MARATHON GOLD

MEMORANDUM

To:	Andrea Raska, Impact Assessment Agency of Canada
From:	Tara Oak, Marathon Gold Corporation
Date:	January 31, 2024
IAAC #:	80169

Reference: Supplementary Information, Berry Pit Expansion Environmental Registration / Environmental Assessment (Valentine Gold Project) Update

Following federal regulatory review of the Berry Pit Expansion Environmental Registration / Environmental Assessment Update (Berry Pit Expansion EA Update, submitted August 11, 2023), the Impact Assessment Agency of Canada (IAAC) requested that Marathon Gold Corporation (Marathon) provide clarification regarding groundwater modelling inputs and results, and the corresponding assessment of potential effects of the proposed Berry Pit Expansion. The information provided below summarizes the supplemental information provided and includes an updated Figure 7.6 and Table 7.8, which supersede those presented in the Berry Pit Expansion EA Update.

The groundwater model was updated to incorporate waste rock backfill proposed for the northeast basin of the Berry pit. The resulting modelled effects on groundwater are consistent with those previously presented in the Berry Pit Expansion EA Update, and do not affect the subsequent surface water or assimilative capacity assessments.

Figure 7.6 from the Berry Pit Expansion EA Update has been updated to include particle tracking results for the waste rock backfilled into the northeast basin of the Berry pit (attached). The particle tracking presented on the updated Figure 7.6 indicates that the point of discharge for most of the particles that originate at the northeast basin is Frozen Ear Pond, which discharges to Valentine Lake, with the remainder discharging to Victoria River.

The mean distance and travel time of particles from the Berry pit northeast basin to the Victoria River are consistent with those presented for the Berry pit basins in the Berry Pit Expansion EA Update. Thus, these model inputs are unchanged; therefore, the attenuation factors and discharge concentrations for this pathway are also unchanged from those presented in Table 7.8 of the Berry Pit Expansion EA Update.

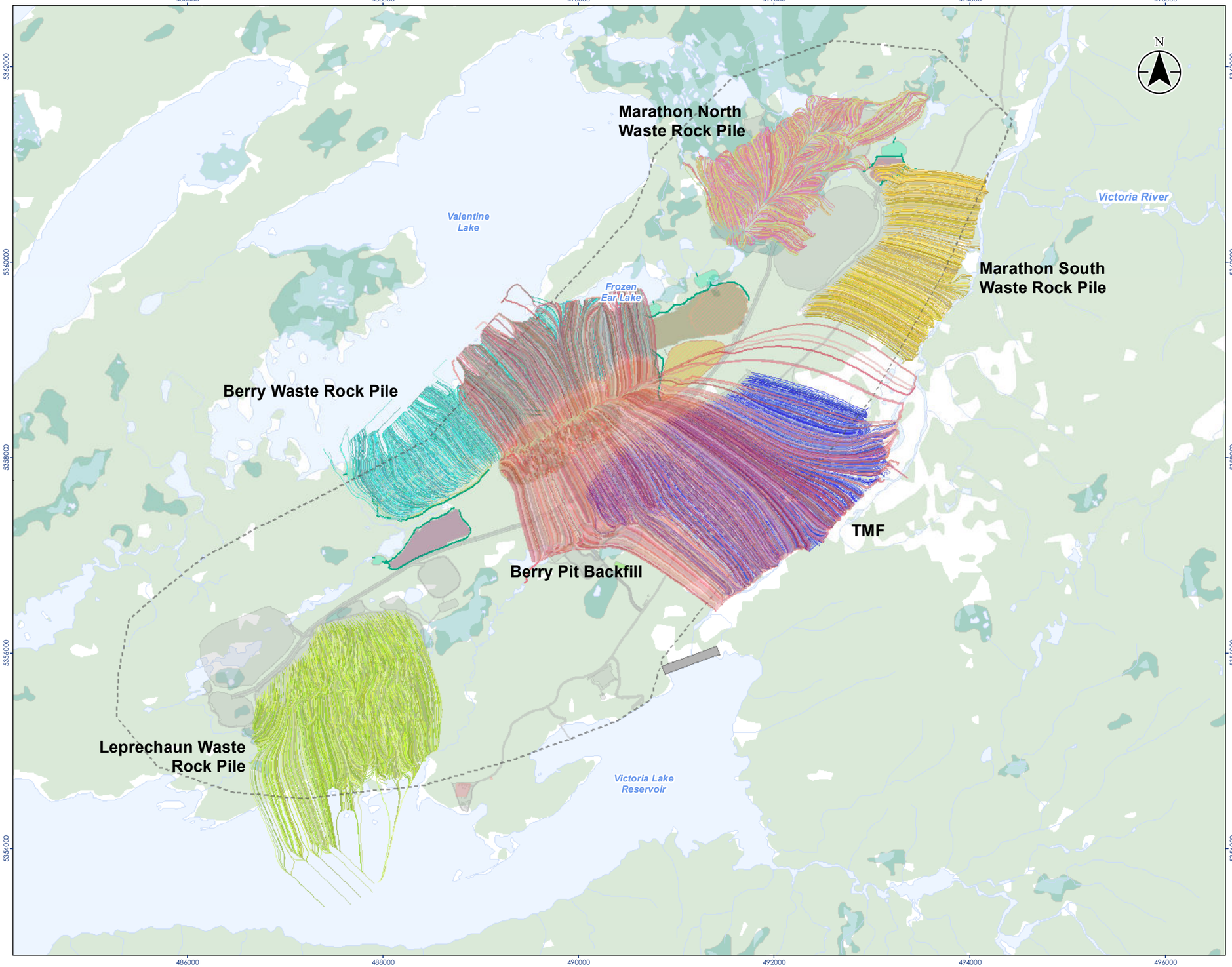
For the particles that originate at the northeast Berry pit basin and discharge to Frozen Ear Pond, the model was applied to determine the attenuation factor. This is consistent with the approach employed to determine the attenuation factor for waste rock backfill and tailings deposited in the south and central basins, as presented in the Berry Pit Expansion EA Update. The predicted post-closure attenuation ratio for groundwater in contact with the waste rock backfilled in the northeast basin of the Berry pit discharging to Frozen Ear Pond is 0.008. This

indicates that if a solute particle is released from the northeast basin of the Berry pit at a nominal concentration of 1 mg/L, it will be attenuated to a concentration of 0.008 mg/L when it is discharged to Frozen Ear Pond.

Based on the attenuation factor of 0.008, the predicted concentrations of parameters of potential concern (POPCs) in groundwater discharge to Frozen Ear Pond that originate at the northeast basin are attached as an updated Table 7.8 from the Environmental Registration / EA Update. Concentrations in groundwater discharge to Frozen Ear Pond are predicted to be similar to the groundwater discharge quality to Valentine Lake, and to be below Valentine Lake tributary 75th percentile concentration values, with the exception of total/weak acid dissociable (WAD) cyanide, total/un-ionized ammonia, and sulphate (Appendix 8B, Berry Pit Expansion Environmental Registration / EA Update). The predicted concentrations of total/WAD cyanide, total/un-ionized ammonia, and sulphate and other POPCs are below the limits in the Metal and Diamond Mining Effluent Regulations (MDMER), the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (CWQG-FAL) and the BC water quality guideline for sulphate.

The assimilative capacity study as presented in the Berry Pit Expansion EA Update remains as presented in that document, as it is unaffected by the update to Table 7.8. To represent the worst-case discharge quality scenario to Valentine Lake, MDMER parameters in the assimilative capacity study had been modelled using MDMER Schedule 4 limit values. The water quantity and water quality model was used to predict the quality and quantity of the toe seepage and surface runoff from the waste rock pile and stockpiles to the six sedimentation ponds and their final discharge points (FDPs) for the Expansion Project (Appendix 8A of the Berry Pit Expansion EA Update). The predicted FDP flows and quality, which include toe seepage from the waste rock pile and other stockpiles, were then input into the assimilative capacity model to simulate mixing zones within Valentine Lake (Appendix 8B of the Berry Pit Expansion EA Update).

Overall, the assessment of groundwater and surface water effects presented in the Berry Pit Expansion EA Update uses the most recent data and modelling available for the site, including hydrogeological data and assessment completed at the time of writing. This is also true for the assessment of groundwater effects associated with the TMF (as a result of the changes to the tailings composition as described in the Berry Pit Expansion EA Update).



Stantec

Legend

- Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

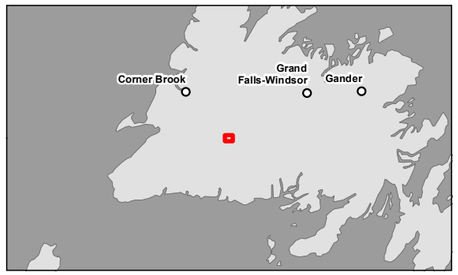
- Approved Project Components

0 1 2 km

1:40,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVC
Prepared by AMW on 2024-01-08
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
7-6

Title
Particle Traces Illustrating Flow Paths from Waste Rock Piles, TMF, and Backfilled Berry Pit, following Closure of Approved Project and Project Expansion Operation

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Table 7.8 Predicted Concentrations POPC in Groundwater Discharge to the Victoria River and Valentine Lake Originating at the TMF and the Backfilled Berry Pit Post Closure

Parameter	Units	MDMER Limit[A]	Discharge to Victoria River Originating at:		Discharge to Valentine Lake Originating at:	Discharge to Frozen Ear Pond Originating at:
			TMF	Backfilled Berry Pit	Backfilled Berry Pit	Backfilled Berry Pit
Aluminum	µg/L	-	9.6	39	3.4	4.5
Antimony	µg/L	-	0.13	0.2	0.017	0.022
Arsenic	µg/L	100	0.15	0.6	0.052	0.069
Barium	µg/L	-	0.79	1.4	0.12	0.16
Boron	µg/L	-	1.7	3.6	0.3	0.41
Cadmium	µg/L	-	0.002	0.0049	0.00042	0.00056
Calcium	µg/L	-	9,400	6,900	590	790
Chromium	µg/L	-	0.1	0.17	0.015	0.02
Copper	µg/L	100	3.1	2.2	0.19	0.25
Iron	µg/L	-	18	24	2	2.7
Lead	µg/L	80	0.013	0.023	0.002	0.0026
Magnesium	µg/L	-	1700	1100	90	120
Manganese	µg/L	-	31	31	2.6	3.5
Mercury	µg/L	-	0.0019	0.0037	0.00031	0.00042
Molybdenum	µg/L	-	0.53	1.3	0.11	0.14
Nickel	µg/L	250	0.095	0.15	0.013	0.017
Phosphorus	µg/L	-	2.5	3.5	0.3	0.4
Potassium	µg/L	-	220	450	39	52
Selenium	µg/L	-	0.048	0.082	0.007	0.0093
Silver	µg/L	-	0.0089	0.015	0.0013	0.0018
Sodium	µg/L	-	2,500	5,100	430	580
Thallium	µg/L	-	0.0027	0.0072	0.00062	0.00083
Uranium	µg/L	-	0.036	0.19	0.016	0.022
Zinc	µg/L	400	0.42	0.5	0.043	0.058
Chloride	µg/L	-	240	570	49	65
Nitrate + Nitrite	µg/L	-	3.6	60	5.2	6.9
Nitrite	µg/L	-	0.81	3.5	0.3	0.4
Nitrate	µg/L	-	3.6	59	5.1	6.7
Ammonia	µg/L	-	730	890	76	100
Unionized Ammonia	µg/L	500	28	34	2.9	3.9
$Cyanide_{Total}$	µg/L	500	20	270	23	31
$Cyanide_{WAD}$	µg/L	-	5.1	27	2.3	3.1
Sulphate	µg/L	-	19,000	19,000	1,600	2,100
Fluoride	µg/L	-	28	37	3.2	4.3

Notes:
[A] = MDMER, Schedule 4, Maximum Authorized Monthly Mean Concentration
- = Not applicable