.	High monitoring requirements of runoff and seepage.	Low monitoring requirements of runoff and seepage.	No monitoring requirements of runoff and seepage (use of Whale Tail WRSF only).
	Closure and Reclamation Costs	Qualitative Scale	Incremental cost increase (>20% of the total cost of closure for the water management system). Low cost certainty (<60% probability of completing closure and reclamation within budget).	Incremental cost increase is high (>20% of the total cost of closure for the water management system). High or moderate certainty for closure of this option (>60% probability of completing closure and reclamation within budget).	Incremental cost increase is moderate to high (10-20% of the total cost of closure for the water management system). Moderate cost certainty for closure of this option (60-90% probability of completing closure and reclamation within budget).	Incremental cost increase is small (<10% of the total cost of closure for the water management system). High cost certainty for closure of this option (>90% probability of completing closure and reclamation within budget).	Incremental cost increase is small (<10% of the total cost of closure for the water management system) for removal of pumping equipment water management infrastructure.	No incremental cost difference - No incremental changes to closure beyond the approved Whale Tail Pit Project closure plan.
	Long-Term Post-Closure Costs	Qualitative Scale	Active water treatment and management required in perpetuity.	Active water treatment and/or management infrastructure is required to be operated for undetermined amount of time.	Active water treatment and/or water management time period is undetermined but does not require active pumping.	Active water treatment and management may be required <10 years.	Post closure monitoring required for <10 years.	No post-closure monitoring required.

Table 8.2-1: Weighting of Accounts

Account	Weight
Technical	3
Environment	6
Socio-Economic	3
Economic	1.5

Table 8.2-2: Weighting of Sub-Accounts

Account	Sub-Account	Weight
Technical	WRSF (Design, Construction, Operation, and Closure)	3
	Water Management Infrastructure	4
	Operational Consequences of Failure	6
Environment	Air Quality	2
	Surface Water	5
	Fish and Aquatic Habitat	6
	Terrestrial Habitat	4
	Environmental Consequences of Failure	4
Socio-Economic	Inuit Land Use	6
	Land Use Consequence of Failure	5
Economic	IVR WRSF Costs	1

Table 8.2-3: Weighting of Indicators

Account	Sub-Account	Indicators	Weight
Technical	WRSF (Design, Construction, Operation, and Closure)	Length of Haul Road	5
		Requirement for Additional Drilling/Design	3
	Water Management Infrastructure	Length of pipeline (combined)	6
		Contact Water Collection Infrastructure	4
		Surface water management infrastructure	6

Account	Sub-Account	Indicators	Weight
Technical *(cont'd)*		Number of Waterbodies to fishout	5
		Area of Waterbodies Overprinted	5
		Closure Complexity	3
		Post-Closure Complexity	6
	Operational Consequences of Failure	Operational Consequence IVR WRSF failure	1
Environment	Air Quality	GHG and Dust Emissions During Construction of the IVR WRSF	6
		GHG Emissions During Operation of Water Management Infrastructure	3
	Surface Water	Loss of Natural Waterbodies	1
		Ability to Manage Surface Water Quality Impact	4
	Fish and Aquatic Habitat	Number of Fish-Bearing Waterbodies	5
		Diversity of Affected Fish Community	3
		Extent of Fish Habitat Loss	6
		Abundance of Affected Fish Community	2
	Terrestrial Habitat	Terrestrial habitat loss	1
	Environmental Consequences of Failure	Environmental Consequence of Failure of Water Management Infrastructure	3
		Environmental consequence of Slope Failure to Fish-bearing water bodies	6
Socio-economic Account	Inuit Land Use	Loss of Waterbody Used For Fishing	4
		Relocation of Fish	6
		Disruption of Landscape (Operations)	4
	Land Use Consequence of Failure	Land Use Consequence of Failure of Water Management Infrastructure	1
Economic Account	IVR WRSF Costs	Capital Costs	1
		Fish Habitat Offsetting Costs	1
		Operating/Sustaining Costs	1
		Closure and Reclamation Costs	1
		Long-Term Post-Closure Costs	1

Inuit land use indicators consider potential impacts on fishing and the Inuit in relation to the land. In consultation with Inuit Elders and community members in Baker Lake, the potential need to relocate fish (i.e., to proceed with construction at a fish-bearing lake) was highlighted as point of concern related to spiritual changes to the fish. As such, the relocation of fish is given the highest weight (6). The loss of a waterbody used for fishing is weighted somewhat lower (4) as waterbodies for fishing are plentiful throughout the landscape. The potential disruption of the IVR WRSF on the landscape during mine operations, which could affect the appreciation of land use activities and/or the environment, is also weighted 4.

The economics indicators describe costs associated with various phases and/or activities of the Whale Tail Pit Expansion Project. All costs are weighted equally, and are nominally appointed a weight of 1.

8.3 Quantitative Analysis

The ECCC Guidelines describe the calculation of merit ratings for each candidate based on the relevant scores and weightings. Merit ratings were calculated using the ECCC spreadsheet (**Attachment C**). The resulting “alternative merit rating” is a number between 1.0 and 6.0, where higher numbers indicate a greater degree of preference. The alternative, account, and sub-account merit ratings can be compared across alternatives. Table 8.3-1 provides the merit ratings for each of the three alternatives (for the purpose of scoring, Alternative III was assumed to overprint fish-bearing waterbodies).

Table 8.3-1: Merit Ratings of Alternatives

Name	Description	Merit Rating
Alternative A	Location identified in FEIS addendum and Waste Management Plan, overprints three waterbodies frequented by fish.	**4.66**
Alternative B	Northwest of Location A, unknown if overprints waterbodies frequented by fish.[1]	3.03
Alternative K	Northeast of Location A, does not overprint waterbodies frequented by fish.	3.72

Bolded score indicates the highest scored option.
[1] For the purpose of the alternatives analysis it was assumed that overprinted waterbodies supported fish populations similar to that of A50, A51, and A52.

9. STEP 6: SENSITIVITY ANALYSIS

The sensitivity analysis is designed to test the strength of the results and identify areas where a change in weightings may significantly influence the results. Considering the results of the preliminary quantitative analysis in Section 8.3, the objective of the sensitivity analysis is to understand possible sources of bias and subjectivity in the preceding calculations. This is achieved by changing the value based weightings and examining the results. Although the “scores” are fact-based and therefore not subject to variation, the weightings of accounts, sub-accounts, and indicators may vary between stakeholders and could have a significant impact on the results.

Three sensitivity cases were performed:

- Sensitivity Case 1: Set the Economic Account to zero to determine the best technical/environmental solution independent of cost.
- Sensitivity Case 2: Set both weights of the Technical and Economic accounts to zero and environmental and socio-economic remain the same as the preliminary analysis.
- Sensitivity Case 3: Set an even weight for each of the four accounts.

Table 9-1 shows how each of the alternatives compare between the accounts for the preliminary analysis and the overall merit ratings for each of the sensitivity cases performed. For each of the accounts Alternative A has the highest score. Results of the sensitivity analysis to examine the best solution independent of project costs and technical complexity indicates that Alternative A is the best solution.

Table 9-1: Sensitivity Analysis (Alternative Merit Ratings)

Scenario		Alternative A	Alternative B	Alternative K
Preliminary Analysis	Technical = 3	**5.41**	3.98	4.28
	Environmental = 6	**4.42**	2.45	3.05
	Socio-Economic = 3	**4.52**	3.16	4.48
	Economic = 1.5	**4.40**	3.20	3.80
	Overall	***4.66***	*3.03*	*3.72*
Sensitivity Case 1 (Preliminary Analysis with Economic Weight = 0)		**4.69**	3.01	3.71
Sensitivity Case 2 (Preliminary Analysis with Economic Weight and Technical Weight = 0)		**4.45**	2.68	3.53
Sensitivity Case 3 (All Accounts Weighted Evenly)		**4.69**	3.20	3.90

Bolded score indicates the highest scored option.

10. CONCLUSIONS

Based on the outcomes of the quantitative analysis, including consideration of the sensitivity analysis, the preferred IVR WRSF alternative is Alternative A. This alternative would store IVR Pit waste rock for the Whale Tail Pit Expansion Project in an area that would overprint waterbodies A50, A51, A52, and A-P21 (Figure 6-1).

Lakes A50, A51, and A52 are fish-frequented waterbodies and overprinting of the lakes with a WRSF will require an amendment to Schedule 2 of the MDMER. The advantages of this alternative include a relatively small footprint, reduced need for surface water management infrastructure, reduced complexity during operations, and reduced consequences in the event of water management operational failure. This alternative also facilitates effective management of surface water quality impacts at the mine site as natural drainage conditions support the collection of contact water from the IVR WRSF to the IVR Attenuation Pond.

The alternatives assessment has considered other options for the IVR WRSF, including one alternative that does not involve the overprinting of fish-bearing waterbodies and one alternative that has the potential to overprint fish-bearing waterbodies. However, the disadvantages of these alternatives based on technical, environmental, and safety considerations are highlighted in the results.

Pursuant to ECCC's '*Streamlining the Approvals Process for Metal Mines with Tailings Impoundment Areas*', Agnico Eagle has completed the following steps to support a streamlined Schedule 2 amendment process:

- Conducted an assessment of the IVR WRSF alternative locations, including the costs and benefits of the alternatives (this report);
- Proposed a fish habitat compensation plan associated with the preferred attenuation pond alternative, which outlines the habitat losses and gains in relation to the use of waterbodies A50, A51, and A52; and
- Conducted consultations on the WRSF alternatives as described in Section 3.1.2

The NIRB's review of Agnico Eagle's Final Environmental Impact Statement has provided further opportunities for Inuit, Inuit organizations and the public to comment on the assessment of attenuation pond alternatives and proposed fish habitat compensation plan pertaining to the Expansion Project.

11. REFERENCES

Agnico Eagle (Agnico Eagle Mines Limited). 2016. *Inuit Qaujimajatuqangit Baseline Report*. June 2016. Included as Appendix 7-A of the Whale Tail Pit Project: Final Environmental Impact Statement (FEIS).

Agnico Eagle. 2018a. *Whale Tail Pit Expansion Project: Final Environmental Impact Statement Addendum*. Submitted by Agnico Eagle Mines Limited – Meadowbank Division. Prepared by Golder Associates Ltd. December 2018.

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Agnico Eagle. 2019a. *Whale Tail Pit Waste Rock Management Plan, Version 5.0*. Prepared by Agnico Eagle Mines Limited, Meadowbank Division. May 2019.

Agnico Eagle. 2019b. *Whale Tail Pit Water Management Plan, Version 4.0*. Prepared by Agnico Eagle Mines Limited, Meadowbank Division. May 2019.

Agnico Eagle. 2019c. *Whale Tail Pit Interim Closure and Reclamation Plan, Version 2.0*. Prepared by Agnico Eagle Mines Limited, Meadowbank Division. May 2019.

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ECCC. 2019. *Report Template for Assessment of Alternatives for Mine Waste Disposal*. Prepared by Mining and Processing Division Environment and Climate Change Canada. July 2019.

Nunavut Impact Review Board (NIRB). 2017. *Final Hearing Report: Agnico Eagle Mines Ltd. Whale Tail Pit Project*. NIRB File No. 16MN056. November 2017.

Nunavut Water Board (NWB). 2018. *Water Licence No: 2AM-WTP1826. Issued by Nunavut Water Board to Agnico Eagle Mines Limited for Water Use and Deposit of Waste at Whale Tail Pit Mine and Haul Road, Kivalliq Region, Nunavut*. Date of issuance: May 29, 2019. Expiry: May 28, 2026.

ATTACHMENT A ECCC LETTER TO AGNICO EAGLE DATED NOVEMBER 8, 2019

Mr. Jamie Quesnel
Regional Manager
Permitting and Regulatory Affairs
Agnico Eagle Mines Limited - Meadowbank Division
Baker Lake, Nunavut, Canada
X0C 0A0

November 8, 2019

Subject: Whale Tail Pit Expansion Project - Meadowbank Division
Listing of additional waterbodies on Schedule 2 of the *Metal and Diamond Mining Effluent Regulations*

Dear Mr. Quesnel,

Agnico Eagle Mines Limited (AEM) is proposing the development of an expansion to its Whale Tail Pit Project (Meadowbank Division), located in Nunavut. The mine expansion project intends to dispose of mine waste by overprinting waters.

The *Fisheries Act* prohibits the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter any such water (subsection 36(3)), unless authorized by regulations (subsection 36(5)). The *Metal and Diamond Mining Effluent Regulations* (MDMER) authorize deposits into a Tailings Impoundment Area (TIA) that is a water or place set out in Schedule 2 of the Regulations. Authorization to deposit mine waste containing a deleterious substance into waterbodies frequented by fish can be given by listing the waterbodies on Schedule 2 of the MDMER.

Waterbodies to be listed on Schedule 2 of the MDMER:

The proponent has submitted a number of studies, technical reports and records about the watersheds and associated waterbodies in the project area, as shown in Appendix 1. Environment and Climate Change Canada (ECCC) has also received advice from Fisheries and Oceans Canada (DFO), dated October 10, 2019 (with an Addendum received November 6, 2019), on whether these waterbodies are considered waters frequented by fish. Based on the information provided thus far, if the proponent intends to deposit mine waste in these waters frequented by fish, authorization can be given by listing them[1] on Schedule 2 of the MDMER:

[1] or portions of them in the case of waterways

Lakes	• Lake A50 • Lake A51	• Lake A52 • Lake A53
Waterways	• A53-A17* • A50-A17* • A51-A50	• A52-A51* • A53-A52

*Only portion(s) of waterway are concerned. Further assessment required to delineate.

The proponent had originally identified Lake A53, and its associated watercourse A53-A17, as the sole waterbodies within the project area that are fish frequented[2] and overprinted by mine waste. Field investigations confirmed the presence of at least five (5) fish species, including arctic char. As a result, the proponent submitted an Assessment of Alternatives report for the use of Lake A53 (and a portion of watercourse A53-A17) as a TIA into which effluent is to be deposited (attenuation pond)[3].

In addition, the proponent has submitted data gathered during the 2019 field season, which confirmed the presence of Ninespine Stickleback in three (3) lakes: A50, A51 and A52. The proponent stated that the [… previously described non-fish bearing Lake 50, Lake 51, and Lake 52 were reclassified as fish-bearing lakes based on the Ninespine Stickleback observations in summer 2019][4]. The site layout shows these waterbodies as being overprinted by either effluent or waste rock.

For the five (5) waterways identified (A53-A17, A52-A51, A50-A17, A53-A52 and A51-A50), records indicate that these may be either seasonal watercourses or diffuse watercourses during specific flow conditions, e.g., during and immediately following freshet. The site layout shows them as being partially or entirely overprinted by mine waste.

Please note that ultimately, it is the responsibility of the proponent to identify all waters frequented by fish being overprinted by mine waste so that authorization may be given by listing these waterbodies on Schedule 2 of the MDMER. The proponent must comply at all times with the *Fisheries Act* and the MDMER. Should the proponent seek authorization to deposit mine waste into additional waterbodies, the proponent must advise ECCC of this change as soon as possible.

Schedule 2 Process:

Proposals to amend Schedule 2 of the MDMER must meet various requirements before the Minister of the Environment can recommend the amendment to the Governor in Council. It is the Proponent's responsibility to:

- Develop an Assessment of Alternatives (AA) for mine waste disposal in accordance with ECCC's Guidelines for the Assessment of Alternatives for Mine Waste Disposal;

  Note that the AA report shall include a list and map/figure indicating all waterbodies to be listed on Schedule 2.

[2] Agnico Eagle Mines Ltd. (December 2018): *Final Environmental Impact Statement Addendum - Whale Tail Pit Expansion Project*; submitted to NIRB, subsections 2.3 and 6.5.4.
[3] Agnico Eagle Mines Ltd. (September 2019): *Whale Tail Pit Expansion Project - Attenuation Pond Alternatives Assessment Report.*
[4] Agnico Eagle Mines Ltd. (August 9, 2019): *Final Written Submission Responses, Whale Tail Pit – Expansion Project*; submitted to NIRB.

- Develop a Fish Habitat Compensation Plan (FHCP) that complies with the requirements of section 27.1 of the MDMER and DFO's *Fisheries Productivity Investment Policy (2013);* and

- Participate in public and Indigenous consultations on the potential amendment to Schedule 2 of the MDMER for the waterbodies impacted by the mine waste disposal areas. These consultations can be initiated when the AA report and FHCP have been reviewed in consideration of ECCC and DFO's policies and guidelines.

The proponent can either prepare new AA and FHCP reports for the additional aforementioned waterbodies or the proponent can include new sections in the AA and FHCP reports being developed for Lake A53 to encompass all fish frequented waterbodies overprinted by mine waste.

Please note that the Mining and Processing Division of ECCC will be responsible for preparing the regulatory package and associated documentation required to amend Schedule 2 of the MDMER. The typical timelines associated with the regulatory amendment process vary between 12 and 24 months following consultations depending if the project goes through the streamlining or regular process.

Should you have any questions or concerns regarding the attached comments or next steps, please do not hesitate to contact me at 819-420-7369 or via email at corinne.proux@canada.ca.

Sincerely,

Corinne Proux
Senior Program Engineer
Mining and Processing Division
Environment and Climate Change Canada

cc: Eva Walker, Environmental Assessment Coordinator, ECCC
Patrick Koch, Head Mining Technical Analysis Unit, ECCC
Nancy Seymour, Manager, Mining Section, ECCC
Erin Reimer, Technical Advisor I, NIRB
Boyan Tracz, Fisheries Protection Biologist, DFO
Nicola Lower, Principal Consultant, ERM

Attachments:

- Appendix 1: Fish Habitat Assessment – References

Appendix 1: Fish Habitat Assessment – References

- Final Environmental Impact Statement Addendum, Whale Tail Pit Expansion Project, December 2018
- Supporting Document SD-1. Whale Tail Expansion Project 2018 Fish and Fish Habitat Field Investigations: Agnico Eagle Mines Ltd. – Meadowbank Division (C. Portt and Associates, March 10, 2019)
- Supporting Document SD-2. Whale Tail Pit 2014-2016 Fish and Fish Habitat Field Investigations: Agnico Eagle Mines Ltd. – Meadowbank Division (C. Portt and Associates, February 26, 2018)
- Agnico Eagle Mines Ltd. Conceptual Fish Habitat Offsetting Plan – Whale Tail Expansion Project, April 2019
- Agnico Eagle Mines Ltd. Attenuation Pond Alternatives Assessment Report – Whale Tail Expansion Project. November 2018
- DFO Information Requests (IRs), Whale Tail Expansion Project; submitted to NIRB: February 21, 2019
- Agnico Eagle Mines Ltd. Information Request Responses – Whale Tail Expansion Project. March 13, 2019
- DFO Technical Comments, Whale Tail Expansion Project; submitted to NIRB: May 14, 2019
- Agnico Eagle Mines Ltd. Technical Comments Responses, Whale Tail Pit – Expansion Project , May 29, 2019
- DFO Final Written Submission, Whale Tail Expansion Project; submitted to NIRB: July 26, 2019
- Agnico Eagle Mines Ltd. Final Written Submission Responses, Whale Tail Pit – Expansion Project; submitted to NIRB August 9, 2019
- Agnico Eagle Mines Ltd. Draft Meeting Record, July 3, 2019 meeting with DFO;
- includes Appendix 1: AEM presentation
- Agnico Eagle Mines Ltd. Draft Meeting Record, September 30, 2019 meeting with DFO and KIA; includes AEM presentation

ATTACHMENT B TABLE OF CONCORDANCE WITH ECCC GUIDELINES (2016)

Attachment B: Table of Concordance with ECCC Guidelines

The left-hand column of the following table is populated with text taken from the *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (ECCC 2016; Chapter 2: Requirements of Alternatives Assessment, Sections 2.2 to 2.8). The original Guidelines included examples in bulleted lists and tables to illustrate the described requirements, details associated with specific types of mining components that are not relevant to the alternatives considered in this report, and narrative discussion of general concepts in and approaches to multiple accounts analysis. For the sake of brevity and simplicity, these portions of the Guidelines have been omitted from this Table of Concordance. Instances of omitted text are indicated by ellipses.

ECCC Guideline Requirements	Report Section
2.2 Step 1: Identify Candidate Alternatives The first step in the alternatives assessment process entails developing a list of all possible (i.e., reasonable, conceivable and realistic) candidate mine waste disposal alternatives for the site. This should include different mine waste disposal technologies, different disposal storage options, and different disposal locations. At this time it is imperative that no a priori judgements be made about any of the alternatives.	Section 4
It may be appropriate to establish a basic set of threshold criteria to establish the regional boundaries for selecting candidate alternatives. These threshold criteria should be as broad as possible and must be fully described and rationalized to ensure transparency…	Section 4
2.3 Step 2: Pre-Screening Assessment The process of screening, called the pre-screening assessment in these guidelines, entails excluding those alternatives that are “non-compliant” in that they do not meet certain unique minimum specifications which have been developed for the project. This process is often referred to as a “fatal-flaw analysis” in the context of mine waste disposal alternatives assessments. A fatal flaw is defined as any site characteristic that is so unfavourable or severe that, if taken singly, it would eliminate that site as a candidate mine waste disposal alternative. In simple terms, these would be considered the “show-stoppers”.	Section 5.1
There is not a “master list” that qualifies as pre-screening criteria. These criteria need to be uniquely developed for each project, and a thorough qualification and justification of the rationale must be provided. The selection of pre-screening criteria and its rationale needs to be carefully considered since the objective at this time is to provide a transparent process for potentially eliminating the majority of alternatives from detailed analysis and assessment. Therefore, it should be clear to external reviewers that the pre-screening criteria, when evaluated singly, are sufficiently important to eliminate an alternative from further consideration. The level of detail required to support that conclusion has to be evaluated on a case-by-case basis, and it may have to be extensive to be sufficiently supportive.	Section 5.2
Pre-screening criteria should be formulated such that there is a simple “YES” or “NO” response to whether the alternative complies with the set criteria. Most importantly, it must be clear to the external reviewer that there would be no reasonable mitigation strategy that would convert a “YES” into a “NO”. […] Results of the pre-screening assessment are best presented in the form of a summary table that lists each alternative against the pre-screening criteria (and associated rationale) set for the project…	Section 5.2, Table 5.2-1

ECCC Guideline Requirements	Report Section
2.4 Step 3: Alternative Characterization […] Site specific characterization criteria should be developed for each project. To facilitate smooth transition towards the next more rigorous steps of the evaluation process these criteria should be categorized into four broad categories, or "accounts" in the context of these guidelines, that consider the entire project life cycle. This means that both short and long term environmental, technical and socio-economic aspects associated with construction through operation, mine closure and ultimately post-closure maintenance and monitoring need to be considered. The "accounts" can be summarized as follows:	Section 6
▪ Environmental characterization: This account focuses on characterizing the local and regional environment surrounding the proposed TIA. These include elements such as climate, geology, hydrology, hydrogeology, water quality and potential impacts on aquatic, terrestrial and bird life.	Section 6.2
▪ Technical characterization: This focuses on characterization of the engineered elements of each alternative such as storage capacity, dam size and volume, diversion channel size and capacity, dumping techniques, haul distances, sedimentation and pollution control dam requirements, tailings discharge methods, pipeline grades and routes, closure design, discharge and/or water treatment infrastructure and supporting infrastructure such as access roads.	Section 6.1
▪ Project economic characterization: The focus of this account is to characterize life of project economics. All aspects of the mine waste management plan need to be considered including investigation, design, construction (inclusive of borrow development and royalties where applicable), operation, closure, post closure care and maintenance, water management, associated infrastructure (including transport and deposition systems), compensation payments and land use or lease fees.	Section 6.4
▪ Socio-economic characterization: This account focuses on how a proposed TIA may influence local and regional land users. Elements that are considered here include characterization and valuation of land use, cultural significance, presence of archaeological sites and employment and/or training opportunities…	Section 6.3
▪ The deliverable for this step should ideally be a series of summary tables that list the selected characterization criteria for each account for each of the alternatives under consideration. The table should include a concise summary of the rationale behind each criterion. This format allows an external reviewer to easily compare the factual characteristics across alternatives…	Tables 6.1-1, 6.2-1, 6.3-1,6.4-2
2.5 Step 4: Multiple Accounts Ledger […] In order to evaluate alternatives using the MAA decision making tool, it is necessary to develop a multiple accounts ledger. This ledger seeks to identify those elements that differentiate alternatives, and provides the basis for scoring and weighting as described in Step 5, which is necessary to complete the evaluation.	Section 7, Table 7.3-1
The multiple accounts ledger consists of the following two elements: (1) sub-accounts, known as evaluation criteria, and (2) indicators, known as measurement criteria.	Tables 7.1-1 and Table 7.2-1

ECCC Guideline Requirements	Report Section
2.5.1 Sub-Accounts Sub-accounts (evaluation criteria) are developed using the characterization criteria selected during Step 3. The fundamental difference between these sets of criteria is that characterization criteria are factual and have been developed with no a priori judgements being made regarding any of the alternatives being considered, while evaluation criteria consider only the material impact (i.e., benefit or loss) associated with any of the alternatives being evaluated… The choice of sub-accounts must be carefully considered so that only those sub-accounts that truly differentiate mine waste disposal alternatives are presented for evaluation. To facilitate this, sub-accounts should comply with the following guidelines: ■ Impact driven: The evaluation criteria must, as far as practicable, be linked to an impact as opposed to merely being a factual element. For example, the size of an impacted lake in itself is not a relevant sub-account, but if the size of the lake is linked to its value or potential habitat loss, then the sub-account is appropriate. ■ Differentiating: The sub-account must define an aspect which distinctly differentiates one alternative from another, and that difference is expected to have a material effect on the final selection of an alternative. For example, land ownership may be an important evaluation criterion, if different alternatives fall on ground with different ownership. Conversely, if all the mine waste disposal alternatives under consideration were on land belonging to a single owner, then there really is no need to consider this sub-account in the analysis. ■ Value relevance: A sub-account must be relevant in the context of the alternatives being evaluated. For example, the size of dams in itself is not a relevant sub-account unless it is linked to a relevant context such as increased long-term risk of failure or increased maintenance and inspection requirements. ■ Understandability: Sub-accounts must be unambiguously defined, such that two external reviewers cannot interpret the outcome differently. For example, distance between the TIA and the mill complex may be a sub-account with the understanding that greater distances pose greater technical and environmental risk. However, someone may assume that because there is a significant dust hazard associated with a proposed alternative, a greater distance could be advantageous due to reduced worker health and safety risks. ■ Non-redundancy: There should not be more than one sub-account that measures the same evaluation criteria. If individual sub-accounts measure similar criteria, consideration should be given to combining those criteria. ■ Judgemental independence: Sub-accounts should be judgementally independent, which means that preferences with respect to a single criteria, or trade-offs between criteria, cannot depend on the value of another. For example, assume “traditional land use” is one sub-account and another is “landowner perception”. It may be concluded that for one alternative “hunting” will be impacted which would result in a negative impact on “traditional land use”. However, if “landowner perception” is influenced by a decrease in hunting then judgemental independence does not exist… The deliverable at this stage in the process will be a summary table which lists the sub-accounts complete with the rationale behind each. Appropriate supporting documentation will likely have to be clearly referenced…	Section 7.1 Table 7.1-1

ECCC Guideline Requirements	Report Section
2.5.2 Indicators To allow qualitative or quantitative measurement of the impact (i.e., benefit or loss) associated with each alternative for any given sub-account, the sub-account needs to be measurable. Sub-accounts by nature are often not directly measurable, and need to be sufficiently decomposed to allow measurability. This decomposition takes the form of sub-sub-accounts, which in the language of MAA are called indicators, or measurement criteria. […] These indicators may be different for the different life-cycle stages of the project (i.e., construction, operation and closure) and, where appropriate, may be divided into separate time periods. When selecting indicators thought should be given to the parameter that will be used to define measurability. This measurability is required in order to continue to Step 5, which is the value-based decision process. Assigning measurability is relatively simple for sub-accounts that readily lend themselves to parametric terms such as “water quality” or “capital costs”. The challenge comes when measurability needs to be assigned to sub-accounts that do not readily lend themselves to parametric terms such as “traditional land use” which must be supplemented by indicators such as “effects on hunting”. This problem can be overcome by constructing qualitative value scales. […] In order to develop a qualitative value scale it is necessary to define at least two points on the scale (usually the end points). The points on the scale are defined descriptively and draw on multiple concepts in the definition of the indicator. […] Qualitative value scales should be developed to have the following characteristics: ■ Operational: The decision maker should be able to rate alternatives that were not specifically used to define the scale, i.e., should another TIA be added for evaluation at a later time, the scale developed previously should still be relevant. ■ Reliable: Different external reviewers should be able to rate an alternative according to the value scale and assign the same score. ■ Value relevant: The value scale must be directly relevant to the indicator being scored. ■ Justifiable: Any external reviewer should reach the conclusion that the value scale is reasonable and representative. The deliverable for this part of the process will be the expansion of the sub-accounts summary table to include indicators. As previously stated, this collective information is also known as the multiple accounts ledger…	Section 7.2 Table 7.2-1
2.6 Step 5: Value-Based Decision Process At the conclusion of Step 4, the multiple accounts evaluation is complete and the value-based decision process begins. This process entails taking the list of accounts, sub-accounts and indicators and assessing the combined impacts for each of the alternatives under review. This entails scoring and weighting of all indicators, sub-accounts and accounts and quantitatively determining merit ratings for each alternative. These three processes are described in the following sections.	Section 8
2.6.1 Scoring […] Scoring is done by developing qualitative value scales for every indicator, including those which appear to be readily measurable. […] By following this procedure, it is abundantly obvious to the external reviewer why a particular indicator score has been assigned to an alternative, and since the qualitative value scale has been developed collaboratively, with input from stakeholders, there is built in confidence that the scoring is appropriate…	Section 8.1 Table 8.1-1

ECCC Guideline Requirements	Report Section
2.6.2 Weighting At this time the analyst, with input from stakeholders, needs to have the ability to introduce their value bias between individual indicators. This is done by applying a weighting factor to each indicator. […] It is important to bracket the weighting factor, and in the context of these guidelines, it is recommended that the weighting factors range from 1 through 6. This means that any one indicator can be considered to be up to 6 times more significant than another. […] Considering the inherent subjectivity of weighting, there is a natural tendency to want to standardize or prescribe weighting factors. This would result in a fixed value bias, which reflects the value bias of the imposing guidelines with no consideration of site specific conditions, rather than allowing the analyst with input from stakeholders, to set value bias relevant to their project. Notwithstanding this, within the framework of these guidelines, it is proposed that the Base Case of the alternatives assessment use the following weightings for accounts: ■ Environment - 6 ■ Technical - 3 ■ Project Economics - 1.5 ■ Socio-Economic - 3 The analyst is still encouraged to assign other weightings to accounts and demonstrate their effect on the assessment outcome, as described in Step 6…	Section 8.2 Tables 8.2-1, 8.2-2, 8.2-3
2.6.3 Quantitative Analysis The quantitative analysis is relatively simple, and given the potentially large amount of accounts, sub-accounts, and indicators this analysis is well suited to using a spreadsheet type approach. For each indicator, the indicator value (S) of each alternative is listed in one column. The weighting factor (W) is listed in another column and the combined indicator merit score (S × W) is calculated as the product of these values. […] At this time it is possible to compare alternative merit ratings for all mine waste disposal alternatives evaluated and the preferred option will be the one which has the highest merit rating. The deliverable at this point in the process will be summary tables […]. It is, however, very important that justification is provided for all the weightings used along every step of the process. An external reviewer should be able to review the weightings, and conclude that they are reasonable, even though he may not agree with them.	Section 8.3 Attachment C, Table 8.3-1
2.7 Step 6: Sensitivity Analysis […] The way to test the sensitivity of the value based decision making process is to assign different weightings to those indicators, sub-accounts and accounts according to a range of value systems representative of the perceived disparity. The level and type of sensitivity analysis that should be carried out is not set, and should not be prescriptive. It is entirely project specific and to a large extent will be based on feedback received from stakeholders throughout the alternatives assessment process. […] The merit rating of each alternative is compared to the base case analysis to determine if the results of the sensitivity analysis are likely to lead to a different decision about which alternative may be the preferred option. […] The deliverable for this step would be a well-documented summary of the sensitivity analysis that was carried out. This may be presented in summary tables similar to those presented in Step 5 […].	Section 9, Table 9-1

ECCC Guideline Requirements	Report Section
2.8 Step 7: Document Results The final step in the alternatives assessment process entails thorough documentation of the results. This is best done through a comprehensive technical report, which systematically describes the outcome of each of the steps as recommended in these guidelines. The primary technical alternatives assessment report should be a concise summary of the findings of each step, using comparative summary tables and descriptive definitions which make the results immediately apparent to the external reviewer. Detailed supporting information related to elements such as cost estimate breakdowns, or geochemical assessment should be presented in appendices, or if stand-alone reports have been produced, these should be properly referenced and made available for review.	Sections 4 to 10

ATTACHMENT C IVR WRSF QUANTITATIVE ANALYSIS (MERIT RATINGS)

Whale Tail Pit Expansion Project

Quantitative analysis for indicators related to Technical Account					Alternative-A		Alternative-B		Alternative-K	
Account	Sub-account	ID	Indicator	Indicator Weight (W)	Indicator Value (S)	Indicator Merit Score (S × W)	Indicator Value (S)	Indicator Merit Score (S × W)	Indicator Value (S)	Indicator Merit Score (S × W)
Technical	WRSFs (Design, Construction, Operation, and Closure)	1	Length of Haul Road	5	4	20	4	20	4	20
		1	Requirement for Additional Drilling/Design	3	6	18	5	15	5	15
				Sub-account merit score (∑(SxW))		38		35		35
				Sub-account merit rating (RS=∑(SxW)/∑W)		4.75		4.38		4.38
	Water	2	Length of pipeline (combined)	6	5	30	4	24	2	12
		2	Contact Water Collection System	4	5	20	1	4	1	4
		2	Surface water management infrastructure	6	6	36	3	18	1	6
		2	Number of Waterbodies to fishout/dewater	5	4	20	5	25	6	30
		2	Area of Overprinted Waterbodies	5	5	25	6	30	6	30
		2	Closure Complexity	3	5	15	3	9	3	9
		2	Post-Closure Complexity	6	5	30	3	18	3	18
				Sub-account merit score (∑(SxW))		176		128		109
				Sub-account merit rating (RS=∑(SxW)/∑W)		5.03		3.66		3.11
	Operational consequences of failure	3	Operational Consequence IVR WRSF failure	1	6	6	4	4	5	5
				Sub-account merit score (∑(SxW))		6		4		5
				Sub-account merit rating (RS=∑(SxW)/∑W)		6.00		4.00		5.00

Quantitative analysis for sub-accounts related to Technical Account			Alternative-A		Alternative-B		Alternative-K	
Account	Sub-account	Sub-Account Weight (W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)
Technical	WRSFs (Design, Construction, Operation, and Closure)	3	4.75	14.25	4.38	13.13	4.38	13.13
	Water Management Infrastructure	4	5.03	20.11	3.66	14.63	3.11	12.46
	Operational Consequence IVR WRSF failure	6	6.00	36.00	4.00	24.00	5.00	30.00
	Account merit score (Σ{Rs × W})			70.36		51.75		55.58
	Account merit rating (Ra = Σ{Rs×W}/ ΣW)			5.41		3.98		4.28

Quantitative analysis for indicators related to Environment Account					Alternative-A		Alternative-B		Alternative-K	
Account	Sub-account	ID	Indicator	Indicator Weight (W)	Sub-account merit rating (Rs)	Indicator Merit Score (S × W)	Indicator Value (S)	Indicator Merit Score (S × W)	Indicator Value (S)	Indicator Merit Score (S × W)
Environment	Air Quality	1	GHG and Dust Emissions During Construction	6	1	6	1	6	1	6
		1	GHG and Dust Emissions During Operations	3	6	18	4	12	4	12
				Sub-account merit score (∑(SxW))		24		18		18
				Sub-account merit rating (RS=∑(SxW)/∑W)		2.67		2.00		2.00
	Surface Water	2	Loss of Natural Waterbodies	1	1	1	3	3	4	4
		2	Ability to Manage Surface Water Quality Impact	4	5	20	1	4	1	4
				Sub-account merit score (∑(SxW))		21		7		8
				Sub-account merit rating (RS=∑(SxW)/∑W)		4.20		1.40		1.60
	Fish and Aquatic Habitat	3	Number of Fish-Bearing Waterbodies	5	1	5	2	10	6	30
		3	Diversity of Affected Fish Community	3	5	15	5	15	6	18
		3	Extent of Fish Habitat Loss	6	5	30	5	30	6	36
		3	Abundance of Affected Fish Community	2	5	10	5	10	6	12
				Sub-account merit score (∑(SxW))		60		65		96
				Sub-account merit rating (RS=∑(SxW)/∑W)		3.75		4.06		6.00
	Terrestrial Habitat	4	Terrestrial habitat loss	1	5	5	3	3	3	3
				Sub-account merit score (∑(SxW))		5		3		3
				Sub-account merit rating (RS=∑(SxW)/∑W)		5.00		3.00		3.00
	Environmental Consequences of Failure	5	Environmental Consequence of Failure of Water Management Infrastructure	3	6	18	1	3	1	3
		5	Environmental consequence of Slope Failure	6	6	36	1	6	1	6
				Sub-account merit score (∑(SxW))		54		9		9
				Sub-account merit rating (RS=∑(SxW)/∑W)		6.00		1.00		1.00

Quantitative analysis for sub-accounts related to Environment Account			Alternative-A		Alternative-B		Alternative-K	
Account	Sub-account	Sub-Account Weight (W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)
Environment	Air Quality	2	2.67	5.33	2.00	4.00	2.00	4.00
	Surface Water	5	4.20	21.00	1.40	7.00	1.60	8.00
	Fish and Aquatic Habitat	6	3.75	22.50	4.06	24.38	6.00	36.00
	Terrestrial Habitat	4	5.00	20.00	3.00	12.00	3.00	12.00
	Environmental Consequences of Failure	4	6.00	24.00	1.00	4.00	1.00	4.00
	Account merit score (Σ{Rs × W})			92.83		51.38		64.00
	Account merit rating (Ra = Σ{Rs×W}/ ΣW)			4.42		2.45		3.05

Quantitative analysis for indicators related to Socio-Economical Account					Alternative-A		Alternative-B		Alternative-K	
Account	Sub-account	ID	Indicator	Indicator Weight (W)	Indicator Value (S)	Indicator Merit Score (S × W)	Indicator Value (S)	Indicator Merit Score (S × W)	Indicator Value (S)	Indicator Merit Score (S × W)
Socio-Economi	Inuit Land Use	1	Loss of Waterbody Used For Fishing	4	5	20	5	20	6	24
		1	Relocation of Fish	6	1	6	1	6	6	36
		1	Disruption of Landscape (Operations)	4	5	20	5	20	5	20
				Sub-account merit score (∑(SxW))		46		46		80
				Sub-account merit rating (RS=∑(SxW)/∑W)		3.29		3.29		5.71
	Land Use Consequence of Failure	2	Land Use Consequence of Failure of Water	1	6	6	3	3	3	3
				Sub-account merit score (∑(SxW))		6		3		3
				Sub-account merit rating (RS=∑(SxW)/∑W)		6.00		3.00		3.00

Quantitative analysis for sub-accounts related to Socio-Economical Account			Alternative-A		Alternative-B		Alternative-K	
Account	Sub-account	Sub-Account Weight (W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)
Socio-Econo	Inuit Land Use	6	3.29	19.71	3.29	19.71	5.71	34.29
	Land Use	5	6.00	30.00	3.00	15.00	3.00	15.00
	Consequence of Failure							
	Account merit score (Σ{Rs × W})			49.71		34.71		49.29
	Account merit rating (Ra = Σ{Rs×W}/ ΣW)			4.52		3.16		4.48

Quantitative analysis for indicators related to Economical Account					Alternative-A		Alternative-B		Alternative-K	
Account	Sub-account	ID	Indicator	Indicator Weight (W)	Indicator Value (S)	Indicator Merit Score (S × W)	Indicator Value (S)	Indicator Merit Score (S × W)	Indicator Value (S)	Indicator Merit Score (S × W)
Economical	IVR WRSF Costs	1	Capital Costs	1	4	4	3	3	4	4
		1	Fish Habitat Offsetting Costs	1	5	5	5	5	6	6
		1	Operating/Sustaining Costs	1	5	5	2	2	3	3
		1	Closure and Reclamation Costs	1	5	5	4	4	4	4
		1	Long-Term Post-Closure Costs	1	3	3	2	2	2	2
				Sub-account merit score (∑(SxW))		22		16		19
				Sub-account merit rating (RS=∑(SxW)/∑W)		4.40		3.20		3.80

Quantitative analysis for sub-accounts related to Economical Account			Alternative-A		Alternative-B		Alternative-K	
Account	Sub-account	Sub-Account Weight (W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)	Sub-account merit rating (Rs)	Sub-account merit score (Rs × W)
Econo	IVR WRSF Costs	1	4.40	4.40	3.20	3.20	3.80	3.80
	Account merit score (Σ{Rs × W})			4.40		3.20		3.80
	Account merit rating (Ra = Σ{Rs×W}/ ΣW)			4.40		3.20		3.80

Quantitative analysis for accounts		Alternative-A		Alternative-B		Alternative-K	
Account	Account Weight (W)	Account Merit Rating (Ra)	Account Merit score (Ra × W)	Account Merit Rating (Ra)	Account Merit score (Ra × W)	Account Merit Rating (Ra)	Account Merit score (Ra × W)
Technical	3	5.41	16.24	3.98	11.94	4.28	12.83
Environmental	6	4.42	26.52	2.45	14.68	3.05	18.29
Socio-Economical	3	4.52	13.56	3.16	9.47	4.48	13.44
Economical	1.5	4.40	6.60	3.20	4.80	3.80	5.70
	Alternative merit score (Σ{Ra × W})		62.92		40.89		50.25
	Alternative merit rating (A = Σ{Ra×W}/ ΣW)		4.66		3.03		3.72

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ERM's Toronto Office
120 Adelaide Street West, Suite 2010
Toronto, ON
Canada M5H 1T1

T: +1 416 646 3608
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