TECHNICAL MEMORANDUM

DATE 8 October 2020 **Project No.** 20144940-778-TM-Rev1

TO Michel Groleau
Agnico Eagle Mines Limited

CC Angie Arbaiza, Jen Range, John Faithful

FROM Hafiz Ahmed; Julien Lacrampe **EMAIL Jennifer_Range@golder.com**

IMPACT ASSESMENT OF THE DIVERSION OF SITE RUNOFF TO MELVIN BAY ON THE FLOW AND WATER LEVEL REGIMES OF MELIADINE LAKE

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) owns and operates the Meliadine Gold Project (the Project) located in the A and B sub-watersheds of the Meliadine Lake watershed in Nunavut. Agnico Eagle retained Golder Associates Ltd. (Golder) to assess the potential impacts of diverting the Project site runoff away from Meliadine Lake to Melvin Bay (Figure 1), on the flow and water level regimes of Meliadine Lake.

This technical memorandum presents the methods and results of the impact assessments.

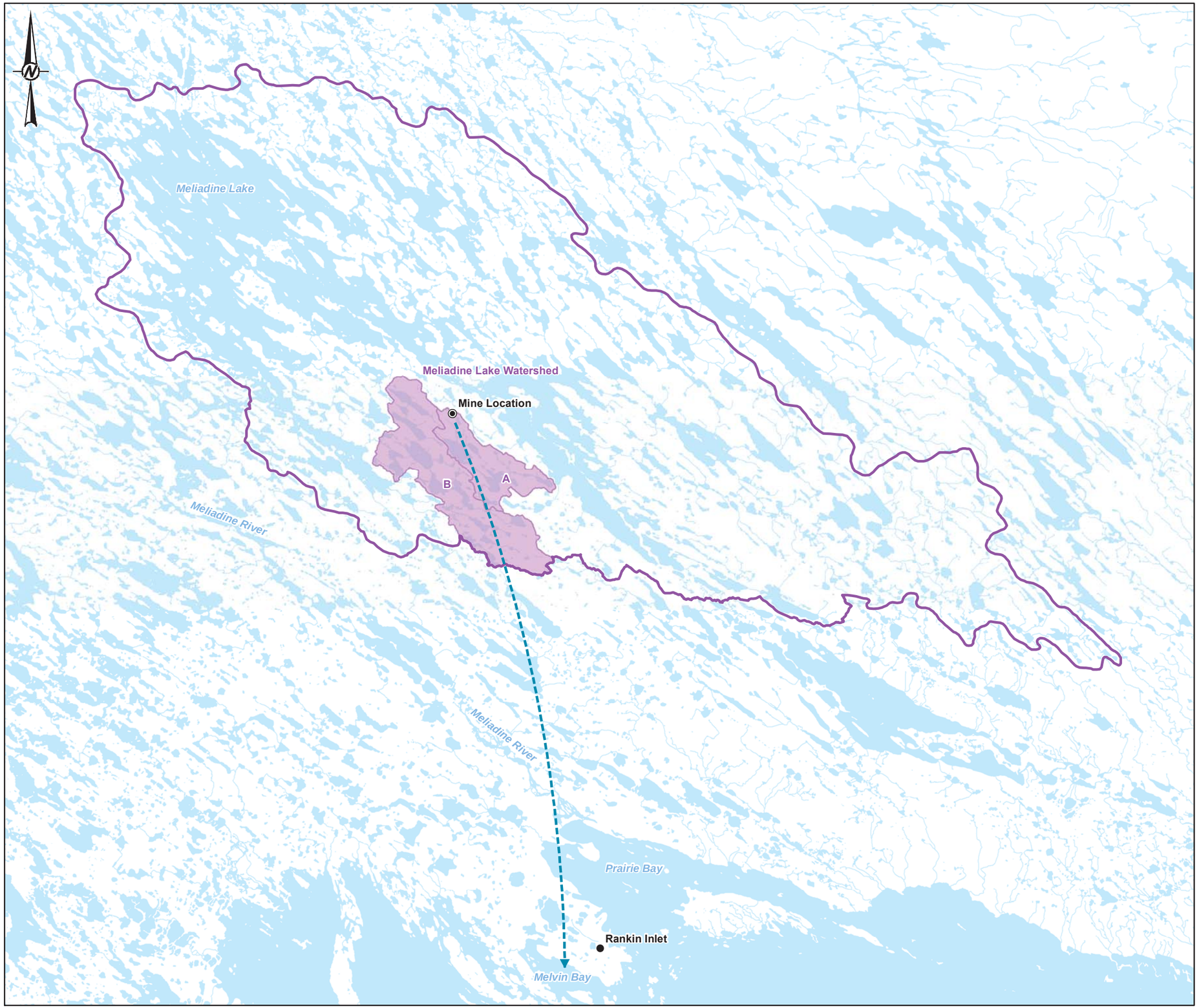
2.0 METHODS

The assessment followed the methods of the Project's Final Environmental Impact Assessment (FEIS; Agnico Eagle 2014), and was completed using the Project's water balance model, developed to derive long-term mean characteristics and variability for key waterbodies near the Project. The Project's water balance model and general assessment methods can be found in Sections 7.3.1.1 and 7.3.3.1 of the FEIS. Model input sources and assessment methods are summarized as follows:

- Baseline flow and water level regimes of Meliadine Lake were obtained from Appendix 7.3-A of the FEIS (Agnico Eagle 2014)
- Drainage areas of the Meliadine Lake watershed and of the diverted sub-watersheds (i.e., A and B sub-watersheds) were obtained from Section 7.3.1.2 of the FEIS (Agnico Eagle 2014)
- The effective land and lake areas of the Meliadine Lake watershed under diverted condition were derived by subtracting the land and lake areas of the A and B sub-watershed from those of the Meliadine Lake watershed
- The baseline water balance model was updated with the effective lake and land areas of the Meliadine Lake watershed, as derived above, and with a freshwater intake value of 741,706 m^3/year, to simulate the flow and water level regimes of the Meliadine Lake watershed under diversion conditions
- Flow and water level regimes of Meliadine Lake were compared between the baseline and the diversion conditions

It is noted that the flow regimes of Meliadine Lake provided in this document correspond to the sum of the flows at the two outlets of Meliadine Lake, consistent with the methods of the FEIS (Agnico Eagle 2014).

Golder Associates Ltd.
16820 107 Avenue, Edmonton, Alberta, T5P 4C3, Canada T: +1 780 483 3499 F: +1 780 483 1574



LEGEND

- CONCEPTUAL DIVERSION
- DIVERTED WATERSHED BOUNDARY
- WATERSHED BOUNDARY
- WATERCOURSE
- WATERBODY

0 3.5 7

1:175,000 KILOMETRES

REFERENCE(S)

1. WATERBODIES AND WATERCOURSES OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

DATUM: NAD 83 PROJECTION: UTM ZONE 15

CLIENT

AGNICO EAGLE MINES LIMITED

AGNICO EAGLE

PROJECT

MELIADINE GOLD MINE
NUNAVUT

TITLE

WATERSHED DIVERSION TO MELVIN BAY

CONSULTANT

GOLDER

YYYY-MM-DD	2020-07-06
DESIGNED	JL
PREPARED	CDB
REVIEWED	JL
APPROVED	JL

PROJECT NO.	CONTROL	REV.	FIGURE
20144940	2000	0	1

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3.0 RESULTS

3.1 Drainage Areas

The drainage areas of Meliadine Lake, discretized in land and lake areas, are provided in Table 1, for baseline and diversion conditions. The diversion is expected to reduce the land area by 6.6%, the lake area by 4.0%, and the total drainage area by 5.7%.

It is noted that the diverted area was assumed to include the entire A and B sub-watershed areas. However, the diverted area is expected to include the entire A sub-watershed area, and only a portion of the B sub-watershed area. The drainage area values provided below for the diversion conditions are therefore conservative.

Table 1: Drainage Areas of Meliadine Lake under Baseline and Diversion Conditions

Drainage Area	Baseline Conditions	Diversion Conditions
Land Area (km^2)	361	337
Lake Area (km^2)	199	191
Total Area (km^2)	560	528

3.2 Flow and Water Level Regimes

The derived potential impacts of the diversion on the flow and water level regimes of Meliadine Lake are summarized in Table 2, Figure 2, and Figure 3 for flood and median conditions. The derived impacts are summarized as follows:

- Discharges: mean monthly discharges are expected to decrease by 6% to 8% during the open water season compared to the baseline condition. The flood discharges for the 2-year period is expected to decrease by 7% and 100-year return periods is expected to decrease by 6%. Low flows are expected to decrease by 7% to 8% from the baseline values.
- Water levels: mean monthly water levels are expected to decrease by 1 cm during the open water season compared to the baseline condition. The flood levels corresponding to the 2-year discharge is expected to decrease by 1 cm. The flood levels corresponding to the 100-year discharge is expected to decrease by 2 cm. The water levels during the low flow season are expected to decrease by 1 cm. Overall, these changes in water levels are not expected to be measurable.

Table 2: Changes in Flow and Water Level Regimes of Meliadine Lake from the Diversion (Median Conditions)

Parameter	Peak Daily		Mean Monthly				
	2-Year	100-Year	June	July	August	September	October
Discharge (%)	-6.8%	-5.9%	-6.6%	-6.2%	-7.1%	-6.8%	-7.6%
Water Level (m)	-0.01	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01

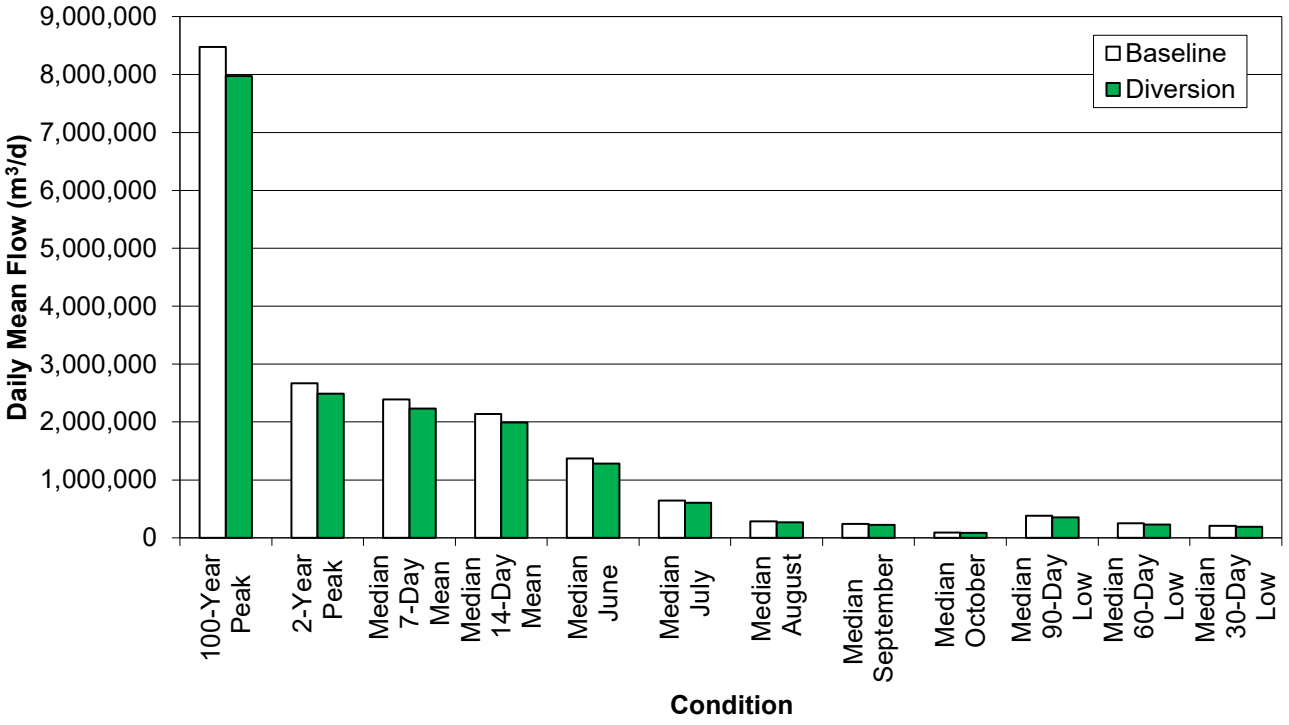


Figure 2: Derived Flow Regimes at Meliadine Lake during the Baseline and Diversion Scenarios

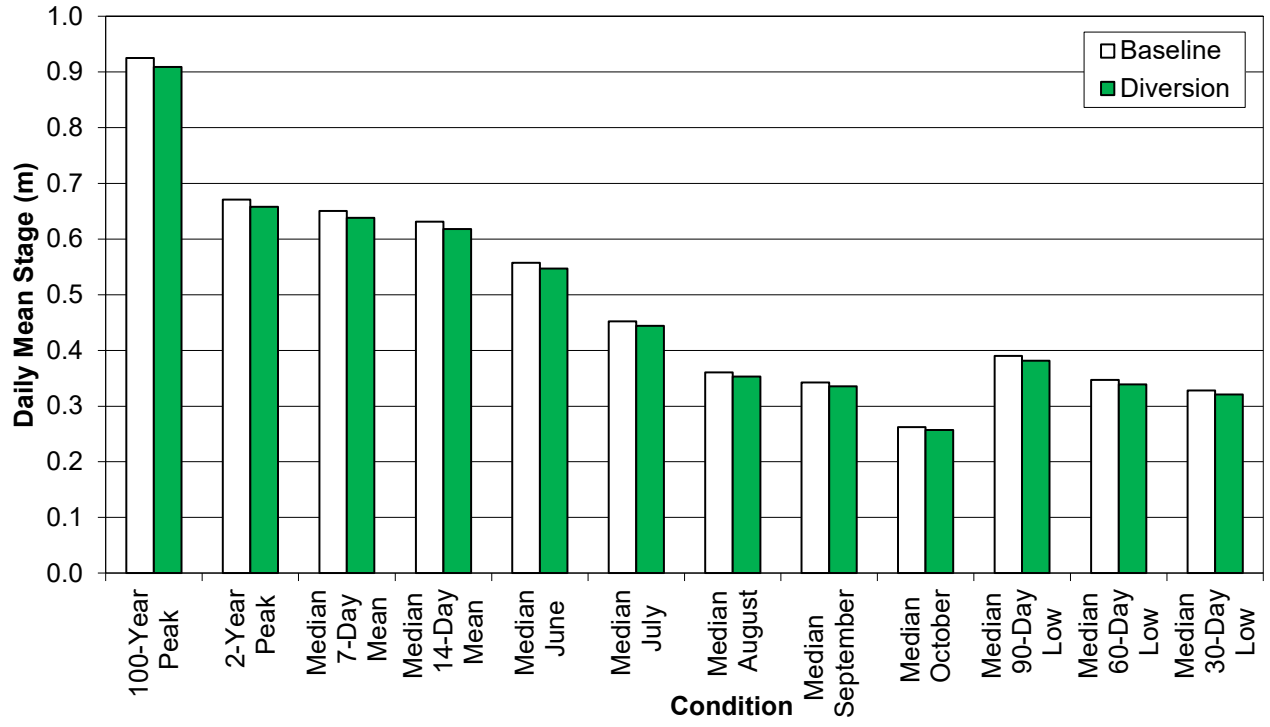


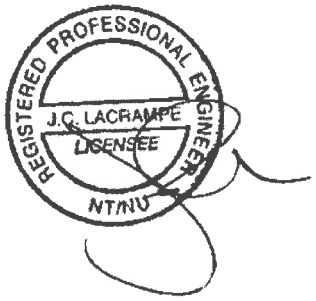
Figure 3: Derived Water Level Regimes at Meliadine Lake during the Baseline and Diversion Scenarios

4.0 CONCLUSIONS AND CLOSURE

This technical memorandum presents the methods and results of the potential impacts of diverting the Project site runoff away from Meliadine Lake to Melvin Bay. The assessment was completed using conservative assumptions, and concluded that the diversion will result in a small reduction in overall flows, and negligible effects on the levels of Meliadine Lake.

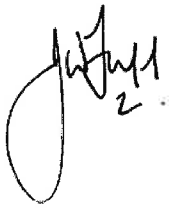
This technical memorandum was prepared and reviewed for Agnico Eagle by the undersigned. Please contact the undersigned with any questions or concerns about this memorandum.

Prepared By:



Julien Lacrampe, P.Eng.
Senior Water Resources Engineer

Reviewed By:



John Faithful, B.Sc.
Principal

HA/JL/jr

https://golderassociates.sharepoint.com/sites/128148/project files/5 technical work/3000_wl_amendment/task 2/02_reporting/rev1/20144940-778-tm-rev1-meliadinelakeassessment.docx

References

Agnico Eagle Mines Ltd. (Agnico Eagle). Final Environmental Impact Assessment (FEIS) – Meliadine Gold Project. April 2014.