



Mt Rawdon Operations

Post Closure Water Management Plan

Evolution Mining Limited

Mount Rawdon Operations P/L

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Basis of Report

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Table of Contents

Basis of Report	i
1.0 Introduction	1
1.1 Project Overview	1
1.2 Purpose of this Document	1
1.3 Objectives and Scope	1
1.4 Guideline Criteria.....	2
1.5 Closure Schedule	4
2.0 Water Management Environment.....	6
2.1 Topography and Drainage	6
2.2 Meteorology	8
2.2.1 Rainfall	8
2.2.2 Evaporation	10
2.2.3 Climate Change.....	11
2.3 Soil Properties	12
2.4 Surface Water	12
2.5 Groundwater	13
3.0 Existing Site Water Management	17
3.1 Surface Water Management.....	17
3.1.1 Surface Water Requirements	17
3.1.2 Surface Water Management Measures	17
3.1.3 Water Management Domains	21
3.1.4 Surface Water Monitoring	23
3.1.5 Regulated Structures.....	27
3.1.6 Wet Season Management.....	27
3.1.7 Water Balance Model	28
3.2 Groundwater Management.....	28
3.2.1 Groundwater Requirements	28
3.2.2 Groundwater Management Measures	29
3.2.3 Groundwater Monitoring	30
3.2.4 Groundwater Model.....	30
3.3 Seepage Management	32
3.3.1 Seepage Requirements.....	32
3.3.2 Seepage Management Measures.....	32
3.3.3 Seepage Management Domains	32
3.3.4 Seepage Monitoring	35



3.3.5 Seepage Modelling.....	37
4.0 Post Closure Water Management.....	39
4.1 Contributing Studies	39
4.1.1 Water Balance Assessment	39
4.1.2 Groundwater Assessment	42
4.1.3 Site Stormwater Concept.....	46
4.2 Surface Water Management.....	49
4.2.1 Objectives	49
4.2.2 Surface Water Management System	49
4.2.3 Surface Water Management Measures	56
4.2.4 Surface Water Monitoring	58
4.2.5 Regulated Structures.....	60
4.2.6 Wet Season Management	60
4.2.7 Water Balance Modelling.....	60
4.3 Groundwater and Seepage Management.....	61
4.3.1 Objectives	61
4.3.2 Groundwater and Seepage Management Measures	61
4.3.3 Groundwater and Seepage Monitoring	63
4.3.4 Groundwater Modelling	63
4.3.5 Seepage Modelling.....	64
5.0 Water Impact Response Plan	65
5.1 Response Procedures	65
5.2 Impact Mitigation	66
6.0 Data Management and Reporting.....	67
6.1 Data Management.....	67
6.2 Reporting.....	67
6.2.1 Impact Investigation	67
6.2.2 Receiving Environment Monitoring Program.....	67
6.2.3 Model Updates	67
6.3 Review and Update	67
7.0 References.....	68

Tables in Text

Table 1	PRC Plan Guideline Requirements.....	2
Table 2	MRO Closure Schedule	4
Table 3	Detailed Monthly and Annual Rainfall Depths – Mt Perry (The Pines) (mm)	9



Table 4	BoM 2016 Rainfall Depths – Frequent to Rare Storms: 25.2625 S, 151.7625 E ..	9
Table 5	Average Evaporation Depths – SILO Grid Point 25.25 S, 151.75 E	10
Table 6	Key Surface Water Structures at MRO	18
Table 7	General Spill Prevention Priorities	27
Table 8	Known Seeps associated with the Tailings Storage Facility	35
Table 9	Post Mining Equilibrium Final Void Inflow	42
Table 10	MRO Post Closure Stormwater Concept – Drainage Design Requirements.....	48
Table 11	Catchment Areas – End Mining and Post Mining Ore Processing (Phase’s 1 and 2)	50
Table 12	Catchment Areas – Long-term Post Closure (Phase 5)	50
Table 13	MRO Post Closure Sediment Dam Size Requirements.....	53

Figures in Text

Figure 1	Site Location and Overview	5
Figure 2	Topography and Drainage	7
Figure 3	Average Monthly Rainfall – Mt Perry (The Pines)	8
Figure 4	Comparison of Average Monthly Rainfall and Evaporation Depths	11
Figure 5	ASC Soil Mapping.....	15
Figure 6	Surrounding Watercourses	16
Figure 7	Key Water Storages.....	20
Figure 8	Surface Water Monitoring Locations	26
Figure 9	Groundwater Monitoring Network	31
Figure 10	Seepage Trenches and Known Seeps.....	38
Figure 11	Predicted Post Closure Pit Void Water Levels	40
Figure 12	Predicted Post Closure Pit Salinity (as TDS).....	41
Figure 13	Predicted Post Closure Pit Sulfate Concentrations	41
Figure 14	Simulated Groundwater Net Inflow to Final Void	42
Figure 15	Post Mining Equilibrated Groundwater Table Elevations.....	43
Figure 16	Particle Tracking from a) 2040 to 2540 (500 Years from Closure); b) 2395 to 2545 (150 Years following Equilibrium).....	45
Figure 17	MRO Post Closure Stormwater Concept – Site Schematic	47
Figure 18	Site Catchments – End Mining and Post Mining Ore Processing (Phase’s 1 and 2)	51
Figure 19	Site Catchments – Long-term Post Closure (Phase 5)	52
Figure 20	Post Closure Surface Water Management System	55



Appendices

- Appendix A Environmental Authority EPML00712113 – Schedule E**
- Appendix B Environmental Authority EPML00712113 – Schedule H**
- Appendix C Environmental Authority EPML00712113 – Schedule I**



1.0 Introduction

1.1 Project Overview

Mt Rawdon Operations (MRO or “the Site”) is an open pit gold mine located approximately 80 km southwest of the city of Bundaberg and 300 km north-northwest of Brisbane, QLD (**Figure 1**). MRO commenced operations in 2001 and has been wholly owned by Evolution Mining Limited (Evolution) since 2011. The Site ceased mining activities during September 2024 and is forecast to conclude ore processing in late 2025. Subsequently, Evolution plans to close MRO and commence site rehabilitation and closure.

Evolution submitted a Progressive Rehabilitation and Closure Plan (PRC Plan) for MRO in November 2022 (Evolution, 2022). The former QLD Department of Environment and Science (DES) (now the Department of the Environment, Tourism, Science and Innovation (DETSI)) responded to the submission with an information request (DES, 2022) which is due for response by Evolution in January 2025. As such, Evolution are continuing with their existing PRC Plan submission.

1.2 Purpose of this Document

SLR Consulting Australia Pty Ltd (SLR) was engaged by Evolution to prepare a post closure Water Management Plan (WMP) for MRO. This WMP (“this Plan”) will accompany an updated PRC Plan submission for the Site.

The purpose of this document is to outline requirements for site water management during rehabilitation and closure of MRO, as well as following relinquishment of the Site. This includes surface water, groundwater and seepage aspects pertinent to the Site and details management measures commensurate with the proposed schedule of closure activities (refer **Section 1.5**).

1.3 Objectives and Scope

The key objectives for water management at the Site following cessation of activities, as addressed by this Plan, are as follows:

- To prevent the release of mine affected water (MAW) to receiving waters, namely Perry River, Rawdon Creek, Swindon Creek, Twelve Mile Creek, Burnett River and Mingham Creek;
- To prevent the migration of potentially contaminated seepage or groundwater to the receiving environment;
- To restore the pre-mining catchment areas of receiving waters, maximise natural catchment space and promote the return of “clean” runoff to the environment;
- To implement water management structures that are safe, stable, free draining and consistent with the surrounding natural landscape and intended purposes;
- To regulate water quality prior to release to the environment by specifying requirements for water management structures within the final landform;
- To ensure water storages that are to remain at the former Site have suitable overflow mechanisms in place should overflow occur;
- To prescribe management practices that may be necessary to influence the behaviour of waters within the final pit void;



- To outline erosion and sediment control requirements for any disturbance activities undertaken during rehabilitation and closure activities;
- To ensure that adequate monitoring and data analysis is undertaken to detect any potential impacts to surface water and groundwater quantity/quality during rehabilitation and closure activities;
- To outline minimum requirements for data management, reporting and incident response procedures to be followed during rehabilitation and closure activities;
- To promote long-term passive water management practices; and
- To facilitate the Site in meeting its intended post-mining land use (PMLU) objectives.

This Plan covers the following scope related to water management:

- Stormwater management;
- Surface water quantity and quality;
- Groundwater quantity and quality; and
- Seepage management.

This Plan does not include information related to flooding, wastewater or firewater management nor does it prescribe mitigation measures for these aspects. It is understood these items are addressed within separate documentation.

1.4 Guideline Criteria

This Plan has been prepared in accordance with the relevant requirements of the (former) Queensland Government Department of Environment, Science and Innovation (DESI) Guideline: Progressive Rehabilitation and Closure Plans (DES Reference: ESR/2019/4964, version 3.01, effective 16 September 2024) – “the Guideline” (DESI, 2024).

The general rehabilitation practices applicable to this Plan include:

- Water management;
- Voids; and
- Hydrogeology;

A cross reference between the relevant Guideline requirements and where they are addressed in this Plan is provided in **Table 1**.

Table 1 PRC Plan Guideline Requirements

Guideline Requirement	Section of this Plan
Water Management	
A description of contaminants that pose a risk to environmental values of the receiving environment	Section 2.4
Source, pathway and fate of contaminants that have the potential to impact environmental values	Section 4.1.2
Infiltration and seepage intervention and collection controls	Section 4.2, Section 4.3
Surface water diversions and long-term management requirements	Section 4.2, Section 4.3



Guideline Requirement	Section of this Plan
Dewatering requirements	Section 4.2, Section 4.3
On-going water management and reduction requirements (i.e. treatment)	Section 4.2, Section 4.3
Voids	
Options available for minimising final void area and volume (where a final void is proposed)	N/A
Proposed final dimensions of the void (i.e. depth, length and width)	N/A
Pit wall geotechnical and geochemical stability, considering the effects of long-term erosion and weathering of the pit wall and the effects of significant hydrological events	N/A
Proposed final slope angles of high wall, low wall and end walls of each final void	N/A
Void hydrology, addressing the long-term water balance and water level in the voids, stratification connections to groundwater resources and potential for overflow	Section 4.1.1
Groundwater modelling to determine whether the void is acting as a sink or a source for groundwater	Section 4.1.2
A water balance study including an assessment of void surface and groundwater interactions such as: • Groundwater lowering/reduction in hydraulic head (from new voids (e.g. caves/karst systems) • Cones of depression and associated impacts • The drainage and flooding behaviours of surface waters in the vicinity of the void • The potential extent of flooding and implications of interactions with the void • A conceptual model that incorporates projected inflows, outflows, and recharge rates • Water storage and long-term water balance • Each of the major water fluxes into and out of the void • The sources of surface water within the mine catchment that are likely to influence the water quality in the void	Section 4.1.1
Predicted water quality in the long-term including potential stratification	Section 4.1.1
A 3D void design plan	N/A
Rehabilitation strategies	Section 4.1.1, Section 4.2.3
Hydrogeology	
Determining the groundwater occurrence including the existence of, and depth to, aquifers and aquitards	Section 2.5
Locating groundwater recharge and discharge locations locally and regionally	Section 2.5



Guideline Requirement	Section of this Plan
Groundwater quality within each of the aquifers and from surface expressions (i.e. seeps and springs)	Section 2.5
Current and potential future uses of groundwater including existing groundwater extraction bores	Section 2.5, Section 4.1.2, Section 4.3
Groundwater flow direction and velocity, including field tests to determine hydraulic conductivity	Section 2.5
The development of potentiometric mapping and hydro stratigraphic cross sections	Section 4.1.2
Groundwater modelling to determine contaminant transport and potential changes to groundwater level from dewatering or waste storage	Section 4.1.2

1.5 Closure Schedule

Evolution has developed a schedule detailing the progression of rehabilitation and closure activities to be completed at MRO. The schedule has been prepared in accordance with the PMLU objectives for the Site, which include:

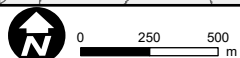
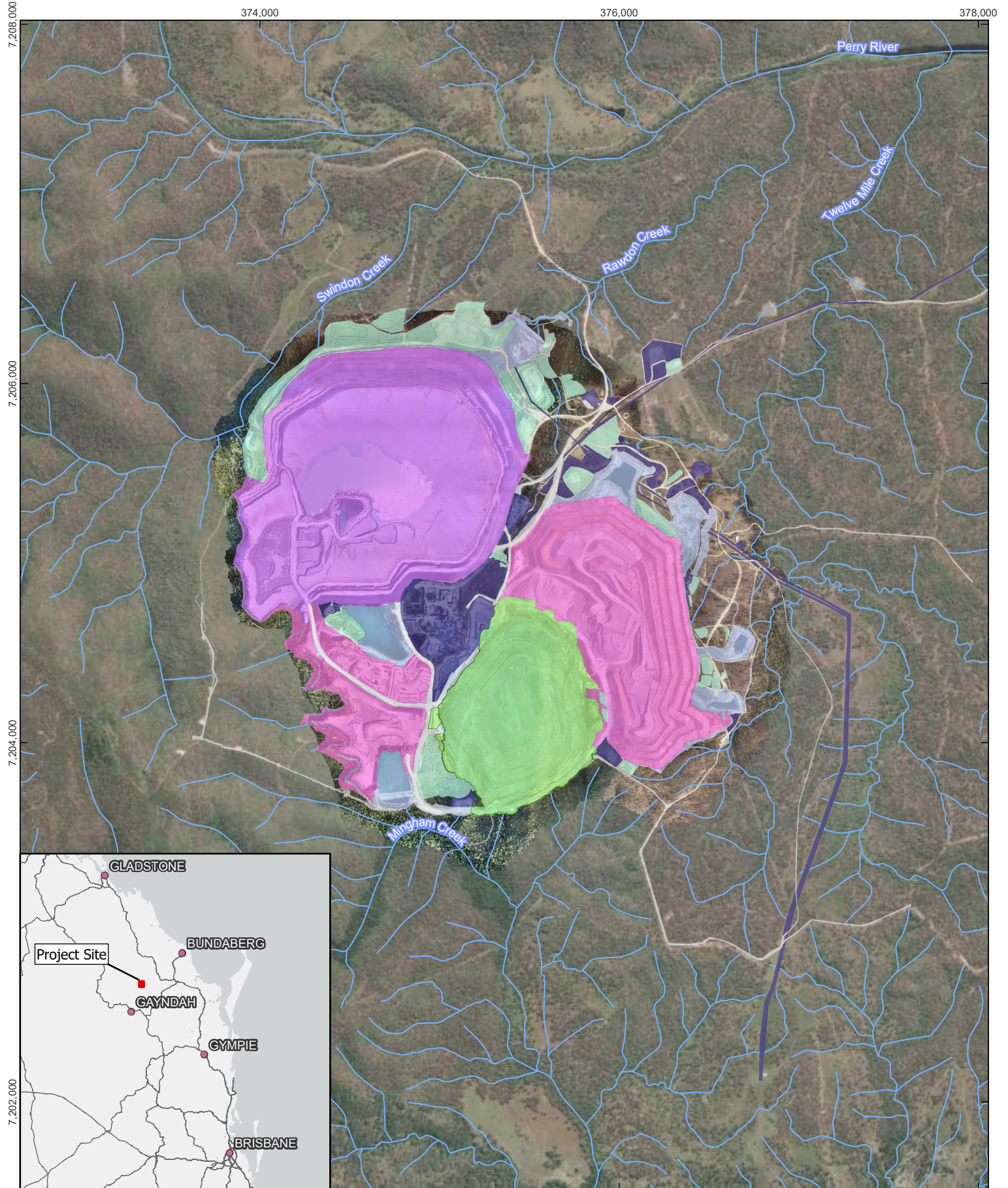
- Low-intensity grazing;
- Open woodland;
- Water storage for agricultural purposes; and
- Stock water.

The closure schedule for the Site is presented in **Table 2**. Note the closure schedule does not include consideration for the proposed Mt Rawdon Pumped Hydro project (MRPH) given the project remains subject to approval at the time of this document's preparation.

Table 2 MRO Closure Schedule

Phase	Description	Schedule
1	End mining	September 2024
2	Post mining ore processing	September 2024 – October 2025
3	Post ore processing and initial rehabilitation Estimated to include initial rehabilitation activities / "care and maintenance" period.	November 2025 – January 2030
4	Final rehabilitation and closure activities Estimated to include 2 years of bulk rehabilitation activities, 1 year for wetland construction and vegetation establishment, and 2 years of monitoring to verify final water quality is suitable for release to environment/PMLUs. Site to officially close by 2035.	January 2030 – January 2035
5	Long-term post closure	January 2035 onwards





Coordinate System:	GDA2020 MGA Zone 56
Scale:	1:27,500 at A4
Project Number:	623.030415
Date Drawn:	31-Jan-2025
Drawn by:	NT

LEGEND

- | | |
|----------------------------|------------------------------|
| Watercourse | Tails Storage Facility |
| Borrow Pits and Stockpiles | Overburden Dump |
| Infrastructure | Water Storage and Management |
| Pit | Miscellaneous |

MOUNT RAWDON POST CLOSURE

SITE LOCATION AND OVERVIEW



DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

FIGURE 1

2.0 Water Management Environment

2.1 Topography and Drainage

The Site is present on the Great Dividing Range in a landscape of steep hills to mountains within the Burnett River Region of QLD. The topography at MRO falls away steeply from an elevation of 256 metres Australian Height Datum (mAHD) at the top of Mount Rawdon to undulating hills of about 150 mAHD at its base. The land then slopes gently over 3 km to alluvial flats along the Perry River where the elevation is approximately 120 mAHD.

Drainage surrounding MRO is predominantly directed to the north and east. A series of ephemeral creeks drain the deposit area north into the Perry River which subsequently drains to the Burnett River. The drainages are generally incised, with the catchment areas comprising moderate to steep slopes. There is no natural permanent standing water in creeks; the most prevalent surface water features are intermittent water holes occurring along the Perry River. South of the Site, the topography grades generally towards the south and lies within the Burnett River Catchment which is upstream of Paradise Dam within the Burnett River.

A map of topography and drainage at MRO is presented in **Figure 2**.



374,000

376,000

7,206,000

7,204,000

Swindon Creek

Rawdon Creek

Twelve Mile Creek

Mingham Creek



0 250 500 m

Coordinate System: GDA2020 MGA Zone 56

Scale: 1:17,500 at A4

Project Number: 623.030415

Date Drawn: 22-Jan-2025

Drawn by: NT

LEGEND

Topographic Contour (20m AHD)

Watercourse

Elevation (mAHD)

262

-165

**MOUNT RAWDON
POST CLOSURE****TOPOGRAPHY AND DRAINAGE**

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FIGURE 2

Path: H:\Projects-SLR\623-TSV\623.030415.00001 Mount Rawdon Operations Post C\06 SLR Data\01 GIS\GISIMRO_Post_Closure.aprx\623030415_Fig_04_02_Location of Seepage Trenches1

2.2 Meteorology

2.2.1 Rainfall

The Site is located within the subtropical region of Queensland which experiences distinct wet and dry seasons. As typical for this form of climate, rainfall presents as short, intense events that occur primarily in the wet season spanning December to March.

Rainfall data have been collected in proximity of MRO at various Bureau of Meteorology (BoM) rainfall stations. A review of these sources was conducted within the post closure water balance assessment (SLR, 2025a) prepared to inform this Plan which determined that rainfall records from the Mt Perry (The Pines) BoM station are representative of conditions at the Site.

The Mt Perry (The Pines) station (BoM station ID: 039070) is located approximately 16 km northwest of MRO (BoM, 2025). This station has 138 years of daily rainfall data from 1887 to date with limited data gaps and provides an excellent record of historical rainfall. Average annual rainfall at Mt Perry (The Pines) is 939.4 mm. Seasonal rainfall variance is apparent, with highest rainfall occurring across December to March. **Figure 3** shows the average monthly rainfall depths recorded at Mt Perry (The Pines) from 1887 to the end of 2024.

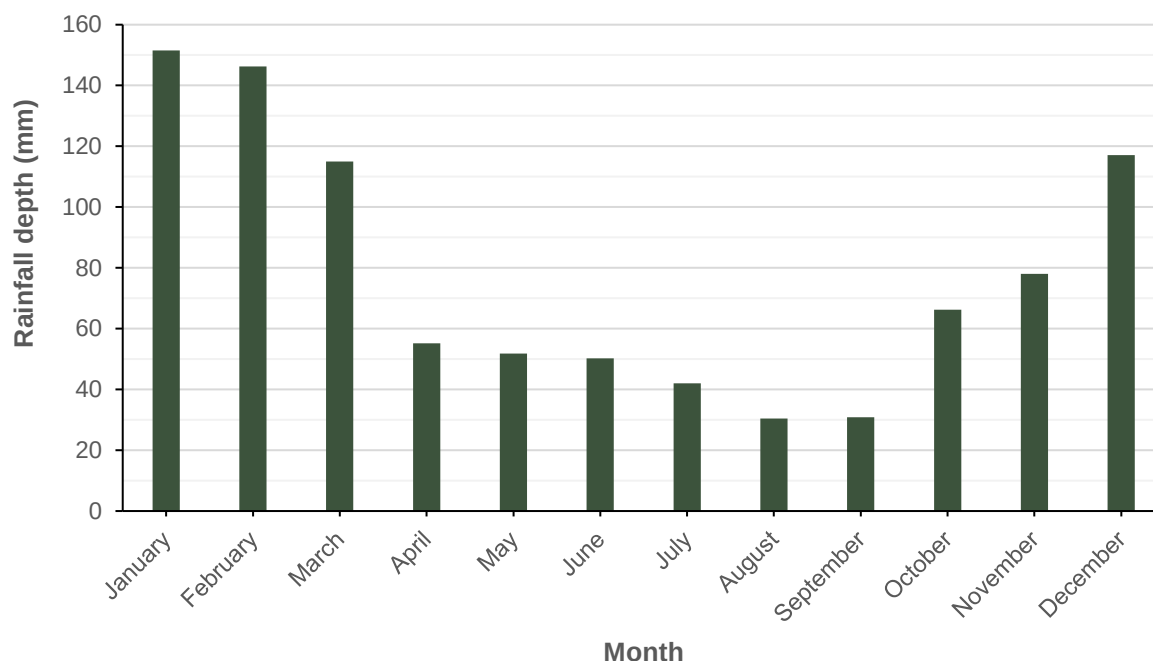


Figure 3 Average Monthly Rainfall – Mt Perry (The Pines)

The station indicates there can be considerable fluctuation in the depth of rainfall from year to year near the site. The lowest recorded annual rainfall was 397.4 mm in 1902, and the highest annual rainfall was 2,207.2 mm measured in 1893. In particular, there are stark differences in summer rainfall between dry and wet years. For example, the 10th percentile rainfall in February is 27.3 mm, while the 90th percentile rainfall is 322.0 mm.

Rainfall statistics for the Mt Perry (The Pines) BoM station are summarised in **Table 3**. The statistics include the mean monthly and annual rainfalls, as well as information for minimum, median, and maximum recorded rainfall months/years, and the 5th, 10th, 90th and 95th percentile months/years. Data accessed from the BoM website, 9 January 2025.



Table 3 Detailed Monthly and Annual Rainfall Depths – Mt Perry (The Pines) (mm)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	151.5	146.3	115.0	55.2	51.8	50.2	42.0	30.4	30.9	66.2	78.0	117.1	939.4
Lowest	0.5	1.3	2.6	0	0	0	0	0	0	0	0	5.6	397.4
5th %ile	17.7	17.8	9.2	5.9	2.2	1.9	1.3	0.2	0	8.0	7.8	22.0	566.8
10th %ile	34.5	27.3	19.0	11.3	6.9	4.8	3.3	1.7	1.3	12.3	21.3	44.1	604.4
Median	124.4	109.8	76.1	40.6	39.1	30.6	26.7	22.1	22.1	52.9	66.2	109.4	903.0
90th %ile	294.6	322.0	261.5	109.7	105.4	112.4	95.9	69.4	71.1	125.7	146.9	206.5	1,274.4
95th %ile	404.8	399.6	329.8	159.4	144.4	159.5	140.3	78.0	86.3	169.5	175.1	253.5	1,413.0
Highest	602.6	853.9	589.1	197.0	290.6	321.1	312.1	130.4	173.8	405.0	241.5	584.8	2,207.2

Intensity-frequency-duration (IFD) data for the Site was sourced from the BoM website (BoM, 2016), accessed 9 January 2025. Rainfall depths for various Annual Exceedance Probability (AEP)/Average Recurrence Interval (ARI) and storm durations are shown in **Table 4**.

Table 4 BoM 2016 Rainfall Depths – Frequent to Rare Storms: 25.2625 S, 151.7625 E

Duration	Annual Exceedance Probability / (Average Recurrence Interval)						
	63.2% / (1 in 1)	50% / (1 in 1.44)	20% / (1 in 4.48)	10% / (1 in 9.49)	5% / (1 in 20)	2% / (1 in 50)	1% / (1 in 100)
1 min	2.47	2.79	3.78	4.45	5.1	5.95	6.59
5 min	8.86	10	13.7	16.1	18.5	21.6	23.9
10 min	14.8	16.7	22.5	26.4	30.2	35.2	39
15 min	18.9	21.3	28.8	33.8	38.6	45	49.8
30 min	26.3	29.7	40.3	47.5	54.4	63.6	70.6
45 min	30.4	34.4	47.1	55.7	64.1	75.2	83.7
1 hour	33.1	37.6	51.8	61.5	71	83.6	93.3
1.5 hour	36.9	42.1	58.4	69.7	80.8	95.7	107
2 hour	39.6	45.2	63.1	75.6	88	105	118
3 hour	43.5	49.8	70.1	84.4	98.7	118	134
4.5 hour	47.9	54.9	77.9	94.1	111	133	151
6 hour	51.4	59	84.1	102	120	145	165
9 hour	57.1	65.7	94.2	115	136	165	188
12 hour	61.9	71.3	103	125	149	181	207
18 hour	69.7	80.4	116	143	170	208	238
24 hour	75.9	87.7	127	157	187	229	262
30 hour	81.2	93.9	137	169	202	247	283
36 hour	85.7	99.2	145	179	215	262	300
48 hour	93	108	158	196	236	287	329
72 hour	103	120	177	219	264	322	367
96 hour	110	128	188	234	282	342	390



120 hour	114	133	195	242	291	354	402
144 hour	117	136	199	246	295	359	408
168 hour	119	138	201	248	295	360	409

2.2.2 Evaporation

Estimated evaporation rates at the Site have been sourced from the SILO database (Jeffrey, Carter, Moodie, & Beswick, 2001). A SILO grid point is less than 1 km north of the Site at 25.25° S, 151.75° E (Latitude, Longitude). Evaporation data downloaded from the grid point represents interpolated Class A pan evaporation which indicates the amount of water evaporating from bare ground or open water.

Table 5 presents the average monthly and annual evaporation rates from the SILO grid point at 25.25° S, 151.75° E based on data from 1 January 1900 to 31 December 2024. The monthly averages align to Site rainfall trends with greatest evaporation typically experienced across the summer months.

Table 5 Average Evaporation Depths – SILO Grid Point 25.25 S, 151.75 E

Month	Average Monthly Evaporation – Class A pan (mm)
January	207.7
February	168.1
March	166.0
April	127.5
May	97.4
June	79.2
July	87.3
August	114.8
September	149.6
October	185.1
November	197.2
December	213.7
Average Annual Evaporation – Class A pan (mm)	1,793.6

A comparison of average monthly rainfall and estimated evaporation has been made to characterise the likely relationship between incident rainfall and evaporation at the Site. **Figure 4** depicts monthly averages of rainfall and evaporation alongside 5th and 95th percentile monthly rainfall. The plot indicates that evaporation rates typically exceed rainfall under average conditions. During wet years, rainfall can outweigh evaporation across majority of the year, particularly if extreme wet season rainfall is observed.



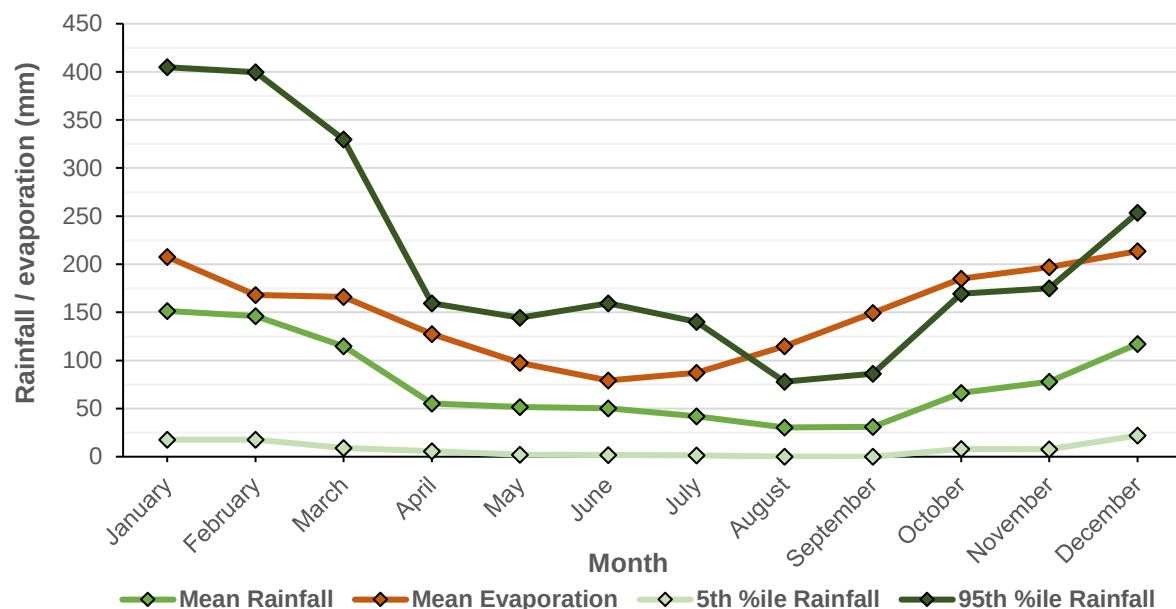


Figure 4 Comparison of Average Monthly Rainfall and Evaporation Depths

2.2.3 Climate Change

There is now widespread recognition that human activities are contributing to observed climate change. Climate change (warming) has the potential to increase the prevalence and severity of rainfall extremes and needs to be considered in water planning for long-term projects.

The post closure water balance assessment prepared to inform this Plan (SLR, 2025a) used the Biophysical Modelling Consistent Climate Scenarios (CCS) Tool (State of Queensland, 2024) to obtain daily rainfall sequences accounting for expected climate change. The Climate – EIS Information Guideline (DESI, 2024) advises that the potential change in climate at a project site be assessed, and that a conservative approach should be taken, by assuming the worst-case scenario for climate change projection at the site. Thus, the climate data sourced from the CCS Tool was based on the following emissions scenario and climate models:

- Projection year 2070
- RPC 2.8 (Worst case emissions scenario)
- 2 Different composite models:
 - HP: High Global warming and a warm Pacific Ocean
 - WI: Smaller global warming and a warm Indian Ocean

Comparison of the climate change rainfall sequences to existing SILO data was made within the water balance assessment. The comparison with the HP model outcomes shows a decrease in expected precipitation throughout the year, except for March, indicating a slight increase. The monthly average changes associated with the WI composite model are less pronounced and fluctuate more throughout the year. The annual total precipitation depths associated with both composite models indicate a projected decrease.

Evaporation rates are expected to increase throughout the year for both considered composite models, with the mean annual evaporation (MAE) increasing by approximately 10%.



2.3 Soil Properties

The Australian Soil Classification (ASC) in the National Soil Grid (ASRIS, 2011) identifies three soil orders within the mine lease including:

- Tenosols;
- Rudosols; and
- Dermosols.

Figure 5 illustrates the ASC mapping in vicinity of the Site.

The majority of the MRO footprint is dominated by tenosols. These soils have only weak profile development and tend to develop on rocky areas in the uplands or on alluvial or aeolian deposits where soil development is weak (State of Queensland, 2023). Tenosols are often differentiated from other rudimentary soils due to their level of development i.e., they include bleached layers and colour shifts. Rudosols, mapped in the north and eastern extents of the Site, are comparable to tenosols. However, they are considered the least developed of all soil variations in Australia, often occurring as shallow soils with little more than some minor organic matter accumulation on the surface and weathered parent material (Agriculture Victoria, 2020). Lastly, dermosols are clay soils that are well structured, water retentive and have good agricultural potential overall. This type of soil typically covers the higher-rainfall coastal and sub-coastal regions of Queensland

Soil nutrient properties have been investigated at MRO through numerous sampling and analytical programs over the life of mine (LOM) (Evolution, 2022). These studies have confirmed the presence of sodic soils as indicated by ASC mapping, as well as elevated levels of nitrogen, barium and vanadium. Conversely, phosphorous has only been detected at minor concentrations within surface soils.

The presence of Acid Sulfate Soils (ASS) at Site has been examined previously using the Australian Soil Resource Information System (Evolution, 2022). This review concluded that ASS was not mapped at MRO, except for a high probability area coinciding with the footprint of the tailings storage facility (TSF). This classification is owing to the presence of the TSF and does not reflect natural soil mapping.

The potential for erosion of soils at the Site has previously been reviewed based upon the percentage presence of fine sand and silt within the A1 horizon (Evolution, 2022). Overall, the soil present at MRO was determined to exhibit moderate to high erosion potential, which is typical of poorly structured, sodic soils. The removal of vegetation through disturbance activities significantly enhances potential for erosion.

2.4 Surface Water

The Site is located within the Lower Burnett subcatchment of the Burnett River Basin. There are six key watercourses that surround MRO including Rawdon Creek, Swindon Creek and Twelve Mile Creek, which all flow northeast to the Perry River, and Mingham Creek which flows southeast towards the Burnett River. Ultimately, these watercourses flow into the Burnett River which discharges into the Coral Sea approximately 88 km northeast of the Site.

Figure 6 shows the watercourses in vicinity of the Site. When reviewed under the Strahler ordering system (Strahler, 1952), first and second order watercourses comprise 80% of the mapped watercourse network surrounding the Site. Being at the top of the subcatchments, the first and second order watercourses are predominantly unnamed, but these also include Rawdon Creek, Swindon Creek and Twelve Mile Creek.



During intense rainfall events, runoff surrounding MRO flows rapidly overland, and surface flow in the ephemeral creeks lasts only a few hours. This is supported by streamflow data from three gauging stations installed in the Perry River (at Perry Weir), Twelve Mile Creek and Mingham Creek (ERIAS, 2024). For most of the year, there is no flow in the Perry River and water ponds in a series of disconnected low-volume waterholes. The contributing ephemeral watercourses are usually completely dry, only hosting limited ponded waters following rainfall. Perry Weir is the only permanent surface water feature in vicinity of the Site (aside from site storages), with a stage level of 98 mAHD and a bottom elevation of 91 mAHD.

Surface water quality has been monitored in the watercourses surrounding the Site throughout the LOM. Water quality is generally sound, with pH typically being neutral to slightly acidic and salinity ranging from fresh to brackish. However, various water quality exceedances have been reported as part of the MRO Receiving Environment Monitoring Program (REMP) (SLR, 2023). Monitoring conducted as part of the REMF has assisted in determining contaminants of potential concern (COPCs) in the study area that pose a risk to the environmental values of the receiving environment.

The principal COPCs are sulfate, arsenic and weak acid dissociable (WAD) cyanide. Other COPCs assessed at the Site over time include aluminium, boron, cadmium, copper, iron, lead, manganese, molybdenum, nitrate, pH and zinc (Esslemont, 2020).

2.5 Groundwater

The primary hydrogeological feature of the mine lease is a fractured rock aquifer developed in, and around, the extinct core of a shield volcano flanked by the Aranbanga Andesites to the west and silicified Curtis Island Metasediments to the east (Esslemont G. , 2019). The volcano's central core is an intensively fractured, collapse structure of dacite and dacite-rich volcanoclastics (Mine Sequence Volcanics) involving phases of tectonic reactivation and intrusion of magmas through reactivated fractures that formed dacitic, rhyolitic and quartz-feldspar-biotite-porphyry dykes and sills. Trachyandesite and andesite dykes formed during the last phase of brittle fracturing.

There are three distinct aquifers identified at MRO:

- Soil and small pockets of alluvium in drainage lines;
- Weathered rock (saprolite and oxidation transition zones); and
- Fractured rock aquifer (described above).

The overlying soil and alluvial pockets are of limited extent and thickness. The weathered rock aquifer varies in thickness across the Site and is subject to drainage on sloping land after rainfall events that recharge the aquifer. The weathered and fractured rock aquifers have structural features that potentially influence groundwater flow including rock fabric (bedding planes and foliation), zones of argillization, dykes, faults and fracture planes. Groundwater compartments have been identified in the weathered and fractured rock aquifers.

Groundwater level observations at MRO vary greatly spatially. Standing water level depths range from near surface to over 30 m below ground level (mbgl) (although most groundwater levels are 2 to 10 mbgl) in aquifers that are conceptualised as highly localised and discontinuous (NRC, 2015). Overall, the natural distribution of groundwater levels forms a subdued reflection of topography, with groundwater flow mostly directed from topographic highs to lower areas along creek lines. Three primary directions of flow are reported:

- Towards the north to Perry River;
- Towards the south to Mingham Creek; and
- To the west towards a watercourse known as Outside Creek.



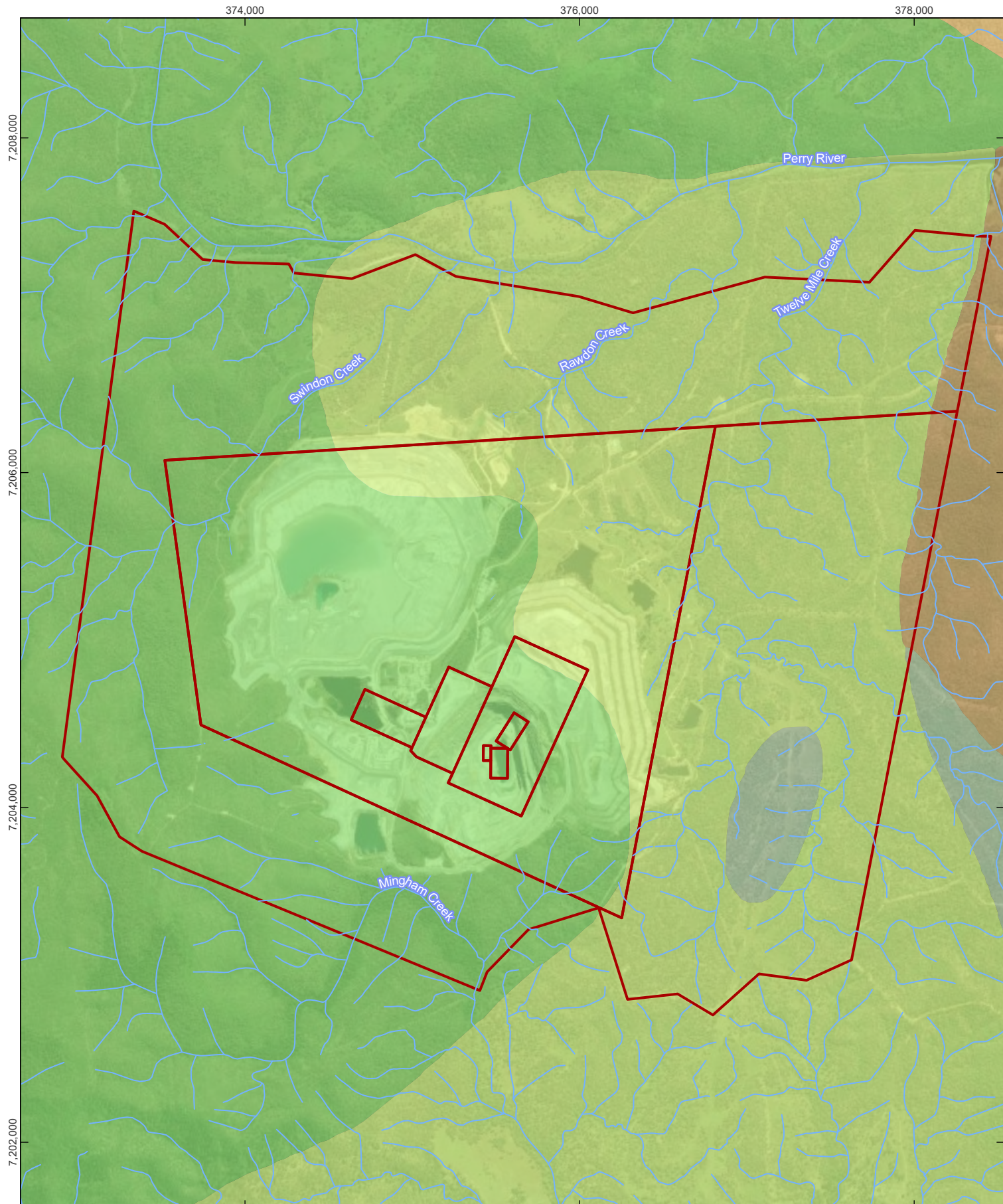
Dewatering of the mine pit has resulted in a cone of depression, altering the initially topographically driven groundwater flow paths and drawing flows towards the pit, with mounding under the TSF and northern waste rock dump (NWRD) also influencing the groundwater flow regime.

The major forms of groundwater-surface water interaction are considered to be groundwater recharge from rainfall-runoff and groundwater discharge to surface water. There are no known perennial groundwater discharge sites and baseflow to the creeks is thought to be negligible. Several groundwater discharge seeps occur close to the TSF due to artificially raised water levels (i.e., groundwater mounding), which are managed by MRO to mitigate surface water interaction through infrastructure including seepage interception trenches and dewatering bores. Localised temporary seeps are known to occur at gullies in the headwaters of Mingham Creek and upper catchment of Swindon Creek following rainfall events. Other intermittent groundwater discharge is suspected to occur in lower parts of the receiving landscape.

Groundwater quality data have been collected from monitoring bores in vicinity of MRO across the LOM. In summary, median pH is neutral (pH 7 to 8) in mine-owned and registered bores proximal to the Site and electrical conductivity (EC) is fresh to brackish (~1,500 $\mu\text{S}/\text{cm}$) (ERIAS, 2024). Data have shown a multitude of bores to be mine affected including within the subcatchments of Mingham Creek, Rawdon Creek, Swindon Creek and Twelve Mile Creek (Esslemont, 2021). The results highlight impacts from the COPCs outlined in **Section 2.4**.

The Queensland Groundwater Database shows over 50 bores within the immediate vicinity of the Site (ERIAS, 2024). The reported usages include mine monitoring, sub-artesian monitoring, water supply, a combination of these usages or “not stated”. The majority are owned by MRO and used for environmental monitoring or operational purposes.





0 0.5 1 km

Coordinate System: GDA2020 MGA Zone 56

Scale: 1:30,000 at A4

Project Number: 623.030415

Date Drawn: 23-Jan-2025

Drawn by: NT

LEGEND

- Watercourse
- Mining Lease

ASC Classification

- Chromosol
- Dermosol
- Rudosol
- Sodosol
- Tenosol

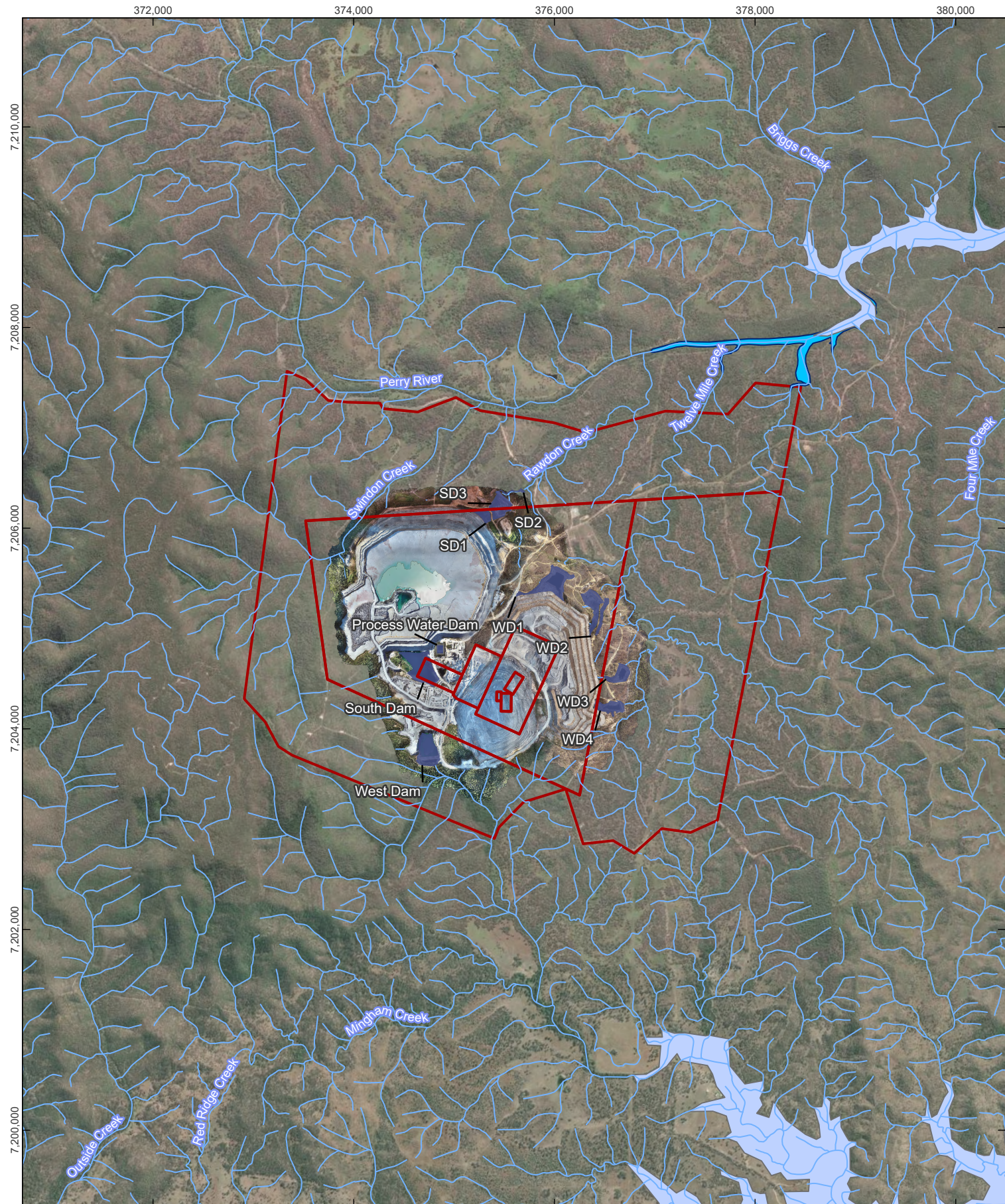
**MOUNT RAWDON
POST CLOSURE**

ASC SOIL MAPPING



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FIGURE 5



 0 0.5 1 km
 Coordinate System: GDA2020 MGA Zone 56
 Scale: 1:50,000 at A4
 Project Number: 623.030415
 Date Drawn: 30-Jan-2025
 Drawn by: NT

LEGEND

-  Watercourse
-  Mining Lease
-  Water Storage and Management
-  Perry River Weir
-  Flood Plain

MOUNT RAWDON POST CLOSURE

SURROUNDING WATERCOURSES



DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

FIGURE 6

3.0 Existing Site Water Management

3.1 Surface Water Management

3.1.1 Surface Water Requirements

The Site manages surface water under the MRO Stormwater Management Plan (SWMP) (Evolution, 2023). The SWMP was prepared to satisfy conditions within Schedule E of the Environmental Authority (EA) for the Site (EPML00712113) (State of Queensland, 2023) related to stormwater, and is designed to operate cohesively with the Site's groundwater and seepage management plans.

The EA provisions pertaining to stormwater are described in Schedule E of the EA which is attached as **Appendix A** of this Plan. In summary, the SWMP was designed to address the following aspects related to stormwater:

- Contaminants must not be released to any waters or the bed and bank of any waters, with the exception of authorised releases;
- Offsite release of impacted stormwater may only be from the authorised spillway locations on the six regulated dam structures;
- Releases must be monitored and any releases must meet the specified water quality release contaminant limit criteria;
- All reasonable and practicable erosion protection and sediment control measures must be implemented and maintained;
- Receiving waters must be monitored during flow events and water quality results compared to results from four upstream creeks to ensure that downstream water quality is not impacted from site operations;
- Groundwater is subject to contaminant limits and must be monitored quarterly;
- Seepage from the TSF must not enter surface waters;
- Regulated dams must meet a range of design and inspection criteria each year;
- There is a requirement for all regulated dams to comply with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*; and
- There is a requirement that all low hazard dams comply with various criteria relating to design, construction, operation, and maintenance.

3.1.2 Surface Water Management Measures

3.1.2.1 Stormwater Management

The Site employs a stormwater management network to control rainfall-runoff, regulate water quality, and contain MAW (or "dirty water", including sediment laden runoff, potential acid runoff and seepage expressions) within an enclosed system. This infrastructure includes:

- Diversion drains upstream of MRO to direct clean runoff away from operational or disturbed areas;
- Open channel drains, culverts, sediment traps and dams, rock check dams and silt fences within the Site footprint to manage sediment and dirty water; and
- Permanent and temporary pipe networks in conjunction with pumping facilities.



The core water management structures at the Site are the dams. The SWMP lists and classifies the Site's dams based on the definition provided within the EA together with other key structures. **Table 6** shows the structures, the assigned classifications per the SWMP and identifies the regulated structures (per **Appendix B** of this Plan) present on Site. **Figure 7** shows the key water storages used for surface water management at the Site.

Table 6 Key Surface Water Structures at MRO

Structure	Dam	Historical Farm Dam	Other	Capacity (ML)	Regulated Structure
Tailings storage facility (TSF)	X			5,659	X
Sediment dam 1 (SD1)		X	X	16	
Sediment dam 2 (SD2)		X		4.6	
Sediment dam 3 (SD3)	X			74	X
Water dam 1 (WD1)	X			210	X
Water dam 2 (WD2)	X			102	X
Water dam 3 (WD3)	X			36	X
Water dam 4 (WD4)	X			72	X
South Dam	X			559	X
West Dam	X			397	X
Process Water Dam	X			12	X
Raw Water Dam	X			11	
Perry River Dam	X			829	
Homestead Dam		X		N/A	
Crusher Dam		X		N/A	
Stockpile Dam			X	N/A	
Pit Sump			X	N/A	
Seepage Pit			X	N/A	
Lime Silo Gully			X	N/A	

Note: Dam – means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works (from EPML00712113).

Historical Farm Dam – a dam that existed prior to the establishment of MRO and not one that was constructed for mine operational purposes.

Other – meeting neither the definition of “Dam” or “Historical Farm Dam”.

3.1.2.2 High Flow Releases

During high flow conditions in the Perry River, the Site is permitted to release water to the river as part of water inventory management. The specifications for any planned releases including monitoring requirements are described in Schedule E of the EA, attached as **Appendix A**.

The Site can release under the following conditions:

- Water may be released via WD1 into the Perry River Dam, upstream of the weir, where the flows measured at the Perry River Weir are equal to or greater than 1 m³/s as measured through an operational flow gauging station.

The Site must monitor the release in accordance with requirements detailed in **Section 3.1.4**.



3.1.2.3 Water Reuse

Under Schedule I of the EA, attached as **Appendix C** of this Plan, the Site may release MAW captured at WD1 for irrigation purposes at designated land application areas. This measure assists the Site with water inventory management while providing a beneficial reuse for water that may otherwise be unserviceable.

The schedule of release is managed under the MRO Irrigation Management and Monitoring Program (IMMP). The conditions surrounding the IMMP serve to prevent harm to health and the environment as a result of the program. This includes a requirement to monitor release events as described in **Section 3.1.4**. An IMMP report is produced at an annual frequency to document the outcomes of the program.





0 0.5 1 km

Coordinate System: GDA2020 MGA Zone 56

Scale: 1:30,000 at A4

Project Number: 623.030415

Date Drawn: 30-Jan-2025

Drawn by: NT

LEGEND

- Watercourse
- Perry River Weir
- Mining Lease
- Pit
- Tailings Storage Facility
- Water Storage and Management

MOUNT RAWDON POST CLOSURE

KEY WATER STORAGES



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FIGURE 7

3.1.3 Water Management Domains

The structures identified in **Section 3.1.2** fall within distinct water management domains at the Site. The stormwater management areas include:

- The TSF area;
- The waste rock dumps (WRDs);
- Plant area and associated maintenance yards;
- Mine operations yard; and
- The pit area.

Each domain presents different opportunities and constraints towards surface water management at MRO.

3.1.3.1 Tailings Storage Facility

The TSF at MRO has been constructed at the headwater of Rawdon Creek, a minor tributary of the Perry River. It is centred around 1.3 km northwest of the pit and is a low-profile valley-type storage.

Surface water management at the TSF is divided into three sub-areas:

- The TSF surface;
- Toe of the north wall area; and
- Toe of the south wall area.

The TSF surface has a catchment of approximately 152 ha which is separated from external clean water catchments by diversion bunds primarily along the western perimeter. The surface of the TSF drains to a decant structure on the southwestern face of the dam. Water that drains to the decant is pumped back to the process water dam for reuse at the Site. A suite of fan evaporators are in place to relieve excess water storage that accumulates on the TSF. A design storage allowance is regularly maintained within the TSF given the structure is classified as a high consequence dam. Water quality is also periodically monitored within the TSF in accordance with the requirements of the EA.

The northern toe area of the TSF includes dams SD1 and SD3 to manage runoff from the northern TSF embankment as well as seepage. Under normal operations, water collected in SD1 is pumped by permanent floating electric pump to the TSF decant. A diversion drain is in place to divert clean runoff on the eastern side away from SD1.

The southern toe area of the TSF includes South Dam for the management of surface runoff and potential seepage from the TSF. Water captured in South Dam is pumped to the Raw Water Dam for beneficial reuse in processing. A suite of fan evaporators are in place to relieve excess water storage at South Dam, and a spillway is present on the south end of the dam which reports to West Dam should an overflow event occur.

3.1.3.2 Waste Rock Dumps

The Site includes two waste rock dump areas:

- The northern waste rock dump; and
- The western waste rock dump (WWRD).

The NWRD includes four water retention dams, WD1 through WD4, downstream to contain surface runoff. These dams have been constructed to each receive flows from the four main



drainage lines on the NWRD. It is recognised that the NWRD hosts potentially acid forming (PAF) rock, and as such the dams also act to prevent the release of potentially harmful surface flows and seepage. Two former farm dams, the Golding and Homestead Dams, remain at the toe of the NWRD and augment water and sediment storage of WD1 and WD2. Clean water diversions are established around the dams to maximise environmental flows. Water from these dams is returned to the Process Water Dam for use as process water or removal by mechanical evaporation. Water quality (surface water and groundwater) is also periodically monitored in vicinity of the NWRD in accordance with the EA.

The WWRD is situated west of the pit and receives flows from a non-acid forming (NAF) environment. West Dam is the main water storage in place to manage the WWRD including the capture of surface flows and neutral mine drainage generated by infiltration of water through the WWRD. Clean water diversions are in place upslope of the WWRD and West Dam. South Dam also receives a minor portion of runoff from the WWRD.

If required, West Dam serves to receive volumes from the pit when dewatering is necessary. Water volumes in West Dam are managed either by pump-back to South Dam (then to the Process Water Dam), offsite release to Mingham Creek following reverse osmosis (RO) water treatment and monitoring, or mechanical removal by fan evaporators. Water quality (surface water and groundwater) is also periodically monitored in vicinity of the WWRD in accordance with the EA.

3.1.3.3 Plant Area

The plant area constitutes the lower slopes of Mount Rawdon at the centre of the Site between the TSF and the pit. The area covers approximately 15 ha and includes the crushers, ore stockpile, mill, sedimentation dams, and the maintenance and administration facilities.

Stormwater in the plant area reports to one major stormwater channel which runs from the haul road, through the crusher area and plant site, before ultimately reporting to South Dam. A series of sediment traps and ponds are installed along the way to facilitate sediment capture and stormwater flow control prior to being captured at South Dam. These structures include:

- Primary and Secondary Crusher Gully;
- Crusher Dam;
- Lime Silo Gully; and
- Stockpile Dam.

3.1.3.4 Mine Operations Yard

The mine operations yard(s) are located east of the main access road and include laydown yards, chemical storage and workshop spaces. All flows in this area report to WD1 downstream. Water from WD1 is returned to the Process Water Dam for use as process water or removal by mechanical evaporation. Water quality (surface water and groundwater) is also periodically monitored in and nearby to WD1 in accordance with the EA.

3.1.3.5 The Pit Area

The pit area at MRO comprises a substantial catchment area of 75 ha including the inner pit surface and immediate surrounds. Water management in this area is predominantly governed by incident rainfall volumes that enter the pit as direct rainfall or runoff from the surrounds. Groundwater ingress to the pit is minimal and a sump is maintained at the base of the pit to minimise disturbance to mining operations from surface water or groundwater.



When required, water is pumped away from the pit sump to West Dam and eventually back to the Process Water Dam for reuse in processing. The pit is strategically mined to accommodate hazards posed by wet season rainfall. If necessary, the pit is available as an emergency storage in the event of excess site water storage, particularly during wet season, or a dam failure.

3.1.4 Surface Water Monitoring

The EA for the Site contains numerous provisions related to the monitoring of surface water at MRO and its receiving waters. The conditions are stipulated within Schedule E of the EA, attached as **Appendix A** of this Plan, and the condition/table references below refer to those held within **Appendix A**.

The provisions related to periodic surface water monitoring include:

- All determinations of the quality of contaminants released must be made in accordance with methods prescribed in the latest edition of the Environmental Protection Agency Water Quality Sampling Manual, and carried out on samples that are representative;
- Stormwater released from the Containment locations listed in Table E1 must be monitored at the locations and frequencies defined in Table E1 for the parameters shown in Table E2;
- Receiving waters potentially impacted by the release of stormwater impacted by mining activities, seepage from site dams or potentially impacted ground water must be monitored at the locations and frequencies defined in Table E3, for the water quality parameters listed in Table E4; and
- The Tailings Storage Facility must be monitored for the water quality parameters indicated and at the frequency specified in Table E5.

The following provisions are included should monitoring indicate the potential for impacts:

- In the event that monitoring conducted in accordance with condition E11 indicates the water quality within the Tailings Storage Facility does not comply with the contaminant limits defined in Table E5, implement all reasonable and practicable measures to prevent access by all livestock and minimise access by native fauna to the dam.
- In the event that monitoring results, as interpreted by a suitably qualified person, indicate an impact in terms of contaminant levels in downstream monitoring sites compared to levels found in upstream monitoring sites, then the environmental authority holder must complete an investigation into the source, cause or extent of environmental harm being caused, or the extent of environmental harm likely to be caused, and provide this to the administering authority within one (1) month of receiving the analysis results. For the purposes of this condition, a suitably qualified person is someone possessing appropriate qualifications and experience in the field of surface water monitoring program design monitoring and data analysis and who can competently make recommendations about these matters. In assessing the monitoring results the suitably qualified person must give consideration to relevant methodology and water quality criteria specified by the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand in Australian Guidelines for Water Quality Monitoring and Reporting, 2000 and Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000 or more recent editions of the documents.



The Site meets these requirements through completion of water level and quality monitoring in storages and receiving watercourses as outlined in the SWMP. Periodic monitoring of receiving waters includes Mingham Creek, Rawdon Creek, Swindon Creek, Twelve Mile Creek, and the Perry River at the locations shown in **Figure 8**. The results of periodic surface water monitoring are documented as part of REMP reporting at the Site.

Additional provisions are in place for the monitoring of high flow releases (**Section 3.1.2.2**) and water reuse as part of the IMMP (**Section 3.1.2.3**). The conditions are stipulated within Schedule's E and I of the EA, attached as **Appendix A** and **Appendix C** of this Plan respectively, and the condition/table references below refer to those attachments.

The provisions related to high flow release and water reuse monitoring include:

- The following information must be recorded daily for the duration of releases pursuant to condition E39 and provided to the administering authority upon request:
 - The water level in WD1, WD2, WD3 and WD4; and
 - Contaminant monitoring results required by condition E48; and
 - The volume of the release to the Perry River; and
 - The background flow rate in the Perry River.
- Water released pursuant to condition E39 must be monitored for and comply with the contaminant limits and monitoring frequency specified in Table E10;
- Monitoring for the contaminants listed in Table E12 must be conducted when water is being released pursuant to condition E39 at the monitoring locations and frequencies specified in Table E11;
- While water is released pursuant to condition E39, visual monitoring must occur twice every day to verify that discharges in the Perry River comply with the requirements of this environmental authority and records of this visual monitoring must be recorded and maintained onsite;
- The quality of receiving waters must be monitored at the locations and frequency in Table E11, for the contaminants specified in Table E12;
- The contaminant concentrations measured at Table E11 "Downstream Perry River (within 1 km of the weir)" in receiving waters must not be outside the pH range or exceed the Electrical Conductivity or any total water quality objective specified in Table E12;
- Mine affected water release pursuant to condition I1, must be monitored for and comply with the contaminant limits and monitoring frequency specified in Table I1; and
- The daily volume of mine affected water released to the land must be measured and records kept of the volumes of mine affected water released.

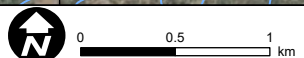
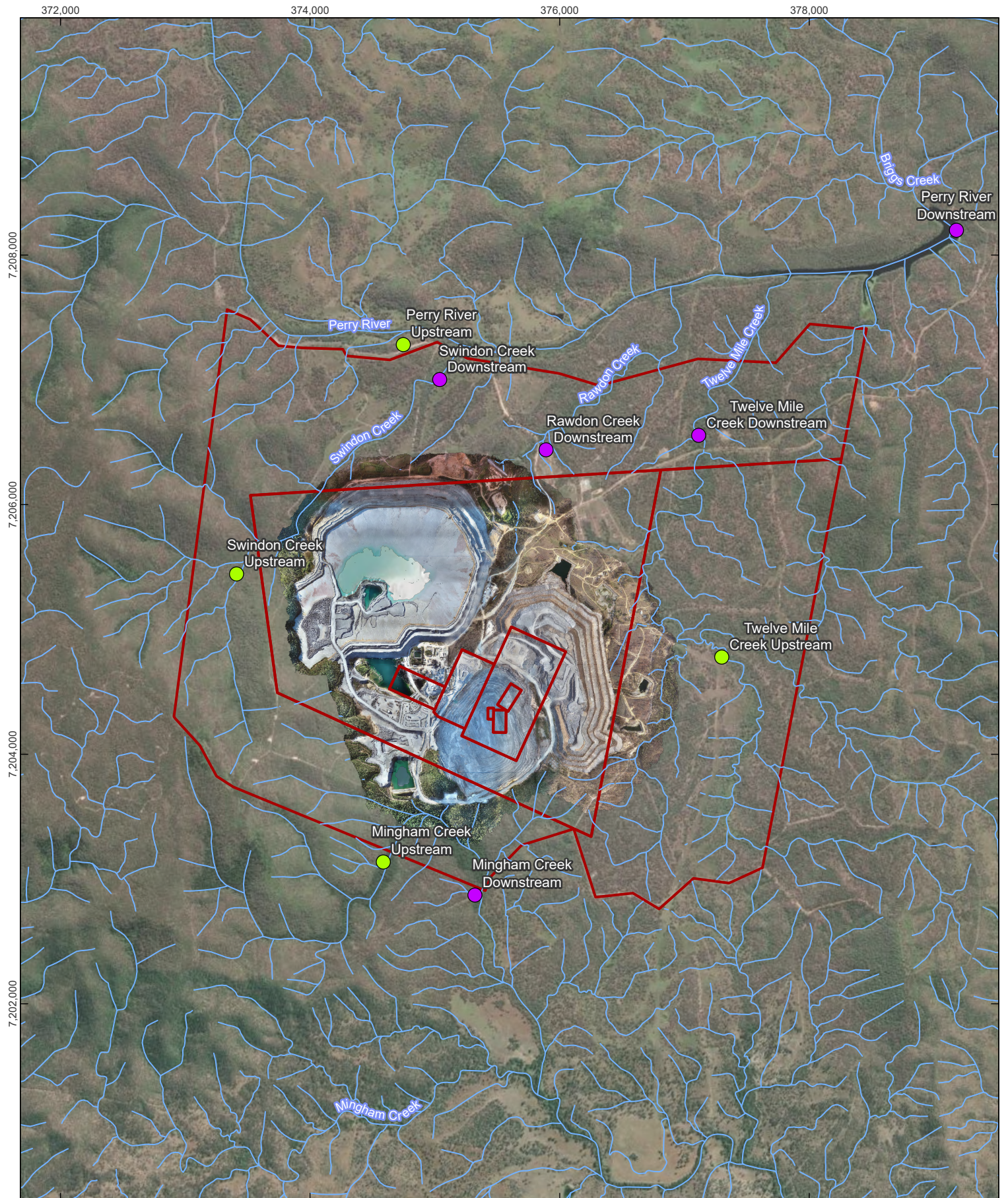
The following provisions are included should monitoring indicate the potential for impacts:

- Should any contaminant measured at Table E11 "Downstream Perry River (within 1 km of the weir)" in receiving waters be outside the pH range or exceed the Electrical Conductivity or dissolved water quality objective specified in Table E12, the environmental authority holder must immediately cease releasing and notify the administering authority under condition E51 and additionally provide the following information in writing:
 - Release cessation date/time; and
 - Natural flow volume in receiving water; and



- Volume of water released; and
 - Details regarding the compliance of the release with the conditions of this environmental authority (i.e., contamination limits, natural flow, discharge volume); and
 - All in-situ water quality monitoring results; and
 - Any other matters pertinent to the water release event.
- The holder of the environmental authority must notify the administering authority by phone call within six (6) hours, followed by written notification (via email to the pollution hotline at: pollutionhotline@des.qld.gov.au) (or the current alternative) within twenty-four (24) hours, after becoming aware of any release not in accordance, or reasonably expected to not be in accordance with, the conditions E39 to E51; and
- The giving, transferring and application of mine affected water must cease immediately upon notification or otherwise becoming aware that:
 - The use of mine affected water is causing or threatens to cause environmental harm,
 - Is posing a human health risk,
 - Is not compliant with the conditions of this environmental authority.





Coordinate System: GDA2020 MGA Zone 56

Scale: 1:40,000 at A4

Project Number: 623.030415

Date Drawn: 30-Jan-2025

Drawn by: NT

LEGEND

- Watercourse
- Mining Lease

Surface Water Monitoring Location

- Downstream
- Upstream

**MOUNT RAWDON
POST CLOSURE**

**SURFACE WATER MONITORING
LOCATIONS**



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FIGURE 8

3.1.5 Regulated Structures

The Site operates a range of regulated structures as defined under the *Manual for assessing consequence categories and hydraulic performance of structures (ERS/2016/1933)* (State of Queensland, 2016). Under Schedule H of the EA, as shown in **Appendix B**, hydraulic performance criteria are defined in Table H1 for regulated structures at the Site which must be met as part of safe operations.

Three key components comprise the hydraulic performance criteria:

- Spillway critical design storm capacity;
- Design storage allowance (DSA); and
- Mandatory reporting level (MRL).

The spillway capacity is a feature designed into the structures during construction. Apart from ensuring the spillway is designed to specification, the only ongoing requirement is to ensure the spillway maintains structural integrity and any damage/hazards are reported and addressed to ensure functionality. The DSA is a criterion that must be actively managed throughout the life of the structures. This pertains to the storage volume that must be maintained within a structure such that volume is available to contain a major rainfall event. The DSA volume for each structure corresponds to its assigned consequence category. At MRO, all regulated structures are classified as “Significant” consequence with the exception of the TSF which has a greater classification of “High” consequence. Lastly, the MRL identifies the critical stage level within a structure where a rainfall event equivalent to the DSA would result in overtopping. Similar to DSA, the MRL is a criterion that requires active management as it too changes in response to stage levels within a structure. Schedule I of the EA includes provisions that serve to ensure the Site maintains the hydraulic performance criteria and safely operates regulated structures.

3.1.6 Wet Season Management

The Site employs a hierarchical contingency plan to manage the risk of spills from water storages arising from annual wet seasons. A general framework is maintained, referred to as spill prevention priorities, which defines the priority in which water storages are generally managed to prevent spills. As defined in the EA, wet season at the Site is deemed to extend from 1 November in one year to 31 May in the following year inclusive.

Table 7 outlines the spill prevention priority framework. As stipulated in the SWMP, the priority order is considered generalised and can be shuffled depending on circumstances at the time.

Table 7 General Spill Prevention Priorities

Structure	Priority	Description
TSF	1	Spills to SD3. Pump to pit in preference to overflow.
SD3 (SD1)	2	Spills to Rawdon Creek. Pump to TSF to prevent spill offsite.
WD1/WD2	3/4	Generally, the two poorer WD qualities. Priority to be determined based on water quality at the time.
South Dam/WD3/WD4	5/6/7	Priority to be determined based on water quality at the time.
West Dam	8	Poorer quality water. Priority to be determined based on water quality at the time.
Raw Water Dam	N/A	Internally drains to Process Water Dam. Undesirable to overflow at this reduces potential for decant water use.



Process Water Dam	N/A	Internally drains to South Dam. Undesirable to overflow at this reduces potential for decant water use.
Crusher Gullies/Crusher Dam/Lime Silo Gully/Stockpile Dam	N/A	Internally drains to South Dam. These are routinely overflowed as part of normal operations.
Homestead Dam	N/A	Internally drains to WD1 and WD2, respectively. These are routinely overflowed as part of normal operations.
Pit	N/A	Extremely unlikely to overflow.

An array of actions are established to guide the management of water storages at MRO during the wet season. These include:

- Operation of mechanical evaporators;
- Where applicable, desilt and repair/replace rock check walls;
- Pump transfer between storages including metering transfers;
- Regular monitoring of standing water level/pondage elevations;
- Measuring inflows;
- Monitoring spillway activity; and
- Releasing water where quality criteria are compliant.

In the event of overflow, the Site monitors water quality within the applicable storages and at its receiving waters including offsite. MRO are then to notify regulatory authorities of the overflow event. The monitoring data and information gathered from the overflow event is subsequently reviewed to inform whether investigation works are required.

As described in **Section 3.1.3.5**, the pit is an emergency storage and considered the last line of defence to manage extreme water storage at the Site. Due to the pit's storage capacity (>50,000 ML), it is extremely unlikely to experience overflow during the LOM.

3.1.7 Water Balance Model

The Site maintains an operational water balance model (WBM) developed in GoldSim to track water inventory trends and inform water related decision making. The WBM is particularly critical for providing pre-wet season forecasts, allowing MRO to act in advance and prevent potential water related incidents such as spills or water quality degradation.

The operational WBM was last updated by ATC Williams (ATCW) in September 2024 (ATCW, 2024). The update was requested by MRO following a significant rockfall event in the pit with aim to understand potential impacts towards the NWRD and its receiving water storages (WD1 to WD4) as well as to recalibrate the model to capture various large rainfall events that occurred leading up to the rockfall event.

3.2 Groundwater Management

3.2.1 Groundwater Requirements

The Site manages groundwater under the MRO Groundwater Monitoring and Management Plan (GMMP) (Evolution, 2023). The GMMP was prepared to satisfy conditions within Schedule E of the EA for the Site related to groundwater.

The EA provisions pertaining to groundwater include:



- identify potential sources, causes and extent of contaminant seepage and disturbance to groundwater from the activity;
- ensure that all potential groundwater impacts due to the activity are identified, mitigated, and monitored in accordance with the conditions of the environmental authority;
- ensure that adequate groundwater monitoring and data analysis is undertaken to achieve the following objectives:
 - detect any impacts to groundwater levels due to the activity;
 - detect any impacts to groundwater quality due to the activity;
 - detect any impacts caused by contaminant seepage on surface water quality;
 - detect and analyse short- and long-term trends in groundwater quality at operational bores at an annual frequency;
 - determine compliance with conditions E22, E23, E24, E25, E26 and E28;
- include a review process to identify improvements to the program;
- include an appropriate quality assurance and quality control program; and
- assess the success of the seepage management system required under conditions E32 and E34 and determine if any additional mitigation measures are required for the adequate management of seepage;
- include a groundwater model which includes an assessment of current seepage rates and predicted post-mining seepage rates; and
- have consideration for any comments provided by the administering authority.

3.2.2 Groundwater Management Measures

The GMMP is implemented in conjunction with the MRO Seepage Management Plan (SMP) (Evolution, 2023) to manage impacts related to groundwater and seepage. Additionally, infrastructure in place to manage surface water under the SWMP assists with the management of groundwater and seepage.

The Site includes the following measures for the management of groundwater:

- Monitoring bores: for the collection of groundwater elevation and quality data;
- Dewatering bores: to return potentially harmful groundwater or seepage back to Site;
- Seepage interception trenches: to mitigate the release of potentially harmful groundwater or seepage away from the Site;
- Subsurface drainage: such as the pipe in the Southern Embankment Seepage Collection system, to control the subsurface drainage regime where necessary; and
- Dams and sumps: used to mitigate the release of potentially harmful surface water, groundwater or seepage.

As a distinction, groundwater is primarily monitored and managed using the network of monitoring and operational (dewatering) bores at the Site. The other measures may periodically assist to manage shallow groundwater; however, they serve more to mitigate shallow surface waters that express as seepage.

Further detail on seepage management infrastructure is provided in **Section 3.3**.



3.2.3 Groundwater Monitoring

The Site monitors impacts to groundwater elevation and quality at MRO and surrounds through a routine groundwater monitoring program. The program is executed using the Site's groundwater monitoring network, as shown in **Figure 9**, which comprises four types of monitoring bore:

- Compliance Bores: to assess if the Site is meeting its compliance requirements;
- Interpretation Bores: located outside of potential influence of the activity and used for comparative and interpretative purposes;
- Operational Bores: where groundwater quality must be maintained or improved; and
- Operational Management Bores: for interpretation purposes.

The bores are periodically monitored for standing water level and water quality in accordance with Table E7 of the EA. Groundwater quality is assessed in line with the requirements of Table E8 and E9 of the EA.

3.2.4 Groundwater Model

A numerical groundwater model was developed for the Site in accordance with the requirements of Schedule E of the EA. The model was developed in MODFLOW-SURFACT and last updated in 2020 by SLR to produce post-mining groundwater predictions (SLR, 2020).

A separate numerical model was established during 2024 as part of the environmental assessment for MRPH (CDM Smith, 2024). This model was constructed using MODFLOW-USG and includes MRO within its domain. The model was used to assess groundwater flows and solute transport for the proposed MRPH.





0 0.5 1 km

Coordinate System: GDA2020 MGA Zone 56

Scale: 1:30,000 at A4

Project Number: 623.030415

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LEGEND

- Watercourse
- Mining Lease

Groundwater Monitoring Network

- Compliance Bore
- Interpretation Bore
- Operational Bore
- Operational Management Bore

MOUNT RAWDON POST CLOSURE

GROUNDWATER MONITORING NETWORK



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FIGURE 9

3.3 Seepage Management

3.3.1 Seepage Requirements

The Site manages seepage under the MRO Seepage Management Plan (SMP) (Evolution, 2023). The SMP was prepared to satisfy conditions within Schedule E of the EA for the Site related to seepage.

The EA provisions pertaining to seepage include:

- The Seepage Management Plan required under condition E32 must at a minimum include control measures to:
 - prevent the release of seepage to groundwater in the receiving environment; and
 - prevent seepage migration into surface waters.

In summary, the intent of the SMP is to contain chemicals of potential concern (COPCs) generated by weathering of processed rock (tailings), sub-economic ore and barren rock (waste rock). Expressly, seepage containment measures aim to minimise seepage from:

- the TSF;
- the waste rock dumps; and
- operational areas.

Additionally, the SMP serves to manage COPCs associated with land disposal of human waste (wastewater) and potential accidental spills of hydrocarbons or hazard chemicals.

3.3.2 Seepage Management Measures

The SMP is implemented in conjunction with the GMMP to manage impacts related to groundwater and seepage. Additionally, infrastructure in place to manage surface water under the SWMP assists with the management of groundwater and seepage.

The physical measures employed to manage seepage are consistent with those described for the management of surface water in **Section 3.1.2** and groundwater in **Section 3.2.2**.

Additionally, the following practices are undertaken to manage seepage at MRO:

- Maintaining a tailings deposition regime (in terms of cycling periods) to maximise consolidation of the tailings beach and thereby the storage efficiency of the TSF;
- Maximising water recovery while limiting the volume of free water in the decant pond, by maintaining an effective balance between deposition scheduling and decant water recovery rate;
- Implementation of mining and construction processes to minimise the generation of solutes in the waste rock source term, including implementation of waste rock segregation and overseeing the application of NAF rock building material; and
- Surface water and groundwater monitoring to assess TSF performance, identify preferred flow paths/basement sequences, and provide a feedback trigger for implementing additional targeted dewatering works.

3.3.3 Seepage Management Domains

The measures described in **Section 3.3.2** fall within distinct seepage management domains at the Site. The seepage management areas include:



- the TSF;
- the waste rock dumps (WRDs); and
- operational areas.

Each domain presents different opportunities and constraints towards seepage management at MRO.

3.3.3.1 Tailings Storage Facility

Seepage along the northern embankment of the TSF is managed by the following actions:

- A downstream seepage interception drain against the final LOM toe of the northern embankment, extending from the TSF western embankment to SD1, which intercepts and transfers seepage to SD1, and establishes an upper limit of the phreatic surface at around 150 mAHD to limit the hydraulic head potential of seepage from the TSF;
- Five dewatering bores (MRDB5, MRDB6, MRDB7, MRDB10, MRMB31) that intercept seepage passing below the downstream seepage interception drain in the Northern Seepage Zone, and below SD3 in Rawdon Creek. The dewatering bores generate cones of depression that locally lower the standing water level to about 98 mAHD in designated flowpaths, which also limits the hydraulic head potential of seepage from the TSF;
- Containment and diversion of seepage from the Bore 10 gully (adjacent to MRMB10). This seep is now diverted into the downstream seepage interception drain; and
- Sediment Dam 1 provides secondary containment and returns water to the TSF. located downstream of SD1 and captures overflow from SD1.

Collectively the dewatering bores and seepage interception system return seepage water to the TSF and lower the effective hydraulic head potential of the Northern Wall seepage.

Seepage from the western embankment of the TSF is managed by the following actions:

- The downstream seepage interception drain (refer item 1 above) that intercepts and transfers seepage to SD1;
- Interrupted placement of tailings and PAF waste rock in the western cell to allow tailings in the western cell to dry and consolidate;
- French drains downgradient of the western cell embankment and western TSF wall that respectively transfer seepage water to Well 5 and Well 1;
- Seepage intersection sumps installed downgradient of the western cell embankment and western TSF wall (Well 5, Well 1), which transfer seepage water to the Seepage Interception Drain;
- Dewatering bores (MRDB1, MRDB27, MRDB3, MRDB4) that intercept deep seepage by generating cones of depression that locally lower the standing water level, which lowers the hydraulic head potential for seepage from the TSF towards Swindon Creek. The intercepted seepage water is transferred to Well 1 or the downstream seepage trench; and
- A Seepage Interception Dam commissioned in 2021 to intercept seepage and stormwater. It has a clay core with deepened foundation, and two adjacent French drains with connected sumps that transfer seepage to the seepage interception drain via Well 1.



Collectively the seepage interception system returns seepage water to the TSF and lowers the effective hydraulic head potential of seepage from the Western Embankment.

Seepage from the southern embankment of the TSF is managed by the following actions:

- The Southern Embankment seepage collection system, which is a French Drain that connects with the South East Dewatering Well (Stan's Well) and returns water to the Process Water Dam. The well intercepts seepage through the South-Eastern Embankment; and
- Relocating the decant, and the decant-access-causeway. The old decant was decommissioned in 2018 and has been filled with PAF and tailings to seal the hydraulic connection between it and the Southern Embankment via the existing decant-access- causeway. It has been replaced by a new decant.

The South Dam collect runoff of seepage expression and stormwater that has flowed through the outer batter wall of the southern embankment.

3.3.3.2 Waste Rock Dumps

Solutes generated in the NWRD are carried through the rock pile and along four existing drainages on the eastern side of the dump. Seepage at the NWRD is managed by:

- Four water retention dams (WD1, WD2, WD3, WD4) that intercept stormwater and seepage. Water is transferred to WD1 from WD2, WD3 and WD4, and then returned to the Raw Water Dam for use as process water.
- Seepage interception systems downstream of WD1 and WD2, which drain into dewatering wells, dewatering bore MRMB26 downgradient of WD1 as well as dewatering bores (MRMB27, MRDB8) downgradient of WD2 that return seepage water to the retention dams.
- Observing and recording groundwater standing water levels and water quality in monitoring bores MRMB25 and MRMB26 (downgradient of WD1), MRMB27 and MRMB63 (downgradient of WD2), and a compliance bore MRMB77 (downgradient of MRMB25, MRMB26, MRMB63 and MRMB27). Bores MRMB26 and MRMB27 are equipped to return intercepted seepage in groundwater to WD1 and WD2 respectively.
- Observing and recording groundwater standing water levels and water quality in compliance bores MRMB61, MRMB62 and MRMB78. These bores are located downgradient of WD3 and WD4.

The WWRD generates NAF seepage which reports to West Dam. Additional water sources reporting West Dam include water transfers from the pit, and seepage below the West Dam wall that is collected by a sump then returned to West Dam. This water is returned to the process water circuit for usage or removed by enhanced mechanical evaporation.

3.3.3.3 Operational Area

Sewage generated in the main administrative offices and the fixed-plant maintenance area is processed by the Wastewater Treatment Plant (WTP) located adjacent to the main office area and disposed onto the land application area in amounts that can be assimilated by soil and growing plants. This ensures that deep leaching of salts and nutrients does not occur. If required, there is also the option of removal by truck for off-site disposal.

If a spill of acid, cyanide or hydrocarbon occurs the Chemical Spills Procedure (MRO ENV PRO 0288), Cyanide Spill Response TARP (MRO_MIL_FOR_0533) or Hydrocarbons – Spill Clean – Up/Disposal Procedure (MRO ENV PRO 0204) are followed. These dedicated procedures contain, report, clean-up and if required rehabilitate the Site.



Hydrocarbon spills in operational areas are recorded, and affected soil is excavated or removed and transported to a bioremediation facility (land farm) for aerobic biodegradation of the hydrocarbon.

The landfill area contains mainly inert materials that have been disposed of in a trench, except for a relatively small volume of timber and timber pallets that may putresce.

3.3.4 Seepage Monitoring

Seepage at MRO is monitored as part of the surface water monitoring program under the SWMP as well as the groundwater monitoring program within the GMMP. The respective programs are described in **Section 3.1.4** and **Section 3.2.3**.

In summary, seepage is monitored at MRO as follows:

- Groundwater standing water levels are measured monthly;
- Surface water volumes in the interception dams that capture seepage are measured daily to weekly;
- Water quality parameters in the interception dams and groundwater bores are measured quarterly which includes field parameters, major ions, trace elements and cyanide;
- The volume of surface water/seepage water from WD1 that is disposed onto the Land Application area near the mine entrance is measured daily, weekly in-situ for EC and pH, and monthly for water quality parameters;
- The volume of wastewater disposed onto the Land Application area beside the WTP is measured daily, and water quality parameters are measured monthly; and
- Measurements are evaluated against prescribed contaminant limits in the EA and are reported to the (former) Department of Environment and Science (DES).

The GMMP includes a detailed register of seeps associated with the TSF. Mapping of all known seeps in vicinity of MRO is also shown within the GMMP and the SMP. This mapping has been reproduced in **Figure 10** along with the locations of seepage interception trenches. Note it is uncertain which seeps in **Table 8** correspond with the seeps mapped in **Figure 10**.

Table 8 Known Seeps associated with the Tailings Storage Facility

Seep Number	Description
Seeps 1 and 2	Two seeps at the toe of the Southern Embankment were being balanced by evaporation and soil absorption and reported to the South Dam. These seeps are still active and were flowing into South Dam in April 2021.
Seeps 3, 4, 5 and 6	A seep near the decant causeway and three seeps on the Northern Embankment toe were flowing at < 0.1 L/s in a formed channel and reporting to TSF Sed Dam 1. Seep 3 has healed and is no longer a seep and Seeps 4, 5 and 6 have subsequently been covered by rock buttress.
Seep 7	A seep that expressed some 60 m from the toe of the Northern Embankment, in an area disturbed during embankment construction, which flows into a drain that reports to TSF Sed Dam1. This seep is active and flowing into the drain in April 2021.
Seep 8	Minor efflorescence in the “Red Hill Borrow” area northeast of the TSF, with no moisture or wetting. Stormwater runoff from this area reports to SD1. This seep was last reported in October 2019 and has subsequently been covered by rock buttress.
Seep 9 (now Seep 15)	A seep downgradient of the Northern Embankment, some 600m from the Rawdon Creek alignment in a former borrow area, with flows estimated to



	be expressing some 2 m to 3 m below the former pre-disturbed level. Seepage flows (<0.1 L/s) reported to an open sump (Marty's Sump) and were routinely pumped back to the TSF until the Seepage Interception Drain was installed in 2017 (Marty's sump connects with the Seepage Interception Drain, which reports to SD1). A 140m long cutoff wall (extending 4 m deep) was installed between the second seepage trench and Marty's Sump. Seep 9 was last reported in January 2019 and has subsequently been covered by rock buttress. This seep is actively flowing into the SD1 via the Seepage Interception Drain. In 2021 additional dewatering bores were installed to capture seepage that passes below the Seepage Interception Drain.
Seep 10	A low flow seep from the western toe of the TSF, which is being captured by a trench that directs flow into Well 1. This seep is active and was flowing into SD1 via Well 1 in April 2021.
Seeps 11, 12 and 13	These three seeps are no longer deemed to be tailings fluid based on analyses of water quality.
Seep 14	A damp area extends about 20 m downgradient of the western embankment, with no pooling of water and very low flow that was being balanced by evaporation and soil absorption. An intercept well and syphon have subsequently been installed to return seepage from the Western Embankment to the TSF.
Seep 15	See Seep 9.
Seep 16	North Wall borrow pit near TSF Well #4. This seep was last reported in January 2019 and has subsequently been covered by rock buttress.
Seep 17	No longer a seep.
Seep 18	Damp ground in the BK Hire laydown area. This area was still damp in April 2021.
Seep 19	This was located approximately on the 163RL bench near Ramp 5, Red Hill. It is no longer deemed to be a seep.
Seep 20	A low flow seep from the north-western toe of the TSF, which contributes to surface ponding. This seep is near pumpback bore 3 (MRDB2), which is actively transferring seepage into the Seepage Interception Drain.
Seep 21	This seep downslope of the toe of the Western Cell reports to Well 5, which subsequently transfers seepage to SD1.
Seep 22	A seep on the southern wall of the TSF, which occasionally flows or contributes to surface ponding on the ramp from the South Dam standpipe. This seep is active and was flowing down the ramp in April 2021.
Seep 23	This seep downslope of the toe of the Western Cell reports to Well 5 and pumpback bore 1 (MRPB1), which transfers seepage to SD1. Operational processes of depositing tailings, and PAF waste rock placement in unconsolidated tailings, near the Western Embankment as recommended by the life of mine waste rock deposition plan were modified to allow the tailings to dry out and consolidate in this part of the TSF.
Seep 24	Low flow underground seep from the western toe of the TSF, which was being captured by pumpback bore 2 (MRPB2) that directs flow into SD1 via the Seepage Interception Drain. This seep was active during April 2021.
Seep 25	A seep downslope of the Northern Embankment, which was being balanced by evaporation and soil absorption and upslope of the Seepage Interception Drain. This seep has subsequently been covered by rock buttress.
Seep 26	Artesian flow up the standpipe of a geotechnical bore drilled into the bench on the western toe of the TSF, which is syphoning into SD1 via the Seepage Interception Drain. This seep is active and was flowing in April 2021.
Western Embankment	A damp area extends about 20 m downgradient of the western embankment. A French drain and intercept well were installed to return seepage from the Western Embankment into SD1 via the Seepage Interception Drain.



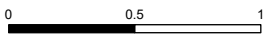
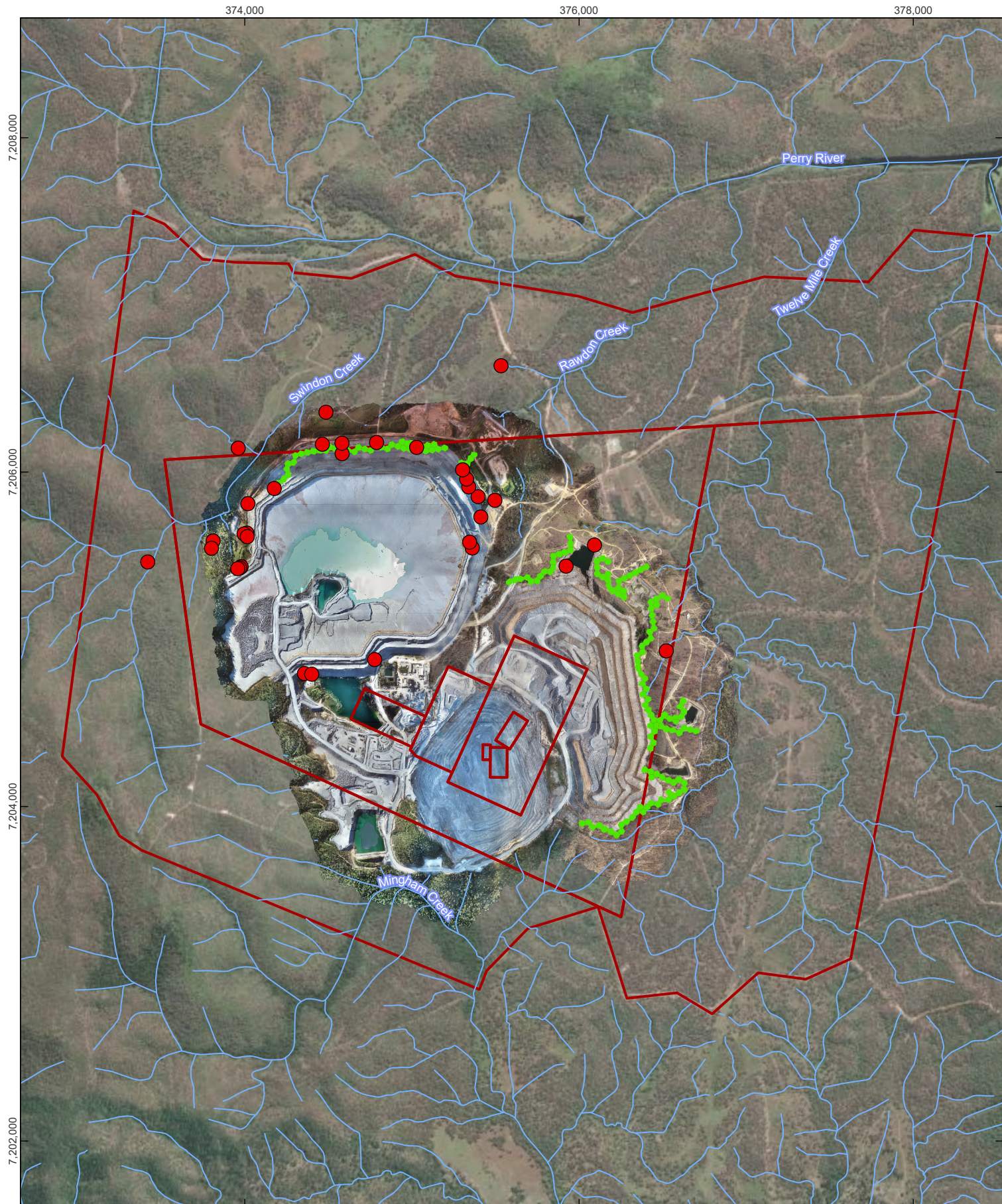
3.3.5 Seepage Modelling

Various models been employed to enhance understanding of seepage at the Site. These include:

- SEEP/W models of the TSF and NWRD (ATCW, 2021);
- The numerical groundwater model;
- To an extent, the water balance model (WBM); and
- To an extent, the geological block model (to inform waste rock segregation).

Additionally, the Site refers to their own broader modelling guidance from the Model for Effluent Disposal using Land Irrigation (MEDLI) to determine seepage rates for the land disposal of captured seepage water from WD1 onto the Land Application area (Evolution, 2018).





Coordinate System: GDA2020 MGA Zone 56
 Scale: 1:30,000 at A4
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LEGEND

- Seepage Location
- Watercourse
- Mining Lease
- Seepage Trench

**MOUNT RAWDON
POST CLOSURE**

**SEEPAGE TRENCHES AND
KNOWN SEEPS**



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FIGURE 10

4.0 Post Closure Water Management

4.1 Contributing Studies

4.1.1 Water Balance Assessment

A post closure water balance assessment was undertaken to provide forecasting of water inventory and quality (salt loads) at MRO following closure and accordingly inform this Plan (SLR, 2025a). The operational WBM as updated in September 2024 (refer **Section 3.1.7**) was adapted by SLR to serve as the post closure WBM for the study. The key intended outputs of this study include predicted long-term water level and salt behaviour, as well as water volumes and quality expected to report via externally draining catchments to ultimately inform future water management requirements at the Site.

As stock watering is the critical water-related PMLU for the Site, a review was conducted to determine relevant indicators to be adopted in the salt balance model (SBM) along with corresponding threshold values for assessment. Based on guidance within the ANZECC & ARMCANZ Water Quality Guidelines (ANZECC & ARMCANZ, 2000) for water consumption by beef cattle, total dissolved solids (TDS) and sulfate were identified as the indicator elements for assessment. Sulfate was highlighted for the assessment as it's been a principal COPC throughout the LOM that has been observed at elevated concentrations, and additionally there is published guidance for this analyte and its interaction with cattle. Although all critical analytes (predominantly metallic COPCs) were not assessed within the study, the approach provides an indication of the rate of change expected to apply to other contaminants.

To evaluate the salinity modelling outcomes, three risk categories were defined:

- Low: TDS <5,000 mg/L (cattle drinking – no loss of production)
- Medium: TDS >5,000 and <10,000 mg/L (cattle drinking – some loss of production)
- High: TDS >10,000 mg/L (Not expected to support cattle drinking).

To evaluate the sulfate modelling outcomes, three risk categories were defined:

- Low: <1,000 mg/L (cattle drinking – only temporary effects and may cease once stock become accustomed to the water)
- Medium: >1,000 and <2,000 mg/L (cattle drinking – adverse effects may occur, especially in young or lactating animals or in dry, hot weather when water intake is high. These effects may be temporary and may cease once stock become accustomed to the water)
- High: >2,000 mg/L (cattle drinking – may cause chronic or acute effects).

The post closure WBM was simulated over a period of 400 years (starting from 2035) to model water levels and 200 years to model water quality. The initial WBM and SBM results, using the original planned external catchment draining to the pit, showed unfavourable sulfate concentrations in the pit void over the mid to long-term (within 200 years). The model results indicated that the pit water level will likely reach equilibrium within a 400-year timeframe, below the expected long-term local groundwater levels, therefore resulting in a terminal sink. An opportunity was identified to improve the long-term water quality in the pit void by increasing the rehabilitated area draining inwards to the pit and thus freshening this water body. This could be done only whilst ensuring the pit void remained a sink for local groundwater.

The study found that increasing the rehabilitated area draining inwards to the pit to around 100 ha would improve the long-term water quality, and ensure the predicted sulfate concentrations within the pit void waterbody stay within the low-risk category for cattle drinking



over the 200-year period, while maintaining the pit as a sink for local groundwater. **Figure 11** presents the predicted pit void water levels. **Figure 12** and **Figure 13** show the predicted pit void salinity (as TDS) and sulfate levels, respectively.

At this stage, the feasibility of achieving this landform is yet to be investigated, and it is recommended that subsequent works be undertaken to optimise pit water behaviour in harmony with achieving a safe and practical final landform.

External to the pit, the WBM was applied to inform projected water volumes and quality in catchments planned to drain to the receiving environment following closure of the Site. Modelling indicates that the restored catchments will augment downstream flows by approximately 6% of the average flows currently observed within the Perry River catchment. For water quality, the results signify that average concentrations of TDS (277 mg/L) and sulfate (103 mg/L) discharging from the Site will be below respective limits under the Water Quality Objectives of the Perry River.

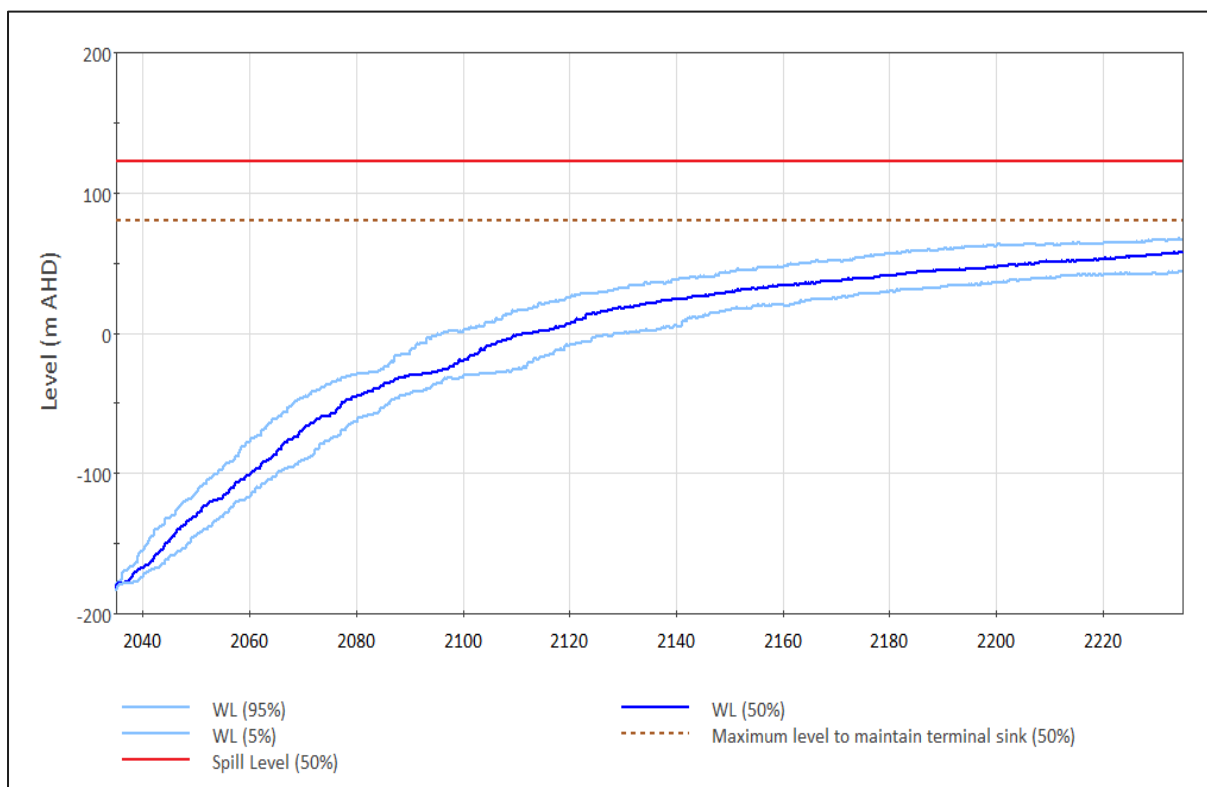


Figure 11 Predicted Post Closure Pit Void Water Levels



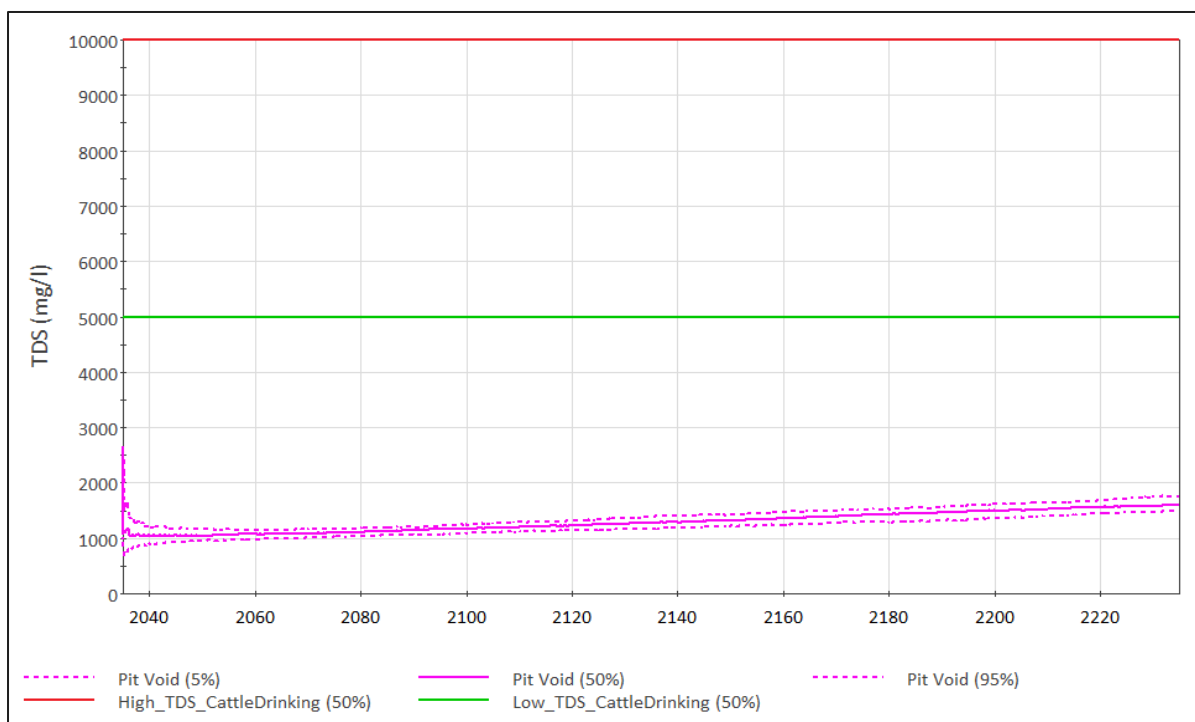


Figure 12 Predicted Post Closure Pit Salinity (as TDS)

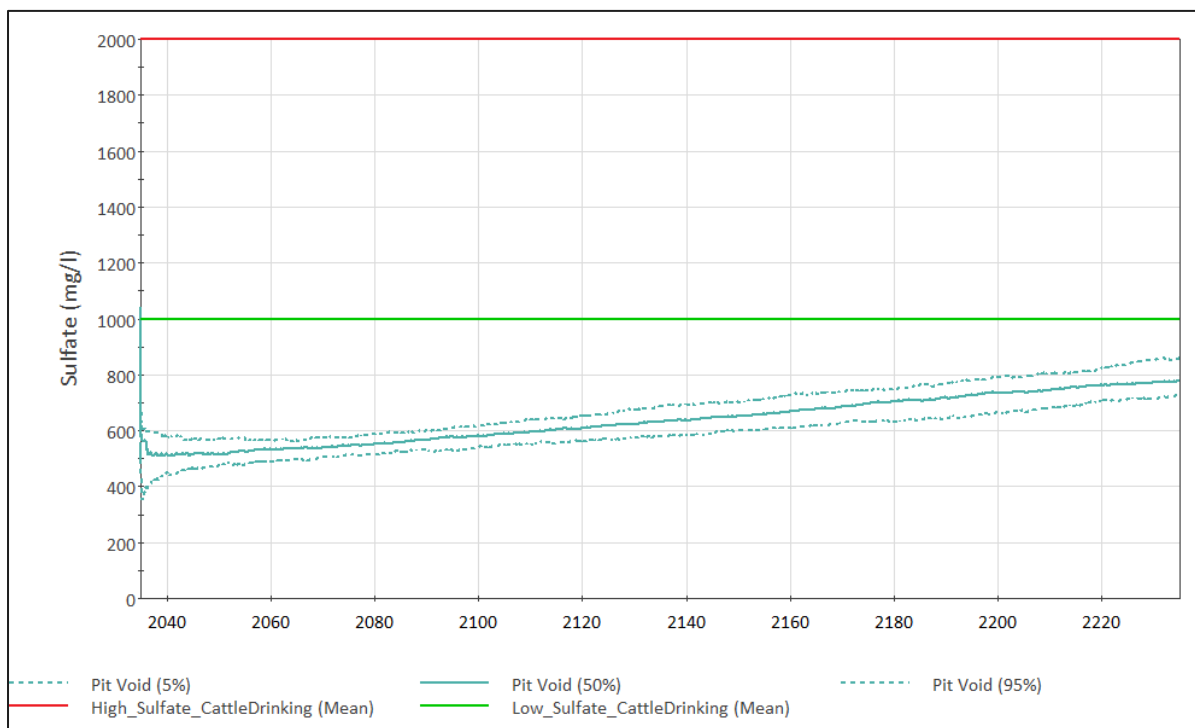


Figure 13 Predicted Post Closure Pit Sulfate Concentrations



4.1.2 Groundwater Assessment

A post closure groundwater assessment was prepared to provide understanding on expected groundwater conditions following closure and accordingly to inform this Plan (SLR, 2025b). The assessment employed the 3D transient groundwater model developed by CDM Smith on behalf of the MRPH (CDM Smith, 2024). The model was adapted by SLR to simulate predicted groundwater elevation and contaminant transport at MRO in the post closure state.

Water elevation in the void was informed by outputs from the post closure WBM (SLR, 2025a). The model was simulated for a period of 500 years post closure. The results aligned with the WBM and confirmed the void is predicted as a long-term groundwater sink. Groundwater net inflow to the final void slowly declines with time as the void lake stage rises. **Table 9** presents net inflow versus outflow results at the end of the 500-year modelling period. The net void inflow from groundwater decreases from 0.2 ML/day in 2025 down to 0.04 ML/day in 2545 as shown in **Figure 14**. The equilibrated groundwater table elevations are depicted in **Figure 15**.

Table 9 Post Mining Equilibrium Final Void Inflow

Groundwater flow component	Flux (ML/d)
Post Mining Equilibrium Groundwater outflow to Groundwater	<0.001
Post Mining Equilibrium Groundwater inflow to pit	0.042
Post Mining Equilibrium Groundwater Net Flow to pit	0.041

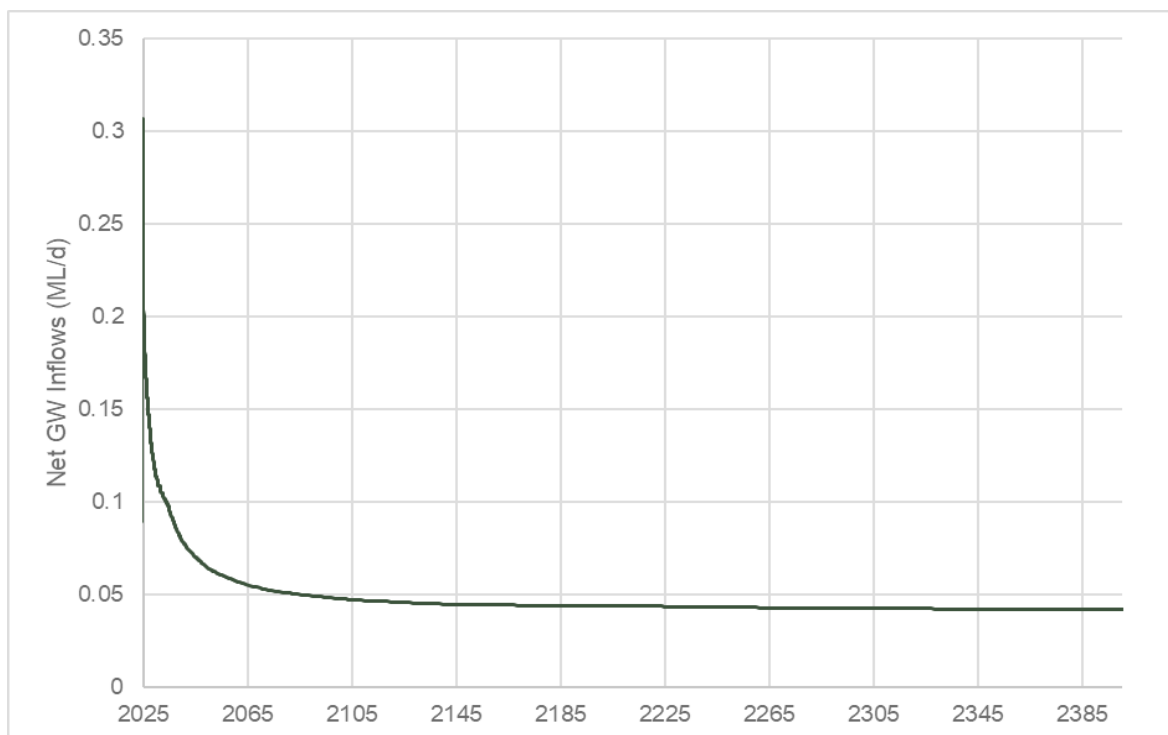
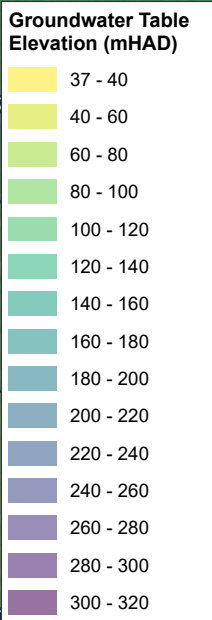
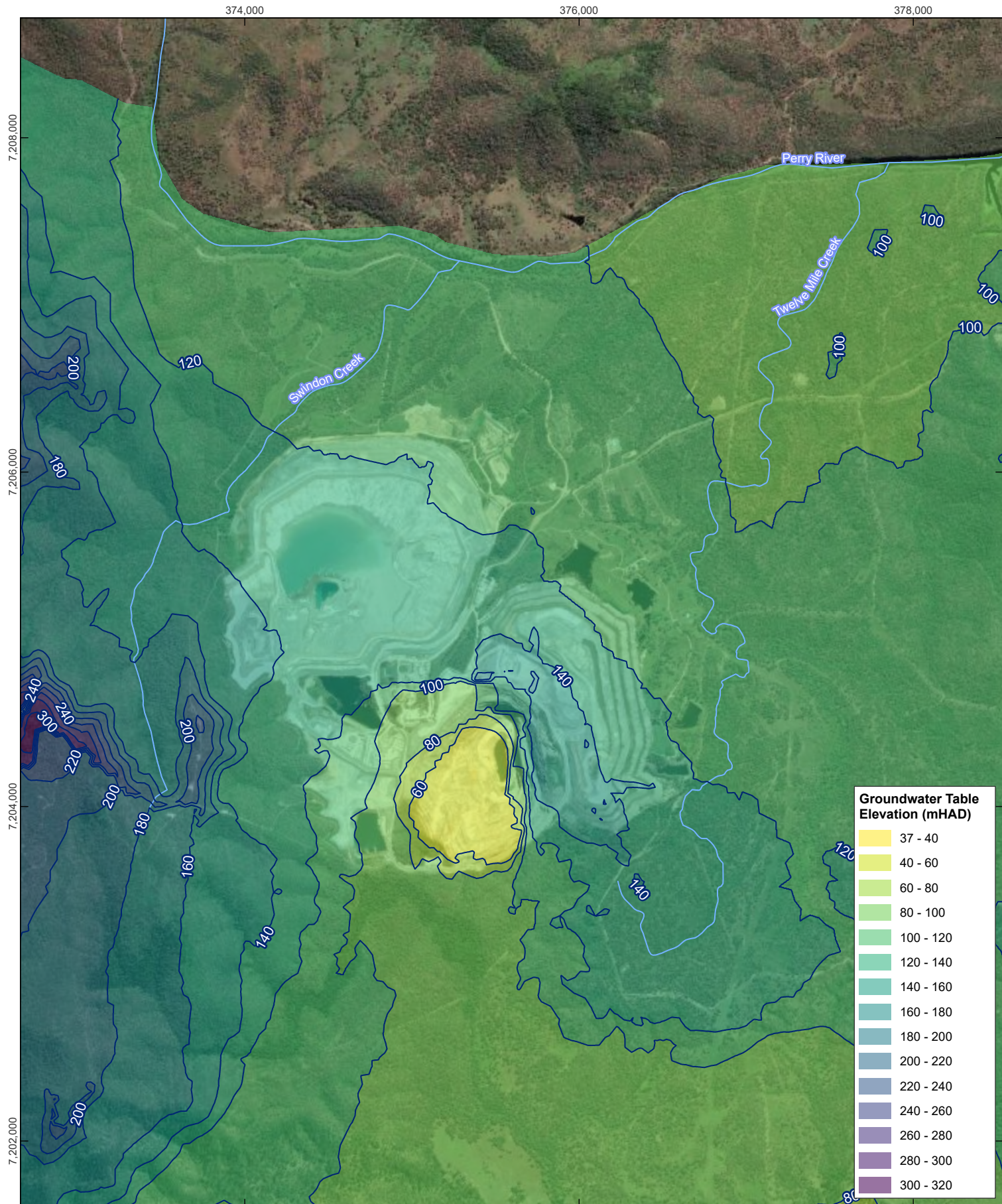


Figure 14 Simulated Groundwater Net Inflow to Final Void






 0 0.5 1 km
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LEGEND

 Groundwater Contour (mHAD)
 Watercourse

**MOUNT RAWDON
POST CLOSURE**

**POST MINING EQUILIBRIUM
GROUNDWATER TABLE ELEVATIONS**



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FIGURE 15

The potential for contaminant transport away from MRO was examined using post-processing particle tracking. **Figure 16** shows the predicted contaminant flow pathways following closure. As the pit lake is predicted to remain a sink, contaminant solutes present within the void lake are not predicted to migrate to the surrounding groundwater. Particles originating from the final void lake do not migrate out of the final void, and particles originating from the final void edge are captured by the final void or appear effectively stationary.

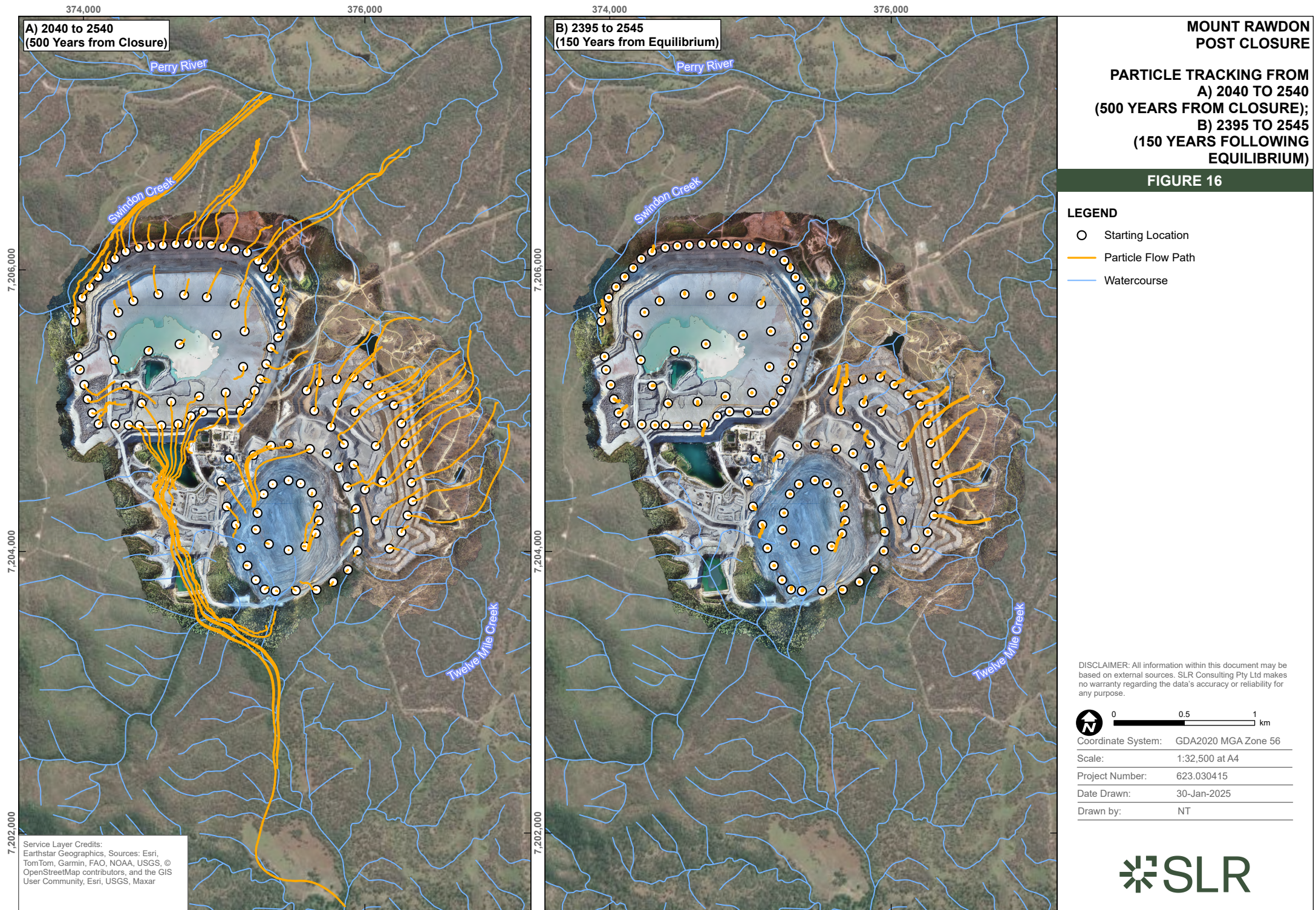
The groundwater located under both the TSF and the NRWD is predicted to travel primarily toward drainage lines within the Perry River catchment, with a small portion flowing toward the final void. Most particles originating from the NRWD travel towards Twelve Mile Creek. Following the establishment of groundwater equilibrium, transport rates are predicted to reduce significantly (less than 2.5 m/year). Groundwater originating from under the TSF will initially migrate towards the Perry River, the final void and Mingham Creek. At equilibrium, the velocities are expected to reduce to less than 0.5 m/year, and all transport is predicted to occur towards the Perry River.

Potential risks to groundwater will depend on several chemical and geochemical factors such as contaminant concentration at the source, leakage rates and geochemical reactions along the flow path. There is potential for some groundwater expression at the surface along some drainage lines (primarily Twelve Mile Creek). However, leakage rates are expected to be very low at equilibrium (0.0015 ML/day for the entire model domain) and thus likely to be negligible in comparison to ephemeral surface water flow.

The assessment also included evaluation of potential impacts to environmental receptors. A review of Groundwater Dependent Ecosystems (GDEs) was undertaken which found no GDEs located within the potential impact zone of the Site. The closest GDE identified is a surface water GDE associated with the Sunday Creek, about 8 km upstream of MRO. Accordingly, the potential for post closure impacts to GDEs was deemed unlikely. Additionally, a review of registered bores was completed. The review indicated that no private bores are located within the area where contaminants are modelled to potentially migrate, leading the study to conclude that impacts to private bore users was unlikely.

Impacts due to climate change were also examined within the post closure groundwater assessment. This included comparison of current rainfall and evaporation trends with predicted trends from the representative concentration pathway (RCP) 8.5 scenarios (van Vuuren, Edmonds, & Kainuma, 2011). The data indicate that climate change is likely to reduce the risk of groundwater expression to the surface due to a predicted decline in groundwater recharge rates.





4.1.3 Site Stormwater Concept

A concept design for post closure stormwater management at MRO was prepared to inform closure feasibility for the Site as well as to support this Plan (SLR, 2024). The concept design includes proposed locations and structural details for water management features to be implemented at the Site following closure.

A hydrological analysis was undertaken using the XP-RAPTS software package to estimate peak flows at MRO. Rainfall data were based on Intensity–Frequency–Duration (IFD) data and design temporal patterns for the region (**Table 4**) in accordance with Australian Rainfall and Runoff 2019 (Ball, et al., 2019). Analysis was completed for all areas of Site external to the TSF plateau and the northern waste rock dump (NWRD) as the design for these facilities was tasked to other specialists. The areas assessed include:

- The eastern TSF batters/benches and workshop area;
- The sub-catchments incorporating West Dam, South Dam, the southern TSF batters/benches and the main infrastructure area; and
- Areas immediately adjacent the pit.

Figure 17 shows the overall proposed stormwater concept including catchment boundaries and drainage locations where vehicle access is proposed to remain. **Table 10** outlines conceptual details for proposed drainage structures which will be further developed during detailed design.

The stormwater concept was prepared under the following considerations:

- Open channel drains were designed to safely convey peak runoff from the 1% AEP/ 1 in 100-year ARI rainfall event as determined using Manning’s equation in a drain which is long-term stable;
- Catchment slopes were taken as the average catchment slope based on digital elevation model (DEM) data for the Site dated June 2024 (provided by Evolution);
- The design assumes South Dam is decommissioned in future, with the sub-catchment divided evenly between sub-catchments S3 and S4;
- The northern TSF batters/benches were excluded from this assessment as discussions with Evolution indicated the existing water management regime in this area is likely to be retained post closure;
- The requirements for diversion contours/bunds will be specified during detailed design, or at a concept level when a final landform design becomes available;
- It is proposed that drains in the South/West Dam Area will be established along the existing haul roads where viable, however, these structures may need to be installed adjacent to roads if spatially constrained (to be confirmed during detailed design);
- At the two locations in the South/West Dam area where drainage is proposed to cross long-term access roads, low-flow pipes and rock armoured causeways are proposed to maintain vehicle access (**Figure 17**). It is envisioned that, at a minimum, a DN600 reinforced concrete pipe (RCP) culvert and rock sizing consistent with connecting drains would be required at each crossing. Final specifications will be confirmed during detailed design; and
- It is recommended that sustainable drainage principles are applied during detailed design to improve the compatibility of long-term site drainage with the receiving environment e.g., designing sinuosity into drains to dissipate energy and replicate natural flow mechanisms.



374,000

375,000

374,800

376,000

375,000

377,000

Perry River

Swindon Creek

Causeway 1

Causeway 2

Insert 1

0 25 50 m

Causeway 1

Insert 1

Causeway 2

Mingham Creek

Twelve Mile Creek



0 250 500 m

Coordinate System: GDA2020 MGA Zone 56

Scale: 1:17,500 at A4

Project Number: 623.030415

Date Drawn: 30-Jan-2025

Drawn by: NT

LEGEND

Watercourse

Diversion Contour/
BundDrain Start/Stop
PointOpen Channel
Drain

Low-flow Pipe

Rock Lined
Causeway

Haul Road

Catchment
Boundary**MOUNT RAWDON
POST CLOSURE****MRO POST CLOSURE STORMWATER
CONCEPT – SITE SCHEMATIC**

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FIGURE 17

Table 10 MRO Post Closure Stormwater Concept – Drainage Design Requirements

Channel section	Reach Length (m)	Slope (%)	Batter slopes	Base width (m)	Bank height (m)	Top width (m)	Peak flow depth (m)	Design freeboard (mm)	Peak velocity (m/s)	Recommended lining / D ₅₀ (mm)
Workshop Area										
W1	660	1.5	1V:3H	6	1.2	13.2	1.0	200	2.5	250
W2	920	1.5	1V:3H	9	1.2	16.2	1.0	200	2.6	250
Pit										
P1	670	1.5	1V:3H	7	0.5	10	0.2	200	1.1	Hydroseeded
P2	440	1.5	1V:3H	9	0.5	12	0.2	200	1.1	Hydroseeded
P3	280	1.5	1V:3H	5	0.5	8	0.2	200	0.9	Hydroseeded
P4	200	1.5	1V:3H	5	0.5	8	0.2	200	0.9	Hydroseeded
South/West Dam Area										
S1	360	1.5	1V:3H	5	0.5	8	0.3	200	1.2	100
S2	620	1.5	1V:3H	10	0.7	14.2	0.5	200	1.7	100
S3	1000	1.5	1V:3H	10	0.8	14.8	0.6	200	2.0	200
S4	1000	1.5	1V:3H	10	0.8	14.8	0.5	200	1.8	200
S5	1200	1.5	1V:3H	8	1.0	14	0.8	200	2.2	200
S6	200	1.5	1V:3H	8	1.2	15.2	1.0	200	2.5	250
S7	150	1.5	1V:3H	9	1.5	18	1.2	200	2.9	300
S8	400	1.5	1V:3H	8	0.5	11	0.3	200	1.3	100



4.2 Surface Water Management

4.2.1 Objectives

The objectives for post closure surface water management align with those stated in **Section 1.3** and the guidance within **Section 1.4** (DESI, 2024). Ultimately, the intent is to convert the Site to a landform that can be passively managed where practical, meets the proposed PMLUs and preserves environmental values in the long-term.

The proposed PMLUs most relevant to water is water storage for beneficial reuse (e.g. agricultural purposes and stock watering). Various water storages are proposed to support these activities, and as such it is critical to develop a landform that is safe, stable, does not cause harm to the environment and can sustain the use. Additionally, water quality is a key consideration that may limit usage if not fit for purpose. As MRO will be rehabilitated in accordance with **Section 1.5**, the requirements for water management will need to be adapted to suit activities at the Site and achieve the post closure objectives.

This section outlines requirements for surface water management to meet the objectives of this Plan and the broader Site.

4.2.2 Surface Water Management System

4.2.2.1 Catchments

The existing surface water management scheme at the Site will be adapted towards a final post closure surface water management system (SWMS). The SWMS will need to mitigate risks relevant to water in line with closure activities and subcatchments at Site as they are progressively modified.

Figure 18 shows the current catchment plan for the Site, and **Figure 19** shows the proposed post closure catchment plan. **Table 11** and **Table 12** provide a breakdown of the catchment areas by land use for the current and post closure catchment plans, respectively. Catchments until the end of mining and processing operations (**Figure 18**) are based on the latest operational WBM update completed September 2024 (ATCW, 2024). The long-term post closure catchments (**Figure 19**) consider final plans for the current operational areas together with closure designs for the TSF and NWRD as prepared by ATC Williams (ATCW) and Okane Consultants (Okane), respectively (ATCW, 2024); (Okane, 2024).

The catchment plans demonstrate that sediment-laden water will continue to form a management requirement at MRO until all catchments are rehabilitated and stable as planned by 2035 (Phase 5). Additionally, potentially harmful seepage is expected to report to water storages until rehabilitation and capping of the TSF and NWRD is completed. Therefore, existing storages that capture sediment and seepage will be vital for water management during rehabilitation.



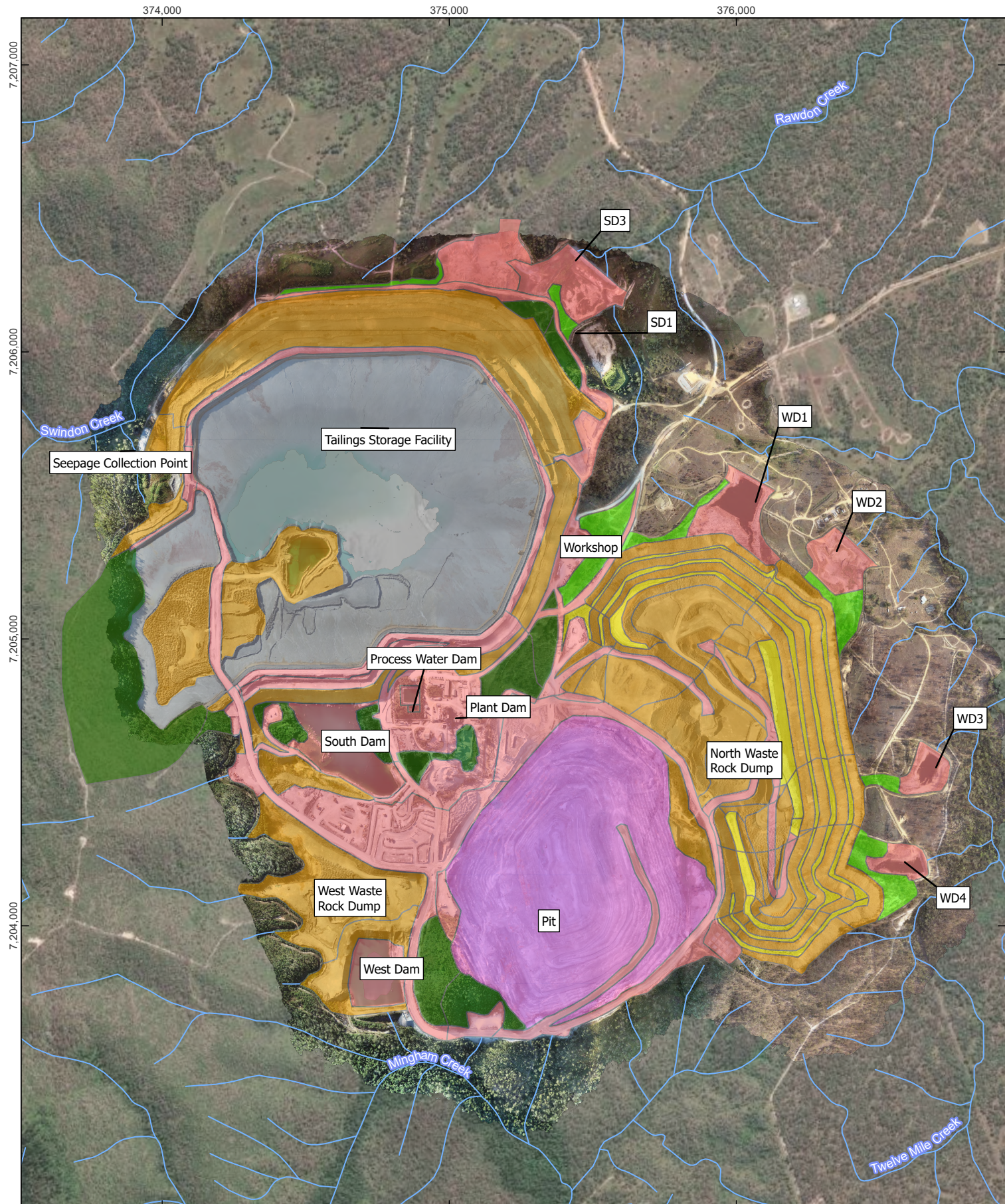
Table 11 Catchment Areas – End Mining and Post Mining Ore Processing (Phase's 1 and 2)

	Area (ha)												
	TSF	Pit	South Dam	West Dam	WD1	WD2	WD3	WD4	PRD	TSF_SD1	TSF SD_3	RWD	PWD
Hardstand	2.6	16.6	30.7	24.5	13.5	5.0	2.2	6.2	0	4.5	15.5	0.1	0.45
Natural Dense	21.5	0	7.6	7.4	1.9	0	0	0	9,275	1.0	1.2	0	0
Natural Sparse	0	0	0	0	4.75	2.0	0.6	2.7	0	0	1.6	0	0
Open Cut	0	65.4	0	0	0	0	0	0	0	0	0	0	0
Rehab	0	0	0	0	3.75	12.3	0	1.7	0	0	0	0	0
Tailings	108.7	0	0	0	0	0	0	0	0	0	0	0	0
Waste Rock	17.6	16.2	5.1	23.5	24.5	24.8	1.0	15.5	0	36.6	0	0	0

Table 12 Catchment Areas – Long-term Post Closure (Phase 5)

	Area (ha)						
	TSF	Pit	South Dam / West Dam	SD1 / SD3	NWRD North / Workshop	NWRD South	PRD
Hardstand/Road	2.59	5.5	7.4	3.4	0	0	0
Natural Dense	0	0	0	0	0	0	9,275
Natural Sparse	147.85	28.6	91.35	57.1	40.4	71.6	0
Open Cut	0	65.4	0	0	0	0	0





 0 250 500 m
 Coordinate System: GDA2020 MGA Zone 56
 Scale: 1:17,500 at A4
 Project Number: 623.030415
 Date Drawn: 30-Jan-2025
 Drawn by: NT

LEGEND

 Hardstand	 Tailings
 Natural	 Waste Rock
 Natural (Cleared)	 Rehab Waste Rock
 Pit	

MOUNT RAWDON POST CLOSURE

SITE CATCHMENTS – END MINING AND POST MINING ORE PROCESSING (PHASE'S 1 AND 2)



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FIGURE 18



 0 250 500 m
 Coordinate System: GDA2020 MGA Zone 56
 Scale: 1:17,500 at A4
 Project Number: 623.030415
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LEGEND

- Watercourse
- - - Future Water Diversion Drain
- Hardstand
- Natural
- Pit
- Catchment

MOUNT RAWDON POST CLOSURE

SITE CATCHMENTS – LONG-TERM POST CLOSURE (PHASE 5)



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FIGURE 19

4.2.2.2 Drainage and Water Storages

A concept design for post closure stormwater management at MRO was prepared to support this Plan as detailed in **Section 4.1.3**. The design outlines proposed locations and structural requirements for water management features to be implemented at the Site. The design was prepared with the aim to maximise natural catchment space and promote the return of “clean” runoff to the environment in accordance with the Site’s PMLU objectives.

The proposed post closure SWMS is shown in **Figure 20**. Note this is only a concept and is expected to be subject to change during detailed design. Hydrological analysis and sizing was complete for all areas of Site external to the TSF plateau and NWRD. Drainage features shown for the TSF plateau and NWRD have been sourced from the closure concept designs produced by ATCW and Okane. Sizing is not provided for the TSF plateau and NWRD drainage as the designs are still being progressed. Additionally, a wetland/water treatment system capable of regulating water quality prior to environmental release has been documented by Alluvium for inclusion in the final SWMS at the Site (Alluvium, 2023). In the report, the system is proposed between the NWRD and dam WD2. Through discussions with Evolution, it is considered likely that further systems will be required along the northern embankment of the TSF. **Figure 20** shows the proposed locations for these systems within the overall SWMS.

As the SWMS will be developed prior to vegetation establishment at the Site, temporary sediment dams are proposed to regulate water quality prior to rehabilitation completion. The proposed sediment dam locations are identified in **Figure 20**. Conceptual details for the dams are summarised in **Table 13**. The dams have been specified as Type D dams in accordance with *Best Practice Erosion and Sediment Control* (the “White Book”) (IECA, 2008).

Table 13 MRO Post Closure Sediment Dam Size Requirements

Sediment Dam ID	Cumulative catchment area (ha)	Design rainfall depth (mm)*	Rainfall-runoff volume (ML)	Sediment storage volume (ML)	Total volume (ML)
1	50	31.2	11	6	17
2	2.5		0.7	0.4	1.1
3	2.5		0.8	0.4	1.2
4	2		0.6	0.3	0.9
5	125		35.1	17.6	52.7

Note: * – 80%ile 5-day rainfall depth for Bundaberg from “Best Practice Erosion and Sediment Control”, Appendix B – Sediment basin design and operation, Table B29.

Each dam will require, at a minimum, a spillway to attenuate the 2% AEP design storm event including a rock armoured outlet channel. Final specifications will be confirmed during detailed design. Temporary water management measures such as erosion and sediment control during rehabilitation of the TSF and NWRD will be confirmed during detailed design.

A drainage alignment vegetation program is recommended to improve the compatibility of the SWMS with the receiving environment. The program will aim to achieve long-term enhancement of the ecological value through the drainage lines by development of natural hydraulic conditions and establishing appropriate vegetation.

The key aspects of the drainage alignment program should include the following:

- Design and construct the channel to be stable long-term;
- Implementation of effective temporary erosion controls to provide for short-term stabilisation (refer **Section 4.2.3.5**);



- Place naturally occurring soil through the connected banks that would later form the riparian corridor, i.e., stripping of topsoil won from pre-disturbance areas;
- Develop a natural ecotone between the planned riparian and terrestrial area (20 m from top of bank);
- Establish a range of locally occurring vegetation species including riparian vegetation, trees, shrubs, and grass covers;
- No exotic species are to be introduced; and
- Maintain the developing riparian corridor during rehabilitation of the Site.

The following completion criteria are applicable to the drainage alignments:

- Safe, stable and free draining consistent with the receiving environment;
- Geomorphic stability of drainage design comparable to existing downstream waterways; and
- Downstream water quality meets the same or improved criteria due to rehabilitation of the Site.

Existing water storages at the Site will serve as pollution control structures within the SWMS during rehabilitation. This will include capture of sediment-laden water conveyed within drainage structures of the SWMS, and once the TSF and NWRD are rehabilitated and vegetation is established across the contributing catchments of the Site, “clean” runoff from the rehabilitated landform will be released to the receiving environment. Selected minor dams and sumps within the operational area of MRO may be decommissioned during rehabilitation of the Site (likely to be confirmed during final landform design).

4.2.2.3 Water Quality Management

The SWMS has been developed to regulate water quality and render it compatible with the receiving environmental values and PMLU objectives in the post closure landscape.

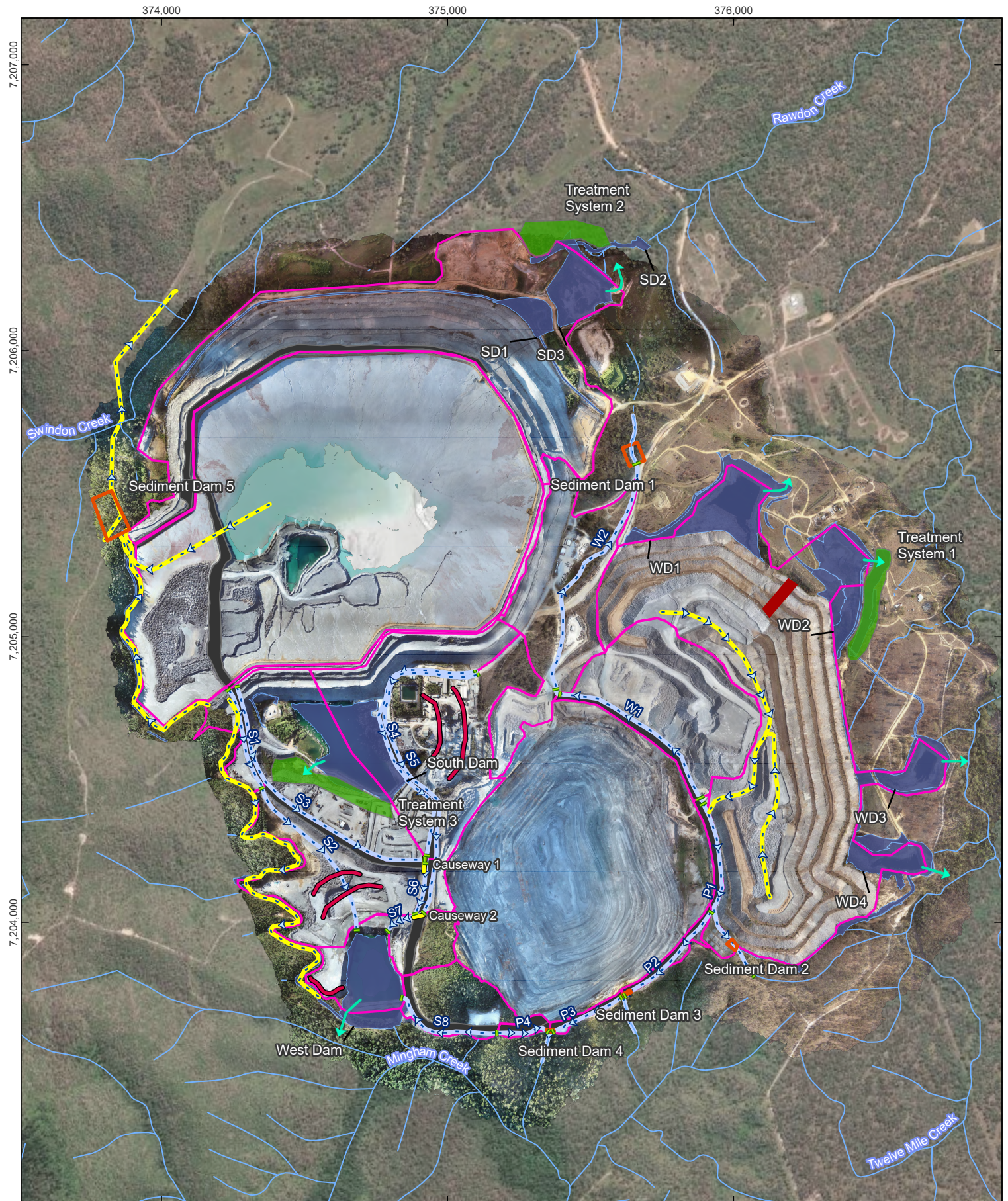
This will be achieved through the following measures:

- Open channels lined with rock armour, locally occurring vegetation species and incorporating sinuosity to reduce sediment/salt loads and promote nutrient uptake;
- Temporary sediment dams and existing water storages will attenuate flows and reduce sediment, salt and nutrient loads in runoff;
- The rehabilitated TSF and NWRD landforms will enhance water quality by contributing “clean” runoff which was previously “dirty”, providing increased runoff volumes that are “clean” due to the cover design properties, and mitigating contributions from contaminated seepage due to the cover design properties;
- Wetlands/water treatment systems installed prior to environmental release at the TSF and NWRD to perform targeted water quality improvement; and
- Augmenting downstream flows by aligning dam spillways to discharge to the headwaters of the surrounding watercourses.

During rehabilitation of the Site, water quality will be assessed against the water quality criteria in Table E2 of the EA (**Appendix A**) prior to release from any currently approved storages.

Once vegetation is established, long-term water quality management features are functioning as desired, and all water quality has been consistently verified as suitable, the Site can present data to the appropriate regulatory authorities to demonstrate that monitoring is no longer necessary or can be conducted at a reduced frequency.





 0 250 500 m
 Coordinate System: GDA2020 MGA Zone 56
 Scale: 1:17,500 at A4
 Project Number: 623.030415
 Date Drawn: 31-Jan-2025
 Drawn by: NT

LEGEND

- | | | |
|--|--|---|
|  Watercourse |  Drainage (TSF & NWRD) |  Treatment System |
|  Diversion Contour/
Bund |  Open Channel
Drain |  Water Storage and
Management |
|  Drain Start/Stop
Point |  Rock Lined
Causeway |  Haul Road |
|  Spillway Outflow |  Sediment Dam |  Catchment
Boundary |
|  Low-flow Pipe |  Drop Structure | |

MOUNT RAWDON POST CLOSURE

POST CLOSURE SURFACE WATER MANAGEMENT SYSTEM



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FIGURE 20

4.2.3 Surface Water Management Measures

The Site will manage surface water using the SWMS, described in **Section 4.2.2**, in conjunction with other management measures and procedures. These measures and procedures include:

- Infiltration and seepage intervention and collection controls;
- Dewatering procedures for dedicated water storages, seepage trenches, and the pit;
- Managed releases of MAW during high flow conditions in the Perry River;
- Reusing MAW as part of the IMMP; and
- Erosion and sediment control measures where disturbance works are required during rehabilitation of the Site.

4.2.3.1 Seepage Collection

Water storages and trenches that currently manage seepage at the Site will remain to provide ongoing mitigation during rehabilitation of the Site. This includes dams downstream of the TSF and NWRD and existing seepage trenches as shown in **Figure 10**. Once rehabilitation and capping of the TSF and NWRD is completed, the Site can present data to the appropriate regulatory authorities to demonstrate that monitoring is no longer necessary or can be conducted a reduced frequency. A review can then be conducted to determine if any relevant storages or trenches can be adapted to a state better suited to the intended PMLUs.

4.2.3.2 Dewatering Procedures

Dewatering and water transfer procedures at the Site are proposed to remain largely consistent with current procedures while existing water storages and trenches remain active. These procedures serve to mitigate the release of potential contaminants to the receiving environment and are to be continued until the Site is rehabilitated, vegetation is established across the landform and long-term water quality management features are functioning to standard. The need to maintain dewatering procedures will be reviewed as rehabilitation proceeds or if warranted by a change of circumstances at the Site.

As MRO will leave a final void following closure, consideration is required towards management practices that may be needed to regulate pit water levels and quality. This could include pit dewatering to influence whether the void acts as a sink or a source (then beneficially reusing as stock water or for environmental release), water imports to dilute void waters and reduce salt/analyte concentrations, or a program that combines various measures to reach a balanced outcome.

The post closure water balance assessment (SLR, 2025a) indicated that an optimal balance between pit water level and quality can be achieved if a rehabilitated catchment area totaling 100 ha is established around the pit void. Under this scenario, it is suggested that limited management actions such as pit dewatering or importing would be required to assist regulate the pit to maintain its function as a sink or for water quality. One necessary action would likely be dewatering of the pit and distributing to smaller storages around the Site to enable safe access to users and stock. However, the currently proposed post closure catchment plan (**Figure 19**) would result in only 28.6 ha of rehabilitated area reporting to the pit, which is predicted to result in sulfate levels potentially unacceptable for stock watering (SLR, 2025a).

In such a case, the most practical management action to improve pit water quality and satisfy the stock watering PMLU would be water import from another source, such as the Perry Weir or Paradise Dam, to dilute pit water and reduce sulfate concentrations. This scenario



necessitates more intensive management during rehabilitation and closure which contradicts the general intent of this Plan.

As such, this Plan reiterates the recommendation to conduct optimisation works during detailed design of the final landform in collaboration with the post closure WBM. Once this has been investigated, improved understanding will be available to guide decisions towards pit water management practices that may be required during rehabilitation of the Site.

4.2.3.3 High Flow Releases

The Site will continue to conduct managed releases to the Perry River during high flow conditions in accordance with Schedule E of the EA (**Appendix A**). This measure has served MRO well as part of water inventory management and there will be an ongoing need to manage water from WD1 prior to the NWRD being rehabilitated.

Once rehabilitation and capping of the NWRD is completed, the Site can present data to the appropriate regulatory authorities to demonstrate that water quality reporting to WD1 is improved and suitable for unmanaged environmental release. This storage is planned to remain post closure within the SWMS (refer **Section 4.2.2**), forming part of the restored Perry River catchment and supplementing environmental flows as well as providing for the PMLUs.

4.2.3.4 Water Reuse

The reuse of MAW within the IMMP, as outlined in Schedule I of the EA (**Appendix C**), will continue during rehabilitation of the Site. This measure complements high flow releases made from WD1 and will support water management prior to rehabilitation of the NWRD.

As described in **Section 4.2.3.3**, the Site may propose to cease this measure and accordingly retire the IMMP when it can be demonstrated that the NWRD catchment (surface and subsurface) has been rehabilitated, and water quality aligns with the PMLU objectives.

4.2.3.5 Erosion and Sediment Control

Disturbance activities associated with rehabilitation and closure activities present the potential to generate sediment that can be transported by wind and rainfall runoff which may pose a risk to surface water quality. As such, erosion and sediment control (ESC) measures will need to be implemented at the Site.

A key risk to surface water quality will be ground disturbance associated with site earthworks. This is envisioned to include development of the TSF and waste rock dump final landforms, newly proposed surface water management features including the wetlands/water treatment systems, as well as general reshaping of the broader site. Construction works will expose site soils and there is potential for erosion to mobilise sediments into receiving watercourses.

Without appropriate controls, there is potential for an increase in turbidity and nutrient loads in the receiving watercourses which may cause water quality and ecological impacts.

Mitigation measures and site management practices should include:

- Minimising the disturbance footprint (staging construction as necessary);
- Separation/diversion of clean water catchment runoff from disturbed runoff areas to minimise sediment-laden water volumes for management;
- Minimising soil erosion (i.e., rehabilitation, drainage and erosion control measures) at the source, rather than trapping resultant sediment. Where this is not practicable, then all reasonable measures will be made to trap sediment by implementing sediment control measures compliant with the required treatment standards. Upslope and downslope ESC measures shall be installed prior to any ground disturbance;



- Conducting best practice land clearing procedures for all proposed disturbance areas;
- Utilising sediment fences to control sheet flow from the disturbance areas during construction works;
- If soil stockpiles are required, then these stockpiles are to be placed in areas away from roadways and other drainage lines. Suitable sediment control measures will be installed downslope of soil stockpiles and upslope clean water runoff diverted (where possible);
- Sealing or revegetation of external disturbed areas as soon as reasonably practicable;
- Effective dust suppression measures (where required);
- Any liquid wastes, fuels and oils stored on-site will be sufficiently bunded to contain any potential spills. Accidental spillage or poor management of fuels, oils, lubricants, hydraulic fluids, solvents, and other chemicals during the construction will be controlled in accordance with MRO spill procedures/TARPs;
- Appropriate site storage of hydrocarbons within bunded areas;
- Barrier fencing will be installed for each stage of construction to delineate no-go areas and to maintain disturbance areas and traffic movement to the designated areas; and
- Implementing an effective monitoring, maintenance and reporting regime.

With the implementation of standard erosion and sediment control measures in accordance with *Best Practice Erosion and Sediment Control* (the “White Book”) (IECA, 2008), the potential environmental impact is considered manageable.

Erosion and Sediment Control Plans (ESCPs) will be prepared where significant disturbance activities are planned. The ESCPs will show all planned mitigation measures in accordance with those detailed in this Plan.

Temporary sediment dams will be managed and dewatered in accordance with the White Book. For Type D dams, as designated for the Site, the dam is required to be dewatered to the bottom of the settling zone prior to a rain event that is likely to produce runoff. Should discharge be required, water quality is to meet the discharge standards of the White Book including pH in range 6.5 to 8.5 and 90% total suspended solids (TSS) below 50 mg/L (alternatively for TSS, the turbidity (NTU) criteria can be adopted).

4.2.4 Surface Water Monitoring

The monitoring of surface waters at MRO and its receiving waters will continue during rehabilitation of the Site. This will ensure that the SWMS and supplementary surface water management measures are functioning as intended and assist to identify where changes in overall water management may be required. Additionally, the monitoring data will serve as input for future water-related modelling and inform whether the Site is on track to meet the PMLU objectives.

The following existing monitoring practices will be maintained at the Site during rehabilitation:

- Monitoring water quality released from the spillways of WD1, WD2, WD3, WD4, SD3 or West Dam in the event of a release (Table E1 and E2 of the EA);
- Monitoring water quality of receiving waters at a monthly frequency or in the event of flow (Table E3 and E4 of the EA; ideally in coordination with groundwater monitoring activities);
- Monitoring water quality of the TSF at a quarterly frequency (Table E5 of the EA);



- Monitoring water levels in regulated structures to maintain DSA and MRL compliance and to inform when dewatering measures may be necessary (Table E6 of the EA);
- Monitoring water levels, quality and volumes in WD1, WD2, WD3 and WD4 along with receiving locations in the event of a high flow release (Table E10, E11 and E12 of the EA); and
- Monitoring water quality and volumes in the event MAW is released in accordance with the IMMP (Schedule I and Table I1 of the EA).

The following monitoring practices are proposed in addition to the existing:

- Monitoring pit water levels at a monthly frequency to improve the depth of observed data available for future water level modelling, validate results and inform whether management actions are required to manage water levels;
- Monitoring water quality in the pit at a monthly frequency, in accordance with Table E4 of the EA (or as determined by subsequent investigations), to improve the depth of observed data available for future water quality modelling, validate results and inform whether management actions are required to manage water quality;
- Monitoring water quality released from the spillways of all water storages planned to release to the environment in accordance with Table E2 of the EA (in addition to those currently monitored);
- Monitoring water quality in all water storages at a quarterly frequency, in accordance with Table E4 of the EA, to determine suitability against the proposed PMLUs and identify if changes are occurring over time;
- Monitoring water quality at the proposed water treatment systems in accordance with the requirements of the design; and
- Inspecting the condition of the SWMS and ESC measures in accordance with the following:
 - Monthly;
 - Prior to any predicted significant rainfall events; and
 - Following any significant rainfall events.

Inspections shall focus on the capacity and condition of the SWMS and ESC measures, water retention within dams, condition of vegetation within drains and general water management practices across the Site. Where water management or ESC structures are identified to have reduced capacity or are in poor condition, remediation works will be undertaken without delay. If the structures have excessive sediment build-up or scouring, they will be desilted, regraded and/or reshaped to ensure the structures maintain their design capacity and can handle subsequent rainfall events. The results of any visual inspections and any remediation works required/undertaken shall be recorded and retained for future reference.

Once the TSF and NWRD are rehabilitated and capped, vegetation is established, long-term water quality management features are functioning as desired and all water quality has been consistently verified as suitable, the Site can present data to the appropriate regulatory authorities to demonstrate which monitoring requirements may no longer be necessary or can be conducted at a reduced frequency. Those deemed no longer needed can be retired.

It is envisioned that some monitoring practices will need to continue post closure to verify that the final landform is performing as intended and/or to identify if any rehabilitation efforts have failed. This will likely include visual inspections of the SWMS, monitoring water quantities and



quality within the SWMS and receiving environment, and consulting with landowners and regulatory authorities. As Evolution will have relinquished the Site at closure, any such responsibilities will fall to the subsequent agreed party.

4.2.5 Regulated Structures

The Site will continue to meet compliance requirements for regulated structures as stipulated in Schedule H of the EA (**Appendix B**) during rehabilitation and closure activities. This will include maintaining the hydraulic performance criteria at identified water storages, including DSA, MRL, and wet season considerations, to mitigate the potential for spill or failure events that may present harm to people, the environment or assets at the Site.

Notification will be provided to regulatory authorities for any regulated structures planned for decommissioning during rehabilitation of the Site. This will include an outline of the proposed repurposing of the structure, and decommissioning will be completed in accordance with advice provided by regulatory authorities such as DETSI, the Department of Local Government, Water and Volunteers (DLGWV) and/or the Australian National Committee on Large Dams (ANCOLD).

In accordance with the MRO PMLU objectives, regulated structures that are not decommissioned are planned to remain to support agriculture and stock watering. It is recognised that structural modifications may be required to ensure safe access for stock in the post closure landscape. Given the contributing catchments for these structures are being rehabilitated, including subsurface catchments associated with seepage from the TSF and NWRD, contamination risks associated with spills are to be mitigated. This will be verified through ongoing water quality monitoring during rehabilitation of the Site. Additionally, overflow controls (weirs and spillways) will remain in place post closure to facilitate any overtopping events. As such, compliance requirements for regulated structures at the Site can be retired upon completion of rehabilitation and closure activities provided MRO demonstrates the structures are suitable for post closure transition.

4.2.6 Wet Season Management

The Site will continue to employ wet season management practices during rehabilitation and closure activities in accordance with existing management as described in **Section 3.1.6**.

All storages currently managed for the wet season will retain their capacity to spill into the future except the TSF. Once the TSF is rehabilitated and capped, the land surface will no longer serve as storage and will be a free draining surface that releases flow to the west via an overflow spillway. This noted, the TSF will need to be managed as currently practiced until it has rehabilitated.

It is understood that no structures which currently drain/spill internally to the Site are expected to drain externally due to rehabilitation and closure activities. If any such changes materialise in future, for instance due to planning undertaken within the final landform design, the spill prevention priorities outlined in **Table 7** should be accordingly reviewed.

Once rehabilitation and closure of the Site is completed, wet season management practices can be retired provided MRO demonstrates the structures are suitable for post closure transition.

4.2.7 Water Balance Modelling

The Site WBM will be continually updated during rehabilitation of the Site to provide ongoing insights towards water inventory/trends and validate post closure modelling completed to inform this Plan.



The WBM will be updated and, if necessary, revised in accordance with the following:

- At an annual frequency commencing the year in which this Plan is approved; or
- If monitoring results identify the need (for instance, if observations at the Site show notable inconsistency with predictions from the model).

The surface water monitoring program during rehabilitation includes requirements to collect periodic pit water level and quality data. This will serve to improve the depth of observed data available for future void water level and quality modelling, validate results and inform whether further management actions are required to manage void water. Following any model updates, a short report will be produced summarising the update and its outcomes.

Once rehabilitation and closure of the Site is completed, the need to utilise the WBM for validating post closure predictions can be reviewed.

4.3 Groundwater and Seepage Management

4.3.1 Objectives

The objectives for post closure groundwater and seepage management align with those stated in **Section 1.3** and the guidance within **Section 1.4** (DESI, 2024). These objectives will need to be met in conjunction with the surface water management objectives (**Section 4.2.1**) to satisfy the holistic water management objectives of the Site in the post closure landscape.

The greatest considerations for long-term groundwater and seepage management are the equilibrated states of local groundwater levels (sink versus source) and water quality. As MRO will be progressively rehabilitated in accordance with **Section 1.5**, the requirements for groundwater and seepage management will need to be adapted to suit activities at the Site and achieve the post closure objectives.

This section outlines requirements for groundwater and seepage management to meet the objectives of this Plan and the broader Site.

4.3.2 Groundwater and Seepage Management Measures

The groundwater and seepage management measures currently employed at the Site will be maintained during rehabilitation and closure activities.

The following physical measures will be maintained at the Site to manage groundwater and seepage:

- Monitoring bores;
- Dewatering bores;
- Seepage interception trenches;
- Subsurface drainage; and
- Dams and sumps.

The following management practices will be maintained to support the physical measures:

- Implementation of mining and construction processes to minimise the generation of solutes in the waste rock source term, including implementation of waste rock segregation and overseeing the application of NAF rock building material; and
- Surface water and groundwater monitoring to assess TSF performance, identify preferred flow paths/basement sequences, and provide a feedback trigger for implementing additional targeted dewatering works.



These measures exclude existing practices at the TSF related to managing tailings deposition and the decant pond as these processes will be ceased at the conclusion of ore processing.

4.3.2.1 Monitoring Bores

The existing groundwater monitoring network as shown in **Figure 9** will be retained during rehabilitation of the Site. Groundwater elevation and quality data will continue to be collected in accordance with **Section 4.3.3**. Following the completion of rehabilitation activities, MRO plans to decommission the groundwater monitoring network. This plan would be supported by data presented to regulatory authorities that demonstrate monitoring is no longer necessary. A review may also be conducted to determine if any infrastructure should be retained, e.g., for continued monitoring purposes or to support the PMLUs.

4.3.2.2 Dewatering Bores and Seepage Interception

The existing dewatering bores and seepage interception trenches will be retained during rehabilitation of the Site. This infrastructure will serve to capture potentially harmful groundwater or seepage and allow for recovery back to MRO while the Site remains a disturbed environment.

The key factor governing when dewatering and seepage interception can cease is the rehabilitation and capping of the TSF and NRW. Once these facilities are rehabilitated, seepage volumes are expected to be negligible due to the cover design properties. Moreover, the low permeability cover design will promote larger surface runoff contributions reporting to seepage interception trenches (and dewatering bores that receive surface contributions) with improved water quality once vegetation is established. These rehabilitated structures will also be supported by the proposed wetland/water treatment systems which will be downstream of known/predicted seepage pathways and capable of regulating MAW. Therefore, it is envisioned that dewatering and seepage interception measures will be retired following rehabilitation of the TSF and NRW, upon the Site demonstrating that the measures are no longer necessary. A review may also be conducted to determine if any infrastructure should be retained, e.g., for continued monitoring purposes or to support the PMLUs.

The post closure groundwater assessment (SLR, 2025b) determined that groundwater located under both the TSF and the NRW is predicted to travel primarily toward drainage lines within the Perry River catchment, including a small portion flowing toward the final void (**Figure 16**). This finding prompted consideration to whether additional dewatering and/or seepage interception measures are required to provide mitigation. As leakage rates are predicted to be fractional once the local groundwater system equilibrates (0.0015 ML/day), contributions to surface water are considered negligible in comparison to ephemeral surface water flow volumes. Therefore, no additional dewatering or interception measures are deemed necessary.

4.3.2.3 Dams and Sumps

As part of the SWMS described in **Section 4.2.2**, existing water storages at the Site that capture stormwater along with shallow groundwater flows and seepage are planned to remain following closure of the Site. Selected minor dams and sumps may be decommissioned within the current operational area of MRO during rehabilitation of the Site (likely to be determined during final landform design).



4.3.3 Groundwater and Seepage Monitoring

The monitoring of groundwater and seepage at MRO and its receiving waters will continue during rehabilitation of the Site. This will ensure that mitigation measures are functioning as intended and assist to identify where changes in overall water management may be required. Furthermore, the results of ongoing monitoring will serve as input to future groundwater, seepage and water balance modelling, as well as validate existing predictions including the conceptualisation of the void as a long-term groundwater sink.

The following existing monitoring practices will be continued at the Site:

- Monitoring groundwater elevation in dedicated monitoring bores at a monthly frequency (Table E7 of the EA);
- Monitoring groundwater quality in dedicated monitoring bores at a quarterly frequency (Table E7, E8 and E9 of the EA; ideally in coordination with surface water monitoring activities);
- Monitoring water volumes within the seepage interception trenches and at known seepage locations as identified in **Figure 10** at a daily to weekly frequency;
- Monitoring water volumes in the interception dams that capture seepage at a daily to weekly frequency;
- Monitoring water quality in the interception dams that capture seepage at a quarterly frequency including field parameters, major ions, trace elements and cyanide;
- Monitoring the volume of surface water/seepage water from WD1 that is disposed onto the Land Application areas near the mine entrance and WTP at a daily frequency;
- Monitoring water quality of surface water/seepage from WD1 that is disposed onto the Land Application areas near the mine entrance and WTP including in-situ EC and pH at a weekly frequency and water quality parameters (as for interception dams) at a monthly frequency; and
- Evaluate measurements against contaminants limits prescribed in the EA and report the results to DETSI or other relevant regulatory authorities.

Should any monitoring infrastructure need to be decommissioned or become damaged due to rehabilitation and closure activities, notification will be provided to regulatory authorities to advise any proposed changes to groundwater and seepage monitoring. As outlined in **Section 4.3.2**, MRO plans to decommission physical groundwater and seepage management measures where feasible including monitoring infrastructure. The removal of such infrastructure would be completed in consultation with the appropriate regulatory authorities.

4.3.4 Groundwater Modelling

The Site groundwater model will be continually updated during rehabilitation of the Site to provide ongoing insights towards predicted groundwater behaviour, support the WBM and validate post closure modelling completed to inform this Plan.

The groundwater model will be updated, and if necessary, revised in accordance with the following:

- At any time the WBM is updated (to support understanding of predicted void behaviour); or
- If monitoring results identify the need (for instance, if observations at the Site show notable inconsistency with predictions from the model).



The latest void recovery data from the WBM would be included as input to the groundwater model during updates and net groundwater inflow versus outflow will be reviewed. Groundwater and seepage monitoring data obtained since the previous update will be incorporated into the model, and previous predictions from the groundwater model will be validated against historical monitoring data. A short report will be produced summarising the update and its outcomes.

Once rehabilitation and closure of the Site is completed, the need to utilise the groundwater model for validating post closure predictions can be reviewed.

4.3.5 Seepage Modelling

The modelling of seepage at a site-scale will be captured within updates to the groundwater model as described in **Section 4.3.4**. This will include assessment of observed seepage rates and predicted post mining seepage rates.

Any future modelling specifically focused on seepage will be completed on an as required basis. The need for seepage modelling may be prompted by the following:

- To inform the design of the final landform or structures within it where seepage is a critical factor; or
- If monitoring results identify the need (for instance, if observations at the Site show notable inconsistency with predictions from previous modelling).

A short report will be produced summarising the modelling and its outcomes.



5.0 Water Impact Response Plan

5.1 Response Procedures

The EA contains various provisions that trigger response or investigation procedures related to water incidents. The conditions are stipulated within Schedule E of the EA, attached as **Appendix A** of this Plan, and the condition/table references below refer to those held within **Appendix A**. These provisions will continue to be followed during rehabilitation activities and will then be retired upon relinquishment of the Site.

These response provisions include:

- **E10** – In the event that monitoring results, as interpreted by a suitably qualified person, indicate an impact in terms of contaminant levels in downstream monitoring sites compared to levels found in upstream monitoring sites, then the environmental authority holder must complete an investigation into the source, cause or extent of environmental harm being caused, or the extent of environmental harm likely to be caused, and provide this to the administering authority within one (1) month of receiving the analysis results.

For the purposes of this condition, a suitably qualified person is someone possessing appropriate qualifications and experience in the field of surface water monitoring program design monitoring and data analysis and who can competently make recommendations about these matters.

In assessing the monitoring results the suitably qualified person must give consideration to relevant methodology and water quality criteria specified by the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand in Australian Guidelines for Water Quality Monitoring and Reporting, 2000 and Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000 or more recent editions of the documents.

- **E12** – In the event that monitoring conducted in accordance with condition E11 indicates the water quality within the Tailings Storage Facility does not comply with the contaminant limits defined in Table E5, implement all reasonable and practicable measures to prevent access by livestock and minimise access by native fauna to the dam.
- **E27** – If groundwater measured at any compliance bore specified in Table E7 exceeds any corresponding contaminant Limit B specified in Table E8 or Table E9 on one (1) sampling occasion the environmental authority holder must:
 - Resample the groundwater within the compliance bore for all exceeding contaminants within 10 business days.
- **E50** – Should any contaminant measured at Table E11 “Downstream Perry River (within 1 km of the weir)” in receiving waters be outside the pH range or exceed the Electrical Conductivity or dissolved water quality objective specified in Table E12, the environmental authority holder must immediately cease releasing and notify the administering authority under condition **E51** and additionally provide the following information in writing:
 - Release cessation date/time; and
 - Natural flow volume in receiving water; and
 - Volume of water released; and



- Details regarding the compliance of the release with the conditions of this environmental authority (i.e., contamination limits, natural flow, discharge volume); and
- All in-situ water quality monitoring results; and
- Any other matters pertinent to the water release event.
- **E52** – The holder of the environmental authority must notify the administering authority by phone call within six (6) hours, followed by written notification (via email to the pollution hotline at: pollutionhotline@des.qld.gov.au) (or the current alternative) within twenty-four (24) hours, after becoming aware of any release not in accordance, or reasonably expected to not be in accordance with, the conditions E39 to E51.

5.2 Impact Mitigation

In the event that the preliminary and any follow-up investigations conclusively identify that the Site has adversely impacted the environment or a neighbouring water user (affected groundwater user or surface water resource), the Site will work with the impacted user and/or the relevant regulatory agencies and attempt to negotiate suitable mitigation measures in a timely manner to rectify the problem identified.

The Site may involve an appropriately qualified specialist to assist with development of mitigation measures. The development of suitable mitigation measures will be based on the outcomes of an appropriate scientific investigation.



6.0 Data Management and Reporting

6.1 Data Management

The data gathered from the surface water, groundwater and seepage monitoring programs will be collated into a database which will include:

- A site plan showing sample locations;
- Periodic inspection reports and photos;
- Tabulated results of the monitoring compared with applicable background/trigger levels;
- All data collected during each monitoring round;
- A record of chain of custody of the samples from sampling through to analysis;
- Laboratory analysis certificates; and
- A description of the procedures, methods and calculations used.

6.2 Reporting

6.2.1 Impact Investigation

As outlined in **Section 5.1**, where monitoring results indicate the potential for impacts, the relevant regulatory agencies will be notified by the Site.

If deemed necessary, an investigation into the potential for environmental harm will be completed and submitted to the regulatory authority. The delivery timeframe will be in accordance with the relevant EA conditions stipulated in **Section 5.1** or as requested.

6.2.2 Receiving Environment Monitoring Program

Condition E19 of the EA requires the Site to produce a Receiving Environment Monitoring Program (REMP) Report at an annual frequency. Data captured through this Plan will be documented within REMP reports during rehabilitation of the Site. The periodic reporting requirement will be retired upon relinquishment of the Site.

6.2.3 Model Updates

In accordance with **Section 4.2.7** and **Section 4.3.4**, reporting will be completed towards any update of the Site WBM or numerical groundwater model. Additionally, and ad-hoc seepage modelling completed will be detailed in a report (**Section 4.3.5**).

6.3 Review and Update

This WMP will be reviewed and, if necessary, revised in response to the following:

- Where it is identified (via on-going inspections/monitoring) that the water management system is not meeting the objectives of this WMP and/or adverse environmental impacts are identified within the Site and/or downstream;
- Changes to the conditions imposed by the EA;
- At the request of a relevant regulatory agency; and/or
- Following the completion of rehabilitation and closure of the Site, or at such a time leading up to closure that sufficient information is available to revise this Plan.



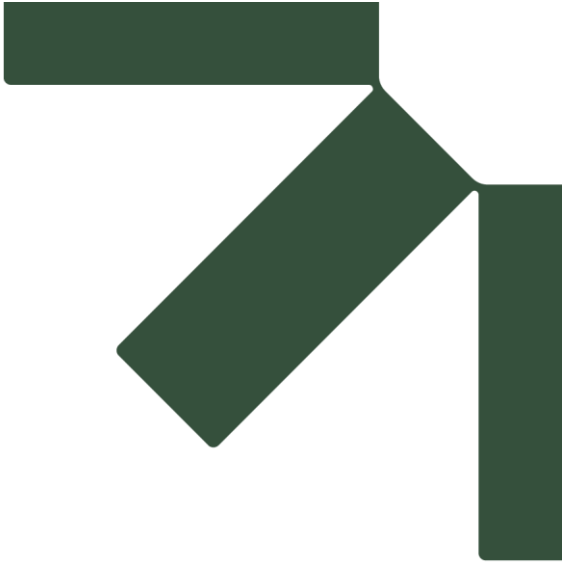
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Appendix A Environmental Authority EPML00712113 – Schedule E

Mt Rawdon Operations

Post Closure Water Management Plan

Evolution Mining Limited

SLR Project No.: 623.030415.00002

31 January 2025

Schedule E – Water

- E1** All determinations of the quality of contaminants released must be made in accordance with methods prescribed in the latest edition of the Environmental Protection Agency Water Quality Sampling Manual, and carried out on samples that are representative.
- E2** Contaminants must not be released to any waters unless otherwise permitted by a condition of this environmental authority. For the purpose of this condition only, “waters” does not include stormwater channels from:
- a) the waste rock dump area to the waste rock dump containment dams WD1, WD2, WD3, WD4; West Dam, South Dam; and
 - b) the Tailings Storage Facility to Sediment Dam 3 (and includes Sediment Dam 1); and
 - c) the Process Water Dam to South Dam.
- E3** The holder of this authority must implement a Storm Water Management Plan that must include, but may not be limited to, measures to:
- a) prevent incident stormwater and stormwater run-off from contacting wastes or contaminants; and
 - b) divert upstream run-off away from disturbed areas, or areas containing wastes or contaminants; and
 - c) capture and manage run-off from disturbed areas (including waste rock dump areas); and
 - d) manage pit water (including that resulting from inflow of groundwater).
- E4** Stormwater impacted by the mining activities may only be discharged from the Containment locations listed in *Table E1* and must comply with the contaminant limits defined in *Table E2*.
- E5** Stormwater released from the Containment locations listed in *Table E1* must be monitored at the locations and frequencies defined in *Table E1* for the parameters shown in *Table E2*.
- E6** All reasonable and practicable erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment.
- E7** Erosion control and sediment control structures must be maintained at all times and repaired or replaced as required after each rainfall event.
- E8** In the event that a release from any dam spillway is necessary the release must be controlled or managed in such a manner that prevents erosion of any watercourse or areas affected or potentially affected by the release.
- E9** Receiving waters potentially impacted by the release of stormwater impacted by mining activities, seepage from site dams or potentially impacted ground water must be monitored at the locations and frequencies defined in *Table E3*, for the water quality parameters listed in *Table E4*.

Table E1 - Containment Dams monitoring locations and frequency ('Table E1')

Impacted stormwater release location	Monitoring Frequency
Spillway of Waste Rock Dump containment dam WD1	In the event of a release from the dam spillway
Spillway of Waste Rock Dump containment dam WD2	In the event of a release from the dam spillway
Spillway of Waste Rock Dump containment dam WD3	In the event of a release from the dam spillway
Spillway of Waste Rock Dump containment dam WD4	In the event of a release from the dam spillway
Spillway of Sediment Dam 3 located in headwaters of Rawdon Creek	In the event of a release from the dam spillway
Spillway of West Waste Rock Dump containment Dam – West Dam	In the event of a release from the dam spillway

Table E2 - Containment Dams contaminant release limits ('Table E2')

Water quality parameter	Units	Release Limit for WD1, WD2, WD3, WD4, and Spillway of Sediment Dam 3.	Release Limits for West Dam
Total Suspended Solids	mg/L	Must not exceed 1200 mg/L or 10% greater than a background value ¹ of the receiving waters whichever is the greater.	Within 10% greater than background value of the receiving water.
pH	pH units	6.0 – 9.0 (range)	6.0 – 9.0 (range)
Total Dissolved Solids	mg/L	<1000	<900
Sulfate	mg/L	<100	<100
Copper	mg/L	<0.04	<0.0025
Zinc	mg/L	<0.15	<0.031
Arsenic	mg/L	<0.05	<0.01
Cadmium	mg/L	<0.005	<0.0008
WAD Cyanide	mg/L	<0.007	<0.007

Note 1: A "background value" for a quality characteristic is the value of the quality characteristic measured on the same day at a background sampling and in-situ monitoring point in the receiving waters not affected by the release situated further than 20 metres up-current from the release point into Twelve Mile Creek and Swindon Creek.

E10 In the event that monitoring results, as interpreted by a suitably qualified person, indicate an impact in terms of contaminant levels in downstream monitoring sites compared to levels found in upstream monitoring sites, then the environmental authority holder must complete an investigation into the source, cause or extent of environmental harm being caused, or the extent of environmental harm likely to be caused, and provide this to the administering authority within one (1) month of receiving the analysis results.

For the purposes of this condition, a suitably qualified person is someone possessing appropriate qualifications and experience in the field of surface water monitoring program design monitoring and data analysis and who can competently make recommendations about these matters.

In assessing the monitoring results the suitably qualified person must give consideration to relevant methodology and water quality criteria specified by the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand in Australian Guidelines for Water Quality Monitoring and Reporting, 2000 and Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000 or more recent editions of the documents.

Table E3 - Receiving waters monitoring locations and frequency ('Table E3')

Monitoring point	Classification	Easting (AMG)	Northing (AMG)	Monitoring frequency
Perry River Downstream	Downstream	378842	7208200	Monthly ¹ , in the event of flow in the receiving waters
Swindon Creek Downstream	Downstream	375038	7207001	Monthly ¹ , in the event of flow in the receiving waters
Rawdon Creek Downstream	Downstream	375890	7206438	Monthly ¹ , in the event of flow in the receiving waters
Twelve Mile Creek Downstream	Downstream	377113	7206554	Monthly ¹ , in the event of flow in the receiving waters
Mingham Creek Downstream	Downstream	375320	7202870	Monthly ¹ , in the event of flow in the receiving waters
Swindon Creek Upstream	Upstream	373410	7205443	Monthly ¹ , in the event of flow in the receiving waters
Twelve Mile Creek Upstream	Upstream	377298	7204777	Monthly ¹ , in the event of flow in the receiving waters
Perry River Upstream	Upstream	374746	7207281	Monthly ¹ , in the event of flow in the receiving waters

Monitoring point	Classification	Easting (AMG)	Northing (AMG)	Monitoring frequency
Mingham Creek Upstream	Upstream	374586	7203135	Monthly ¹ , in the event of flow in the receiving waters

1. Where possible monitoring should coincide with groundwater monitoring

Table E4 - Receiving water monitoring requirements ('Table E4')

Water quality parameter	Units
Total Suspended Solids	mg/L
pH	pH units
Total Dissolved Solids	mg/L
Sulfate	mg/L
Copper	mg/L
Zinc	mg/L
Arsenic	mg/L
Cadmium	mg/L
Cyanide (as WAD cyanide)	mg/L
Major Ions ¹	mg/L
Electrical Conductivity	µS/cm
Nitrate	mg/L
Hardness	-

1. Major ions to be sampled include sodium, fluoride, potassium, calcium, magnesium, chloride, bicarbonate and carbonate

E11 The Tailings Storage Facility must be monitored for the water quality parameters indicated and at the frequency specified in *Table E5*.

E12 In the event that monitoring conducted in accordance with condition **E11** indicates the water quality within the Tailings Storage Facility does not comply with the contaminant limits defined in *Table E5*, implement all reasonable and practicable measures to prevent access by all livestock and minimise access by native fauna to the dam.

Table E5 - Water quality limits for Tailings Storage Facility ('Table E5')

Water Quality Parameter	Units	Contaminant limit	Monitoring frequency
WAD Cyanide	mg/L	50	Quarterly
Arsenic	mg/L	0.5	Quarterly
Sulfate	mg/L	1000	Quarterly
Copper	mg/L	0.5	Quarterly
Zinc	mg/L	20	Quarterly
Lead	mg/L	0.1	Quarterly

E13 The design storage allowance on 1st November of each year for all regulated dams constructed or operated within the operational land must comply with *Table E6*.

Table E6 - Storage design¹ for regulated dams ('Table E6')

Dam	Design Storage Allowance ² Critical Wet Period	Spillway Critical Design Storm ³	Mandatory ⁴ Reporting Level
Tailings Storage Facility	1: 200 Year AEP 4-month wet season plus process inputs for the 4-month wet season	1: 10000 Year AEP	1: 100 Year AEP
Sediment Dam 3	1:20 Year AEP 4-month wet season	1:1000 Year AEP	1:10 Year AEP
WD1	1:20 year AEP 4-month wet season	1:1000 Year AEP	1:10 Year AEP
WD2	1:20 year AEP 4-month wet season	1:1000 Year AEP	1:10 Year AEP
WD3	1:20 year AEP 4-month wet season	1:1000 Year AEP	1:10 Year AEP
WD4	1:20 year AEP 4-month wet season	1:1000 Year AEP	1:10 Year AEP
Process Water Pond	1:20 year AEP 4-month wet season	1:1000 Year AEP	1:10 Year AEP

Dam	Design Storage Allowance ² Critical Wet Period	Spillway Critical Design Storm ³	Mandatory ⁴ Reporting Level
South Dam	1:20 year AEP 4-month wet season	1:100 Year AEP	1:10 Year AEP
West Dam	1:20 year AEP 4-month wet season	1:1000 Year AEP	1:10 Year AEP

NOTE: AEP means Annual Exceedance Probability – being the probability that at least one event as specified will occur in a particular year.

¹ Calculations are to be carried out in accordance with the guideline titled *Site Water Management within the Technical Guidelines for Environmental Management of Exploration and Mining in Queensland (DME 1995)*.

² The design storage allowance on 1st November of each year for any regulated dam constructed within the operational land must be sufficient to contain the run-off from the critical wet period - plus the volume of any other inputs to the storage facility during that critical wet period, as part of operations. Such inputs could be tailings, contaminated site waters, process waters, and any other materials.

³ The critical storm has a duration that produces the peak discharge for the catchment.

⁴ The level below spillway crest that can accommodate runoff from a 72-hour storm at the specified AEP, or the wave allowance at the specified AEP - whichever level is lower.

- E14** The spillway for any regulated dam, constructed or operated within the operational land must be designed and maintained to withstand the peak flow from the spillway capacity critical design storm defined in *Table E6*.
- E15** In the event that a release from a Regulated Dam spillway or the Tailings Storage Facility spillway is required, environmental harm from the discharge must be avoided. This may include controlling the release to prevent erosion of sediment deposition in downstream watercourses, and ensuring that plant and infrastructure, chemical and fuel storages are not located in the flow path of any potential discharge.
- E16** The holder of the environmental authority must mark the mandatory reporting level defined in *Table E6* on the spillway of all regulated dams within the operational land.
- NOTE: The mandatory reporting level may also be marked and measured within the decant pond of the regulated dam. However, the mandatory reporting level within the decant pond must be compared to the mandatory reporting level on the spillway on a regular basis to ensure accuracy.
- E17** The holder of the environmental authority must notify the administering authority when the pondage level of any regulated dam, reaches the mandatory reporting level defined in *Table E6*.

Receiving Environment Monitoring Program (REMP)

E18 A Receiving Environment Monitoring Program (REMP) must be implemented to meet the requirements of conditions **E18** to **E20**.

For the purposes of the REMP, the receiving environment refers to the waters of the Perry River, Burnett River, Swindon Creek, Rawdon Creek, Twelve Mile Creek and Mingham Creek and connected or surrounding waterways downstream of the mining activity.

E19 The REMP must at a minimum:

- a) address and comply with the latest version of the administering authority's guideline *Receiving environment monitoring program guideline (ESR/2016/2399)*; and
- b) encompassing the waters of Perry River, Burnett River, Swindon Creek, Rawdon Creek, Twelve Mile Creek and Mingham Creek and connected or surrounding waterways within 20km downstream of the mining activities, and where possible in tributaries on-site; and
- c) identify, describe and monitor any adverse impacts to surface water environmental values, quality, and flows; and
- d) assess the long-term condition or state of surface waters, sediment, fine sediments, DIN (Dissolved Inorganic Nitrogen) and aquatic ecosystem health; and
- e) include the locations listed in Table E3 monitoring locations; and
- f) identify and describe all environmental values of the receiving environment; and
- g) assess the receiving environment monitoring results against the relevant water quality guidelines for all indicators to protect all environmental values for the water as declared under an environmental protection policy or regulation; and
- h) include an assessment of the potential impacts of the activity and propose appropriate mitigation measures; and
- i) assess the status of and any change to aquatic ecosystem health including aquatic flora and fauna within and immediately surrounding the project area; and
- j) assess the status of and any change to riparian vegetation health within and immediately surrounding the project area; and
- k) apply procedures and/or guidelines from ANZG 2018 and other relevant standards and guideline documents; and
- l) describe sampling and analysis methods and quality assurance and control; and
- m) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

E20 A REMP Report must be prepared for any of the following and submitted to the administering authority on request:

- a) annually by 1 August each year; and
- b) within one (1) month following a continuous two (2) week cessation period of any release pursuant to condition **E39** or where a trigger under condition **E50** has been identified or a period otherwise agreed to by the administering authority.

E21 The REMP Report required by condition **E20** must:

- a) be prepared by an appropriately qualified person; and
- b) outline the findings of the REMP, including but not limited to:
 - i. an assessment of current and long-term upstream water quality; and
 - ii. an assessment of the current and long-term condition or state of surface waters, sediment and aquatic ecosystem health; and
 - iii. recommendations for further investigation or actions; and
 - iv. recommendations for changes or improvements to the monitoring program; and
 - v. potential changes to management of the authorised activity to minimise impacts; and
 - vi. all monitoring results; and
 - vii. a description of all conclusions formed.

Groundwater

- E22** Contaminants are not authorised to be released directly or indirectly to any groundwater.
- E23** Groundwater must be monitored at the locations and frequencies specified in *Table E7*.
- E24** Groundwater in all bores specified in *Table E7* must be monitored for the contaminants identified in *Table E8*.
- E25** Groundwater measured at any compliance bore specified in *Table E7* must not exceed Limit A for any contaminant specified in *Table E8* or *Table E9* on any five (5) consecutive sampling occasions.
- E26** Groundwater measured at any compliance bore specified in *Table E7* must not exceed Limit B for any contaminant specified in *Table E8* or *Table E9* on any three (3) consecutive sampling occasions.

Table E7 - Groundwater monitoring locations and frequency ('Table E7')

Monitoring Point ¹	Location (MGA94 – Zone 56)		Aquifer	Surface RL ² (m)	Depth RL ² (m)	Screened interval RL ² (m)	Monitoring Frequency	
	Easting	Northing					Standing Water Level RL ² (m)	Ground- water Quality
Operational Management Bores ⁵								
Tailings Storage Facility								
MRMB29	375255	7206291	TBA	121.14	22	Records not available	Monthly	Quarterly
MRMB45	375060	7204704	Fractured Rock	152.60	39	33-39		

Monitoring Point ¹	Location (MGA94 – Zone 56)		Aquifer	Surface RL ² (m)	Depth RL ² (m)	Screened interval RL ² (m)	Monitoring Frequency	
	Easting	Northing					Standing Water Level RL ² (m)	Ground- water Quality
MRMB46	375348	7205133	Fractured Rock	151.34	39	26-35		
MRMB69	374430	7204749	Fractured Rock	135.50	36	29.5-36		
Twelve Mile Creek								
MRMB26	376281	7205684	Records not available	114.34	12	Records not available	Monthly	Quarterly
Waste Rock Dump								
MRMB60	376577	7204529	Fractured Rock	131.00	36	27-35	Monthly	Quarterly
MRMB27	376504	7205417	Regolith	111.62	46	Records not available		
MRMB25	376169	7205682	Regolith/ Fractured Rock	115.82	48	Records not available		
Interpretation Bore ⁶								
MRMB37	377492	7204116	Fractured rock	122.74	50	25-49	Monthly	Quarterly
Compliance Bores ³								
TSF North – Swindon Creek								
MRMB13	374164	7206247	Regolith/ Fractured rock	125.11	29.99	18-30		

Monitoring Point ¹	Location (MGA94 – Zone 56)		Aquifer	Surface RL ² (m)	Depth RL ² (m)	Screened interval RL ² (m)	Monitoring Frequency	
	Easting	Northing					Standing Water Level RL ² (m)	Ground- water Quality
MRMB54	374473	7207154	Fractured rock	125.12	31	17.1-29.5	Monthly	Quarterly
MRMB52	375103	7207188	Fractured rock	112.51	31	17.1-29.5		
MRPB2	373568	7205655	Fractured rock	149.92	49	36-49	Monthly	Quarterly
TSF North – Unnamed Creek								
MRMB40	375135	7206605	Fractured rock	121.72	43.5	25-43	Monthly	Quarterly
MRMB55	375956	7205939	Basement	127.60	31	25-31		
MRMB53	375403	7207005	Fractured rock	111.88	25	17.7 – 23.9		
MRMB66	375834	7206885	Basement	127.34	30	27-30		
MRMB74	376301	7206896	Basement	108.6	42	36-42		
Twelve Mile Creek								
MRMB38	377096	7206635	Fractured rock	104.20	41	13-40	Monthly	Quarterly
MRMB61	376731	7204473	Fractured rock	128.00	31	25-31		
MRMB62	376572	7203977	Fractured rock	148.00	37	26-35		
MRMB77	376752	7205786	Fractured rock	107.70	15.5	9.5-15.5		
MRMB78	376952	7204828	Fractured rock	113.51	29	17-29		

Monitoring Point ¹	Location (MGA94 – Zone 56)		Aquifer	Surface RL ² (m)	Depth RL ² (m)	Screened interval RL ² (m)	Monitoring Frequency	
	Easting	Northing					Standing Water Level RL ² (m)	Ground- water Quality
West Dam – Mingham Creek								
MRMB75	375401	7202922	Basement	98.7	30	24-30	Monthly	Quarterly
MRMB76	375155	7203435	Fractured rock	106.14	16.5	10.5-16.5		
Operational Bores ⁴								
TSF North East – Rawdon Creek								
MRMB39	375856	7206535	Fractured rock	112.42	24	23-41	Monthly	Quarterly
MRMB21	375618	7206377	Regolith/ Fractured rock	116.34	34.9	23-35		
TSF North – Unnamed creek								
MRMB30	374892	7206410	Records not available	127.89	30.36	Records not available	Monthly	Quarterly
MRMB48	375466	7205964	Fractured rock	130.73	39	30-39		
Waste Rock Dump								
MRPB1	376644	7205033	Records not available	114.39	35	Records not available	Monthly	Quarterly
MRMB59	376199	7203734	Fractured rock	176.00	31	24-30		
MRMB49	375650	7205571	Basement	145.36	32	17-30		
MRMB63	376558	7205270	Fractured rock	128.00	25	19-22.5		

Monitoring Point ¹	Location (MGA94 – Zone 56)		Aquifer	Surface RL ² (m)	Depth RL ² (m)	Screened interval RL ² (m)	Monitoring Frequency	
	Easting	Northing					Standing Water Level RL ² (m)	Ground- water Quality
Twelve Mile Creek								
MRMB64	376325	7205993	Basement	125.00	43	35-41	Monthly	Quarterly
MRMB67	376399	7206366	Basement	127.10	30	27-30		
MRMB68	376140	7205997	Basement	134.90	30	27-30		
TSF North – Swindon Creek								
MRMB12	374545	7206538	Regolith	119.03	30	5-27	Monthly	Quarterly
MRMB65	374926	7206745	Basement	122.70	30	27-30		
MRMB43	373880	7205740	Fractured rock	137.70	37.5	24-37.5		
MRMB41	374809	7206896	Fractured rock	113.04	40.5	22-40		
MRMB42	374804	7206892	Fractured rock	113.06	16.8	7-16		
MRMB44	373878	7205736	Fractured rock	138.00	13	10-13		
West Dam								
MRMB36	374800	7203578	Fractured rock	108.73	49	36-49	Monthly	Quarterly
MRMB70	374482	7203728	Fractured rock	147.50	42	32.5-42		
MRMB72	374799	7203590	Basement	127.50	22	15.5-22		
MRMB71	374632	7203643	Basement	133.50	39	32.5-39		

1. Bores depicted in *Schedule J, Figure 2B– Groundwater monitoring network*.
2. RL measurement to be taken from top of bore casing to the nearest 1 centimetre.
3. Compliance bores – groundwater monitoring limits in Table E8 and Table E9 apply.

4. Operational bores – groundwater monitoring limits in Table E8 and Table E9 do not apply, groundwater quality must be maintained or improved at these sites.
5. Operational management bores – for interpretation purposes, groundwater monitoring limits in Table E8 and Table E9 do not apply.
6. Interpretation bores – located outside of potential influence of the activity and used for comparative and interpretative purposes, groundwater monitoring limits in Table E8 and Table E9 do not apply.

Table E8 – Groundwater monitoring limits ('Table E8')

Contaminant ¹ (mg/L unless specified otherwise)		Limits ¹⁰	
		Limit A	Limit B
pH ⁵		6.5 -7.5	-
Aluminium ²		-	0.055
Arsenic	All bores except MRMB61, MRMB76, MRMB77 and MRMB78 ²	-	0.013
	MRMB76 and MRMB78 ^{6,7}	0.05	0.08
	MRMB77 ^{6,7}	0.15	0.19
	MRMB61 ^{6,7}	0.015	0.02
Boron ²		-	0.37
Cadmium	All bores except MRMB61, MRMB62 and MRMB78 ²	-	0.0002
	MRMB78 ^{6,7}	0.0005	0.0006
	MRMB61 and MRMB62 ^{6,7}	0.0006	0.0009
Chromium ²		-	0.001
Copper ^{6,7}	All bores except MRMB61, MRMB62 and MRMB77 ^{6,7}	0.001	0.004
	MRMB77 ^{6,7}	0.006	0.008
	MRMB61 and MRMB62 ^{6,7}	0.004	0.005
Lead ²		-	0.0034
Manganese ²		-	1.9
Selenium ²		-	0.005
Zinc	All bores except MRMB61, MRMB62 and MRMB78 ^{6,7}	0.01	0.02
	MRMB78 ^{6,7}	0.04	0.05
	MRMB61 and MRMB62 ^{6,7}	0.035	0.077
Nitrate ^{6,7}	All bores except MRMB61 and MRMB62 ^{6,7}	0.02	0.04
	MRMB61 and MRMB62 ^{6,7}	0.04	0.06

Contaminant ¹ (mg/L unless specified otherwise)		Limits ¹⁰	
		Limit A	Limit B
WAD Cyanide ^{3,4}		-	0.5
Cyanide (as un-ionised HCN, measured as [CN]) ²		-	0.007
Iron	MRMB52 ^{6,7}	1.5	1.6
	MRMB13, MRMB53, MRMB54 and MRPB2 ^{6,7}	0.8	0.9
	MRMB75 ^{6,7}	4	4.9
	All other compliance bores ^{6,7}	0.3	0.65
Major ions ⁸		For interpretation purposes	
Hardness ⁹			

1. All metals and metalloids must be measured as dissolved and total, limits apply to the dissolved fraction (dissolved is from analysis of a filtered sample).
2. ANZG (2018) for 95% protection of species (freshwater).
3. WAD CN is Weak Acid Dissociable Cyanide, measured as an indicator of the bio-available cyanide.
4. The International Cyanide Management Code (2009), Section 4.5.
5. Derived from site specific values, using 20th and 80th percentile.
6. Limit A derived from site specific values (80th percentile).
7. Limit B derived from site specific values (95th percentile).
8. Major ions to be sampled include sodium, fluoride, potassium, calcium, magnesium, chloride, bicarbonate and carbonate.
9. For each sampling event, hardness adjustment for selected metals in freshwaters can be undertaken in accordance with ANZG (2018).
10. An amendment application can be made at any time under the *Environmental Protection Act 1994* to update dataset used to derive site specific limits for compliance bores, based on natural variations.

Table E9 – Bore specific Groundwater Monitoring limits ('Table E9')

Monitoring Point and Contaminant	Limits	
	Limit A ¹	Limit B ²
Sulfate (SO ₄ ²⁻) mg/L		
MRMB74	390	399
MRMB75	793	846
MRMB37	503	532
MRMB62	336	376

Monitoring Point and Contaminant	Limits	
	Limit A ¹	Limit B ²
MRMB61	197	205
MRMB13	272	296
MRMB53	183	194
MRMB40	75	83
MRMB52	69	75
MRPB2	229	242
MRMB38	305	358
MRMB54	106	116
MRMB76	162	165
MRMB78	586	615
MRMB66	195	206
MRMB55	23	25
Electrical Conductivity (µS/cm)		
MRMB74	10894	11042
MRMB75	10352	10451
MRMB37	6852	6952
MRMB62	5780	5926
MRMB61	5792	5834
MRMB13	4561	4765
MRMB53	4490	4561
MRMB40	3826	3922
MRMB52	3018	3072
MRPB2	2774	2820
MRMB38	2311	2427
MRMB54	2309	2386
MRMB76	1742	1768

Monitoring Point and Contaminant	Limits	
	Limit A ¹	Limit B ²
MRMB78	10840	11105
MRMB66	1396	1434
MRMB55	1552	1611

1. Limit A derived from site specific values (80th percentile).
2. Limit B derived from site specific values (95th percentile).

E27 If groundwater measured at any compliance bore specified in *Table E7* exceeds any corresponding contaminant Limit B specified in *Table E8* or *Table E9* on one (1) sampling occasion the environmental authority holder must:

- a) Resample the groundwater within the compliance bore for all exceeding contaminants within 10 business days.

E28 Groundwater quality at operational bores specified in *Table E7* must be maintained or improved.

E29 A bore log must be completed for each groundwater monitoring bore constructed after **1 August 2008** which includes:

- a) bore identification reference and geographic coordinate location; and
- b) specific construction information including but not limited to depth of bore, depth and length of casing, depth and length of screening and bore sealing details; and
- c) standing groundwater level; and
- d) lithological data, stratigraphic interpretation by an appropriately qualified person to identify important features associated with groundwater monitoring; and
- e) target formation of the bore.

*Note: All existing bores must have a bore drill log that meets a); and where available include information required under b), c), d) and e) of condition **E29**.*

E30 The construction, maintenance and decommissioning of groundwater monitoring bores must be undertaken in a manner that:

- a) prevents contaminants entering the groundwater; and
- b) ensures the integrity of the bores to obtain representative groundwater samples from the target aquifer; and
- c) maintains the hydrogeological environment within the aquifer.

Note: Decommissioning of groundwater monitoring bores must meet a) and c) of condition **E30.*

- E31** Monitoring and sampling must be carried out in accordance with the requirements of the latest version of the following documents unless otherwise approved by the administering authority:
- a) for waters and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009 – *Environmental Protection (Water) Policy 2009*
 - b) for groundwater, *Groundwater Sampling and Analysis – A Field Guide* (2009:27 GeoCat#6890.1);
 - c) for subterranean aquatic fauna, the *Guideline for the Environmental Assessment of Subterranean Aquatic Fauna*.
- E32** A Seepage Management Plan must be developed and implemented by **24 September 2018**.
- E33** The Seepage Management Plan required under condition **E32** must be developed by a suitably qualified person.
- E34** The Seepage Management Plan required under condition **E32** must at a minimum include control measures to:
- a) prevent the release of seepage to groundwater in the receiving environment; and
 - b) prevent seepage migration into surface waters.
- E35** By **22 March 2018**, a Groundwater Monitoring and Management Program must be developed by an appropriately qualified person.
- E36** By **22 June 2018**, the Groundwater Monitoring and Management Program required under condition **E35** must be implemented.
- E37** The Groundwater Monitoring and Management Program required by condition **E35** must:
- a) identify potential sources, causes and extent of contaminant seepage and disturbance to groundwater from the activity; and
 - b) ensure that all potential groundwater impacts due to the activity are identified, mitigated, and monitored in accordance with the conditions of the environmental authority; and
 - c) ensure that adequate groundwater monitoring and data analysis is undertaken to achieve the following objectives:
 - i. detect any impacts to groundwater levels due to the activity; and
 - ii. detect any impacts to groundwater quality due to the activity; and
 - iii. detect any impacts caused by contaminant seepage on surface water quality; and
 - iv. detect and analyse short- and long-term trends in groundwater quality at operational bores at an annual frequency; and
 - v. determine compliance with conditions **E22**, **E23**, **E24**, **E25**, **E26** and **E28**; and
 - d) include a review process to identify improvements to the program; and
 - e) include an appropriate quality assurance and quality control program; and
 - f) assess the success of the seepage management system required under conditions **E32** and **E34** and determine if any additional mitigation measures are required for the adequate management of seepage; and

- g) include a groundwater model which includes an assessment of current seepage rates and predicted post-mining seepage rates; and
- h) have consideration for any comments provided by the administering authority.

E38 The Groundwater Monitoring and Management Program must be reviewed by **24 June 2019**, then every 2 years by an appropriately qualified person. The review must include:

- a) an assessment that the Groundwater Monitoring and Management Program continues to meet the requirements stated in condition **E37**; and
- b) a review of all the historical groundwater data against the limits specified in *Table E8 and Table E9*; and
- c) a review of the ionic balance of all on site water storages including tailings storage and comparison against historical groundwater data; and
- d) a review of the conceptual groundwater model and details of any adjustment made.

High flow releases

E39 Water may be released via WD1 into the Perry River Dam, upstream of the weir, where the flows measured at the Perry River Weir are equal to or greater than 1m³/sec as measured through an operational flow gauging station.

E40 Water released pursuant to condition **E39** must be:

- a) released in a controlled manner to prevent erosion of the bed or banks of the Perry River; and
- b) released in a controlled manner to ensure sufficient mixing and dispersion in the Perry River.

E41 The following information must be recorded daily for the duration of releases pursuant to condition **E39** and provided to the administering authority upon request:

- a) the water level in WD1, WD2, WD3 and WD4; and
- b) contaminant monitoring results required by condition **E48**; and
- c) the volume of the release to the Perry River; and
- d) the background flow rate in the Perry River.

E42 Water released pursuant to condition **E39** must be monitored for and comply with the contaminant limits and monitoring frequency specified in *Table E10*.

Table E10 - High flow contaminant release limits ('Table E10')

Contaminant parameters	Contaminant Limits	Monitoring frequency
Flow	Interpretation purposes only	Continuous
Electrical Conductivity (EC)	4000 uS/cm (maximum)	Continuous

pH (pH units)	6.0-9.0	Daily (within 2 hours of the release starting) and every 24hrs thereafter during the release.
Total Suspended Solids	Interpretation purposes only	
Total Dissolved Solids (TDS)	Interpretation purposes only	
Sulfate	Interpretation purposes only	
Copper ¹	Interpretation purposes only	
Zinc ¹	Interpretation purposes only	
Arsenic ¹	Interpretation purposes only	
Cadmium ¹	Interpretation purposes only	
WAD Cyanide	Interpretation purposes only	
Dissolved Inorganic Nitrogen (DIN)	Interpretation purposes only	
Ammonia	Interpretation purposes only	
Total nitrogen (Nitrite and Nitrate)	Interpretation purposes only	

1. Total and dissolved metals must be monitored

E43 Monitoring for the contaminants listed in *Table E12* must be conducted when water is being released pursuant to condition **E39** at the monitoring locations and frequencies specified in *Table E11*.

Table E11 - Monitoring locations and frequencies ('Table E11')

Monitoring location	Coordinates	Monitoring frequency
WD1	376002; 7205529	For Electrical Conductivity and pH (pH units) live monitoring for Perry River (within 1 km of the weir) and for all other locations and parameters daily (within 2 hours of the release starting) and every 24hrs thereafter during the release. Daily for 14 days following the cessation of the release.
Upstream Perry River	374746; 7207281	
Downstream Perry River (as close as reasonably practical to the weir)	378842; 7208200	
Downstream Perry River (within 1 km of the weir)	<i>Within 1km of the weir</i>	

- E44** Water released pursuant to condition **E39** must immediately cease after becoming aware of any release not in accordance with, or reasonably expected to not be in accordance with, the conditions of this environmental authority.
- E45** Stock access to the area immediately downstream of the discharge point, specified in condition **E39**, must be restricted until water quality objectives (total) as specified in *Table E12* are complied with.
- E46** While water is released pursuant to condition **E39**, visual monitoring must occur twice every day to verify that discharges in the Perry River comply with the requirements of this environmental authority and records of this visual monitoring must be recorded and maintained onsite.
- E47** Water released pursuant to condition **E39** must cease when flows in the Perry River falls below 1m³/s at the Perry River Weir.
- E48** The quality of receiving waters must be monitored at the locations and frequency in *Table E11*, for the contaminants specified in *Table E12*.

Table E12 - Receiving waters quality objectives ('Table E12')

Contaminant ¹	Water quality (mg/L unless specified otherwise)	
	Water quality objectives (totals) for Perry River	Water quality objectives (dissolved) for Perry River
pH (pH units) ⁹	6.5 (minimum) or 5 th percentile ² of reference sites ³ , whichever is higher 8.5 (maximum) or 95 th percentile ² of reference sites ³ , whichever is lower	
Electrical Conductivity	1,000 ⁶ µS/cm or 95 th percentile ² of reference sites ³ , whichever is higher	
Total dissolved solids	600 ¹⁵ or 95 th percentile ² of reference sites ³ , whichever is higher	<i>Refer to water quality objectives (totals)</i>
Sulfate (SO ₄ ²⁻)	250 ⁶ or 95 th percentile ² of reference sites ³ , whichever is higher	<i>Refer to water quality objectives (totals)</i>
Arsenic	0.05 ⁴	0.013 ⁵ or 95 th percentile ² of reference sites ³ whichever is higher
Cadmium	0.005 ⁴	0.0002 ⁵ or 95 th percentile ² of reference sites ³ whichever is higher

Copper	0.04 ⁴	0.0014 ⁵ or 95 th percentile ² of reference sites ³ , whichever is higher
Zinc	0.15 ⁴	0.008 ⁵ or 95 th percentile ² of reference sites ³ whichever is higher
Cyanide ⁸	Not applicable	0.007 ⁵
Dissolved Inorganic Nitrogen (DIN)	No net increase from background.	
Ammonia	No net increase from background.	
Total nitrogen (Nitrite and Nitrate)	No net increase from background.	

1. For water quality, all metals and metalloids must be measured as both 'total' (from analysis of an unfiltered sample) and 'dissolved' (from analysis of a field filtered sample).
2. Percentiles (5th, 80th and 95th) of reference site contaminant concentration applied as trigger levels/water quality objectives must be calculated in accordance with QWQG (2009) and ANZECC (2000) methodology. The environmental authority holder must maintain a database documenting all relevant water quality monitoring data and calculation of percentiles adopted as trigger levels/water quality objectives.
3. The relevant reference site for Perry River is specified in Schedule E – *Table 3* of the environmental authority
4. ANZECC (2000) stock limits.
5. ANZECC (2000) 95% species protection, Table 3.4.1.
6. Dunlop et al 2016 "Ecosystem protection trigger values for sulfate in hard waters of the Fitzroy River basin"
7. Analysis for metals/metalloids concentrations in sediment must be conducted on the <2mm fraction of the sample and measured as a dilute acid extractable concentration in a manner consistent with the Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines, CSIRO (May 2013).
8. Cyanide is to be measured with pH and temperature in accordance with ANZECC (2000) methodology
9. pH limits from ANZECC (2000) Table 4.4.2

E49 The contaminant concentrations measured at *Table E11* "Downstream Perry River (within 1 km of the weir)" in receiving waters must not be outside the pH range or exceed the Electrical Conductivity or any total water quality objective specified in *Table E12*.

E50 Should any contaminant measured at *Table E11* "Downstream Perry River (within 1 km of the weir)" in receiving waters be outside the pH range or exceed the Electrical Conductivity or dissolved water quality objective specified in *Table E12*, the environmental authority holder must immediately cease releasing and notify the administering authority under condition **E51** and additionally provide the following information in writing:

- a) release cessation date/time; and
- b) natural flow volume in receiving water; and
- c) volume of water released; and
- d) details regarding the compliance of the release with the conditions of this environmental authority

(i.e., contamination limits, natural flow, discharge volume); and

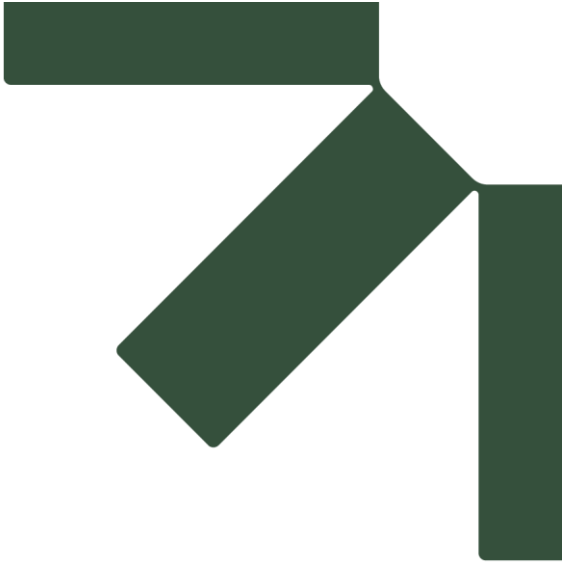
- e) all in-situ water quality monitoring results; and
- f) any other matters pertinent to the water release event.

E51 At the commencement and cessation of releasing water pursuant to condition **E39**, the holder of the environmental authority must notify the administering authority by written notification (via email to the pollution hotline at: pollutionhotline@des.qld.gov.au) within twenty-four (24) hours and must at minimum, include:

- a) the stream flow measured at the Perry River Weir; and
- b) live monitoring of Electrical Conductivity (EC) and pH (pH units) at the Downstream Perry River (within 1 km of the weir).

E52 The holder of the environmental authority must notify the administering authority by phone call within six (6) hours, followed by written notification (via email to the pollution hotline at: pollutionhotline@des.qld.gov.au) within twenty-four (24) hours, after becoming aware of any release not in accordance, or reasonably expected to not be in accordance with, the conditions **E39** to **E51**.

END OF CONDITIONS FOR SCHEDULE E



Appendix B Environmental Authority EPML00712113 – Schedule H

Mt Rawdon Operations

Post Closure Water Management Plan

Evolution Mining Limited

SLR Project No.: 623.030415.00002

31 January 2025

Schedule H – Regulated Structures

- H1** The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* at the following times:
- a) prior to the construction of the structure, if it is not an existing structure; or
 - b) if it is an existing structure, by **23 June 2017**; or
 - c) prior to any change in its purpose or the nature of its stored contents.
- H2** A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
- H3** Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.

Design and construction of a regulated structure

- H4** Conditions **H5** to **H9** inclusive do not apply to existing structures.
- H5** All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
- H6** Construction of a regulated structure is prohibited unless the environmental authority holder has submitted to the administering authority and 28 days have elapsed, the following:
- a) a consequence category assessment report, as required by condition **H2**, and
 - b) the suitably qualified and experienced person certified design and design plan; and
 - c) the associated suitably qualified and experienced person certified operating procedures.
- H7** Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*, and must be recorded in the Regulated Structures register.
- H8** Regulated structures must:
- a) be designed and constructed in accordance with and conform to the requirements of the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
 - b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:
 - i) floodwaters from entering the regulated structure from any watercourse or drainage line; and
 - ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.

H9 Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority within 10 days of the completion of construction of the regulated structure, and state that:

- a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure.
- b) construction of the regulated structure is in accordance with the design plan.

Operation of a regulated structure

H10 Operation of a regulated structure, except for an existing structure, must not commence unless the environmental authority holder has submitted to the administering authority:

- a) One paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition **H7**, and
- b) A set of 'as constructed' drawings and specifications, and
- c) Certification of those 'as constructed drawings and specifications' in accordance with condition **H9**, and
- d) Where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the design storage allowance (DSA) volume across the system, a copy of the certified system design plan;
- e) A statement that confirms:
 - i. The requirements of this authority relating to the construction of the regulated structure have been met;
 - ii. The details required under this authority, have been entered into a Register of Regulated Structures; and
 - iii. There is a current operational plan for the regulated structures.

H11 For existing structures that are regulated structures:

- a) where the existing structure that is a regulated structure is managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the environmental authority holder must submit to the administering authority within three (3) months of the commencement of this condition a copy of the certified system design plan including that structure; and
- b) There must be a current operational plan for the existing structures.

H12 Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Mandatory reporting level

H13 Conditions **H14** to **H17** inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.

H14 The Mandatory Reporting Level (the MRL) specified in *Table H1* must be marked on a regulated structure in such a way that during routine inspections of that structure, it is clearly observable.

Note: The mandatory reporting level may also be marked and measured within the decant pond of the regulated dam. However, the mandatory reporting level within the decant pond must be compared to the mandatory reporting level on the spillway on a regular basis to ensure accuracy.

H15 The environmental authority holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated structure reaches the MRL.

H16 The environmental authority holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated structure.

H17 The environmental authority holder must record any changes to the MRL in *Table H1* and in the Register of Regulated Structures.

Design storage allowance

H18 The environmental authority holder must assess the performance of each regulated structure or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated structure or linked containment system taken prior to 1 July of each year.

H19 By 1 November of each year, storage capacity must be available in each regulated structure (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the structure (or network of linked containment systems), as specified in *Table H1*.

H20 The environmental authority holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated structure (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

H21 The environmental authority holder must, immediately on becoming aware that a regulated structure (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated structure or linked containment systems.

Annual inspection report

H22 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.

- H23** At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions, if applicable, to ensure the integrity of the regulated structure.
- H24** The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.
- H25** The environmental authority holder must within 20 business days of receipt of the annual inspection report, provide to the administering authority:
- a) The recommendations section of the annual inspection report; and
 - b) If applicable, any details of any actions being taken in response to those recommendations.

Transfer arrangements

- H26** The environmental authority holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Decommissioning and rehabilitation

- H27** Regulated structures and structures must not be abandoned but must be decommissioned and rehabilitated to achieve compliance with conditions **G1** and **G2** of this environmental authority.

Transitional Arrangements

- H28** All existing structures that have not been assessed in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* must be assessed and certified in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* by **23 June 2017**.

Hydraulic performance of regulated structures

- H29** Each regulated structure authorised by this environmental authority as specified in *Table A1 Authorised Disturbance*, must meet the hydraulic performance criteria listed in *Table H1* for that structure.

Table H1 – Hydraulic performance criteria ('Table H1')

Name of Regulated Structure	Consequence Category	Spillway Critical Design Storm Capacity		Design Storage Allowance ² (DSA)		Mandatory Reporting Level ⁴ (MRL)		Purpose of structure
		Design Criteria	mAHD	Design Criteria	mAHD	Design Criteria	mAHD	
Tailings Storage Facility ⁶	High	1:10000 year AEP	174.0	1: 200 Year AEP 4 month wet season plus process inputs for the 4 month wet season	172.0	1: 100 year AEP	173.5	Tailings Storage and PAF waste storage
Sediment Dam 3	Significant	1:1000 year AEP	118.5	1:20 Year AEP 4 month wet season	116.6	1:10 Year AEP	116.6	TSF Seepage Collection
WD1	Significant	1:1000 year AEP	126.0m	1:20 year AEP 4 month wet season	123.5	1:10 Year AEP	124.5	North WRD Runoff Containment
WD2	Significant	1:1000 year AEP	119.2m	1:20 year AEP 4 month wet season	118.3	1:10 Year AEP	118.8	North WRD Runoff Containment
WD3	Significant	1:1000 year AEP	125.0m	1:20 year AEP 4 month wet season	124.2	1:10 Year AEP	124.7	North WRD Runoff Containment
WD4	Significant	1:1000 year AEP	133.5m	1:20 year AEP 4 month wet season	132.3	1:10 Year AEP	133.0	North WRD Runoff Containment
Process Water Pond	Significant	1:1000 year AEP	154.7m	1:20 year AEP 4 month wet season	N/A	1:10 Year AEP	N/A	Process Water Buffer Storage
South Dam	Significant	1:100 year AEP	146.5m	1:20 year AEP 4 month wet season	145.7	1:10 Year AEP	145.9	Process Plant Runoff, Containment of Pit Dewatering, and TSF Seepage

Name of Regulated Structure	Consequence Category	Spillway Critical Design Storm Capacity		Design Storage Allowance ² (DSA)		Mandatory Reporting Level ⁴ (MRL)		Purpose of structure
		Design Criteria	mAHD	Design Criteria	mAHD	Design Criteria	mAHD	
West Dam	Significant	1:1000 year AEP	122.5m	1:20 year AEP 4 month wet season	120.3	1:10 Year AEP	121.5	West WRD Runoff Containment, Containment of Pit Dewatering

NOTE: AEP means Annual Exceedance Probability – being the probability that at least one event as specified will occur in a particular year.

¹ Calculations are to be carried out in accordance with the guideline titled Site Water Management within the Technical Guidelines for Environmental Management of Exploration and Mining in Queensland (DME 1995).

² The design storage allowance on 1st November of each year for any regulated dam constructed within the operational land must be sufficient to contain the run-off from the critical wet period - plus the volume of any other inputs to the storage facility during that critical wet period, as part of operations. Such inputs could be tailings, contaminated site waters, process waters, and any other materials.

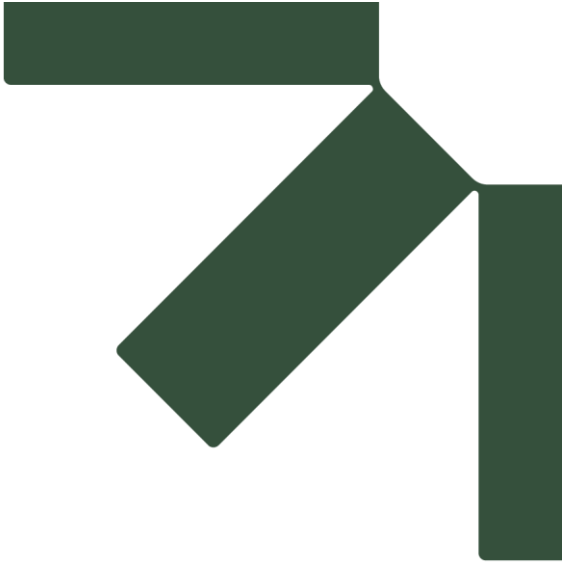
³ The critical storm has a duration that produces the peak discharge for the catchment.

⁴ The level below spillway crest that can accommodate runoff from a 72 hour storm at the specified AEP, or the wave allowance at the specified AEP - whichever level is lower

⁵ TSF is approved for Stage 5 Life of Mine lifts, Stages 5A to 5F, with a final lift approval to RL193.0m

H30 The hydraulic performance criteria specified in *Table H1* are the minimum mandatory performance requirements; regulated structures must be managed in a manner that ensures compliance with all conditions of this environmental authority.

END OF CONDITIONS FOR SCHEDULE H



Appendix C Environmental Authority EPML00712113 – Schedule I

Mt Rawdon Operations

Post Closure Water Management Plan

Evolution Mining Limited

SLR Project No.: 623.030415.00002

31 January 2025

Schedule I – Water reuse

- I1** Mine affected water may be released via WD1 for the purpose of supplying irrigation to the designated irrigation areas identified as A, B and C in Schedule K *Map 4 Designated irrigation areas*.
- I2** Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and used directly at properties owned by the environmental authority holder or a third party for the purpose of supplying irrigation water subject to conditions **I1** to **I13**.
- I3** Where the responsibility for mine affected water is given or transferred to another person for the purpose of irrigation, the responsibility for the mine affected water must only be given or transferred in accordance with a written agreement (the third party agreement) that:
- a) clearly articulates each parties responsibilities and obligations to ensure compliance with all conditions of Schedule I; and
 - b) includes a commitment from the person utilising the mine affected water to use it in such a way as to prevent environmental harm or public health incidents and specifically make the persons aware of the General Environmental Duty (GED) under s. 319 of the Environmental Protection Act 1994, environmental sustainability of the water disposal, protection of environmental values of waters and ensure it is fit for purpose in accordance with any other relevant legislation; and
 - c) must be signed by both parties to the agreement.
- I4** The giving, transferring and application of mine affected water must cease immediately upon notification or otherwise becoming aware that:
- a) the use of mine affected water is causing or threatens to cause environmental harm,
 - b) is posing a human health risk,
 - c) is not compliant with the conditions of this environmental authority.
- I5** Mine affected water released pursuant to condition **I1**, must be monitored for and comply with the contaminant limits and monitoring frequency specified in *Table I1*.

Schedule I – Mine Affected Water Release Limits ('Table I1')

Release location	Contaminant parameters	Contaminant Limits	Frequency
WD1 (Location: 376002; 7205529)	Electrical Conductivity (EC)	Maximum 5000 µS/cm	Weekly in-situ.
	pH	6 to 8.5	
	Sodium Adsorption Ratio (SAR)	Maximum 15	Monthly.
	Total nitrogen	Maximum 25 mg/L ¹	
	Total phosphorus	Maximum 5 mg/L ¹	
	Aluminium	Maximum 20 mg/L ¹	
	Arsenic	Maximum 2.0 mg/L ¹	
	Boron	Refer to Table 9.2.18 of ANZECC ¹	
	Cadmium	Maximum 0.05 mg/L ¹	
	Copper	Maximum 5.0 mg/L ¹	
	Fluoride	Maximum 2.0 mg/L ¹	
	Iron	Maximum 10.0 mg/L ¹	
	Lead	Maximum 5.0 mg/L ¹	
	Manganese	Maximum 10.0 mg/L ¹	
	Molybdenum	Maximum 0.05 mg/L ¹	
	Zinc	Maximum 5.0 mg/L ¹	

¹. Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Volume 3), Primary Industries — Rationale and Background Information (Chapter 9), Irrigation and general water uses, stock drinking water, aquaculture and human consumers of aquatic foods, October 2000.

I6 Mine affected water released pursuant to **I1**, must:

- a) not occur if the soil is saturated; and
- b) use soil moisture meters for irrigation scheduling; and
- c) be carried out based on the estimated irrigation demand (crop water requirement or based on soil moisture deficit plus leaching requirement) or based on soil moisture deficit in the irrigation areas; and

- d) not exceed 50mm hydraulic loading (500kL/ha) per irrigation event; and
- e) not occur if the groundwater level rises to 1 meter from the soil surface; and
- f) not be undertaken within 10m of any natural creek.

17 Mine affected water released pursuant to **11**, must be carried out in a manner such that:

- (a) water is evenly distributed using appropriate irrigation equipment/hardware; and
- (b) vegetation is not damaged; and
- (c) designated irrigation areas are maintained with an appropriate crop in a viable state for transpiration; and
- (d) soil erosion and soil structural damage is avoided; and
- (e) there is no surface ponding or runoff of irrigated mine affected water; and
- (f) add calculated leaching fraction to irrigation to leach down salts from the rootzone; and
- (g) deep percolation to groundwater and subsurface flows of contaminants to surface waters are minimised; and
- (h) Soil salinity (ECse) does not exceed crop's tolerance limit; and
- (i) Soil sodicity (ESP) does not significantly increase from the background; and
- (j) irrigation application does not exceed the irrigation demand; and
- (k) irrigation application rate does not exceed basic infiltration rate of the soil; and
- (l) the capacity of the land to assimilate nitrogen, phosphorous, salts, and moisture is not exceeded; and
- (m) the quality of ground water or surface water is not adversely affected; and
- (n) sodicity in the soil is controlled via appropriate soil amelioration (e.g. gypsum); and
- (o) the build-up of nutrient and heavy metals in the soil and subsoil from irrigated effluent and other sources is controlled.

18 The daily volume of mine affected water released to land must be measured and records kept of the volumes of mine affected water released.

Irrigation Management and Monitoring Program

19 The holder of this environmental authority must develop, implement and maintain an irrigation management and monitoring program (IMMP) to meet the requirements of conditions **19** to **112** and to evaluate the impacts of the release of contaminants to the receiving environment, including but not limited to:

- (a) surface water; and
- (b) groundwater (including but not limited to sub-surface groundwater); and

- (c) soils and sub soils; and
- (d) vegetation and nutrient export.

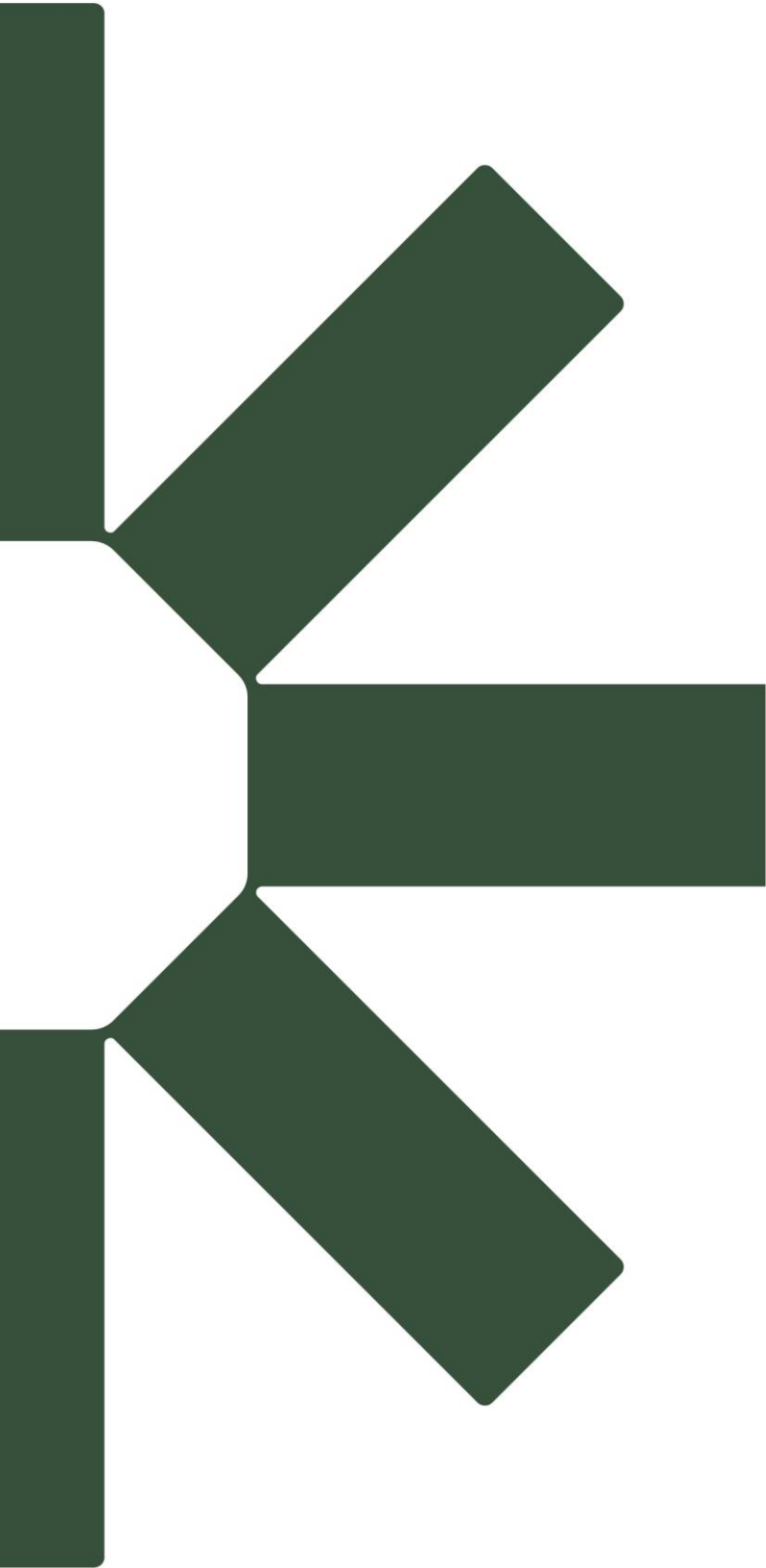
For the purposes of the IMMP, the receiving environment refers to the designated irrigation areas identified as A, B and C in Schedule K Map 4, waters of twelve Mile Creek and connected or surrounding waterways downstream of the mining activity.

- I10** An IMMP required by condition **I9** must be developed in the form specified by the administering authority and at minimum:
- a) address and comply with the latest version of the administering authority's guideline *Disposal of effluent using irrigation Technical guideline* and
 - b) identify and describe all environmental values of the receiving environment; and
 - c) identify, describe and monitor any adverse impacts to groundwater and surface water environmental values, quality, and flows; and
 - d) identify, describe and monitor any adverse impacts to land, soils or sub soil environmental values and quality; and
 - e) assess any short term or long-term condition or state of surface waters, groundwater, land, soils, sub soils, vegetation and nutrient health; and
 - f) assess the receiving environment monitoring results against the relevant water quality guidelines for all indicators to protect all environmental values for the water as declared under an environmental protection policy or regulation; and
 - g) assess the receiving environment monitoring results against the relevant background conditions for all indicators to protect all environmental values for the land as declared under an environmental protection policy or regulation; and
 - h) include an assessment of the potential impacts of the activity and propose appropriate mitigation measures; and
 - i) assess the status of and any change to environmental values health within and immediately surrounding the designated irrigation areas; and
 - j) assess the status of and any change to riparian vegetation health within and immediately surrounding the designated irrigation areas; and
 - k) describe sampling and analysis methods and quality assurance and control in accordance with DES (2018) Monitoring and Sampling Manual.
- I11** An IMMP Report must be prepared annually by 1 August each year and submitted to the administering authority on request.
- I12** The IMMP Report required by condition **I11** must:
- c) be prepared by an appropriately qualified person; and
 - d) outline the findings of the IMMP, including but not limited to:

- i. an assessment of the current and long-term condition or state of environmental values of the receiving environment including soil; and
- ii. maintain soil sustainability and non-pollutive conditions; and
- iii. recommendations for further investigation or actions; and
- iv. recommendations for changes or improvements to the monitoring program; and
- v. potential changes to management of the authorised activity to minimise impacts; and
- vi. all monitoring results; and
- vii. a description of all conclusions formed; and
- viii. recommendations for rehabilitation if necessary; and
- ix. recommendations outlining if supplying irrigation to the designated irrigation areas can sustainably continue.

I13 Water reuse permitted under condition **I1** must not exceed a two-year period, from the commencement date of the first irrigation event.

END OF CONDITIONS FOR SCHEDULE I



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