PROGRESSIVE REHABILITATION AND CLOSURE PLAN



ESMERALDA GRAPHITE PROJECT

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APEM Group

GRAPHINEX

Document Control

Project Name:	**Esmeralda Graphite Project**
Report Title:	Progressive Rehabilitation and Closure Plan
Client:	QLD Aus Graphite Pty Ltd
Project Manager:	Justin Miller
Document ID/Ref.	Progressive Rehabilitation and Closure Plan V0.0
Date of Submission:	22/10/2026
Tenure Nos:	PRCP relates to mining lease application (MLA) tenement numbers 100430 and 100431, which are presently in application under the *Mineral Resources Act 1989* (MR Act).
EA Reference:	Environmental authority for the proposed Project is not presently issued under the *Environmental Protection Act 1994* (EP Act).
EA Holder Name:	Graphinex Pty Ltd
EA Holder Contact Details:	info@graphinex.com.au

Version	Comments	Author	Reviewer	Date
1	Draft issued for client review	AA	SR	29 May 2026
2	Re-issued following department review	AA	SR	22 October 2026

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List of Abbreviations

AEP	Annual Exceedance Probability	MIA	Mine Infrastructure Area
AHD	Australian Height Datum	ML	Mining Lease
AMD	Acid and Metalliferous Drainage	MLA	Mining Lease Application
AQP	Appropriately qualified person	NAF	Not-acid forming
CEC	Cation Exchange Capacity	NAPP	Net acid producing potential
CoC	Contaminants of concern	NMD	Neutral mine drainage
DETSI	Department of the Environment, Tourism, Science and Innovation	NORM	Naturally occurring radioactive materials
DGV	Default guideline value	NQLC	Northern Queensland Land Council
DLGWV	Department of Local Government, Water and Volunteers	NUMA	Non-use management area
DNRME	Department of Natural Resources, Mines and Energy	PAF	Potentially Acid Forming
EA	Environmental authority	PFC	Projective foliage cover
ECEC	Effective Cation Exchange Capacity	PMLU	Post-mining land use
EC	Electrical conductivity	PRCP	Progressive Rehabilitation and Closure Plan
EIS	Environmental impact statement	PWD	Process Water Dam
ERA	Environmentally relevant activities	RA	Rehabilitation Area
ESA	Erosion stability assessment	RE	Regional ecosystems
EV	Environmental Values	REMP	Receiving environmental monitoring program
FoS	Factor of Safety	RM	Rehabilitation milestones
FVC	Fractional vegetation cover	ROM	Run-of-mine
GAB	Great Artesian Basin	SLSA	Soils and Land Suitability Assessment
GDE	Groundwater dependant ecosystems	SPC	Soil Profile Classes
GRDP	Gulf Regional Development Plan	SQP	Suitably qualified person
GRF	Gilbert River Formation	SSMP	Soil stripping and management plan
GRPAC	Gulf Regional Planning Advisory Committee	TSF	Tailings storage facilities
HDPE	High density polyethylene	WEPP	Water Erosion Prediction Project
HMTV	Hardness modified trigger values	WMP	Water Management Plan
MAW	Mine affected water	WoNS	Weeds of National Significance
MIA	Mine Infrastructure Area	WQO	Water quality objectives
ML	Mining Lease	WRD	Waste rock dumps

1 Introduction

AARC Environmental Solutions Pty Ltd (AARC) has been commissioned by QLD Aus Graphite Pty Ltd (Graphinex) to develop a Progressive Rehabilitation and Closure Plan (PRCP) for the Esmeralda Graphite Project (the Project) in accordance with the requirements of the Environmental Protection Act 1994 (EP Act).

The proposed Project is located approximately 70 km south Croydon, Queensland, Australia. An overview of the Project's regional location has been provided in Figure 1. The Project seeks to develop a greenfield, open cut mine to extract and process graphite ore over an operational life of 53 years with a maximum disturbance footprint of approximately 2,413.7 ha.

This PRCP outlines the proposed post-mining land use (PMLU) for the Project as well as the rehabilitation methods that will occur progressively over the life-of-mine to achieve an environmentally sound land use outcome. This document represents Graphinex's objective to provide a rehabilitation strategy that benefits both environmental and public interest.

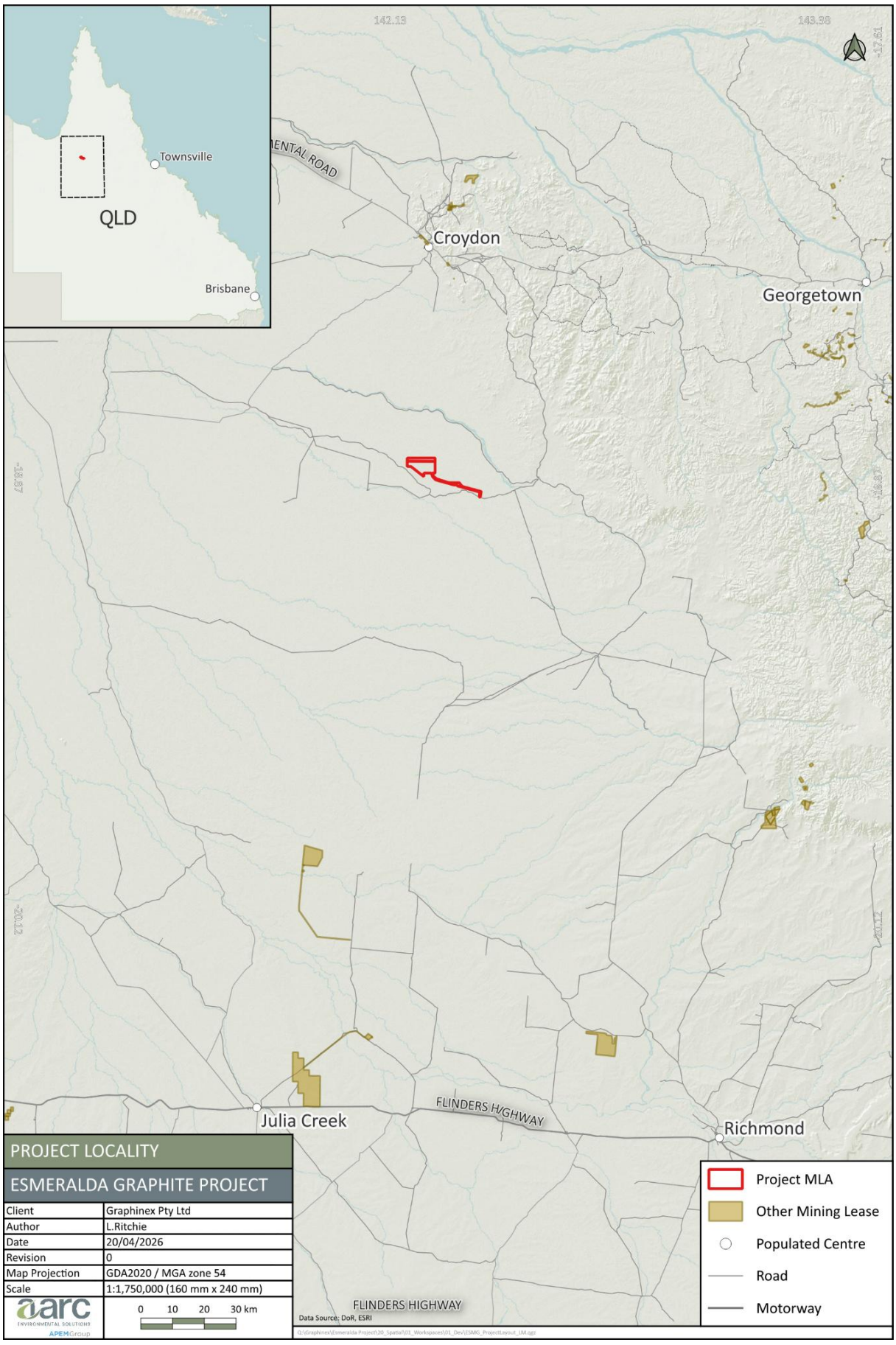


Figure 1: Project locality

2 Scope and objectives

The purpose of this PRCP is to describe the progressive rehabilitation that will be carried out during and after the Project's operational life. The PRCP has been developed in accordance with the requirements of the *Progressive Rehabilitation and Closure Plan Guideline* (PRCP Guideline, DETSI 2026). The PRCP Guideline states that the PRCP must include a rehabilitation planning part and a rehabilitation schedule which are described as follows:

Rehabilitation Planning part:

The purpose of the rehabilitation planning part of the PRCP is to support and justify the development of the proposed PRCP schedule. This part must detail how progressive rehabilitation and closure will be carried out over the entire Project site and on both a rehabilitation area basis and improvement area basis. The key components of the rehabilitation planning part for the Project are:

- community consultation information (refer section 3.2);
- post-mining land uses (PMLUs) (refer section 3.3);
- rehabilitation and management methodology (refer section 3.5);
- risk assessment (refer section 3.6); and
- a monitoring and maintenance program (refer section 3.7).

Rehabilitation Schedule part:

The rehabilitation schedule is a required element of a PRCP. Once approved, the schedule becomes a legally binding and enforceable instrument with which the Project must comply. The schedule must include:

- nomination of either a PMLU or non-use management area (NUMA) for all land within the relevant resource tenures, including land uses for undisturbed land;
- identification of when land becomes available for rehabilitation or improvement;
- rehabilitation or management milestones to achieve the PMLU or NUMA outcomes;
- milestone criteria that demonstrate when each milestone has been completed;
- completion dates for each milestone to be achieved;
- any conditions considered necessary or desirable; and
- a final site design.

Once the PRCP schedule is approved, this document will comprise the rehabilitation planning part.

3 Rehabilitation planning part

3.1 Project planning

3.1.1 Project description

The Project is located approximately 70 km south of Croydon, and approximately 480 km west of Townsville in northwest Queensland, in the Northwest Minerals Province. The Project consists of two MLAs, MLA 100430 (905.7 ha), and MLA 100431 (3,538.8 ha).

The Project will mine the Esmeralda Granite Unit and process the graphite ore on-site. The proposed life-of-mine is approximately 65 years, including construction (Years -2 and -1), operation (Years 1–53), and rehabilitation (Years 54-63).

The Project is estimated to extract a total of 170 Mt of graphite ore over the operational life of the Project. The Project will tap into Queensland's rich natural resources to extract key minerals to support the global shift in decarbonising energy production. There has been a recent global increase in demand for critical minerals such as graphite. The Project object is to develop graphite, to be primarily used as battery anode material.

The Project is a greenfield open cut mining operation that will mine up to 3.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) ore. Ore will be mined to an approximate maximum depth of 250 m below ground level. Extracted ROM ore will be hauled to the mineral processing plant for stockpiling and processing via conventional floatation methods. Graphite concentrate from the processing plant will be transported via truck to a separate facility near Townsville for further refinement and/or distribution to local and overseas market.

3.1.1.1 Project activities

Associated mining activities for the Project that would otherwise form environmentally relevant activities (ERAs) or notifiable activities under the EP Act are provided in Table 1 and Table 2.

It is expected that the activities outlined will be undertaken for all of the Project operations phase (year 1–53) at a minimum. Activities may also be undertaken for all or part of the construction (year -1 and -2) and rehabilitation phases (years 54–63). This includes, but is not limited to:

- electricity generation;
- sewage treatment;
- chemical storage;
- waste storage and disposal; and
- mineral processing, crushing, screening.

Table 1: Prescribed ERAs for the Project

Environmentally Relevant Activity	Description
Schedule 2 of the EP Regulation	
8(3)(1)(c) Chemical storage	Chemical storage (the relevant activity) consists of storing more than 500 m^3 of class C1 or C2 combustible liquids under AS1940 or dangerous goods class 3.
14(3)(2)(a) Electricity generation	Generating electricity by using a fuel, other than gas, at a rated capacity of 10 MW electrical to 150 MW electrical.
31(2)(a) Mineral processing	Processing, in a year, the following quantities of mineral products, other than coke (a) 1,000 t to 100,000 t.
33(1) Crushing, milling, grinding or screening	Crushing, milling, grinding or screening (the relevant activity) consists of crushing, grinding, milling or screening more than 5,000 t of material in a year.
60(1)(a) Waste disposal	Operating a facility for disposing of waste: (d) more than 200,000 t in a year.
63(3)(1)(b)(i) Sewage Treatment	Operating a sewage treatment works at a site that has a total daily peak design capacity of more than 100 but not more than 1,500 equivalent persons.
Schedule 3 of the EP Regulation	
21 A mining activity	A mining activity that is an ineligible ERA, other than a mining activity mentioned in items 9 to 20

Table 2: Notifiable activities for the Project

Notifiable activity	Notifiable activity description
Schedule 3 of the EP Act	
7 Chemical Storage	Storing more than 10 t of chemicals (other than compressed or liquefied gases) that are dangerous goods under the dangerous goods code.
24 Mine wastes	a) Storing hazardous mine or exploration wastes, including, for example, tailing dams, waste rock or waste rock dumps containing hazardous contaminants; or b) Exploring for, or mining or processing, minerals in a way that exposes faces, or releases groundwater, containing hazardous contaminants.
29 Petroleum product or oil storage	Storing petroleum products or oil: c) In above ground tanks with: a. for petroleum products or oil in class 3 in packaging groups 1 and 2 of the dangerous goods code – more than 2,500 L capacity; or b. for petroleum products or oil in class 3 in packaging groups 3 of the dangerous goods code – more than 5,000 L capacity; or c. for petroleum products that are combustible liquids in class C1 or C2 in Australian Standard AS 1940, 'The storage and handling of flammable and combustible liquids' published by Standards Australia – more than 25,000 L capacity.
37 Waste storage, treatment or disposal	Storing, treating, reprocessing or disposing regulated waste including operating a sewage treatment facility with on-site disposal facilities.

3.1.1.2 Mining tenements

The Project consists of two Mining Lease Applications (MLAs), MLAs 100430 (905.7 ha) and 100431 (3,538.8 ha). The Project MLAs overlay Exploration Permits, Mineral (EPMs) 28274, 25210, 27818 and 27195 held by the Proponent. One unnamed road parcel (ID: QLDRXXR1419861418755142600) underlies EPM 28274, however, is not intersected by the proposed Project MLAs.

The neighbouring and overlapping resource and exploration tenures of the Project are detailed in Table 3. The resource tenements associated with the Project include:

- MLA 100430; approximately 905.7 ha, contains the disturbance associated with the proposed water diversion and levee.
- MLA 100431; approximately, 3,538.8 ha, contains the disturbance associated with the Mine Infrastructure Area (MIA), process plant, process water dams, ROM stockpile, sediment dam, solar farm, tailings storage facilities (TSFs), camp, and road access from Esmeralda Prospect Road.

Table 3: Resource tenements associated with the Project

Tenure number	Tenure type	Name	Holder	Grant Date	Expiry Date
Mining tenements					
MLA 100430	Mining Lease Application		QLD Aus Graphite Pty Ltd	-	-
MLA 100431	Mining Lease Application		QLD Aus Graphite Pty Ltd	-	-
Underlying resource exploration tenements					
EPM 28274	Exploration Permit Minerals	Esmeralda	QLD Aus Graphite Pty Ltd	21 November 2023	20 November 2028
EPM 25210	Exploration Permit Minerals	Empress Springs 3	QLD Aus Graphite Pty Ltd	8 April 2014	7 April 2029
EPM 27818	Exploration Permit Minerals	Prospect	QLD Aus Graphite Pty Ltd	30 August 2021	29 August 2026
EPM 27195	Exploration Permit Minerals	Croydon 6	QLD Aus Graphite Pty Ltd	21 January 2020	20 January 2030
Adjoining resource exploration tenements					
EPM 28276	Exploration Permit Minerals	Warrigal Creek	QLD Aus Graphite Pty Ltd	24 February 2025	23 February 2030
EPM 28306	Exploration Permit Minerals	Clara River	Clara Resources Pty Ltd	9 May 2023	8 May 2026
EPM 28309	Exploration Permit Minerals	Prospect Road	Clara Resources Pty Ltd	12 May 2023	11 May 2026

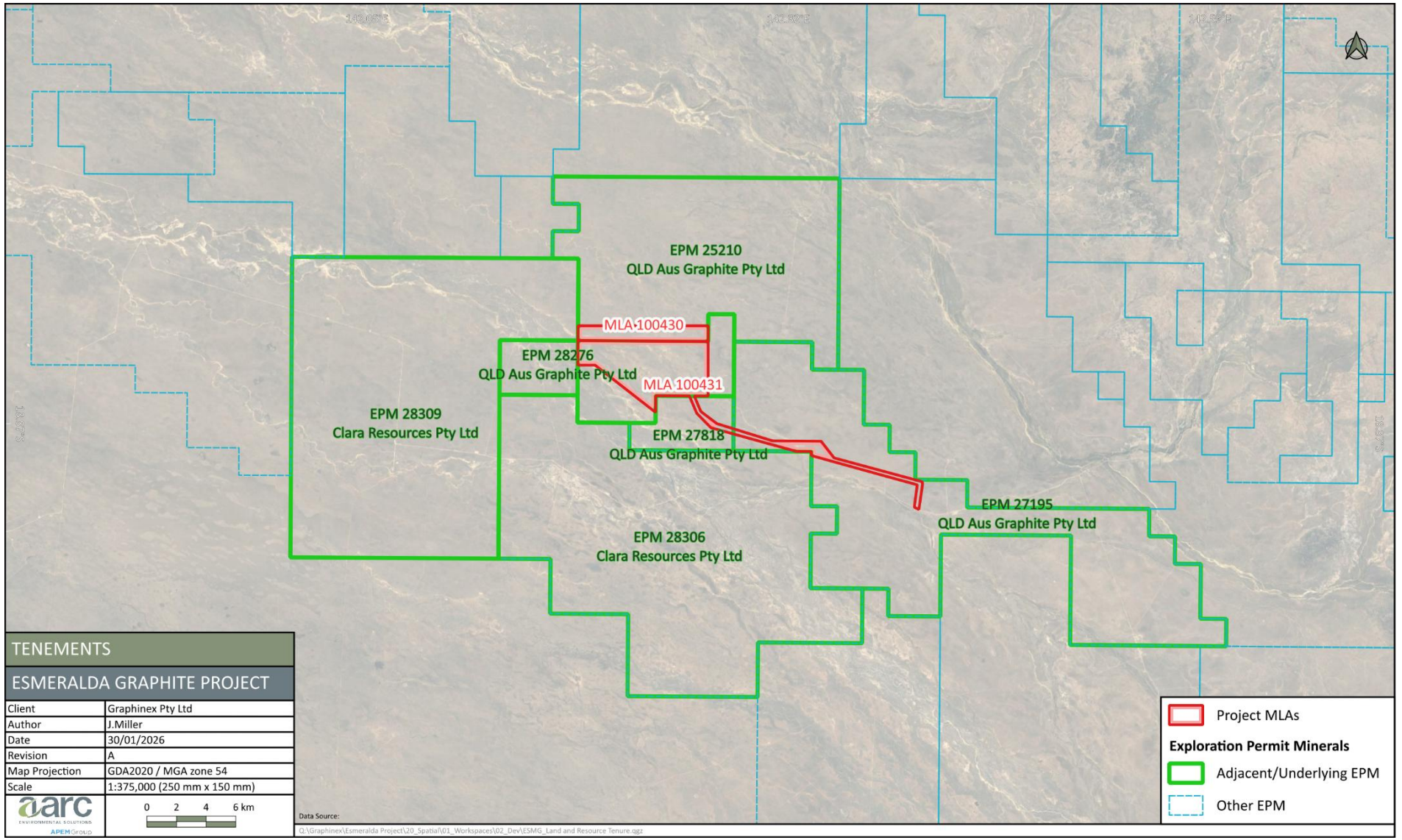


Figure 2: Underlying and adjoining resource tenure

3.1.1.3 Project operations and site layout

It is anticipated that construction activities associated with the Project will commence within 12 months of approvals being obtained. The construction phase, identified nominally as Project 'Year -2' and 'Year -1', is expected to occur across a period of approximately 2 years. Mineral production will commence in 'Year 1' and be sustained for approximately 53 years. The progression of mining operations over the 53 year mine life is depicted in 10-year stages in Figure 3 to Figure 9 with the key stages summarised in Table 4.

Rehabilitation will occur progressively, with areas of waste rock dumps and tailings cells becoming available for rehabilitation late in the Project life. Following the cessation of operations, a period of 10 years is anticipated for the removal and rehabilitation of non-retained infrastructure and rehabilitated landforms.

Table 4: Project phase timeframes

Approximate timeframe	Project phase
Year -2 to Year -1	Construction Project site works commence and is expected to occur over a period of approximately 2 years. This includes pre-strip, growth media stockpiling, development of on-site accommodation, MIA and mine access road, and waste/overburden removal.
Year 1	Operation Mining production commences; • 100 ktpa production output from processing plant • Low grade or unused ROM ore stockpiled for later use • First tailings storage facility constructed
Year 3	• Ramping up to full production of 3.5 Mtpa plant feed • Doubling of the processing plant capacity, from 100 ktpa to 200 ktpa
Year 12	• Second tailings storage facility constructed
Year 18	• Third tailings storage facility constructed
Year 28	• Fourth tailings storage facility constructed
Year 35	• All in-pit waste and ore exhausted • low grade stockpile is reclaimed to feed plant between years 36 and 48
	• In-pit waste backfill commences on small scale
	• Ex-pit tailings will be progressively reclaimed to fill the pit void
Year 46	• In-pit waste backfill ramped up as available void space increases
Year 48	• In situ mining operations progressively cease. Processing plant operations and other activities continue, associated with use of any remaining stockpile and rehabilitation
Year 54–Year 63	Decommissioning and rehabilitation • decommissioning and removal of infrastructure, final rehabilitation and ongoing environmental monitoring.

Mining operations will be conducted using conventional surface mining equipment, including excavator, trucks, dozes, drill rig, and grader. The Project proposes mining to a depth of approximately 250 m below ground level. Extracted ROM ore will be loaded into haul trucks for transport to the mineral processing plant for stockpiling and processing via conventional floatation methods.

A summary of the mining sequence planned is as follows:

1) progressive clearing of vegetation;

2) the stripping and stockpiling of topsoil and subsoil for reuse in rehabilitation of mine landforms, in accordance with the Project's PRCP;

3) the removal of overburden to the site waste rock dumps (WRDs) to support initial infrastructure development, or for use in rehabilitation as infill in the mine void behind the advancing mining face;

4) the extraction of ore, trucked to a ROM pad adjacent to the mineral processing plant to sustain on-site processing of graphite concentrate;

5) the extraction and stockpiling of medium grade ore, for processing later in the mine life while backfilling of the void occurs; and

6) backfilling of the void with tailings and waste rock to surface level, removing the final void from the post-mining landform.

The proposed open cut mining operation will mine approximately 170 Mt graphite ore at a rate of up to 3.5 Mtpa.

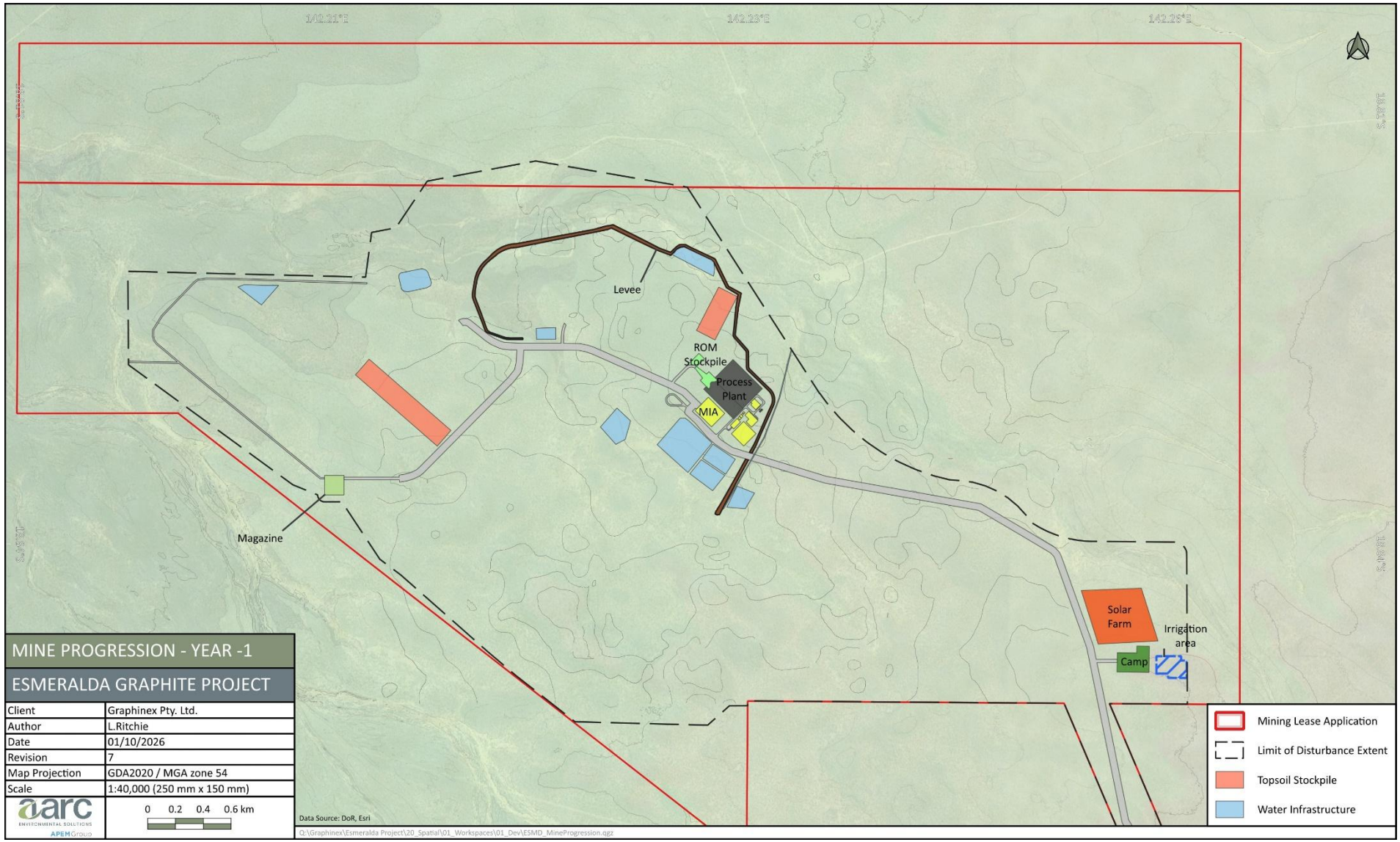


Figure 3: Mine Progression Year 1

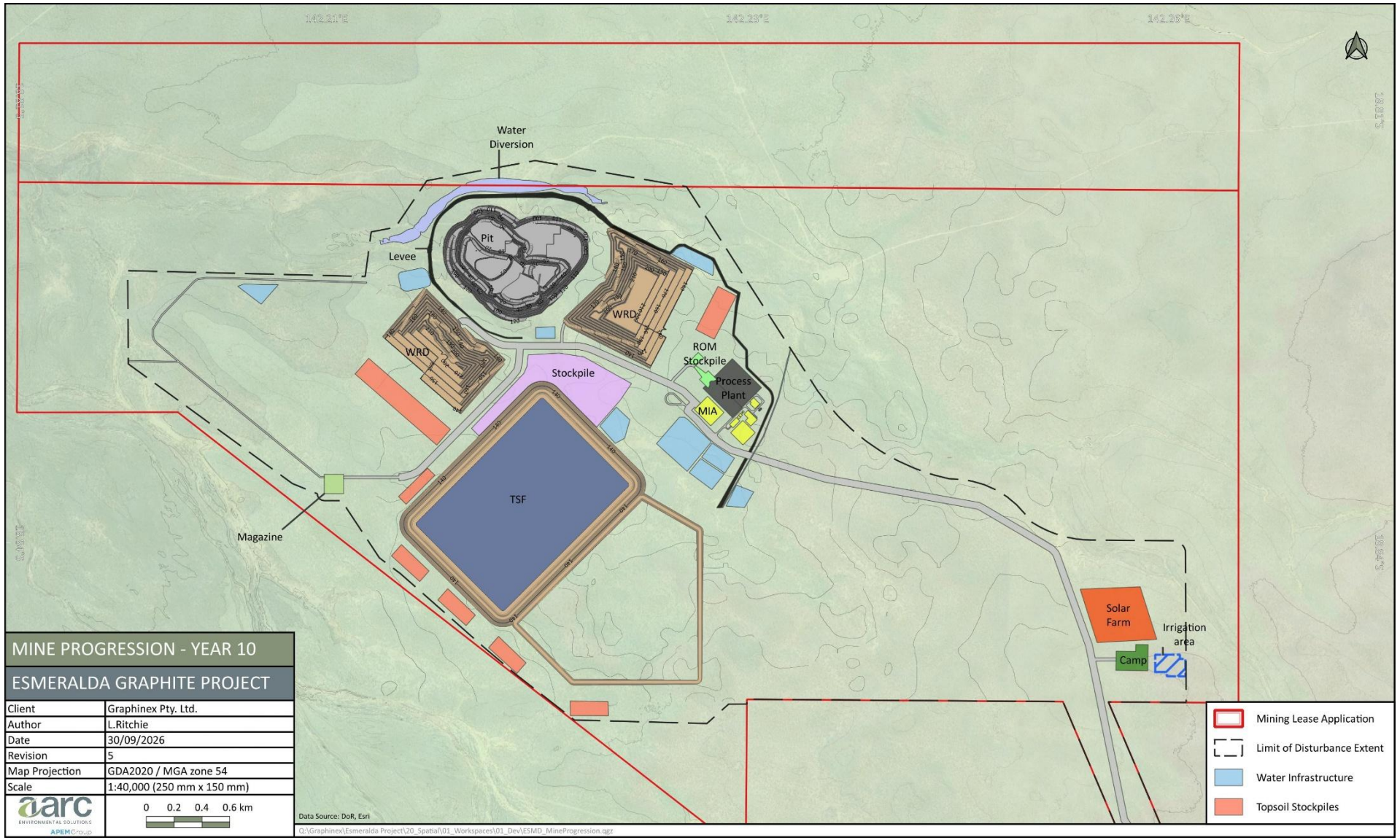


Figure 4: Mine Progression Year 10

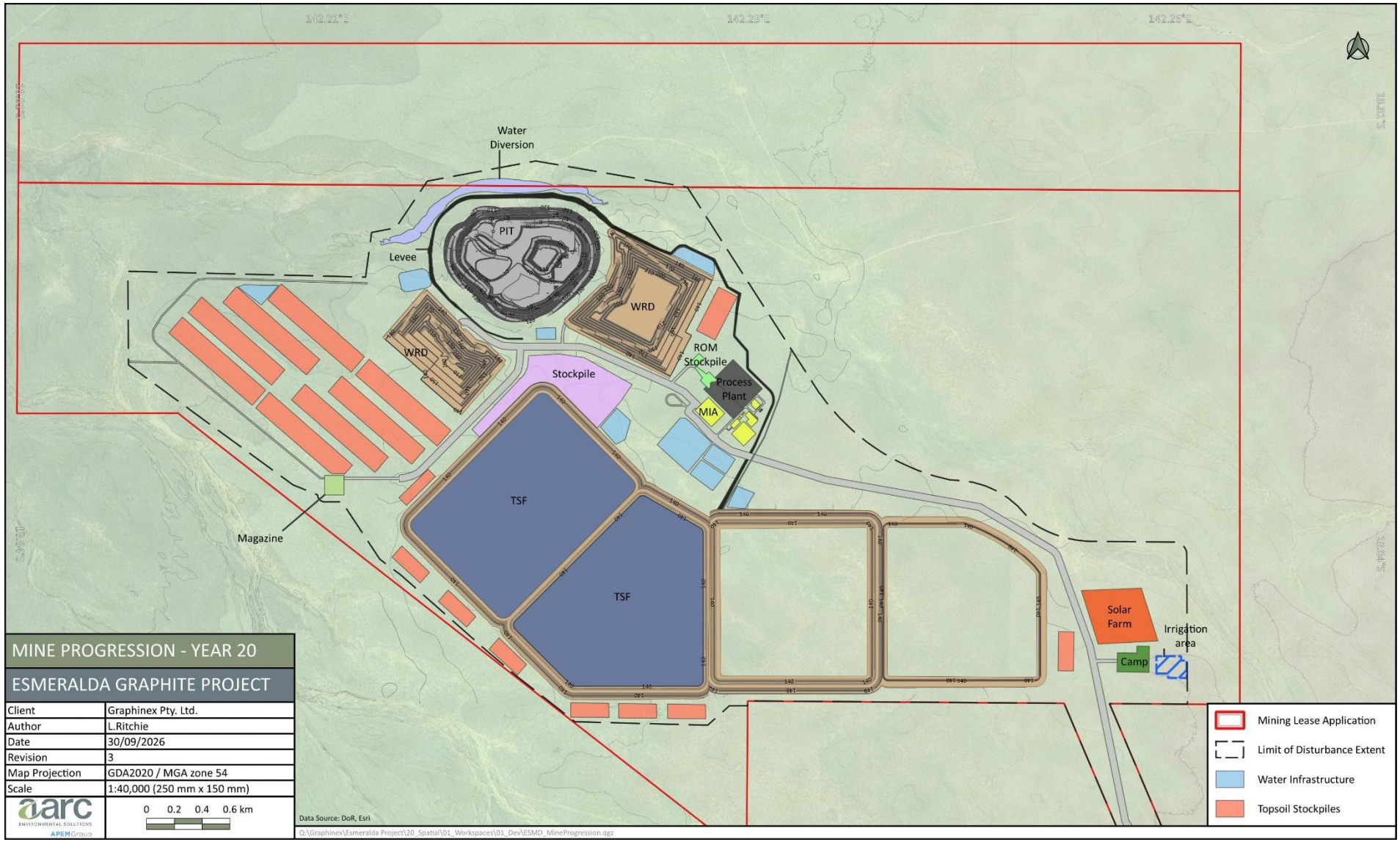


Figure 5: Mine Progression Year 20

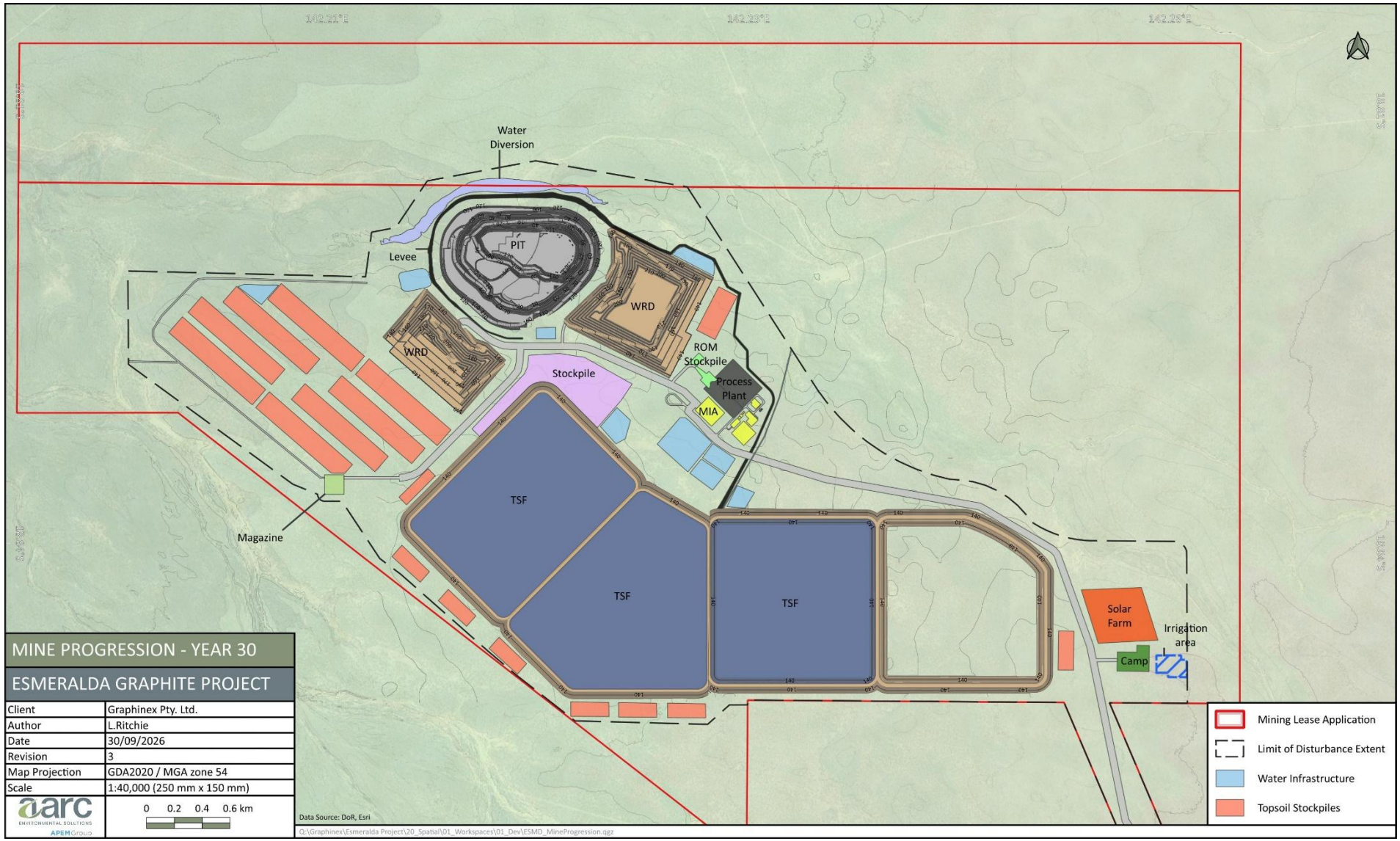


Figure 6: Mine Progression Year 30

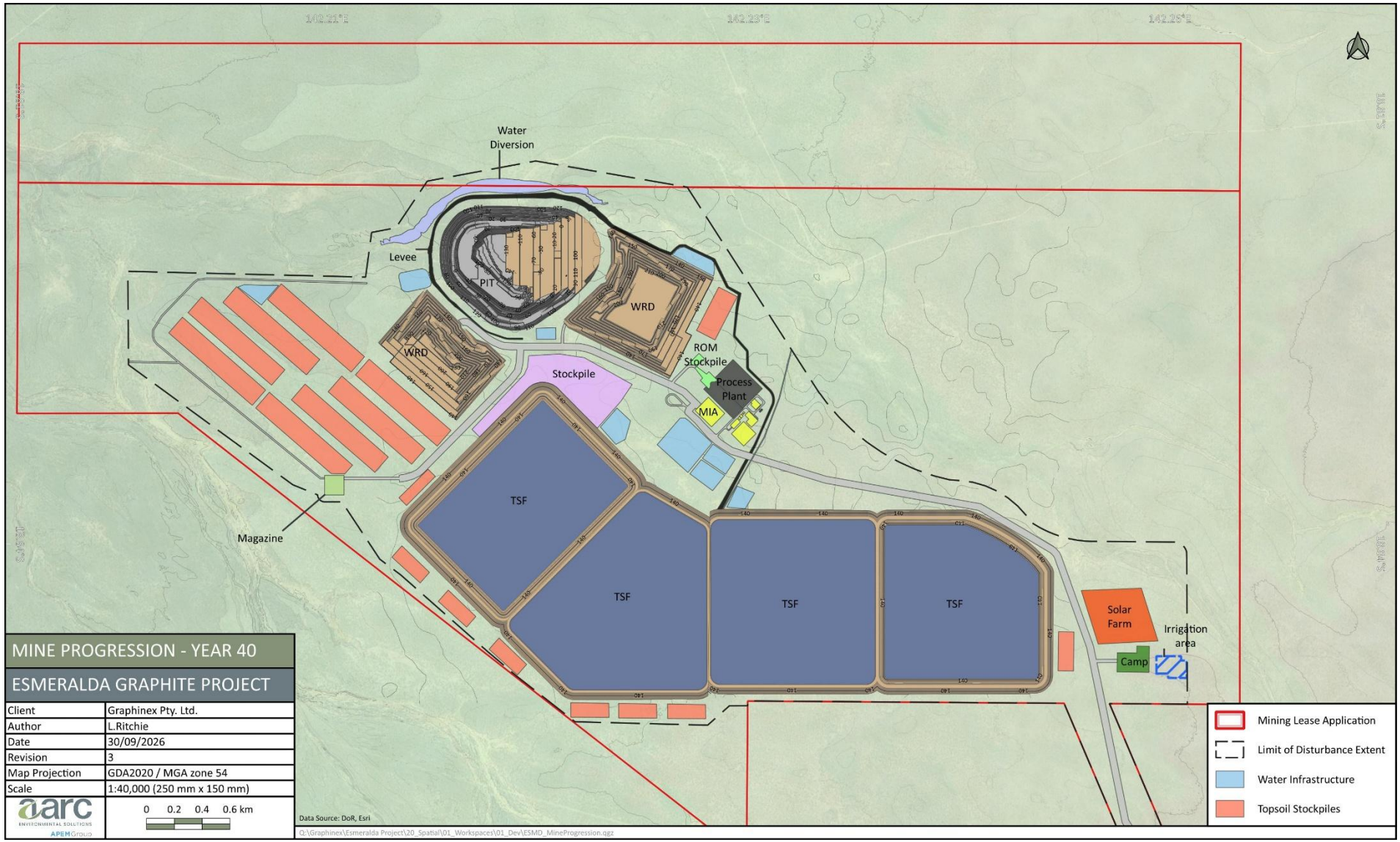


Figure 7: Mine Progression Year 40

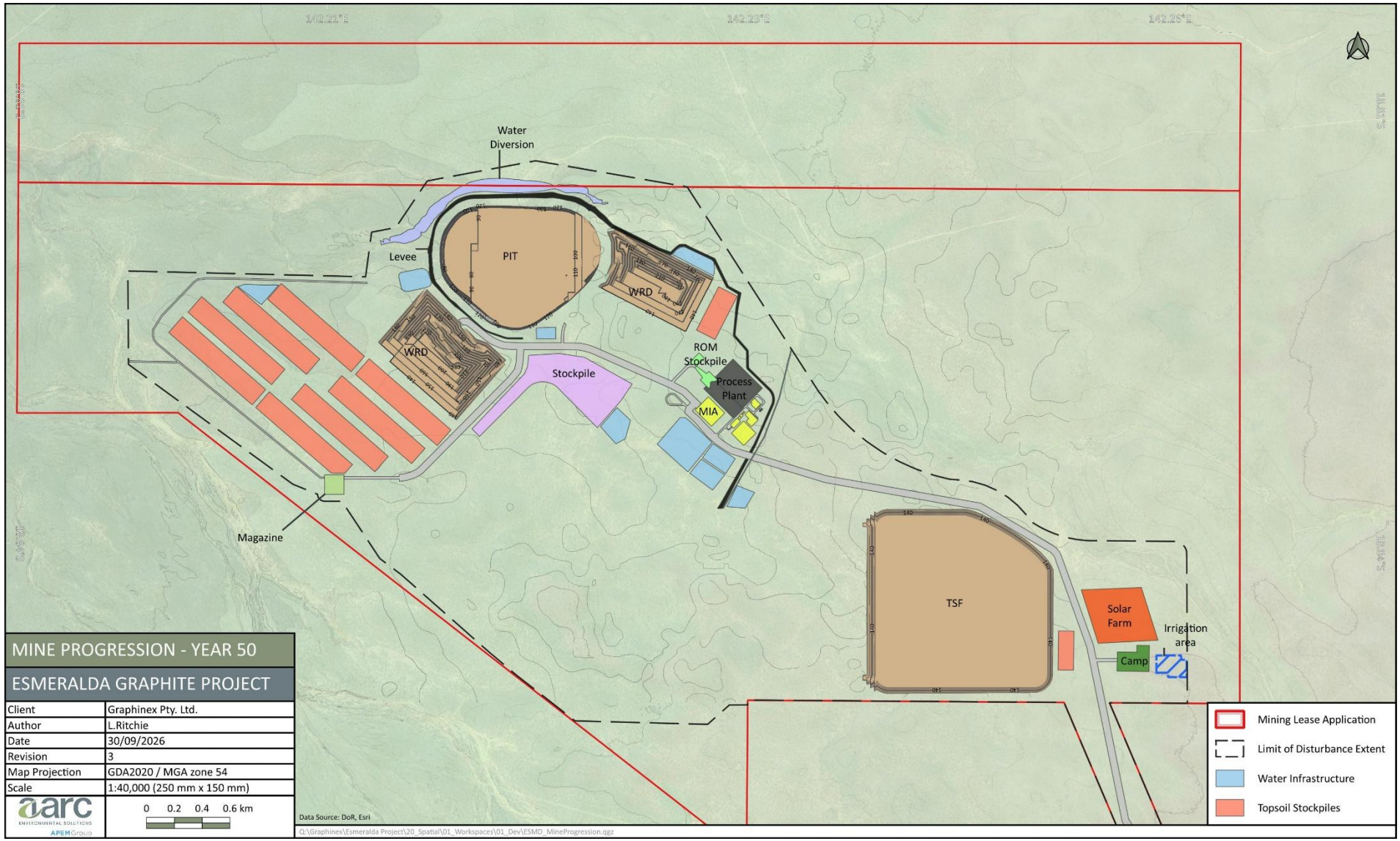


Figure 8: Mine Progression Year 50

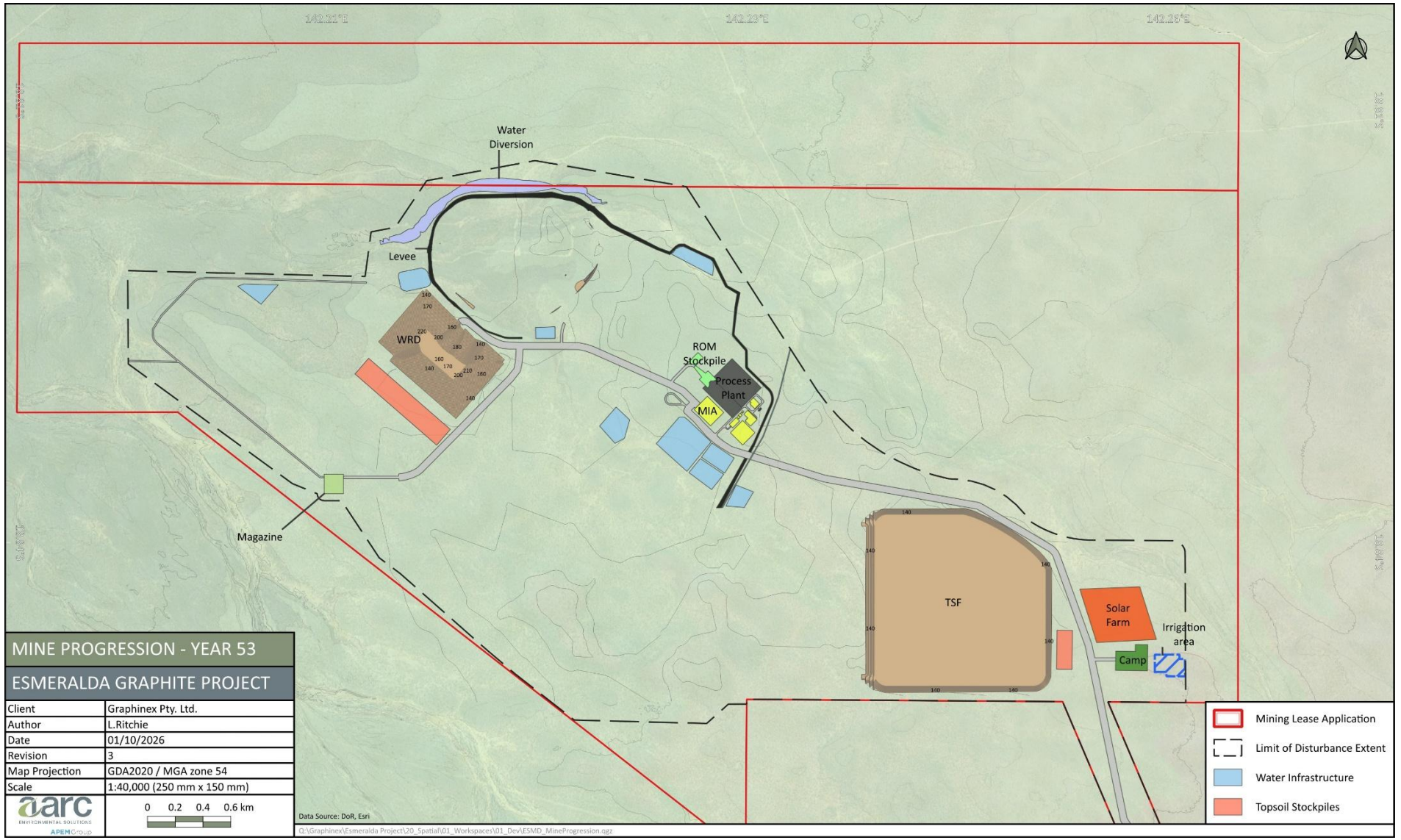


Figure 9: Mine Progression Year 53

3.1.2 Climate

The regional climate is described as sub-tropical wet season dominated rainfall and mild, dry winter months. Rainfall is highly seasonal and is typically associated with monsoonal, thunderstorm and cyclone weather patterns. Long-term climate data (1960 to 2026) was retrieved from Queensland Government SILO LongPaddock (Queensland Government 2026) for -18.85°S, 142.25°E (Figure 10).

Rainfall records indicate annual rainfall is approximately 673 mm/year. Most rainfall occurs during the wet season (December to March), with dry conditions prevailing for most of the year. The mean annual evaporation in the Project area is approximately 2,627 mm, about four times higher than the average rainfall.

The mean monthly maximum temperature is highest in December (37.9°C, with the highest recorded temperature of 44.3°C) and lowest in July (28.7°C). The mean monthly minimum temperature is highest in December (24.5°C) and lowest in July (12.7°C), with the lowest temperature of around 2°C registered in 1983 and 2024.

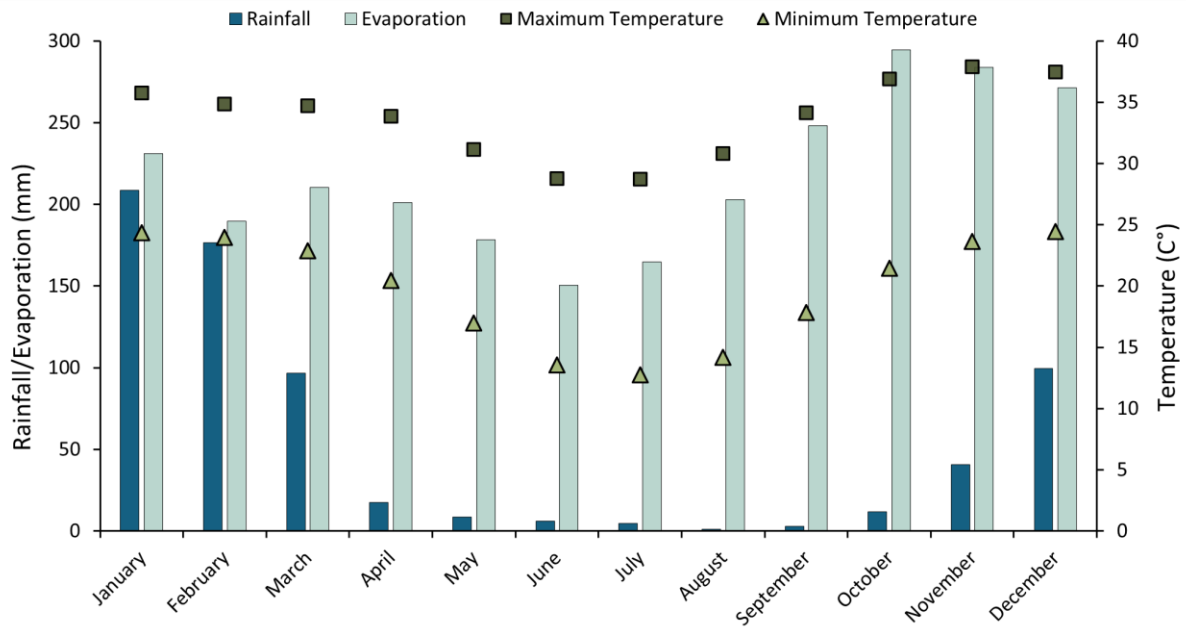


Figure 10: Project area climate data

3.1.3 Geological setting

The entire Project lies within the Cainozoic and Mesozoic cover sequences. These Cainozoic sediments are underlain by the Mesozoic sediments of the Carpentaria Basin consisting of sandstone, siltstones, and shales of the Gilbert River Formation.

A major unconformity exists between the Mesozoic sediments and Proterozoic basement. The Carpentaria basin is comprised of Early Cretaceous to Middle Jurassic age, fluvial to shallow marine dominated sediments. The basement is currently mapped as “unknown basement” and is interpreted to be the Esmeralda Supersuite granites.

Previous drilling in the area suggests that the cover sequence consists of flat laying laminated and cross bedded siltstone, claystone and coarse sandstones. Logging of drill core has stated these sediments had alternating porous and non-porous horizons and differing strengths. According to historic drill holes, this sequence is approximately 50–70 m thick across the Project area.

The targeted resource is hosted within the Proterozoic Esmeralda Supersuite granites and volcanics with low to strongly magnetic domains (Graphinex 2024). The Esmeralda Granite consists of grey, massive, coarse-grained biotite granite with scarce pegmatitic pods and lenses, and rare xenoliths of graphite and graphitic metasediments (RGS 2026).

A number of faults are mapped in the geological model at a regional scale in proximity to the Croydon township and historic goldmines; however, no regional faulting is interpreted within the Project area, and no faulting with significant displacement has been observed. Exploration drilling has identified a number of local scale joints and fractures, with associated observations of slickensides and clay gouge. These joints and fractures have been identified in drill core samples and are associated with local scale deformation with minimal displacement. These localised joints and fractures are discontinuous and cannot be traced between nearby drillholes. The presence of these joints and fractures is likely to locally influence hydraulic conductivity and storage properties of the basement rocks, however, as these features are discontinuous, they are not expected to influence groundwater conditions at a larger (pit) scale.

The stratigraphic sequence across the Project area is summarised in Table 5 and shown in Figure 11 and Figure 12.

Table 5: Stratigraphic sequence at Project site (RGS 2026)

Material Type	Unit	Age	Lithology
Soil		Quaternary	Sand, gravel, silt, and mud - alluvial and channel deposits
		Tertiary Quaternary	Residual and alluvial sands, gravels, silt, and soil
		Tertiary Quaternary	Ferricrete, alluvium, and colluvium
Overburden	Wallumbilla Formation	Cretaceous	Sandstone and mudstone
	Gilbert River Formation	Jurassic Cretaceous	Dominantly sandstones, lesser finer clastics
	Eulo Queen Group	Jurassic	Sandstones, siltstones, and minor conglomerates
		Permian	Rhyolites, local andesites, and granodiorites
Orebody	Inorunie Group	Mid to Late Proterozoic	Dominantly sandstones and orthoquartzites, minor siltstones and mudstones
	Esmeralda Granite (& minor granites)	Middle Proterozoic	Dominantly biotite granites, some with muscovite and/or garnet
	Croydon Volcanic Group	Middle Proterozoic	Dominantly rhyolites and dacites, minor sediments and andesites
	Forest Home Trondhjemite	Middle Proterozoic	Biotite trondhjemite
	Langlovale Group	Middle Proterozoic	Sandstone overlain by finer clastics
	Etheridge Group	Middle Proterozoic	Dominantly fine clastics including carbonaceous shales

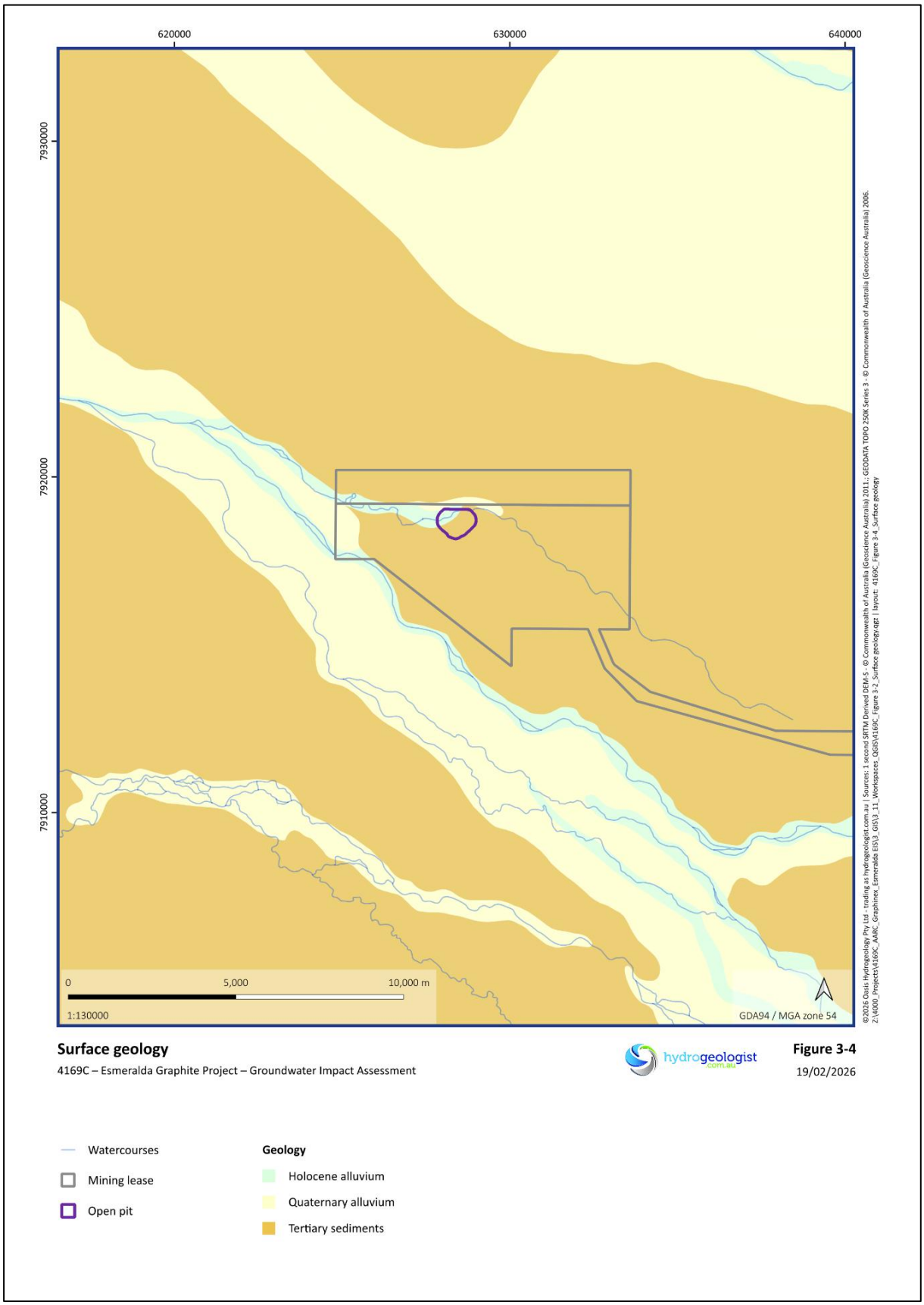


Figure 11: Surface geology

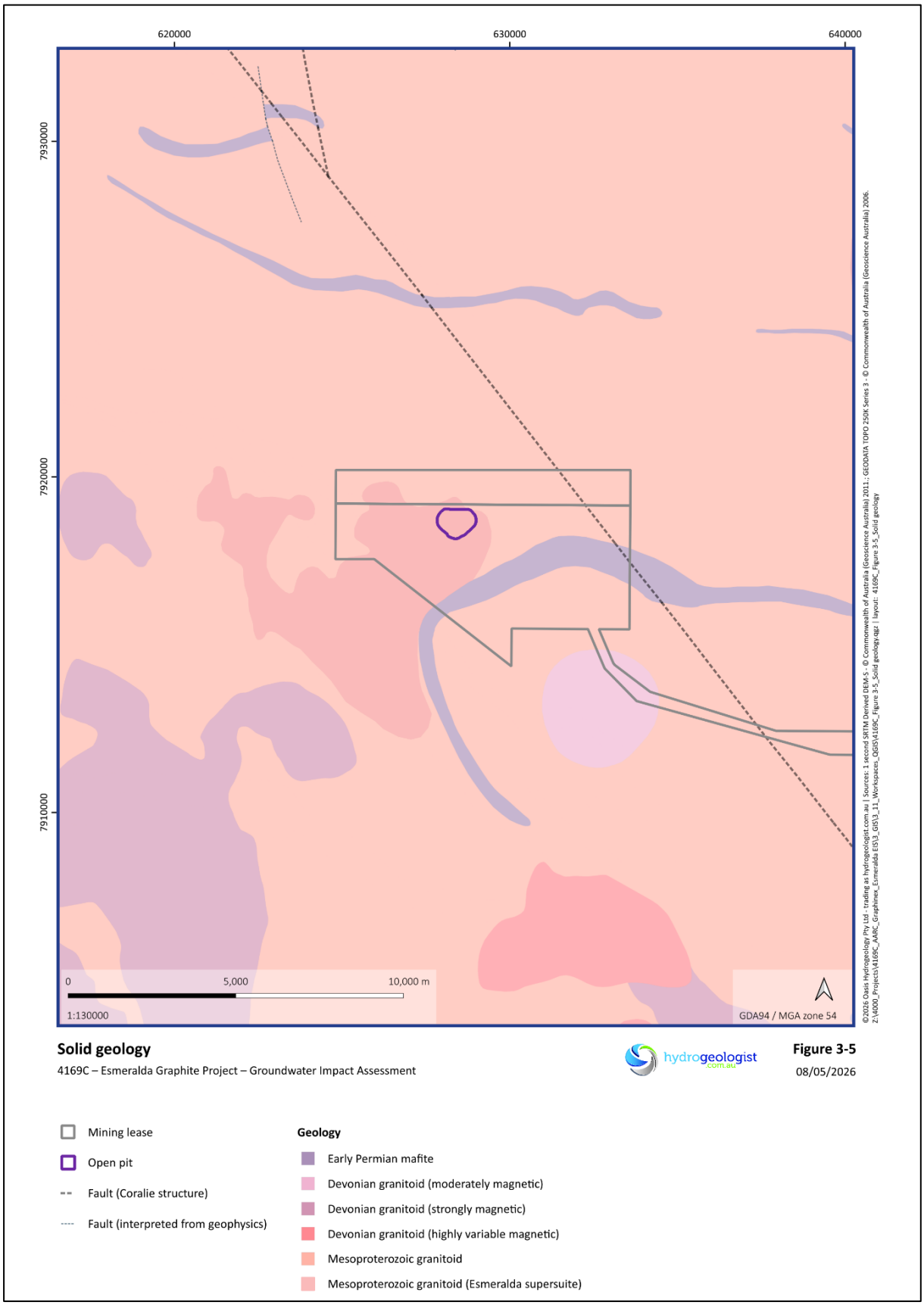


Figure 12: Solid geology

3.1.4 Topography

The Project is located immediately north of Warrigal Creek and the Borer River. Topography surrounding the Project area is very flat with which results in widespread flooding with interactions between the major waterways during significant rainfall events.

Topography within the Project area is flat to gently undulating, with elevations ranging between 120 m and 140 m Australian Height Datum (AHD). The Project area is traversed by unnamed tributaries of the Warrigal Creek draining generally from south-east to north-west through the site. The Project topography and waterways are shown in Figure 13.

3.1.5 Surface hydrology

The Project is located in northern Queensland within the Norman River Catchment area, which drains north to the Gulf of Carpentaria. The Norman River Basin has a total catchment of 49,000 km^2 with the main rivers being the Norman River, Clara River and Yappar River (Engeny 2026a).

The Project is situated between the Clara and Yappar Rivers, approximately 7 km north of the Clara River and 8 km south-west of the Yappar River, at its closest point.

The Warrigal Creek, a 5th order stream that converges with the Clara River, is situated to the south of the Project. The Warrigal Creek originates approximately 50 km south-east of the transport corridor MLA boundary, flowing north-west before converging with the Borer River and flowing into the Clara River, approximately 45 km north-west of the MLA boundary. Periods of flow in the Warrigal Creek and its tributaries are restricted to the wet season events between the months of December and late March.

As part of initial construction and site development up until approximately year 3 of operations, an interim flood protection levee would be developed around the pit and central mine infrastructure area. The flood protection levee is proposed to protect operational areas, including the pit and central mine infrastructure area, from flood ingress. It would wrap around the northern and eastern extents of the project to provide 0.1% AEP flood immunity. After year 3, the mining pit would intercept the location of the levee, and a stream order 3 waterway unnamed tributary, which is considered a watercourse under the *Water Act 2000* (Qld). To maintain a hydrologic connection between the unnamed tributary and Warrigal Creek, as well prevent inundation of the proposed mining pit, a 1.8 km long permanent watercourse diversion is proposed. The diversion would intercept the existing waterway, east of the pit and divert it around the pit's northern extent to tie back into the original waterway. The levee would be extended around this pit extent, and remain in this location until it is removed as part of site rehabilitation and closure.

The levee may extend to the south into the planned footprint of TSF 3, which will not be developed until later in the Project life. At the time of development of this TSF, the overlapping footprint extent of the levee will be removed and allow for the full construction of the TSF. The northern boundary of TSF 3 will subsequently adjoin the levee.

The unnamed stream order 3 waterway flows in an east–west direction and has a moderate size catchment (115 km^2), however, receives significant breakout flood flows from Warrigal Creek, the Borer River and the Yappar River during extreme flood events. The waterways of the study area are shown in Figure 14.

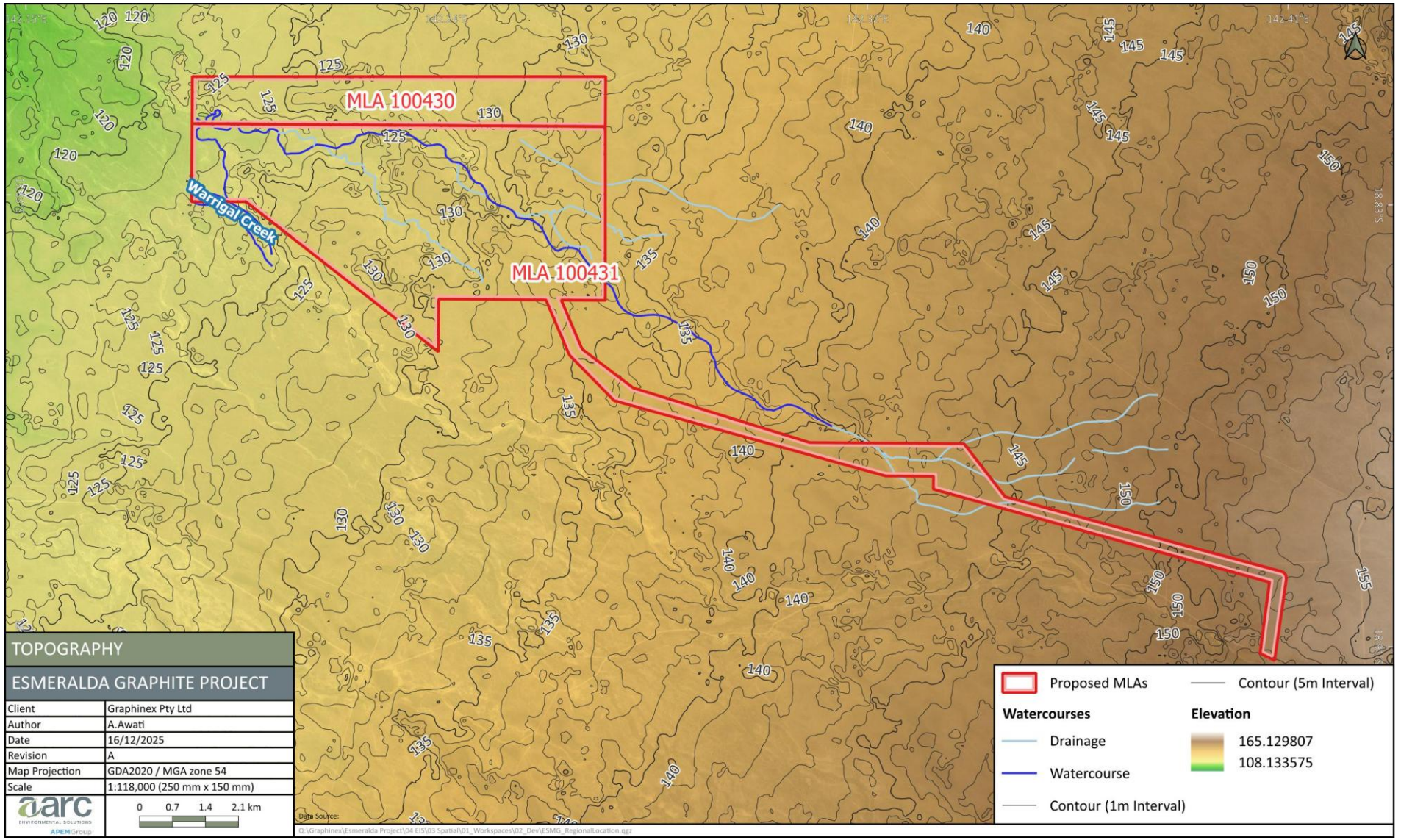


Figure 13: Local topography

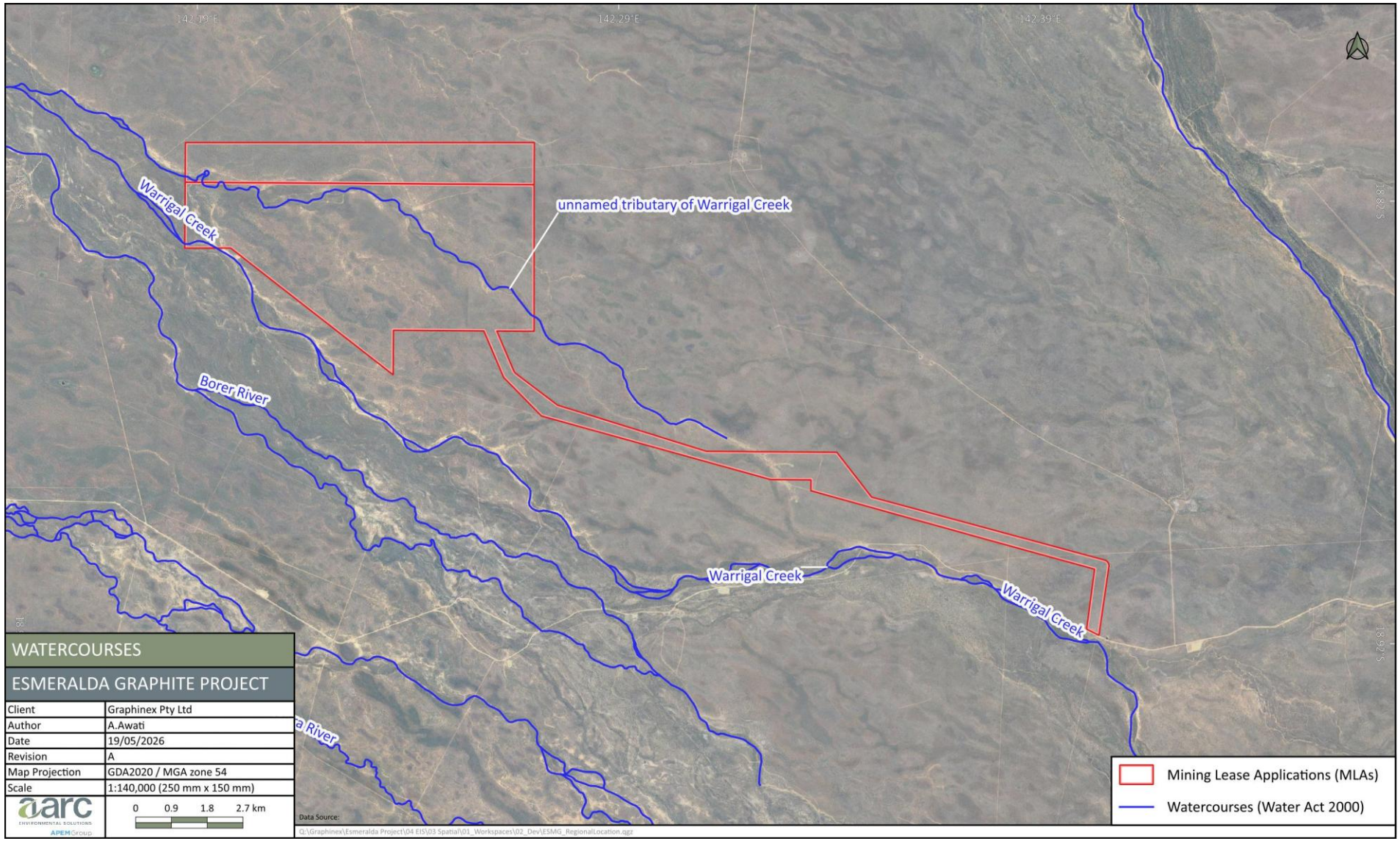


Figure 14: Local surface hydrology

3.1.5.1 Environmental values and water quality objectives

The Environmental Protection Policy (EPP Water) provides a framework for identifying Environmental Values (EVs) and water quality objectives (WQOs) to support the EVs for specific waters. However, there are no prescribed EVs for the Norman Rover catchment under the EPP. Based on all available information and legislative requirements, the following values are considered to be relevant for the Project (Engeny 2026a);

- aquatic ecosystem;
- aquaculture and human consumption;
- crop irrigation;
- agriculture;
- recreational uses;
- drinking water;
- industrial use;
- visual recreation; and
- cultural and spiritual values.

In the absence of scheduled WQOs, the EPP (Water and Wetland Biodiversity) requires WQOs to be a set of water quality guidelines for all indicators that will protect EVs for waters. Draft WQOs for the Project have been adopted from the ANZG (2018) default guideline values for protection of the EVs listed above (Table 6).

A receiving environmental monitoring program (REMP) will monitor and assess any impacts to EVs, water quality, stream flow, and sediment quality within the receiving environment on an annual frequency during construction and operations. Monitoring sites include four upstream locations (W1, W6, W7, and W8) and three downstream locations (W3, W4 and W5).

Table 6: Draft water quality objectives

Indicator	Draft WQO	Corresponding EV
pH	6.5-8.5	Drinking Water
Electrical Conductivity	550 µS/cm	Aquatic Ecosystems
Total Dissolved Solids	500 mg/L	Aquatic Ecosystems
Ammonia N	20 µg/L	Aquatic Ecosystems
Oxidised N	-	Aquatic Ecosystems
Organic N	-	Aquatic Ecosystems
Nitrate	1.1 mg/L	Aquatic Ecosystems
Nitrite	3 mg/L	Drinking Water
Total Nitrogen	500 µg/L	Aquatic Ecosystems
Reactive Phosphorus	4 µg/L	Aquatic Ecosystems
Total Phosphorus	10 µg/L	Aquatic Ecosystems
Dissolved Oxygen	>85%	Drinking Water

Indicator	Draft WQO	Corresponding EV
Turbidity	5 NTU	Drinking Water
Suspended Solids	10 mg/L	Aquatic Ecosystem
Sulphate	25 mg/L	Aquatic Ecosystem
Cryptosporidium	0 cysts	Drinking Water
Hardness (as $CaCO_3$)	200 mg/L	Drinking Water
Sodium	30 mg/L	Drinking Water
Chloride	250 mg/L	Drinking Water
Aluminium (Dissolved)	55 µg/L	Aquatic Ecosystems
Aluminium (Total)	200 µg/L	Drinking Water
Arsenic (Dissolved)	13 µg/L	Aquatic Ecosystems
Arsenic (Total)	10 µg/L	Drinking water
Beryllium (Dissolved)	-	Aquatic Ecosystems
Beryllium (Total)	60 µg/L	Drinking Water
Boron (Dissolved)	940 µg/L	Aquatic Ecosystems
Boron (Total)	500 µg/L	Irrigation
Cadmium (Dissolved)	0.2 µg/L	Aquatic Ecosystems
Cadmium (Total)	2 µg/L	Drinking Water
Chromium (Dissolved)	1 µg/L	Aquatic Ecosystems
Chromium (Total)*	50 µg/L	Drinking Water
Cobalt (Dissolved)	1.4 µg /L	Aquatic Ecosystems
Cobalt (Total)	50 µg /L	Irrigation
Copper (Dissolved)	1.4 µg/L	Aquatic Ecosystems
Copper (Total)	200 µg /L	Irrigation
Fluoride	1,000 µg/L	Irrigation
Iron (Dissolved)	280 µg/L	Aquatic Ecosystems
Iron (Total)	0.2 mg/L	Irrigation
Lead (Dissolved)	3.4 µg/L	Aquatic Ecosystems
Lead (Total)	5 µg/L	Drinking Water
Lithium (total)	2.5 µg/L	Irrigation

Indicator	Draft WQO	Corresponding EV
Manganese (Dissolved)	1.9 mg/L	Aquatic Ecosystems
Manganese (Total)	0.1 mg/L	Drinking Water
Mercury (Dissolved)	0.6 µg/L	Aquatic Ecosystems
Mercury (Total)	1 µg/L	Drinking Water
Molybdenum (Dissolved)	34 µg/L	Aquatic Ecosystems
Molybdenum (Total)	20 µg/L	Irrigation
Nickel (Dissolved)	11 µg/L	Aquatic Ecosystems
Nickel (Total)	20 µg/L	Drinking Water
Selenium (Dissolved)	11 µg/L	Aquatic Ecosystems
Selenium (Total)	4 µg/L	Drinking Water
Uranium (Dissolved)	0.5 µg/L	Aquatic Ecosystems
Uranium (Total)	10 µg/L	Irrigation
Vanadium (Dissolved)	6 µg/L	Aquatic Ecosystems
Vanadium (Total)	100 µg/L	Irrigation
Zinc (Dissolved)	8 µg/L	Aquatic Ecosystems
Zinc (Total)	2,000 µg/L	Irrigation

*

3.1.5.2 Contaminants of Concern

Given the proposed PMLUs for the Project (refer Section 3.3.3), the draft WQOs for aquatic ecosystem protection and stock watering were applied to assess whether WQOs could be achieved in the long-term. default ANZG (2018) guideline values (for aquatic ecosystems and the stock water guidelines were applied to assess if WQOs could be achieved in the long-term. Contaminants of concern (CoC) were chosen based on their expected presence based on long-term water quality monitoring results, their potential to increase in concentration, and their environmental significance. The CoCs were selected as a subset of the draft WQOs listed in Table 6 and are nominated in Table 7.

Table 7: Contaminants of concern and draft WQOs

CoC	Draft WQO
pH (pH Unit)	6.5-8.5
Electrical conductivity (µS/cm) (EC)	550 µS/cm
Total Dissolved Solids (TDS)	500 mg/L
Total Suspended Solids (TSS)	10 mg/L
Sodium	30 mg/L

CoC	Draft WQO
Chloride	250 mg/L
Fluoride	1.6 mg/L
Aluminium	0.055 mg/L
Arsenic	0.013 mg/L
Zinc	0.008 mg/L
Sulfur	-
Copper	0.0014 mg/L
Molybdenum	0.034 mg/L
Rhenium	-
Tellurium	-
Aliphatic Hydrocarbons	-
Aromatic Hydrocarbons	-

3.1.5.3 Surface water quality

Water quality data for the Project area is limited with no historical monitoring data available for the Clara River or Warrigal Creek. A baseline water monitoring program for site-specific data was established in 2025 and currently two rounds of sampling have been collected (February 2025 and January 2026). All results from the surface water sampling are provided in Table 8.

The results of water quality analyses have been compared with the WQOs detailed in Table 6, and characterise the existing water quality as:

- slightly alkaline with an average pH of 6.7 and ranging between 6.2 and 7.4;
- low salinity with an average total dissolved solids of 54.5 mg/L and EC of 84 µS/cm;
- elevated concentrations of nutrients with the default WQOs exceeded for ammonia, total nitrogen and total phosphorus;
- detectable concentrations of dissolved metals including aluminium, barium, copper, manganese, nickel and iron;
- dissolved concentrations of aluminium and iron regularly exceeded the default guideline value WQOs for aquatic ecosystems;
- detectable concentrations of hydrocarbons in a small number of samples; and
- dissolved oxygen (%) (DO) values outside the draft WQOs for all the sites.

Several factors, such as grazing and agricultural land practices, as well as direct access of cattle to the waterways, are likely to influence water quality results. The elevated parameters of aluminium and copper were assumed to be linked to natural mineralisation in the sub-soils of the area. Despite elevated concentrations of the parameters, baseline water quality results were considered typical of a slightly disturbed aquatic ecosystem in this region.

Table 8: Surface water quality results and comparison to draft WQOs

Parameter	Units	WQO	Survey period	W1	W2	W3	W4	W5	W6	W7	W8	W9
Physico-chemical (in situ)												
Electrical conductivity (EC)	uS/cm	550	February 2025	96.2	195.7	88.5	82.3	86.1	85.5	109.9	101.6	NA*
			January 2026	381.4	121.2	60.1	60.8	86.8	79.1	61.7	62.9	NA*
pH	pH units	6.5-8.5	February 2025	6.44	6.88	6.97	6.71	7.04	6.87	6.9	6.86	NA*
			January 2026	6.45	7.10	6.83	6.62	7.00	6.97	6.99	6.94	NA*
Dissolved oxygen (DO)	%	>85	February 2025	81.8	90	105	85.1	95.5	83.8	104.8	100.3	NA*
			January 2026	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Turbidity	NTU	5	February 2025	227.2	118.8	100.5	50.7	44.7	46.1	67.7	61.4	NA*
			January 2026	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Temperature	°C	-	February 2025	30.1	36.2	37.6	36.5	30.6	29.5	37.5	37.6	NA*
			January 2026	34.8	34.4	33.3	33.4	33.3	33.4	31.8	32.2	NA*
Major ions												
Sulphate (as SO_4)	mg/L	25	February 2025	<1	<1	<1	<1	<1	<1	<1	<1	<1
			January 2026	<1	<1	<1	<1	<1	<1	<1	<1	NA*
Fluoride (total)	mg/L	1	February 2025	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
			January 2026	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA*
Calcium (total)	mg/L	1,000	February 2025	<1	2	<1	2	2	2	2	2	2
			January 2026	3	4	4	3	2	2	4	4	NA*
Magnesium (total)	mg/L	500	February 2025	<1	2	<1	2	2	2	2	1	1

Parameter	Units	WQO	Survey period	W1	W2	W3	W4	W5	W6	W7	W8	W9
			January 2026	2	2	2	2	1	1	2	2	NA*
Nutrients												
Ammonia (total)	mg/L	0.02	February 2025	<0.01	0.23	0.34	0.25	<0.01	0.42	0.13	<0.01	0.02
			January 2026	0.01	<0.01	0.03	0.02	<0.01	<0.01	0.03	<0.01	NA*
Nitrogen (total)	mg/L	0.5	February 2025	0.4	1.3	0.8	0.8	0.9	1.4	0.9	0.4	2.3
			January 2026	0.9	0.7	0.8	0.8	0.6	0.7	0.7	0.8	NA*
Phosphorus (total)	mg/L	0.01	February 2025	0.05	0.10	0.07	0.05	0.04	0.04	0.06	0.03	0.17
			January 2026	0.03	0.05	0.05	0.04	0.03	0.04	0.04	0.05	NA*
Dissolved metals												
Aluminium	mg/L	0.055	February 2025	0.34	0.63	0.25	0.09	0.06	0.07	0.36	0.29	0.07
			January 2026	0.23	0.15	0.22	0.27	0.11	0.15	0.23	0.26	NA*
Arsenic	mg/L	0.013	February 2025	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Boron	mg/L	0.94	February 2025	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
			January 2026	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA*
Cadmium	mg/L	0.0002	February 2025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
			January 2026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NA*
Chromium	mg/L	0.001	February 2025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Cobalt	mg/L	0.0014	February 2025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001

Parameter	Units	WQO	Survey period	W1	W2	W3	W4	W5	W6	W7	W8	W9
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Copper	mg/L	0.0014	February 2025	<0.001	0.002	<0.001	0.001	0.001	0.001	0.001	<0.001	0.002
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Lead	mg/L	0.0034	February 2025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Manganese	mg/L	1.9	February 2025	0.004	0.045	0.009	0.059	0.017	0.009	0.076	0.009	0.022
			January 2026	0.002	0.002	0.018	0.011	0.005	0.005	0.013	0.018	NA*
Mercury	mg/L	0.0006	February 2025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
			January 2026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NA*
Molybdenum	mg/L	0.034	February 2025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Nickel	mg/L	0.011	February 2025	<0.001	0.002	<0.001	0.001	0.002	0.001	0.003	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Silver	µg/L	0.05	February 2025	0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
			January 2026	0.14	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA*
Uranium	mg/L	0.0005	February 2025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Vanadium	mg/L	0.006	February 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			January 2026	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA*
Zinc	mg/L	0.008	February 2025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Parameter	Units	WQO	Survey period	W1	W2	W3	W4	W5	W6	W7	W8	W9
			January 2026	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA*
Total metals												
Aluminium	mg/L	0.2	February 2025	4.66	3.33	1.87	1.13	1.04	0.93	1.52	2.58	0.10
			January 2026	0.47	0.74	0.55	0.56	0.65	1.11	0.47	0.48	NA*
Arsenic	mg/L	0.01	February 2025	<0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Boron	mg/L	0.5	February 2025	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
			January 2026	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA*
Cadmium	mg/L	0.002	February 2025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
			January 2026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NA*
Chromium	mg/L	0.05	February 2025	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	<0.001
			January 2026	<0.001	<0.001	<0.001	0.001	0.002	0.002	<0.001	<0.001	NA*
Cobalt	mg/L	0.05	February 2025	0.001	0.002	<0.001	0.002	<0.001	<0.001	0.002	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Copper	mg/L	0.2	February 2025	0.002	0.003	0.002	0.002	0.002	0.004	0.002	0.002	0.001
			January 2026	0.002	0.002	0.001	0.001	0.002	0.002	0.001	<0.001	NA*
Lead	mg/L	0.005	February 2025	0.002	0.002	0.001	0.001	0.001	0.001	0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	NA*
Manganese	mg/L	0.3	February 2025	0.017	0.063	0.020	0.074	0.028	0.022	0.131	0.025	0.025
			January 2026	0.008	0.019	0.044	0.033	0.017	0.025	0.021	0.027	NA*

Parameter	Units	WQO	Survey period	W1	W2	W3	W4	W5	W6	W7	W8	W9
Mercury	mg/L	0.001	February 2025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
			January 2026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NA*
Molybdenum	mg/L	0.02	February 2025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Nickel	mg/L	0.02	February 2025	0.001	0.002	0.001	0.002	0.002	0.002	0.002	0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	0.001	0.002	<0.001	<0.001	NA*
Selenium	mg/L	0.004	February 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			January 2026	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NA*
Uranium	mg/L	0.01	February 2025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
			January 2026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA*
Vanadium	mg/L	0.1	February 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			January 2026	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA*
Zinc	mg/L	2	February 2025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
			January 2026	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA*
Total recoverable hydrocarbons												
C6- C9 Fraction	µg/L	20	February 2025	<20	<20	<20	<20	<20	<20	<20	<20	<20
			January 2026	<20	<20	<20	<20	<20	<20	<20	<20	NA*
C10–C36 Fraction (sum)	µg/L	100	February 2025	<50	<50	<50	<50	<50	<50	<50	<50	120
			January 2026	<50	<50	<50	<50	<50	<50	<50	<50	NA*

3.1.5.4 Sediment quality

An analysis of sediments collected for total metals indicates sediments are within the sediment quality objectives (AARC 2026a).

No sediment analysis results exceeding sediment quality objectives were identified, with the results at all sites below the low trigger level from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018).

3.1.5.5 Waterways providing fish passage

The levees and permanent diversion of a tributary of Warrigal Creek and upgrades to existing crossings have the potential to create barriers to fish passage along the waterways. At the location of the proposed diversion, the unnamed stream order 3 waterway is mapped as being at moderate risk of adverse impact to fish passage from waterway barrier works. Existing crossings of unnamed stream order 2 waterways (tributaries of Warrigal Creek) are classified as being of low risk of adverse impact to fish passage from waterway barrier works.

The fish passage assessment for the Project validated the waterways for waterway barrier works mapping. The unnamed stream order 3 waterway is likely to support fish passage. The diversion will be designed and constructed such that it meets the performance outcomes of 'State code 18: Constructing or raising waterway barrier works in fish habitats' (DAF 2022). The diversion will be expected to maintain fish passage and be representative of the existing waterway conditions.

Upgrades of existing crossings of small tributaries along the transport MLA are unlikely to constitute barriers to fish passage. These areas have been validated as drainage features through the watercourse determination process and are considered unlikely to support fish passage. Nonetheless, these crossings will be designed and constructed in accordance with the 'Accepted development requirements for waterway barrier works' (DPI 2025).

As the Project will be compliant with the accepted development requirements, it is considered unlikely that fish salvage will be required. Additionally, all fish species potentially inhabiting the waterways are assumed to be adapted to conditions of ephemeral waterways, which will not be substantially altered by the Project. No pumping of water from the waterways is proposed, therefore measures to prevent the entrainment of fish into pumping infrastructure is not required. In the event that pumping of surface water is required, screening will be incorporated to prevent the entrainment of fish into water pumping infrastructure.

When assessed against the Matters of State Environmental Significance residual impact guidelines, the Project is considered unlikely to result in a significant residual impact on the waterways providing for fish passage.

3.1.6 Groundwater

The Project is located within the Great Artesian Basin and Other Regional Aquifers Water Plan area (2017), regulating groundwater management within associated aquifers. The primary groundwater bearing unit within the Project area is the Gilbert River Formation (GRF).

A conceptual model of groundwater within the Project has been developed (Hydrogeologist 2026). A cross-section of the Project hydrogeological conceptual model is shown in Figure 15. The key features of the hydrogeological conceptualisation are:

- Monitoring bores screened within these tertiary sediments are consistently dry, suggesting low permeability and limited groundwater storage. Saturated tertiary sediments (recorded outside the Project area) would be generally considered a low permeability, unconfined aquifer.
- The GRF is approximately 40 m thick over the Project area and is intersected at a depth of 10 mbGL or an elevation of approximately 110 mAHD. The GRF is generally regarded as a moderate to high permeability formation and a regional aquifer. This unit forms the only laterally continuous aquifer at the Project site and is the primary groundwater bearing unit encountered in monitoring bores.

- The GRF is regionally considered a confined aquifer where overlain by the Wallumbilla Formation, whereas locally it would be considered as an unconfined aquifer due to the absence of the Wallumbilla Formation at the Project site. There is heterogeneity that occurs within each hydrostratigraphic unit which influences local conditions.
- Basement rocks (Permian and Mesoproterozoic aged igneous and metamorphic rocks) are generally of very low permeability, with groundwater occurrence limited to localised joints and fractures. The basement rocks are regarded as a basal aquitard.
- Due to the massive nature of basement rock, groundwater within the basement would be associated with secondary permeability and porosity that may occur due to the presence of joints and fractures. The Proterozoic basement is considered to be relatively impermeable and acts as a basal aquitard.
- The depth of the groundwater table is between 6–10 mbGL and generally ranges between 6 mbGL and 20 mbGL across the wider study area. The groundwater table broadly reflects topography, with groundwater flowing from the east southeast to west northwest.
- Groundwater in the Project area is recharged during the wet season. Groundwater level data indicates minimal groundwater level increases during the 2025/2026 wet season when compared to a relatively static groundwater level response in the dry season.
- The groundwater table does not intersect the ground surface in any watercourses or drainage features and does not provide baseflow to any creeks within the Project area.

In summary, the conceptual groundwater model indicates:

- no persistent groundwater table within the shallow Tertiary sediments;
- a laterally continuous but generally low to moderate permeability aquifer within the GRF;
- a very low permeability Proterozoic basement with limited groundwater occurrence restricted to joints and fractures;
- stable groundwater levels with limited wet season recharge response;
- a groundwater system of low hydraulic connectivity; and
- groundwater EVs limited to the GRF, with a very low likelihood of groundwater dependent ecosystems occurring within the Project area.

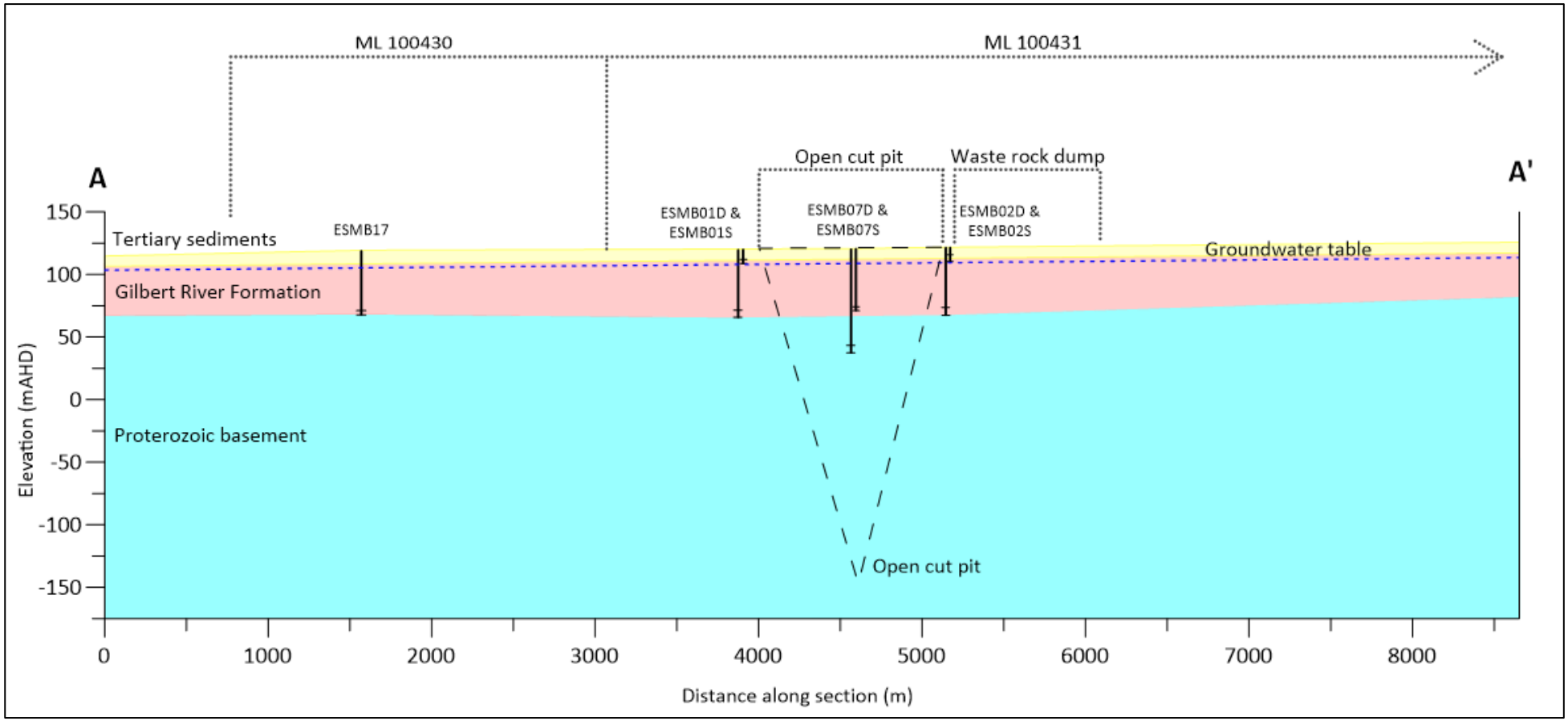


Figure 15: Conceptual groundwater model

3.1.6.1 Groundwater use

Data from registered groundwater bores within approximately 10 km of the Project was obtained from the Department of Local Government, Water and Volunteers (DLGWV) groundwater database (Hydrogeologist 2026). There are 14 registered bores located within 10 km of the Project. Most of the registered bores are constructed within the GRF, a Great Artesian Basin (GAB) aquifer that underlies the Project. The GRF forms the only laterally continuous aquifer at the Project site and is the primary groundwater bearing unit encountered in monitoring bores. Recharge is inferred to occur regionally where the formation is at outcrop or where it is close to the surface (30–40 km to the east and south-east of the Project area).

3.1.6.2 Groundwater quality

Groundwater quality data has been recorded during multiple sampling events in September 2024, November 2024, February 2025, July 2025, September 2025, October 2025, November 2025, and December 2025 at the bores shown in Figure 16.

Field electrical conductivity (EC) ranges from 803 µS/cm to 3,250 µS/cm and is lowest in bore ESMB01D and highest in bore Rowe 1, with both bores screened in the GRF. Pelican bore, Rowe 1 bore and Rowe 2 bore show slightly higher EC concentrations (>2,000 µS/cm) when compared to the site-specific groundwater monitoring bores (between 800 µS/cm and 1,500 µS/cm).

The majority of monitoring bores completed within the GRF record freshwater EC values. Brackish EC conditions are confined to Pelican Bore, Rowe 1 and Rowe 2, which also target the GRF but are located to the east of the Project area, at distances of approximately 22 km, 15 km and 10 km from the Project mining area, respectively. All remaining monitoring bores record fresh EC values, indicating comparatively lower salinity groundwater within the Project area.

Field pH is neutral (7.08) to strongly alkaline (9.17) and is lowest in bore Rowe 1 and highest in bore ESMB02D. pH results show moderate variability and would be considered acceptable for drinking water and stock watering applications (ANZG 2023); however, the groundwater table in the Project area is currently not used for drinking purposes.

Based on data collected during multiple data collection events, groundwater quality from the bores is elevated with respect to a number of metal/metalloid parameters relative to the ANZG (2018) 95% freshwater protection limit. For comparison purposes the results have been compared to the hardness modified trigger values (HMTVs) for cadmium, lead, nickel and zinc, with values calculated from the minimum, maximum and mean total hardness concentrations. The ANZG (2018) guidelines note that, if the water sample exceeds the standard hardness value of 30 mg/L $CaCO_3$, then it is appropriate to modify the default guideline value (DGV) for all hardness sensitive metals except copper. Site groundwater records a minimum/maximum/mean hardness as $CaCO_3$ of 5 mg/L, 182 mg/L and 29 mg/L, respectively.

The Project site groundwater monitoring bores have elevated concentrations of:

- aluminium (39 samples out of 64) when compared to ANZG (2018) DGV;
- arsenic (13 samples out of 64) when compared to ANZG (2018) DGV;
- chromium (four samples out of 64) when compared to ANZG (2018) DGV;
- cobalt (five samples out of 64) when compared to ANZG (2018) DGV;
- molybdenum (two sample out of 64) when compared to ANZG (2018) DGV;
- vanadium (one sample out of 64) when compared to ANZG (2018) DGV; and
- zinc (40 samples out of 64) when compared to ANZG (2018) DGV, with six samples out of 64 when compared to the HMTV calculated from the minimum hardness value for site groundwater and two samples of 64 when compared to the HMTV calculated from the mean/maximum hardness value for site groundwater.

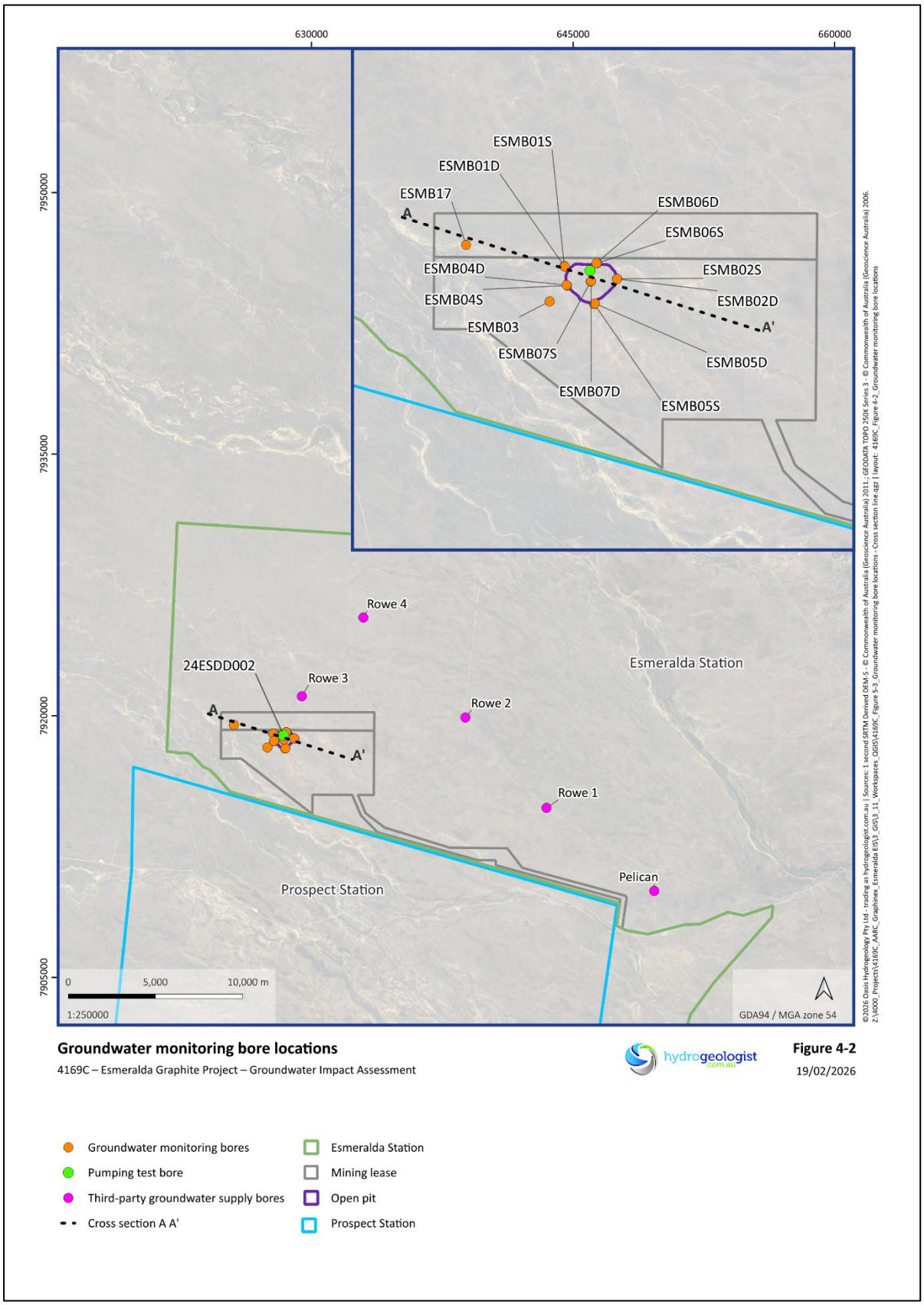


Figure 16: Registered groundwater monitoring bores

Groundwater quality as recorded is provided in the Groundwater Impact Assessment (Hydrogeologist 2026), and the Aquatic Ecology Assessment (AARC 2026a)

Data from all sampling rounds were converted to milliequivalent concentrations (mEq/L) and water type and normalised to milliequivalent percentages (meq%); then plotted on an Extended Durov diagram (Figure 17).

The monitoring bores Pelican Bore, Rowe 1, and Rowe 2 plot firmly within the sodium–chloride water type, reflecting higher salinity and chloride dominance. All remaining monitoring bores plot within the sodium–bicarbonate water type, indicating comparatively lower salinity groundwaters.

Magnesium concentrations are consistently low across all monitoring bores, and calcium concentrations are also low relative to sodium and potassium. Sodium plus potassium concentrations are substantially higher across all monitoring bores, therefore exhibit a strongly sodium- and potassium-dominant cation water type.

Pelican Bore, Rowe 1, and Rowe 2 exhibit a chloride-dominant anion water type, while all remaining monitoring bores are characterised by bicarbonate-dominant anion chemistry.

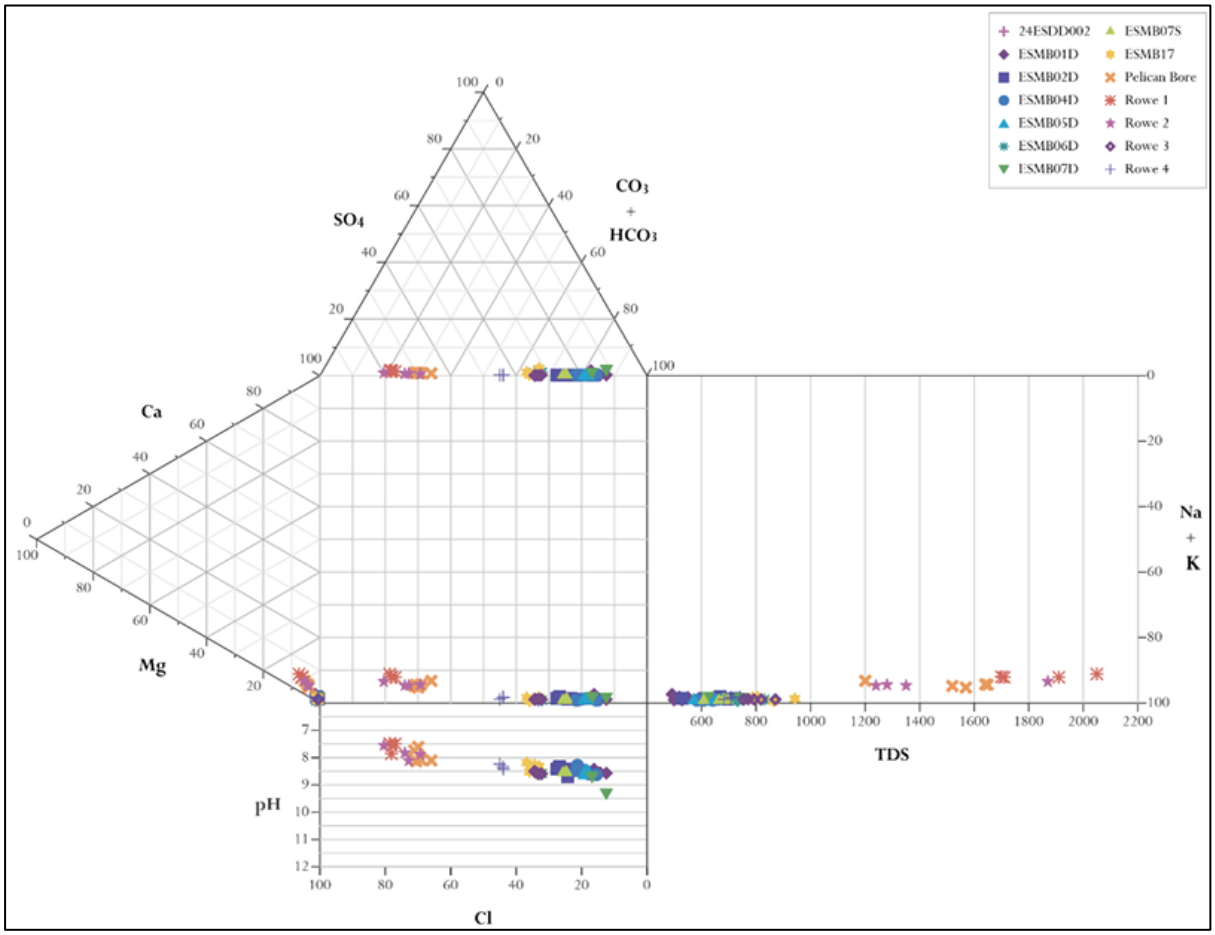


Figure 17: Extended Durov diagram of median major ion composition

3.1.6.3 Groundwater level and flow

Groundwater within the Project area occurs almost exclusively within the Gilber River Formation. The groundwater table is generally between 6 m and 10 mbGL within the Project area. The depth to groundwater along the watercourses and drainage features within the Project area is typically between 6 to 10 m below the bed of the watercourses and drainage features that occur within the Project area.

The groundwater table elevation in the Project area is between 105 mAHD in the northwest of the Project area and 120 mAHD in the southeast. Groundwater flows from the east southeast to the west northwest towards the Gulf of Carpentaria. The groundwater elevation and flow directions are consistent with the observed data (Figure 18). Regional groundwater flow is inferred to generally follow surface topography, with flow directed from east southeast to the west northwest, consistent with regional drainage patterns.

Table 9: Summary of monitoring bore construction details

Bore	Easting	Northing	Hydrostratigraphic unit	Elevation (mAHD)	Casing height (maGL)	Hole depth (mbGL)	Screen interval (mbGL)
ESMB01S	627798	7918997	Tertiary sediments	120.549	0.70	11.5	8.5 - 11.5
ESMB01D	627804	7918987	Gilbert River Formation	120.491	0.71	60	49 - 55
ESMB02S	629007	7918705	Tertiary sediments	122.37	0.57	12	6 - 12
ESMB02D	629007	7918702	Gilbert River Formation	122.367	0.75	60	49 - 55
ESMB03	627462	7918188	Tertiary sediments	121.755	0.69	10	7 - 10
ESMB04S	627861	7918550	Tertiary sediments	119.81	0.70	10	7 - 10
ESMB04D	627850	7918563	Gilbert River Formation	119.891	0.50	51.1	46 - 49
ESMB05S	628485	7918127	Tertiary sediments	120.747	0.62	10	7 - 10
ESMB05D	628499	7918142	Gilbert River Formation	120.382	0.47	53	49 - 52
ESMB06S	628552	7919064	Tertiary sediments	120.108	0.65	10	7 - 10
ESMB06D	628536	7919065	Gilbert River Formation	120.355	0.41	51	47 - 50
ESMB07S	628401	7918643	Gilbert River Formation	121.213	0.49	54	47 - 50
ESMB07D	628411	7918654	Basement rock	121.316	0.79	84	78 - 84
ESMB17	625543	7919486	Gilbert River Formation	117.183	0.66	52	46 - 49
Pelican	649647	7909961	Gilbert River Formation	155.05	0.97	Unknown	Unknown
Rowe 1 (RN171489)	643470	7914726	Gilbert River Formation	145.32	0.57	57	52 - 57
Rowe 2 (RN109343)	638819	7919903	Gilbert River Formation	138.80	0.44	46.5	39 - 46.5
Rowe 3 (RN157196)	629441	7921126	Gilbert River Formation	122.80	0.92	59	42 - 54
Rowe 4	632968	7925635	Gilbert River Formation	128.05	0.28	Unknown	Unknown

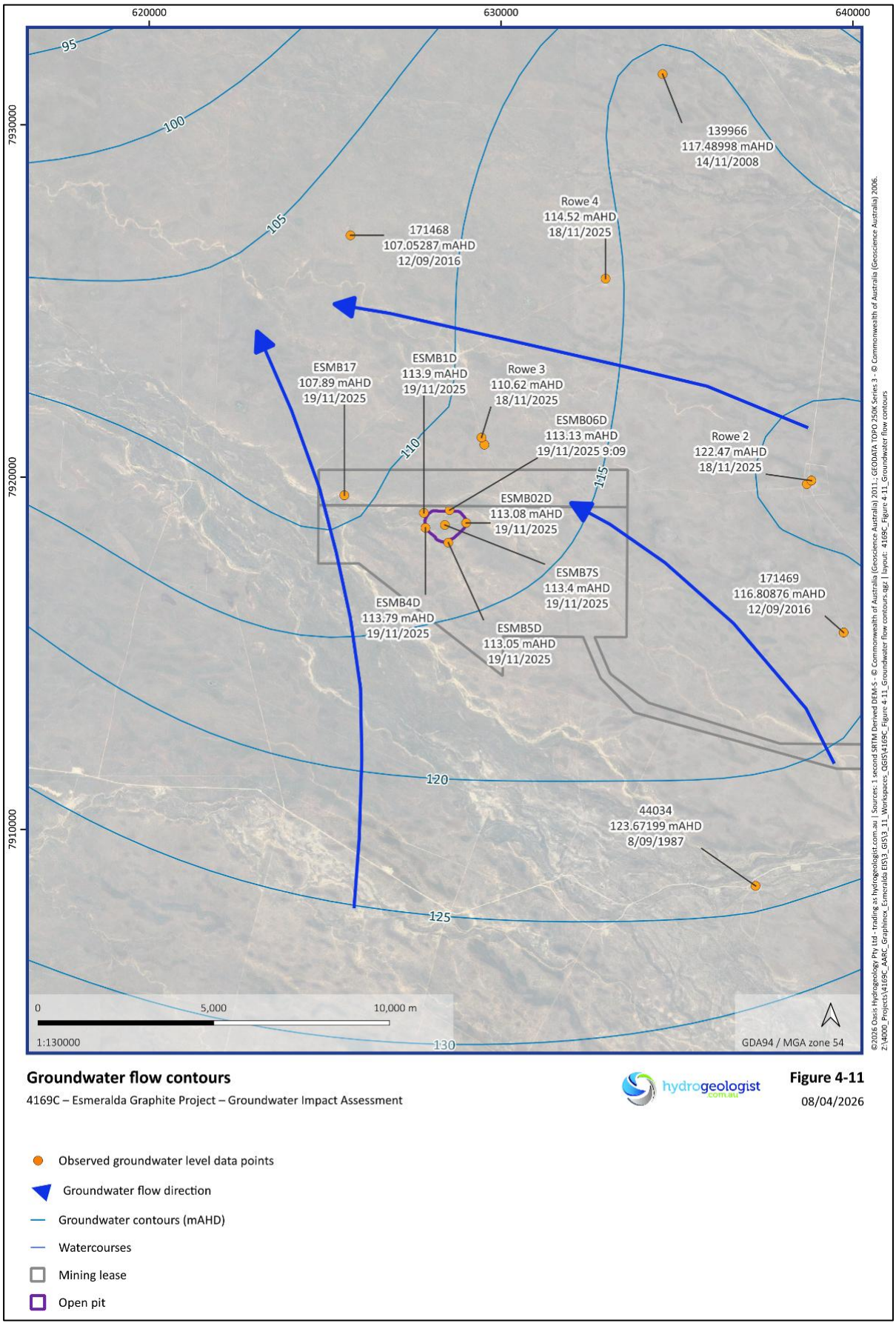


Figure 18: Groundwater flow contours

3.1.7 Land and soil

3.1.7.1 Underlying landholders

The Project MLAs are located entirely within a single landholding, Lot 75 on Plan SP273198, known as the Esmeralda property. The Proponent has undertaken negotiations with the relevant property owner and has acquired rights to the land title underlying the Project MLAs. The process to subdivide the pastoral lease into separate titles has commenced. The anticipated land tenure layout post-subdivision will cover the full Project area and some adjacent lands and have the expected title of Lot 76 on Plan SP353379. The binding option to acquire the land directly under both MLAs will be exercised within 2.5 years and is subject to the subdivision being granted, giving the Proponent title to the land subject to the MLAs.

There is a registered forest management area on Lot 75 on Plan SP273198 (MUID: CY1AESM01), a pastoral holding to the east (however, not directly adjacent) of the Project area.

Land ownership underlying and adjacent to the Project area is described in Table 10 and shown in Figure 19.

The Project access route is in proximity to stock route 395CROY. Transport management will be required when this stock route is in use. Consultation will be undertaken with local government and relevant stakeholders to determine frequency and duration of use and facilitate open communication for Project development.

No State Forests, National Parks or conservation tenure is located within or on land adjacent to the Project.

Table 10: Underlying and adjoining land tenures

Lot	Plan	Tenure	Local Government Area	Property name	Registered owner of the land
Underlying					
75	SP273198	Lands Lease	Croydon Shire	Esmeralda	Currently The Trust Company on behalf of Cunningham Cattle Company Pty Ltd.
Adjoining					
3881	3881PH1911	Lands Lease	Croydon Shire	-	Michael Joseph McCoy and Noeleen Aysha McCoy
-	-	Road Parcel	Croydon Shire	Esmeralda Prospect Road	

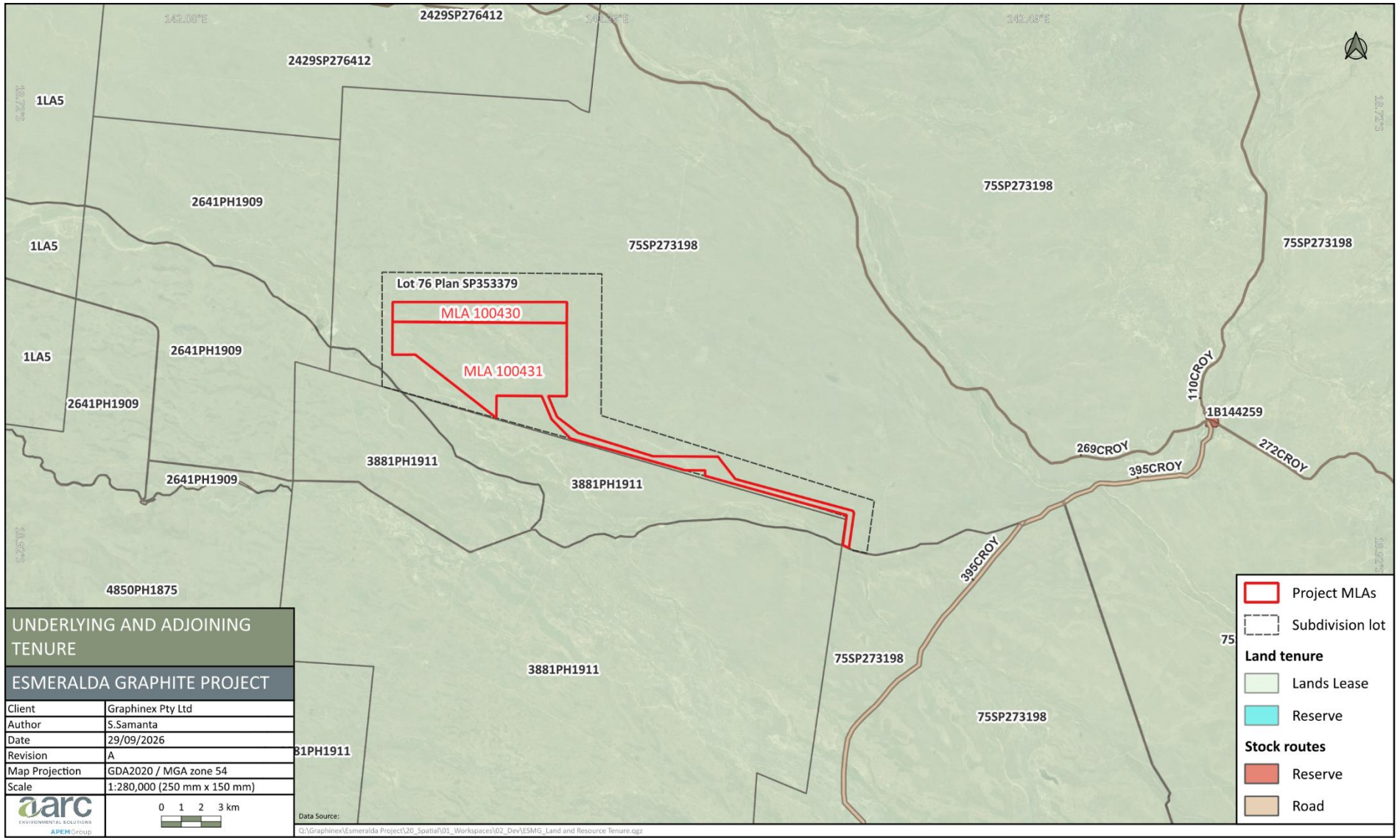


Figure 19: Underlying and adjoining land tenure

3.1.7.2 Current land use

The land in and surrounding the Project area is covered by the Croydon Shire Planning Scheme (2019) and is zoned as 'Rural'. The Project is not located in a Priority Agricultural Area, Strategic Cropping Area, Strategic Environmental Area or Priority Living Area, as defined by the *Regional Planning Intersects Act 2014.*

The predominant land use of north-west Queensland is low intensity cattle grazing, dryland cropping and resource operations. The current land use of the Project site is predominantly low intensity cattle grazing.

Queensland Land Use Mapping classifies the Project area as 'Grazing Native Vegetation', which is defined as (ABARES 2016):

> *Land uses based on grazing domestic stock on native vegetation where there has been limited or no deliberate attempt at pasture modification.*

3.1.7.3 Sensitive receptors

Sensitive receptors are extremely sparse and are primarily limited to homesteads. The location of sensitive receptors is shown in Figure 20. There are no receptors associated with large numbers of viewers or well-used tourism or recreational facilities.

The closest homestead is approximately 5 km from the Project MLAs, with all the other sensitive receptors greater than 10 km from the Project.

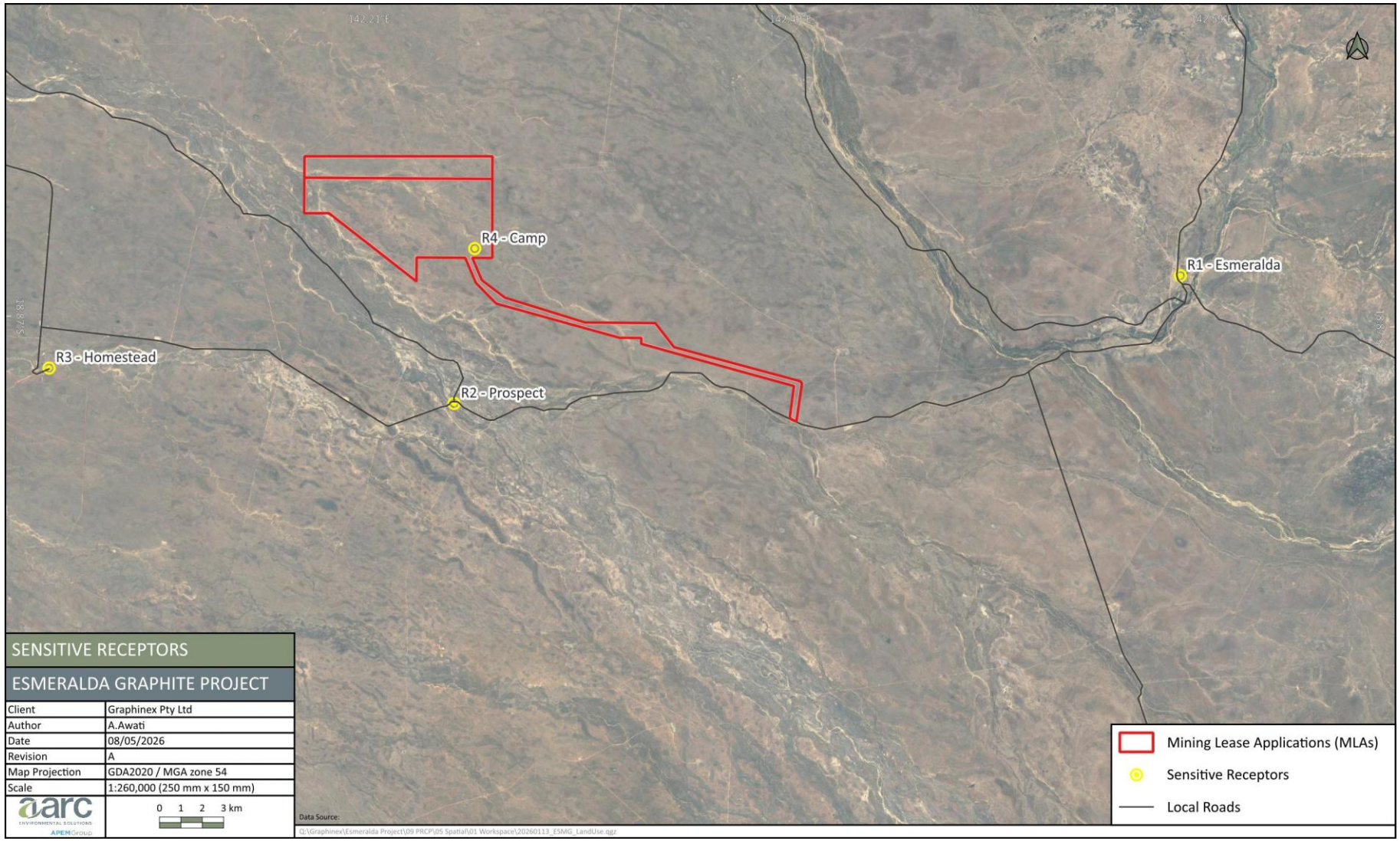


Figure 20: Sensitive receptors

3.1.7.4 Soils

The Atlas of Australian Soils (broadscale national mapping at 1:1,000,000 scale) describes the Project area as being predominantly deep sandy mottled yellow earths on very gently undulating alluvial plains. Numerous sandy rises and shallow sandy stream beds are also described from the southern area of the transport corridor, while the western edge of the mine area includes yellowish brown earthy sands on stream levees, small flood plains and infilled channels.

Land zone

Two land zones occur within the Project:

- Land Zone 3 – recent Quaternary alluvial systems, including closed depressions, paleo-estuarine deposits currently under freshwater influence, inland lakes, and associated wave-built lunettes (Wilson and Taylor 2012). Land Zone 3 excludes colluvial deposits such as talus slopes and pediments. This Land Zone includes a diverse range of soils predominantly Vertosols and Sodosols (Wilson and Taylor 2012). Land Zone 3 also occurs with Dermosols, Kurosols, Chromosols, Kandosols, Tenosols, Rudosols and Hydrosols; and Organosols in high rainfall areas (Wilson and Taylor 2012); and
- Land Zone 5 – Tertiary - early Quaternary loamy and sandy plains and plateaus (Wilson and Taylor 2012). Land Zone 5 consists of extensive, uniform near level or gently undulating plains with sandy or loamy soils and includes dissected remnants of these surfaces. Soils are usually Tenosols and Kandosols, also minor deep sandy surfaced Sodosols and Chromosols (Wilson and Taylor 2012).

Soil assessment

A detailed soil assessment was undertaken by GT Environmental (2026) as part of the environmental impact statement (EIS) to determine site-specific soil characteristics, including stability, permeability, and geochemistry.

Soil samples were evaluated for soil erodibility and dispersion potential for each identified soil profile within the Project site. The soil chemistry of these sites was also analysed to identify properties adverse to plant growth and to determine any potential treatment required of reject materials. These were assessed using key soil characteristics including pH, EC, chloride, and the principle exchangeable cations (calcium, magnesium, sodium, and potassium).

A total of seven soil profile classes (SPCs) were identified and described. An overview of each SPC and its extent within the Project area is described in detail in Table 11.and shown in Figure 21.

GT Environmental (2026) also considered acid sulphate soils in their assessment. They noted that majority of the study area is mapped within the *Atlas of Australian Acid Sulfate Soils* (CSIRO 2024) as C4, or soils having an extremely low probability of occurrence, based on very low confidence. Their field assessment concluded that the study area is highly unlikely to include actual or potential acid sulphate soils.

Overall, the soils of all Soil Profile Classes (SPCs) are considered suitable materials for rehabilitation. Their use in rehabilitation is discussed at Section 3.5.6.4.

Table 11: Soil profile description

Soil profile class	Australian soil class	Soil horizon/depth (m)/boundary	Soil chemistry	Vegetation	Slope
1Cl(Ck)	Brown Tenosol	A11: 0.00-0.17 m; Clear (20-50mm) A12: 0.17-0.70 m; Abrupt (5-20mm) BC: 0.70-0.90 m End of borehole (EOBH)	• very low effective cation exchange capacity (ECEC) across soil profile; • low to very low organic matter in topsoils; • no sodicity concerns in topsoil; • no salinity or chloride toxicity concerns in soil profile • topsoil ranging from slightly acidic to neutral; and • subsoils pH ranging from moderately acidic to alkaline.	Paperbark low woodland	<1.0
2Cl(Ck)	Brown Arenosol	A11: 0.00-0.20 m; Abrupt (5-20mm) A12: 0.20-0.50 m; Gradual (50-100mm) B21: 0.50-1.80 m; Clear (20-50mm) B22: 1.80-2.20 m; Abrupt (5-20mm) BC: 2.20-2.25 m; EOBH	• very low ECEC across soil profile; • low to very low organic matter in topsoils; • no sodicity concerns in topsoil; • moderately acidic topsoil; and • subsoils pH ranging from moderately and strongly acidic to neutral.	Paperbark low woodland	<1.0
3Cl(Ck)	Brown Tenosol	A11: 0.00-0.10 m A12: 0.10-0.45 m BC: 0.45-0.65 m; EOBH	• very low ECEC across soil profile; • low to very low organic matter in topsoils; • no sodicity concerns in topsoil; • topsoil ranging from slightly acidic to neutral; and • subsoils pH ranging from moderately acidic to alkaline.	Paperbark low woodland	<1.0
4Cl(Ck)	Brown Kandosol	A11: 0.00-0.10 m A12: 0.10-0.35 m B21: 0.60-0.75 m; EOBH	• very low ECEC across soil profile; • low to very low organic matter in topsoils; • Sodic conditions in the topsoil to 0.3 m depth and extremely sodic conditions in the subsoil below 0.5m; • subsoils pH ranging from moderately acidic to alkaline.	Paperbark low woodland	1.0
5Cl(Nm)	Leptic Tenosol	A11: 0.00-0.10 m; Abrupt 5-20mm A21: 0.10-0.25 m; Abrupt 5-20mm A22: 0.25-0.35 m; EOBH	• very low ECEC across soil profile; • low to very low organic matter in topsoils; • no sodicity concerns in topsoil; • pH is slightly acidic to neutral throughout profile	Paperbark low woodland	1.0

Soil profile class	Australian soil class	Soil horizon/depth (m)/boundary	Soil chemistry	Vegetation	Slope
6Cl(El)	Brown Dermosol	A11: 0.00-0.10 m; Abrupt 5-20mm A12: 0.10-0.30 m; Abrupt 5-20mm A21: 0.30-0.80 m; Gradual 50-100mm B21: 0.80-1.00 m; Abrupt 5-20mm B22: 1.00-1.30 m; Clear 20-50mm B23: 1.30-1.70 m; Clear 20-50mm B24: 1.70-2.00 m; EOBH	• very low ECEC across soil profile; • low to very low organic matter in topsoils; • no sodicity concerns in topsoil to 1.5 m and extremely sodic conditions in the subsoil below 1.7 m • topsoil ranging from slightly acidic to neutral; and • subsoils pH ranging from moderately acidic to alkaline	Paperbark low woodland	1.0
7Cl(Nm)	Leptic Rudosol	A11: 0.00-0.10 m; Abrupt 5-20mm A12: 0.10-0.15 m; EOBH	• very low ECEC across soil profile; • low to very low organic matter in topsoils; • no sodicity concerns in topsoil; • topsoil ranging from moderately acidic to alkaline	Patchy grasslands	<1.0

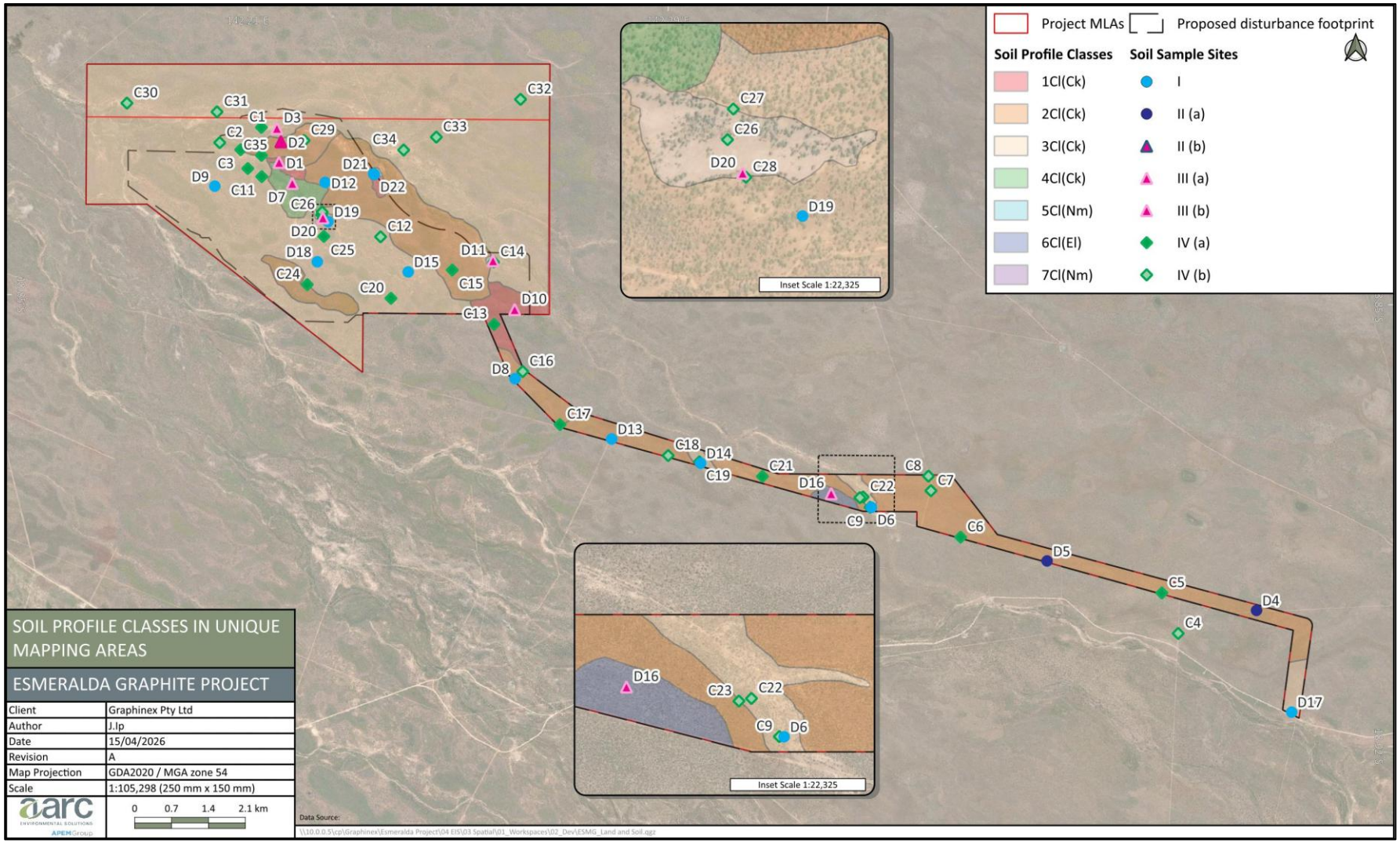


Figure 21: Soil profile classes and observation sites

3.1.8 Flora and fauna

Desktop assessments for flora and fauna were undertaken to collate information on the terrestrial and aquatic ecological values with the Project area and surrounds. These assessments informed subsequent assessment methodology and field survey techniques, ensuring a robust assessment of conservation significant flora and fauna known from the region and potentially inhabiting the Project.

Terrestrial flora and fauna field surveys were conducted for the Project by AARC in August 2024 (13–19 August), November 2024 (14–27 November), February 2025 (11-15 February) and Ausgust 2025 (flora only) (fron 26 August to 2 September) (AARC 2026b). Aquatic ecology field surveys were conducted for the Project by AARC during the wet season in February 2025, with supplementary surveys conducted in December 2025 and January 2026 to support the fish passage assessment and provide additional baseline water and sediment data (AARC 2026a).

3.1.8.1 Vegetation communities

Vegetation communities were mapped on the ground in accordance with the *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland (V7.0)* (Neldner *et al.* 2023). All REs were described in accordance with the *Queensland Regional Ecosystem Description Database* (DESI 2024) classification system. Based on the field results, a map change request was processed and approved by the Queensland Herbarium in March 2026. The accepted RE mapping has been adopted as the field verified vegetation map in this report.

The entire MLA area is mapped as remnant vegetation. No areas of high-value regrowth or non-remnant vegetation were identified. The field verified regional ecosystems (REs) are summarised in Table 12 and displayed in Figure 22, Figure 23, Figure 24 and Figure 25.

Table 12: Summary of field verified vegetation communities

RE	Description	VM Act status	Biodiversity status[2]
RE 2.3.22	Long-fruited Bloodwood (*Corymbia polycarpa*) and *Melaleuca* spp. woodland on sandy channels and levees	Least concern	Of concern
RE 2.3.26a	River Red Gum (*Eucalyptus camaldulensis*) woodland to low woodland, with *Melaleuca* spp., on fringes and in channels of minor watercourses	Least concern	Of concern
RE 2.3.26a / 2.3.50a	River Red Gum (*Eucalyptus camaldulensis*) low woodland, with *Melaleuca* spp., fringing minor watercourses, with areas of bare sand and rock, and scattered vegetation in channels	Least concern	Of concern
RE 2.3.26c	River Red Gum (*Eucalyptus camaldulensis*) low woodland, with Broad-leaved Paperbark (*Melaleuca viridiflora*), on fringes of minor watercourses in broad sand sheets	Least concern	Of concern
RE 2.3.29b	*Melaleuca* spp. low open woodland to low woodland on alluvial plains and drainage depressions	Least concern	No concern at present
RE 2.3.41	Annual tussock grassland on alluvial plains	Least concern	Of concern
RE 2.3.42b	Coolibah (*Eucalyptus microtheca*) low open woodland to woodland on alluvial plains	Least concern	Of concern
RE 2.3.55d	Seasonal swamp (wooded). Broad-leaved Paperbark (*Melaleuca viridiflora*) low woodland in shallow closed depressions on sand sheets	Least concern	Of concern

RE	Description	VM Act status	Biodiversity status[2]
RE 2.3.61c	Seasonal swamp (wooded). Coolibah (*Eucalyptus microtheca*) and Broad-leaved Paperbark (*Melaleuca viridiflora*) woodland in closed depressions on alluvial plains	Least concern	No concern at present
RE 2.5.14a	Broad-leaved Paperbark (*Melaleuca viridiflora*) low open woodland to low woodland on sand sheets	Least concern	No concern at present
RE 2.5.14a / 2.5.17b / 2.3.29b / 2.3.51	Mixed community of *Melaleuca* spp. low open woodland to low woodland on fringes of alluvial plains and sand sheets, with seasonal swamps of River Red Gum (*Eucalyptus camaldulensis*) woodland	Least concern	No concern at present
RE 2.5.17b	Gulbarn (*Melaleuca citrolens*) low open woodland to low woodland on broad sand sheets	Least concern	No concern at present
RE 2.5.18a	Rough-leaved Bloodwood (*Corymbia setosa*) low open woodland to woodland on broad sand sheets	Least concern	No concern at present
RE 2.5.28a	Long-fruited Bloodwood (*Corymbia polycarpa*) woodland on broad plains of reworked sand deposits	Least concern	No concern at present

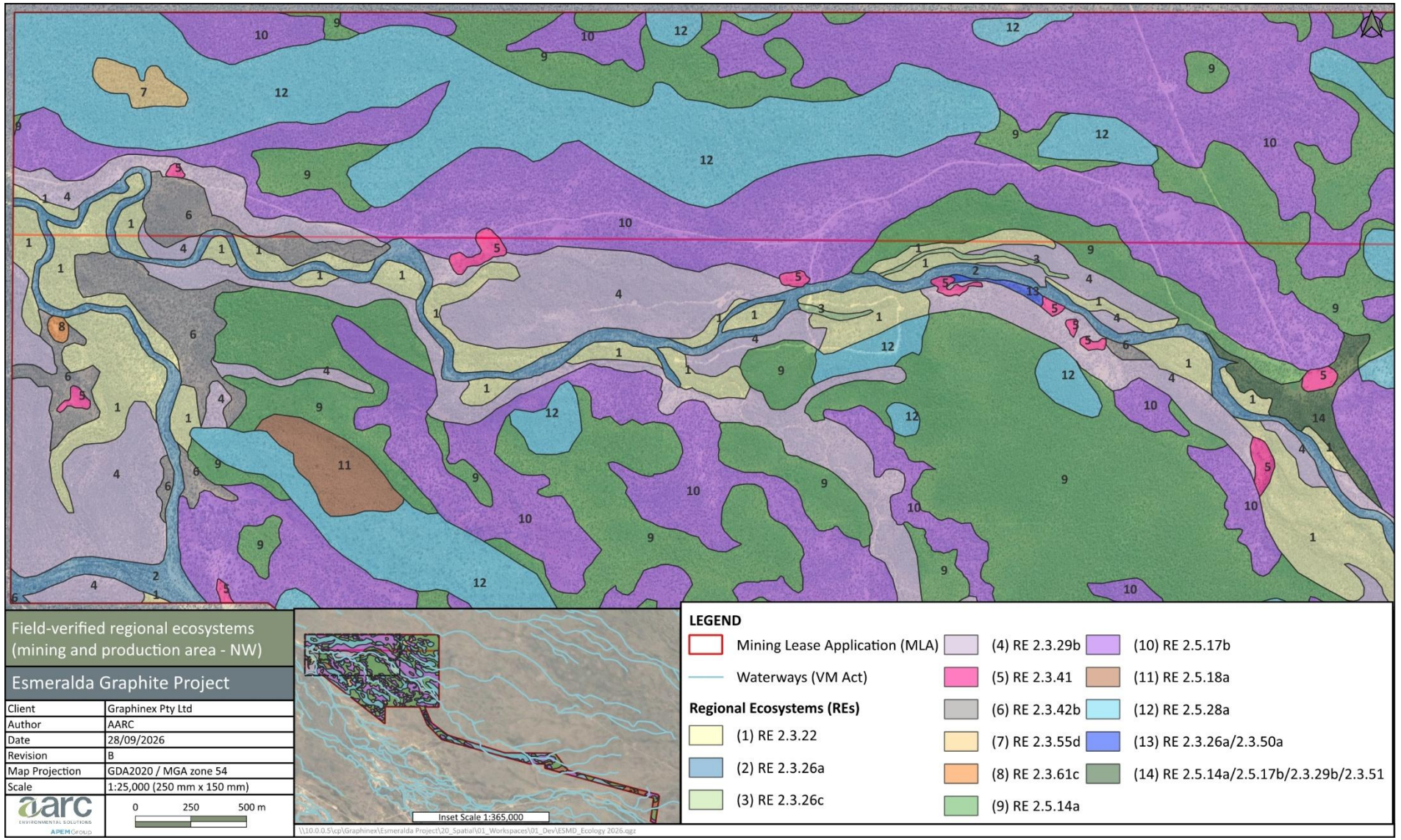


Figure 22: Field verified vegetation communities (mining and processing area – northwest)

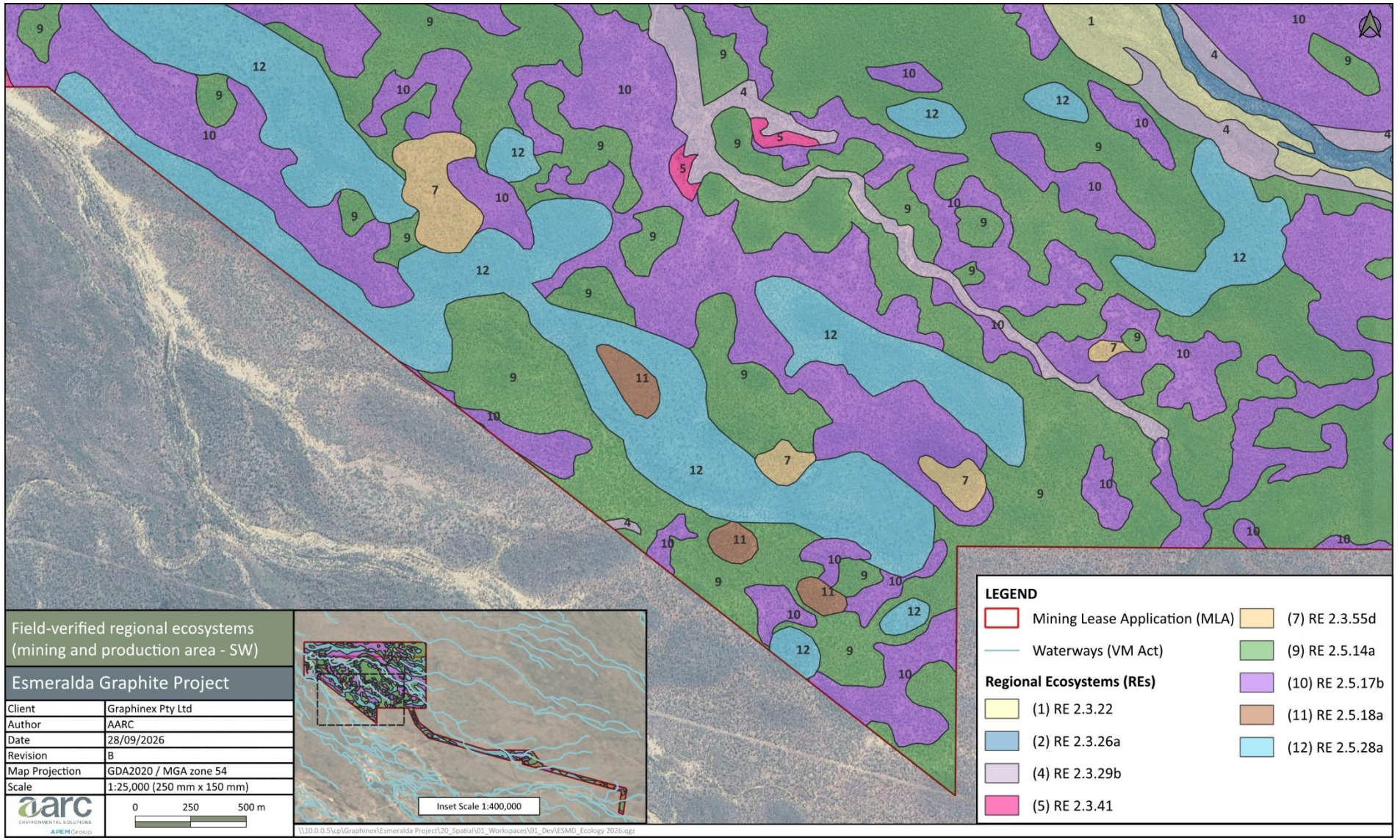


Figure 23: Field verified vegetation communities (mining and processing area – southwest)

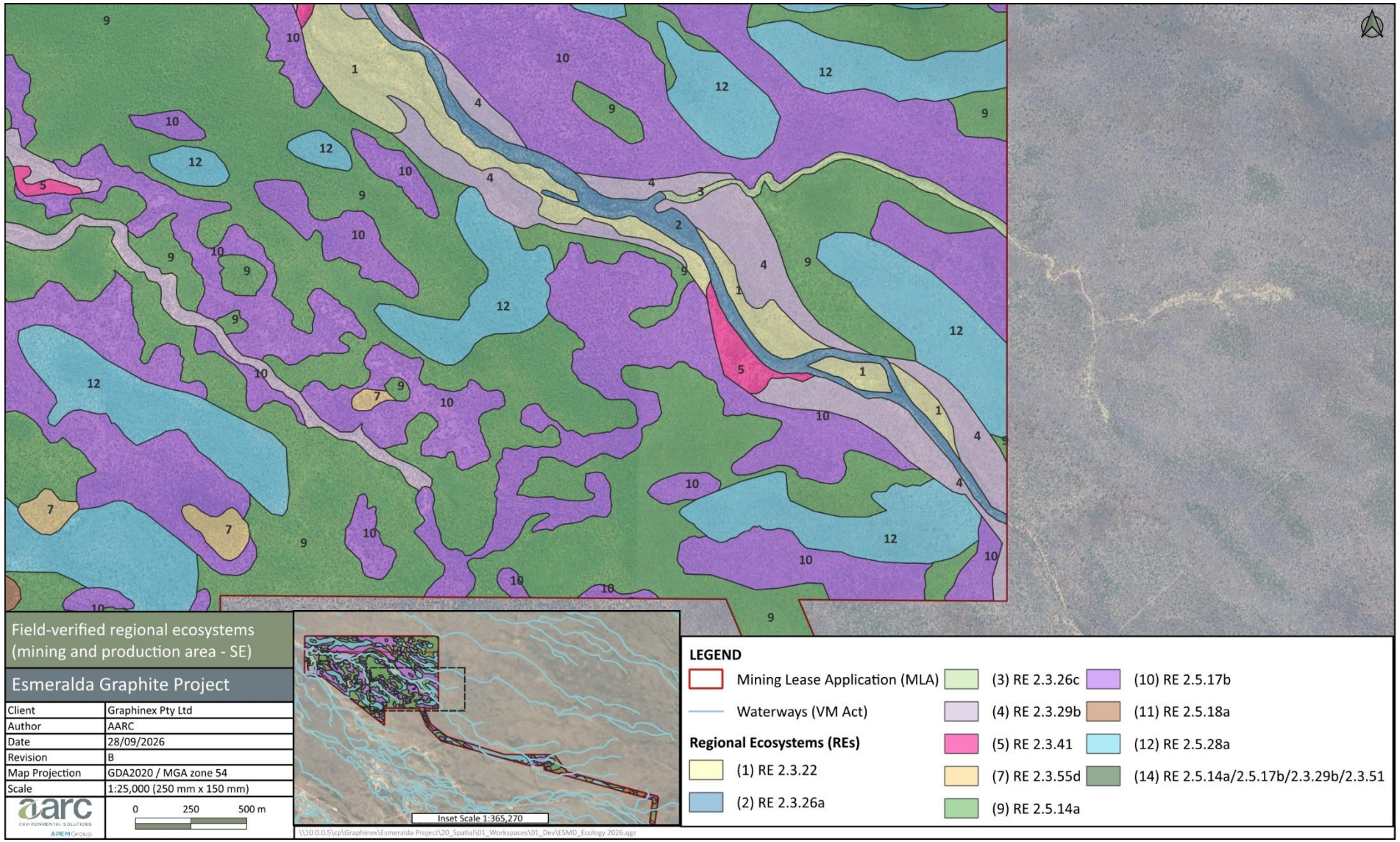


Figure 24: Field verified vegetation communities (mining and processing area – southeast)

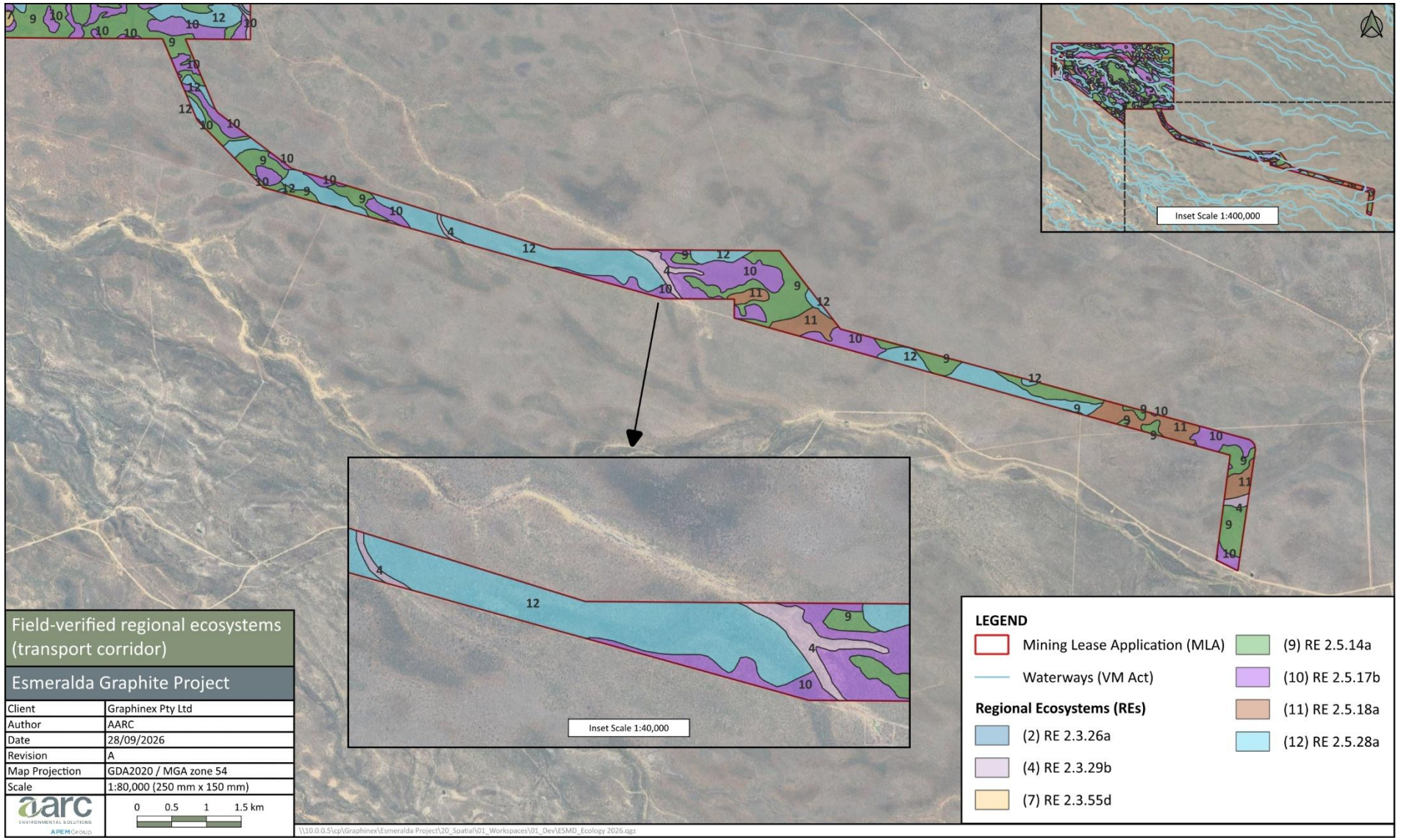


Figure 25: Field verified vegetation communities (transport corridor)

Vegetation condition

The condition of vegetation and the nature of disturbance present within the vegetation communities was recorded during the field surveys. Evidence of cattle grazing was noted at nearly all vegetation communities, occurring in the form of tracks, pats, and direct observation. The condition of all vegetation communities was notably reduced by existing land management practices.

3.1.8.2 Terrestrial flora species

A total of 87 native flora species were confirmed during the field surveys representing 28 families and 67 genera. The dominant family group was Poaceae (18 species), with Fabaceae (14 species) and Myrtaceae (11 species) also prominent. The dominant family groups demonstrate the overall composition of the vegetation communities surveyed, with the ground layer being the most diverse.

No flora species of conservation significance under EBPC Act or NC Act were identified in the Project area.

One introduced flora species - Rubber Vine (*Cryptostegia grandiflora*) – was recorded within the study area in low abundance. This species is listed as a restricted matter under the *Biosecurity Act* (Qld).

Introduced flora species may also be classified by the Australian Government as Weeds of National Significance (WoNS) if they present a serious threat to industry, water supply, human health/safety, plant communities and/or cultural values. Rubber Vine is classed as a WoNS.

3.1.8.3 Fauna observations

Terrestrial fauna species

A total of 144 native vertebrate species were identified during the field surveys, comprising six amphibians, 25 reptiles, 100 birds and 13 mammals. One invertebrate was identified being a Freshwater Crab.

Two bird species of conservation significance, the White-throated Needletail (*Hirundapus caudacutus*), listed as vulnerable and migratory under the EPBC Act, and the Fork-tailed Swift (*Apus pacificus*), listed as migratory under the EPBC Act, were observed during the November 2024 field survey, with the Fork-tailed Swift also being recorded during the February 2025 field survey.

Five introduced fauna species have been recorded in the study area by detecting scats, tracks, sensor camera detection and/or direct observation. The five species are:

- Cane Toads (Rhinella marina);
- Dingo (Canis lupus dingo);
- Feral Cat (*Felis catus*);
- Cow (*Bos taurus*); and
- Feral Pig (*Sus scrofa*).

Three of the introduced species, the Feral Cat, the Feral Pig and the Dingo, are listed as a restricted matter under the *Biosecurity Act* (Qld). However, none of the species are listed as a prohibited matter under the *Biosecurity Act* (Qld). These species are also part of the Croydon Shire Biosecurity Plan 2019 (GCBAI 2019).

Aquatic fauna species

No conservation significant aquatic fauna were identified in the survey. Habitat observations, water, sediment and invertebrate data collected during the survey collectively indicate an aquatic ecosystem consistent with highly ephemeral streams in regional Queensland. Turbidity, dissolved aluminium, total nitrogen, and hydrocarbons were elevated relative to aquatic ecosystem guidelines, assumed to be reflective of land use

practices and the flow conditions at the time of the survey. Observations of grazing impacts were evident at some sites and was reflected in the elevated turbidity and total nitrogen (which is predominantly organic nitrogen forms).

As per Section 3.1.5.5, an unnamed waterway transects part of the Project area and is mapped as moderate and low risk from waterway barrier works for fish passage. A small section of Warrigal Creek transects the Project MLA, and this section is mapped as high risk from waterway barrier works for fish passage.

3.1.8.4 Wetlands

No high ecological significance wetlands were identified within a 150 km radius surrounding the Project. The nearest Ramsar Wetland to the Project is Bowling Green Bay, which is located approximately 470 km south-east of the Project at its nearest point. The second nearest Ramsar Wetland to the Project is the Coral Sea Reserves (Coringa-Herald and Lihou Reefs and Cays), which is located approximately 720 km north-east of the Project at its nearest point.

In the Project area, Warrigal Creek and the unnamed tributary of Warrigal Creek are vegetated with River Red Gum (*Eucalyptus camaldulensis*) woodland to low woodland, with Melaleuca spp. among them. There are some areas of River Red Gum (*Eucalyptus camaldulensis*) low woodland, with Broad-leaved Paperbark (*Melaleuca viridiflora*), often in the smaller channels. The wetlands are mapped as seasonal swamps with either Coolibah (*Eucalyptus microtheca*) and Broad-leaved Paperbark (*Melaleuca viridiflora*) woodland in closed depressions on alluvial plains, or Broad-leaved Paperbark (*Melaleuca viridiflora*) low woodland in shallow closed depressions on sand sheets (Table 13). Queensland wetland mapping for the Project area identifies vegetation types potentially containing wetland REs (palustrine and riverine). Three ephemeral swamps areas (mapped as VM Act wetlands) have been identified through terrestrial and aquatic ecological surveys (Figure 26, Figure 27 and Figure 28).

Table 13: Regional Ecosystems analogous with wetlands in the study area

RE	Description	VM Act status	Wetland association
RE 2.3.26a	River Red Gum (*Eucalyptus camaldulensis*) woodland to low woodland, with *Melaleuca* spp., on fringes and in channels of minor watercourses	Least concern	Riverine
RE 2.3.26c	River Red Gum (*Eucalyptus camaldulensis*) low woodland, with Broad-leaved Paperbark (*Melaleuca viridiflora*), on fringes of minor watercourses in broad sand sheets	Least concern	Riverine
RE 2.3.55d	Seasonal swamp (wooded). Broad-leaved Paperbark (*Melaleuca viridiflora*) low woodland in shallow closed depressions on sand sheets	Least concern	Palustrine
RE 2.3.61c	Seasonal swamp (wooded). Coolibah (*Eucalyptus microtheca*) and Broad-leaved Paperbark (*Melaleuca viridiflora*) woodland in closed depressions on alluvial plains	Least concern	Palustrine

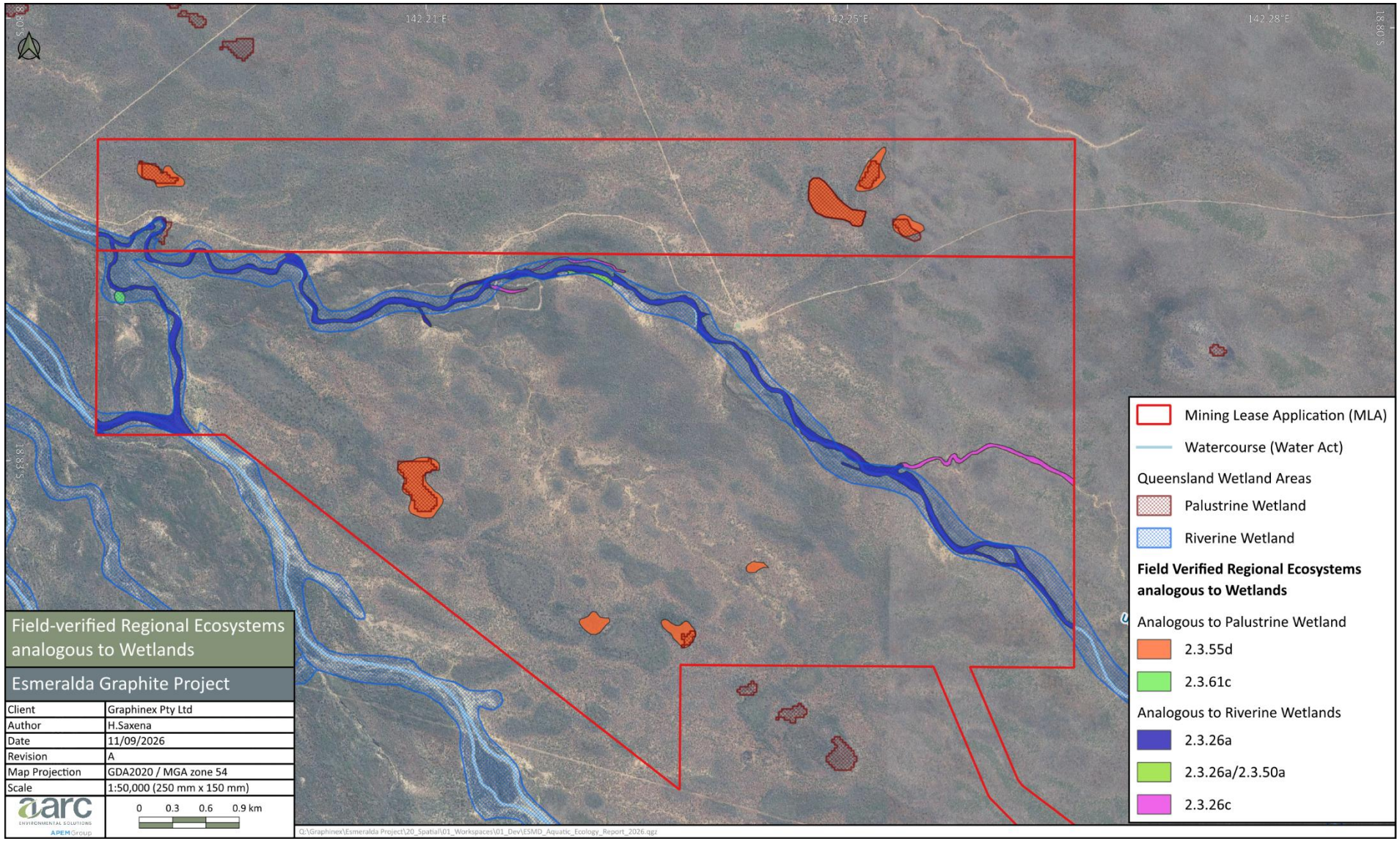


Figure 26: Regional ecosystems analogous to wetlands (mining and processing area)

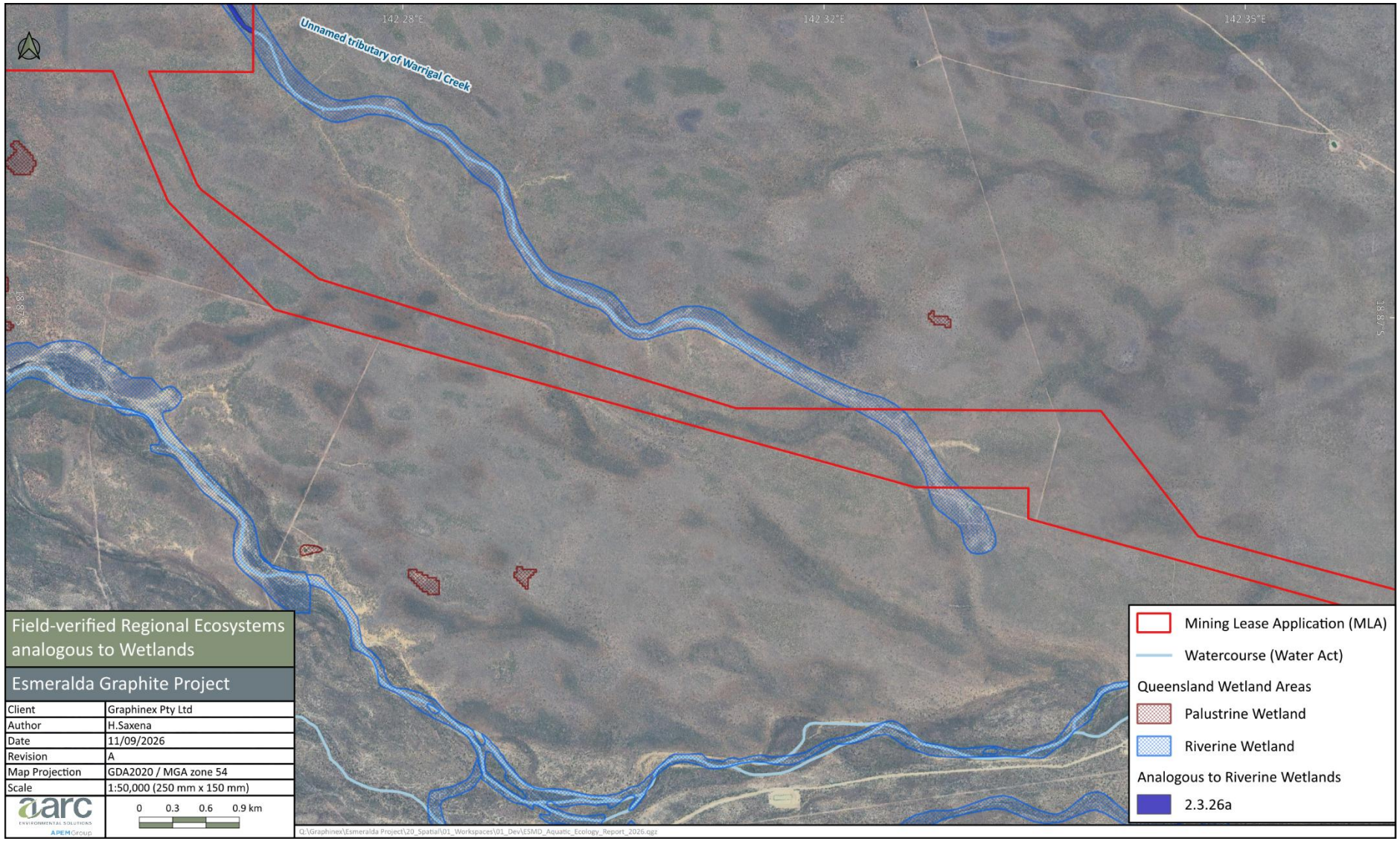


Figure 27: Regional ecosystems analogous to wetlands (western transport corridor)

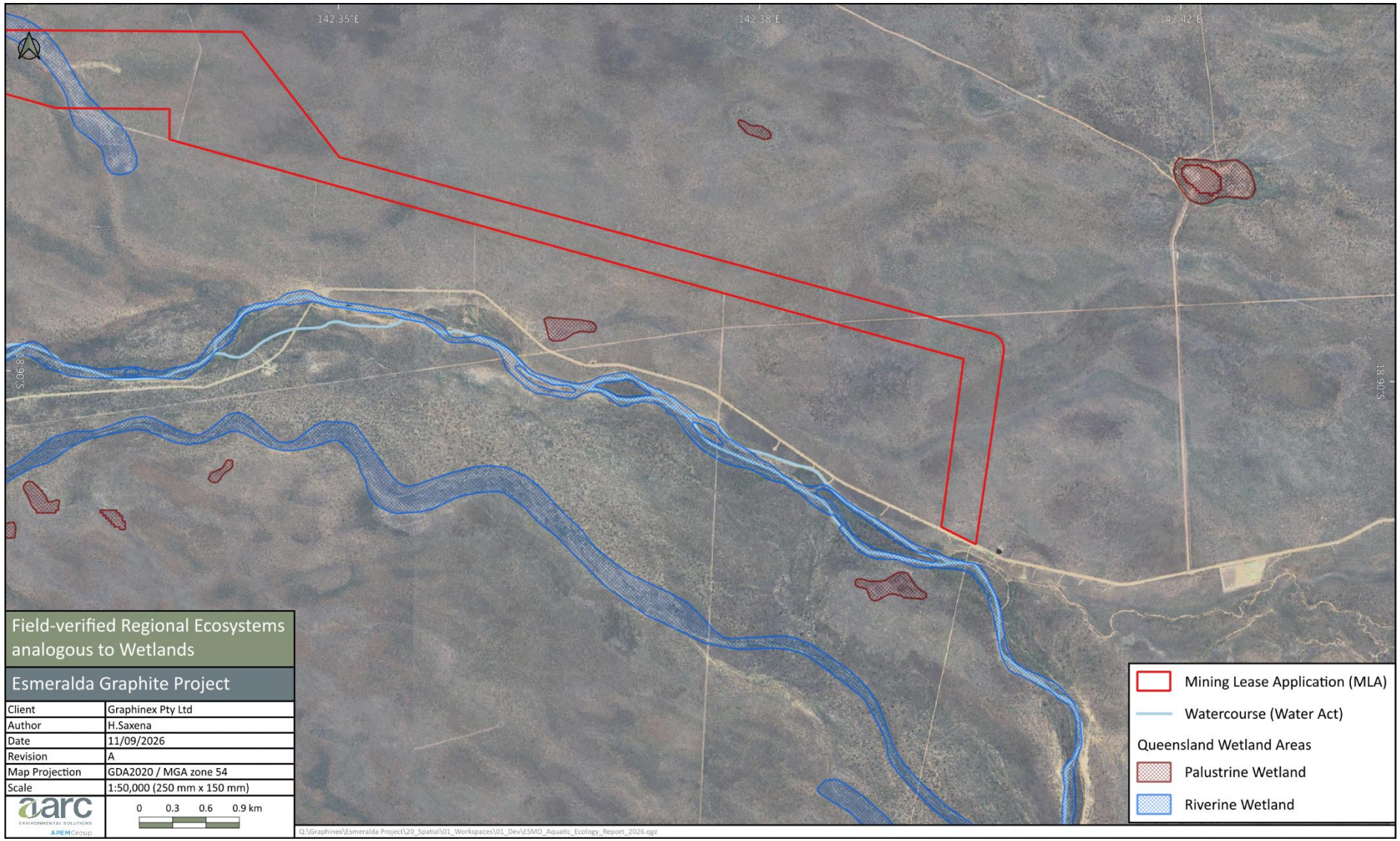


Figure 28: Regional ecosystems analogous to wetlands (eastern transport corridor)

3.1.8.5 Groundwater dependent ecosystems

A preliminary desktop search indicated the possible presence of terrestrial groundwater dependant ecosystems (GDEs) around the proposed mining area and further afield. These potential GDEs are generally linked to riverine / floodplain ecosystems. While government mapping generally indicates watercourse vegetation to have potential as GDEs, this is not considered to be an indication of actual groundwater dependency. GDEs will be determined through further assessment against by specialist GDE experts to quantify presence or absence.

The nearest publicly mapped spring is located more than 30 km from the Project mining area. There are no surface expressions of groundwater within or near the Project.

Watermark Eco (2026) completed targeted field investigations of areas identified within the GDE Atlas as potential aquatic or terrestrial GDEs. The assessment found no evidence that woody vegetation within the Project area relies directly on groundwater to sustain transpiration during dry seasonal conditions. Instead, vegetation was observed to depend on moisture retained within the vadose zone.

3.2 Community consultation

3.2.1 Stakeholder and community engagement activities

The surrounding community and affected stakeholders have been engaged on numerous occasions throughout the development of the Project, as well as during the preparation of the PRCP and EIS. The details of this engagement are included within the Public Consultation Report (AARC 2026c) included as an Appendix to the EIS. This engagement has been critical to ensure that all relevant community members are aware of the Project, its aspects, and potential impacts. Consultation has provided stakeholders the opportunity to comment on issues of relevance to them.

The Project consultation undertaken has included the following objectives:

- ensuring that community members have understood the Project details, timing and workforce arrangements so that discussions about impacts and benefits are meaningful;
- providing community members with the opportunity to identify and assess potential social impacts and applicable mitigation measures;
- ensuring transparent and inclusive community engagement to facilitate the ongoing management and monitoring of potential social impacts.
- ensuring that Project planning and delivery are informed by community views; and
- ensuring that rehabilitation and closure objectives and PMLUs are developed in consideration of community expectations.

Graphinex maintains a community engagement register that meets the requirements of section 126C(1)(c)(iii) of the EP Act and the PRCP Guidelines. This register has been used to record consultation date(s), engaged community member(s), consultation type, information provided, key issues raised, response actions and/or outcomes and any commitments made by Graphinex. The community engagement register including consultation up to and including February 2026 is included as Appendix D. From the register, and beyond pre-clearing and access matters, few issues related to rehabilitation and closure have been raised.

The proposed PMLUs generally seek to return the land to a land-use type consistent with the pre-mining land use, which is predominantly low intensity grazing on native vegetation. Rehabilitation and closure matters, including the proposed PMLUs, will continue to form part of stake holder engagement throughout the Project life. Consultation undertaken to date has identified few issues relating to rehabilitation and closure, and feedback received through ongoing engagement will be considered in the development and implementation of the PRCP. Ongoing consultation will provide interested stakeholders with the opportunity to provide input on the proposed PMLUs and rehabilitation and closure outcomes.

3.2.2 Community and Stakeholder Engagement Plan

A Community and Stakeholder Engagement Plan for the Project has been developed to address the requirements of 126C(1)(c)(iii) and section 126C(1)(c)(iv) of the EP Act, and the PRCP Guideline. It is intended to act as a framework to guide consultation and ensure stakeholders are provided the opportunity to engage on, among other things, rehabilitation and closure matters relating to the Project. The Project Community and Stakeholder Engagement Plan is included at Appendix D.

Ongoing consultation will occur at key stages of the Project life where any significant progress is made or when Project activities change significantly. The following methods will be used to maintain contact with the local community throughout the life of the Project:

- provision of a company contact phone number and website for enquiries and complaints;
- communicating with the community throughout the life of the Project via site visits, consultation meetings and printed materials; and
- consulting with the community closer to the closure and decommissioning of the mine concerning requirements for mine closure, access, post-mining monitoring.

Additionally, feedback from the consultation process and any complaints, compliments or other points of contact will continue to be entered into the community engagement register.

3.3 Post-mining land use

This section of the PRCP describes and discusses the PMLUs proposed for the Project in accordance with section 126C(1)(d) of the EP Act.

In accordance with the Queensland Government's objectives defined in the *Mined Land Rehabilitation Policy* (Queensland Government 2018), the general post-mining rehabilitation goals for the Project are to leave an area that is safe, stable, does not cause environmental harm and is able to sustain the PMLU.

3.3.1 Existing land use

The Project is not located in a Priority Agricultural Area, Strategic Cropping Area, Strategic Environmental Area or Priority Living Area, as defined by the Regional Planning Interests Act 2014. The current land use of the Project site is mapped as predominantly low intensity cattle grazing on native woodlands, as well as a small section classified as a lake, and a marsh/wetland designation for a riparian zone. Land use is classified according to the *Australian Land Use and Management Classification version 8* (ABARES 2016)

3.3.2 Planning scheme conformance

The land in and surrounding the Project area is within the Croydon Shire Planning Scheme (2019) and is zoned as 'Rural'. The purpose of the rural zone is to:

1) *provide for rural uses and activities; and*
2) *provide for other uses and activities that are compatible with—*
    a. *existing and future rural uses and activities; and*
    b. *the character and environmental features of the zone; and*
3) *maintain the capacity of land for rural uses and activities by protecting and managing significant natural resources and processes.*

The non-statutory Gulf Regional Development Plan (GRDP) is currently under review. The most recent version (2000) was developed to promote a 'robust regional economy' capable of providing wealth creation and employment opportunities for Gulf communities, with stated objectives to provide opportunities for work with the mining industry and to maximise benefits to the region (GRPAC 2000).

3.3.3 Proposed post-mining land use options

The proposed post-mining land uses (PMLUs) are consistent with the existing rural land use and the strategic land use outcomes identified at the local and State level. The proposed PMLUs are also consistent with the rehabilitation objectives of the Queensland Government's Mined Land Rehabilitation Policy, including establishing land that is safe and stable and does not cause environmental half and is able to sustain an appropriate PMLU.

3.3.3.1 Grazing native vegetation (low intensity)

As per Section 3.3.1, the current land use of the Project area is mapped as predominantly low intensity cattle grazing on native woodlands, as well as a small section classified as a lake, and a marsh/wetland designation for a riparian zone. However, as is often the case in many parts of Queensland, the current land use is one that demonstrably sustains a viable, grazing land use of sufficiently low intensity to address the inherent limitations that might exist. As identified within Section 3.2 of the PRCP Guideline, the land use prior to the mining activity commencing is a key consideration in determining an appropriate PMLU.

The proposed PMLUs have been developed with consideration for the existing local and regional land use, consultation with local community, the *Croydon Shire Planning Scheme* (Croydon Shire 2019), local ecological values, natural site characteristics and the landform features proposed to remain at closure.

Given this the primary target PMLU is designated as 'grazing native vegetation'. Native grasses are mostly perennial and persist well in the Australian environment. Their adaptation to the harsh and varying climate – including severe droughts, low rainfall, and highly weathered soils – make achieving the PMLU of grazing on native pastures most likely to succeed when seeding with a diverse, native grass mix.

3.3.3.2 Riparian ecosystem

As noted above, while the predominant land use of the area is low intensity cattle grazing on native pastures, there are some minor identified areas of riparian vegetation, albeit still subject to grazing given that no fencing to exclude cattle exists. The proposed PMLU of the permanent diversion is a 'riparian ecosystem' that will aim to achieve similar conditions to the existing riparian environment adjacent to the bank of an unnamed tributary of the Warrigal Creek.

3.3.3.3 Retained infrastructure

'Retained infrastructure' includes roads, tracks and buildings that are complementary to the predominant grazing PMLU proposed, as well as for access and safety reasons. Retained infrastructure components nominated for retention to support the grazing PMLU and to be transferred to the landholder upon surrender, include:

- cattle exclusion fencing around the area of:
    - tailings storage facility Cell 4 (RA9); and
    - the southwestern waste rock dump (RA8);
- seal roads, access tracks and haul roads;
- airfield;
- helipad;
- accommodation camp;

- solar array;
- diesel station; and
- HV substation

A signed landholder agreement has been received by Graphinex, and will be subject to acquisition of the land by the Proponent, and the establishment of a new entity:

(a) consents to the permanent infrastructure identified in this letter remaining on the Land after the cessation of mining activities for the Project; and

(b) undertakes to accept responsibility, liability and ongoing maintenance obligations for the permanent infrastructure following the surrender of MLs 100430 and 100431 by QLD Aus Graphite Pty Ltd.

The retained infrastructure will provide ongoing benefits post-cessation of mining and support the proposed post-mining land uses. The roads will provide improved access for land management, grazing and emergency services The retained airfield and helipad will provide aviation access to support emergency responses and access to the remote location. Meanwhile, the solar array will provide a long-term source of renewable electricity to support retain grazing operations in a remote location, in a manner which will contribute to the reduction of greenhouse gas emissions.

3.3.3.4 Retained water storage

Sediment dam 3 will be retained post-closure. Retention of the water storage structure has been agreed by the proposed future landholder, through a signed landholder agreement as stated in 3.3.3.3.

The intended PMLU for the retained 'water storage' is to provide a water source meeting the required objectives for stock watering, and which is complementary to the broader 'grazing native vegetation' land use. The remaining water storage structures (process water dam, pit dewatering dam, sediment dams 1, 2 and 4, clean water drain, clean water sump and mine affected water (MAW) sump) will be decommissioned and rehabilitated to the 'grazing native vegetation' PMLU.

3.3.3.5 Grassland

For the majority of the site, the proposed PMLU aims to reinstate the existing land use of low intensity grazing on native vegetation by returning the land to similar vegetation type and land class suitability to that existing prior to mining disturbance.

At the end of the mining phase, a mining pit will exist. An options analysis was undertaken to identify and assess closure options. A summary of the outcomes of the options analysis is provided in Table 14 with the preferred outcome being to backfill the pit in a managed way to address the identified potential groundwater impact concerns. Key advantages of this approach include significantly minimising the waste rock dump and TSF footprints at closure, as well as maximising the area of preferred 'grazing native vegetation' PMLU.

Table 14: Mine pit closure options analysis

Option	Outcome	Pros	Cons
1. No backfill	Final pit lake (~40m below surface)	• Permanent sink • No risk of contaminant release to GW • No rehandle of waste or tailings	• Potential to result in a NUMA • NUMA cannot be approved in floodplain • Requires permanent flood protection landforms

Option	Outcome	Pros	Cons
2. Partial backfill waste rock only	Final pit lake expected (~40m below surface)	• Likely permanent sink • No risk of contaminant release to GW • Removal of waste dumps in final landform • Backfill ore zone minimises interaction with pit lake • PMLU outcome agricultural water supply	• Requires permanent flood protection landforms • Rehandle costs waste • Difficult to demonstrate long-term water quality meets PMLU outcome to regulators
3. Partial backfill tailings and waste	Final pit lake expected	• Likely permanent sink • Low risk of contaminant release to GW • Removal of waste dumps in final landform • Removal of some TSFs in final landform, reducing rehab costs and risk • Backfill ore zone minimises interaction with pit lake • PMLU outcome agricultural water supply	• Requires permanent flood protection landform • Rehandle costs waste • Rehandle costs tailings • Difficult to demonstrate long-term water quality meets PMLU outcome to regulators • Managed disposal of tailings in ore zone
4. Complete backfill tailings and waste	Water shedding landform	• Final landform consistent with pre-mining landscape • Clear PMLU of grazing achieved • No pit lake to manage • No requirements for permanent flood protection • Maximises removal of TSFs in final landform, reducing rehab costs and risk	• Rehandle costs waste • Maximises rehandle costs for tailings • Removal of pit lake evaporation will result in a long-term flow through arrangement • Managed disposal of tailings in ore zone • Geochemical study needed to predict risk of contaminant release • Preferred PMLU outcome
5. Complete backfill tailings and waste with a capping layer	Water shedding landform and hydraulic isolation of tailings	• Final landform consistent with pre-mining landscape • Clear PMLU of grazing achieved • No pit lake to manage • No requirements for permanent flood protection • Maximises removal of TSFs in final landform, reducing rehab costs and risk • Non-polluting	• Rehandle costs waste • Maximises rehandle costs for tailings • Removal of pit lake evaporation will result in a long-term flow through arrangement • Managed disposal of tailings in ore zone • Geochemical study needed to predict risk of contaminant release • Preferred PMLU outcome

However, the retained waste rock dump and final cell of the TSF are not considered amenable to a 'grazing native vegetation' PMLU and are proposed instead to be returned to a 'grassland' PMLU to provide for additional management controls commensurate with the identified risks.

'Grassland' is considered as a variant of the low intensity cattle grazing land use, applied where slopes exceed those typically suited to the proposed grazing land use, and therefore requiring careful management controls.

'Grassland' has been proposed as a PMLU for the retained TSF and WRD as these landforms will be elevated and have slopes greater than 20%, making them unsuitable for safe or sustainable grazing.

While the Australian Land Use Management Classification (ABARES 2016) defines the nominated land use for the area as 'grazing native vegetation', the intent of the 'grassland' PMLU is for these areas to be rehabilitated with vegetation species composition and distribution consistent to the surrounding grazing land use, while excluding cattle access to these areas.

3.3.3.6 Summary land use outcomes

Disturbed areas will be returned to land uses of either 'grazing native vegetation', 'water storages', 'riparian ecosystem' or 'retained infrastructure' as applicable. Section 3.5 further defines the specific proposed rehabilitation areas and assigned PMLUs.

The proposed PMLUs are shown in Figure 29 and Figure 30 and detailed in Table 15 and:

- are considered viable, having regard to the use of land in the surrounding region;
- are consistent with how the land was used before a mining activity was carried out;
- are consistent with the uses of land permitted under local planning instruments; and
- will deliver, or aim to deliver, a beneficial environmental outcome that is acceptable to the local community.

Table 15: Summary of proposed PMLUs

PMLU	Description	Mine domain/ area
'Grazing native vegetation' (low intensity)	Targeting a modified woodland ecosystem similar to that of the land use of surrounding areas.	• Mine infrastructure area • Supporting Surface Activities • Water management infrastructure • Backfilled void and levee • Rehabilitated TSFs and WRD
Retained infrastructure	Roads and other infrastructure providing benefit to agricultural production.	• Retained roads and buildings • Airfield • Cattle exclusion fence • Helipad • Solar array • HV substation
Grassland	Grassland typically on slopes comprising a mix of native and pasture species providing agricultural value and surface stability on artificial landforms.	• Retained WRD • Retained TSF
Water Storage	Dams to remain as water body, for stock watering.	• Raw water dam • Pit dewatering dam • Sediment dams
Riparian ecosystem	Native vegetation community consistent with the existing landscape reinstated along restored drainage lines, providing biodiversity values and surface stability functions.	• Diversion

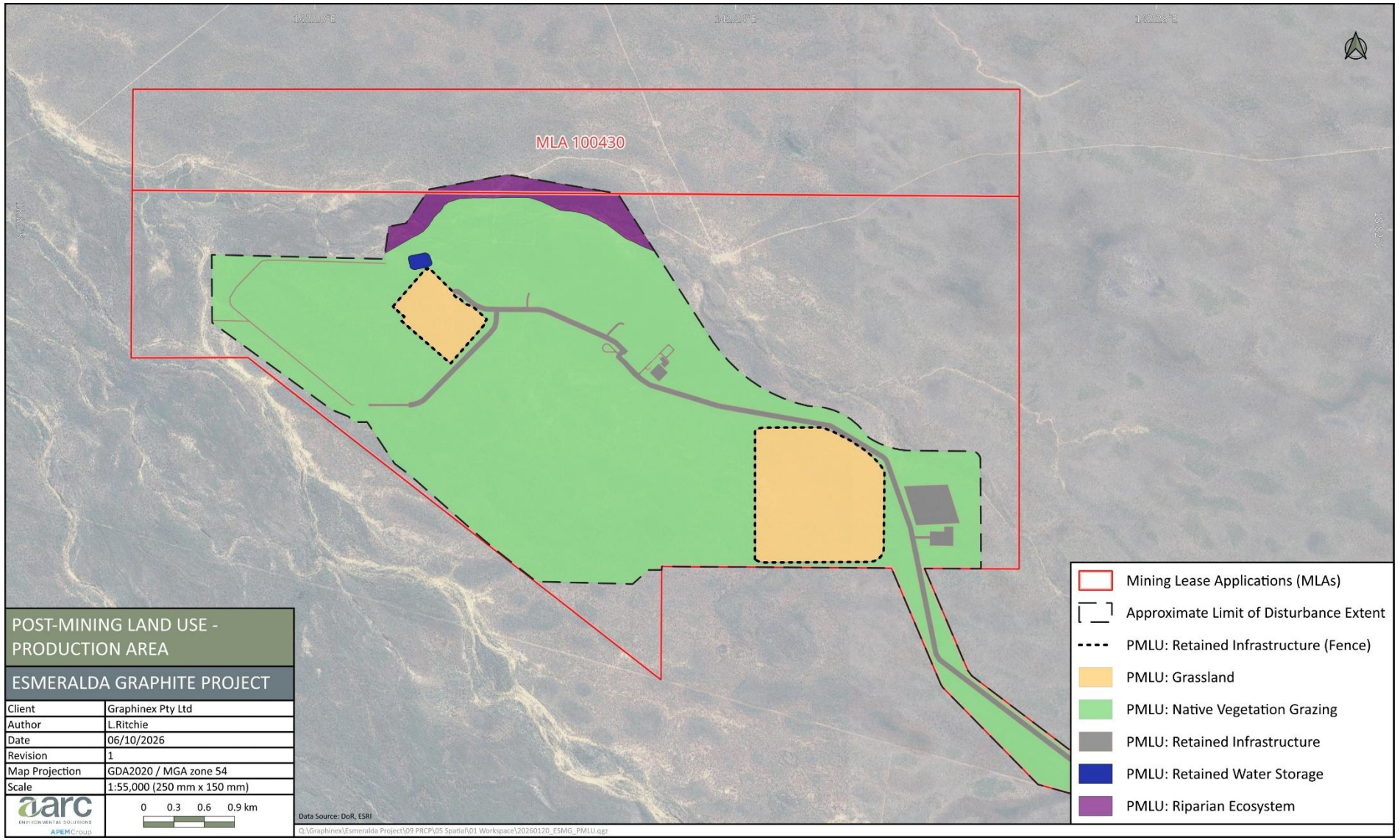


Figure 29: Proposed PMLUs - Mining and production area

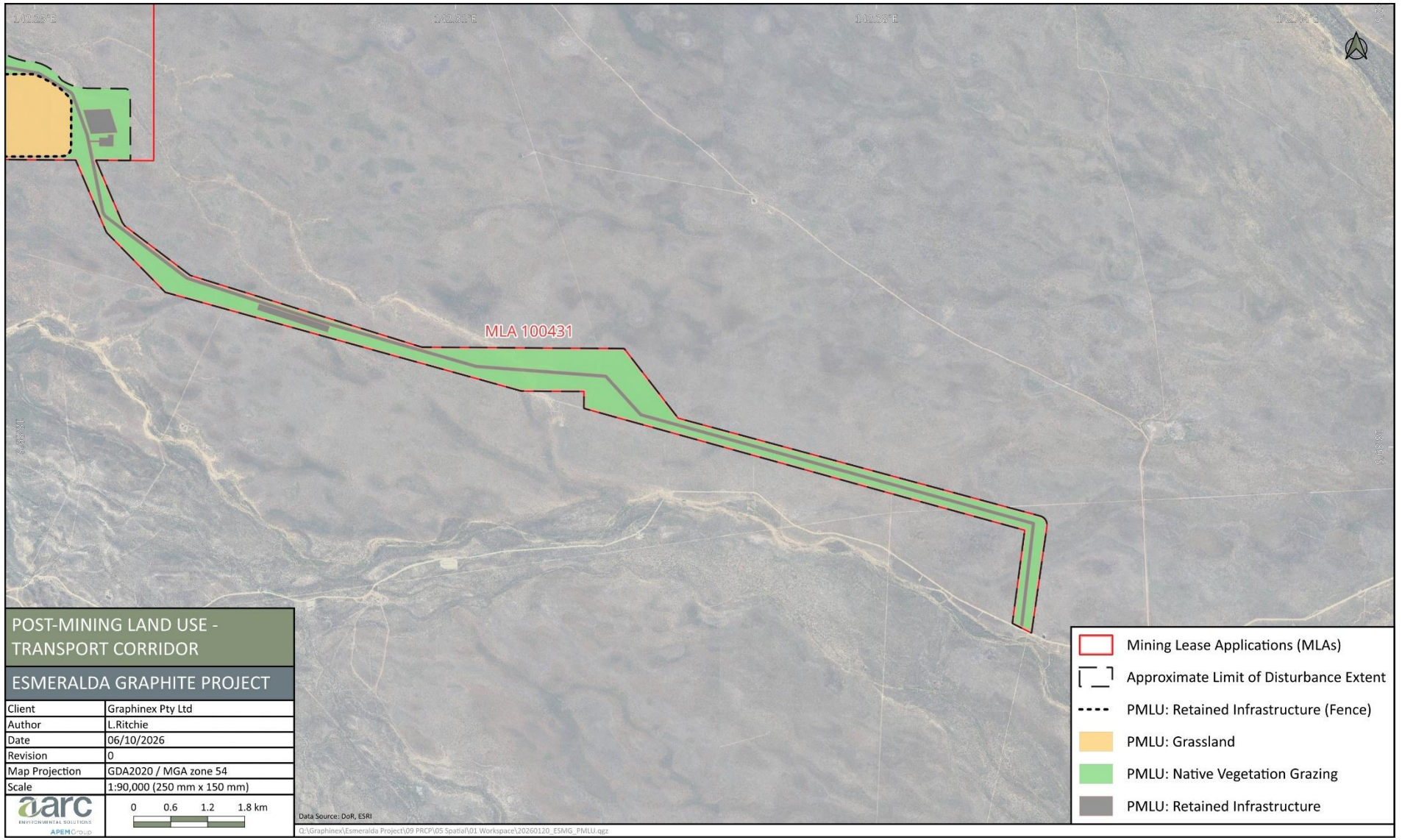


Figure 30: Proposed PMLUs - Transport corridor

3.4 Non-use management areas

There are no non-use management areas proposed for the Project.

3.5 Rehabilitation management methodology

3.5.1 Rehabilitation objectives

In Queensland, mine rehabilitation is required under the EP Act. Amendments to the EP Act in late 2018 implemented key elements of the State Government's *Mined Land Rehabilitation Policy* (Queensland Government 2018) which intends to ensure that, for land disturbed by mining activities:

- the land is safe and structurally stable;
- there is no environmental harm being caused by anything on or in the land; and
- the land can sustain a post-mining land use (section 111A of the EP Act).

These three objectives comprise the general rehabilitation goals for the Project.

3.5.2 Rehabilitation areas

To allow the development of a PRCP schedule that satisfies the requirements of the PRCP Guideline, discrete rehabilitation areas (RAs) have been defined for the Project. An RA is defined by the EP Regulation as an area of land in the PMLU to which a rehabilitation milestone for the post-mining use relates. RAs are nominated for areas of disturbance within the Project with consideration for the disturbance type and the proposed PMLU. The RAs proposed for the Project are described in Table 16 and shown in Figure 31 and Figure 32.

Table 16: Project rehabilitation areas (RAs)

Reference	Rehabilitation area	Description of RA	PMLU	Area (ha)
RA1	Mine infrastructure area	• Mineral processing plant, ore handling facilities and associated infrastructure • Sewage treatment plant and effluent irrigation infrastructure • Fencing and magazine	Grazing native vegetation (low intensity)	18.
RA2	Retained infrastructure	• Mine access roads and track • Airfield and helipad • Cattle exclusion fence • Solar array and associated infrastructure • Workers village accommodation	Retained Roads and buildings	175
RA3	Supporting Surface Activities (Buffer disturbance area)	• Minor areas of surficial disturbance arising from approved supporting activities requiring rehabilitation; including topsoil stockpiles on natural surfaces	Grazing native vegetation (low intensity)	1295.1
RA4	Rehabilitated water management infrastructure	• Process water dam • Raw water dam • Clean water sump • Sediment dams 1, 2, 4 • Pit dewatering dam; and • MAW sump	Grazing native vegetation (low intensity)	25.3
RA5	Retained water storages (for stock watering)	• Sediment dam 3	Retained water storage	2.95
RA6	Backfilled void	• Void backfilled with tailings and waste rock to approximate pre-existing surface level • Rehabilitated levee	Grazing native vegetation (low intensity)	79.7
RA7	Rehabilitated levee	• Rehabilitated levee	Grazing native vegetation (low intensity)	11.6
RA8	Rehabilitated waste rock dump footprint	• Footprint of waste rock dump used for backfilling void	Grazing native vegetation (low intensity)	58.9
RA9	Retained Waste Rock Dump	• Out-of-pit waste rock dump	Grassland	42.6
RA10	Retained Tailings Storage Facility	• Retained TSF	Grassland	157.1
RA11	Rehabilitated TSF footprint	• TSF footprint following relocation of tailings	Grazing native vegetation (low intensity)	486.1
RA12	Permanent diversion	• Disturbance area associated with the diversion	Riparian ecosystem	60.8
Total Disturbance				2,413.7

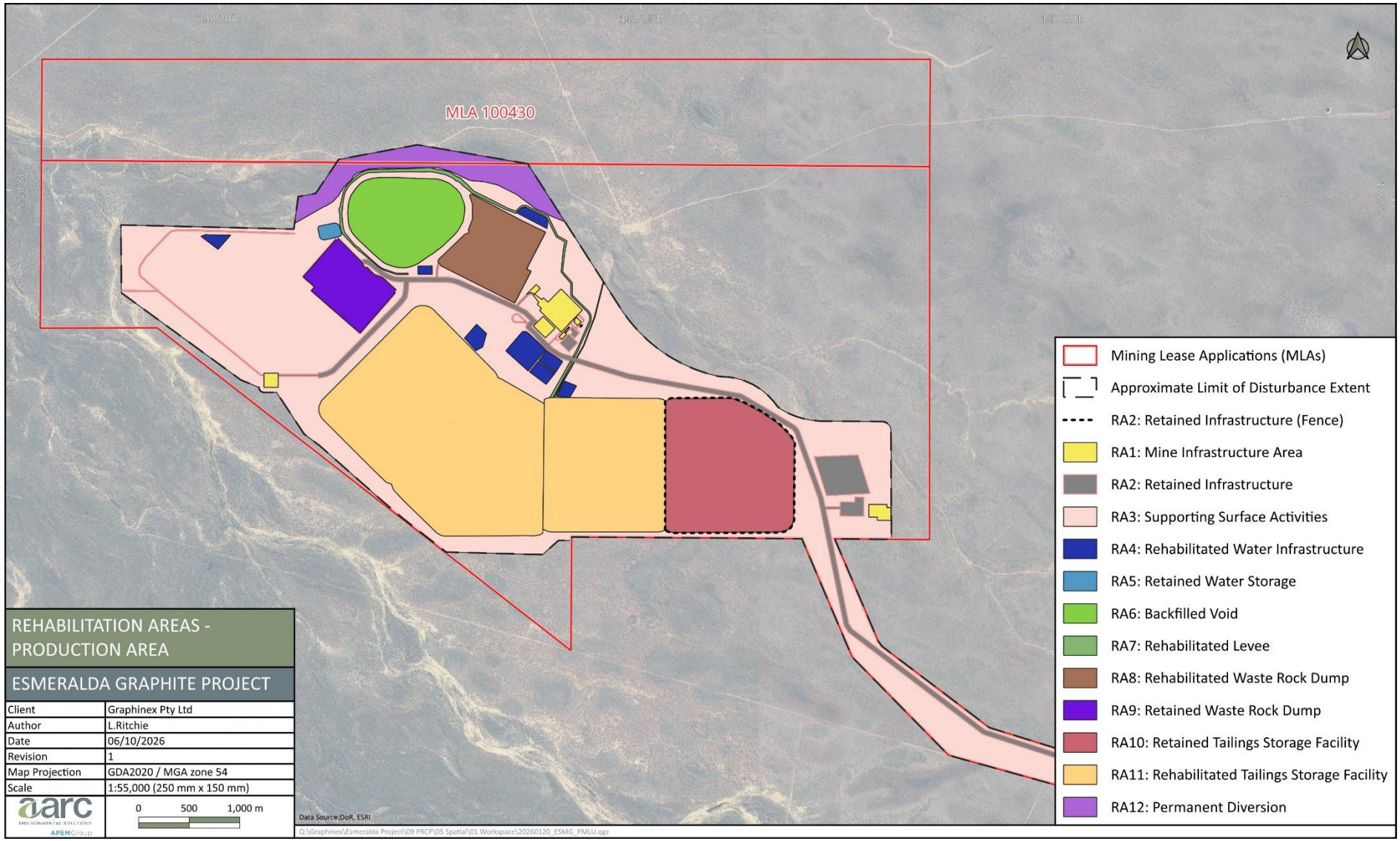


Figure 31: Rehabilitation areas - production area

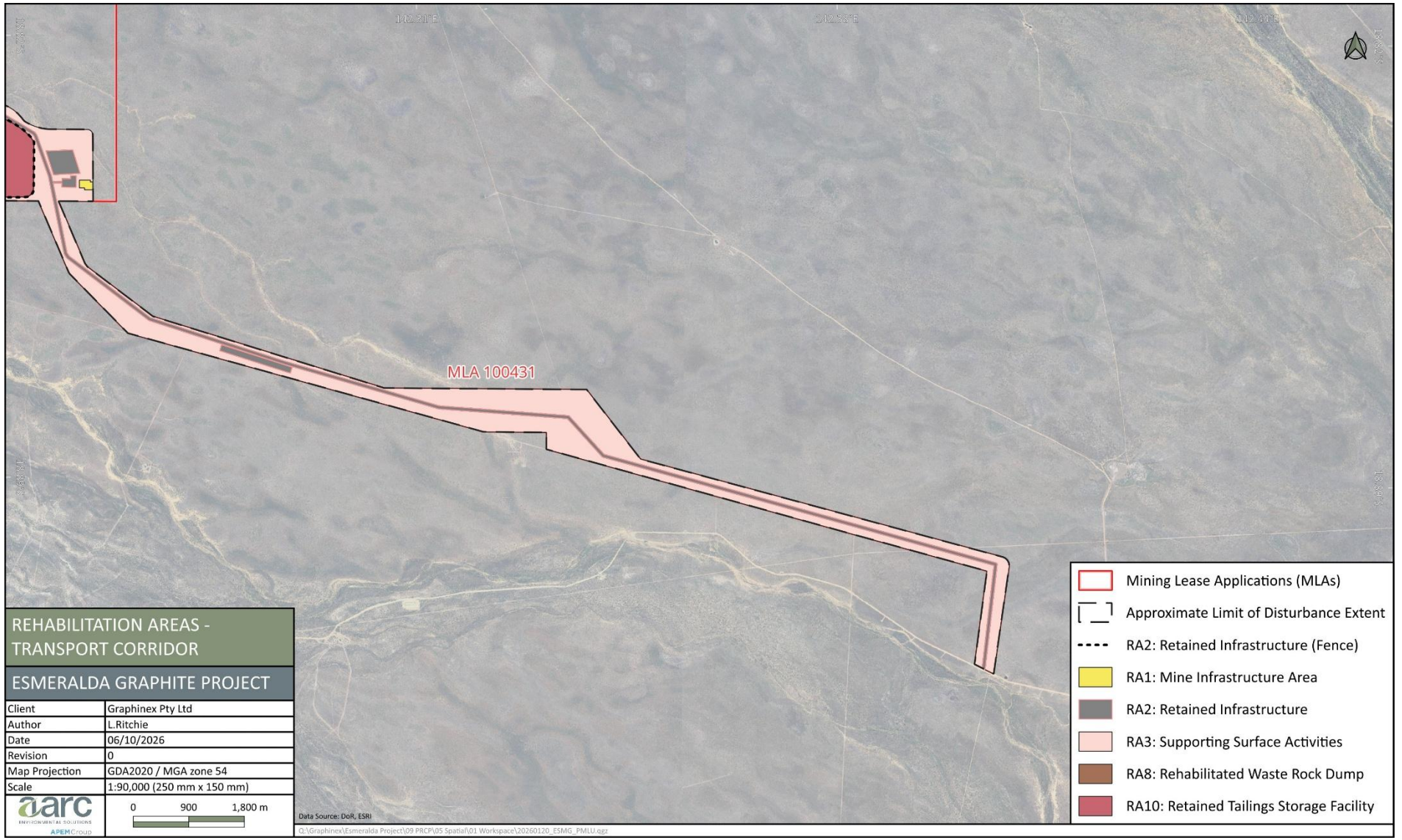


Figure 32: Rehabilitation areas - transport corridor

3.5.3 Rehabilitation milestones

The nominated rehabilitation milestones and their applicability to the various RAs are outlined in Table 17. It should be noted that that not all rehabilitation milestones (RMs) are applicable to all RAs.

3.5.4 Milestone criteria

Critical to assessing the success of rehabilitation and improvement outcomes is the definition of milestone criteria. In accordance with the PRCP Guideline, milestone criteria are used to demonstrate the completion of a specific milestone and should be appropriate for achieving the milestone and facilitate achieving subsequent RMs. Milestone criteria are preferably specific, measurable, achievable, realistic and timely. The final milestone criteria should:

- be outcome-based (linked to the end land use);
- be flexible to adapt to changing circumstances;
- be able to evolve as the mine life progresses;
- include metrics suitable to demonstrate that rehabilitation is trending positively;
- undergo periodic review; and
- include a measurement approach that details how the criterion will have been met (CoA 2016, ANZMEC & MCA 2000).

Milestone criteria have been identified for the Project that provide a clear definition of milestone completion for each RAs. The milestone criteria demonstrate the completion of progressive rehabilitation steps and events. Completion criteria for each RA will be used as the milestone criteria for the final milestone in the proposed schedule and will demonstrate achievement of the land to a safe and stable condition at surrender.

The nominated RM criteria are provided in Table 18.

Table 17: Milestones and their applicability to rehabilitation areas

Milestone reference	Milestone description	RA1	RA2	RA3	RA4	RA5	RA6	RA7	RA8	RA9	RA10	RA11	RA12
RM1	Infrastructure decommissioning and removal	√		√	√		√		√	√	√	√	
RM2	Determination/management of contaminated land status	√	√	√	√	√	√		√		√	√	
RM3	Landform development (bulk earthworks/ reprofiling/ re shaping)				√		√	√	√	√	√	√	
RM4	Capping/cover installation										√		
RM5	Surface preparation (topdressing, contour ripping, soil amelioration)	√		√	√		√	√	√	√	√	√	
RM6	Revegetation (seeding and/or planting)	√		√	√		√	√	√	√	√	√	√
RM7	Achievement of surface requirements (grazing, grassland PMLUs)	√		√	√		√	√	√	√	√	√	
RM8	Achievement of surface requirements (riparian ecosystem PMLU)												√
RM9	Achievement of target PMLU to safe and sustainable condition (grazing, grassland PMLUs)	√		√	√		√	√	√	√	√	√	
RM10	Achievement of target PMLU to safe and sustainable condition (riparian ecosystem PMLU)												√
RM11	Achievement of target PMLU to safe and sustainable condition (retained water storage PMLU)					√							
RM12	Achievement of target PMLU to safe and sustainable condition (retained infrastructure PMLU)		√										
RM13	Surface water and groundwater demonstrate non-polluting landform (all PMLUs)	√	√	√	√	√	√	√	√	√	√	√	√

Table 18: Milestones and their applicability to rehabilitation areas

Milestone reference	Applicable Rehabilitation Area	Rehabilitation milestone	Milestone criteria
RM1	RA1, RA3, RA4, RA6, RA8–RA11	Infrastructure decommissioning and removal	1.1 With the exception of any infrastructure to remain as part of the PMLU, where infrastructure is agreed to be retained by the landholder as evidenced by a signed landholder agreement, or required for rehabilitation activities, the following are complete: a. all services disconnected and removed; b. all buildings and associated infrastructure dismantled and removed off-site; c. all hardstand, concrete areas and roads (bitumen, blue metal, aggregate etc.) removed; d. all fencing and associated foundations removed; e. all pipelines drained and removed; f. all boreholes capped and buried (including drill pads, monitoring bore holes, and seepage interception systems); g. all waste not authorised to be disposed of on-site removed; h. all surface water drainage infrastructure that is not compatible with the sustainment of the PMLU is removed; i. all machinery and equipment, not required for rehabilitation works removed from site; j. all dams dewatered and desilted; and k. water course crossings and culverts removed.
RM2	RA1—RA6, RA8, RA10, RA11	Determination/ management of contaminated land status	2.1 Contaminated Land Investigation (investigation, remediation and validation) completed by a suitably qualified person (SQP) in accordance with appropriate guidance, including but not limited to the National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM) and National Remediation Framework. 2.2 Contaminated water and sediment removed from dams. 2.3 contaminated and hazardous material either remediated in situ or removed/transported to facility lawfully able to accept the material, a validation report has been completed, and, if required, a site suitability statement has been prepared. 2.4 Contaminated Land Auditor has certified that no contamination unsuitable for the PMLU remains or is occurring and has achieved RM2.2 and RM2.3.

Milestone reference	Applicable Rehabilitation Area	Rehabilitation milestone	Milestone criteria
			For RA10 only 2.5 RM 2.1 to RM2.4 will take place after RM 4 – Capping is completed.
RM3	RA4, RA6–RA11	Landform development (bulk earthworks/ reprofiling/ re shaping)	3.1 All major earthworks are completed and landform constructed to design parameters in accordance with the design specification provided by an AQP that achieves an outcome that is safe, erosionally and structurally stable and appropriate to support the achievement of the PMLU. 3.2 The permanent diversion (RA11) constructed in accordance with an AQP prepared and peer reviewed Design Plan for all watercourse diversions as per the guideline *Works that interfere with water in a watercourse for a resource activity – watercourse diversions authorised under the Water Act (OSW.2019/4599*), or a later revision. 3.3 Constructed landforms (RA9, RA10) achieve design criteria for geotechnical stability with a Factor of Safety (FoS) ≥ 1.5. 3.4 For RA6: a. Sufficient surcharge material is placed to ensure that the final settled landform is water shedding. 3.5 For RA9, the WRD: a. Maximum slope gradients of 30% measured from the toe of the slope to the crest of the slope; and b. A maximum vertical height of no more than 65 m above the original ground level. c. A maximum slope length of no more than 205 m measured from the top of the slope to the crest of the slope 3.6 For RA10, the final embankment of TSF4: a. has maximum slope gradients of 38% measured from the toe of the slope to the crest of the slope; and b. a maximum vertical height of no more than 20 m above the original ground level. c. A maximum slope length of no more than 47 m measured from the top of the slope to the crest of the slope 3.7 An "as-constructed Report" prepared which details and justifies all variations to the landform feature designs, including a certification that such variations will not affect the design performance. 3.8 All environmentally problematic materials have been appropriately placed and located within the final landform, consistent with the relevant designs. 3.9 All landforms are shaped to be water shedding. 3.10 Tracks not being retained, per a signed landholder agreement, have been regraded.

Milestone reference	Applicable Rehabilitation Area	Rehabilitation milestone	Milestone criteria
			3.11 Material from the WRDs, used in rehabilitation, has been demonstrated to be geochemically and physically appropriate for the intended purpose.
RM4	RA10	Capping/ cover installation	4.1 All capping materials are barren or not-acid forming (NAF), not capable of generating Acid and Metalliferous Drainage (AMD), or hazardous alkaline mine drainage. 4.2 Covered landform is water shedding and does not display surface ponding 4.3 The cover system displays erosional stability, is geotechnically stable and supports the PMLU. 4.4 Capping installed to design parameters including: a. working cover of at least 2 m thickness. 4.5 The cover system must demonstrate, through in situ monitoring and AQP verification, that: a. water infiltration is minimised and b. seepage is minimised and does not cause material environmental harm. 4.6 Certification provided by an AQP confirms that capping materials have been implemented to design or compaction specifications.
RM5	RA1, RA3, RA4, RA6–RA11	Surface preparation (topdressing, contour ripping, soil amelioration)	5.1 Prior to each revegetation event, soil health and suitability assessed and documented by an AQP1, to confirm the following parameters are met: c. pH in the range of 6-8.5; d. EC (saturated extract) is ≤2 dS/cm (2,000 µS/cm); e. Exchangeable sodium percentage (ESP %) <6; and f. Emerson aggregate class is 3-4 5.2 and a recommendation made for ameliorants to ensure sodicity, salinity, pH and fertility levels are suitable to achieve the relevant PMLU. 5.3 Vegetation growth media placed to a target 0.15 m depth and a minimum depth of 0.10 m. 5.4 Deep ripping of compacted surfaces, to at least 0.3 m into soil/subsoil profile along contour of slopes. 5.5 Records to be collected and retained of: a. growth media placement and origin; b. ameliorants applied and incorporated into the surface;

Milestone reference	Applicable Rehabilitation Area	Rehabilitation milestone	Milestone criteria
			c. evidence indicating achievement of target depth growth media placement depth; and d. evidence of ripping/cultivation activity. 5.6 The surface and groundwater monitoring networks are installed and monitoring is underway.
RM6	RA1, RA3, RA4, RA6–RA12	Revegetation (seeding and/or planting)	6.1 Seeding completed using seed mix and sowing rates described in Table 32: Seed mix or as amended for additional native endemic species as recommended by an AQP. 6.2 At least four species of 3P native pasture species, two native legumes and two native shade tree species established, from Table 32- Species list and seeding rates for grazing PMLU are applied per application area. 6.3 Minimum seeding rates, subject to revision based on experience, of: a. For the upper and mid banks – 5 kg/ha trees species, 5 kg/ha woody understorey species and 5 kg/ha grasses and other groundcover species; and b. For the lower banks – 10 kg/ha of groundcover species. 6.4 Appropriate erosion controls installed/placed and functioning as designed (as per AQP certified report) to ensure plant establishment is not significantly impacted from erosive events.
RM7	RA1, RA3, RA4, RA6–RA11	Achievement of surface requirements (**grazing, grassland PMLUs**)	7.1 Weed presence is less than 5% of total vegetative cover. 7.2 Ground cover: a. For slopes ≤15%, total vegetative ground cover ≥80% and total groundcover ≥70%; and b. For slopes > 15%, total vegetative groundcover ≥ 85% and total ground cover ≥ 90% 7.3 With respect to erosion: a. No evidence of erosion classified as 'moderate' or 'severe' as defined by the appended Erosion classification framework[2]. 7.4 Erosion requiring intervention has been remediated and does not impact achieving the PMLUA 7.5 Surface water runoff quality for those quality characteristics determined to be CoCs based on-site-specific quality data must not exceed draft WQO detailed in Table 7 For RA9 and 10 only, in addition to RM7.1—RM7.4: 7.6 A BioCondition assessment completed in accordance with latest version of Queensland Herbarium's 'BioCondition Assessment Manual' determines that the PMLU has reached a BioCondition score of >10/40 PRCP Benchmark as described in Table 37.

Milestone reference	Applicable Rehabilitation Area	Rehabilitation milestone	Milestone criteria
RM8	RA12	Achievement of surface requirements (**riparian ecosystem PMLU**)	8.1 Weed presence is a less than 5% of total vegetative cover. 8.2 Ground cover: a. For slopes ≤15%, total vegetative ground cover ≥ 80% and total groundcover ≥70%; and b. For slopes > 15%, total vegetative groundcover ≥ 85% and total ground cover ≥ 90% 8.3 With respect to erosion: a. No evidence of erosion classified as 'moderate' or 'severe' defined by the appended Erosion classification framework[2]. 8.4 Erosion requiring intervention has been remediated and does not impact achieving the PMLU 8.5 Surface water runoff quality for those quality characteristics determined to be CoCs based on-site-specific quality data must not exceed draft WQO detailed in Table 7.
RM9	RA1, RA3, RA4, RA6–RA11	Achievement of target PMLU to safe and sustainable condition (**grazing, grassland PMLUs**)	9.1 Safety hazards in the RAs are not significantly different to surrounding unmined landscapes subject to the same land use. 9.2 For RA9 and RA10: a. Permanent fencing in place and maintained post-closure which excludes stock. b. With respect to erosion: any erosion present will not compromise the achievement of a PMLU to a stable condition; c. No evidence of scouring, overtopping, sedimentation or destabilisation in or associated with erosion and sediment control and engineered drainage structures. 9.3 Surface water runoff quality for those quality characteristics determined to be CoCs based on-site-specific quality data must not exceed draft WQO detailed in Table 7. **Grazing PMLU** 9.4 Minimum vegetation composition (per hectare (averaged)) of: a. three species of 3P native pasture species; b. two legumes; and c. two shade tree species, present. 6. Native vegetation/grassland PMLUs. 9.5 A BioCondition assessment completed in accordance with latest version of Queensland Herbarium's 'BioCondition Assessment Manual' determines that the PMLU has reached a BioCondition score of >20/40 as described in Table 37.

Milestone reference	Applicable Rehabilitation Area	Rehabilitation milestone	Milestone criteria
RM10	RA12	Achievement of target post-mining land use to safe and sustainable condition (**riparian ecosystem PMLU**)	10.1 Geomorphic index score: greater than or equal to upstream and downstream values (Index of Diversion Condition method) 10.2 Watercourse vegetation meets the following: a. ≥2 native tree species; b. ≥2 native shrubs species; and c. ≥2 grass species. d. Tree canopy cover ≥ 13% 10.3 Riparian vegetation index score: greater than or equal to upstream and downstream values (Index of Diversion Condition method). 10.4 All results from stream sediment quality should be monitored at, but not limited to, downstream monitoring sites, undertaken twice a year (at end of wet season and end of dry season) complies with ANZECC/ARMCANZ (2000) Interim Sediment Quality Guidelines – low, for a minimum of 5 consecutive years. 10.5 An AQP has certified that diversion being retained in the landform continue to achieve the following: a. Incorporate natural features (including geomorphic and vegetation) present at the location of the diversion; b. Maintain the pre-existing hydrologic characteristics of surface water for the area in which the watercourse diversion is located; c. Maintain the hydraulic characteristics of the local watercourses without requiring ongoing maintenance; d. Maintain sediment transport and water quality regimes that allow the diversion to be self-sustaining, while minimising any impacts to upstream and downstream water quality, geomorphology, or vegetation; e. Maintain equilibrium and functionality in all substrate conditions at the location of the diversion; and f. geotechnically and erosionally stable.
RM11	RA5	Achievement of target PMLU to safe and sustainable condition (r**etained water storage PMLU**)	11.1 Infrastructure to be transitioned to a future landholder is: a. Suitable in type and scale for the approved post-mine land use; b. Verified by an AQP as fit for purpose and; c. Accepted by signed agreement with the future landholder.

Milestone reference	Applicable Rehabilitation Area	Rehabilitation milestone	Milestone criteria
			11.2 An AQP certifies that all infrastructure to be retained on-site is safe, stable and will not cause environmental harm. 11.3 All retained water storages are safe and stable. 11.4 Water storages monitored quarterly, water must be of a suitable quality for livestock ingestion and must not exceed the stock water guidelines (ANZECC 2000), for a minimum of 5 consecutive years.
RM12	RA2	Achievement of target PMLU to safe and sustainable condition (**retained infrastructure PMLU**)	12.1 Infrastructure to be transitioned to a future landholder is: d. Suitable in type and scale for the approved post-mine land use; e. Verified by an AQP as fit for purpose and; f. Accepted by signed agreement with the future landholder. 12.2 An AQP certifies that all infrastructure to be retained on-site is safe, stable and will not cause environmental harm.
RM13	All RAs	i. Surface water and groundwater demonstrate non-polluting landform (a**ll PMLUs**)	13.1 For a minimum of five consecutive years groundwater quality must be monitored quarterly at, but not limited to, compliance bores for quality limits specified in Table 7 for those quality characteristics determined to be CoCs based on-site-specific quality data at limits to be determined from available site-specific water quality data. 13.2 Groundwater quality results must be collected for at least five consecutive years prior to surrender. 13.3 Surface water quality results monitored monthly during flow at nominated monitoring locations. Surface water monitoring locations must not exceed the quality limits specified in Table 7 for those quality characteristics determined to be CoCs based on-site-specific quality data at limits to be determined from available site-specific water quality data, for a minimum of 5 consecutive years, within the five year period immediately prior to the milestone completion date. 13.4 Where the surface water quality at the downstream site exceeds the upstream site result, an AQP must complete: a. an assessment to determine if the exceedance is a result of a rehabilitation area: and b. where the assessment under a) verifies that the exceedance is a result of a rehabilitation area: ii. If there is no or a low risk to achieving a stable condition, then no further action is to be taken; or iii. If there is a risk greater than low to achieving a stable condition, then an assessment of potential environmental harm, and any changes or rectification actions to rehabilitation activities must be determined and implemented. iv. can only be triggered 3 times over 5 consecutive years prior to surrender. 13.5 If the above condition is triggered, the relevant 5-year timeframe is reset.

Milestone reference	Applicable Rehabilitation Area	Rehabilitation milestone	Milestone criteria
			13.6 The assessments must be completed and provided to the administering authority within 3 months of receiving the relevant sampling results.

[1] Appropriately qualified person means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods, or literature.
[2] Erosion classification framework:

Erosion classification	Minor	Moderate	Severe
Sheet erosion	Shallow soil deposits downslope	Partial exposure of roots; moderate soil deposits downslope	Loss of surface horizon; subsoil exposure; root exposure; substantial soil deposits downslope
Rill/gully erosion	<0.3m deep <15 rills per transect*	<0.3m deep 15-30 rills per transect*	>0.3m deep >30 rills per transect* and/or any
Gully erosion	Absent	>0.3m deep Gullies are linear, continuous and restricted to primary of minor drainage lines	>0.3m deep Gullies are continuous or discontinuous, and either tend to branch away from primary drainage lines and on to footslopes, or have multiple branches within drainage lines
Tunnel erosion	Absent	Absent	Present
Mass movement	Absent	Absent	Present

3.5.5 Rehabilitation timeframes

RMs are required to be achieved as soon as practicable after land becomes available for rehabilitation. Land is considered to become available for rehabilitation at the completion of mining, except where land is being used for operating infrastructure or soil stockpiles, or is identified as being 'retained infrastructure' post-closure.

Rehabilitation milestone timeframes have been developed with consideration for the size of RAs, the applicable milestone activities and interim rehabilitation activities that are scheduled to occur or anticipated to be required before the area becomes available for rehabilitation. Milestones that involve revegetation activities, including monitoring of revegetation, make provision for unfavourable growing seasons and unforeseen extreme events such as droughts or storms that could negatively impact vegetation establishment. As a result, milestone timeframes are extended to ensure achievement.

A risk assessment for rehabilitation activities has been undertaken for the Project and the risks identified have informed the timeframe assigned to each milestone. The Project risk assessment is detailed further in Section 3.6 and has been provided in full in Appendix D.

The land availability timing and the nominated rehabilitation timeframes considered for scheduling of RAs are outlined in Table 19 and Table 20.

Table 19: Land availability justification

Rehabilitation area	Description		Year of land availability	Justification
RA1	Mine infrastructure area	Mineral processing plant, ore handling facilities and associated infrastructure	2084	All mine infrastructure within RA1 will remain operationally required for the duration of processing activities and will become available for decommissioning and rehabilitation immediately following cessation of processing in 2084.
		Sewage treatment plant and effluent irrigation infrastructure		
		Fencing and magazine		
RA2	Retained infrastructure	Mine access roads and tracks	2084	All retained infrastructure will be remain operationally required for the duration of processing activities and will therefore be available for rehabilitation immediately following cessation of processing in 2084.
		Airfield and helipad		
		Solar array and associated infrastructure		
		Cattle exclusion fence		
		Workers village accommodation		
RA3	Supporting Surface Activities (Buffer disturbance area)	Minor areas of surficial disturbance arising from approved supporting activities requiring rehabilitation.	2084	All areas will be available for rehabilitation immediately once processing activities have ceased
		Topsoils stockpile on natural surfaces	2091	The topsoil stockpile area will be available in 2091 for rehabilitation once the relevant RAs have reached or completed RM3.
RA4	Rehabilitated water management infrastructure	Process water dam	2084	These water management structures will be decommissioned immediately once processing activities have ceased.
		Clean water sump		
		Pit dewatering dam		
		MAW sump	2088	The MAW sump will be required to capture any seepage from the retained TSF 4 (RA9) and will be available for rehabilitation in 2088 once RA9 begins RM4. The Sediment dams 1, 2, and 4 and the raw water dam will be required to supply water for dust suppression post-closure and will be available for rehabilitation in 2088.
		Sediment dams 1, 2, 4		
		Raw water dam		

Rehabilitation area	Description		Year of land availability	Justification
RA5	Retained water storage	Sediment Dam 3	2084	The retained water management structure will become available in 2084 once processing activities have ceased
RA6	Backfilled void	Void backfilled with tailings and waste rock to approximate pre-existing surface level	2084	The mining backfilled void will be available for rehabilitation once processing activities have ceased.
RA7	Rehabilitated levee	Levee	2088	The levee will be available for rehabilitation in 2088, once all major earthworks are completed on the backfilled void.
RA8	Rehabilitated waste rock dump footprint	Footprint of waste rock dump used for backfilling void	2081	Waste rock materials from the WRD will be used to backfill the void and will become available once all the materials are backfilled in the void by 2081.
RA9	Retained waste rock dump	Out-of-pit waste rock dump	2084	The retained waste rock dump will become available in 2084 once processing activities have ceased.
RA10	Retained Tailings Storage Facility		2084	The retained tailings storage facility will become available in 2084 once processing activities have ceased. Following infrastructure and decommissioning of the TSF (RM1), the retained TSF will move to RM3 (1 year). The determination of contaminated land status (RM2) will happen after landform development (RM3). This only applies for the retained RA10.
RA11	Rehabilitated TSF footprint	TSF Cell 1	2076	TSF Cell 1 will commence deconstruction towards the end of mining in 2076 with all the embankment construction materials and tailings returned to the mine pit.
		TSF Cell 2	2078	TSF Cell 2 will commence deconstruction after all the embankments and tailings from TSF Cell 1 has been returned to the mine pit in 2078.
		TSF Cell 3	2080	TSF Cell 3 will commence deconstruction after all the embankments and tailings from TSF Cell 2 has been returned to the mine pit in 2080.
RA12	Permanent diversion	Disturbance area associated with the diversion	2033	The RA associated with the diversion will become progressively available for rehabilitation as it is constructed in Year 3, with revegetation and seeding (RM6) commencing in the same year. This

Rehabilitation area	Description		Year of land availability	Justification
				RA is therefore planned to achieve RM6 in Year 3 allowing for vegetation establishment and monitoring to commence in Year 4.

Table 20: Proposed timeframes for RMs associated with each RA

Rehabilitation Area (RA)	Rehabilitation Milestones (RM)	Summary rehabilitation methodology	Associated risks	Risk level assigned	Proposed timeframe (years)	Justification for assigned timeframe
RA1 RA3 RA4 RA6 RA8–RA11	RM1: Infrastructure decommissioning and removal	• All non-required services, equipment, machinery, infrastructure disconnected and removed	Few environmental impact risks associated with infrastructure decommissioning	Class I	2	Some existing, to be removed, infrastructure will be required to support other rehabilitation activities (pipes, pumps, offices etc.). Decommissioning activities are considered low risk and expected to take approximately 2 years.
RA1 RA2 RA3 RA4–RA8, RA10-RA12	RM2: Determination/ management of contaminated land status	• Contaminated material remediated and a contaminated land assessment undertaken by an AQP[1] • Standard phase 1 assessment of contamination	• Contaminated land • Surface water • Groundwater	Class II	2	Provide sufficient time for engagement of consultants, sampling, analysis and determinations.

Rehabilitation Area (RA)	Rehabilitation Milestones (RM)	Summary rehabilitation methodology	Associated risks	Risk level assigned	Proposed timeframe (years)	Justification for assigned timeframe
RA3 RA4 RA6–RA12	RM3: Landform development (reshaping, reprofiling, topdressing, contour ripping/discing, soil amelioration)	• All bulk earthworks and landform reshaping/ reprofiling works completed to design specifications	• Surface roughness rockiness, depressions) in excess of that expected for the PMLU • Excessive/unplanned settlement of fill materials • Significant slope failure • Slope roughness on batter slopes • Slope roughness on formed diversion slopes	Class II	3	As land becomes available, all bulk earthworks and installation of drainage features will be completed to design specifications. Time allowance for engagement of contractors (where required), mobilisation of suitable machinery/equipment to commence rehabilitation; sequential dewatering and drying of TSF cells for accessibility to undertake earthworks.
RA10	RM4: Capping installation and landform development	• Mobilisation of contractors • dewatering of TSF • bulk earthworks (TSF) • consolidation	• Slope roughness on batter slopes • Release of contaminants • Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Class II	3	After drying/ consolidation of the TSF, the land will be capped to design specifications. The timeframe assigned is 3 years.
			• Significant slope failure	Class I		
RA1 RA3 RA4 RA6–RA11	RM5 - Surface preparation (topdressing, contour ripping, soil amelioration)	• Surface preparation (e.g. growth media placement, contour ripping, soil amelioration activities as required)	• Insufficient quality of soil resources on-site available to undertake rehabilitation activities.	Class I	2	Growth media amelioration and prompt vegetation establishment are key processes to minimise the identified risks.
RA1 RA3 RA4 RA6–RA12	RM6: Revegetation (seeding and/or planting)	• Revegetation with species consistent with the PMLU	• Natural hazards (fire, drought, heavy rainfall) following planting resulting in poor seed establishment and loss of topsoil.	Class II	2	The seeding and / or planting of suitable target species is classified as 'Low' risk, however, there is an inherent risk associated with the impact of natural weather events. The assigned timeframe of 2 years allows time for vegetation establishment.

Rehabilitation Area (RA)	Rehabilitation Milestones (RM)	Summary rehabilitation methodology	Associated risks	Risk level assigned	Proposed timeframe (years)	Justification for assigned timeframe
RA1 RA3 RA4 RA6–RA11	RM7: Achievement of surface requirements (grazing, grassland PMLUs)	• Vegetation monitoring and maintenance as required • Erosion monitoring	• Rill or sheet erosion resulting in downstream sedimentation	Class I	5	Achievement of target vegetation and erosion criteria is dependent on climatic conditions and soil preparation. Allowance is made for adverse climatic conditions such as droughts or storms that will negatively impact vegetation establishment and subsequently affect erosion outcomes. The timeframe also allows for repair and maintenance activities that may be required as a result. Given these factors and the risk classification, the timeframe assigned is 5 years.
			• Insufficient density/diversity of vegetation • Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Class II		
RA12	RM8: Achievement of surface requirements (riparian ecosystem PMLU)	• Vegetation structure is consistent with analogue sites	• Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas • Poor revegetation outcomes, inadequate weed control, adverse weather (drought, flood)	Class II	10	Achievement of target revegetation criteria is dependent on climatic conditions and soil preparation. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the risk classification, the timeframe assigned is 10 years.
RA1 RA3 RA4 RA6–RA11	RM9: Achievement of target PMLU to safe and sustainable condition (grazing, grassland PMLUs)	• Vegetation and erosion monitoring and maintenance • Land suitability, soil health and Hazard and Safety Assessment	• Insufficient density/diversity of vegetation in grazing, grassland PMLU • Unintended introduction of pests and weeds • Inability to achieve grassland PMLU	Class II	15	Achievement of target revegetation criteria is dependent on good climatic conditions and soil preparation. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required.

Rehabilitation Area (RA)	Rehabilitation Milestones (RM)	Summary rehabilitation methodology	Associated risks	Risk level assigned	Proposed timeframe (years)	Justification for assigned timeframe
		• Water quality monitoring of water storages, groundwater, surface water and stream sediments	• Inability to achieve grazing PMLU criteria • Insufficient density/diversity of vegetation in grazing (TSF)	Class III		Given these factors and the risk classification, the timeframe assigned is 15 years.
RA12	RM10: Achievement of target PMLU to safe and sustainable condition (riparian ecosystem PMLU)	• Vegetation and erosion monitoring and maintenance • Land suitability, soil health and Hazard and Safety Assessment • Water quality monitoring of water storages, groundwater, surface water and stream sediments	• Inability to achieve riparian vegetation outcome	Class III	10	Some areas of steeper slopes. Achievement of target revegetation criteria is dependent on climatic conditions and soil preparation. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the 'Moderate' risk classification, the timeframe assigned is 10 years.
			• Unintended introduction of pests and weeds	Class II		
RA5	RM11: Achievement of target PMLU to safe and sustainable condition (retained water storage PMLU)	• Landholder agreement • Water quality monitoring of retained water storages • Hazard and Safety Assessment	• Poor water quality in retained water storages • Water quality in retained storages not meeting PMLU water quality requirements	Class II	4	Allowance is made for reparation activities, the likelihood of natural hazard events, consecutive water quality monitoring events and challenges associated with pest/weed control.
RA2	RM12: Achievement of target PMLU to safe and sustainable condition (retained infrastructure PMLU)	• Hazard and Safety Assessment • Landholder agreement	• Unsafe or damaged retained infrastructure	Class III	1	Given the minimal active rehabilitation work required to achieve a stable condition for retained infrastructure, the timeframe assigned is 1 year.

Rehabilitation Area (RA)	Rehabilitation Milestones (RM)	Summary rehabilitation methodology	Associated risks	Risk level assigned	Proposed timeframe (years)	Justification for assigned timeframe
All RAs	RM13: Surface water and groundwater demonstrate non-polluting landform (all PMLUs)	• Water quality monitoring of groundwater and surface water quality	• Not meeting WQOs for surface waters and groundwaters	Class II	5	Timeframe allows for any unexpected instances of poor water quality to be addressed and monitoring of vegetation establishment to achieve a stable condition.

3.5.6 General rehabilitation practice

3.5.6.1 Hydrogeology

Mining will occur at a maximum depth of approximately 250 mbgl, intersecting the water table at 10 mbgl. The primary groundwater bearing unit within the Project area is the GRF, which is approximately 40 m thick across the Project area. The description of the local geology including the lithology, extent and thickness of each hydrostratigraphic unit is discussed in Section 3.1.6.

Hydraulic conductivity

Hydraulic conductivity testing was conducted in the Project area with both falling head tests and a 72-hour constant rate pumping test. Falling head tests results suggest a groundwater system characterised by relatively low to moderate hydraulic conductivity across the Project area. Table 21 details the results of hydraulic conductivity tests. Observations from the testing and analysis show that:

- Groundwater occurs within low (less than 0.1 m/d) to moderate (0.1 to 1 m/d) permeability formation across the Project area
- Measured hydraulic conductivity for the monitoring bores screened over the Tertiary sediments (ESMB 05S) is low and ranges from 0.002 m/d to 0.004 m/d. The hydraulic conductivity indicates a highly heterogeneous, clay-dominant profile. While the Tertiary sediments are not locally saturated in the Project area, they are assessed as a low permeability, unconfined aquifer.
- Measured hydraulic conductivity for the monitoring bores screened over the GRF (ESMB01D, ESMB02D, ESMB04D, ESMB05D, ESMB06D, ESMB07S, and ESMB17) ranges between 0.006 m/d and 0.84 m/d and has a transmissivity of 1.6 m^2/d. This range suggests a high degree of variability within the GRF; however, in general the GRF has relatively low hydraulic conductivity/transmissivity indicating that the GRF is a low permeability aquifer. The GRF is generally regarded as a regional confided aquifer; however, given the lack of a local confining layer, and that the shallow Tertiary sediments are unsaturated, the GRF is assessed locally as an unconfined aquifer.
- The Proterozoic basement (ESMB07D) has a very low hydraulic conductivity of 0.00056 m/day, reflecting the massive nature of the Proterozoic basement.

The 72-hour constant rate pumping test (at 0.75 L/s), including recovery monitoring, was undertaken at an existing exploration drill hole, 24ESD002, to assess aquifer behaviour and response to sustained pumping within the geological units intersected by the bore. A maximum drawdown of 27.3 m was observed during the constant rate pumping test. The groundwater level in the exploration drill hole recovered back to within 1 m of the pre-test level 30 minutes into the recovery period.

Table 21: Hydraulic conductivity results

Bore	Formation	Standing water level (mTOC)	Hydraulic conductivity (m/day)		
			Hvorslev	Bouwer Rice	Thiem Equation (Steady-State Radial Flow to Well)
ESMB01D	GRF	7.66	0.57	0.53	
ESMB02D	Gilbert River Formation	10.51	0.012	0.011	
ESMB04D	GRF	6.64	0.110	0.102	
ESMB05S	Tertiary sediments	-	0.004	0.002	
ESMB05D	GRF	7.8	0.83	0.78	
ESMB06D	GRF	7.65	0.044	0.041	

Bore	Formation	Standing water level (mTOC)	Hydraulic conductivity (m/day)		
			Hvorslev	Bouwer Rice	Thiem Equation (Steady-State Radial Flow to Well)
ESMB07S	GRF	8.36	0.69	0.64	
ESMB07D	Proterozoic basement	56.1			0.00056
ESMB17	Gilbert River Formation	15.16	0.0066	0.0058	

Groundwater flow

Groundwater within the Project area occurs almost exclusively within the GRF. The groundwater table is generally between 6 m and 10 mbGL within the Project area. The depth to groundwater along the watercourses and drainage features within the Project area is typically between 6 to 10 m below the bed of the watercourses and drainage features that occur within the Project area. These watercourses do not receive groundwater baseflow.

The groundwater table elevation in the Project area is between 105 mAHD in the northwest of the Project area and 120 mAHD in the southeast. Groundwater flows from the east southeast to the west northwest towards the Gulf of Carpentaria. Regional groundwater elevations range from approximately 125 mAHD in the southeast to 100 mAHD in the northwest of the Project area. Regional groundwater flow is inferred to generally follow surface topography, with flow directed from east southeast to the west northwest, consistent with regional drainage patterns.

Groundwater modelling

Groundwater modelling was undertaken for the Project by Hydrogeologist (2026) using the modelling software MODFLOW-USG, which is widely accepted by hydrogeologists and groundwater modelling specialists for predicting impacts associated with open cut mining projects.

Two transient predictive model scenarios were developed to assess the potential effects of the Project on the surrounding groundwater system. These scenarios are the:

- No mining scenario - a hypothetical case representing future conditions in the absence of mining activities; and
- Project scenario - includes the proposed development of the Esmeralda Graphite Project.

These scenarios were developed to provide predictions of:

- Groundwater inflow rates to the mine at annual intervals during the active mining phase. At the end of mining the pit is completely backfilled (no residual void remains).
- Groundwater level drawdown (relative to the pre-mining initial water level) at the end of mining.
- Post-mining groundwater level recovery, for a period up to 1,000 years post-mining.

Groundwater inflow

Groundwater inflows are predicted to peak in mine year 5 at approximately 13,750 m^3/day (5,024 ML per annum). This peak is associated with the direct removal of water during active pit excavation through the GRF and the inflow from the surrounding groundwater system.

Following this peak, inflow rates are predicted to decrease over the life of the Project to a rate of approximately 1,500 m^3/day at the end of the Project mining operations.

The actual volume of groundwater pumped from the Project mining area will be less than that predicted by the numerical model, as a large component of the groundwater will be lost to evaporation and entrained moisture in the mined ore and overburden.

Predicted groundwater level drawdown

The maximum predicted drawdown in the GRF extends radially to a maximum distance of 3,000 m from the open pit crest to the south and west, and up to 2,800 m from the open pit crest to the north and up to 1,500 m from the open crest to the west. The predicted maximum Project drawdown in the GRF ranges from approximately 1 m to 50 m. The maximum predicted drawdown in the GRF is shown in Figure 34. Post-mining, the open pit void will be completely backfilled with tailings and waste rock, leaving no residual void.

Post-mining, groundwater inflow from the GRF will contribute to the groundwater level recovery, along with a minor contribution from the Proterozoic basement, the Tertiary sediments and surface infiltration to the backfilled final void.

For modelling purposes, two post-closure scenarios were developed to assess the recovery rates in the backfilled void. The first scenario assumed the open pit void is fully backfilled with tailings (represented by relatively low hydraulic conductivity and low storage properties), the second scenario assumes the open pit void is fully backfilled with waste rock (represented by relatively high hydraulic conductivity and high storage properties). In reality, the open pit void will be backfilled with a combination of these materials (including a low permeability capping layer) and hence these scenarios provide a plausible range of the likely groundwater level recovery in the backfilled void.

Post-closure groundwater level recovery considered the two post-closure scenarios mentioned above, which identifies that groundwater levels in the backfilled final void recover to approximately 113 mAHD around 100–150 years post-closure (Figure 36) and the pre-mining groundwater flow directions are re-established (Hydrogeologist 2026).

Throughout this recovery phase, the pit continues to behave as a sink, with groundwater flowing inward from surrounding aquifers until hydraulic equilibrium is reached. In the long-term, the backfilled void will act as a flow through system, maintaining groundwater flow conditions that are in hydraulic connection with the GRF.

Particle tracking was carried out using the post-mining numerical groundwater model for both the tailings backfill scenario and waste rock backfill scenario described above. The particle tracking shows that the particles remain well within the Project MLs after 1,000 years post-mining (Figure 35). Those particles that originated around the perimeter of the final void pit crest migrate approximately 100 m from the pit crest (to the west northwest).

Advective transport calculations show that the groundwater movement from the backfilled pit void through the Gilber River Formation to the northwest would occur over extremely long timescales. The calculated advective travel time is approximately 5,000 years for a 1 km path length, demonstrating that groundwater migration from the backfilled pit void to a downgradient receptor would take place over millennial timescales (Hydrogeologist 2026).

As stated above, groundwater level will recover to pre-mining levels approximately 100-150 years post-closure and as active dewatering will stop with backfilling i, groundwater levels within the pit void are estimated to recover around 100-150 years post-closure. During this time, groundwater cannot leave the pit as hydraulic gradients are directed inward, towards the pit. Inflowing groundwater gradually fills the pore spaces in the backfilled material (tailings and waste rock) (RGS 2026b). This water mobilises solutes from the backfilled material and increases the total dissolved solids concentration of the pore water.

Once groundwater level has recovered, the backfilled material will be saturated and the backfill pore water can spill into the adjacent GRF aquifer. The spillage of water from the backfilled pit into the GRF aquifer will be driven by:

- The movement of groundwater from upgradient into the east southeast side of the pit.

- Rainfall infiltrating the backfill top surface, with some lost to runoff and evapotranspiration and the remainder percolating downward. This percolating water mobilises weathering products, transporting dissolved solutes from unsaturated waste rock backfill to groundwater.

As shown in Figure 33, void water spilling from the pit will progressively mix with regional groundwater, and a plume of pit-affected groundwater will gradually extend from the pit. The plume will potentially impact pastoral bores downgradient of the pit (RGS 2026b).

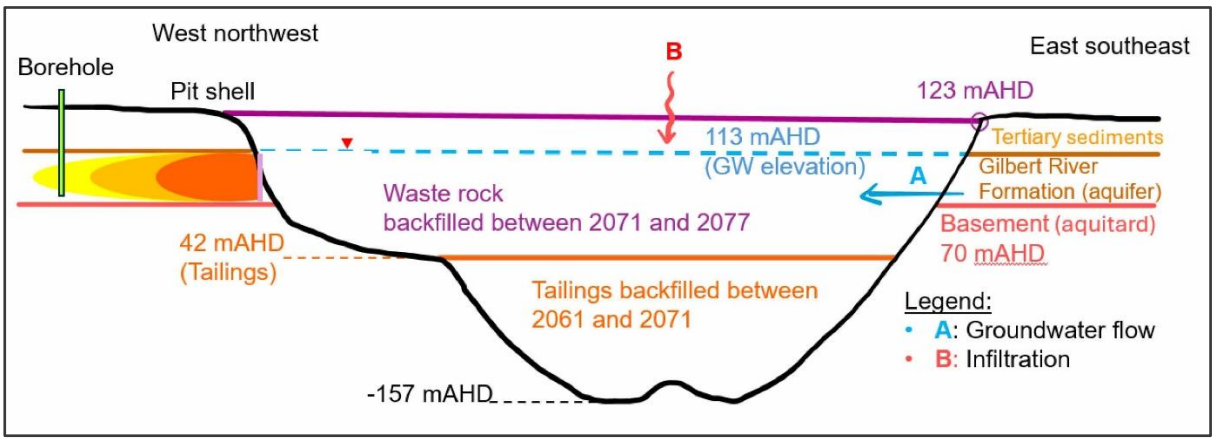


Figure 33: Backfilled void diagrammatic representation

Groundwater quality

Geochemical modelling was undertaken where four scenarios were modelled to compare potential conditions in the post-closure pit void, including Scenario 2 and Scenario 4, which were considered for the proposed approach for the Project. Both the scenarios consider "flow through" conditions where, following saturation, the tailings are hydraulically isolated and the groundwater flowing into the backfilled pit is limited to the waste rock aquifer. Scenario 4 differs from Scenario 2 where the initial void water quality is affected by the solute load associated with acid generation in the tailings during transfer from the above ground facilities into the pit prior to saturation.

The source terms developed for the modelling include neutral pH and low pH unsaturated tailings. The low pH source term represents a conservative condition in which acid generation in the tailings during transfer into the pit increases the release of dissolved constituents prior to saturation in the pit. Kinetic testing showed that the neutralisation capacity of the tailings is initially sufficient to offset acid generation; however, following a lag period, the tailings can generate acidic leachate (RGS 2026).

The proposed approach for the Project will effectively hydraulically isolate the tailings and reduce water infiltration to approximately 3% (RGS 2026). Scenarios 2 and 4 indicate that:

- the modelled void water pH remained within the range of pH6-8, broadly consistent with the local groundwater range of pH 7.5-8.7;
- TDS reached approximately 2,000 mg/L, which is within the local groundwater range of 492-2,050 mg/L;
- aluminium (Al) concentrations were below DGV and within local groundwater ranges;
- arsenic (As) concentrations were elevated in Scenario2, whereas it was generally below DGV and comparable with the local groundwater range in Scenario 4;
- cadmium, cobalt, copper, nickel and zinc concentrations were comparable to DGV and local groundwater in Scenario 2, whereas the concentrations were higher in Scenario 4 due to the assumed acid generation in tailings;

- median chromium (Cr) concentrations were below DGV and local groundwater in Scenario 2. The modelled chromium concentration range increased in Scenario 4 due to the higher chromium concentration in the low pH tailings source term used in Scenario 4
- lead (Pb) concentrations were below hardness-adjusted DGV but are generally higher than the local groundwater;
- concentrations of molybdenum (Mo), selenium (Se) and vanadium (V) were generally higher than DGV and local groundwater due to elevated source terms; and
- uranium (U) concentrations under Scenario 2 show a narrower range compared with Scenarios 1 and 3, which reflects the higher contribution of uranium from tailings.

The model outcomes show that Scenario 2 results in lowest element concentrations. However, the results from Scenario 4, being the likely scenario, indicates the need to limit tailings oxidation during transfer from the above ground facilities into the pit.

Preliminary seepage transport calculations indicate a delay of more than 500 years before detectable changes occur at receptors located approximately 100 m downgradient of the pit, reflecting the slow advective velocity and dispersion within the GRF aquifer.

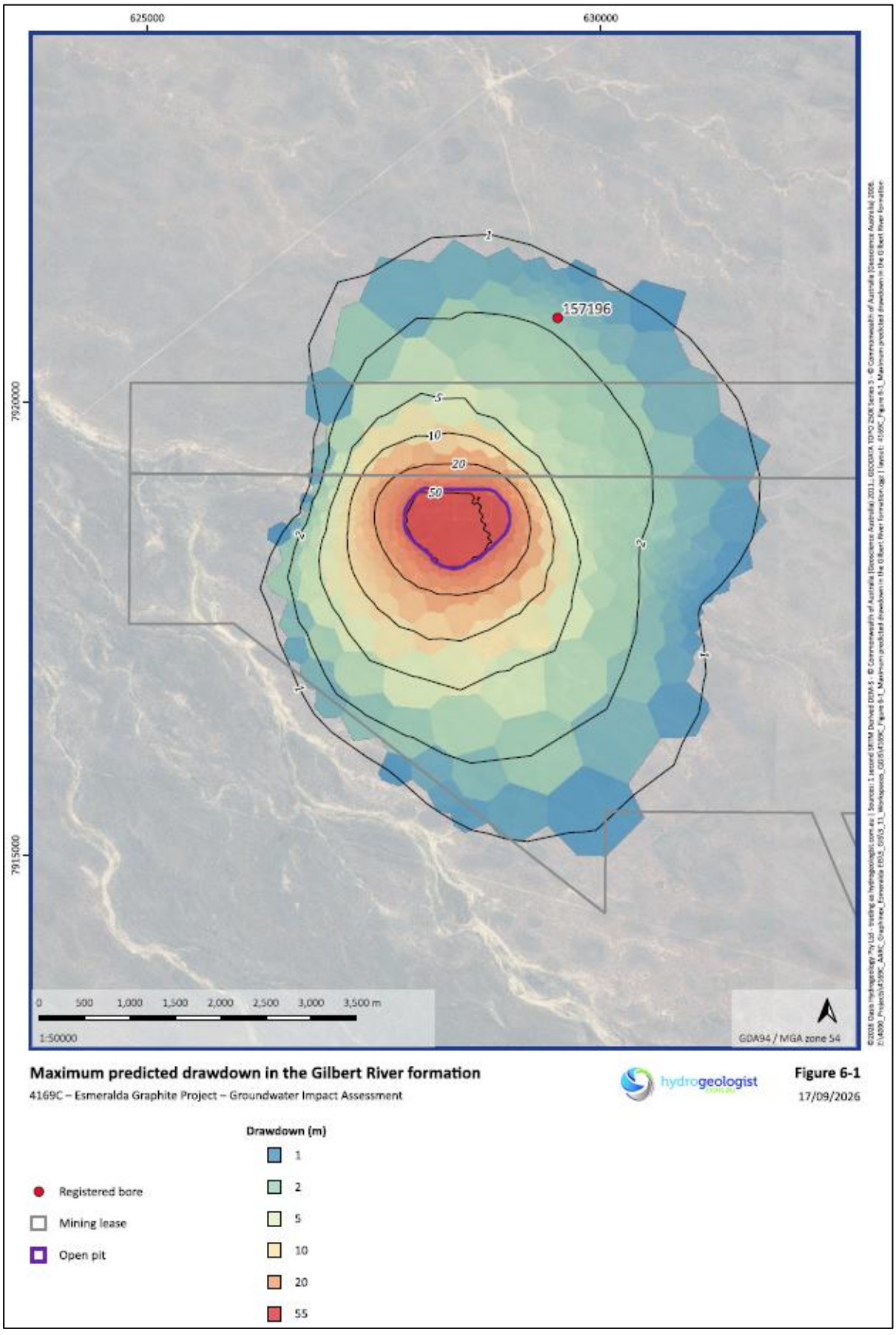


Figure 34: Maximum predicted drawdown in the GRF

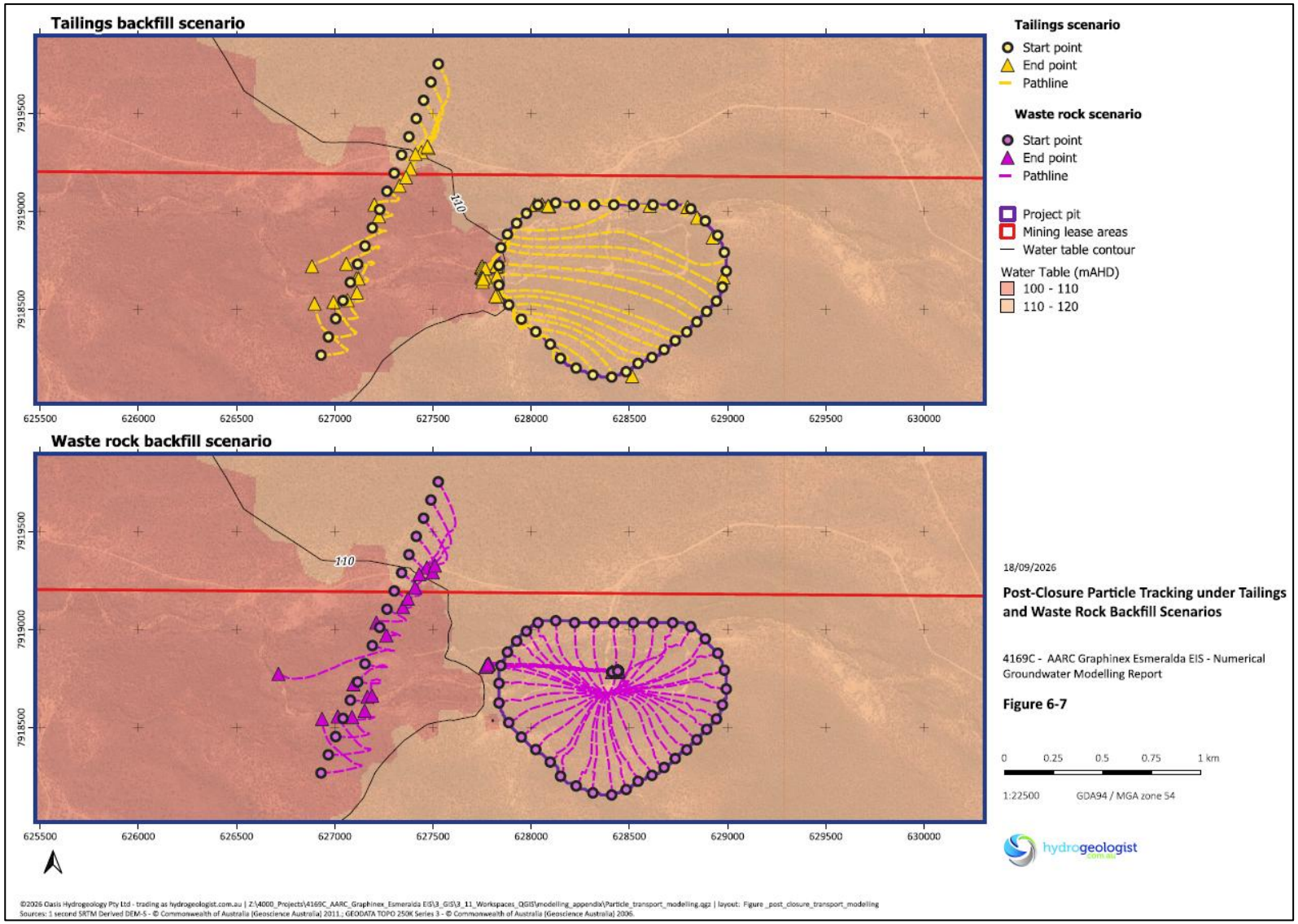


Figure 35: Post-closure particle tracking - 1,000 years

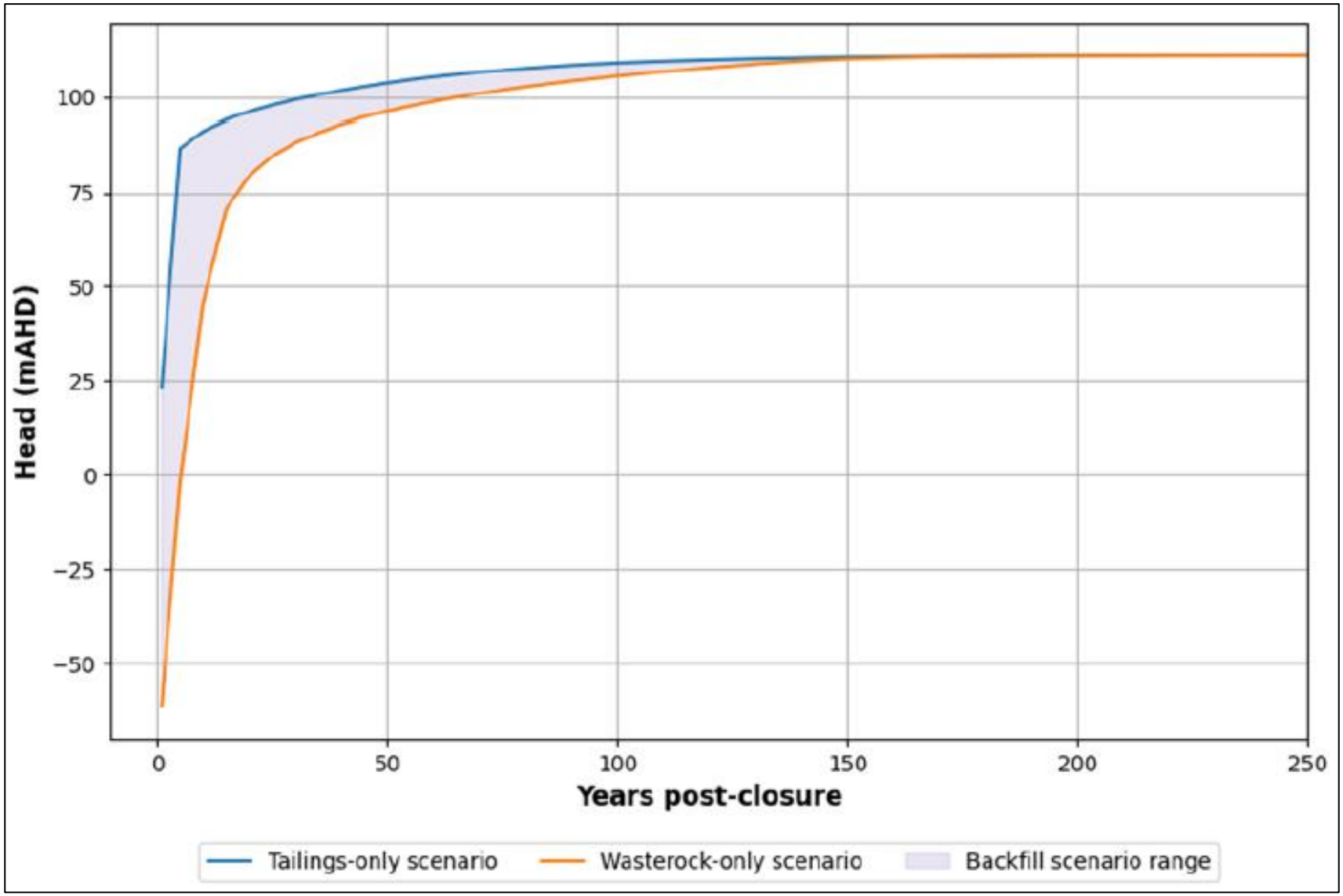


Figure 36: Groundwater level recovery within the backfilled pit void

3.5.6.2 Flooding

The Project is located on the northern side of the Warrigal Creek main channel, while a minor unnamed tributary flows to the west, north of the pit. The surface topography is generally flat, although the land near the Project area slopes northwest at an average grade of 0.2%.

Flooding at the Project location is dominated by breakout flooding from the northern banks of Warrigal Creek and the Borer River which are influenced by flooding interactions with other major waterways. Other key breakout flooding interactions relevant to the Project location are from Yapper River into Warrigal Creek (22 km and 40 km upstream of the Project) and from the Clara River into the Norman River (66 km upstream of the Project).

Flood modelling was undertaken by Engeny (2026a) to assess the potential risk to the final landform. The flood model included the potential interactions of the Yappar River, Clara River and Warrigal River, and break out that may affect flood behaviour at the Project (Engeny 2026a).

A closure phase case scenario was run to assess flooding impacts at the closure phase of the Project. The closure case flood model included the proposed backfill of the mine, removal of mine infrastructure and TSF1, 2, and 3 and final landforms and the diversion drain to the north of the rehabilitated mine pit. The retained WRD was not represented in the model however, flooding impacts associated with the retained WRD were reported to be isolated to the immediate areas around the WRD given its location outside of the floodplain conveyance area. The model was then simulated for the 1% and 0.1% AEP design flood events under the 2090 median emission pathway projection (SSP2-4.5) and the 2090 high emission pathway projection (SSP – 8.5). The flood impact mapping for the design AEP events and the change in the 1% AEP peak flood depth and velocity is provided as Figure 37, Figure 38, Figure 39 and Figure 40. The flood impact assessment results show that:

- the closure of the Project will continue to have minor impacts to Warrigal Creek and Borer River flooding due to the diversion of the unnamed waterway (stream order 3). However, the impact is less than during the operation phase of the Project;
    - this impact is expected to include isolated increases in peak flood levels at the location of the diversion drain and south of the rehabilitated TSF4;
    - breakout north from the diverted unnamed waterway (stream order 3) has not been modelled in the closure scenario, reinstating the flow path to existing conditions;
- peak flood depth in Warrigal Creek decreases by a maximum of 0.03 m in the 1% AEP event;
- the changes in flood depth are minor and are not expected to result in any adverse impacts to the waterway, surrounding properties or flood immunity of any third-party infrastructure; and
- increases to peak flood velocity are confined to the diversion drain and to the south of the rehabilitated TSF4. Decreases in peak flood velocity have been modelled downstream of the rehabilitated TSF4.

Post-closure surface water runoff and overland flow pathways have been considered with reference to the final landform topography (Figure). Following removal of the flood protection levee, the landscape will be returned towards the pre-mining drainage setting, allowing a general return to natural surface water flow pathways across the landscape. While the on-site stream order 1 waterway will not be formally reinstated, the naturally lower topography associated with this drainage pathway will remain, and removal of the flood protection levee will allow surface water flows to drain through this area. The final landform topography shows a general reinstatement of pre-mining topographic setting and elevations, with the landscape generally flat to gently sloping upwards to the south-southeast, with surface runoff and overland flow ultimately draining towards the receiving environment.

Meanwhile, flood modelling results for the high emission paths for 2090 were used to calculate resulting afflux. Climate change and uplift factors have been applied in accordance with the site-specific duration dependant estimates for rates of change (%/C), and loss scaling ratios (Australian Rainfall and Runoff Data Hub 2026). The impact assessment results show:

- the SSP5-8.5 pathway for 2090 results in an increase in depth across the floodplain. Breakout flooding towards the MLA has a modelled afflux of up to 0.75 m in the 0.1% AEP event and 0.82 m in the 1% AEP event. Flooding at the MLA increases by 0.45 m in both the 0.1% and 1% AEP events; and
- flood velocity afflux in the SSP5-8.5 pathway was minor, modelled at 0.15—0.35 m/s for the 0.1% and 1% AEP events.

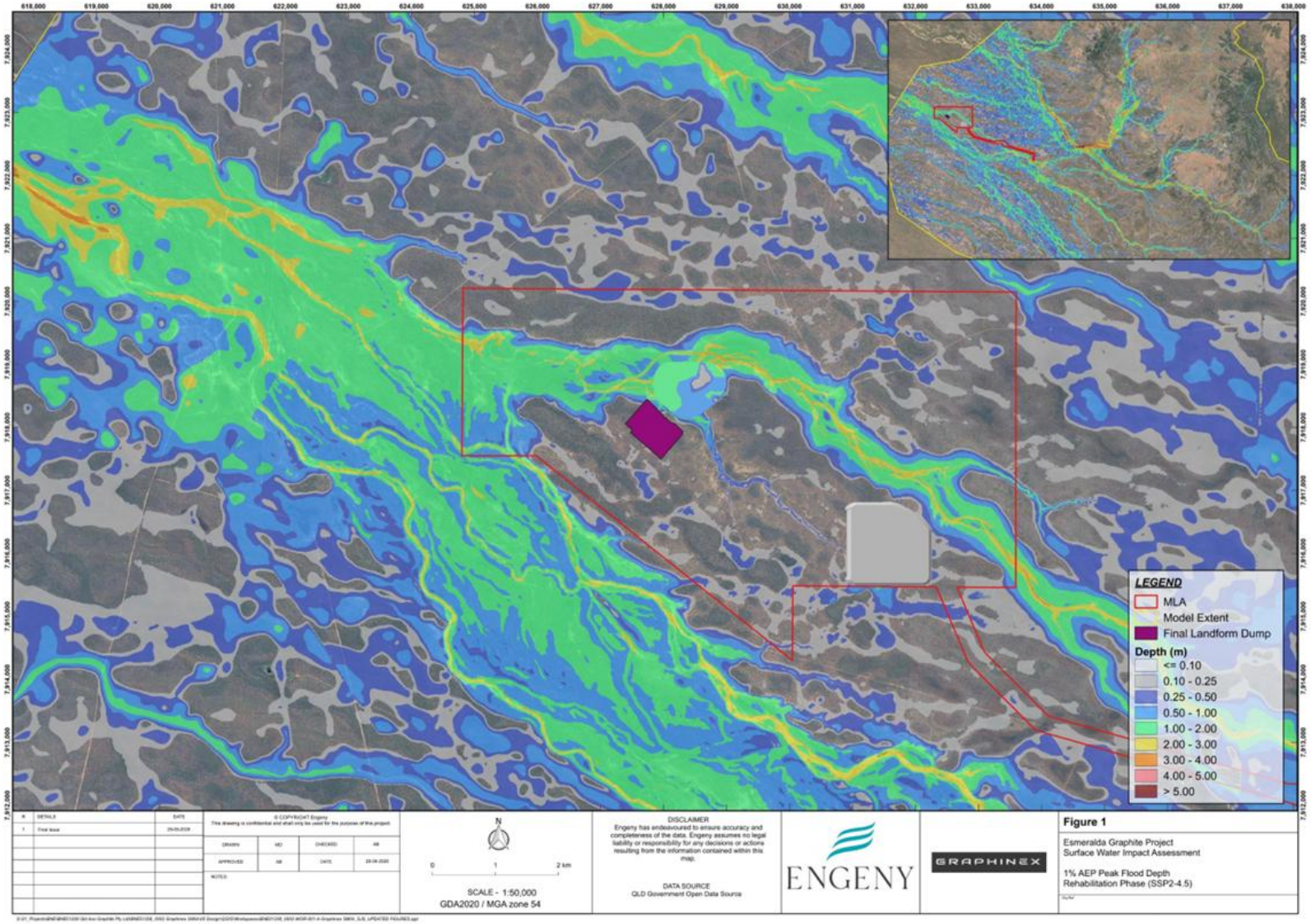


Figure 37: 1% AEP flood afflux for the closure phase (SSP2 - 4.5 2090)

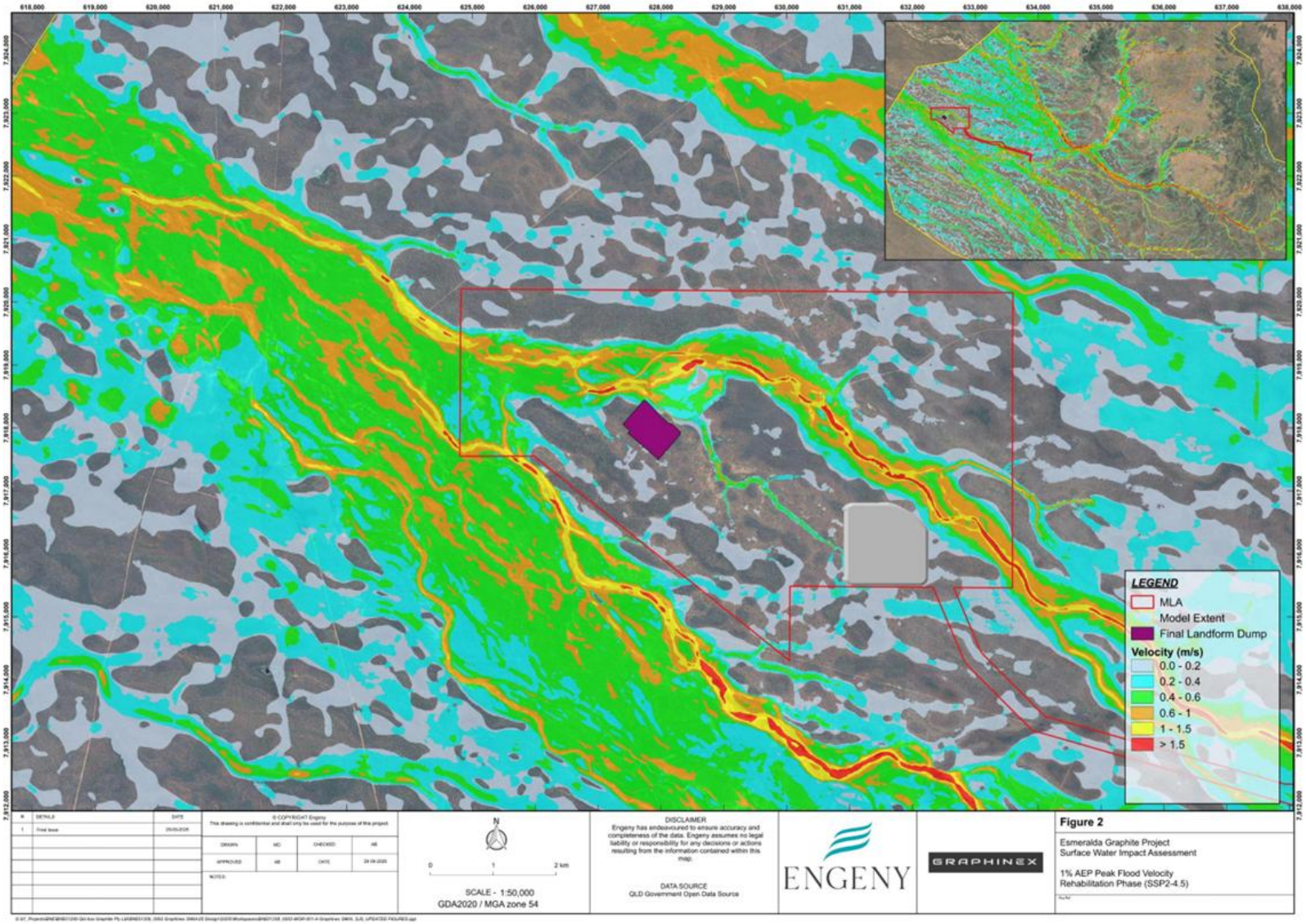


Figure 38: Change in 1% AEP peak flood velocity for the closure phase (SSP2-4.5 2090)

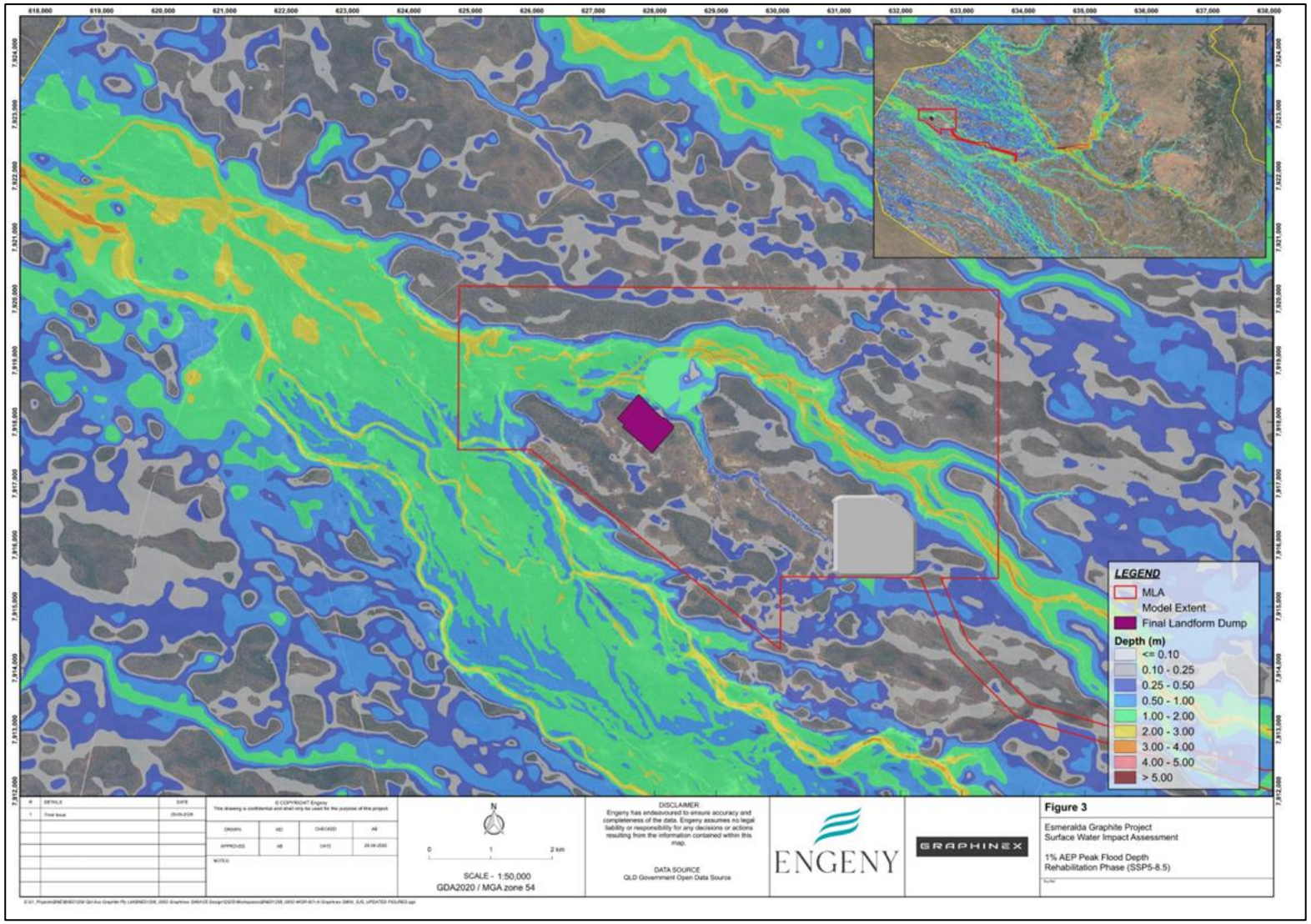


Figure 39: 1% AEP flood afflux for the closure phase (SSP5-8.5 2090)

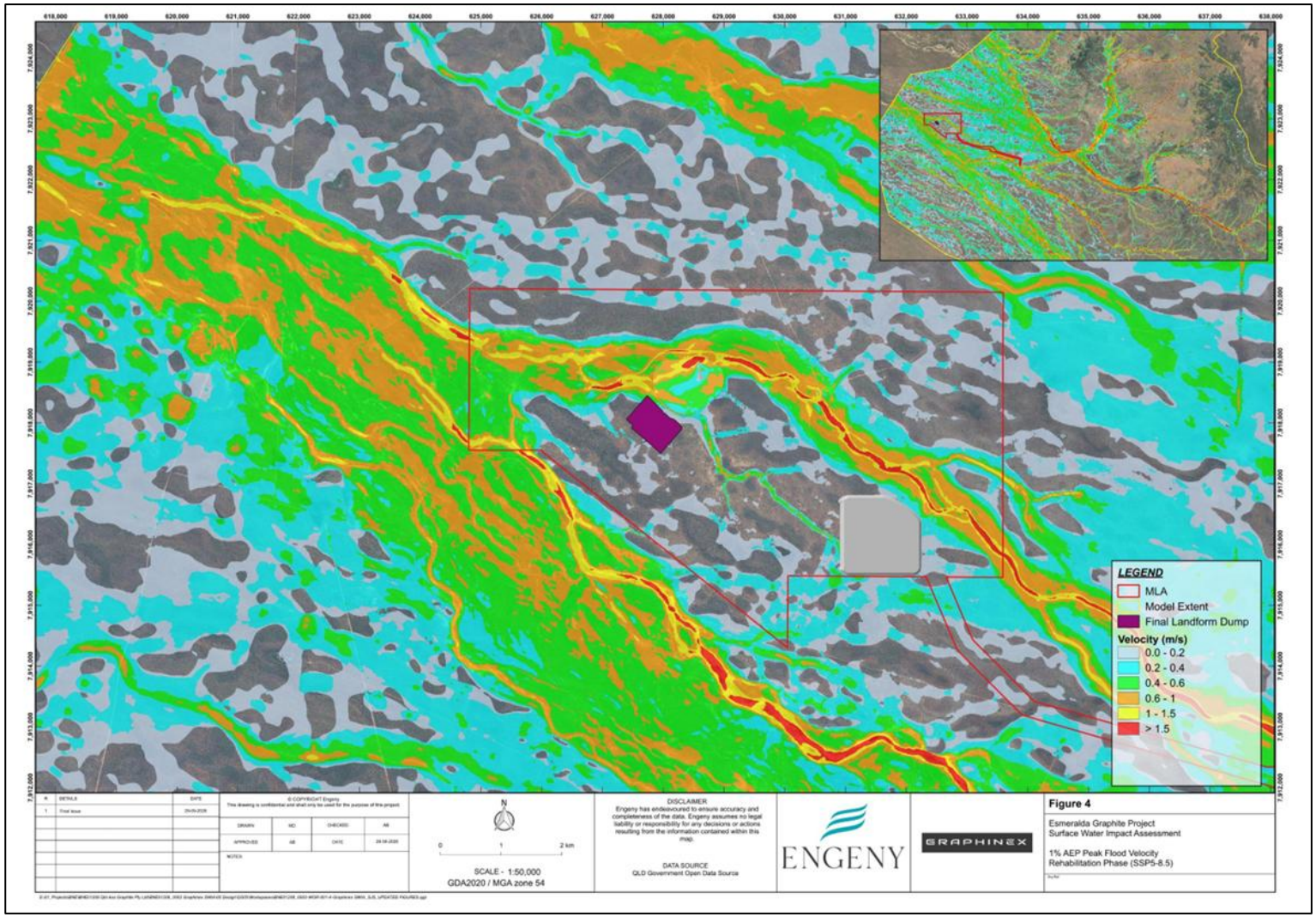


Figure 40: Change in 1% AEP peak flood velocity for the closure phase (SSP5-8.5 2090)

3.5.6.3 Mine material characterisation

An assessment of waste streams that will be produced during mining operation was undertaken by RGS (2026). The geochemical assessment assessed the potential for acid, saline and metalliferous drainage for Project overburden (topsoils and subsoils), waste materials (tailings and waste rock), and ore (target material for processing). The geochemical assessment of the mine materials and tailings is summarised in Table 22 and included at Appendix U of the EIS. The findings of the geochemical assessment have been used in defining the key closure landform features and their construction and, where required, their capping and other management requirements.

The mine materials were also assessed for naturally occurring radioactive materials (NORM). In general, NORM concentrations in mine materials were slightly above background levels in uncontaminated soil but are unlikely to pose a significant threat to human health or the environment (RGS 2026). NORM concentrations in overburden and soil were below applicable screening levels, while concentrations in waste rock were higher than those observed in other material types. Meanwhile, NORM concentrations in low grade ore, ore body and tailings were slightly lower than those in waste rock (RGS 2026).

Table 22: Summary of geochemical assessment of mine materials and tailings

Mine materials	Assessment summary findings	Classification
1. Overburden	• Highly weathered • Slightly alkaline. • Low salinity • Low to moderate acid neutralising capacity; • Total sulphur content is negligible and higher concentrations are likely to be in an oxidised form as gypsum • High soluble fluoride concentrations • Possible elevated concentrations of aluminium, molybdenum and selenium in alkaline pH conditions and may produce neutral mine drainage (NMD); however, the concentrations are expected to typically decrease over time and not persist in the long-term	• NAF-Barren
2. Waste rock	• Alkaline • pH neutral • Total sulphur content is negligible • Typically moderate acid neutralising capacity	• NAF-Barren
3. Low grade ore	• Typically slightly alkaline and typically low salinity • Low to moderate acid neutralising capacity • Leachate to eventually become weakly acidic • Concentrations of pH-sensitive metals/metalloids aluminium, cadmium, copper, lead, nickel and zinc are above criteria for freshwater aquatic ecosystems (ANZG 2018) but are well below livestock drinking water quality standards and typically diminish over time	• Low to moderate risk waste • Mostly NAF-Barren or NAF, occasionally PAF
4. Ore body	• Circumneutral to slightly alkaline • Higher total sulphur and total carbon content • Majorly low neutralising capacity and some acid potential • Elevated total sulphur content and low ANC • Slow acid generation can occur under freely oxidising conditions • Metal/metalloid concentrations may increase if leachate water quality falls below pH 6	• Moderate risk material • Majorly PAC-LC or PAF • Occasional samples are NAF-Barren

Mine materials	Assessment summary findings	Classification
5. Tailings	• Neutral to slightly alkaline pH with low salinity • Low acid neutralising capacity • Moderately saline seepage • Initial contact water may contain slightly elevated concentrations of aluminium • Other metal/metalloid concentrations expected to be low	• Moderate to high risk material • PAF

The geochemical assessment by RGS (2026) concluded that overburden and waste rock are likely suitable as a bulk fill or cover material and therefore would not require any AMD management. In oxidising conditions, overburden can produce neutral metalliferous drainage (NMD), resulting in slightly elevated concentrations of fluoride, molybdenum and selenium, which will be included in the water monitoring program. However, the concentrations are expected to typically decrease over time and not persist in the long-term.

Meanwhile, tailings will require an AMD management strategy, which involves disposing tailings into the backfilled void with a waste rock cover and soil capping. Representative samples of actual process tailings will be collected and geochemically characterised once they become available during mining operations. The PRCP planning part will be revised and updated, where required, to reflect the outcomes of the operational tailings characterisation.

3.5.6.4 Soil and capping material assessment

An assessment of available growth media resource was undertaken as part of the soil and land suitability assessment (GT Environmental 2026) and is summarised at Table 23. This assessment considered the available soil resources, its suitability for rehabilitation purposes, limitations and, where required, recommendations for reuse in mine rehabilitation.

Required growth media volumes based on the various disturbance areas are shown at Table 24. The materials balance suggests that there is a surplus of 24,603,840 m^3 of available growth media. Given this, soil stripping for use as a growth media will generally be confined to the higher quality soil profile types to a depth of up to 2 m depending on the specific SPC.

The design of the retained TSF cell has been developed by SRE (2026) and is described in detail in Section 3.5.6.9.

With consideration of the Project mining schedule, the outer batter slopes of TSF cell 4 are likely to be constructed of hard durable competent granite, which typically comprises predominantly quartz (silica), up to 70% or more, with feldspar, mica and other accessory minerals. This material will take decades to centuries to break down through weathering.

Rehabilitation of the outer batters of the TSF cell 4 might reasonably take the form of weathered rock, placed over the granite, in a mosaic pattern, which has thin topsoil cover, where topsoil is available. Vegetation comprising shrubs, native to the area, will be sown to further stabilise the batter slopes.

The tailings are predominantly a low-plasticity sandy silt, and the surface of the TSF cell 4 is expected to be covered with granite waste rock to prevent generation of dust and the cover system placed comprising weathered rock and growth media. Both overburden and waste rock materials have been assessed by RGS (2026) as beneficial for use and NAF-Barren.

Table 23: Recommended soil stripping depths by soil profile class

Soil profile class	Topsoil stripping depth (mbgl)	Subsoil stripping depth (mbgl)	Limitations and/or recommended amelioration and management measures	Area within disturbance footprint (Ha)	Available topsoil volume within disturbance (m^3)	Available subsoil volume within disturbance (m^3)
1Cl(Ck)	0.00–0.70		Topsoil resources to the depth of 0.70 mbgl may be recommended for use on all RAs.	93.8	657,090	0
2Cl(Ck)	0.00–0.50	UMAs 2, 8, 13, 16: 0.50–2.20 UMA 11: 0.50–1.15 UMA 18: 0.50–1.40 UMA 19: 0.50–1.70	Topsoil and subsoil resources may be recommended for use on all RAs. Subsoil resource between 0.50 and 2.20 mbgl may be used as subsoils for rehabilitation use, supporting the placement of topsoil as is the observed soil profile.	1,072.4	5,362,000	UMAs 2, 8, 13, 16: 10,327,500 UMA 11: 407,550 UMA 18: 2,893,500 UMA 19: 968,400
3Cl(Ck)	0.00–0.45	0.45–0.65	Topsoil and subsoil resources may be recommended for use on all RAs. Subsoil resource between 0.45 and 0.65 mbgl may be used as subsoils for rehabilitation use, supporting the placement of topsoil as is the observed soil profile.	1,159.6	5,218,200	2,319,200
4Cl(Ck)	0.00–0.60	0.60-0.75	Topsoil and subsoil resources may be recommended for use on all RAs. Subsoil resource between0.60 and 0.75 mbgl may be used as subsoils for rehabilitation use, supporting the placement of topsoil as is the observed soil profile. Subsoils below 0.60 m should be kept separate and placed as the first layer prior to suitable subsoil and then topsoil. Gypsum application after the stripping and stockpiling may assist in reducing potential erosion and dispersion.	62.4	374,160	93,540
5Cl(Nm)	0.00–0.35	-	Topsoil resources to the depth of 0.35 mbgl may be recommended for use on all RAs.	2.4	8,400	0

Soil profile class	Topsoil stripping depth (mbgl)	Subsoil stripping depth (mbgl)	Limitations and/or recommended amelioration and management measures	Area within disturbance footprint (Ha)	Available topsoil volume within disturbance (m^3)	Available subsoil volume within disturbance (m^3)
6Cl(El)	0.00–0.30	0.30-2.00	Topsoil and subsoil resources may be recommended for use on all RAs. Subsoil resource between 0.30 and 2.0 mbgl may be used as subsoils for rehabilitation use, supporting the placement of topsoil as is the observed soil profile. Subsoils below 2.0 m should be kept separate and placed as the first layer prior to suitable subsoil and then topsoil. Gypsum application after the stripping and stockpiling may assist in reducing potential erosion and dispersion.	19.1	57,720	327,080
7Cl(Nm)	0.00–0.15	–	Topsoil resources to the depth of 0.15 mbgl may be recommended for use on all RAs.	4.1	6,150	0
Total					**11,683,720**	**17,336,770**

Table 24: Disturbance areas and growth media volume requirements

Disturbance areas	Growth media requirement
RA1, RA3, RA4, RA7, RA10 and RA11	2,797,650m^3
RA8	375,000 m^3
RA9	786,000 m^3
RA6	458,000 m^3
Total	**4,416,650 m^3**

3.5.6.5 Final landform design

The final landform design incorporates the key landform features remaining at closure (Figure 41). These include:

- retained water storage (RA5);
- the backfilled void (RA6);
- the retained waste rock dump (RA9);
- the retained tailings storage facility cell (RA10); and
- the permanent diversion (RA12).

At closure, the backfilled pit will have a final landform similar to the existing landform, sitting slightly proud of the existing surface to allow for settlement. The retention of a single remaining TSF cell and waste rock dump post-closure will alter the existing topography, however, the revegetation and sloping of these landforms will not create a significant landform impact. The permanent diversion will also alter the final topography, however, it will have a maximum depth of approximately 1 m, with the design criteria of mimicking the functionality of the existing watercourse and therefore will not result in significant impacts.

The remaining RAs that have been identified comprise the areas that will exist at closure in a landform stage similar to, if not identical to, the pre-existing landform. These include:

- the MIA (RA1);
- 'retained infrastructure', comprising mine access roads, tracks and the airfield (RA2);
- the supporting service activities area (RA3);
- rehabilitated water management infrastructure (RA4);
- the rehabilitated waste rock dump footprint (RA8); and
- the rehabilitated TSF footprint (RA11).

Each of the key landform features, their characteristics and construction are discussed in the following subsections.

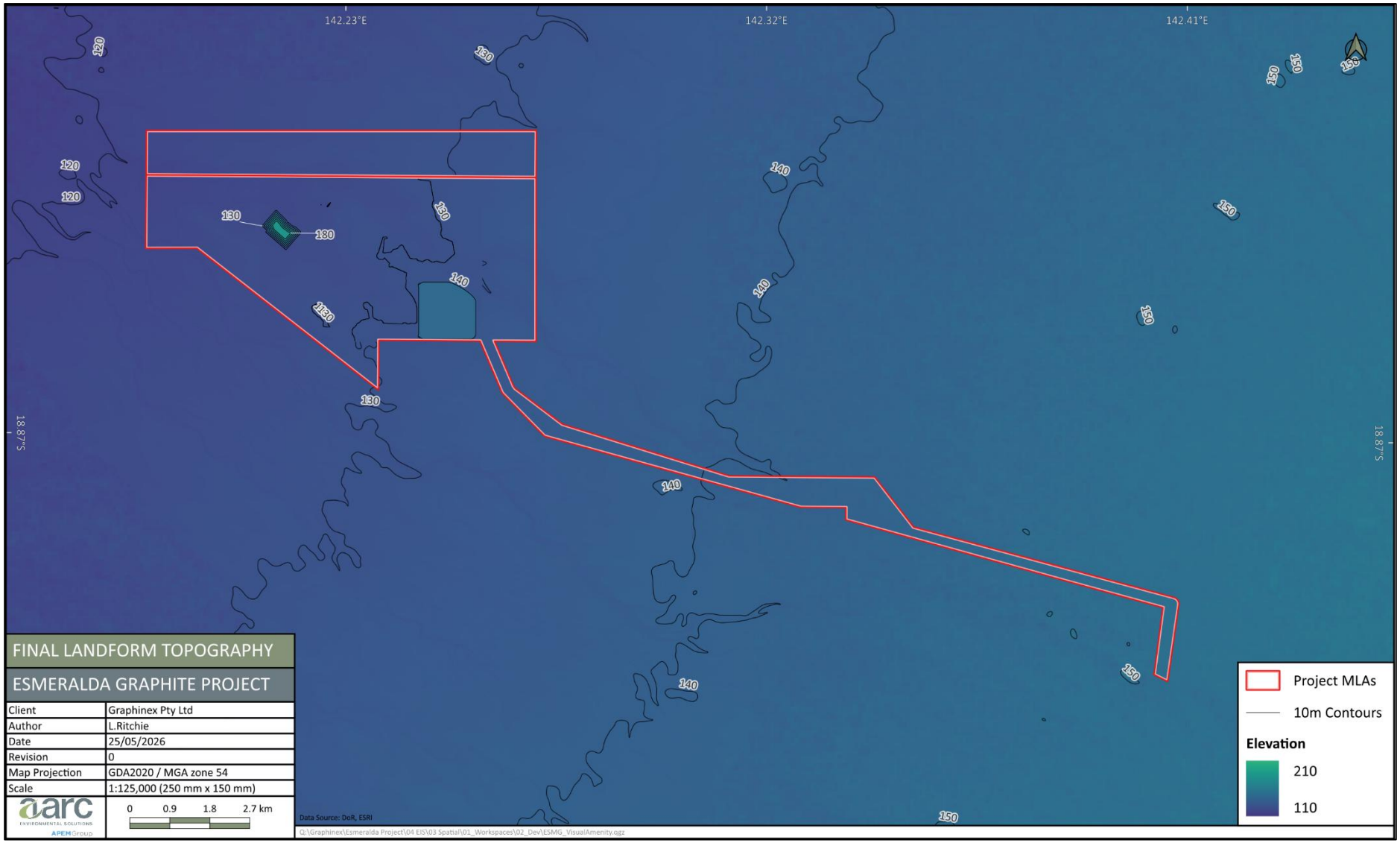


Figure 41: Final landform design

3.5.6.6 Retained water storage (RA5)

The water storage proposed to be retained at closure includes Sediment Dam 3 located on the Project area. The water storage is proposed to be retained as it will be complementary to the nominated PMLU and will only have contained waters with a quality unlikely to have any detrimental impact on their future use as stockwater dams.

Once its operational functional life has concluded, the sediment dam will be assessed with sediment materials sampled to ensure no adverse contaminants remain. Spillways adequately sized spillways will be incorporated where these do not already exist and retaining wall batters assessed for both erosional and, where applicable, geotechnical stability. Water quality will be tested to ensure it meets stock water quality guideline criteria.

3.5.6.7 Backfilled void (RA6)

On completion of mining operations, the mine void will be completely backfilled, leaving no residual void and, apart from a slight increase in elevation to ensure no localised surface ponding, will generally mimic the pre-mining topography; and retain the pre-mining localised drainage system.

Backfilling of the void will initially utilise consolidated tailings materials from the initial three TSF cells to a level of approximately 123 m AHD following by NAF-Barren waste rock material from the southeastern waste rock dump. Backfilling will be conducted in two phases:

- Tailings will initially be deposited from the base of pit (-157 mAHD) to a level of approximately 42 mAHD. Tailings will be deposited in a dry state using excavators and trucks from at or just before the end of mining in 2065 until 2075. A low permeability capping layer will then be constructed on top of the tailings at an elevation of 42 mAHD. to provide hydraulic isolation.
- Waste rock will then be placed on top of the tailings' low permeability capping layer (42 mAHD) and up to ground level (123 mAHD) from 2075 until 2081. The final stage of backfilling will incorporate a capping layer of 2 m depth comprising 1.5 m of suitable waste rock and 0.5 m of growth media. The surface of the waste rock will be engineered to facilitate surface water drainage and minimise infiltration into the backfilled final void. The backfilled material will be compacted under the trafficking of heavy machinery and an assessment of likely settlement will guide the final level of backfilling such that, post-settlement, the backfilled void surface will remain sufficiently proud of the surrounding landscape that the closure landform feature will not pond or inhibit surface drainage.

Backfilling of the pit, and the backfilling sequence proposed has been designed to achieve the following outcomes:

- To minimise the extent of landform/topographical change arising from the Project, through the removal of waste materials (i.e., tailings and waste rock) from above ground landform features; and the filling of the mine pit to near pre-mining levels.
- Hydrogeochemical modelling for the post-closure backfilled pit was undertaken by RGS Environmental Consultants (RGS 2026) which estimated that groundwater levels would have recovered approximately 100–150 years after completion of mining. While the recovered groundwater level is expected to minimise ongoing oxidation of tailings material such that groundwater impacts will be highly unlikely or improbable (RGS 2026); it is still proposed to provide a cap over the backfilled tailings material to provide hydraulic isolation by limiting infiltration to approximately 3% to further mitigate groundwater impact.
- Improved rehabilitation outcomes by maximising the footprint area of relatively level, near pre-mining topographic levels.

This RA includes an adjoining levee (RA7) constructed to exclude floodwaters from entering the pit during the Project's operational phase. The levee will be removed once backfilling of the pit has reached a point that floodwater ingress is no longer a risk. Any surplus material from the levee will be used within the pit backfilling area.

Both the levee and backfilled pit, once backfilling has been reached the design surcharge level, will be spread with suitable growth media, cultivated using dozer or grader tynes or other suitable available farming equipment, and then seeded in accordance with the revegetation methodology outlined in Section 3.5.6.13.

3.5.6.8 Retained waste rock dump (RA9)

Two waste rock dump facilities are required during the operational life of the mine to store waste materials excavated from the pit. At closure most of these waste rock materials be utilised to backfill the pit. Waste rock material will initially be drawn from the East WRD and then from the remaining West WRD located to the south of the pit. However, there will still be a surplus of waste rock material resulting from the Project and resident within the West WRD. Once backfilling of the pit is complete, the remaining waste rock will be reshaped and rehabilitated.

The final waste rock dump landform has been based on the outcomes of an erosion stability assessment (ESA, AARC 2026d). The ESA utilised a Water Erosion Prediction Project (WEPP) model selected given the determined risk categorisation of the key final landform structures on-site. The WRD was determined to be a low risk landform as the overburden and waste rock has been classified as NAF-Barren and suitable as bulk fill or cover material with no acid mine drainage management required RGS (2026).

The WEPP model utilised soil profiles developed based on soil and subsoil sampling and analysis results from the Soils and Land Suitability Assessment (SLSA) undertaken by GT Environmental (2026). Hillslopes were generated from the final landform spatial data using ArcGIS Pro.

Two WRD slope profiles, WRD-S1 and WRD-S2, were assessed as being representative of slope length, slope complexity, and variation. The top of WRD-S1 is approximately 185 mAHD, with the bottom of the slope approximately 125 mAHD, giving a slope height of 60 m. The slope runs continuously for approximately 205 m and is generally linear, with a slope percentage of 29%. WRD-S2 is similar, with a top elevation of 185 mAHD and a bottom of 125 mAHD, for a total slope height of 60 m and is generally linear. The slope runs for 200 m, with a slope percentage of 30%.

The ESA adopted a target erosion rate of 4 t/ha/yr, with a maximum tolerable erosion rate of 10 t/ha/yr, based primarily on the Loch *et al.* (2025) which proposes a long-term average erosion rate for a landform slope of 4 t/ha/y as a conservative modelling target to benchmark modelling scenarios for landform design.

Based on 588 100-year WEPP iterations, covering a range of soil samples and land use management profiles, the average annual soil loss, expressed in tonnes per hectare per year (t/ha/yr), for each iteration was calculated and assessed against the target and maximum tolerable erosion rates.

For the retained WRD, the average base (0% groundcover) erosion rate modelled across all slopes is 100 t/ha/yr, with a maximum base erosion rate of 125 t/ha/yr along WRD-S2 with soil type 5Cl(Nm). The groundcover required for all slopes and soil types to meet the maximum threshold is highly variable, ranging from 25% to 50%. The target threshold was similarly variable, ranging from 45% to 80%. Predicted erosion rates (Table 25) indicate that at a groundcover level of 80%, predicted erosion rates of the WRD slopes are below the target erosion rate of 4 t/ha/yr for all soil types. When considering the dominant soil types proposed to be included in rehabilitation, a 70% groundcover level is required to achieve the target erosion rate for the WRD slopes. It is considered that these cover requirements can be achieved through a combination of revegetation and, where appropriate, use of a rock mulch layer.

Table 25: Modelled groundcover requirements and soil loss rates for WRD slopes

Slope	Soil Type	Base Case (0% Cover)	Target Rate (4 t/ha/y)		Maximum Rate (10 t/ha/y)	
		Soil Loss (t/ha/yr)	Groundcover (%)	Soil Loss (t/ha/yr)	Groundcover (%)	Soil Loss (t/ha/yr)
WRD-S1	1Cl(Ck)	89.4	65	3.5	40	9.4
	2Cl(Ck)	53.6	45	3.5	25	9.0
	3Cl(Ck)	114.3	70	3.8	45	9.9
	4Cl(Ck)	102.8	65	3.9	45	8.6
	5Cl(Nm)	124.3	75	3.3	50	8.5
	6Cl(EI)	110.3	80	3.5	50	9.3
	7Cl(Nm)	105.7	75	3.4	45	10.0
WRD-S2	1Cl(Ck)	89.5	65	3.6	40	9.5
	2Cl(Ck)	54.4	45	3.7	25	9.2
	3Cl(Ck)	114.7	70	3.9	45	10.0
	4Cl(Ck)	103.0	70	3.3	45	8.7
	5Cl(Nm)	125.7	75	3.5	50	8.7
	6Cl(EI)	110.1	80	3.5	50	9.3
	7Cl(Nm)	108.1	77	3.6	50	8.6

Consequently, the retained WRD will have a conservative estimated footprint of 42.7 ha, typical slope gradients of less than 30% and an elevation above natural topography of a 60 m. The top surface will be relatively flat but domed to prevent rainfall runoff from ponding. Drainage from the WRD will be facilitated by engineered rock lined spine drains and, where necessary graded drains.

3.5.6.9 Retained tailings storage facility cell (RA10)

The Project will have four tailings storage facility cells, TSF1, TSF2, TSF3 and TSF4 during the operational life of the mine to store tailings excavated from the pit. Tailings from three of the tailings cells will be utilised to backfill the pit at closure. Tailings will initially be drawn from TSF1, TSF2, and TSF3 and then, depending on the target tailings backfill level, from TS4. Following removal of the tailings, TSF1, TSF2 and TSF3 will be decommissioned and rehabilitated, with the seepage underdrainage infrastructures such as HDPE liners and pipes, removed and disposed of within the backfilled pit. There will still be a surplus of tailings within TSF4 following backfilling of the pit. Once pit backfilling is complete, TSF4 will be finally capped and rehabilitated.

As outlined in Section 3.5.6.3, geochemical assessments have characterised the tailings as being typically alkaline with low salinity and low acid neutralising capacity. Should the tailings generate any contact water or seepage, this would be moderately saline (RGS 2026).

The majority of tailings samples are classified as PAF. One of the tailings samples showed relatively low concentrations of sulphide sulphur, although a low neutralising capacity is consistent across all samples. Based on the alkaline pH values, it is likely that some of the inherent sulphide sulphur is slow to react. RGS (2026) determined that the sulphur is in the form of pyrrhotite and elemental sulphur.

Initial contact water may contain slightly elevated concentrations of aluminium; however, all other metal/metalloid concentrations are expected to be low. If the tailings are left unmanaged and allowed to oxidise, several metals/metalloids, including aluminium, boron, cadmium, copper, lead, manganese, nickel, and zinc could mobilise into pore water under weakly acidic conditions (RGS 2026).

Leachate from the tailings is expected to contain low concentrations of soluble metals and metalloids when generated under saturated (anoxic) conditions.

Physically, the tailings behave predominantly as sand; as such they are likely to be permeable, drain quickly, and have low water retention characteristics. Overall, the tailings are classified as Emerson Class 3 or 4 and are expected to have good structure and stability and unlikely to be sodic or dispersive.

The TSF cells will be designed to contain tailings at the expected dry densities in the range of 1.35 to 1.50 t/m^{3,} targeting a minimum average in situ dry density of 1.45 t/m^3 (SRE 2026). An HDPE lining will be placed on the base and sides of the TSF, and embankment raises will be constructed by downstream raising.

TSF design parameters

Tailings will be contained within earthen cells lined with high density polyethylene (HDPE) to establish a very low risk of seepage (SRE 2026). The TSFs have been designed with a range of measures to manage surface water risks and minimise the potential for uncontrolled releases. The TSF design has incorporated the following aspects:

- a geotechnical site investigation to assess the foundation and construction materials;
- seismic hazard assessment to confirm appropriate earthquake ground motions for design;
- layout optimisation, to specifically provide for a balance cut-to-fill ratio;
- surface water management;
- seepage control;
- slope stability;
- dam failure modes assessment and qualitative review of the risk of a dam break;
- the HDPE liner system and underdrainage design;
- spillway design;
- monitoring system design;
- water balance modelling and hydraulic design of stormwater controls; and
- safety in design and constructability.

Key TSF design parameters for each cell are summarised in Table 26. There are four stages per cell over the storage life of each cell. The design concept is based on downstream construction techniques with both upstream and downstream slopes of 2.5:1 (H:V). The perimeter embankments are to comprise an engineered, compacted ‘select’ soil embankment with a cut-off trench on the upstream face, with a minimum crest width of 5 m. The downstream section of the embankment will have a minimum crest width of 15 m and comprise traffic compacted mine waste.

A numerical geotechnical stability assessment of the TSF design was undertaken. The assessment indicates that the Factor of Safety (FoS) exceeds the minimum ANCOLD (2019) requirements, suggesting long-term environmental and structural stability. Each of the TSF cells will be regulated structures and subject to the design, certification and operational requirements of the Guideline *Structures which are dams or levees constructed as part of environmentally relevant activities* (DESI 2024).

Table 26: TSF key design parameters

TSF cell	TSF stage	Embankment crest RL (m)	Storage volume 1 m freeboard allowance (Mm^3)	Tailings capacity (Mt dry)	Operating life (years) @ 3.25 Mtpa	Zone 1 earthworks incl seepage cut-off (Mm^3)	Zone 2 downstream earthworks (Mm^3)
Cell 1	1	133.50	4.69	7.03	2.16	0.11	0.77
Cell 2	1	138.75	6.08	9.13	2.81	0.12	1.48
Cell 3	1	144.00	6.50	9.75	3.00	0.12	2.30
Cell 4	1	149.25	6.93	10.40	3.20	0.12	3.17
Cell 1	2	133.50	3.45	5.34	1.64	0.11	0.44
Cell 2	2	138.75	6.39	9.90	3.05	0.12	0.93
Cell 3	2	144.00	6.81	10.55	3.25	0.12	1.48
Cell 4	2	149.25	7.24	11.21	3.45	0.12	2.15
Cell 1	3	133.50	2.67	4.13	1.27	0.11	0.33
Cell 2	3	138.75	6.26	9.70	2.98	0.12	0.93
Cell 3	3	144.00	6.71	10.40	3.20	0.12	1.43
Cell 4	3	149.25	7.12	11.03	3.39	0.12	2.13
Cell 1	4	133.50	2.67	4.13	1.27	0.11	0.33
Cell 2	4	138.75	6.26	9.70	2.98	0.12	0.93
Cell 3	4	144.00	6.71	10.40	3.20	0.12	1.43
Cell 4	4	149.25	7.12	11.03	3.39	0.12	2.13
Total			**93.57**	**143.83**	**44.26**	**1.90**	**22.36**

Capping and rehabilitation

The four TSF cells are captured within RA9 (TSF4) and RA10 (TSF1, TSF2 and TSF3), and have a PMLU of 'grassland', and 'grazing native vegetation—low intensity', respectively.

The TSF1, TSF2 and TSF3 will commence deconstruction towards the end of mining with all the embankment construction materials and tailings returned to the mine pit. Given that the TSF cells will be raised in the downstream direction, and the closure fate is for the majority of this material to be used to backfill the pit, progressive rehabilitation of the downstream slopes of the embankments for each cell will not be possible during the operational phase of the Project (Wave International 2025).

TSF4 will be reshaped with embankments graded to the design slope gradient (Table 18), have a low permeability and capillary break engineered layer installed above the tailings, and have a self-draining upper surface installed. The upper surface will comprise of waste rock materials and soil, of approximately 1.5 m and 0.5 m respectively. The capping layer design will be in accordance with the relative risk ranking of the TSF.

The underdrainage collection system will be retained in place following closure to ensure long term geotechnical stability. The combination of an engineered impermeable layer and the final rehabilitated TSF surface, shaped to promote surface drainage and prevent ponding of rainfall, will ensure minimal risk of TSF water drainage. Water quality at the outlet of the drainage system will be monitored against the nominated WQOs.

The MAW sump, which receives water from the TSF underdrainage system, will be retained post-closure until monitoring confirms that water is no longer reporting from the TSF underdrainage system, after which the MAW sump will be rehabilitated.

Following installation of the capping layer, the TSF will be subject to surface preparation and revegetation works as outlined at 3.5.6.13 and then monitoring and maintenance provisions as detailed in Section 3.7.

As described at Section 3.5.6.8, the ESA (AARC 2026d) WEPP model was selected given the determined risk categorisation of the key final landform structures on-site. The final TSF cell will be retained with an engineered waste rock and soil cover sufficient to reduce the risk of the TSF, following closure, to a medium-risk landform for the purposes of WEPP modelling.

Two TSF slope profiles, TSF-S1 and TSF-S2, were assessed as being representative of slope length, slope complexity, and variation for the TSF. The top of TSF-S1 is approximately 149 mAHD, with the bottom of the slope approximately 132 mAHD, giving a slope height of 17 m. The slope runs continuously for approximately 47 m and is a straight slope, with a slope percentage of 36%. TSF-S2 is similar, with a top of 149 mAHD and a bottom of 131 mAHD, for a total slope height of 18 m. The slope is also a straight slope, running for approximately 47 m, with a slope percentage of 38%.

The ESA adopted a target erosion rate of 4 t/ha/yr, with a maximum tolerable erosion rate of 10 t/ha/yr, based primarily on the Loch *et al.* (2025) which proposes a long-term average erosion rate for a landform slope of 4 t/ha/y as a conservative modelling target to benchmark modelling scenarios for landform design.

Based on 588 100-year WEPP iterations, covering a relevant range of relevant soil samples and land use management profiles, the average annual soil loss, expressed in tonnes per hectare per year (t/ha/yr), for each iteration was calculated and assessed against the target and maximum tolerable erosion rates.

For the retained TSF, the average base erosion modelled across all TSF slopes is 73 t/ha/yr, with a maximum base erosion rate of 103 t/ha/yr along TSF-S2 with soil type 5Cl(Nm). The groundcover required for all slopes and soil types to meet the maximum threshold is variable, ranging from 20% to 55%. The target threshold was similarly variable, ranging from 45% to 85%.

Predicted erosion rates (Table 27) indicate that at a groundcover level of 85%, predicted erosion rates of the TSF slopes are below the target level of 4 t/ha/yr. Similarly, if groundcover on the slopes is 55%, then slope erosion rates are below the maximum soil loss rate of 10 t/ha/yr. As such, groundcover of 55% should be sufficient at the TSF during the early establishment of groundcover on the slopes, with a long-term target of 85% to achieve landform stability. It is considered that these cover requirements can be achieved through adequate revegetation efforts.

Table 27: Modelled groundcover requirements and soil loss rates for TSF slopes

Slope	Soil Type	Base Case (0% Cover)	Target Rate (4 t/ha/y)		Maximum Rate (10 t/ha/y)	
		Soil Loss (t/ha/yr)	Groundcover (%)	Soil Loss (t/ha/yr)	Groundcover (%)	Soil Loss (t/ha/yr)
TSF-S1	1Cl(Ck)	64.6	70	3.9	40	9.5
	2Cl(Ck)	38.3	45	3.6	20	9.8
	3Cl(Ck)	82.2	80	3.6	45	9.8
	4Cl(Ck)	78.1	75	3.7	45	9.2
	5Cl(Nm)	90.6	80	3.7	50	8.7
	6Cl(EI)	72.9	85	3.8	50	8.7
	7Cl(Nm)	62.0	75	3.7	40	9.7
TSF-S2	1Cl(Ck)	69.8	75	3.7	45	8.9
	2Cl(Ck)	42.7	50	3.4	25	8.8
	3Cl(Ck)	89.4	85	3.6	50	9.2
	4Cl(Ck)	84.8	80	3.0	50	8.6
	5Cl(Nm)	102.9	85	3.8	55	8.6
	6Cl(EI)	77.3	85	4.0	50	9.3
	7Cl(Nm)	67.5	80	3.8	45	9.4

3.5.6.10 Permanent diversion (RA12)

An unnamed tributary (stream order 3) reporting to Warrigal Creek crosses the proposed Project mining pit location. Warrigal Creek flows approximately 3 km before converging with the Borer River, flowing 45 km into the Clara River, where it flows 60 km into the Norman River, eventually terminating in the Gulf of Carpentaria.

To maintain a hydrologic connection between the unnamed tributary and Warrigal Creek, as well as to prevent inundation of the proposed mining pit, a 1.8 km long permanent diversion of the unnamed tributary is proposed as part of the Project. A conceptual cross-section of the proposed diversion is shown in Figure 42 with the post-mining scenario shown in Figure 43. As stated in Section 3.5.6.7, following closure, the levee will be removed to allow for reinstatement of the flood plain on both banks of the watercourse diversion.

The unnamed tributary is a determined watercourse under the Water Act 2000 and therefore requires a permanent watercourse diversion designed in accordance with the requirements of the DNRMMRRD *Guideline: Works that interfere with water in a watercourse for a resource activity— watercourse diversions authorised under the Water Act 2000* (DNRME 2019).

Geomorphic description

The existing stream order 3 tributary is characterised by a low-capacity active channel with a moderate sinuosity. Along the diverted and downstream reaches there are several anabranch channels along the mainstream alignment indicating a large proportion of low engages the floodplain. The channel section along the diverted reach is variable with the main channel depth typically varying between 0.7 m and 1.5 m with some sections reaching 2.0 m. In some sections the main channel is poorly defined, and water is expected to engage the anabranch channels in very-frequent flow events.

The geometric design for the diversion is based on replicating the existing channels cross-section, channel grades and sinuosity to best replicate existing conditions. The channel alignment was kept close to the existing alignment to maintain the diversion within the existing floodplain while limiting excessive disturbance and earthworks to construct a new floodplain along its alignment. The diversion will tie in neatly with the existing channel at bed level at both the upstream and downstream extents to ensure hydrological continuity by preventing ponding.

The proposed cross-section of the diversion has been selected based on the average cross-section of the existing watercourse, as shown in Figure 44. The proposed channel has a 1 m deep low flow channel with a 5 m bed width. The low flow channel banks are relatively flat (12.5%) which extent up to a flatter high flow channel (4%) to convey breakout flows and allow potential future migration of the low flow channel. The longitudinal grade has been selected to replicate the existing waterway and maintain hydraulic conditions (stream power) within the proposed diversion equivalent to the existing watercourse.

Accordingly, the proposed diversion design maintains the natural flow regime of the existing waterway without the use of drop structure, impoundments or significant changes of the waterway catchment area. The depth of cut of the proposed diversion remains above the regional groundwater level and therefore is considered highly unlikely to intercept groundwater.

Rehabilitation strategy

A field verified assessment of vegetation communities was conducted by AARC in December 2025 and identified wetland associated REs in the Project area. No WPAs, HES wetlands or high ecological value waters identified under the Environmental Protection (Water) Policy 2009, schedule 2 are present in the Project area. Mapping of the RE's is shown in Figure 26 and summarised as:

- RE 2.3.26a: River Red Gum woodland with *Melaleuca spp.,* on fringes and in channels of minor watercourses (Least Concern). This is the dominant ecosystem present along the riparian corridor of the existing waterway and will inform the revegetation requirements of the diversion.
- RE 2.3.26c: River Red Gum woodland with *Melaleuca viridiflora.,* on fringing, sandy, minor watercourses (Least Concern). This ecosystem if less dominant and present on a small number of the existing waterway anabranch channels.
- RE 2.3.55d: Seasonal wooded swamp with *Melaleuca viridiflora.,* on low woodland sandy depressions (Least Concern).
- RE 2.3.61c: Seasonal wooded swamp with *Eucalyptus* microtheca and Melaleuca *viridiflora.,* on woodland alluvial depressions (Least Concern).

Several other less dominant ecosystems were mapped however, RE 2.3.26a will inform the revegetation approach for the diversion. Aquatic flora was surveyed as part of the field investigation. The two main species of flora identified were *Cyperus* sp. and *Juncus* sp., no threatened species of aquatic flora were identified (as per EPBC Act or NC Act). No introduction of invasive species is expected as part of the diversion works.

As a permanent diversion, in accordance with the Watercourse Diversion Functional Design Report (Engeny 2026), the diversion will form part of the post-closure landform and will be rehabilitated to establish the riparian ecosystem PMLU. Rehabilitation of the diversion will aim to achieve similar conditions to the existing creek riparian environment to provide ecological connectivity values for local flora and fauna species.

Disturbance of existing vegetation within the proposed diversion floodplain areas will be minimised during construction. This is to reduce the required extent of rehabilitation and revegetation following construction.

Rehabilitation will include establishment of vegetation and ecosystem across the diversion channel, banks and associated riparian areas to promote bank stability and minimise erosional processes. The establishment of trees, shrubs and grasses will provide erosion resistance and contribute to the long-term stability of the diversion channel and banks.

Species selection for revegetation of the diversion is proposed with consideration of the dominant existing watercourse vegetation (i.e., RE 2.3.26a - River Red Gum woodland with Melaleuca spp.).

Three revegetation zones, numbered Zone 0 to Zone 2, have been identified for the diversion as described in Table 28.

Table 28: Description of rehabilitation zones and revegetation strategy

Rehabilitation Zone	Name	Locality	Target RE	Ground Layer	Mid and Upper Layers
0	Channel bed	Low flow channel bed	-	N/A	N/A
1	Channel banks	Low flow channel banks	2.3.26a	Initial seeding of quick establishing, non-native cover crop, followed by seeding of locally native ground species.	No tree or shrub species proposed for the channel banks.
2	Floodplain revegetation	High flow channel banks	2.3.26a	Initial seeding of quick establishing, non-native cover crop, followed by seeding of locally native ground species.	Seeding of locally native shrub and tree species associated with the RE.

*Desirable RE only. Subject to change during detailed design due to seed availability or herbarium map changes.

A detailed seed mix will be developed during the detailed design process with the general aim to include a fast-establishing cover crop to provide initial stabilisation of the disturbed areas, and a mix of native vegetation to provide long-term ground stability following establishment of the cover crop and woody vegetation. Seed collecting under appropriate approvals will be carried out well in advance of earthworks (if possible) and timed to match the seasonal seed drop of the target species. Seeding will be targeted for late spring or early autumn to avoid high intensity rainfall events that may provoke erosion. Watering may be required after placement of seeds depending on the time of year and climate conditions.

Performance criteria for revegetation have been developed to monitor the success of rehabilitation following the construction and revegetation of the diversion. Nominated performance criteria for this RA have been included in Table 29.

Table 29: Performance criteria for riparian ecosystem vegetation rehabilitation goals

Goal	Values to be protected	Performance criteria
Non-polluting	Protection of slightly to moderately disturbed aquatic ecosystems.	• Establishment of sufficient vegetation cover to minimise erosion of banks and transport of high loads of sediment into the watercourse • Maintenance of a sediment transport regime that does not directly impact on upstream and downstream reaches • Prevent mine affected water from entering the receiving environment
Stable landform and sustainable agreed land use	The land within the watercourse diversion is of similar habitat to agreed undisturbed analogue habitat.	• Total ground cover on the watercourse banks is sufficient to maintain potential sheet erosion rates (at or below the upper acceptable erosion potential of the current watercourse banks) • Protective foliage cover is at least 70% • Plant cover is stable or increasing • Revegetation establishment is completed prior to start of the wet season • Apply topsoil for growth medium
	Overall condition of the diversion is consistent with the upstream or downstream reaches.	• Index of Diversion Condition (ACARP 2001) describing bed and bank conditions, and riverine vegetation extent demonstrates progress towards reference reaches • Geomorphic features and vegetation composition similar to those in the local landscape
	Existing habitat values adjoining the approved works are maintained.	• Individuals of significant species will be managed during construction such that the risk of incidental deaths is low • Existing vegetation beyond the approved disturbance zone is not disturbed • No new weeds are introduced to the area • Weed frequency neither above pre-disturbance levels nor to levels that threaten revegetation • Fires are prevented • Diversion is functionally self-sustaining e.g.; no ongoing maintenance is required

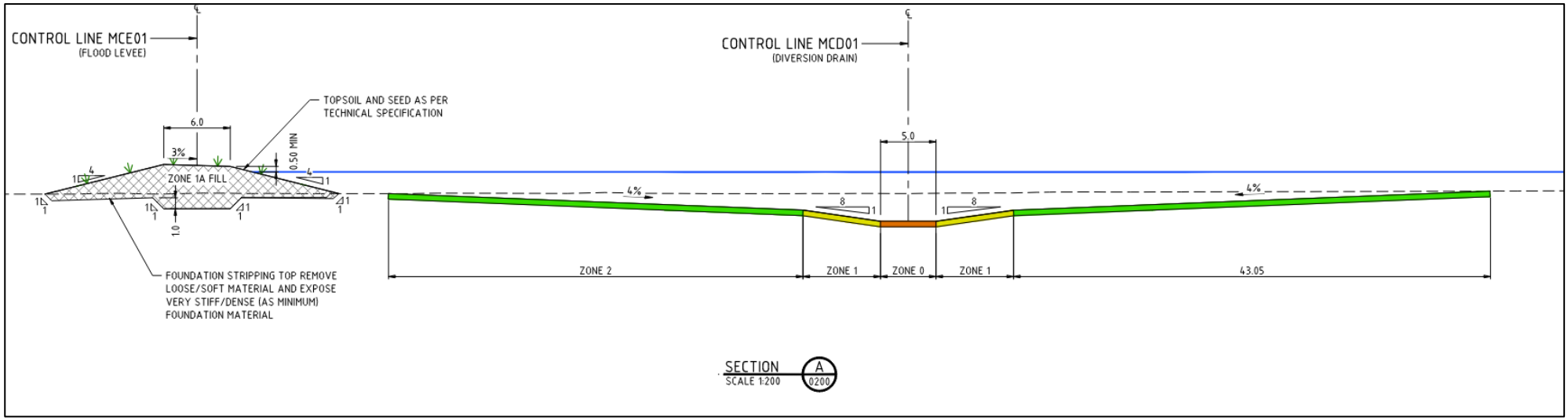


Figure 42: Conceptual diversion drain cross-section - operational scenario

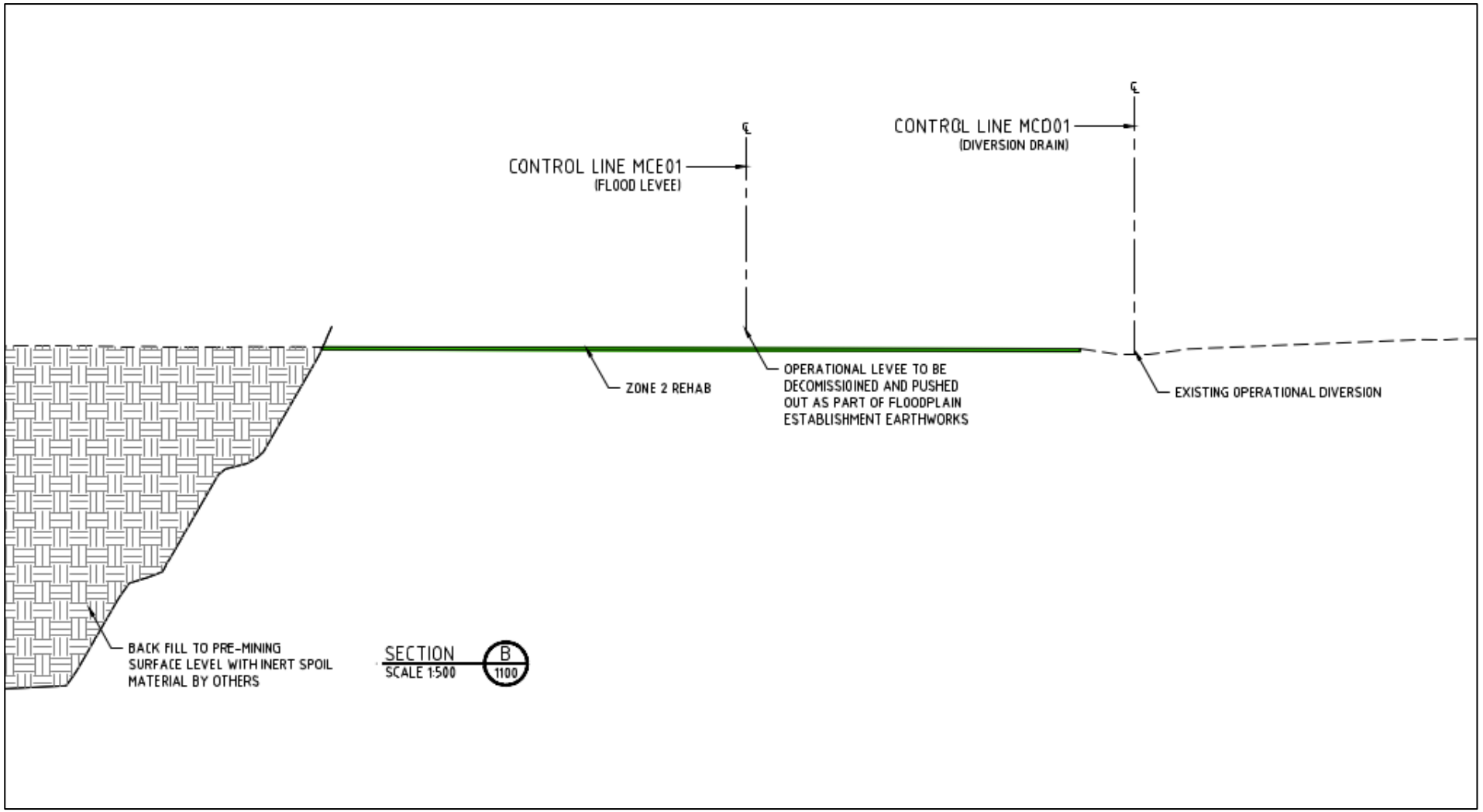


Figure 43: Conceptual diversion drain cross-section - post- mining scenario

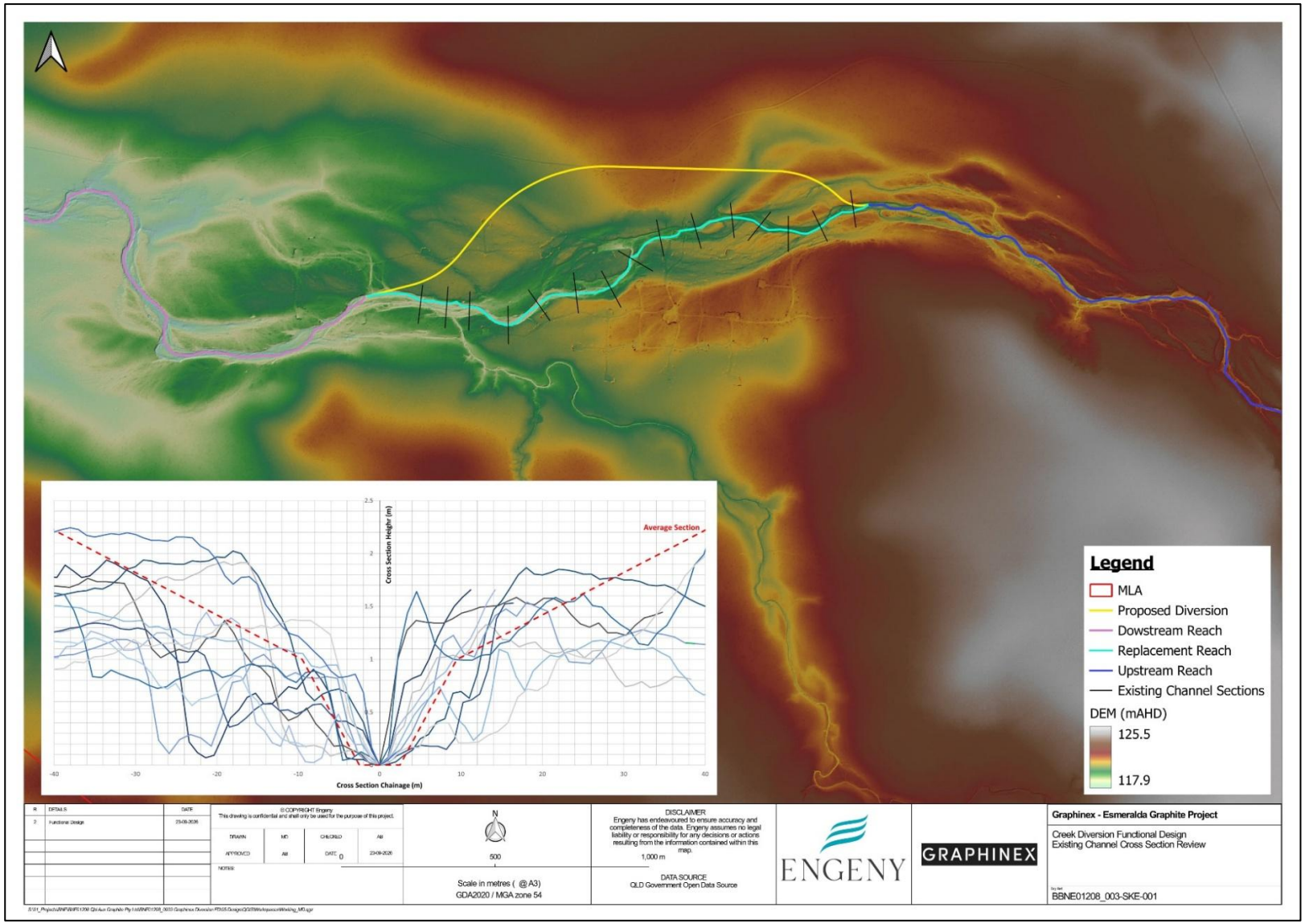


Figure 44: Existing channel cross-section review

3.5.6.11 Other rehabilitation areas

All infrastructure will be removed unless formal written agreements have been reached with the underlying landowners for its ongoing use, maintenance, and management. Where agreements have not been reached to retain infrastructure, that infrastructure will be removed from site in an appropriate manner.

Based on conversations to date with the landowner, it is anticipated that the infrastructure to be retained will include:

- cattle exclusion fencing around the area of:
  - tailings storage facility Cell 4 (RA9); and
  - the southwestern waste rock dump (RA8)
- access roads and tracks;
- the airstrip;
- helipad;
- accommodation camp;
- solar array;
- Diesel station; and
- HV substation

Buildings

In the absence of a continuing use for the Project's buildings post-closure, all buildings and infrastructure (including footings and foundations) will be demolished and, if comprising clean construction/demolition waste disposed of on-site, or alternatively removed from site. Prior to disposal, all wastes will be assessed and classified in accordance with the Environmental Protection (Waste Management) Regulation 2000. A land contamination assessment will be undertaken where potential contamination exists. Contaminated materials will either be remediated in situ or excavated and disposed of to an appropriately licensed facility.

Building footings will be excavated to a depth of at least 1 m below ground level. Disturbed areas will then be recontoured to match the surrounding topography and revegetated (refer Section 3.5.6.13).

Roads and tracks

Roads and tracks that are not required post-closure will be reshaped, topsoiled, and ripped and revegetated (refer Section 3.5.6.13).

Workshops, chemical and fuel storages

All workshops, chemical and fuel infrastructure will be removed from site at completion of mining and sold, recycled or appropriately disposed of to a facility authorised to accept such waste.

A land contamination assessment will be undertaken for all areas associated with workshops and chemical/fuel storages. Contaminated materials will either be remediated in situ or excavated and disposed of to an appropriately licensed facility.

Plant and equipment footings will be excavated to a depth of at least 1 m below ground level. Disturbed areas will then be recontoured to match the surrounding topography and revegetated.

3.5.6.12 Water management

A water management system has been developed for the Project to preserve the EVs of the receiving environment. The water management system includes MAW storages, raw water storage, sediment storages and drainage diversion of undisturbed catchments. The site water storages will maintain supply to Project water demands.

A Water Management Plan (WMP) will be maintained and reviewed annually to provide for the proper and effective management of water at the Project. The WMP outlines the required management activities to manage the actual and potential environmental impacts resulting from mining activities and includes a water balance model used to assess performance of the water management system. Figure 45 provides the schematic of the water balance model.

Post-closure, the majority of the site will return to its pre-existing drainage condition with the exception of Sediment dam 3.

Post-closure surface runoff will drain from rehabilitated landforms along natural surface water flow pathways, including through the naturally lower topography associated with the existing drainage pathway, towards the receiving environment.

Geochemical characterisation indicates that soil, overburden and waste rock materials are generally characterised by negative or close to zero net acid producing potential (NAPP) values (RGS 2026). The NAPP results indicate that the materials are expected to add alkalinity to surface runoff and seepage, suggesting that acid-generating drainage is not expected from these materials

The Project does not propose any controlled releases to surface water or groundwater. Potential uncontrolled releases within retained water management infrastructure include seepage, overtopping and dam break events associated with site water management infrastructure. Based on the technical assessments undertaken by Engeny (2026a) and SRE (2026), Project water management infrastructure was assessed in accordance with the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) (the Manual). The risk assessment is discussed in the following section.

Water storages

There are several water management features associated with the Project. The key water management features are described in Table 30 along with their post-closure fate.

As outlined in Section 3.5.6.6, at closure, only Sediment Dam 3 will be retained as a stock water dam or water storage able to sustain a stock water quality.

At closure, water remaining within the water storages proposed for decommissioning will be managed through evaporation, following which the water storages will be decommissioned and rehabilitated. The liners within the water storages will be removed as part of decommissioning and, where they cannot be recycled, will be collected and disposed of off-site by a licensed waste contractor to an approved waste facility.

At closure, the MAW sump will continue to receive water from the retained TSF underdrainage system. Water within the MAW sump will be managed through evaporation until monitoring confirms that water is no longer reporting from the TSF underdrainage system, after which the MAW sump will be decommissioned and rehabilitated. The liner within the MAW sump will be removed and managed as described above.

As discussed above, potential uncontrolled releases include seepage, overtopping and dam break. Table 31 summarises the consequence categories for the retained water storages.

Table 30: Water storages

Storage	Estimated total capacity	Operation	Retained post-closure
Process Water Dam (PWD)	400 ML	Located within the processing area. Will be central storage to the processing plant and be used for water supply to the plant. Will also capture runoff from the plant area and receive pump inflows from the other site storages to maintain supply to water demands.	No
Pit Dewatering Dam (PDD)	200 ML	Located to the south of the processing area and will be operated empty to supply process water demands. Will receive dewatering for the mining pit and TSFs to supply process water demands	No
MAW Sump	100 ML	Located upstream of the mine pit and will collect runoff from the ore stockpile area and overtopping flows from the PWD and PDD.	No. Retained post-closure until monitoring confirms that water is no longer reporting from the TSF underdrainage system, after which the MAW sump will be rehabilitated.
Sedimentation Pond 1	60 ML	Manage sediment runoff generated from the northeast waste rock dump	No
Sedimentation Pond 2	94 ML	Manage sediment runoff generated from southern areas of the Project	No
Sedimentation Pond 3	135 ML	Manage sediment runoff generated from the northwest waste rock dump	Yes
Sedimentation Pond 4	60 ML	Manage sediment runoff generated from the western soil stockpiles	No
TSF1	16,201	Recovery of water to supply water demands. Cell will overflow towards the mining pit	No
TSF2	17,101	Recovery of water to supply water demands. Cell will overflow towards the mining pit	No
TSF3	17,001	Recovery of water to supply water demands. Cell will overflow towards the mining pit	No
TSF4	17,001	Recovery of water to supply water demands. Cell will overflow towards the mining pit	Yes
Raw Water Dam	200 ML	Proposed for rainfall storage and for backup storage requirements.	No
Clean Water Sump	200 ML	Collects runoff from upstream natural catchments. Water collected in the sump is pumped to the Raw Water dam	No

[1]Design Storage Allowance as determined from the TSF design (SRE 2026)

Table 31: Preliminary consequence category assessment summary

Structure	Failure to contain – seepage	Failure to contain – Overtopping	Dam Break
Sedimentation Pond 1	Low	Low	Low
Sedimentation Pond 2	Low	Low	Low
Sedimentation Pond 3	Low	Low	Low
Sedimentation Pond 4	Low	Low	Low
Raw Water Dam	Low	Low	Low
Clean Water Sump	Low	Low	Low
TSF4	Significant	Significant	Significant

Based on the consequence assessments, the retained water storages (Sediment Dams, Raw Water Dam and Clean Water Dam) are classified as low consequence structures. Accordingly, the potential impacts of uncontrolled releases on surface water values are expected to be low.

Meanwhile TSF4 also represents a potential source of uncontrolled release to groundwater through seepage. However, as discussed in Section 3.5.6.9, the TSF will be fully HDPE-lined. Given this, the hydraulic conductivity of the TSF has been assumed to be very low (at least 1.0×10^{-9} m/sec/m^2), suggesting that the likelihood of uncontrolled release of contaminants to groundwater will be low.

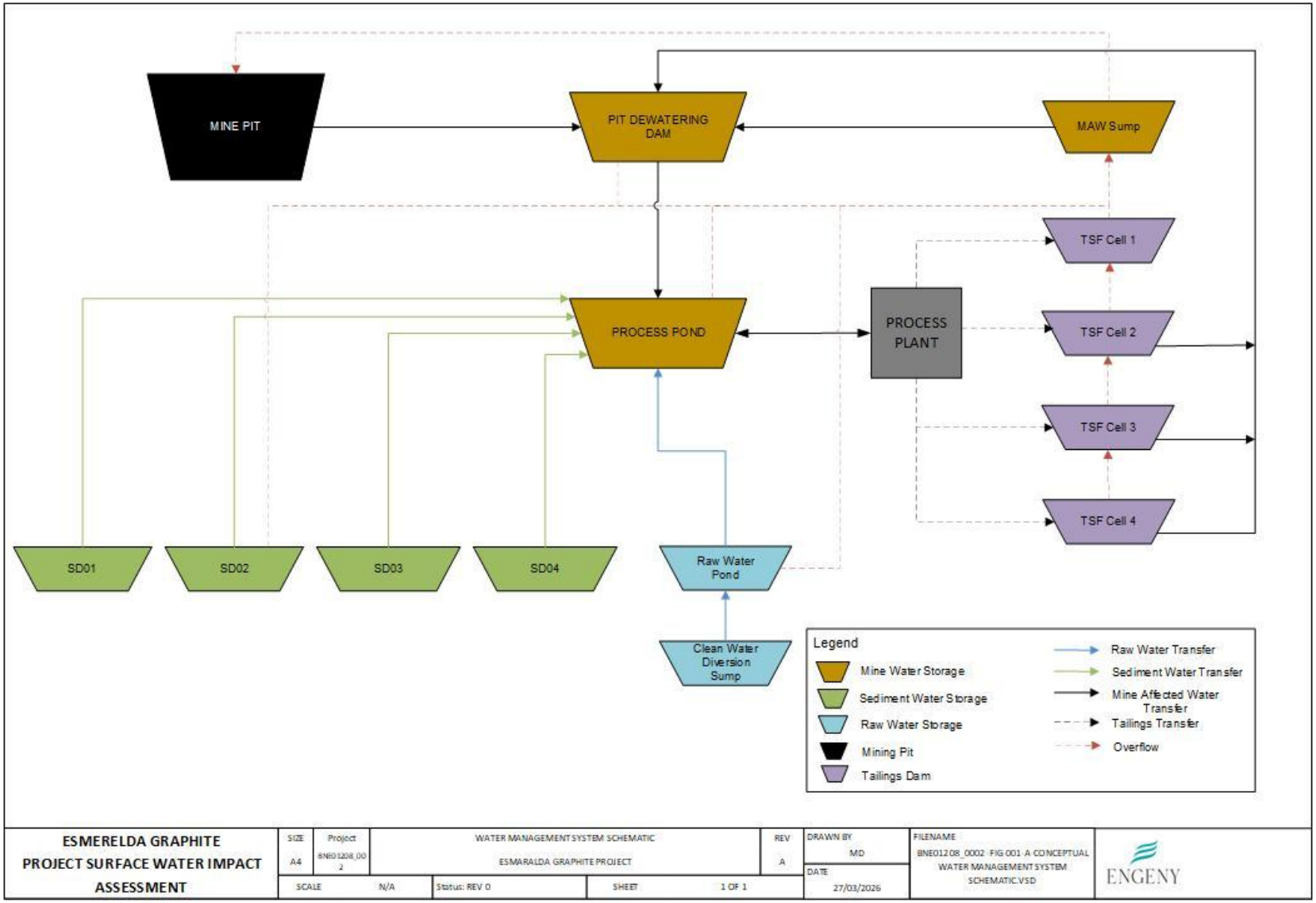


Figure 45: Water management system schematic

3.5.6.13 Surface preparation and revegetation

The key objective of the Project's revegetation plan is to ensure that a self-sustaining vegetation community is established. The plant species used need to conform to the agreed PMLU; for this Project the PMLUs largely conform to the composition of the pre-existing communities. Given the low intensity grazing land use, there also need to species present which conform to the 3P category (palatable, productive, and perennial).

Growth media management

As outlined at Section 3.5.6.4, sufficient topsoils/subsoils are available to address rehabilitation requirements. Given that the majority of RAs will not be available prior to the completion of mining, soils will need to be specifically managed to maintain their viability for rehabilitation purposes.

Soil management measures will be contained within a soil stripping and management plan (SSMP) which will be configured to address the following outcomes and requirements:

- preserve as much of available soils resources as possible;
- ensure soils are not degraded during stripping, stockpiling and reinstatement;
- minimising the handling of soils;
- supervision of stripping to control recovery depth based on the existing soils mapping;
- Records of areas stripped and date of stripping/stockpiling;
- delineation of suitable stockpile areas;
- ensuring stockpiles are generally less than 2 m high and shaped to encourage water drainage and minimise erosion and loss of resource;
- suitably segregating soils when stripping, stockpile and reinstating to minimise mixing of materials (both spatially between SPCs and vertically within soil profiles) with sufficiently different characteristics throughout soil handling;
- as soil resources are to be stockpiled for a period in excess of six months, agronomic testing should be undertaken and appropriate amelioration and seeding carried out to stabilise the stockpiles until reuse; and
- Prior to reuse in rehabilitation works, testing of soil properties to determine the requirement for and application of ameliorants such that this can be planned to occur during the rehandling of soils for rehabilitation. Key parameters that should be considered include pH, ESP, CEC (major cations), organic matter content and other essential nutrients such as nitrate, phosphorous and sulphate.

Soil amelioration, fertilisers and amendments

Soil amelioration is usually used to correct a chemical constraint and is often used as a mitigation measure and/or to improve rehabilitation outcomes. The most common ameliorants are the use of gypsum to address sodicity and agricultural lime to neutralise acidic soils. Fertiliser application can improve growing conditions and support plant growth and is particularly important during the establishment phase of new rehabilitation.

The SLSA (GT Environmental 2026) for the Project provides general recommendations for amelioration suggesting that the following:

- Overall, pH amelioration is not recommended for the SPCs in the study area.
- In relation to salinity, while no amelioration is recommended, it is noted that elements such as EC, chlorine and sodium (Na) are transient and will change following disturbance, stockpiling and mixing and may need to be addressed at the point of reinstatement of soils.
- Only SPC 6Cl(El) indicated a specific issue with sodicity and it is recommended that where this material is utilised, it should be segregated from other soils and assessed and ameliorated separately.

- SPCs were observed very low fertility indicators of macronutrients, phosphorus and varying levels of micronutrients. Native vegetation and some introduced pasture species are adapted to very low nutrient levels and in general, it may not be required to apply fertiliser where the PMLU relies on native vegetation establishment. Appropriate fertiliser rates, where required, will be determined prior to each revegetation event based on the soil health and suitability assessment undertaken by an AQP in accordance with RM criterion 5.1 (refer Table 18). The assessment will inform the requirements for fertiliser and other ameliorants to ensure soil fertility and other soil properties are suitable to achieve the relevant PMLU. It is recommended that fertiliser applications should occur during final soil placement and seed bed preparation.
- The incorporate of organic matter into the growth media will increase organic levels, improve soil structure, increase CEC, reduce erosion as well as increase water holding capacity. SPCs which may benefit from amelioration with organic matter are generally the sandier, firm setting soils with low CEC and Plant Available Water Capacity; such as SPCs 3Cl(Ck), 5Cl(Nm), 6Cl(El) and 7Cl(Nm). It is recommended, where possible, to utilise an organic matter generated from land clearing or stripped vegetation, where it is near the RAs and readily available.

Records will be maintained relating to soil sampling and analysis results, as well as utilised ameliorants, their application rates and application methods.

Soil reinstatement and surface preparation

Soil sampling and analysis on stockpiled soils is recommended prior to use to understand if there are amelioration requirements to support the intended rehabilitation outcomes. The characterisation and assessment of amelioration requirements will confirm soil properties and guide amelioration activities.

At time of reinstatement, any subsoil resources being utilised as a subsoil will be placed first and reprofiled to be consistent with the landform. Ripping or cultivation of the reinstated subsoil may be required to overcome any compaction that occurs during stockpiling and the reinstatement process.

Growth media should be placed to a target 0.15 m depth. Where stripping and stockpiling of soils will potentially increase the sodicity and potential surface condition issues gypsum should be applied prior to stripping. Erosion and sediment control structures will be implemented and maintained as required.

Growth media from long-term stockpiles will likely benefit from the addition of organic material to boost fertility, improve structure and biological activity, particularly where stockpiles have been higher than about 0.5 m. The preparation of disturbed areas prior to the establishment of vegetation will involve ripping or tyning along the contour to create sufficient surface roughness to minimise erosion and maximise water retention. RAs will be reprofiled to in a manner compatible with the surrounding topography and with consideration of establishing or maintaining an appropriate drainage system.

Revegetation

To maximise revegetation success, revegetation activities will be scheduled during spring before the heavy wet season rainfall begins. Seeding may also occur during the summer months, depending on rainfall. Seeds will be sown using direct seeding or tube stock depending on the species and areas to be revegetated.

Seed stocks will be checked for viability upon purchase and seeded as soon as possible. Seeds may be spread by hand, tractor or by air. Hand seeding is suitable for small areas up to 5 ha; while a tractor with a rear spreader attached is more suitable for larger areas. Seeds should not be buried over 5–10 mm in depth in the soil.

Table 32 provides a provisional list of potentially suitable revegetation species for the site based on those identified during the Terrestrial Ecology Assessment (AARC 2026b), and including the dominant species found within the field verified vegetation communities. Ideally, three species from each vegetation layer should be selected for seeding depending upon availability cost and then on actual rehabilitation performance based on early rehabilitation efforts. This will prevent the emergence of a monoculture. All species listed are suited to the northern Queensland climate and site-specific environmental conditions.

As noted, the seed species listed are indicative and are subject to change with season, availability, and following assessment of rehabilitation performance. The minimum total seeding rate is to be no less than 15 kg/ha. In addition, should challenges arise in establishing early vegetation cover on slopes, Japanese Millet (*Echinochloa utilis*) and Saia Oats (*Avena strigose*) may be sown as cover crops during summer and winter seasons respectively at rates of up to 30 kg/ha. To improve soil condition and reduce erosion during vegetation establishment, gypsum maybe be applied to enhance infiltration and reduce dispersion. It may also assist in minimising runoff and rill erosion in the absence of adequate vegetation cover (GT Environmental 2026).

Monitoring of rehabilitated areas will commence at the wet season following rehabilitation works and will be carried out in conjunction with the rehabilitation monitoring and maintenance program (Section 3.7).

Table 32: Indicative species seed mix[1]

PMLU	Species name	Common name
Creek diversion	**Tree layer**	
	Eucalyptus camaldulensis	River Red Gum
	Melaleuca fluviatilis	Weeping Tea-tree
	Eucalyptus microtheca (surrounding vegetation)	
	Corymbia polycarpa (surrounding vegetation)	Long-fruited Bloodwood
	Lower tree and shrub	
	Asteromyrtus symphyocarpa	Liniment Tree
	Acacia torulosa	Torulosa Wattle
	Melaleuca viridiflora	Broad-leaved Paperbark
	Ground layer	
	Eragrostis speciosa	Handsome lovegrass
	Schizachyrium crinizonatum	
	Aristida ingrata	
	Setaria surgens	Annual Pigeon Grass
	Eriachne mucronata	Mountain Wanderrie Grass
	Schizachyrium fragile	Firegrass
Grassland	*Eragrostis speciosa*	Handsome lovegrass
	Schizachyrium crinizonatum	
	Aristida ingrata	
	Setaria surgens	Annual Pigeon Grass
	Eriachne mucronata	Mountain Wanderrie Grass
	Schizachyrium fragile	Firegrass
	Chrysopogon fallax	Golden Beard Grass
	Aristida spp.	
Low intensity grazing woodland	**Tree and shrub layer**	
	Corymbia polycarpa	Long-fruited Bloodwood
	Melaleuca viridiflora	Broad-leaved Paperbark
	Melaleuca citrolens	Gulbarn
	Grevillea pteridifolia	Golden Parrot Tree

PMLU	Species name	Common name
	Acacia holosericea	
	Acacia galioides	Whorled-leaved Wattle
	Carissa lanceolata	Currantbush
	Ground layer	
	*Eragrostis speciosa**	Handsome lovegrass
	*Schizachyrium crinizonatum**	
	*Aristida ingrata**	
	Setaria surgens	Annual Pigeon Grass
	Eriachne mucronata	Mountain Wanderrie Grass
	Schizachyrium fragile	Firegrass
	Chrysopogon fallax	Golden Beard Grass
	Aristida spp.	

The backfilled pit and retained TSF cell 4, will have a capping depth of 2 m, including 0.5 m of soil, and 1.5 m of suitable waste rock. The rooting depth of some native species can reach depths of up to 2 m and therefore may not play a key role in the revegetation of the backfilled pit, however, the existing community composition in the area of the proposed pit is dominated by Feathertop Wiregrass (AARC 2025b), which has a rooting depth of approximately 50 cm. Other species in the mix, including Golden Beardgrass (a 3p species) which is known to support soil stabilisation due to its mat-like root structure, are also expected to be highly suited to the proposed rehabilitation outcomes of the pit. The diverse and site-specific seed mix proposed is expected to ensure the success of revegetation across all rehabilitated landforms without relying on any one specific species; and ensuring consistency with the existing community composition.

3.6 Risk assessment

3.6.1 Risk assessment requirements

Section 126C(1)(f) of the EP Act requires the PRCP to identify the risks, for each PMLU, of a stable condition not being achieved and how the applicant intends to manage or minimise the risk.

A risk assessment has been carried out in accordance with the following standards:

- AS/NZS ISO 31000:2018 Risk management – Guidelines; and
- HB203:2012 Managing environment-related risk.

3.6.2 Risk assessment process

Any risk assessment needs to be undertaken with consideration of the scope, context and criteria relevant to the assessment. For this risk assessment, the following scope and purpose was discussed and agreed to:

> *The purpose of this risk analysis is to identify the risks of a stable condition for land not being achieved for the agreed PMLUs nominated, and the approach to be taken to manage and minimise the risks identified.*

For this risk assessment, risk scenarios (or 'threats') were identified and considered for each RAs associated with the Project. The causes attributable to each risk scenario were documented as well as the potential impacts. Existing controls were noted, defined as those reasonably expected to be in place for a Project of this nature and having appropriate and contemporary management systems. Each risk scenario was then assessed

with respect to health, safety, the environment, and compliance against the risk assessment schema outlined in Section 3.6.3.

3.6.3 Risk assessment schema

Risks specific to the rehabilitation of the Project were classified using the risk classification schema described below. The risk assessment schema used is comparable to those used widely within the mining industry and comprises the following components:

- a control effectiveness ranking (Table 33) used for assessing the operational controls expected to be in place for a project of this type;
- a likelihood classification descriptors table (Table 34); and
- a consequence classification descriptors table (Table 35) intended to guide a consistent assessment of consequence.

Following a consensus determination of likelihood and consequence, the risk level was determined using the matrix shown in Table 28. For any risks classified as 'significant' or above, additional mitigation and management measures were identified and documented. Mitigation and management measures were also documented for some lower-level risks, where these were feasible if required.

Table 33: Risk assessment control effectiveness ranking

Control Rank	Description	Guidance
C1	Substantially effective/adequate design	Controls considered adequate and operating effectively on almost all occasions
C2	Mostly effective/adequate design	Controls considered adequate and operating effectively on most occasions
C3	Inadequate design/partially effective	Controls considered inadequate or only operating to partial effectiveness on most occasions
C4	No controls/ineffective	There are no controls, or the existing controls are operating ineffectively on all occasions

Table 34: Risk assessment likelihood classification

Level of Risk Probability	Descriptive Guidance	Probability	Frequency
Highly Likely	The event is expected to occur in most circumstances	>25%	The event and consequence are expected to occur at least twice per year
Likely	The event will probably occur in most circumstances	10% - 25%	The event and consequence are expected to occur once to twice per year
Possible	The event could occur at some time	1% - 10%	The event and consequence are expected to occur at least once in 1 to 10 years
Unlikely	Not expected but the event may occur at some time in the future	0.1% - 1%	The event and consequence are expected to occur at least once in 10 to 100 years
Rare	The event may occur only in exceptional circumstances	<0.1%	The event and consequence are expected to occur less than once in every 100 years

Table 35: Risk assessment consequence classification

Category	Consequence Scale				
	1. Very Low	**2. Low**	**3. Moderate**	**4. High**	**5. Very High**
Safety & Health	• Reversible health effects of little concern • Low level, short-term subjective symptoms • First aid treatment	• Reversible health effects of concern • Medical treatment • Reversible injuries requiring treatment, but not leading to restricted duties	• Severe reversible health effects of concern • Lost time illness/injury • Reversible injury or moderate irreversible damage to one or more persons	• Single fatality or irreversible health effects or disabling illness or severe impairment to one or more persons	• Multiple fatalities or serious disabling illness to multiple people
Environmental	• Near-source confined and promptly reversible impact (a shift)	• Near-source confined and short-term, promptly reversible impact (a week)	• Near-source confined and medium-term recovery impact (on-site a month, off-site a week)	• On-site impact that is unconfined and requiring long-term recovery or residual impact • off-site impact that is near-source confined • recovery on-site = years, off-site a month	• Impact that is widespread unconfined and requiring long-term recovery, leaving major residual damage
Legal/ Compliance/ Regulatory	• Non-conformance with internal requirement with very low potential for impact • Non-compliance with community commitment goes unnoticed by external parties, minimal effort to correct	• Non-compliance with external or internal requirement with low potential for impact • Formal censure • Non-compliance with community commitment, requiring limited effort to correct	• Non-compliance with internal/external requirement with moderate impact • Moderate penalties for breach of permit • Non-compliance with community commitment reported formally	• Breach of licence(s), regulation with high potential for prosecution • Systemic internal standards breach-high impact • Community commitment breach	• Suspended or severely reduced operations imposed by regulators • Breach of community commitment results in direct loss of established consents

Table 36: Risk assessment classification matrix

Likelihood	Consequence				
	Very Low	**Low**	**Moderate**	**High**	**Very High**
Highly Likely	Class II	Class III	Class IV	Class IV	Class IV
Likely	Class II	Class III	Class III	Class IV	Class IV
Possible	Class I	Class II	Class III	Class IV	Class IV
Unlikely	Class I	Class I	Class II	Class III	Class IV
Rare	Class I	Class I	Class II	Class III	Class III

3.6.4 Risk assessment outcomes and management

The full risk assessment outcomes are detailed in Appendix E. In summary, 79 risk scenarios were assessed in total and comprising:

- 28 Class I risks; defined as Risks that are below the risk acceptance threshold and do not require active management;
- 44 Class II risk; defined as risks that lie on the risk acceptance threshold and require active monitoring; and
- seven (7) Class III risk; defined as risks that exceed the risk acceptance threshold and require proactive management.

There were no Class IV risks identified; defined as risks that significantly exceed the risk acceptance threshold and need urgent and immediate attention.

Of the seven (7) Class II risks identified:

- Five (5) were considered to be compliance risks related to the risk of achieving a sustainable PMLU with respect to five of the RAs. The Class III compliance rankings were not reflected by their respective environmental risks for the equivalent risk scenario which ranged from Class I to Class II. This classification better reflects the deemed seriousness of not complying with PRCP schedules and criteria rather than any specific environmental risk.
- One risk related to the high consequence associated with the risk of personal safety during flood events within the retained diversion. It should be noted that this risk ranking is no different from that applied in the current pre-mining state.
- The remaining Class III risk was identified as having an environmental consequence relating the challenges that may be associated with achieving an acceptable riparian vegetation outcome within the rehabilitated diversion channel.

3.7 Monitoring and maintenance

3.7.1 Rehabilitation monitoring

Monitoring of a rehabilitated area will commence as soon as the area has been revegetated and achieved RM6. Rehabilitation will be monitored initially on an appropriate frequency to the stage of rehabilitation until achievement of a stable PMLU (RM7 or RM8), and then at a lesser frequency depending on rehabilitation performance.

Survey timing will preferentially occur post-wet season, as monitoring at this time allows for more accurate identification of the species present and a clearer understanding of species richness on-site. Where sufficient data is acquired that demonstrates that rehabilitation is clearly on a trajectory to achieve milestone criteria, the frequency of monitoring may be reviewed.

The rehabilitation monitoring program aims to achieve data collection at sufficient spatial and temporal resolution to ensure statistically valid results. The following methods will be employed at each monitoring site and described in detail in the following sections:

- permanent vegetation monitoring transects (ground cover monitoring and species richness);
- photographic monitoring;
- erosion monitoring;
- topsoil characterisation (as required and particularly where revegetation performance is inadequate).

RAs will be visually assessed to identify signs of fauna utilisation, noticeable issues such as erosion, vegetation cover deficiencies, or weed and / or pest infestations. Satellite imagery technology may also be employed. These observations will be incorporated with the results of each rehabilitation progress report.

3.7.1.1 Analogue sites

The analogue sites (also referred to as reference sites) will be established within a similar habitat type of the rehabilitated areas. The analogue sites consisting of established vegetation communities, are likely to show less temporal variation compared to rehabilitation sites. The reference sites established will correspond to the current proposed PMLUs.

Analogue sites will be initially scheduled for monitoring at least biennially to establish reference conditions and provide a baseline against which rehabilitation monitoring results can be assessed.

Monitoring frequency will take into consideration the RM requirements and RM schedule. It is recommended that the timing of monitoring of reference sites coincides with monitoring of RAs (i.e. post-wet season).

3.7.1.2 Permanent vegetation monitoring transects

Permanent monitoring sites will be established to ensure sampling repeatability over the life of the monitoring program, with each transect located within an area that is readily accessible.

This method involves the collection of quantitative data on ground cover, species richness, and tree and shrub density within each plot at monitoring sites. Each monitoring site is demarcated by a 50 m long transect and observations/ measurements are taken 5 m on either side of the transect, thereby representing an effective plot size of 50 m by 10 m. A plastic delineator post-guide is installed at each end of the transect to ensure the exact location of the permanent transect can be identified, ensuring robust sampling repetition.

To measure species richness, all vascular plants occurring within 5 m of either side of the 50 m transect are recorded. Any species unable to be identified are collected for later identification. Percentage ground foliage cover for each species is recorded within ten 1 m x 1 m quadrats placed every 5 m along the 50 m transect, alternating sides. In each quadrat, the percentage cover of rock, bare ground, organic litter (for slopes ≥10%),

and each plant species present is recorded. Species are classified into one of the following six groups for reporting purposes:

- native pasture species;
- exotic pasture species;
- trees;
- shrubs;
- forbs; and
- noxious weeds.

This methodology is used to record species richness and the projective foliage cover (PFC) on the transects to assess against milestone criteria. It should be noted that due to the pastoral nature of rehabilitation sites, the PFC is inferred from the vegetation cover measured at each transect.

The above methodology has been adapted based on information contained within the BioCondition Assessment Framework (Eyre et al. 2015), the Vegetation Assessment Guide (DoE 2013), and the Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Neldner et al. 2022).

3.7.1.3 BioCondition assessments

For Graphinex, BioCondition assessments will be undertaken for the 'Grassland' PMLU. The assessment will utilise the benchmark criteria in Table 37.

Table 37: BioCondition Benchmark criteria: Grassland PMLU

BioCondition Assessable Attributes	**BioCondition Assessable Attribute Weighting**	**2.5.14a Modified BioCondition benchmark**	**RM7 (Achievement of surface requirements)**	**RM9 BioCondition Score**
Non-native plant cover (%)	10	0	10	10
Native shrub species richness	5	3	2	2
Grass species richness	5	5	3	3
Forbs and other species richness	5	8	5	5
Native shrub canopy cover	5	14%	3.5%	7%
Native perennial grass cover	5	44%	11%	22%
Organic litter ground cover	5	58%	6%	29%
Overall score required	**Total = 40**	**40**	**≥10**	**≥20**

3.7.1.4 Photographic monitoring

Photographic monitoring at monitoring sites shows a visual comparison over time of the vegetation, ground cover, erosion, and general appearance of each monitoring site.

A digital camera is used to take photos. Photos will be retained in a database to provide a permanent record for each monitoring site. The process consists of taking one photograph from the beginning of the transect facing towards the end of the transect, and another from the end of the transect facing towards the beginning.

3.7.1.5 Canopy cover

Tree canopy cover is an established means of characterising stand productivity, and the distribution and abundance of biomass (Eyre *et al.* 2017). It refers to the estimation of the percentage canopy cover of the living, native tree layer along a 50 m transect, using the line intercept method (Greig-Smith 1964). For this attribute, the vertical projection of tree canopy cover of the species making up the tree canopy cover is assessed. The vertical projection of the tree canopy over the 50 m transect is recorded as illustrated in Figure 46. The total length of the projected canopy of each layer is then divided by the total length of the tape to give an estimate of percentage canopy cover on the site.

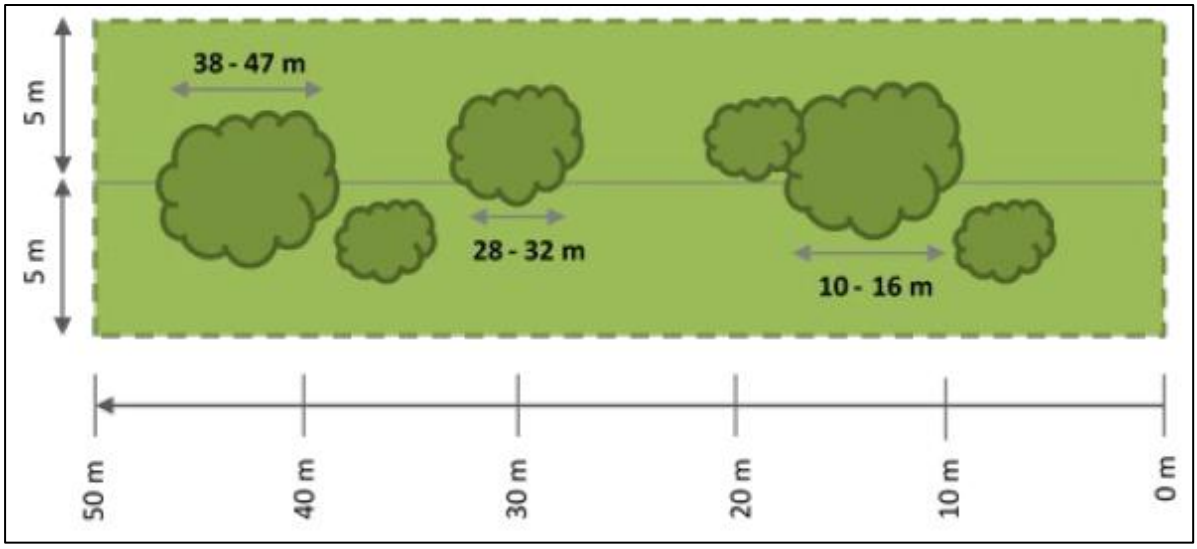


Figure 46: Guide to monitoring canopy cover (after Eyre et al. 2017)

3.7.1.6 Fauna observations

Observations of any fauna species or indicators of fauna presence (e.g. scats, tracks or other signs of fauna activity) within or in the vicinity of the RAs will be noted as part of rehabilitation monitoring.

3.7.1.7 Erosion monitoring

Erosion at survey sites is monitored through visual assessment over time. Assessment is undertaken by traversing the 50 m transects and recording the number and average depth of any erosion features, rill lines or gullies. It should be noted that the placement of permanent transects may not be representative of the level of erosion across the entire rehabilitated landform. To compensate for this, general observations undertaken during the survey are also utilised in assessing rehabilitation performance.

Table 38 outlines how erosion observed on-site is classified. The overall classification of the erosion on each transect is determined by the highest classification attributed to either the number of rills/gullies or the

maximum depth. For example, a transect may present only one or two rills but if these are recorded as being 25 cm deep, the transect will be classified as presenting a 'Moderate' erosion classification. The occurrence of a gully requires a classification of 'Severe' or 'Extreme'.

Some erosion is expected in the first years of establishment given the initial absence of vegetation and the frequency and severity of storm events. Therefore, erosion stability will be assessed from year four following seeding and/or planting. Monitoring will commence in the first year and the first three years will represent landform establishment.

The following information is recorded at each site:

- GPS reading of location;
- general description of type of erosion (gully [>30 cm], rill line [<30 cm]) and possible causes;
- depth of erosion;
- width of erosion;
- length of erosion;
- where eroded material is being deposited; and
- whether the erosion line is stabilised by vegetation.

Table 38: Erosion classification framework

Erosion classification	Minor	Moderate	Severe	Extreme
No. of rill/gully*	<15	15-30	31-50	>50
Greatest observed depth (cm)	<10	10-30	30-60	>60

*Gully: highly visible form of soil erosion, with steep-sided, incised drainage lines greater than 30 cm deep.

3.7.1.8 Satellite-derived fractional vegetation cover

Fractional vegetation cover (FVC) can be derived from operational satellite images by spectral unmixing when calibrated using field or extremely high resolution imagery. The Project proposes to apply satellite based FVC to monitor the rehabilitation the progress against vegetation cover criteria for grazing PMLU areas. Fractional cover model will use the Landsat JRSRP v1 algorithm but apply local site calibration using extremely high resolution orthophotos or published field methods (Muir *et al.* 2011) to directly calibrate coincident satellite imagery. It is proposed to update fractional cover algorithms to maintain best scientific practice against published methods.

Green and non-photosynthetic vegetation cover within 1 m of the surface is functional in preventing erosion. Most erosion on rehabilitated WRDs occurs during vegetation establishment (Carroll *et al*. 2000). Establishment and maintenance of functional vegetation cover is essential. This cover must be tolerant of drought, maintain the required level of effective cover and provide a beneficial PMLU that can be quantified.

Green FVC forms a small component of FVC for waste rock rehabilitation under permanent dryland conditions. Non-photosynthetic grass material is the dominant cover source for soil and waste rock at the end of the dry season. Confirming that functional protection in maintained is essential to demonstrating safe, stable, and sustainable rehabilitation.

The FVC of RAs will be compared to the FVC of reference sites. Sustained high levels of FVC are essential to the safety, stability, non-polluting and sustainability (development of functioning topsoil) of post-mining landforms.

A remote sensed FVC analysis allows monitoring of all rehabilitated pasture compared to ~1% assessed by transects. Further, satellite imagery can sustain monitoring at better than seasonal intervals. Fractional cover is defined as that fraction of a satellite imagery pixel condition across three ground cover classes being:

1) photosynthetic vegetation;

2) non-photosynthetic vegetation; and

3) bare ground.

A median value of FVC can be determined for all satellite imagery pixels within a defined polygon area (or set of combined polygons). Subject to certain limitations, a median FVC value can be determined for polygons enclosing a RAs which is then able to be compared with polygons enclosing a reference/analogue area that is representative of unmined land having similar landform, land cover and land use.

Satellite-derived indices will be reported annually based on one imagery acquisition per calendar month (12 per annum). Except where cloud cover or cloud shadow occlude the Project site in a calendar month, imagery of the area and acquisition metadata are assessed.

FVC is reported in graphical form with median and interquartile ranges for each rehabilitation polygon and combined reference area polygons. In addition, dates and duration of failure to achieve the target are reported in tabular form with mapping information for sources of non-compliance.

3.7.1.9 Topsoil characterisation

Topsoil sampling is not considered to be an annual requirement of the rehabilitation monitoring program. It is, however, to be undertaken to address any deficiencies in the chemical composition of the soil that may be detrimental to vegetation health.

Topsoil analysis will typically include the following suite of parameters:

- pH;
- EC/chloride concentration;
- exchangeable sodium percentage;
- cation exchange capacity;
- soil carbon;
- macronutrients (nitrogen, phosphorus, potassium and sulphur); and
- micronutrients.

Data collected as part of the monitoring program will ultimately be compiled into a land suitability assessment of the rehabilitated land.

3.7.1.10 Surface water monitoring

Surface water quality monitoring will be undertaken for the Project in accordance with the relevant receiving environment monitoring program or surface water monitoring program. Surface water monitoring will be undertaken by a competent person and will be in accordance with the latest edition of the administering authority's water quality *Monitoring and Sampling Manual 2018* (DES 2018). Samples will be collected from each of the surface water monitoring sites listed in Table 39 and shown in Figure 47, in accordance with the methods specified in DES (2018). Water quality samples will be analysed under laboratory testing conditions for the parameters listed in Table 7. The results of the analysis will be compared to the draft WQO detailed in Table 6.

Table 39: REMP water monitoring locations

Monitoring points	Sampling	Easting (GDA 2020)	Northing (GDA 2020)
Upstream monitoring points			
UW1 (Stream Order 3 Tributary)	Water Quality and Sediment	639620	7912130
UW6 (Warrigal Creek)	Streamflow, Water Quality and Sediment	625796	7917437
UW7 (Stream Order 3 Tributary)	Water Quality and Sediment	632395	7916667
UW8 (Stream Order 3 Tributary)	Streamflow, Water Quality and Sediment	630425	7918381
Downstream monitoring points			
DW3 (Stream Order 3 Tributary)	Water Quality and Sediment	626637	7919048
DW4 (Warrigal Creek)	Water Quality and Sediment	624366	7919486
DW5 (Warrigal Creek)	Water Quality and Sediment	621982	7920554

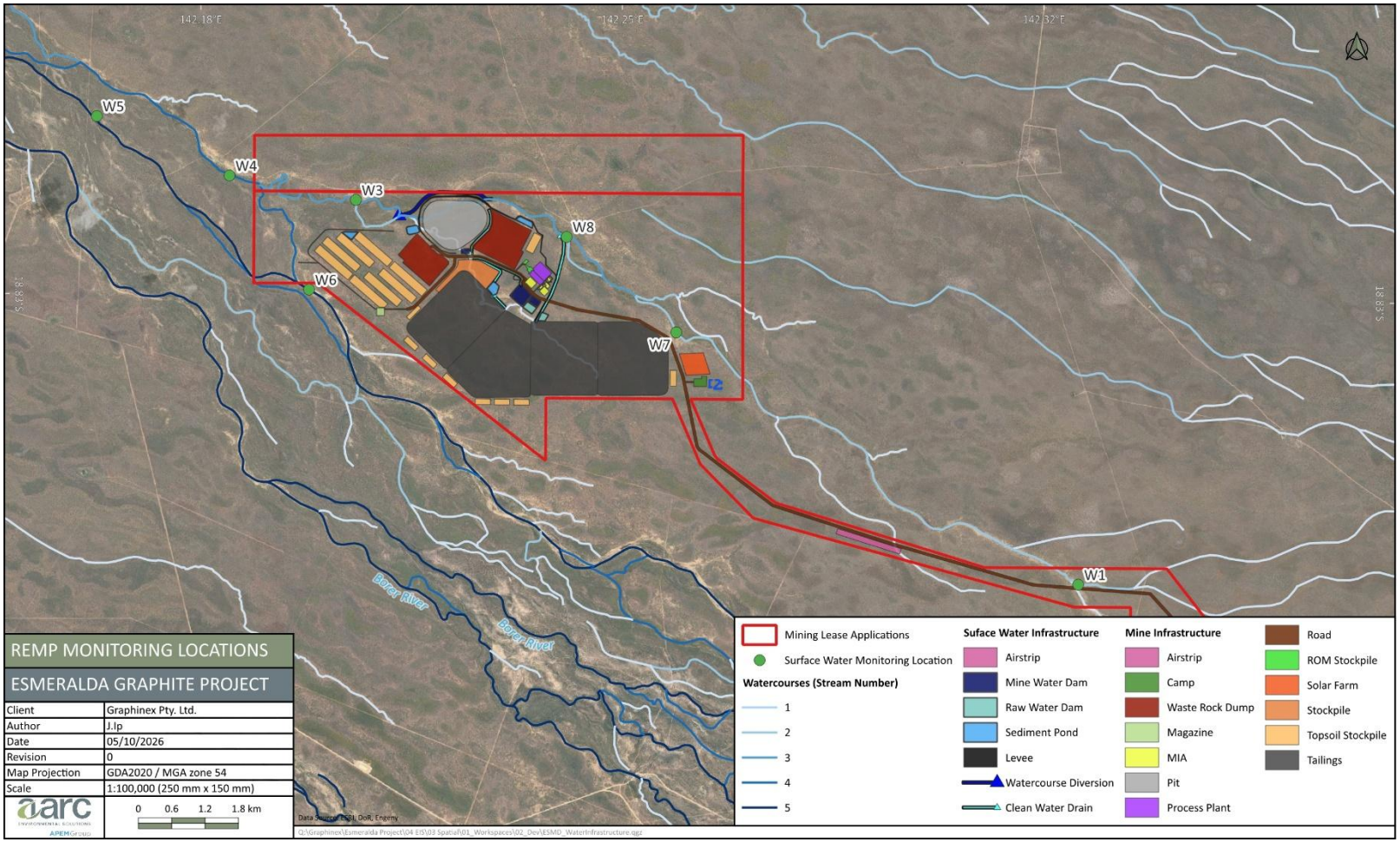


Figure 47: REMP monitoring locations

3.7.1.11 Groundwater monitoring

Groundwater sampling will be conducted in accordance with the procedures and practices outlined in the Queensland Government *Monitoring and Sampling Manual and the Groundwater Sampling and Analysis - A Field Guide 2nd Edition*. Groundwater monitoring program will be supervised and undertaken by an appropriately qualified person.

The existing groundwater monitoring network comprises of 14 site-specific monitoring bores and five landholder bores (Figure 48). Details of the groundwater networking bores are summarised in Table 9.

Additional monitoring bores will be installed, with the indicative locations detailed in Table 40and shown in Figure 49The new proposed locations include bores beyond the immediate pit area to monitor the extent of groundwater drawdown at varying distances from the pit and provide data for ongoing validation of groundwater model predictions. Additional monitoring is also proposed in the vicinity of the TSFs and WRD to monitor groundwater quality associated with these facilities. Bores will target stratigraphy across the Tertiary alluvium, Gilbert River Formation, and Proterozoic basement.

The proposed locations in Figure are indicative and may be refined based on site access, local geological and hydrogeological conditions, and further technical assessment.

As part of the TSF monitoring network, nine groundwater monitoring bores are proposed around the perimeter of the TSF with six bores within the Tertiary sediments, and three deeper bores proposed within the GRF.

Groundwater level and quality monitoring will be undertaken on a monthly to two-monthly basis. To develop site-specific groundwater quality trigger values for a monitoring network, DES (2021) recommends that 20th and 80th percentiles be based on a minimum of 18 datapoints over at least 12 and preferably 24 months. The current groundwater quality dataset does not achieve this minimum sample size; hence further sampling events are needed before any site-specific trigger values are to be developed. The frequency of monitoring events will be increased to capture the number of sampling events in a shorter timeframe for permitting (EA) requirements.

Groundwater monitoring bores will be decommissioned as part of the rehabilitation and decommissioning phase of the Project, at the point where groundwater quality monitoring is no longer required. The North_TSF_GRF monitoring bore associated with the TSF will be retained following closure to monitor groundwater quality associated with TSF 4.

Once a sufficient groundwater quality dataset is available, groundwater quality trigger values will be developed as per the Queensland Government guideline (DES 2021). Site-specific groundwater quality trigger values for the Project will be developed prior to mining.

Table 40: Proposed additinal monitoring bore details

Hole ID	Easting (MGA94 Zone 54)	Northing (MGA94 Zone 54)	Nominal depth (m)	Target stratigraphy
North_GRF_East	629848	7919385	50	Gilbert River Formation
North_GRF_West	626984	7919193	50	Gilbert River Formation
North_WRD	627417	7918261	50	Tertiary sediments
North_GRF_Centre	628534	7919344	50	Gilbert River Formation
North_TSF_GRF	630519	7916903	50	Gilbert River Formation

Hole ID	Easting (MGA94 Zone 54)	Northing (MGA94 Zone 54)	Nominal depth (m)	Target stratigraphy
South_TSF_GRF	632380	7915535	50	Gilbert River Formation
North_Prot	628595	7919340	100	Proterozoic basement
South_Prot	627933	7917268	100	Proterozoic basement
TFS_MB1	627379	7916777	10	Tertiary sediments
TFS_MB2	627990	7917325	10	Tertiary sediments
TFS_MB3	629649	7915106	10	Tertiary sediments
TFS_MB4	632414	7915597	10	Tertiary sediments
TFS_MB5	630484	7916899	10	Tertiary sediments
TFS_MB6	628416	7915706	10	Tertiary sediments
TFS_MB7	627379	7916777	50	Gilbert River Formation

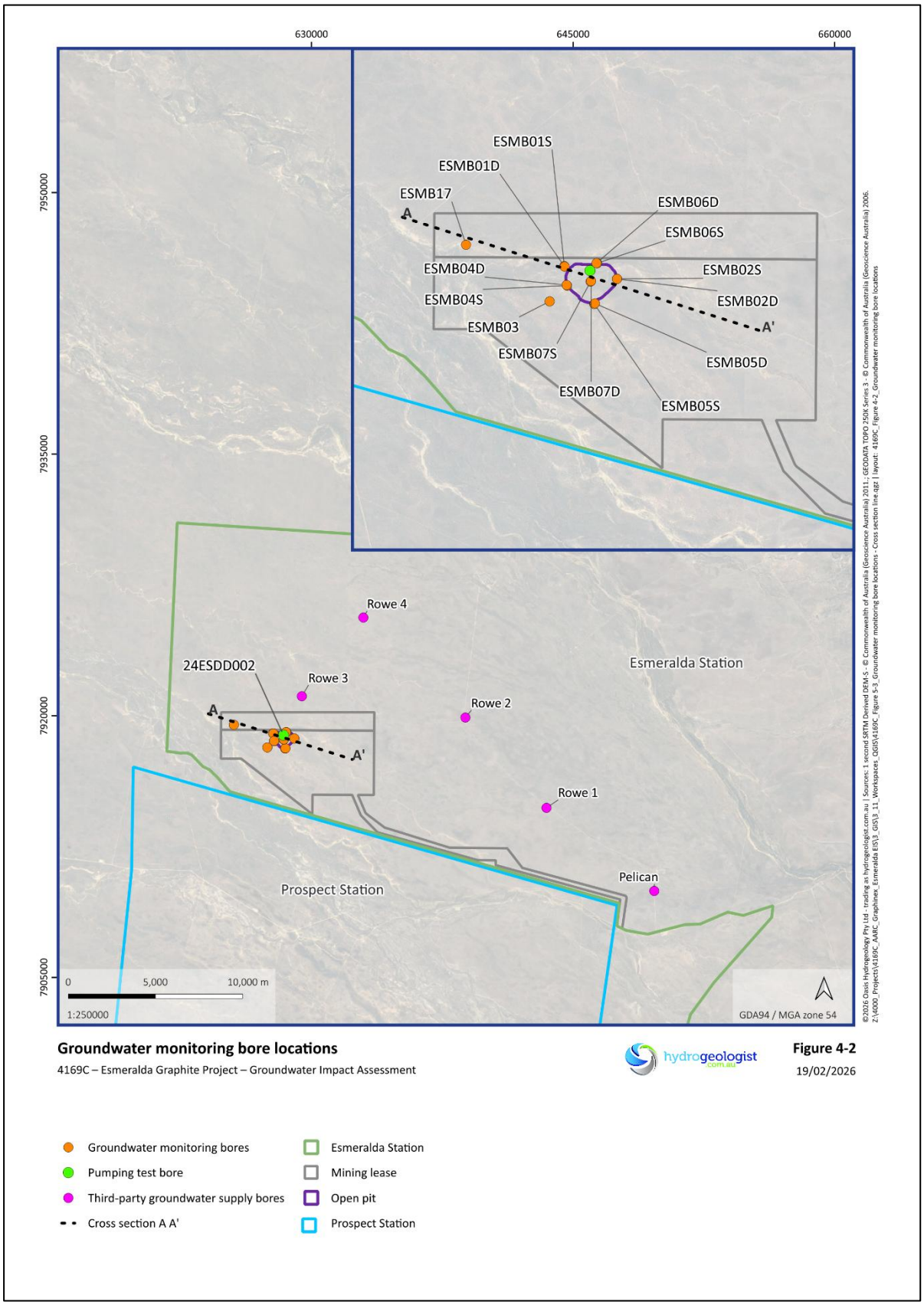


Figure 48: Groundwater monitoring bore locations

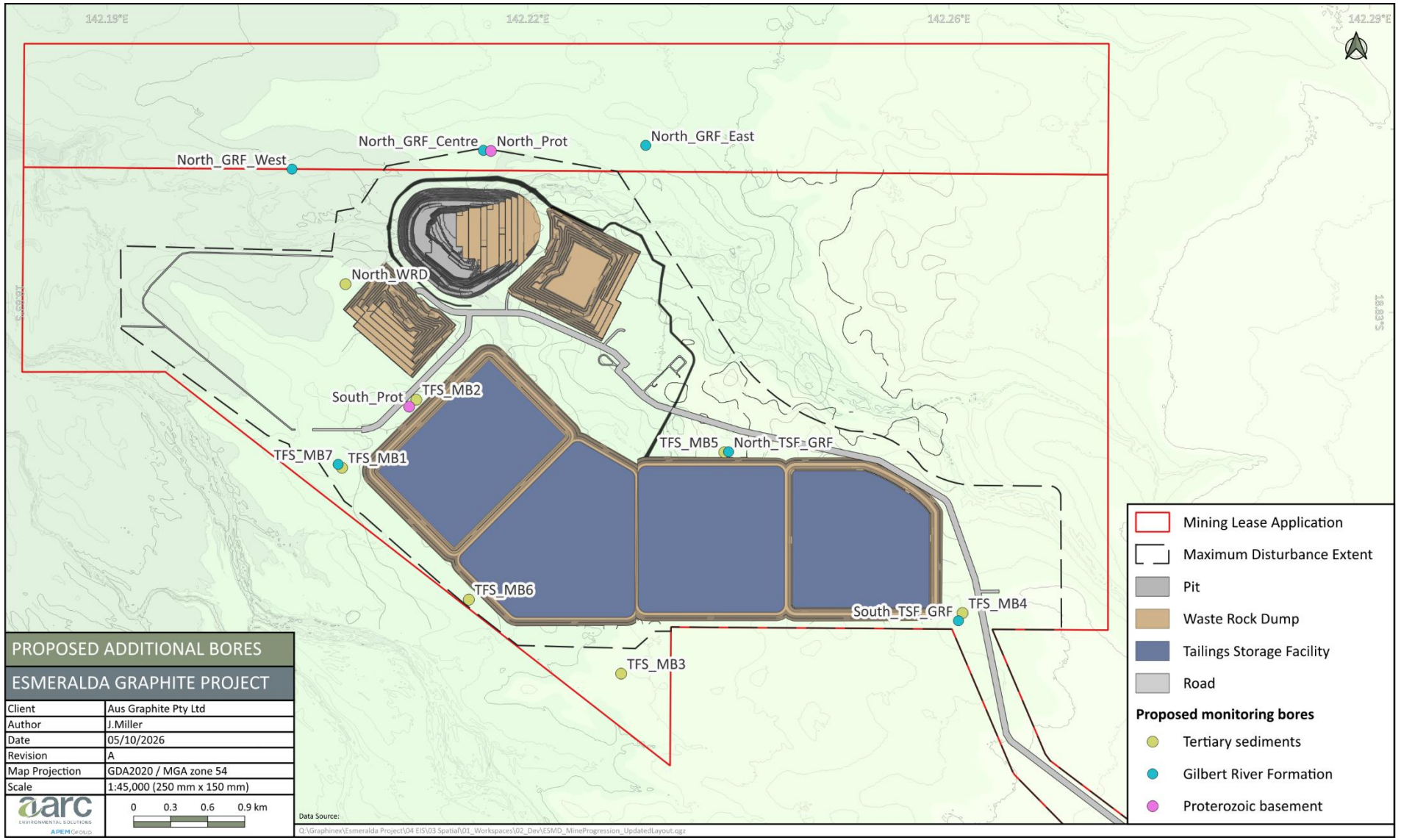


Figure 49: Proposed additional monitoring bores

3.7.2 Maintenance

Rehabilitation indicators and visual observations will be used to identify any aspects of the rehabilitated area that are of concern or suggest rehabilitated land is not on a trajectory of meeting the required completion criteria. These may include:

- evidence of active erosion;
- inadequate vegetation cover or growth;
- invasive weed or pest species;
- soil dispersion / instability; and
- soil infertility.

Following rehabilitation monitoring events, areas of rehabilitation will be assessed for maintenance. An annual visual inspection of all rehabilitated areas will be undertaken to provide an overview of the status of the rehabilitation and identify any noticeable issues such as erosion or inadequate vegetation cover or growth. This information, along with monitoring results, will be used to inform the maintenance schedule.

Maintenance may include repairing areas of excessive soil erosion or undertaking supplementary plantings or seeding to increase floristic diversity and cover to assist in achieving completion criteria.

If issues re-occur, an investigation will be carried out to determine the reason and allow for remediation. Modification of rehabilitation methods and specifications may be required, and rehabilitation and maintenance planning updated accordingly.

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Appendix A. PRCP Schedule Tables

Post-mining land uses (PMLU)										
Rehabilitation area	RA1: Mine infrastructure area									
Relevant activities	Mineral processing plant, ore handling facilities and asociated infrastructure, sewage treatment plant and effluent irrigation infrastructure, fencing, and magazine									
Total rehabilitation area size (ha)	18									
Commencement of first milestone: RM1	10/12/2084									
PMLU	Grazing native vegetation (low intensity)									
Date area is available	10/12/2084									
Cumulative area available (ha)	18									
Milestone completed by	10/12/2090	10/12/2096	10/12/2111	10/12/2119						
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	18									
RM2	18									
RM5	18									
RM6		18								
RM7		18								
RM9			18							
RM13				18						

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA2: Retained infrastructure									
Relevant activities	Mine access roads and tracks, airfield, solar array and associated infrastructure, camp,cattle exclusion fence and helipad									
Total rehabilitation area size (ha)	175									
Commencement of first milestone: RM2	10/12/2084									
PMLU	Retained infrastructure									
Date area is available	10/12/2084									
Cumulative area available (ha)	175									
Milestone completed by	10/12/2087	10/12/2119								
Milestone Reference	**Cumulative area achieved (ha)**									
RM2	175									
RM12	175									
RM13		175								

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA3: Supporting surface activities									
Relevant activities	Minor areas of surficial disturbance arising from approved supporting activities requiring rehabilitation; including topsoil stockpiles on natural surfaces									
Total rehabilitation area size (ha)	1295.1									
Commencement of first milestone: RM1	10/12/2084									
PMLU	Grazing native vegetation (low intensity)									
Date area is available	10/12/2084	10/12/89								
Cumulative area available (ha)	1148.2	1295.1								
Milestone completed by	10/12/2089	10/12/2094	10/12/2199	10/12/2114	10/12/2119					
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	1148.2	1295.1								
RM2	1148.2	1295.1								
RM5		1295.1								
RM6		1295.1								
RM7			1295.1							
RM9				1295.1						
RM13					1295.1					

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA4: Rehabilitated water management infrastructure									
Relevant activities	Process water dam, pit dewatering dams, MAW sump, raw water dam, clean water sump and sediment dams 1, 2, 4									
Total rehabilitation area size (ha)	25.4									
Commencement of first milestone: RM1	10/12/2084									
PMLU	Grazing native vegetation (low intensity)									
Date area is available	10/12/2084									
Cumulative area available (ha)	25.4									
Milestone completed by	10/12/2090	10/12/2095	10/12/2099	10/12/2114	10/12/2119					
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	25.4									
RM2	25.4									
RM3	24.3									
RM5	24.3									
RM6	24.3	25.4								
RM7			25.4							
RM9				25.4						
RM13					25.4					

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA5: Retained water storage									
Relevant activities	Sediment dam 3									
Total rehabilitation area size (ha)	2.95									
Commencement of first milestone: RM2	10/12/2084									
PMLU	Retained water storage									
Date area is available	10/12/2084									
Cumulative area available (ha)	2.95									
Milestone completed by	10/12/2090	10/12/2119								
Milestone Reference	**Cumulative area achieved (ha)**									
RM2	2.95									
RM11	2.95									
RM13		2.95								

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA6: Backfilled void									
Relevant activities	Void backfilled with tailings, low permeability layer, and waste rock to approximate pre-existing surface level									
Total rehabilitation area size (ha)	79.7									
Commencement of first milestone: RM1	10/12/2084									
PMLU	Grazing native vegetation (low intensity)									
Date area is available	10/12/2084									
Cumulative area available (ha)	79.7									
Milestone completed by	10/12/2089	10/12/2097	10/12/2112	10/12/2119						
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	79.7									
RM2	79.7									
RM3	79.7									
RM5		79.7								
RM6		79.7								
RM7		79.7								
RM9			79.7							
RM13				79.7						

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA7: Rehabilitated Levee									
Relevant activities	Rehabilitated levee									
Total rehabilitation area size (ha)	11.6									
Commencement of first milestone: RM1	10/12/2088									
PMLU	Grazing native vegetation (low intensity)									
Date area is available	10/12/2088									
Cumulative area available (ha)	11.6									
Milestone completed by	10/12/2094	10/12/2099	10/12/2114	10/12/2119						
Milestone Reference	**Cumulative area achieved (ha)**									
RM3	11.6									
RM5	11.6									
RM6	11.6									
RM7		11.6								
RM9			11.6							
RM13				11.6						

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
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3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA8: Rehabilitated waste rock dump									
Relevant activities	Footprint of waste rock dump used for backfilling void									
Total rehabilitation area size (ha)	58.9									
Commencement of first milestone: RM1	10/12/2081									
PMLU	Grazing native vegetation (low intensity)									
Date area is available	10/12/2081									
Cumulative area available (ha)	58.9									
Milestone completed by	10/12/2085	10/12/2091	10/12/2096	10/12/2111	10/12/2119					
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	58.9									
RM2	58.9									
RM3		58.9								
RM5		58.9								
RM6		58.9								
RM7			58.9							
RM9				58.9						
RM13					58.9					

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA9: Retained waste rock dump									
Relevant activities	Out-of-pit waste rock dump									
Total rehabilitation area size (ha)	42.7									
Commencement of first milestone: RM1	10/12/2084									
PMLU	Grassland									
Date area is available	10/12/2084									
Cumulative area available (ha)	42.7									
Milestone completed by	10/12/2089	10/12/2092	10/12/2097	10/12/2112	10/12/2119					
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	42.7									
RM3	42.7									
RM5		42.7								
RM6		42.7								
RM7			42.7							
RM9				42.7						
RM13					42.7					

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA10: Retained tailings storage facility									
Relevant activities	TSF4									
Total rehabilitation area size (ha)	157.2									
Commencement of first milestone: RM1	10/12/2084									
PMLU	Grassland									
Date area is available	10/12/2084									
Cumulative area available (ha)	157.2									
Milestone completed by	10/12/2090	10/12/2094	10/12/2099	10/12/2114	10/12/2119					
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	157.2									
RM3	157.2									
RM4	157.2									
RM2		157.2								
RM5		157.2								
RM6		157.2								
RM7			157.2							
RM9				157.2						
RM13					157.2					

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
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4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

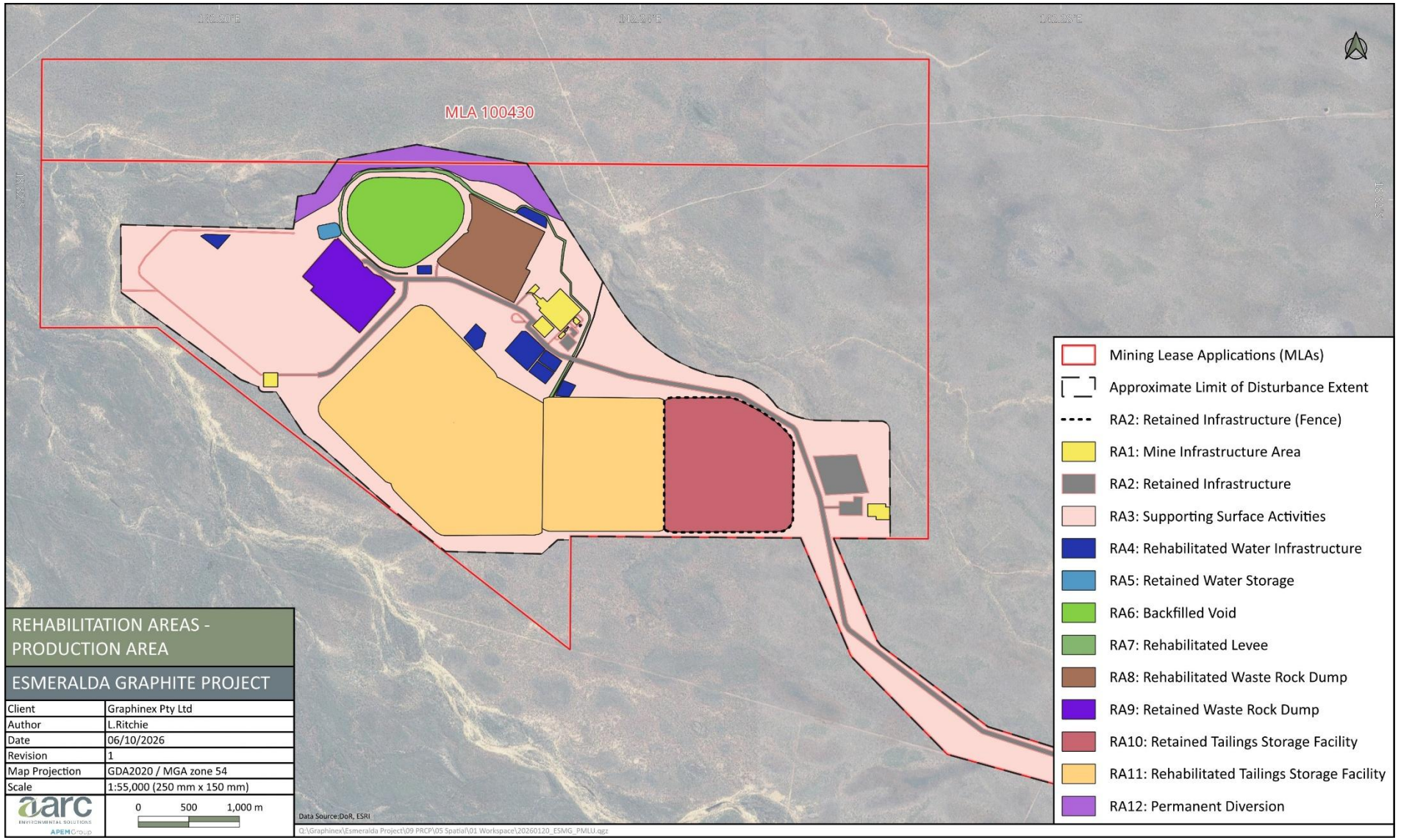
Post-mining land uses (PMLU)										
Rehabilitation area	RA11: Rehabilitated tailings storage facilities									
Relevant activities	TSF1, TSF2 and TSF3									
Total rehabilitation area size (ha)	486.8									
Commencement of first milestone: RM1	10/12/2076									
PMLU	Grazing native vegetation (low intensity)									
Date area is available	10/12/2076	10/12/2079								
Cumulative area available (ha)	327.2	486.8								
Milestone completed by	10/12/2079	10/12/2082	10/12/2085	10/12/2090	10/12/2092	10/12/2107	10/12/2119			
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	327.2	486.8								
RM2	164.3	327.2	486.8							
RM3		327.2	486.8							
RM5		164.3	327.2	486.8						
RM6			327.2	486.8						
RM7				327.2	486.8					
RM9						486.8				
RM13							486.8			

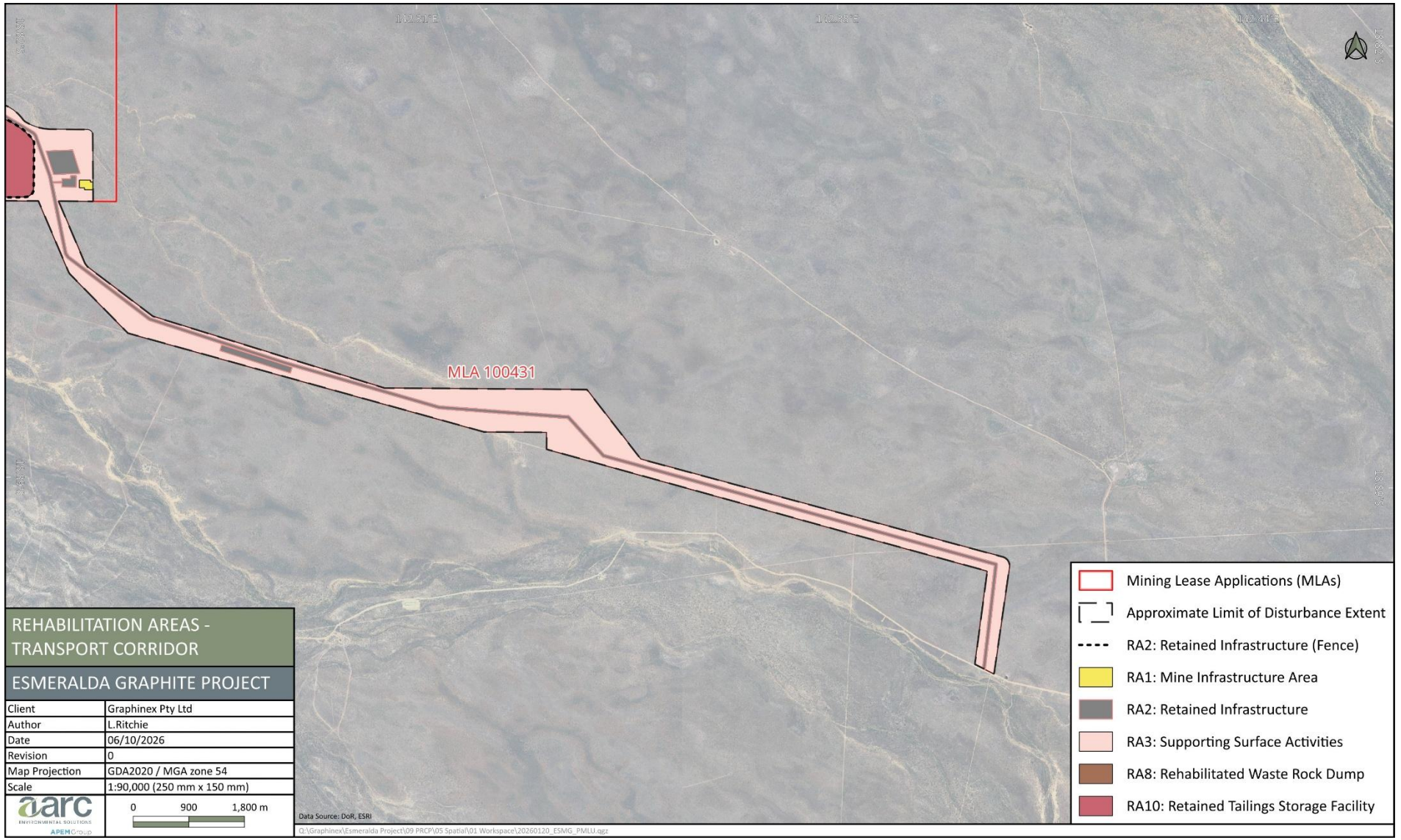
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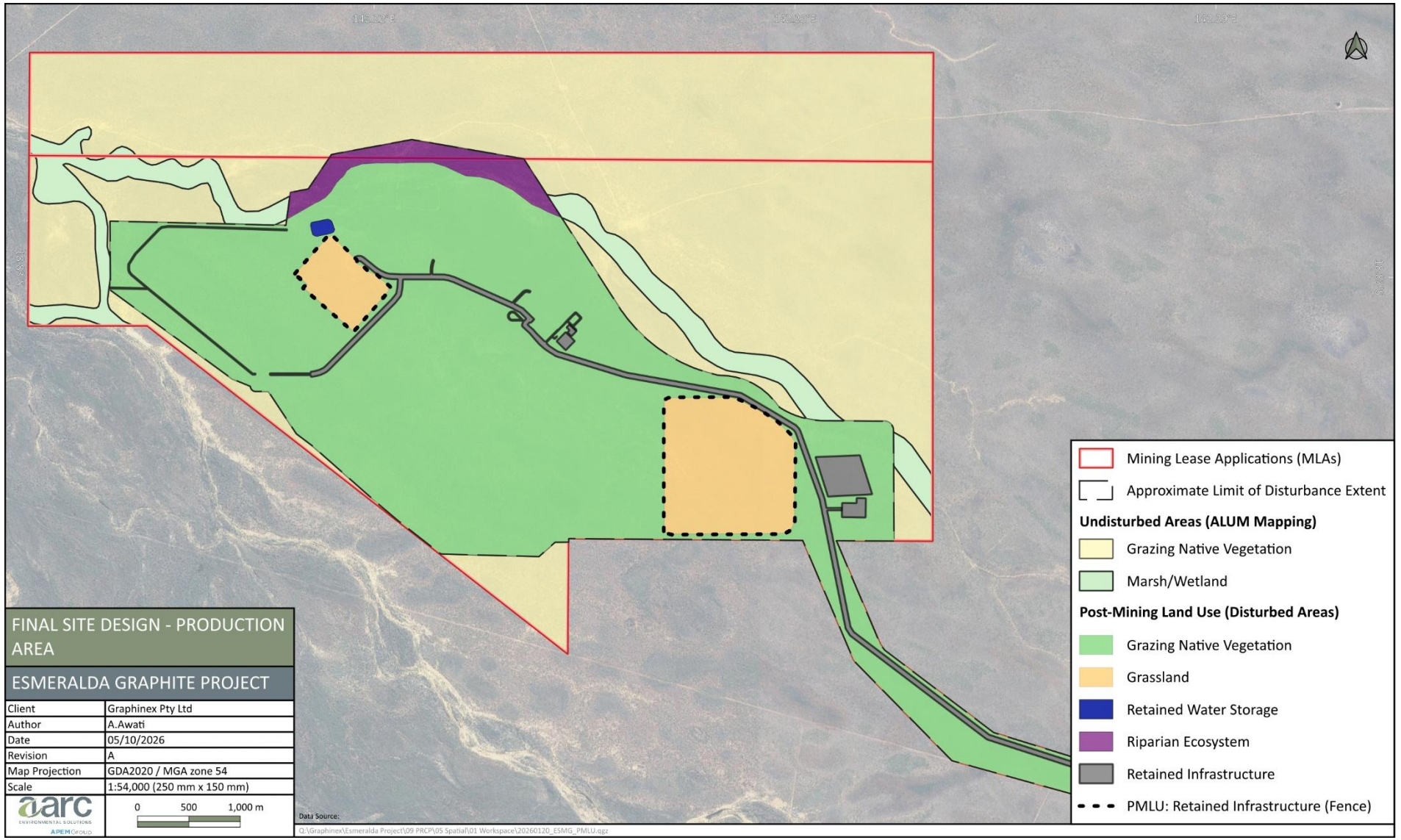
Post-mining land uses (PMLU)										
Rehabilitation area	RA12: Permanent diversion									
Relevant activities	Disturbance area associated with the diversion and Minor areas of surficial disturbance arising from approved supporting activities requiring rehabilitation									
Total rehabilitation area size (ha)	60.8									
Commencement of first milestone: RM1	10/12/2033									
PMLU	Riparian ecosystem									
Date area is available	10/12/2033									
Cumulative area available (ha)	60.8									
Milestone completed by	10/12/2033	10/12/2043	10/12/2053	10/12/2119						
Milestone Reference	**Cumulative area achieved (ha)**									
RM6	60.8									
RM8		60.8								
RM10			60.8							
RM13				60.8						

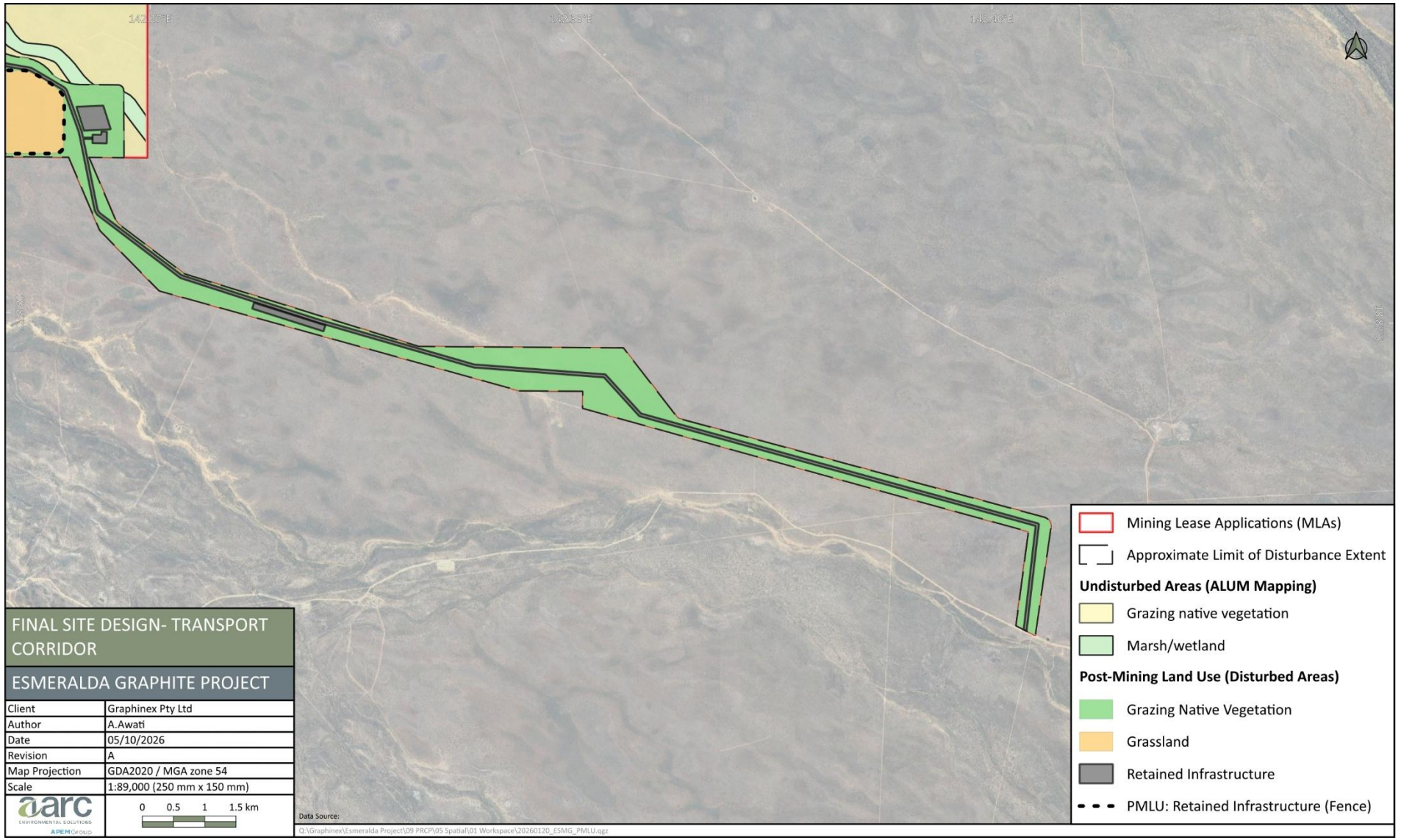
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2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Appendix B. Reference Map and Final Site Design


MLA 100430
Mining Lease Applications (MLAs)
Approximate Limit of Disturbance Extent
RA2: Retained Infrastructure (Fence)
RA1: Mine Infrastructure Area
RA2: Retained Infrastructure
RA3: Supporting Surface Activities
RA4: Rehabilitated Water Infrastructure
RA5: Retained Water Storage
RA6: Backfilled Void
RA7: Rehabilitated Levee
RA8: Rehabilitated Waste Rock Dump
RA9: Retained Waste Rock Dump
RA10: Retained Tailings Storage Facility
RA11: Rehabilitated Tailings Storage Facility
RA12: Permanent Diversion
REHABILITATION AREAS - PRODUCTION AREA
ESMERALDA GRAPHITE PROJECT
Client Graphinex Pty Ltd
Author L.Ritchie
Date 06/10/2026
Revision 1
Map Projection GDA2020 / MGA zone 54
Scale 1:55,000 (250 mm x 150 mm)
0 500 1,000 m
Data Source:DoR, ESRI


MLA 100431
REHABILITATION AREAS - TRANSPORT CORRIDOR
ESMERALDA GRAPHITE PROJECT
Client | Graphinex Pty Ltd
Author | L.Ritchie
Date | 06/10/2026
Revision | 0
Map Projection | GDA2020 / MGA zone 54
Scale | 1:90,000 (250 mm x 150 mm)
0 900 1,800 m
Data Source: DoR, ESRI
Q:\Graphinex\Esmeralda Project\09 PRCP\05 Spatial\01 Workspace\20260120_ESMG_PMLU.qgz
Mining Lease Applications (MLAs)
Approximate Limit of Disturbance Extent
RA2: Retained Infrastructure (Fence)
RA1: Mine Infrastructure Area
RA2: Retained Infrastructure
RA3: Supporting Surface Activities
RA8: Rehabilitated Waste Rock Dump
RA10: Retained Tailings Storage Facility


Mining Lease Applications (MLAs)
Approximate Limit of Disturbance Extent
Undisturbed Areas (ALUM Mapping)
Grazing Native Vegetation
Marsh/Wetland
Post-Mining Land Use (Disturbed Areas)
Grazing Native Vegetation
Grassland
Retained Water Storage
Riparian Ecosystem
Retained Infrastructure
PMLU: Retained Infrastructure (Fence)
FINAL SITE DESIGN - PRODUCTION AREA
ESMERALDA GRAPHITE PROJECT
Client Graphinex Pty Ltd
Author A.Awati
Date 05/10/2026
Revision A
Map Projection GDA2020 / MGA zone 54
Scale 1:54,000 (250 mm x 150 mm)
0 500 1,000 m
Data Source:
Q:\Graphinex\Esmeralda Project\09 PRCP\05 Spatial\01 Workspace\20260120_ESMG_PMLU.qgz


142.27°E
142.33°E
142.40°E
Mining Lease Applications (MLAs)
Approximate Limit of Disturbance Extent
Undisturbed Areas (ALUM Mapping)
Grazing native vegetation
Marsh/wetland
Post-Mining Land Use (Disturbed Areas)
Grazing Native Vegetation
Grassland
Retained Infrastructure
PMLU: Retained Infrastructure (Fence)
FINAL SITE DESIGN- TRANSPORT CORRIDOR
ESMERALDA GRAPHITE PROJECT
Client Graphinex Pty Ltd
Author A.Awati
Date 05/10/2026
Revision A
Map Projection GDA2020 / MGA zone 54
Scale 1:89,000 (250 mm x 150 mm)
0 0.5 1 1.5 km
Data Source:
Q:\Graphinex\Esmeralda Project\09 PRCP\05 Spatial\01 Workspace\20260120_ESMG_PMLU.qgz

Appendix C. Referenced Technical Studies

AARC 2026, *Esmeralda Graphite Project Erosion Stability* Assessment., report prepared for QLD Aus Graphite Pty Ltd by AARC Environmental Solutions Oty Ltd (AARC), Brisbane.

GT Environmental 2026, *Soil and Land Suitability Assessment: Esmeralda Graphite Project*, report prepared for QLD Aus Graphite Pty Ltd, Brisbane.

RGS 2026, *Geochemistry Assessment of Mine Materials and Tailings,* report prepared for Graphinex by RGS Environmental Consultants Pty Ltd, Brisbane.

SRE 2026, *Esmeralda Graphite Project Technical Report for Tailings Storage Facilities*, Rev 0, report prepared for Graphinex by Soil & Rock Engineering Pty Ltd (SRE), Brisbane.

Wave International 2025, Tailings and Waste Management, Esmeralda Graphite Project Pre-Feasibility Study, report prepared for Graphinex by Wave International.

Hydrogeologist 2026, *Esmeralda Graphite Project Groundwater Impact Assessment,* report prepared for Graphinex by Hydrogeologist.

Engeny 2026a, *Surface Water Impact Assessment,* report prepared for Graphinex by Engeny.

Engeny 2026b, *Watercourse Diversion Functional Design Report,* report prepared for Graphinex by Engeny.

Appendix D. Community and Stakeholder Engagement Plan and Engagement Register

Community and Stakeholder Engagement Plan

Engagement action	Responsibility	Targeted stakeholders	Timing[1]	Monitoring			
				Performance indicators	Data source	Responsibility	Frequency
Establish and maintain Project website, contact details, and complaints and grievance procedure	Graphinex	All	PC, C, O, and D	Website content regularly maintained	Project website	Graphinex	Annually
Maintain constructive relationships with Traditional Owners	Graphinex	Tagalaka Aboriginal Corporation	PC, C, O, and D	Ongoing, open communication	Engagement register	Graphinex	Annually
Build and maintain positive relationships with local governments	Graphinex	Croydon Shire Council Normanton Shire Council Richmond Shire Council	PC, C, O, and D	Ongoing, open communication	Engagement register	Graphinex	Quarterly during pre-construction and construction, annually during operation and rehabilitation
Hold community information sessions	Graphinex	Croydon community Normanton community Richmond community	PC	Level of Project awareness in communities	Stakeholder feedback Website interactions	Graphinex	Half yearly during pre-construction
Seek inputs to develop emergency and disaster response plans	Graphinex	Health and emergency services	PC	Inputs received from all health and emergency service providers involved	Engagement register	Graphinex	Once during pre-construction
Communicate Project schedule and needs including skilled and unskilled workers, services and supplies	Graphinex	Local businesses Employment and training services	PC and C	Level of Project awareness amongst targeted stakeholders	Stakeholder feedback Website interactions	Graphinex	Half yearly during pre-construction and construction

[1] Project phases are denoted through 'PC' for pre-construction activities; 'C' for construction 'O' for operations; and 'D' for decommissioning and rehabilitation

Engagement action	Responsibility	Targeted stakeholders	Timing[1]	Monitoring			
				Performance indicators	Data source	Responsibility	Frequency
Promote local employment and local content opportunities and tender requirements	Graphinex	Local jobseekers Local businesses	PC and C	Number of applicants and tenders received from local communities	HR records Tender records Engagement register	Graphinex	Half yearly during pre-construction and construction
Seek community inputs on community support program and initiatives	Graphinex	All	PC and C	Community feedback received	Engagement register	Graphinex	Annually during pre-construction and construction
Provide ongoing updates about Project activities including increased traffic volumes, etc	Graphinex	All	PC, C, O, and D	No complaints received regarding lack of awareness	Complaints register	Graphinex	Annually during pre-construction, construction, operation and rehabilitation
Participate in and support community events and initiatives	Graphinex	Croydon community Normanton community Richmond community	PC, C, O, and D	Graphinex employees participate in and/or support events and initiatives	Engagement register Community support program reporting	Graphinex	Annually during pre-construction, construction, operation and rehabilitation
Acknowledge and resolve any complaints and grievances	Graphinex	All	PC, C, O, and D	All complaints and grievances resolved within a timely manner	Complaints register	Graphinex	Annually during pre-construction, construction, operation and rehabilitation
Seek inputs from interested stakeholders on rehabilitation and closure, if amendments to the PRCP are required	Graphinex	Interested stakeholders	PC, C, and O	Feedback received from interested stakeholders	Engagement register	Graphinex	Annually during pre-construction, construction, operation, and rehabilitation

Engagement action	Responsibility	Targeted stakeholders	Timing[1]	Monitoring			
				Performance indicators	Data source	Responsibility	Frequency
Notify the community about and promote the community support program	Graphinex	All	O	Community involved with community support program	Engagement register Community Support Program reporting	Graphinex	Annually during operation

Graphinex Engagement Register

Date	Stakeholder	Engagement method	Summary of engagement
Queensland Government Agencies			
6/06/2024	Director-General of the Department of the Premier and Cabinet (Queensland), Queensland Government senior officials	In-person meeting	Project briefing
6/06/2024	Office of the Coordinator-General (**OCG**)	In-person meeting	Project briefing
11/07/2024	Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (**DNRMMRRD**)	In-person meeting	Project briefing
19/08/2024	Department of Premier and Cabinet, Treasury, OCG, DNRMMRRD, QIC, Trade and Investment Queensland (TIQ)	In-person meeting	Tour of Townsville Demonstration Facility
25/09/2024	OCG	In-person meeting	Project overview and approvals pathway
21/10/2024	Department of Regional Development, Manufacturing and Water	Email	Request for engagement on water supply and unallocated water
28/11/2024	Department of Regional Development, Manufacturing and Water	Online meeting	Project water supply requirements, scoping of availability of unallocated water under the Gulf Water Plan
19/12/2024	OCG	Email	Approvals pathway (mining lease application, EPBC referral), review of path forward including floodplain considerations
16/01/2025	OCG, Critical Minerals Queensland	In-person meeting	Project update, approvals pathway, State support

22/01/2025	OCG	Email	Project update, approvals pathway
27/01/2025	Department of Regional Development, Manufacturing and Water	Email	Expression of interest for unallocated water submitted, to be considered in the Gulf Water Plan review
2/04/2025	OCG	In-person meeting	Pre-lodgement discussion, application for coordinated project declaration
4/04/2025	Department of Regional Development, Manufacturing and Water	In-person (Cairns) and online meeting	Project water requirements, groundwater supply and unallocated water options
10/04/2025	Queensland Government and Commonwealth representatives	In-person meeting	Tour of Townsville Demonstration Facility
17/05/2025	OCG	In-person meeting	General EIS and Project update
20/05/2025	Department of Regional Development, Manufacturing and Water	Email	Unallocated water provisions and Great Artesian Basin water plan drawdown calculations provided to support water supply assessment
27/05/2025	OCG	Email	Feedback on preliminary draft Initial Advice Statement, additional information requested on Project scope, potential impacts and management
3/06/2025	OCG	In-person meeting	Project update and approvals pathway
12/06/2025	OCG	In-person meeting	General update
17/06/2025	OCG	Email	Final void and floodplain considerations, streamlined EIS review
28/07/2025	OCG	Email	Introduction to OCG contact for EIS social matters
9/09/2025	OCG	Online meeting	General EIS and Project update, discussion of draft Terms of Reference
15/09/2025	OCG	Email	Terms of Reference signed off for publication, project timeframes
18/09/2025	DNRMMRRD (Minister Dale Last)	In-person event	Industry engagement event for manufacturing and government support
18/09/2025	OCG	Email	Terms of Reference released
22/10/2025	Queensland Government	In-person event	Joint meetings alongside the Queensland Government delegation regarding the Project and State support at the International Mining and Resources Conference (IMARC)

27/10/2025	OCG	Letter	Application for prescribed project declaration submitted
6/11/2025	OCG	Online meeting	General EIS and Project update
13/11/2025	Minister for State Development, Infrastructure and Planning	Letter	Project declared a prescribed project
19/11/2025	OCG	Letter	EIS assessment methodologies
24/11/2025	OCG	Online meeting	EIS progress meeting
30/11/2025	OCG	Email	Approvals pathway
15/12/2025	OCG	Online meeting	EIS progress meeting
4/02/2026	OCG	Online meeting	EIS progress meeting
5/02/2026	OCG	In-person meeting	EIS progress meeting
12/02/2026	OCG	Email	Approvals status
12/02/2026	Department of Environment, Tourism, Science and Innovation (**DETSI**)	Email	Application for pre-lodgement services lodged for the rehabilitation and closure plan and environmental authority
18/02/2026	OCG	Online meeting	EIS progress meeting
25/02/2026	OCG, DETSI	Online meeting	Pre-lodgement meeting
3/03/2026	OCG	Letter	EIS process
4/03/2026	OCG, Cross-Agency Assessment Team (**CAAT**)	In-person meeting	EIS assessment team meeting
25/03/2026	OCG, DETSI, CAAT	Meeting	EIS progress update, social impact assessment approach, study area and scoping
15/04/2026	OCG	Online meeting	EIS progress meeting
21/04/2026	OCG	Email	Subdivision for land acquisition
30/04/2026	OCG	Email	EIS economics chapter
1/05/2026	DNRMMRRD	Email	Subdivision for land acquisition

8/05/2026	DNRMMRRD	Online meeting	Draft cultural heritage management plan and ancillary agreement for mining lease applications, native title agreement
28/05/2026	OCG	Email	Preliminary draft EIS lodged
26/06/2026	Department of Women, Aboriginal and Torres Strait Islander Partnerships and Multiculturalism (**DWATSIPM**)	Email	Notice of intention to develop a cultural heritage management plan for the Project
17/07/2026	OCG	Email	Preliminary draft EIS feedback
3/08/2026	OCG, DETSI, CAAT	Online meeting	Preliminary draft EIS feedback
11/08/2026	DWATSIPM	Email	Executed cultural heritage management plan and plan area submitted, consultation records and endorsement provided
17/08/2026	OCG	Email	Proposed environmental authority conditions identified for discussion
19/08/2026	OCG	In-person meeting	Preliminary draft EIS feedback
21/08/2026	OCG	Email	Preliminary draft EIS feedback
24/08/2026	DNRMMRRD	Email	Subdivision survey plan registered, subdivided leases progressing to Ministerial approval
24/08/2026	DNRMMRRD	Email	Technical assessment on mining lease applications
25/08/2026	OCG, DETSI	Online meeting	EIS groundwater requirements and groundwater model
9/09/2026	OCG	Email	EIS surface water and flooding approach, including data, sampling locations and monitoring frequency
15/09/2026	OCG, DETSI	Online meeting	Update to surface water, flooding and groundwater model
22/09/2026	OCG	Email	Surface water and flooding information requirements to support the draft EIS progressing to public notification
Federal Government Agencies			
5/03/2025	DCCEEW	Online meeting	EPBC referral process, information requirements and timing
14/04/2025	DCCEEW	Online meeting	Public submission received on the referral, referral information and process

28/05/2025	DCCEEW	Email	Formal request for information, additional ecological survey methods and results provided, referral decision timeframe suspended by agreement
Local Government Agencies			
3/07/2025	Croydon Shire Council	Email	Project introduction and arrangement of a meeting with Council
15/07/2025	Croydon Shire Council	In-person meeting	Project introduction and update covering company background, approvals status, environmental surveys, site operations, employment opportunities, development timeline, transport and road matters, and opportunities for local procurement and collaboration
11/08/2025	Croydon Shire Council	Email	Mining lease applications lodged, agreement to purchase underlying land and proposed subdivision of State lease, request for Council letter of support
15/08/2025	Croydon Shire Council	Phone call	Council letter of support for the subdivision provided, general Project update and timing discussed
28/10/2025	Richmond Shire Council	Email	Council offer to assist, road network and local government services, meeting arranged to discuss options
31/10/2025	Richmond Shire Council	Online meeting	Introductory meeting and Project update, covering approvals status, environmental surveys, development timeline, local government services, road network, accommodation, employment opportunities and collaboration on road funding advocacy
18/11/2025	Croydon Shire Council	Email	Arranging site visit and Project briefing to Councillors
9/12/2025	Croydon Shire Council	In-person meeting	Project update covering approvals status, environmental surveys, site operations, employment opportunities, development timeline, community/roads/services matters, and opportunities for collaboration including joint approach to road funding and SIA/EIS consultation
4/03/2026	Croydon Shire Council	Email	Proposed meeting to discuss the social impact assessment and road use following completion of transport study
2/04/2026	Croydon Shire Council	Email and phone call	Social impact assessment consultation with Councillors requested to occur at a Council meeting
16/04/2026	Croydon Shire Council	Meeting	Social impact assessment consultation with Councillors

21/07/2026	Croydon Shire Council	In-person meeting	Project update covering EIS lodgement and OCG feedback, social impact assessment completion, native title agreements executed, subdivision progress, development timeline, road matters and opportunities for collaboration
24/09/2026	Croydon Shire Council	Email	Project point of contact update, road condition report and road upgrade plan with State funding, road use agreement to be progressed, EIS expected for public comment
Landowner			
12/09/2023	Private landowner (Esmeralda Station)	In-person meeting	Introductory meeting, exploration access and discussion of the Project
10/01/2024	Private landowner (Esmeralda Station)	Email	Notice of intention and land access arrangements, agreement executed
17/04/2024	Private landowner (Esmeralda Station)	Email	Approval of drilling logistics
23/04/2024	Private landowner (Esmeralda Station)	Email	Notice of entry issued
23/05/2024	Private landowner (Esmeralda Station)	Email	Re-issued certificates
31/05/2024	Private landowner (Esmeralda Station)	In-person meeting	Project update and discussion of long-term land access and acquisition of the Project area
18/06/2024	Private landowner (Esmeralda Station)	Email	Site induction issues resolved
24/06/2024	Private landowner (Esmeralda Station)	Email	Landholder complaint remedied and outcomes addressed
14/07/2024	Private landowner (Esmeralda Station)	Email	Option agreement over part of Esmeralda Station, landholder consultation on terms and details
7/09/2024	Private landowner (Esmeralda Station)	Email	Land acquisition proposal for the Project area provided
23/09/2024	Private landowner (Esmeralda Station)	Online meeting	Land acquisition discussion

10/10/2024	Private landowner (Esmeralda Station)	Phone call	Land acquisition discussion
14/10/2024	Private landowner (Esmeralda Station)	Phone call	Operations update
22/10/2024	Private landowner (Esmeralda Station)	Phone call	General Project discussion
23/10/2024	Private landowner (Esmeralda Station)	Phone call	Project update, access discussions, land specific discussions, weather, and land acquisition negotiations
23/10/2024	Private landowner (Esmeralda Station)	Phone call	Project update, access discussions, land specific discussions, weather, and land acquisition negotiations
11/11/2024	Private landowner (Esmeralda Station)	Phone call	Project update, access discussions, land specific discussions, weather, and land acquisition negotiations
11/11/2024	Private landowner (Esmeralda Station)	Phone call	Project update, access discussions, land specific discussions, weather, and land acquisition negotiations
12/11/2024	Private landowner (Esmeralda Station)	Email	Land acquisition documents provided for landholder review
20/11/2024	Private landowner (Esmeralda Station)	Phone call	Project update, access discussions, land specific discussions, weather, and land acquisition negotiations
20/11/2024	Private landowner (Esmeralda Station)	Phone call	Project update, access discussions, land specific discussions, weather, and land acquisition negotiations
14/01/2025	Private landowner (Esmeralda Station)	Phone call	Project update, access discussions, land specific discussions, weather, and land acquisition negotiations
28/02/2025	Private landowner (Esmeralda Station)	Email	Cattle access wording for the land acquisition agreement agreed by landholder
19/03/2025	Private landowner (Esmeralda Station)	Email	Execution of land acquisition agreement
17/04/2025	Private landowner (Esmeralda Station)	Phone call	Landholder supported proposed field program

28/04/2025	Private landowner (Esmeralda Station)	SMS	Operations update
2/05/2025	Private landowner (Esmeralda Station)	Email	Landholder directed to correct contact personnel
5/05/2025	Private landowner (Esmeralda Station)	Email	Site access provided
10/05/2025	Private landowner (Esmeralda Station)	Email	Landholder investor consultation questions on the land agreement addressed
17/05/2025	Private landowner (Esmeralda Station)	SMS	Operations update
30/05/2025	Private landowner (Esmeralda Station)	SMS	General EIS and Project update
9/06/2025	Private landowner (Esmeralda Station)	Phone call	General EIS and Project update
12/06/2025	Private landowner (Esmeralda Station)	Email	Site induction
17/06/2025	Private landowner (Esmeralda Station)	Phone call	General EIS and Project update
15/07/2025	Private landowner (Esmeralda Station)	SMS	General EIS and Project update
4/08/2025	Private landowner (Esmeralda Station)	Email	Subdivision consent letters executed by landholder parties
22/08/2025	Private landowner (Esmeralda Station)	Email	Land parcel sale and subdivision documents executed
10/10/2025	Private landowner (Esmeralda Station)	Email	Approved access
11/10/2025	Private landowner (Esmeralda Station)	Phone call	General EIS and Project update

11/11/2025	Private landowner (Esmeralda Station)	Phone call	Installation approved
13/11/2025	Private landowner (Esmeralda Station)	In-person meeting	Installation approved, general project and operations update, project impacts discussed
20/11/2025	Private landowner (Esmeralda Station)	Email	Subdivision of lease consent documents executed
4/12/2025	Private landowner (Esmeralda Station)	SMS	General Project update
9/12/2025	Private landowner (Esmeralda Station)	Phone call	General Project update
13/12/2025	Private landowner (Esmeralda Station)	Email	General EIS and Project update
13/12/2025	Private landowner (Esmeralda Station)	SMS	General EIS and Project update
13/12/2025	Private landowner (Esmeralda Station)	Phone call	General EIS and Project update
15/12/2025	Private landowner (Esmeralda Station)	Phone call	General EIS and Project update
7/01/2026	Private landowner (Esmeralda Station)	SMS	Landholder advised of rainfall and access status
19/01/2026	Private landowner (Esmeralda Station)	SMS	Landholder advised of access status, assistance provided with a property survey
2/02/2026	Private landowner (Esmeralda Station)	Email	Safety matter
20/02/2026	Private landowner (Esmeralda Station)	Email	Subdivision consents progressing
2/04/2026	Private landowner (Esmeralda Station)	Email	Subdivision consents obtained and executed
Traditional Owners			

1/05/2024	Tagalaka Aboriginal Corporation (**TAC**)	Email	Organisation of pre-clearing assessments
17/10/2024	North Queensland Land Council (**NQLC**)	In-person meeting	Introductory meeting on native title engagement with the Tagalaka People; progress discussions, project update and development plan and timing
17/10/2024	Tagalaka Waangu rugby league team	In-person meeting	Team sponsorship, footballs/drink bottles provided, general discussion
18/10/2024	Tagalaka Waangu rugby league team	In-person meeting	Community sponsorship support
19/10/2024	Tagalaka Waangu rugby league team	In-person meeting	Community sponsorship support
20/10/2024	Tagalaka Waangu rugby league team	In-person meeting	Community sponsorship support
23/10/2024	TAC	Phone call	Project update
31/10/2024	TAC	Phone call	Project update
6/11/2024	TAC	Email	Project introduction material shared with all TAC Directors covering development plans, site operations and collaboration concepts
13/01/2025	TAC	Phone call	Exploration cultural heritage survey planning
14/01/2025	NQLC, Tagalaka Waangu rugby league team	In-person meeting	Project update
15/01/2025	NQLC, Tagalaka Waangu rugby league team	In-person meeting	Project update
31/03/2025	TAC	Email	Cultural heritage survey timing confirmed, monitoring team organisation, sponsorship request received
1/04/2025	TAC	Email	Scope, duration and quote for cultural monitoring of the 2025 field program
15/05/2025	TAC	In-person meeting (Croydon)	Project update and general discussions
16/05/2025	TAC	In-person meeting	Cultural monitoring of the 2025 field survey went smoothly
22/05/2025	NQLC	Email	MLA submission confirmation and MLA numbers provided, on-country meeting proposed

26/05/2025	NQLC, TAC	Email	On-country site visit and meeting dates confirmed
4/06/2025	NQLC	Email	On-country meeting budget approved, preferred site date confirmed
11/06/2025	NQLC	Email	Progression of native title negotiations discussed at a high level
17/06/2025	NQLC	Email	TAC agreed to meet in Croydon following the site visit
19/06/2025	NQLC	Email	Benefits proposal provided, introduction of economic advisor
23/06/2025	NQLC	Online meeting	Project information provided for the economic advisor's assessment of the benefits of the proposal, contact details exchanged
24/06/2025	NQLC	Email	EPBC referral decision notice shared
9/07/2025	NQLC	Email	Agenda for Board meeting settled based on instructions
15/07/2025	NQLC	In-person meeting / on country	Site visit, discussion of project areas, cultural heritage and environmental values
16/07/2025	NQLC	In-person meeting	Project presentation to the Board, native title agreement terms discussed
29/07/2025	NQLC	Email	Draft cultural heritage management plan provided, comments returned and acknowledged
14/08/2025	TAC	Email	Community contact list and best practice engagement, communication protocol for community updates
17/09/2025	NQLC	Email	Draft cultural heritage management plan follow-up
22/09/2025	NQLC	Email	Response to benefits proposal, draft cultural heritage management plan and terms sheet received
2/10/2025	NQLC	Email	Revised terms sheet, cultural heritage management plan and benefits table provided
14/10/2025	TAC	Email	Member contact information and privacy considerations for community engagement
17/11/2025	NQLC	Email	Agenda and documents for negotiation meeting provided
25/11/2025	NQLC	Email	Board requested a negotiation meeting
28/11/2025	NQLC	Online meeting	Negotiation meeting
5/12/2025	NQLC	Email	Budgets and logistics for negotiation meeting, updated presentation provided

14/01/2026	TAC, NQLC	In-person meeting (Cairns) and online	Board meeting including project presentation
15/01/2026	NQLC	In-person (Cairns) and online meeting	Negotiation meeting
19/01/2026	TAC, NQLC	Online meeting	General EIS and Project update
29/01/2026	NQLC	Email	Proposed amendments to native title agreement provided
3/02/2026	NQLC	Email	Revised benefits proposal, budgets for negotiation and community meeting approved
13/02/2026	NQLC	Email	Updated draft cultural heritage management plan provided
16/02/2026	TAC	In-person meeting	General EIS and Project update
20/02/2026	NQLC; DNRMMRRD	Email	Further negotiation meeting scheduled
23/02/2026	NQLC	Email	Revised financial proposal acknowledged
5/03/2026	NQLC	Email	Feedback on native title agreement
8/03/2026	NQLC	Email	agenda and revised budgets provided
13/03/2026	NQLC	Online meeting (changed to online for safety due to weather and flooding)	Negotiation meeting
27/03/2026	NQLC	Email	Negotiation meeting
30/03/2026	NQLC	In-person meeting	Negotiation meeting
16/04/2026	NQLC	Email	Native title agreement draft letter forwarded to the State
9/05/2026	NQLC	Email	Updated ancillary agreement and cultural heritage management plan provided
14/05/2026	NQLC	Email	Comments on proposed benefits and land management matters
25/05/2026	NQLC	Email	Draft agreements exchanged ahead of upcoming meetings
28/05/2026	NQLC, community members	In-person meeting (Normanton)	Negotiation meeting and community consultation meeting, detailed project update provided including development plans and EIS matters
31/05/2026	TAC	Email	Funding support for a community cultural event confirmed

3/06/2026	NQLC	Email	Further drafts of ancillary agreement and cultural heritage management plan, native title agreement amendments agreed for forwarding to the State, meeting budgets discussed
16/06/2026	NQLC	Email	Native title agreement final amendments coordinated with the State, further community meeting arranged
26/06/2026	NQLC, TAC, landowner, occupier	Letter	Written notice of proposed cultural heritage management plan issued
29/06/2026	NQLC	Online meeting	Final review of native title related documents
3/07/2026	TAC	In-person meeting (Croydon)	Consultation and consent meeting, native title holders received a detailed project update and consented to entering the cultural heritage management plan and related agreements
7/07/2026	NQLC, TAC	Letter	Response to written notice confirming endorsement as the Aboriginal party for the cultural heritage management plan
10/07/2026	NQLC	Email	Final execution copies of native title related documents following consent meeting
20/07/2026	TAC, NQLC	Email	Native title related agreements executed, documents forwarded to the State and acknowledged
30/07/2026	TAC	Letter	Endorsement as the Aboriginal party for the cultural heritage management plan confirmed
25/08/2026	TAC	Email	Access to draft EIS and rehabilitation plan files and project environmental and cultural heritage information provided for review
Local and Regional Organisations/Groups			
21/06/2024	Club Croydon	In-person meeting	Accommodation arrangements in Croydon for Project field personnel
21/07/2025	Port of Townsville Limited	Email	Introduction, confirmation of available capacity
11/08/2025	Port of Townsville Limited	In-person meeting	Introduction meeting on concentrate export through the port, follow-up visit offered and accepted
18/09/2025	Townsville Port Authority	Online meeting	Project brief and transport requirements
31/10/2025	Local community group representative	In-person meeting	Discussion with a traditional owner business group from Far North Queensland with Tagalaka people involvement
9/12/2025	Rural Fire Service	In-person meeting	General Project update and operations and impacts update

9/12/2025	Croydon Hospital Services	In-person meeting	Briefing on hospital and ambulance coverage in the region; project and potential impacts to community and hospital discussed
27/03/2026	• Local businesses; • Croydon State School; • Croydon Primary Health Centre; • Rural Fire Brigade; and • Men's Shed.	Email and phone	Social impact assessment interviews arranged with Croydon stakeholders; participant information approved for issue
31/03/2026	• Local businesses; • Croydon State School; • Croydon Primary Health Centre; • Emergency services; and • Community groups.	Interviews (online)	Social impact assessment stakeholder interviews commenced: local employment and business opportunities, housing and accommodation, health and emergency services capacity, road use and community values
23/04/2026	Royal Flying Doctor Service	Phone	Aeromedical response capability at the mine site discussed, including site medical facilities, workforce numbers and airstrip specifications

Appendix E. Rehabilitation Risk Assessment

Risk Description				Risk Evaluation							Risk Rating				Count				
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	IV	III	II	I	Final Risk Rating
RA1 / RA3 / RA4 Mine infrastructure area/ Supporting surface activities area/Rehabilitated water management structures																			
Safe																			
Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Inadequate surface preparation, localised settlement	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), rehabilitation monitoring and assessment, undertake repairs and maintenance as required	C1		U		L				I			0	0	0	1	I
Chemicals or hazardous materials remaining in RA post-closure	Improper disposal of hazardous materials, leaks, spills or other operational management failures	Safety hazard for personnel, stock and wildlife	Operational management controls for hazardous materials storage, low inherent toxicity of materials used on site, and spills management.	C1		U		M				II			0	0	1	0	II
Stable - erosional risk																			
Initial/ongoing rill and/or sheet erosion of rehabilitated areas	Potentially dispersive topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques and other contributing factors to improve the likelihood of revegetation success on rehabilitated slopes where required.	C1		U			L				I		0	0	0	1	I
Initial/ongoing rill and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient. Low risk drainage network design (avoidance of flow concentration, ESCP, effective revegetation techniques, monitoring). Regular (typically annual) review of water management design parameters, monitoring of drainage network performance, prompt remediation and causal feedback loop to water management system review	C1		U			L				I		0	0	0	1	I
Initial/ongoing rill and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques and other contributing factors to improve the likelihood of revegetation success on rehabilitated slopes where required.	C2		P			L				II		0	0	1	0	II
Non-polluting - other environmental harm (pH, TSS, NTU etc)																			
Rill or sheet erosion resulting in downstream sedimentation	Insufficient early revegetation, ESCP controls, drainage capacity and/or design	Revegetation performance impacts, downstream receiving environment water quality and dependent ecosystem impacts	Confirm no potentially contaminated materials within RA and low risk of saline drainage. Regular rehabilitation performance monitoring and assessment	C1		U			L				I		0	0	0	1	I
Sustainable - PMLU																			
Insufficient density/diversity of vegetation in grazing PMLU	Adverse weather potential/ minor flood inundation, poor vegetation establishment and PMLU density/diversity metrics	Reduced long term suitability for PMLU	Soil management and amelioration, well-developed rehabilitation methodologies, management and maintenance activities, rehabilitation performance monitoring and assessment, undertake repairs and improvement works as required	C3		U			L	M			I	II	0	0	1	1	II
Unintended introduction of pests and weeds	Poor weed management practices	Unintended spread of weed species	Pest and weed management practices, limited vehicular access to site, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate	C2		U			M				II		0	0	1	0	II
RA2 Retained infrastructure																			
Safe																			
Unsafe or damaged retained infrastructure	Insufficient maintenance of infrastructure, not fit for purpose	Hazard to landowner/public	Limited risks associated with infrastructure proposed to be retained. Will require final agreement of landowner (and Minister) at surrender	C2		U		L				I			0	0	0	1	I
Non-polluting - other environmental harm (pH, TSS, NTU etc)																			
Contamination arising from retained infrastructure	Presence of hazardous contaminants or materials in retained infrastructure	Localised land contamination, release of hazardous materials to receiving environment	Removal of all hazardous materials and contaminants from site prior to surrender	C1		R			M				II		0	0	1	0	II

Risk Description				Risk Evaluation							Risk Rating				Count				
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	IV	III	II	I	Final Risk Rating
Sustainable - PMLU																			
Unsafe or damaged retained infrastructure	Insufficient maintenance of infrastructure, not fit for purpose	Hazard to landowner/public	Limited risks associated with infrastructure proposed to be retained. Will require final agreement of landowner (and Minister) at surrender	C2		U			L	H			I	III	0	1	0	1	III
RA5 Retained water storage(s)																			
Safe																			
Wall failure/dam break of retained structures	Extreme rainfall events, poor construction materials/methods	Downstream hazard to public, downstream water quality impacts	Only small, properly constructed water storage(s) to be retained at closure; dam will be assessed as safe and stable prior to relinquishment; volumes small and water will be free of contaminants	C2	R			L				I			0	0	0	1	I
Unauthorised access	Insufficient access controls	Hazard to public/stock	Remote location, property fencing/signage. Safe access for stock.	C2	R			M				II			0	0	1	0	II
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of embankments	Erodible construction materials, inadequate bank stabilisation, adverse weather events/overtopping	Localised land impacts and downstream water quality impacts	Embnakment/storage design addressing material issues, adequate/effective construction material amelioration, prompt vegetation establishment, monitoring and maintenanceas required, erosion and sediment controls during establishment.	C1		U			M				II		0	0	1	0	II
Non-polluting - other environmental harm (pH, TSS, NTU etc)																			
Poor water quality in retained water storages	Adverse geochemical characteristics of disturbed materials in catchment	Downstream water quality impacts	Mine affected water to be removed from dam, water quality monitoring program to allow early detection and management of poor water quality	C2		P			L				II		0	0	1	0	II
Sustainable - PMLU																			
Water quality in retained storages not meeting PMLU water quality requirements	Adverse geochemical characteristics of disturbed materials in catchment	Livestock health, wildlife hazard	No evidence of signficant adverse water quality in existing structures, contamination assessment, water quality assessment,	C2		U			L				I		0	0	0	1	I
Pests and weeds impact PMLU sustainability	Poor weed management practices	Unintended spread of weed species	Pest and weed management practices, limited vehicular access to site, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate	C2		U			M				II		0	0	1	0	II

Risk Description				Risk Evaluation							Risk Rating				Count				
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	IV	III	II	I	Final Risk Rating
RA6 Backfilled void																			
Safe																			
Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Erosion gullies etc due to some dispersive subsoils/ topsoils, inadequate surface preparation, localised settlement	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), maintenance controls (pre-closure), rehabilitation monitoring and assessment, undertake repairs and maintenance as required	C1		U		L				I			0	0	0	1	I
Stable - geotechnical risk																			
Excessive/unplanned settlement of fill materials	Backfill material not behaving as expected, uncontrolled backfill methodology.	Slumping of fill, ponding, localised land impacts, delays to next rehabilitation milestone step	Final landform design incorporates surcharge of backfill, additional available material to rectify settlement, geotechnical assessment during backfilling operation and at closure, monitoring of tailings consolidation in TSFs	C1		U			M				II		0	0	1	0	II
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Potentially dispersive topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Backfilled pit topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques	C2		U			L				I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Backfilled pit topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques	C2		U			L				I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Backfilled pit topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques	C2		U			L				I		0	0	0	1	I
Non-polluting - geochemical risk																			
Hazardous contaminants in surface/subsurface runoff from rehabilitated areas	Adverse waste rock/overburden geochemistry	Land contamination, potential for contaminated runoff from rainfall runoff events	Confirmed non-NAPP materials and low risk of saline drainage, routine confirmatory geochemical testing, regular water quality monitoring and assessment	C2		U			M				II		0	0	1	0	II
Non-polluting - other environmental harm																			
Non-hazardous contaminants in surface/subsurface runoff from rehabilitated areas	Adverse waste rock/overburden geochemistry	Revegetation performance impacts, downstream receiving environment water quality impacts	Confirmed non-NAPP materials and low risk of saline drainage, routine confirmatory geochemical testing, regular water quality monitoring and assessment	C1		U			L				I		0	0	0	1	I
Sustainable - PMLU																			
Inability to achieve grazing PMLU criteria	Adverse weather potential/ minor flood inundation, poor vegetation establishment and PMLU density/diversity metrics	Reduced long term suitability for PMLU	Soil management and amelioration, well-developed rehabilitation methodologies, management and maintenance activities, rehabilitation performance monitoring and assessment, undertake repairs and improvement works as required	C2		P			L	M			II	III	0	1	1	0	III
Unintended introduction of pests and weeds	Poor weed management practices	Unintended spread of weed species	Pest and weed management practices, limited vehicular access to site, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate	C2		U			M				II		0	0	1	0	II

Risk Description				Risk Evaluation							Risk Rating				Count				Final Risk Rating
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	IV	III	II	I	
RA7 Rehabilitated WRD footprint																			
Safe																			
Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Inadequate removal of waste rock dump materials, surface condition post-removal, inadequate surface preparation	Safety hazard for personnel, stock and wildlife	Relatively level pre-disturbance landform to be retained, TSF removal and surface preparation measures and controls, rehabilitation monitoring and assessment, undertake repairs and maintenance as required	C2		U		M				II			0	0	1	0	II
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Potentially dispersive topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques and other contributing factors to improve the likelihood of revegetation success on rehabilitated slopes where required.	C2		U			L					I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient. Low risk drainage network design (avoidance of flow concentration, ESCP, effective revegetation techniques, monitoring). Regular (typically annual) review of water management design parameters, monitoring of drainage network performance, prompt remediation and causal feedback loop to water management system review	C2		U			L					I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques and other contributing factors to improve the likelihood of revegetation success on rehabilitated slopes where required.	C2		U			L					I		0	0	0	1	I
Non-polluting - geochemical risk																			
Residual waste rock/ overburden material remains within footprint	Ineffective clean-up post removal of waste rock dumps	Land contamination, potential for contaminated runoff from rainfall runoff events	Confirmed non-NAPP materials and low risk of saline drainage, routine confirmatory geochemical testing, regular water quality monitoring and assessment	C1		U			M					II		0	0	1	0	II
Non-polluting - other environmental harm																			
Non-hazardous contaminants in surface/subsurface runoff from rehabilitated areas	Adverse waste rock geochemistry	Revegetation performance impacts, downstream receiving environment water quality impacts	Confirmed non-NAPP materials and low risk of saline drainage, routine confirmatory geochemical testing, regular water quality monitoring and assessment	C1		U			L					I		0	0	0	1	I
Sustainable - PMLU																			
Inability to achieve grazing PMLU criteria	Adverse weather potential/ minor flood inundation, poor vegetation establishment and PMLU density/diversity metrics	Reduced long term suitability for PMLU	Soil management and amelioration, well-developed rehabilitation methodologies, management and maintenance activities, rehabilitation performance monitoring and assessment, undertake repairs and improvement works as required	C2		P			L	M				II	III	0	1	1	0	III
Unintended introduction of pests and weeds	Poor weed management practices	Unintended spread of weed species	Pest and weed management practices, limited vehicular access to site, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate	C2		U			M					II		0	0	1	0	II

Risk Description				Risk Evaluation						Risk Rating				Count				
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	IV	III	II	I	Final Risk Rating
RA8 Retained WRD																			
Safe																			
Surface roughness (rockiness, depressions) in excess of that expected for PMLU	Steepness of WRD slope gradients, rocky nature of waste rock, inadequate surface preparation, localised settlement, erosion features	Safety hazard for wildlife	Surface preparation measures (initial), PMLU excludes personnel and stock, monitoring and maintenance controls (pre-closure)	C2		U		M				II			0	0	1	0	II
															0	0	0	0	
Stable - geotechnical risk																			
Significant slope failure	Landform not constructed to design, excessive slope steepness, physical material properties, inadequate drainage controls, adverse rainfall event	Localised land impacts	Compaction from residence time in dump prior to final rehabilitation, slope moderation, maximum slopes subject to design and WEPP outcomes, provision of adequate drainage infrastructure, effective revegetation, rehabilitation monitoring and assessment, undertake repairs and maintenance as required	C2		R			M				II		0	0	1	0	II
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible soils, excessive slope gradients, insufficient groundcover	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective soil amelioration, prompt revegetation establishment, revegetation monitoring and management as required	C2		U			L				I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, sub-catchment delineation, sufficient water storage structures, engineered flow channels (where required), effective revegetation techniques, rehabilitation monitoring and management as required	C2		U			M				II		0	0	1	0	II
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Existing rehabilitation of infrastructure disturbance areas, downstream sedimentation controls, revegetation, monitoring and maintenance	C2		U			M				II		0	0	1	0	II
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ vegetation disease/loss, climatic events (drought)	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required	C2		U			L				I		0	0	0	1	I
Non-polluting - geochemical risk																			
Hazardous contaminants in surface/subsurface runoff from rehabilitated areas	PAF materials present in waste rock/ overburden materials	Revegetation performance impacts, downstream receiving environment water quality and dependent ecosystem impacts	Confirmed non-NAPP materials and low risk of saline drainage, routine confirmatory geochemical testing, regular water quality monitoring and assessment	C2		U			M				II		0	0	1	0	II
Non-polluting - other environmental harm																			
Non-hazardouis contaminants in surface/subsurface runoff from rehabilitated areas	Excessive erosion of landform beyond that predicted	Revegetation performance impacts, downstream receiving environment water quality and dependent ecosystem impacts	Confirmed non-NAPP materials and low risk of saline drainage, prompt revegetation establishment, revegetation monitoring and management as required, regular water quality monitoring and assessment	C2		P			L				II		0	0	1	0	II
Sustainable - PMLU																			
Insufficient density/diversity of vegetation in grassland PMLU	Adverse weather, poor vegetation establishment	Reduced long term suitability for PMLU	Soil management and amelioration, well-developed rehabilitation methodologies, management and maintenance activities, rehabilitation performance monitoring and assessment, undertake repairs and improvement works as required	C3		U			L	M			I	II	0	0	1	1	II
Unintended introduction of pests and weeds	Poor weed management practices	Unintended spread of weed species	Pest and weed management practices, limited vehicular access to site, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate	C2		U			M				II		0	0	1	0	II

Risk Description				Risk Evaluation						Risk Rating				Count				
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	IV	III	II	I	Final Risk Rating
RA9 Retained TSF																			
Safe																			
Slope roughness on batter slopes	Batter slope gradients and construction materials	Trip hazard for personnel, stock and wildlife	PMLU excludes personnel and stock, batter slopes pose the greater risk area	C2		U		M				II			0	0	1	0	II
Stock, wildlife, personnel access to consolidated tailings material	Inadequate exclusion controls, capping layer	Exposure to potentially hazardous material	Capping design; exclusion controls	C2		P		L				II			0	0	1	0	II
Stable - geotechnical risk																			
Significant slope failure	Inadequate TSF cell design, excessive batter slope gradients and inappropriate construction materials and methodology	Localised land impacts	TSF cell design, capping design and construction supervisory controls, AQP assessment and sign-off, rapid consolidation of tailings, stock and personnel exclusion controls	C1		R			L				I		0	0	0	1	I
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Excessive batter slope gradients, poor revegetation outcomes	Localised land impacts and downstream water quality impacts	TSF cell design and construction supervisory controls, appropriate soils testing and amelioration, prompt revegetation establishment, revegetation monitoring and maintenance as required, sediment controls during establishment	C2		U			L				I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Appropriate cell drainage design with acceptable, avoidance of flow concentration, sub-catchment delineation, engineered flow channels if required, effective revegetation techniques, rehabilitation monitoring and management, monitoring of drainage network performance, prompt remediation and causal feedback loop	C2		U			M				II		0	0	1	0	II
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Appropriate cell drainage design catering for expected design storm events, avoidance of flow concentration, sub-catchment delineation, engineered flow channels if required, effective revegetation techniques, rehabilitation monitoring and management, monitoring of drainage network performance, prompt remediation and causal feedback loop	C2		U			M				II		0	0	1	0	II
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ vegetation disease/loss, climatic events (drought), other	Localised land impacts and downstream water quality impacts	Appropriate cell drainage design catering for expected design storm events, rehabilitation monitoring and management, monitoring of drainage network performance, prompt remediation and causal feedback loop	C2		U			L				I		0	0	0	1	I
Non-polluting - geochemical risk																			
Release of contaminants from retained TSF	Inadequate TSF cell design, inappropriate construction materials and practice	Localised land contamination, groundwater quality impacts and downstream water quality impacts	TSF cell design and construction supervisory controls, performance monitoring of TSF cells during operational phase	C2		U			M				II		0	0	1	0	II
Non-polluting - other environmental harm																			
Release of contaminants from retained TSF	Inadequate TSF cell design, ineffective batter slope stabiisation, ineffective ESCP controls	TSF4 cell batter degradation, exposure to tailings, downstream water quality impacts	TSF cell design and construction supervisory controls, performance monitoring of TSF cells during operational phase, monitoring of TSF4 batter	C2		U			M				II		0	0	1	0	II
Sustainable - PMLU																			
Inability to achieve grassland PMLU criteria	Inadequate rehabilitation	TSF4 cell batter degradation, exposure to tailings, downstream water quality impacts	TSF cell design and construction supervisory controls, performance monitoring of TSF cells during operational phase, monitoring of TSF4 batter	C2		U			M				II		0	0	1	0	II

Risk Description				Risk Evaluation						Risk Rating				Count				
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	IV	III	II	I	Final Risk Rating
RA10 Rehabilitated TSF footprints																			
Safe																			
Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Inadequate removal of tailings and cell construction materials, surface condition post-removal, inadequate surface preparation	Safety hazard for personnel, stock and wildlife	Relatively level pre-disturbance landform to be retained, TSF removal and surface preparation measures and controls, rehabilitation monitoring and assessment, undertake repairs and maintenance as required	C2		U		M				II			0	0	1	0	II
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Potentially dispersive topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques and other contributing factors to improve the likelihood of revegetation success on rehabilitated slopes where required.	C2		U			L				I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient. Low risk drainage network design (avoidance of flow concentration, ESCP, effective revegetation techniques, monitoring). Regular (typically annual) review of water management design parameters, monitoring of drainage network performance, prompt remediation and causal feedback loop to water management system review	C2		U			L				I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Pre-mining topography is of low slope gradient, adequate/effective topsoil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques and other contributing factors to improve the likelihood of revegetation success on rehabilitated slopes where required.	C2		U			L				I		0	0	0	1	I
Non-polluting - geochemical risk																			
Residual tailings and/or contaminated foundation material remains within footprint	Ineffective clean-up post removal of cells, leakage from liner to foundation materials	Land contamination, potential for contaminated runoff from rainfall runoff events	Adequate supervisory controls during removal and backfilling operations, assessment of foundation materials following removal of liner, excavation of any potentiallycontaminated material to pit or remaining TSF and backfilling with soil materials	C1		U			M				II		0	0	1	0	II
Non-polluting - other environmental harm																			
Rill or sheet erosion resulting in downstream sedimentation	Insufficient early revegetation, ESCP controls	Revegetation performance, downstream receiving environment water quality and dependent ecosystem impacts	Confirm no residual materials on footprint, low risk of saline drainage from replaced soils, regular rehabilitation performance monitoring and water quality monitoring	C2		U			M				II		0	0	1	0	II
Alteration to existing aquatic habitats beyond area predicted	Inadequate rehabilitation drainage capacity and/or design	Changes to local catchment drainage patterns resulting in localised downstream flow changes impacting on aquatic habitat connectivity	Drainage network should not change from pre-disturbance, avoidance of flow concentration, appropriate species selection, effective revegetation techniques	C2		R			M				II		0	0	1	0	II
Sustainable - PMLU																			
Insufficient density/diversity of vegetation in grazing PMLU	Adverse weather potential/ minor flood inundation, poor vegetation establishment and PMLU density/diversity metrics	Reduced long term suitability for PMLU	Soil management and amelioration, well-developed rehabilitation methodologies, management and maintenance activities, rehabilitation performance monitoring and assessment, undertake repairs and improvement works as required	C2		P			L	M			II	III	0	1	1	0	III
Unintended introduction of pests and weeds	Poor weed management practices	Unintended spread of weed species	Pest and weed management practices, limited vehicular access to site, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate	C2		U			M				II		0	0	1	0	II
RA11 Permanent diversion																			
Safe																			
Slope roughness on formed diversion slopes	Slope gradients, materials used and inappropriate construction equipment	Trip hazard for personnel, stock and wildlife	Initial fencing controls will limit access to personnel and stock, Effective construction and access controls	C2		U		M				II			0	0	1	0	II
Flood flows endangering humans and stock	Adverse rainfall events, poor access controls	Drowning. Loss of stock	Initial fencing controls will limit access to personnel and stock and access controls. Note that risk will be no different to current existing situation	C3		R		H				III			0	1	0	0	III

Risk Description				Risk Evaluation						Risk Rating				Count				
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Controls	Control Effectiveness	Likelihood - Frequency	Likelihood - Probability	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	IV	III	II	I	Final Risk Rating
Stable - geotechnical risk																			
Significant material slip failure	Landform not constructed to design requirements (compaction etc), poor design, physical material properties, adverse rainfall event	Localised land impacts, downstream water quality and sedimentation impacts	Compaction from residence time in dump prior to final rehabilitation, slope moderation, maximum slopes subject to engineered design, provision of adequate drainage infrastructure, rapid revegetation, rehabilitation monitoring and assessment, undertake repairs and maintenance as required	C2		R		M				II			0	0	1	0	II
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Existence of potentially dispersive soils, adverse weather events	Localised land impacts and downstream water quality impacts	Longitudinal bed slope will be maintained to approximate that existing prior to disturbance, adequate/effective soil amelioration, prompt revegetation establishment, sediment controls during vegetation establishment, revegetation monitoring, revegetation maintenance and repairs as required, modify revegetation methods and techniques and other contributing factors to improve the likelihood of revegetation success on rehabilitated slopes where required.	C2		U			L				I		0	0	0	1	I
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate diversion design	Localised land impacts and downstream water quality impacts	Appropriate engineered design of diversion structure, effective revegetation techniques, rehabilitation monitoring and management as required, regular monitoring of diversion performance, prompt remediation and causal feedback loop maintenance program	C2		U			M				II		0	0	1	0	II
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Appropriate engineered design of diversion structure, effective revegetation techniques, rehabilitation monitoring and management as required, regular monitoring of diversion performance during rainfall events	C2		U			M				II		0	0	1	0	II
Non-polluting - other environmental harm																			
Alteration to existing riparian vegetation upstream and downstream	Poor revegetation outcomes, inadequate weed control, adverse weather (drought, flood)	Eroded/erodible landform, loss of riparian corridor and ecosystem values	Appropriate engineered design of diversion, effective revegetation techniques, rehabilitation monitoring and management as required, regular monitoring of diversion performance, prompt remediation and causal feedback loop maintenance program	C2		R			M				II		0	0	1	0	II
Sustainable - PMLU																			
Inability to achieve riparian vegetation outcome	Poor revegetation outcomes, inadequate weed control, adverse weather (drought, flood)	Eroded/erodible landform, loss of riparian corridor and ecosystem values	Appropriate engineered design of diversion, effective revegetation techniques, rehabilitation monitoring and management as required, regular monitoring of diversion performance, prompt remediation and causal feedback loop maintenance program	C3		U			H	H			III	III	0	2	0	0	III
Unintended introduction of pests and weeds	Poor weed management practices	Unintended spread of weed species	Pest and weed management practices, limited vehicular access to site, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate	C2		U			M				II		0	0	1	0	II