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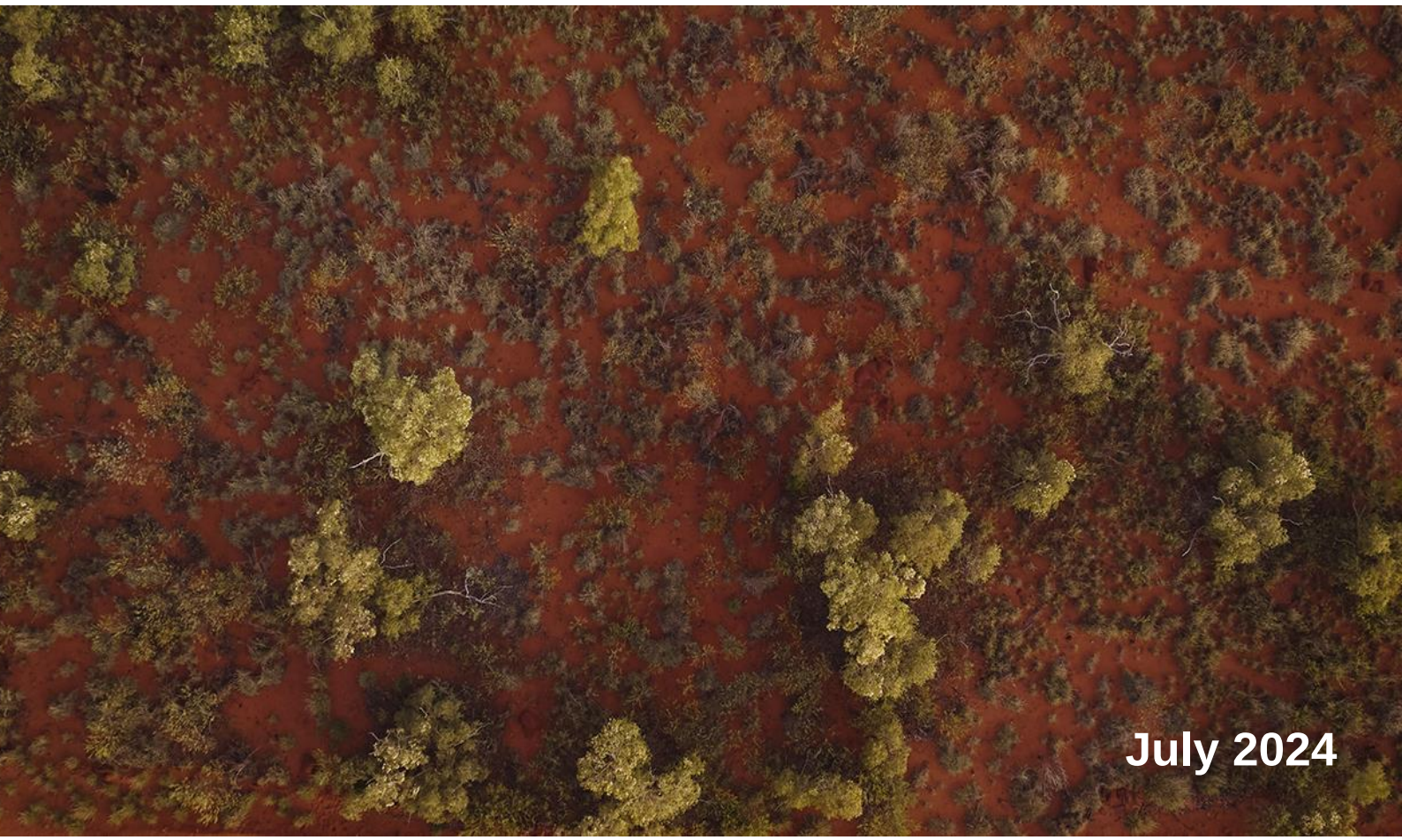
CONCEPTUAL MINE CLOSURE PLAN

HEMI GOLD PROJECT



July 2024

CONCEPTUAL MINE CLOSURE PLAN
Hemi Gold Project

AUTHORISATIONS

Task	Name	Company	Signature	Date
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Prepared by

RPMGLOBAL

Prepared for

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1. INTRODUCTION

1.1 Purpose and Scope

This Conceptual Mine Closure Plan has been developed to provide supplementary information relating to Mine Closure and Post-Closure to support Commonwealth and State environmental approvals for the Hemi Gold Project (the Project; Hemi). The Project located approximately 85 km south of Port Hedland in Western Australia (Figure 1-1).

Given the current stage of the Project's planning, much of the information provided in this document is at a conceptual level, and it will form the basis of future Mine Closure Plans (MCPs) for the Project, including the MCP that will be submitted with the Mining Proposal for the Project under the Western Australian (WA) *Mining Act 1978* (Mining Act). As such this MCP has been developed to broadly align with, but not conform to the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) 2020 guidelines (DMIRS, 2020a, 2020b).

This document seeks to:

- Provide a summary of the Project, including a high level description of the operation and infrastructure, location details and tenure.
- Detail statutory obligations relevant to rehabilitation and closure of the Project.
- Current strategy for ongoing stakeholder engagement.
- Summary of relevant baseline and closure data including climate, hydrology, hydrogeology, materials characterisation, rehabilitation design studies and other closure-related data.
- Identify potential post-mining land use, including relevancy to the local environment, stakeholder acceptance and achievability.
- Identify potential risks that could prevent the Project from meeting closure objectives and identify treatments for these risks.
- Generic closure criteria and monitoring requirements that will be achieved or sustainably progressing towards achievement before the mining tenement can be relinquished.
- Identify proposed closure and rehabilitation tasks needed under differing closure scenarios.
- Summarise the proposed monitoring and maintenance program needed to assess the closure and rehabilitation strategies against completion criteria.
- Provide detail of financial closure provisioning as it pertains to the requirements under the WA Mining Act.

1.2 Proponent Details

De Grey Mining Limited (De Grey) is the proponent of the Project.

All compliance and regulatory requirements regarding this MCP should be forwarded by email, post or courier to the following address:

Proponent: De Grey Mining Limited
Address: Ground Floor, 2 Kings Park Road, West Perth, WA, 6005
Contact: Sarah Thomas
Title: Environment Manager
Phone: +61 8 6109 6825
Email: sarah.thomas@degreymining.com.au

1.3 Project Location

Hemi is located within Mineral Fields 45 and 47 in the Pilbara Region of WA, approximately 85 km south of Port Hedland within the Shire of the Town of Port Hedland. The site is accessed via the Great Northern Highway. The Project will proceed on the following mining tenure:

- Mining Lease M47/1628 held by Last Crusade Pty Ltd, a wholly owned subsidiary of De Grey. This lease application includes the Hemi deposits and the surrounding area.
- Miscellaneous Licences L45/600, L45/604, L 45/605, L45/612, L47/1047 (pending), L47/1048, L47/1049, L47/966, L47/963 (pending), L45/642, L47/1069 (pending), L47/1070, L47/1071 submitted by De Grey. These will be used for supporting infrastructure.

The Project area is predominately located on the Indee Station Pastoral Lease with a small portion of the northern miscellaneous licences intersecting the Mundabullangana Station Pastoral Lease. Tenements and the Development Envelope are shown in Figure 1-2.

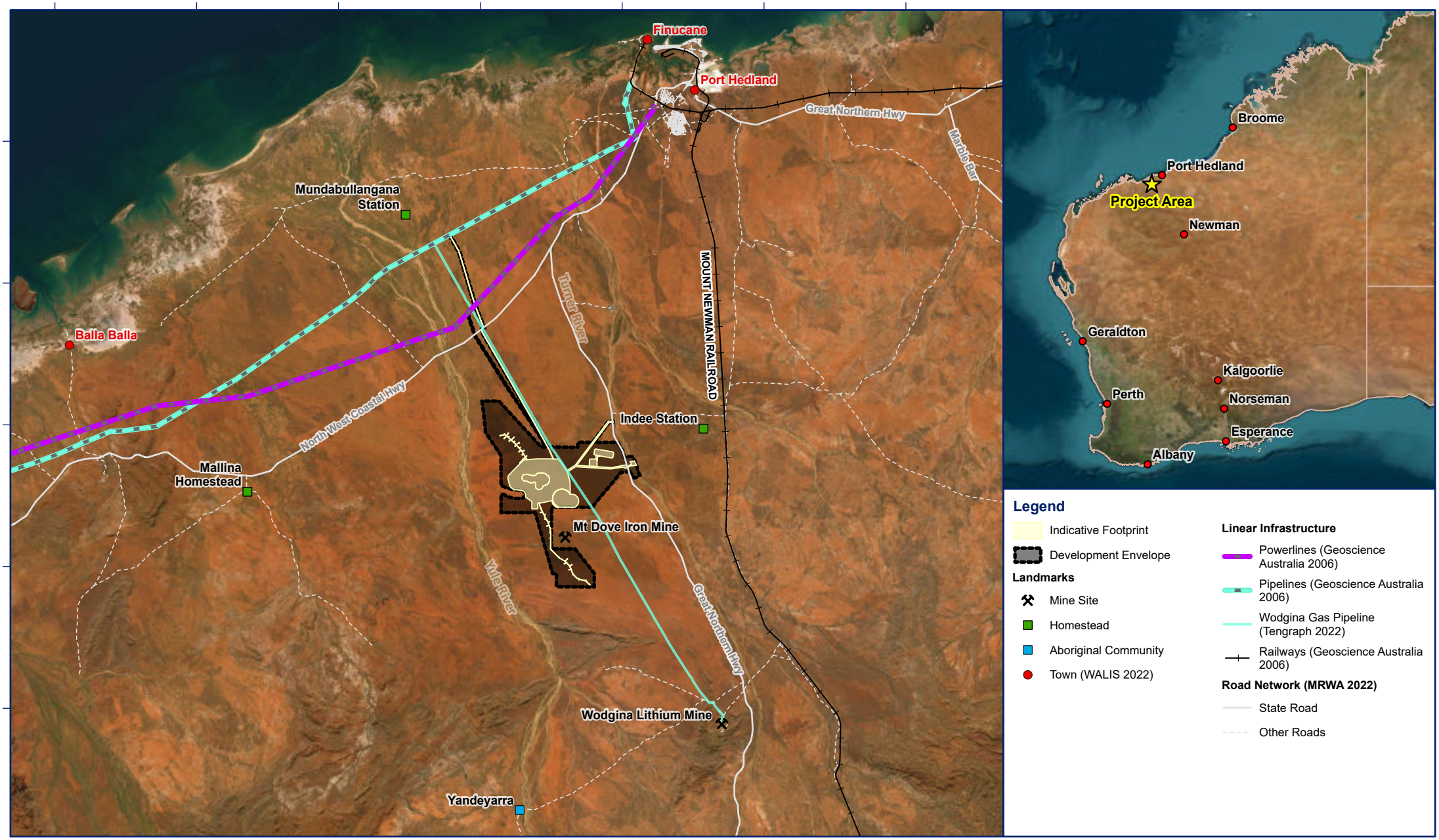

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Figure 1-1		
ADV-AU-00673	Location Plan	

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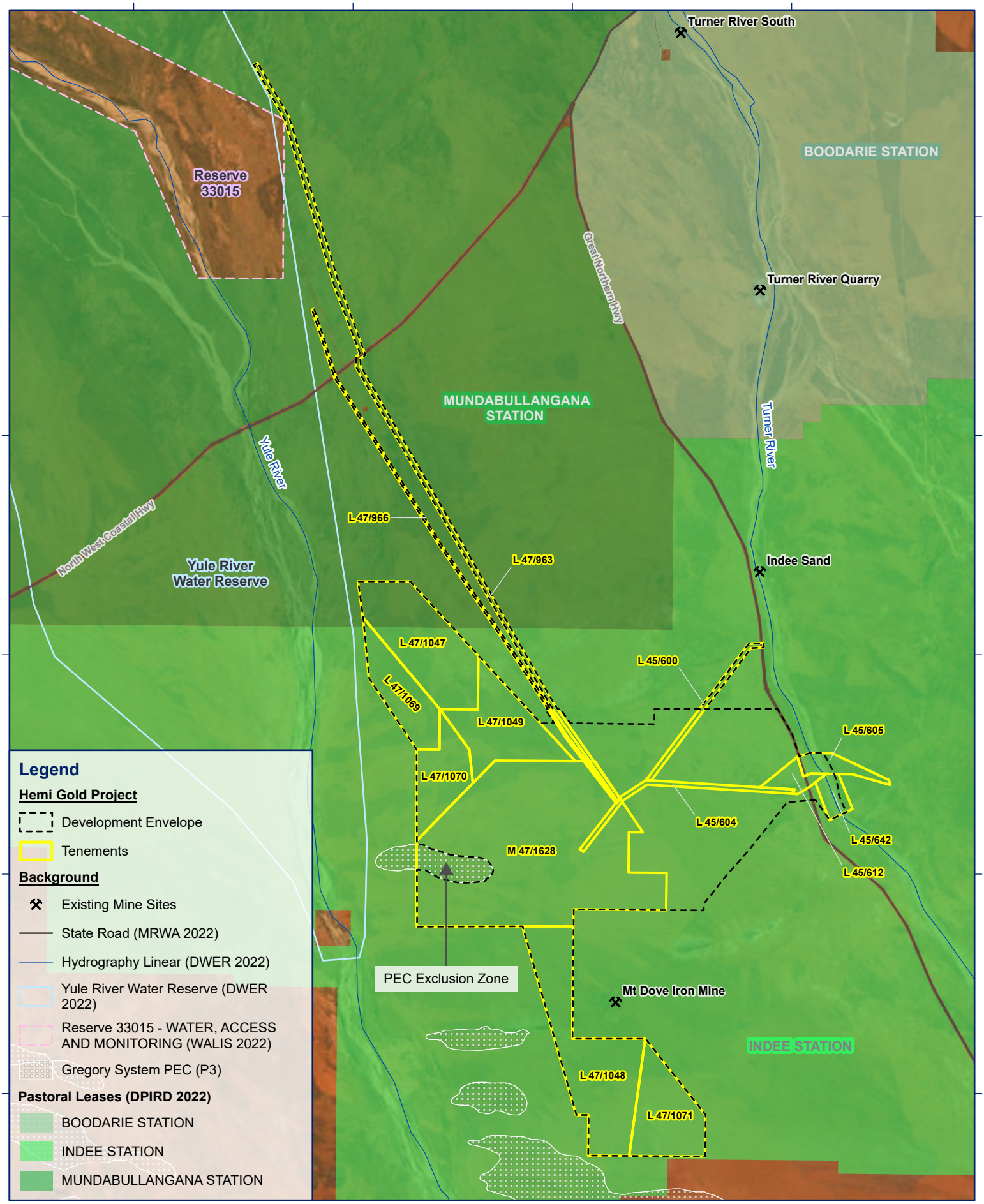

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Hemi Gold Project - Conceptual Mine Closure Plan

Development Envelope

Figure 1-2 | ADV-AU-00673 | July 2024

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2. THE PROPOSAL

2.1 Summary and Key Characteristics

Hemi is a greenfields project, with no existing mining or processing operations within the Development Envelope. Existing exploration and pastoral disturbance at the Project include laydown areas, access roads and tracks; core yards; drill pads and sumps. approved via Programs of Works (PoWs) issued by DEMIRS in accordance with the *Mining Act 1978* (Mining Act). This disturbance will either be rehabilitated in accordance with approval conditions, alternatively where ongoing access is required this will be included in the Mining Proposal applications for use during proposed mining operation.

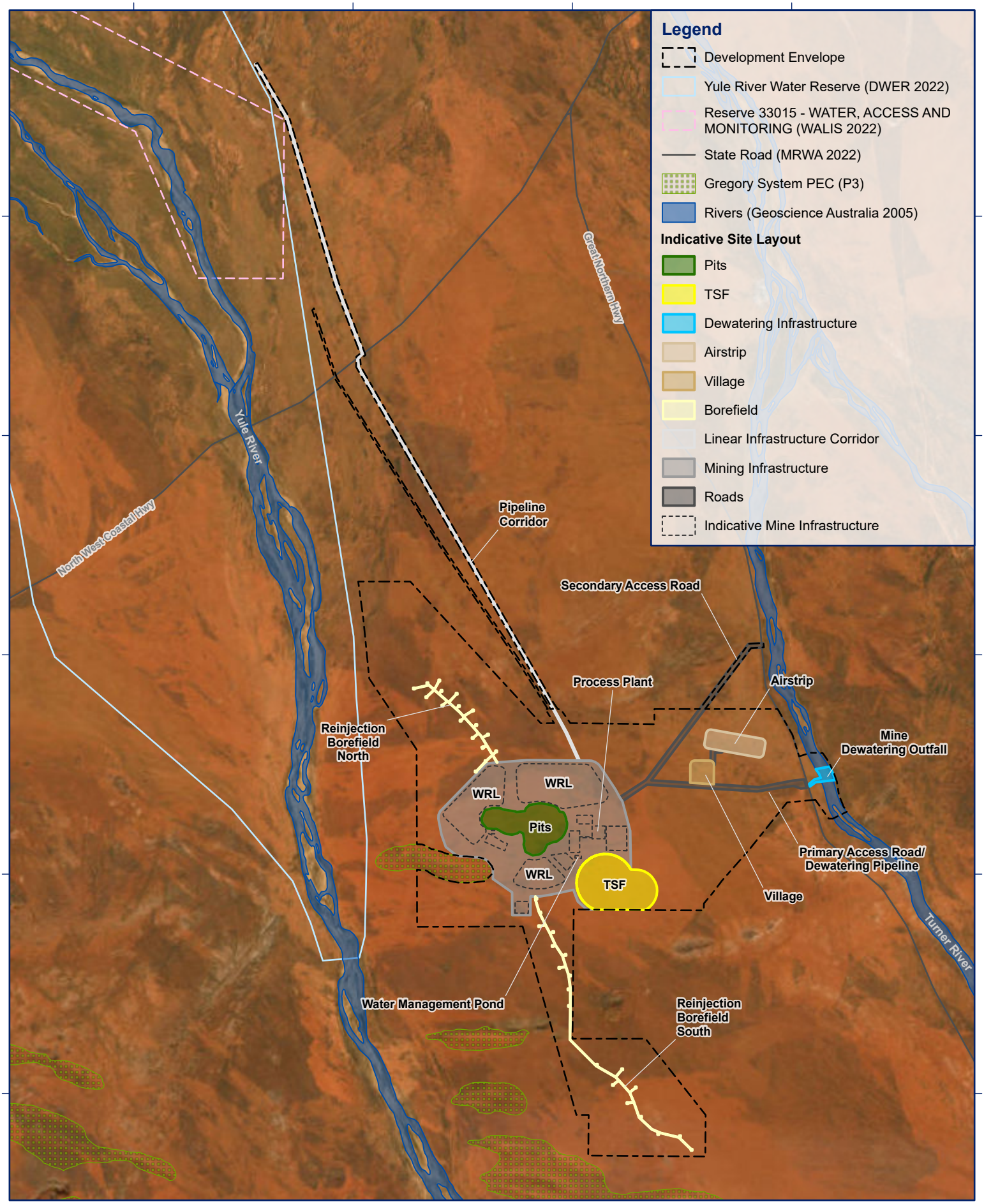
The key components of the Project comprise:

- Open cut mining of gold bearing ore from six pits collectively known as the Hemi deposits (Aquila, Brolga, Crow, Diucon, Eagle, and Falcon).
- Construction and subsequent operation of a ~10 million tonne per annum (mtpa) processing plant.
- Storage of tailings in a 2-cell, Integrated Waste Landform (IWL) Tailings Storage Facility (TSF).
- Water supply from the local groundwater aquifer with accompanying groundwater and surface water management infrastructure to facilitate mine dewatering and aquifer reinjection.
- Discharge of surplus water that is of acceptable quality into the Turner River, via water management ponds.
- Stockpiling of waste rock with rehabilitation to form safe, stable and non-polluting Waste Rock Landforms (WRLs).
- Stockpiling of low-grade ore separately from waste rock for future processing (or rehabilitation) after high-grade ore is exhausted.
- Linear infrastructure corridors to access power options.
- Two linear infrastructure corridors for a sealed access road; dewatering infrastructure and potential power infrastructure, east of the Hemi deposits.
- Power supply consisting of connection to the North West Interconnected System (NWIS) (preferred option), with the potential for an on-site solar farm.
- Construction and operation of a sealed airstrip that can accommodate the operation of aircraft with capacity for approximately 100 passengers.
- Construction of additional supporting infrastructure including offices, workshops, laydowns, explosives magazines, accommodation village, wastewater treatment, landfills, surface water management infrastructure, pipelines, and borrow pits.
- An anticipated 15-year Life of Mine (including an initial two-year dewatering phase), followed by a closure phase.

The total disturbance area for the Project (excluding disturbance areas associated with exploration) is anticipated up to 5,830 ha and is provided for individual domains in Table 2-1 with an indicative site layout presented in Figure 2-1.

Table 2-1 Estimated Disturbance for the Project

Domain	Area (ha)
Airstrip	235
Borefield	72
Dewatering Infrastructure	48
Mining Infrastructure	3522
Pipeline Corridor	211
Pits	538
Roads	368
TSF	725
Village	111
Total	**5,830**



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Hemi Gold Project - Conceptual Mine Closure Plan

Proposed Site Layout

Figure 2-1	ADV-AU-00673	July 2024

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2.2 Mining Operations and Ore Processing

Aspects of the mining operations, ore processing and associated infrastructure relevant to closure planning are detailed further in the sections below.

2.2.1 Pits

De Grey proposes to mine six open pits at Hemi. These are the Aquila, Brolga, Crow, Diucon, Eagle and Falcon pits. These will start as individual pit shells, however, as mining progresses will merge to form two larger voids at the end of mining.

Detailed geotechnical studies and assessment is ongoing in accordance with regulatory and industry standards for wall and bench configurations to prioritise pit stability and safe operations. General design parameters are provided in Table 2-2, however these will vary depending on factors such as pit wall lithology and groundwater inflows.

Table 2-2 General Pit Design Parameters

Material	Batter Height (m)	Batter Angle (°)	Berm Width (m)	Inter-ramp Angle (°)
Oxide	10	50	6	34.8
Transitional	10	65	7	40.6
Fresh	20	75	8	56.3

2.2.2 Processing

An onsite processing plant, with a ~10 million tonne per annum capacity, will be constructed to produce gold dorè from gold-bearing ore. The process will consist of:

- A two-stage crushing circuit, followed by high pressure grinding rolls and grinding in a ball mill to reduce ore particle size.
- A gravity gold leaching circuit.
- A flotation circuit that separates out sulphide-bearing material into flotation concentrate.
- A pressure oxidation (POx) circuit that oxidises the sulfides in the flotation concentrate and converts ore into a form amenable to carbon-in-leach processing.
- A carbon-in-leach circuit that treats concentrate from the POx circuit as well as flotation tailings.
- An electrowinning circuit.
- A refining furnace that produces gold dorè.

Tailings will be passed through a thickener to recover process water and then pumped as a slurry to the TSF.

De Grey may construct a secondary crushing station as mining progresses and haulage distances increase. Crushed ore will most likely be transported by conveyor to the processing plant. This arrangement is likely to reduce diesel consumption associated with haulage in the later stages of the Project.

2.2.3 Tailings Storage

Tailings at Hemi will be stored in an Integrated Waste Landform, hereafter referred to as the TSF. Embankments will be constructed out of mine waste with a low permeability upstream zone of clayey mine waste materials. The floor of the TSF will consist of:

- A 0.5 m compacted clay liner placed in a 300 m radius of the central decants with a permeability of $<10^{-8}$ m/s.
- A 0.5 m compacted clay liner placed over stony ground in the northwest of the TSF, with a permeability of $<10^{-8}$ m/s.
- In-situ material compacted to 0.3 m, with a permeability of $<10^{-8}$ m/s over the remainder of the TSF floor.

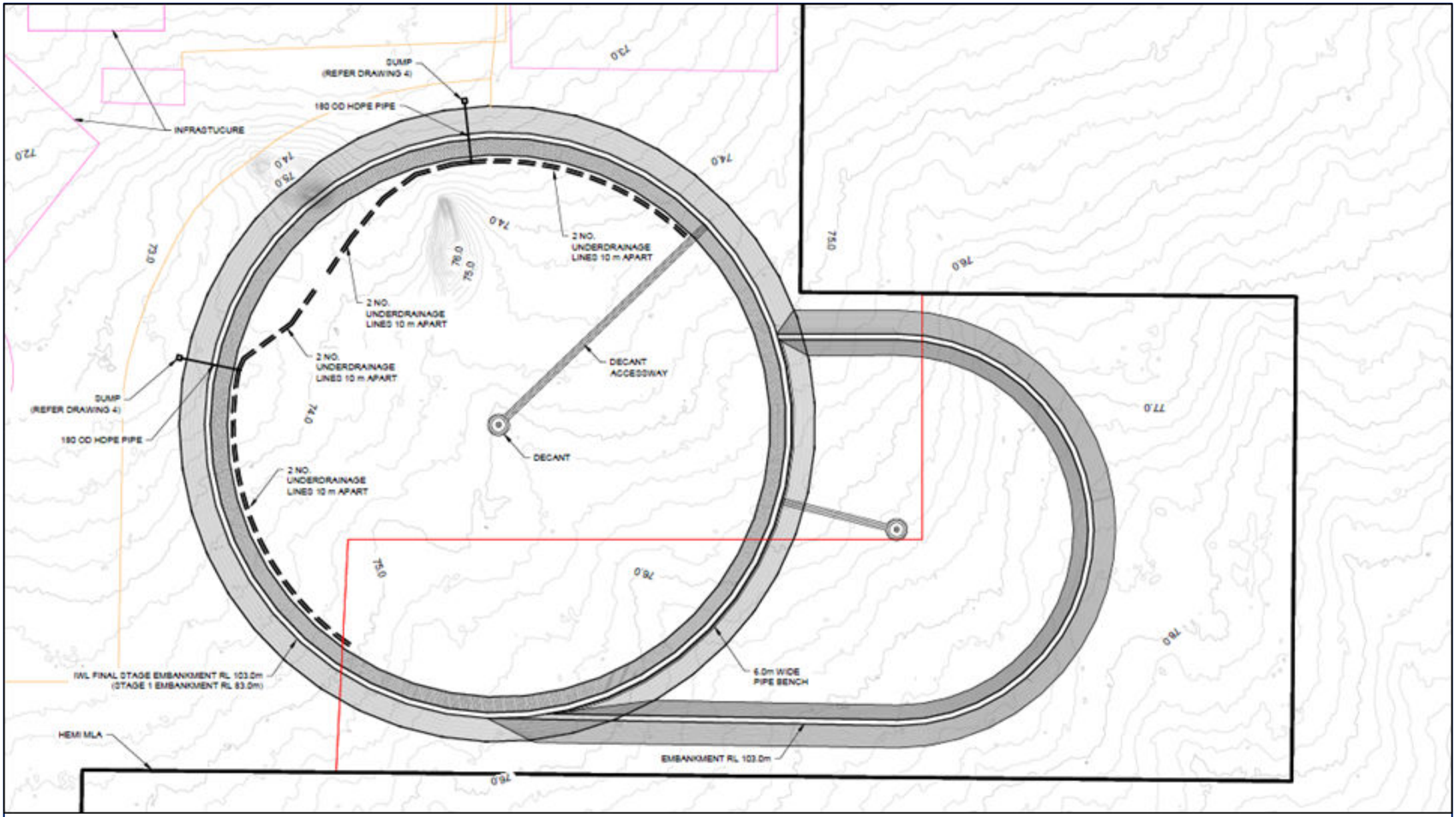
The TSF will be a single landform, likely to consist of two cells which may be constructed together or in a staged manner. The embankments will be lifted as tailings deposition progresses to accommodate approximately 130 million tonnes of tailings. A preliminary design is provided in Figure 2-2 and a cross section through the embankments in Figure 2-3 and Figure 2-4. CMW Geoscience's geotechnical engineer designed the TSF in accordance with Australian National Committee on Large Dams (ANCOLD) requirements. Land and Marine Geological Services Pty Ltd has provided peer review to CMW.

Tailings will be deposited sub-aerially via spigots and beached towards central decants. Measures to reduce seepage from the TSF include:

- Compacted foundation.
- 0.5 m thick compacted clay liner 300 m radius around central decant.
- Treatment of tailings through a thickener to reduce water outputs to the TSF.
- Collection of surface water from central decant for reuse in the processing plant.
- Collection of water from base of tailings via an underdrainage system for reuse in the processing plant.
- Construction of cut-off trench at the base of embankments to limit lateral movement of seepage.
- Installation of embankment piezometers to monitor the phreatic surface.
- Operation in conformance with a TSF Operating Strategy.

Embankment piezometers will be installed to monitor for seepage.

The TSF embankment will be benched during operations and the benching reprofiled for closure (refer to Figure 2-4). The final downstream slopes will likely comprise a 17 m wide berm, at 15 m vertical height and batter slopes at approximately18°, in order to allow for construction utilising predominantly oxide waste materials.



Not to Scale
Source: CMW, 2022

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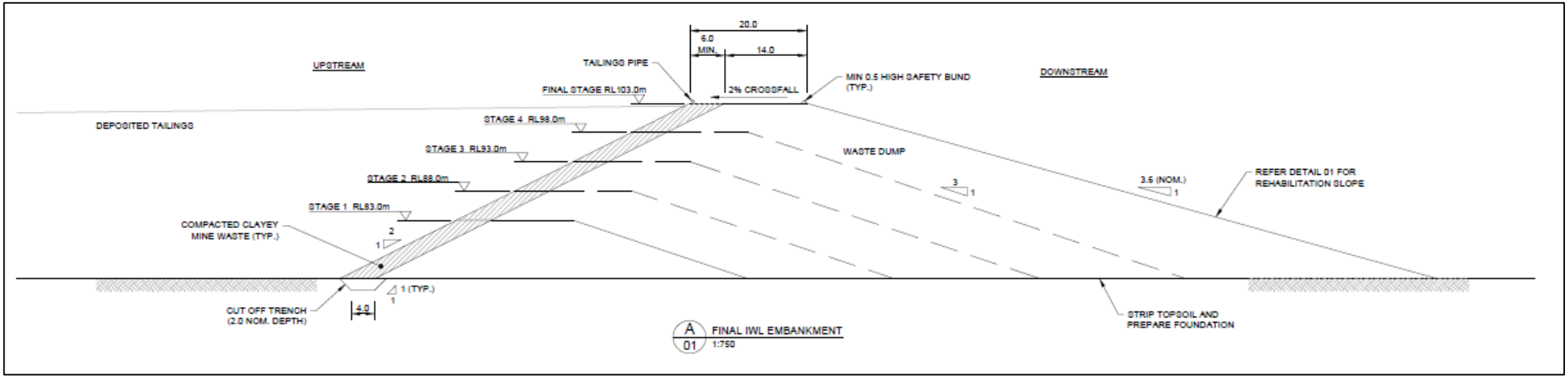
Figure 2-2		
ADV-AU-00673	**Hemi TSF Design**	

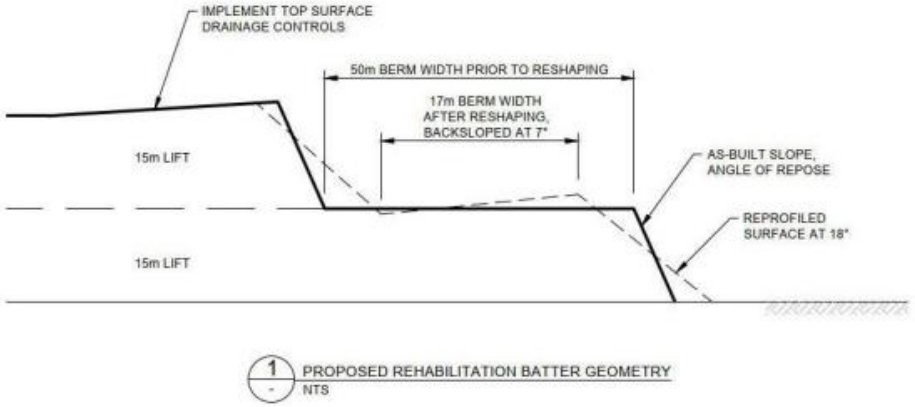
Figure 2-3 Cross Section of TSF Embankment



Source: (CMW, 2022)

Figure 2-4 Typical Cross Section of TSF Rehabilitation Slope

The proposed rehabilitation geometry is shown below.



Source: (CMW, 2022)

2.2.4 Waste Rock Landforms

Mine waste will be deposited into external WRLs. Benign waste material will also be used as construction material for the TSF outer embankments, the base of the Run of Mine (ROM) pad, other hardstands, road base and to line drains were required. The WRLs have been located outside of zone of geotechnical instability of the open pits, but as close as possible to minimise haulage distances and associated greenhouse gas emissions. At this stage of feasibility planning, backfilling of mine waste into pits is not possible due to scheduling constraints and mineralisation being open at depth. Should the option become feasible, De Grey would seek appropriate approvals.

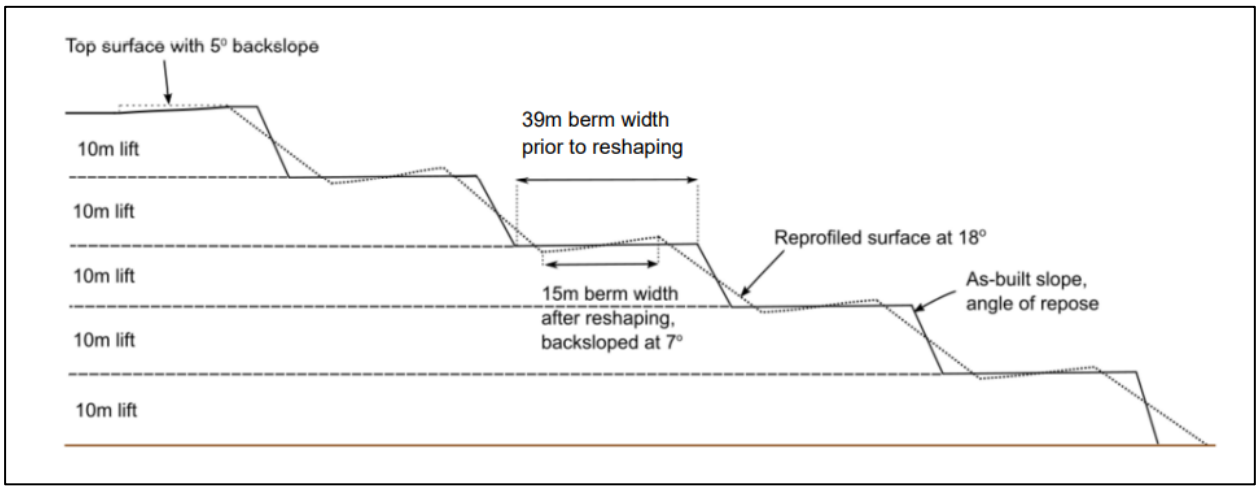
Mine Earth (Mine Earth, 2022a) have provided high-level design guidance to inform the optimal configuration for final slopes of the WRLs to achieve long-term drainage control and erosional stability outcomes, based on modelled scenarios utilising site-specific assumptions for climate, hydrological and materials property characteristics. The design standards selected for the conceptual landform closure design were:

- Performance standard - Landform drainage controls be designed to manage a 1 in 1000-year annual exceedance probability (AEP) rainfall event.
- Design life standard - Landform drainage controls to be designed to meet the performance standard over a 300-year design effective service life.

A conservative final lift height setting of 10 m has been nominated for the WRLs. The modelling indicated that for a 10 m lift of the WRL slopes a 15 m wide berm, backsloped at 7°, was required at closure to meet the design standards. Adopting a berm width wider than this will offer increased water holding capacity and design life. To achieve the final design, it is important that the as-tipped geometry of the landform incorporates sufficient space to implement the final design. To achieve the final berm width, a tip-to (prior to reshaping) berm width was calculated for the 10 m lift, the modelling has indicated that to achieve a 15 m berm width at closure, a 39 m tip-to width will be necessary for the 10 m lift as shown in Figure 2-5.

Waste characterisation studies completed by SRK Consulting (Australasia) Pty Ltd (SRK) show that most of the waste at Hemi does not pose a risk of acid and metalliferous drainage and only a small proportion (~5%) of samples were potentially acid forming. Approximately 20% of the non-acid forming (NAF) samples had a sufficient sulphide content to pose a potential neutral or saline mine drainage risk. The studies and implications for placement of material and risks are discussed further in Sections 5.3 and 7.2.3.

Figure 2-5 Tip-to berm width typical section for WRLs



Source: (Mine Earth, 2022a)

2.2.5 Water Management Infrastructure

Dewatering will be required to enable below the water table mining of the deposits, and surplus mine water will be reinjected into paleochannel aquifer that runs through the development area, as well as discharged into the Turner River. A water management pond will be constructed for the Project, as well as dewatering bores, reinjection bores and associated water pipelines.

2.2.6 Power and Fuel Infrastructure

Proposed primary power options for the Project include either grid connected power with potential for supplementary power from a solar farm once the project is established. Power or gas feed into the site will either be through above-ground power lines or underground gas pipeline respectively.

Onsite power will be distributed via above-ground powerlines with mobile diesel generators used to power some electrical equipment where construction of powerlines is not practicable.

Diesel storage in the form of above-ground storage tanks with appropriate bunding will be in place to support a diesel-powered mine fleet and any mobile diesel generators.

2.2.7 Airstrip

A sealed airstrip, with capacity for jet aircraft having approximately 100 seats will be constructed at the Project in accordance with Civil Aviation Safety Authority (CASA) standards to support a fly-in, fly-out workforce. The use of nearby third-party airstrips is also being considered.

2.2.8 Other Infrastructure

Other infrastructure required to support the mining operation includes, but is not limited to:

- An accommodation village with capacity to meet workforce requirements.
- Workshops.
- Administration buildings.

- Washdown facilities.
- Bioremediation facilities.
- Communication facilities.
- Borrow Pits.
- Laydown Areas.
- Landfill and waste management facilities.
- Monitoring bores.
- Haul and access roads.
- Pipeline and powerline corridors.
- Water storage ponds.
- Topsoil stockpiles.
- Explosives magazine and ammonium nitrate emulsion (ANE) compound.
- Gatehouse and security.

3. IDENTIFICATION OF CLOSURE OBLIGATIONS AND COMMITMENTS

Legislation and other legal obligations applicable to closure and rehabilitation of the Hemi Gold Project are summarised in the following subsection. These will be incorporated within a Legal Obligations Register that will be maintained by De Grey to include all commitments and obligations that must be adhered to at closure.

3.1 Legislation

3.1.1 Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act) has established a nationally consistent framework for environmental assessments for both variations to existing and new projects. Mining projects that have the potential to impact on matters of national environmental significance are assessed under this legislation.

The Project was referred under the EPBC Act on 15 May 2023 and determined to be a Controlled Action. The Project is currently under assessment with any conditions relating to closure to be added to the Legal Obligations Register when provided.

3.1.2 Mining Act 1978 (WA)

The *Mining Act 1978* (WA) (Mining Act) regulates mining leases, mining approvals and terms and conditions for mines on both private and crown land.

Mining Proposals

The main closure commitments from approval documents for the Project are contained within Mining Proposals and Mine Closure Plans approved under the provision of the Mining Act. Closure commitments from these documents are to be followed as part of closure planning. This Conceptual MCP has been prepared to comply with relevant commitments made within approval documentation, with the various commitments incorporate within the Legal Obligations Register.

Mine Closure Plan

The first Mine Closure Plan will be submitted with the Mining Proposal to DEMIRS under the Mining Act. Mine Closure Plans are updated every three years in accordance with conditions of mining tenure.

Tenement Conditions

Project tenements are subject to a number of conditions relating to closure and rehabilitation which will be followed as part of closure activities. These will be detailed in the Legal Obligations Register.

3.1.3 Environmental Protection Act 1986 (WA)

Part IV – Referral and Assessment of Significant and Strategic Proposals

The *Environmental Protection Act 1986* (WA) (EP Act) provides for the prevention, control and abatement of pollution and environmental harm for the conservation, preservation, protection, enhancement, and management of the environment. This Project was referred to the Environmental Protection Authority (EPA) on 15 June 2023 with details of several key environmental factors.

The EPA considered that the Project required Assessment on Referral Information was required for the following key environmental factors; inland waters; flora and vegetation; terrestrial fauna; subterranean fauna; terrestrial environmental quality; greenhouse gas emissions; air quality; and social surroundings. Any conditions relating to closure in the Ministerial Statement will be included within the Legal Obligations Register.

Part V – Prescribed Premises, Works Approvals and Licences

Part V (Section 52) of the EP Act establishes a range of statutory instruments to permit the assessments and management by the Department of Water and Environmental Regulation (DWER) of environmental outcomes arising from emissions from industry. Prescribed Premises categories relevant to the Project are defined in Schedule 1 of the *Environmental Protection Regulations 1987* (WA) being:

- Category 5 - Processing or beneficiation of metallic or non-metallic ore: premises on which (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam (50,000 tonnes or more per year)
- Category 6 - Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore (50,000 tonnes or more per year).
- Category 54 - Sewage facility: premises on which sewage is treated (excluding septic tanks); or from which treated sewage is discharged onto land or into waters (100 m^3 or more per day).
- Category 57 - Used tyre storage (general): premises on which water is extracted and discharged into the environment to allow mining or ore (50,000 tonnes or more per year).
- Category 64 - Class II putrescible landfill site (20 tonnes or more per annum)
- Category 70 - Screening, etc of material: premises on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated (more than 5,000 but less than 50,000 tonnes per year).
- Category 73 - Bulk storage of chemicals, etc: premises on which acids, alkalis or chemicals that – (a) contain at least one carbon to carbon bond; and (b) are liquid at STP (standard temperature and pressure), are stored (1,000 cubic meters in aggregate).

Any conditions from the Works Approval or Environmental Licence will be added to the Legal Obligations Register.

Part V – Clearing of Native Vegetation

Part V (Section 51) of the EP Act specifies that clearing of native vegetation in Western Australia requires a permit. The clearing provisions of this Act are described in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. A Native Vegetation Clearing Permit (NVCP) is not required when a project is assessed under Part IV of the EP Act, however may be needed if minor or preliminary works are granted.

Conditions in a NVCP, if granted, will be adhered to in closure planning and added to the Legal Obligations Register.

3.1.4 Contaminated Sites Act 2003 (WA)

The *Contaminated Sites Act 2003* (WA) (CS Act) requires that known or suspected contamination is reported to DWER where the substance is present at above background concentrations in the land or waters of a site that presents or potentially presents a risk of harm to human health or any environmental value.

De Grey will maintain an internal contaminated sites register to facilitate contaminated site investigations and management if required.

3.2 Guidelines

3.2.1 ANZMEC/MCA Strategic Framework for Mine Closure

The Australian and New Zealand Minerals and Energy Council (ANZMEC) and Minerals Council of Australia (MCA) developed ‘The Strategic Framework for Mine Closure (Strategic Framework)’ (ANZMEC/MCA, 2000) which is intended to promote a nationally consistent approach to mine closure management in all Australian jurisdictions. The Strategic Framework has established principles for mine closure that are agreed between regulating authorities and the mining industry.

3.2.2 DEMIRS Guidelines for Preparation of MCPs

In March 2020, DEMIRS released guidance on the preparation of MCPs, titled ‘Statutory Guidelines for Mine Closure Plans’. These guidelines adopted the objectives and principles of the Strategic Framework, whilst providing further description of how MCPs in Western Australia can meet these objectives and principles. DEMIRS released supplementary information titled ‘Mine Closure Plan Guidance – How to Prepare in Accordance with Part 1 of the Statutory Guidelines for Mine Closure Plans’ (DMIRS, 2023). The MCP provided for approval to DEMIRS will be developed in accordance with the statutory guidelines and the supporting guidance material, collectively referred to as the 2020 MCP Guidelines.

3.2.3 Western Australian Biodiversity Science Institute Guidelines

The Western Australian Biodiversity Science Institute (WABSI) released a guidline in 2019 entitled ‘A framework for developing mine-site completion criteria in Western Australia’. The intent of the WABSI guideline is to support the development and implementation of completion criteria and associated monitoring programs and to provide greater consistency for mining companies to develop risk-based completion criteria and monitoring.

3.2.4 International Council of Mining and Minerals

The International Council of Mining and Minerals (ICMM) released the 'Integrated Mine Closure: Good Practice Guide (2nd Edition) in 2019. This guideline provides important guidance that supplements the Australian guidelines listed above.

3.2.5 International Standards Organisation

The Internation Standards Organisation (ISO) released updated closure guidance in 2021 titled 'ISO 21795 Mine Closure and reclamation Planning (Part A and Part B)'.

3.3 Closure Obligations Register

All closure obligations identified under the various acts and approval documentation, as discussed above, will be collated into a single Legal Obligations Register. The Legal Obligations Register is a comprehensive checklist for De Grey to use during the closure process and will be updated annually to reflect additional approvals and maintain its relevance.

4. STAKEHOLDER ENGAGEMENT

Stakeholder engagement is a fundamental part of the mine closure planning process. The stakeholder engagement process comprises:

- Identification of Stakeholders and interested parties.
- A specific communication strategy for engaging stakeholders throughout the life of mine.
- Maintenance of a stakeholder engagement register that tabulates the outcomes of stakeholder engagement.

4.1 Identification of Stakeholders

Stakeholders who have an interest in the closure and rehabilitation of Hemi will be identified by De Grey. These decision-making authorities and other stakeholders that have an interest in closure of the Project are identified in Table 4-1.

Table 4-1 Stakeholder Identification

Stakeholder Category	Stakeholder Name
Key Stakeholders	
Decision Making Authorities	DEMIRS
	DWER
	EPA
Traditional Owners	Kariyarra Aboriginal Corporation (KAC)
Other Stakeholders	
Government Authorities	Department of Biodiversity Conservation and Attractions (DBCA)
	Department of Planning, Lands and Heritage (DPLH)
	Main Roads WA
	Town of Port Hedland
	Water Corporation of WA
Neighbouring Landholders	Indee Station Pastoral Lease
	Mundabullangana Station Pastoral Lease.

4.2 Stakeholder Engagement Strategy

The purpose of the stakeholder closure communication strategy is to ensure that relevant stakeholders are kept informed and have the opportunity to provide input on mine closure aspects of mining operations. It also aims to minimise the impact of mine closure on both workers and the local community. The communication strategy for each stakeholder is summarised in

Table 4-2 Stakeholder Engagement Strategy

Stakeholder Category	Stakeholder Name	Consultation Method and Timing	Focus (Closure)
Key Stakeholders			
Decision Making Authorities	DEMIRS	• Review of MCP (every three years) • Mining Proposals (as required) • Annual Environmental Report (AER) • Mining Rehabilitation Fund (MRF) (annually) • Site inspections (as required) • Miscellaneous correspondence and meetings, as required	• Decommissioning • Safety • Materials Characterisation • Closure designs and task register • Rehabilitation progress • Completion criteria • Landform stability • Final land use • Consultation strategy • Financial provisioning.
	DWER	• Annual Audit Compliance Report (AACR) • Form 2 reporting, as required	• Pollution control • Contaminated sites
	EPA	• Annual compliance report • Formal correspondence, as required • Meetings, as required	• Protection of key environmental factors
Traditional Owners	KAC	• Formal correspondence • Meetings as required	• Protection of Aboriginal cultural heritage • Post mining land use.
Other Stakeholders			
Government Organisations	DBCA	• Formal correspondence • Meetings as required	• Biodiversity
	DPLH	• Formal correspondence • Meetings as required • MCP	• Post mining land use • Relinquishment
	Main Roads WA	• Formal correspondence • Meetings as required	• Activity and use of infrastructure during fleet mobilisation/demobilisation
	Town of Port Hedland	• Shire council meetings • Annual mining liaison meeting	• Final land use • Transition to post mining business
Neighbouring Landholders	Pastoral Leases	• Formal correspondence • Meetings as required	• Post mining land use • Retention of assets

5. BASELINE AND CLOSURE DATA

5.1 Regional Setting

The Project lies within Chichester subregion (PIL1) with northern infrastructure corridors within the Roebourne subregion (PIL4) of the Pilbara region, as described by the Interim Biogeographic Regionalisation for Australia (IBRA) Version 7 (DoEE, 2012). The Chichester subregion is situated on the northern end of the Pilbara Craton.

The Chichester subregion has significant areas of basaltic ranges amongst undulating Archean granite and basalt plains. These plains support a shrub steppe characterised by *Acacia inaequilatera* over hummock grasslands with *Eucalyptus leucophloia* tree steppes occurring on the ranges. Drainage of the subregion occurs through many rivers running north including De Grey, Oakover, Nullagine, Shaw, Yule and Sherlock Rivers (Kendrick P & McKenzie N., 2001).

The Roebourne subregion has quaternary alluvial and older colluvial coastal and sub-coastal plains. These plains support grass savannah of mixed bunch and hummock grasses and dwarf shrub steppe of *Acacia stellaticeps* or *Acacia pyrifolia* and *Acacia inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Resistant linear ranges of basalts occur across the coastal plains, with minor exposures of granite.

5.2 Climate

The Pilbara Region where the project is located has a desert climate (arid), characterised by hot dry days and cold clear nights, with unreliable rainfall occurring during the year, with two distinct seasons: a hot summer period extending from October to April, and mild winter from May to September (ETA, 2022).

The following climate data is presented in the TSF Design Report completed by CMW Geosciences (CMW, 2022) based on data supplied by De Grey and sourced from the Bureau of Meteorology:

- Average annual rainfall of 329 mm.
- Mean annual evaporation 3,590 mm.
- 1:1,000 yr. Annual Exceedance Probability (AEP) 72-hour event, 577 mm (BOM, 2024).
- Probable maximum precipitation (PMP) 6-hour event 950 mm (BOM, 2023, Generalised Short Duration Method).

5.3 Geology

The Hemi Pits are located in a series of intrusives associated with stringer and disseminated sulphide-rich zones. Mineralisation extends over approximately 3.5 km^2, starts at 30 to 40 m below surface and extents to a depth of around 500 m. A layer of transported cover overlies the ore.

Major waste and ore lithologies are shown in Table 5-1. The logged length is indicative of the proportion that a particular lithology will be present in waste rock or ore. Under the modelled gold price, rock from the pits will be directed as follows:

- <0.3 ppm Au content will be placed in WRLs.
- 0.3 – 1 ppm Au will be placed in low-grade stockpiles with the expectation of being processed once high-grade ore is exhausted, or alternatively, rehabilitated.
- ≥1 ppm Au will be hauled to the ROM pad for processing.

Table 5-1 Waste Lithologies at the Project

Lithology	Logged Length (m)		Waste Rock Samples	Ore samples
	Total	%		
Transported	39,874	35	88	
Mafic Intrusive	22,825	20	89	2
Siltstone	21,992	18.9	96	
Intermediate Intrusive	9,805	8.6	41	6
Sandstone	5,248	4.6	25	1
Black Shale	3,615	3.2	21	
Shale	3,462	3	23	
Ultramafic Rock	921	0.8	3	
Mafic Intrusive (Plagioclase)	342	0.3	2	
Quartz Feldspar Porphyry	322	0.3	1	
Felsic Intrusive	295	0.3	2	1
Minor lithologies combined	5,230	4.9		
Total	**113,931**	**100**	**391**	**10**

5.4 Waste Characterisation

5.4.1 Elemental Composition of Waste Rock and Ore

The Global Abundance Index (GAI) provides an indication whether an element is present at elevated levels relative to the median abundance for that element in the relevant media. For rock samples, a GAI greater than three indicates higher levels compared to average levels found in earth's crust, referred to as 'average crustal abundance'.

Based on the GAI index the following elements are considered enriched:

- Ag, As, Bi, Cd, Cr, Cs, Cu, Hg, Ni, Pb, Re, S, Sb, Se, Ta, Te, U, W, Zn in the waste rock.
- Ag, As, Bi, Cd, Pb, Re, S, Sb, Se, Te, and W in the ore.

Enriched concentrations of metals and metalloids are not unusual around zones of mineralisation and do not necessarily indicate an environmental risk unless that element is bioavailable or (if Potentially Acid Forming (PAF) material is present) may become bioavailable under acidic conditions.

5.4.2 Acid and Metalliferous Drainage Potential

Acid and Metalliferous Drainage (AMD) may occur if sulphides present in waste rock or low-grade stockpiles are exposed to oxidising conditions and react with water and oxygen to form sulfuric acid. The resulting acidic leachate may mobilise metals and metalloids that are insoluble at higher pH.

Based on static testing results, SRK (SRK, 2022) classified the AMD potential of waste using the AMIRA and MEND classifications in Table 5-2. Material may be classified as Uncertain (UC); Non-acid Forming (NAF) or Potentially Acid Forming (PAF). The AMIRA method is more common in Australia and considers the Net Acid Generation (NAG) and Net Acid Producing Potential (NAPP) of a material. The MEND method considers the Neutralisation Potential Ratio (NPR), which is the ratio of Acid Neutralising Capacity (ANC) to Maximum Potential Acidity (MPA).

Table 5-2 AMIRA and MEND Classifications

Classification		AMIRA		MEND
		NAPP	NAG pH	NPR
NAF		<0	>4.5	>3
PAF		>0	<4.5	<1
UC	UC(NAF)	<0	>4.5	1 – 3
	UC(PAF)	>0	<4.5	

Waste and ore classification by lithology is summarised in Table 5-3 and shown graphically in Figure 5-2 and Figure 5-3. Cells shaded green indicate the number of samples assessed as PAF. Waste classification by pit is provided in Table 5-4. The locations and AMIRA classification of samples are shown in Figure 5-1.

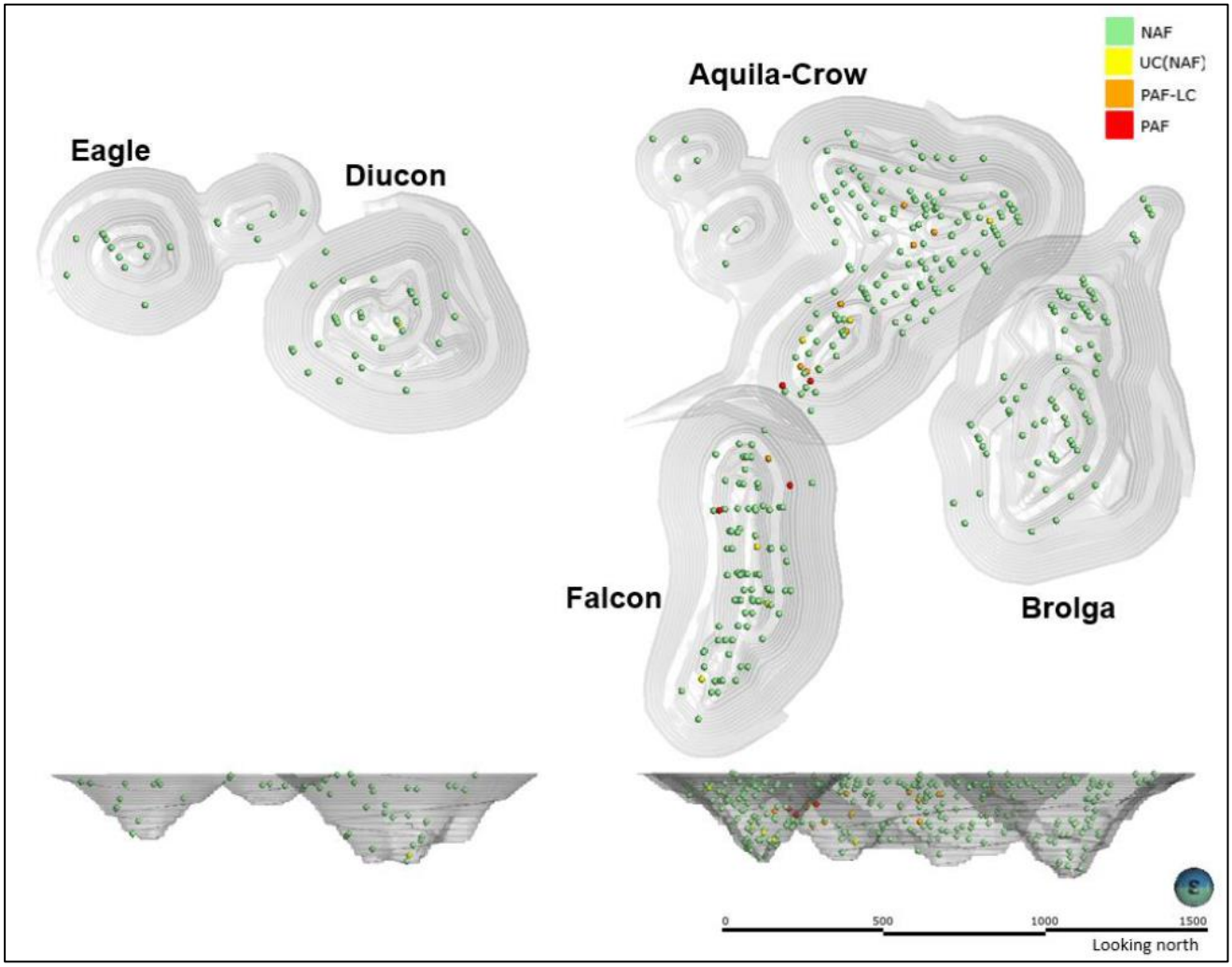
Table 5-3 Classification of Ore and Waste by Lithology

Lithology	Code	Samples	AMIRA				MEND		
			NAF	UC (NAF)	UC (PAF)	PAF	NAF	UC	PAF
Black Shale	BLSE	23	18	1	-	4	17	1	5
Felsic Intrusive	FIRK	2	2	-	-	-	1	1	-
Intermediate Intrusive	IIRK	43	37	3	-	3	31	7	5
Mafic Intrusive	MIRK	93	92	-	-	1	91	1	1
Mafic Intrusive (Plagioclaise)	MIRP	2	2	-	-	-	2	-	-
Quartz Feldspar Porphyry	QFPY	1	1	-	-	-	1	-	-
Sandstone	SDST	28	27	-	-	1	25	2	1
Shale	SHLE	24	22	-	-	2	20	2	2
Siltstone	SLST	99	90	2	-	7	84	8	7
Transported	TRANS	93	93	-	-	-	93	-	-
Ultramafic Rock	UMRK	3	3	-	-	-	3	-	-
All waste rock samples	**Count**	**411**	**387**	**6**	**-**	**18**	**368**	**22**	**21**
	%		**94%**	**1.5%**	**-**	**4.5%**	**90%**	**5%**	**5%**
Ore	-	10	8	2	-	-	4	4	2

Table 5-4 Classification of Waste by Pit

Lithology	Samples	AMIRA				MEND		
		NAF	UC (NAF)	UC (PAF)	PAF	NAF	UC	PAF
Brolga	79	79	-	-	-	77	2	-
Aquila-Crow	169	154	2	-	13	146	9	14
Falcon	104	95	4	-	5	88	9	7
Diucon-Eagle	59	59	-	-	-	57	2	-
All waste rock samples	411	387	6	-	18	368	22	21

Figure 5-1 Sample location plan showing AMIRA classifications



PAF-LC – samples with a low capacity (LC) to generate acidity (NAG acidity < 5 kgH_2SO_4/tonne).

SRK concluded that the majority of waste at Hemi is NAF or UC and poses a low risk of AMD. A small proportion of some lithologies (Black Shale; Intermediate Intrusive; Mafic Intrusive; Sandstone; Shale; and Siltstone) in Aquila, Crow and Falcon is PAF. Ore samples were classified as NAF or UC and low-grade stockpiles pose a low risk of AMD.

Kinetic leach column tests were conducted on 15 waste rock samples. One test remains ongoing whilst the remaining 14 samples are complete. The objectives of the kinetic testing are to measure: the rate of sulfide oxidation; the concurrent rate of acid neutralisation; and solute release rates. To date, the results indicate that leachates are circum-neutral, and concentrations of trace metals are typically low or below detection limits.

Some of the NAF samples contained sulfides and may pose a risk of NMD. Ongoing kinetic leach test analysis will further delineate this risk and identify potentially problematic wastes that need to be encapsulated away from the surface of constructed landforms.

Tailings were classified as NAF due to the nature of the ore and the use of pressure oxidation treatment followed by neutralisation in the carbon-in-leach circuit, which effectively removes any acid generation potential from the tailings.

De Grey will manage the risk of AMD, NMD, saline mine drainage and wastes with poor physical properties by encapsulating these problematic wastes within the WRL, ensuring that they are away from the edges of landforms so as to:

- Limit exposure to water and oxygen, thus preventing the oxidation of sulphides from occurring.
- Limit the potential for poor quality leachate entering the environment.
- Prevent erosion of the landform and promote long-term stability.

These processes for management of waste streams will be detailed in the Project's MP and future versions of the Mine Closure Plan, which will also incorporate the results of ongoing kinetic leach studies.

Figure 5-2 AMIRA Classification of Mine Waste Material

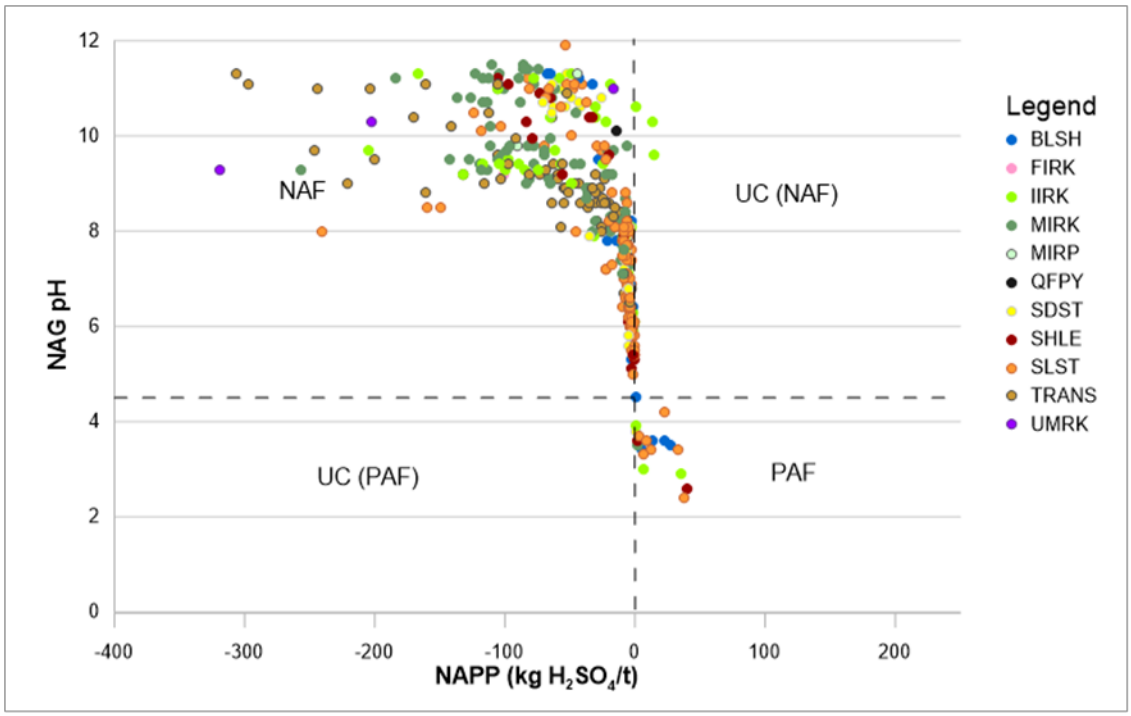
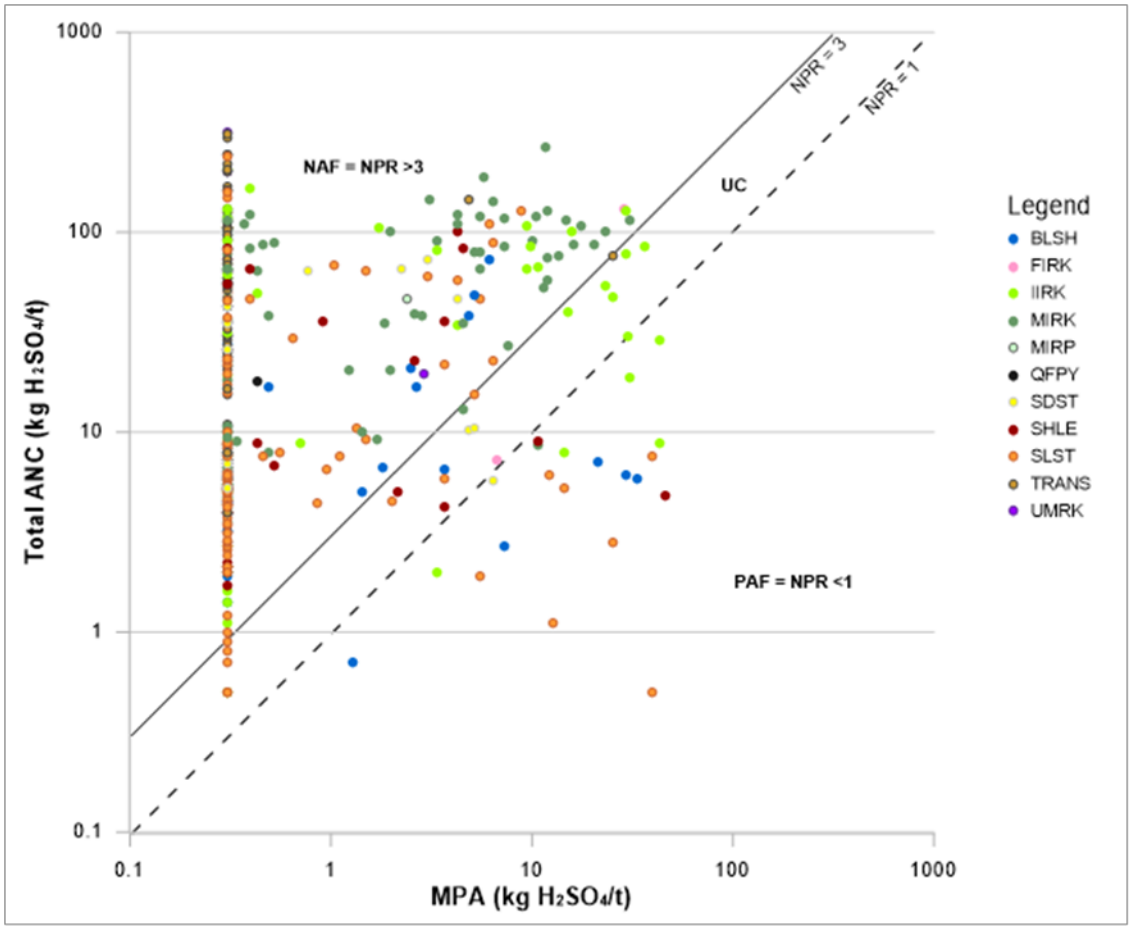


Figure 5-3 MEND Classification of Mine Waste Material



5.4.3 Leachate Analysis

SRK undertook short-term (24-hour contact time) leach testing using deionised water at a 1:3 solid to liquid ratio. The results are indicative of the water quality of any leachates that may be generated and percolate to the base of the waste rock landforms, TSF, and low-grade stockpiles. While the results provide an indication of the leachates that might be generated, in practice, actual dilution with rainfall will vary considerably and additional dilution will occur should leachate percolate into groundwater.

Most mine waste leachate solutions had low salinity (EC < 600 µS/cm) and circum-neutral to alkaline pH. Leachable trace elements, above the limit of reporting, included Al, As, B, Ba, Fe, Ga, Li, Mn, Mo, Ni, Sb, Sr, Ru, Ti, U, V, W, and Zn.

WRLs and the TSF have been constructed inside the modelled dewatering drawdown for the Project (See Figure 5-10). During operations, groundwater under these structures will be drawn towards the pits, abstracted, and reused as process water. At the cessation of dewatering, groundwater will continue to flow towards the pits for several years as they approach their steady-state water levels and any leachates that enter the groundwater are likely to remain at the Project.

De Grey has commissioned kinetic leach studies to further delineate the risk to environmental receptors. These are underway and will be used to support the Project's MP and future versions of the MCP.

5.4.4 Radioactivity

SRK reports that the total head-of-chain uranium and thorium activity in ore, waste and tailings is significantly below 1 Becquerel per gramme, which is the threshold for a material to be considered radioactive.

5.4.5 Erosion Risk

Assessment of weathering and erosion potential was undertaken on a subset of transported material samples that comprised predominantly of alluvia and aeolian materials. Hard rock lithologies at Hemi are competent and unlikely to pose an erosion risk during operations and closure. SRK assessed the unconsolidated the transported material above the ore body for dispersion risk.

Transported materials are generally sodic with low cation exchange capacity, low clay content and represent a low dispersion risk. However, as they are unconsolidated, transported materials should not be placed on the outer surfaces of landforms for closure, unless mixed with other materials.

A review of the susceptibility of key rock types to erosion and weathering was inferred by reviewing the geological characteristics from pre-mining drill data of the Hemi deposit. The classifications are based upon fresh rock composition and the stability classifications for the highly weathers (oxide) to moderately weathered (transitional) component of each rock type. The likely erosional stability classifications are presented in Table 5-5 (Mine Earth, 2022a).

Table 5-5 Erosional Stability Summary for Key Rock Types

Erosional Stability	Oxidation	Lithology	Proportion
Low	Oxide	Transported, Saprolite	68%
	Transitional	Siltstone, Mudstone, Shale	
Moderate	Transitional	Sandstone, Mafic, Intermediate, Ultramafic, Felsic	13%
	Fresh	Siltsone, Mudstone, Shale	
High	Fresh	Mafic, Sandstone, Intermediate, Ultramafic, Felsic	19%

5.4.6 Landform Assessment

Mine Earth were commissioned to review the soil resources and waste rock erosional stability detailed in the previous section to inform WRL design for the Hemi Project. Low stability rock (~68%) is recommended to be placed within the WRLs and not exposed to final shapes after reshaping with high stability rock to prioritised for placement on final landform slopes where possible.

Nominated lifts heights have been set as 10 m for the WRLs and 15 m for the TSF embankment. Rock armour is to be prioritised for placement on final TSF embankment slopes given they are higher than the WRL slopes. A backslope of 5° is to be established around the top surface crest to allow the capture of incidental rainfall and prevent standing water adjacent to the crest (Mine Earth, 2022a).

Indicative final landform designs are for the WRL and TSF are provided in Figure 5-4 and Figure 5-5.

Figure 5-4 Indicative WRL Landform Design

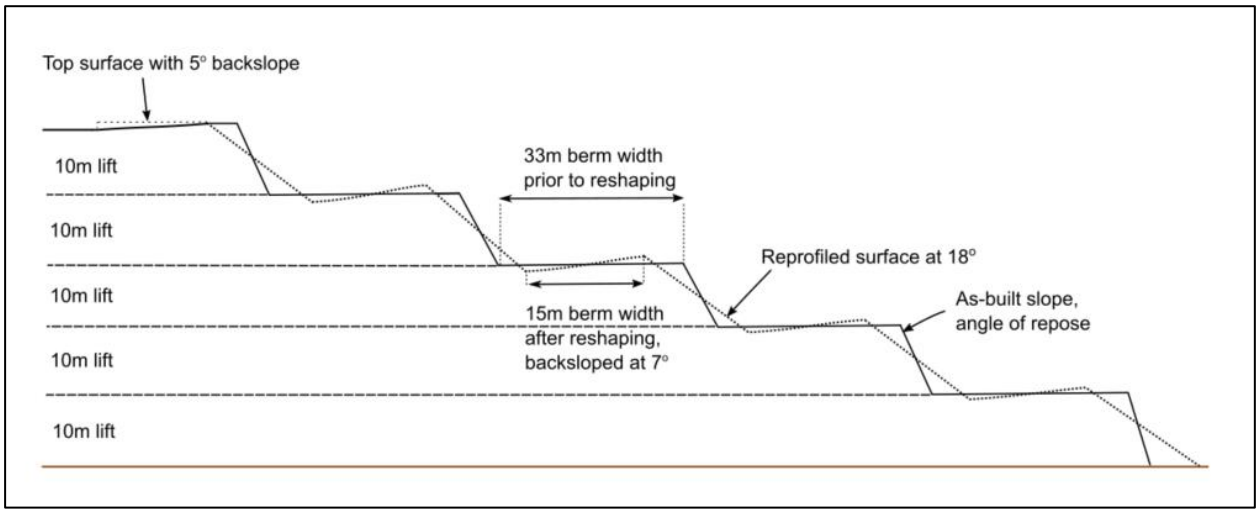
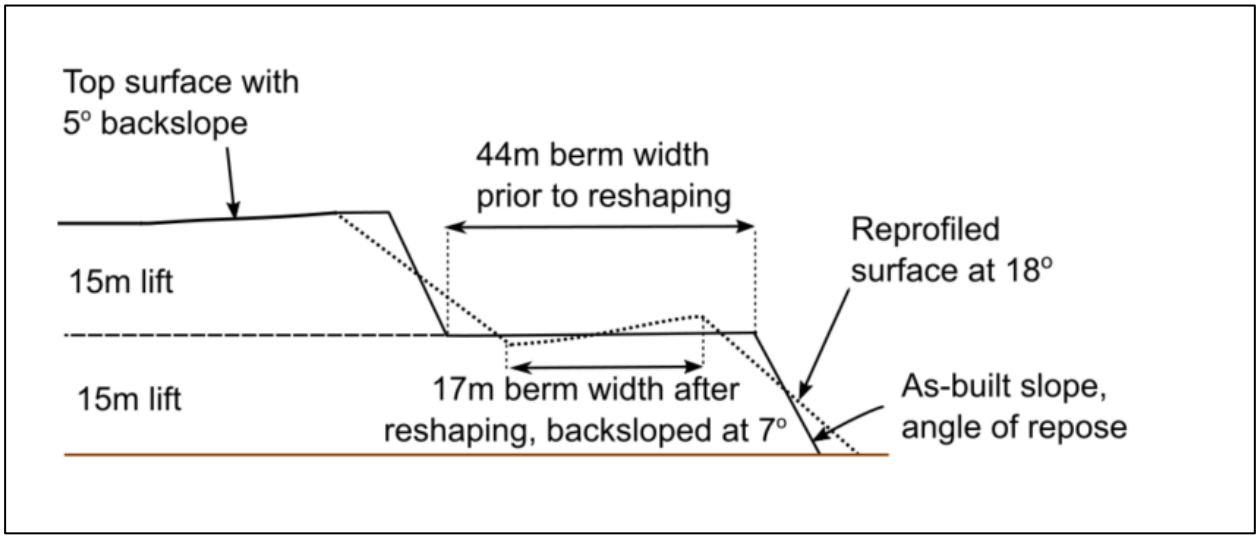


Figure 5-5 Indicative TSF Embankment Design



5.4.7 Fibrous Minerals

Targeted fibrous mineral screening of waste rock showed that asbestiform minerals are present in some ultramafic rock.

A total of 39 targeted samples out of the 391 waste rock samples were screened using scanning electron microscopy for fibrous mineral content. The samples selected for fibre screening were from lithologies in Western Australia known to commonly contain asbestiform minerals and mainly targeted mafic and ultramafic waste rock.

Five samples contained unidentified mineral fibres. One sample contained four countable fibres of actinolite, with the other four samples confirmed to include non-asbestiform fibres including mica, feldspar, chlorite and quartz. The actinolite was identified in one sample of ultramafic material with no fibrous mineral content identified in two separate ultramafic samples. A limited volume of ultramafic material is proposed to be intercepted (0.8% of the total waste rock cumulative logged length.

De Grey geologists are completing a follow up asbestiform material assessment with continued screening of mafic and ultramafic intercepts in accordance with the fibrous mineral management plan. De Grey will implement appropriate precautions, such as the implementation of dust suppression protocols, when this material is intercepted.

5.4.8 Tailings Characterisation

The final (cyanide leach) tailings soils are classified as NAF with the potential to generate neutral metalliferous drainage. The short-term leach solution for the final tailings was alkaline (pH 8), moderately saline (3,700 µS/cm) with detectable cyanide species and elevated concentrations of silver, arsenic, cadmium, cobalt, copper, nickel and zinc. It is noted that the supernatant (and cyanide leach tailings solid) generated from the metallurgical program are anticipated to have high concentration that tailings slurry components deposited into the TSF, as these bench-top materials have not been subjected to degradation (i.e. by UV radiation). Furthermore, De Grey proposes to treat the return decant water with Caros Acid to remove cyanide so as to not impact the flotation process. This will effectively limit the concentration of cyanide in recycled return water within the processing circuit and within the tailings slurry deposited in the TSF.

5.5 Land Systems and Soils

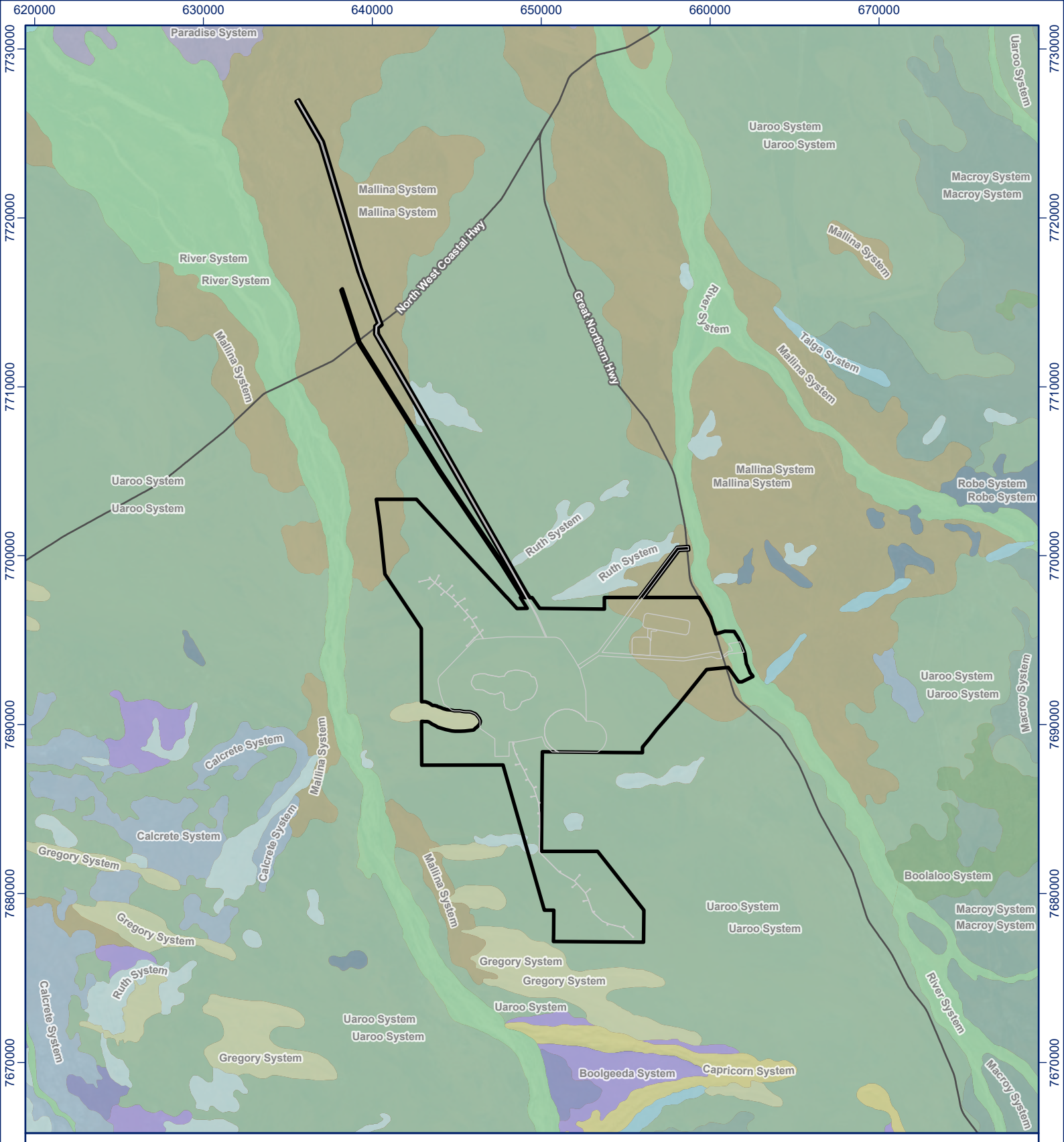
5.5.1 Land Systems

Land systems and major soils in the Pilbara have been mapped by (van Vreeswyk et al., 2004). Land systems and soils at the Project are described in Table 5-6 and shown on Figure 5-6.

Mine Earth undertook an assessment of landforms at the Project. The project is located on a flat, sandy floodplain and no significant landforms such as caves, banded iron formations or mesas are present. There is a single sand dune, forming part of the Gregory Land System in the southwest of the Project area (Mine Earth, 2022a). This has been excluded from the Development Envelope. No impacts to landforms are anticipated and De Grey considers that the factor objective will be met.

Table 5-6 Project Land Systems and Soils

Land System	Description	Major Landforms	Major Soils
Calcrete System	Low calcrete platforms and plains supporting shrubby hard spinifex grasslands.	Calcrete plains, platforms and low rises.	Calcareous shallow loams with minor calcareous loamy earths and red shallow loams.
Gregory	Linear dunes and restricted sandplains supporting shrubby hard spinifex (and occasionally soft spinifex) grasslands.	Linear dunes, swales and sandplains.	Red deep sands with minor red sandy earths within swales.
Mallina	Sandy surfaced alluvial plains supporting soft spinifex grasslands and minor hard spinifex and tussock grasslands.	Sandy surfaced alluvial plains with occasional claypans.	Red sandy earths, red deep sandy duplex soils, red loamy earths and red/brown non-cracking clays.
River	Narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of acacias and fringing communities of eucalypts sometimes with tussock grasses or spinifex.	Flood plains and lower terraces, minor and major channels.	Deep red/brown non-cracking clays and red loamy earths, riverbed soils.
Ruth	Hills and ridges of volcanic and other rocks supporting shrubby hard spinifex and occasionally soft spinifex grasslands.	Hills, ridges and upper slopes.	Stony soils and red shallow loams.
Uaroo	Broad sandy plains, pebbly plains and drainage tracts supporting hard and soft spinifex hummock grasslands with scattered acacia shrubs.	Sandy/loamy plains.	Red sandy earths, red deep sands and red loamy earths.



Legend

- State Road (MRWA 2022)
- Development Envelope
- Indicative Disturbance Footprint

Soil Landscape Systems (DPIRD 2021)

- Boolaloo System
- Boolgeeda System
- Calcrete System
- Capricorn System
- Gregory System
- Macroy System
- Mallina System
- Paradise System
- River System
- Robe System
- Ruth System
- Satirist System
- Talga System
- Uaroo System
- Yamerina System

Scale: 1:300,000
Projection: GDA2020 MGA Zone 50
Created/Reviewed By: AW/SP
Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 2.5 5 10 km

N

RPMGLOBAL

PROJECT

Hemi Gold Project - Conceptual Mine Closure Plan

Land Systems in the Project Area

Figure 5-6 | ADV-AU-00673 | July 2024

CLIENT

DE GREY MINING LTD

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5.5.2 Soil Assessment

A soil assessment was completed by Mine Earth. The project is located on a landscape dominated by flat sandplain with minimal (0.02%) low rocky rises characterised within the Development Envelope. Soil units in the Project area are described as:

Sandplain:

- Flat / low relief alluvial depositional plains with surface lag of gravel materials in the north-eastern portion of the Project.
- Aeolian sand surface layer of varying depths, over thick indurated crust.
- Structured 'topsoil' layer to approximately 10 to 15 cm depth.
- Deep sandy profiles, with increasing clay content with depth.
- Typically, no coarse fragments through surface soil profile.
- Friable, highly weathered lateritic layer consisting of ironstone pisoliths in a sandy matrix, at varying depths (from 90 cm to >175 cm depth).

Low rocky rises:

- Low rocky hills with shallow slopes.
- Shallow surface soils over fractured/weathered and competent rock.
- High percentage of competent rock fragments through the surface soil profile.
- Areas of outcropping competent rock present in some areas.

Dune:

- Excluded from Development Envelope.

Drainage

- Sandy riverbeds.

No acid sulphate soils were identified. The overwhelming majority of disturbance will be located on the sandplain unit, with minor amounts on low rocky rises. The dune unit has been entirely excluded from the Development Envelope, and disturbance in the drainage unit is limited to placement of the dewatering outfall.

Overall, the surface soils within the Project disturbance areas are considered a valuable source of rehabilitation material. The soils are generally non-saline and non-sodic, with only minor dispersion of the clay fraction observed within some samples following severe disturbance. The surface soils typically have a high hydraulic conductivity and 'very rapid' drainage class. Soils from the 'sandplain' soil landform association, which covers the majority of the proposed project disturbance area, should be salvaged and stockpiled for use as a surface rehabilitation medium.

Increases in clay content were typically observed with increasing depth in the soil profiles. The reduced infiltration rate and potential for hard-setting of the deeper, more clay rich soils indicates that the salvage of topsoil for use as a surface rehabilitation material, should be restricted to approximately 0.2m.

A topsoil stockpile area has been included in the indicative Project layout. The stockpile area is sufficiently sized to enable the topsoil to be paddock-dumped into piles no greater than 2 m in height, such that its viability is maintained. The piles will have adequate distance between them to create a series of mounds and troughs to capture surface water and organic matter.

Topsoil can be respread on flat areas, however any placement on WRL batters will be deep ripped to mix soil with competent rock and minimise erosion. Where available, gravels will be stockpiled and mixed with topsoil to create a more competent substrate for rehabilitation.

5.5.3 Materials Balance

Topsoil

The topsoil (0 to 0.2 m) from any disturbance areas within the 'Low rocky rises' soil-landform association is considered suitable as a surface rehabilitation material and should be stockpiled together with the topsoil collected from the 'Sandplain' disturbance areas.

A preliminary topsoil inventory developed by Mine Earth (Mine Earth, 2022b) assuming an average soil salvage depth of 0.3 m and 10% soil loss factor during salvage and stockpiling with estimated volumes for each disturbance area is provided in Table 5-7.

Table 5-7 Preliminary Soil Inventory

Disturbance Footprint	Disturbance Footprint Area (Ha)	Topsoil Volume (m^3)
Pits	289	519,833
Waste Rock Landforms	1,442.	2,595,839
TSF	550	989,764
ROM	70	125,396
Low Grade Stockpile	81	146,485
Plant and Infrastructure	176	317,686
Airstrip	109	196,110
Village	42	75,964
	Total	**4,967,079**

Waste Rock

A desk top review of waste rock erosion stability undertaken by Mine Earth (Mine Earth, 2022a) identified that approximately 68% of waste rock would likely be classified as low stability, approximately 13 % as moderate stability and 19 % as high stability based on the characteristics and distribution of key rock types for the Project.

Details of the lithologies, volumes and implications for placement of each category are summarised in Table 5-8.

Table 5-8 Erosion Stability Summary for Key Rock Types

Erosion Stability	Oxidation	Lithology	Volume (m^3)	Proportion	Stability Category Description
Low	Oxide Transitional	Transported, Saprolite, Siltstone, Mudstone, shale	156,800,250	68%	Rock is likely to demonstrate low erosion resistance and should not be placed on final landform slopes. Low stability rock will require the application of rock armour if exposed on final landform slopes.
Moderate	Transitional Fresh	Sandstone, mafic, intermediate, Ultramafic, Mudstone, Shale	29,125,389	13%	Rock is likely to demonstrate moderate erosion resistance. The suitability of moderate stability rock for use on final landform slopes should be verified during mining and will depend upon the as-dumped properties of the rock, the geometry of the landform slopes and associated drainage implications.
High	Fresh.	Mafic, Sandstone, Intermediate, Ultramafic, Felsic	44,097,646	19%	Rock is likely to demonstrate high erosion resistance and should be suitable for placement on final landform (WRL/TSF) slopes. High stability waste rock may provide a useful source of durable rock armour.

Mine Earth (Mine Earth, 2022a) note that the erosional stability properties of waste rock should be verified during mining and associated management recommendations should be revised accordingly, as the assessment was conducted from pre-mining drill data.

Given the low proportion of high stability rock suitable for placement on landform surfaces, it is recommended that high stability rock is prioritised for placement on final landform slopes where possible. Landform design will need to consider the waste rock material balance based on both physical and geochemical characteristics. This is discussed in more detail Sections 9.3.4 and 9.3.6. Where feasible, any suitable material extracted ahead of schedule should be stockpiled separately to material with a higher erosion risk until such time it is required for construction of landforms.

5.6 Hydrology

5.6.1 Overview

A surface water assessment is included in the hydrogeology report (Geowater Consulting, 2023) for the Proposed Action, which is attached as Appendix 4. Hemi is on a relatively flat plain in an internal surface water catchment between the Yule River and Turner River Catchments (Figure 5-7)The nearest proposed mining infrastructure is located approximately six kilometres east of the Yule River Catchment and two kilometres west of the Turner River Catchment (excluding monitoring bores).

The highest elevation within the Development Envelope is 109 mAHD, situated at the southern portion, while 95% of the terrain is between 54 and 94 mAHD.

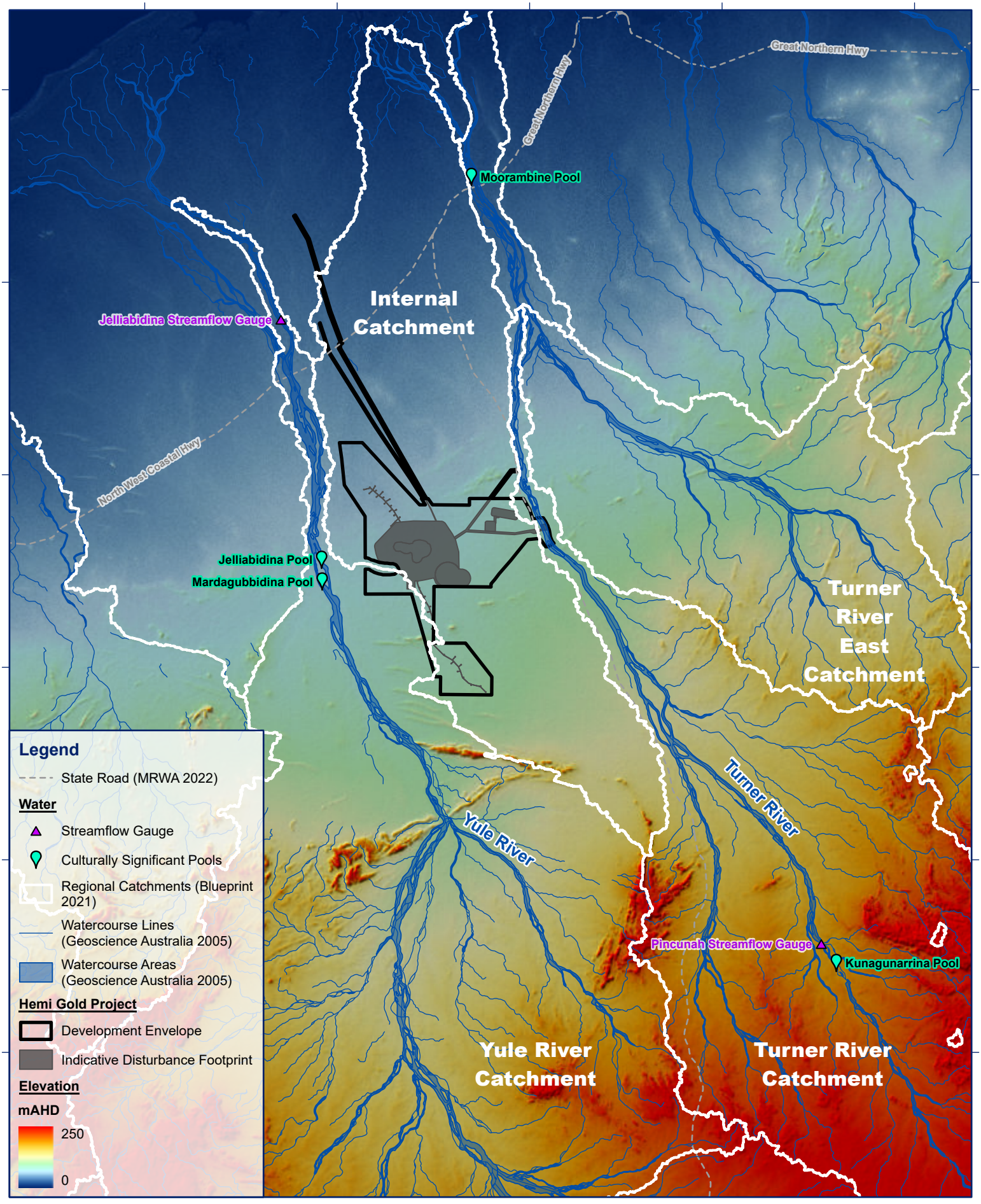
Despite an upstream catchment area of approximately 528 km2, there are no clearly defined drainage lines within the Development Envelope and the Great Northern Highway separates the central mining and infrastructure area from the Turner River. Drainage lines, creeks and rivers in the Pilbara are typically ephemeral and flow for only a short duration following rainfall events.

Modelling predicts that prior to surface water management controls, stormwater flow will result in sheet flow over much of the internal catchment containing the Proposed Action, draining to the north/northwest and eventually forming a series of disorganised drainage lines. Drainage within the internal catchment does not flow to the Turner or Yule River systems. Surface water controls will be applied to manage stormwater runoff within the proposed disturbance footprint.

5.6.2 Flood Modelling

Closure flood modelling and discharge modelling was undertaken by Surface Water Solutions in July 2022 (SWS, 2022). The predicted 1% annual exceedance probability (AEP) flood depths at closure are shown in Figure 5-8. These are considered conservative as it is unlikely that maximum floods will occur in the Yule and Turner Rivers concurrently as the catchments are separate and large. Large flows in the Yule and Turner Rivers are not expected to cause flooding in the Project, however shallow sheet flow with low velocities generated by rainfall is expected in a 1% AEP event. The average flow velocity of 0.4 m/s is less than the 2 m/s threshold typically adopted for the provision of rock armour protection.

The TSF Design Report (CMW, 2022) concluded that the proposed TSF site is located in an area of sheet flow with no major defined drainage channels. The site is between the Yule and Turner Rivers, major river floods (i.e. 1:100 yr. AEP) are unlikely to affect the proposed TSF site. The sheet flows across the undeveloped TSF site for a 1:100 yr. AEP were approximately 0.4 m at low velocity (i.e. flows basically non erosive).



Scale: 1:500,000
Projection: GDA2020 MGA Zone 50
Created/Reviewed By: AW/SP
Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 2.5 5 10 15 km

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PROJECT	CLIENT
Hemi Gold Project - Conceptual Mine Closure Plan	DE GREY MINING LTD
Catchments	
Figure 5-7 | ADV-AU-00673 | July 2024	

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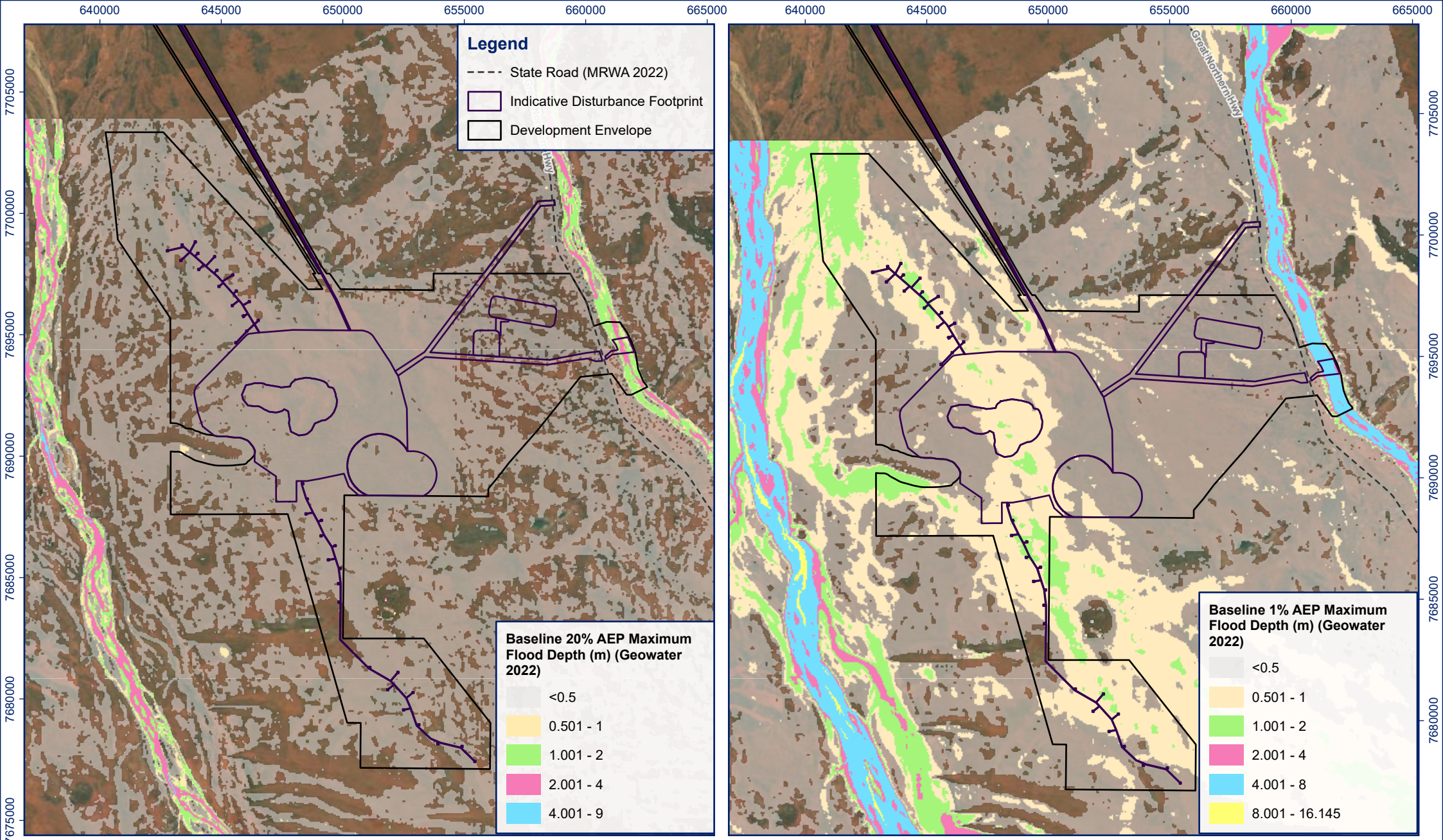

Projection: GDA2020 MGA Zone 50
Created/Reviewed By: KM/EL
Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Scale: 1:200,000

0 1.25 2.5 5 km

PROJECT		CLIENT
July 2024	Hemi Gold Project - Conceptual Mine Closure Plan	DE GREY MINING LTD
Figure 5-8		
ADV-AU-00673	Flood Assessment	

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5.7 Hydrogeology

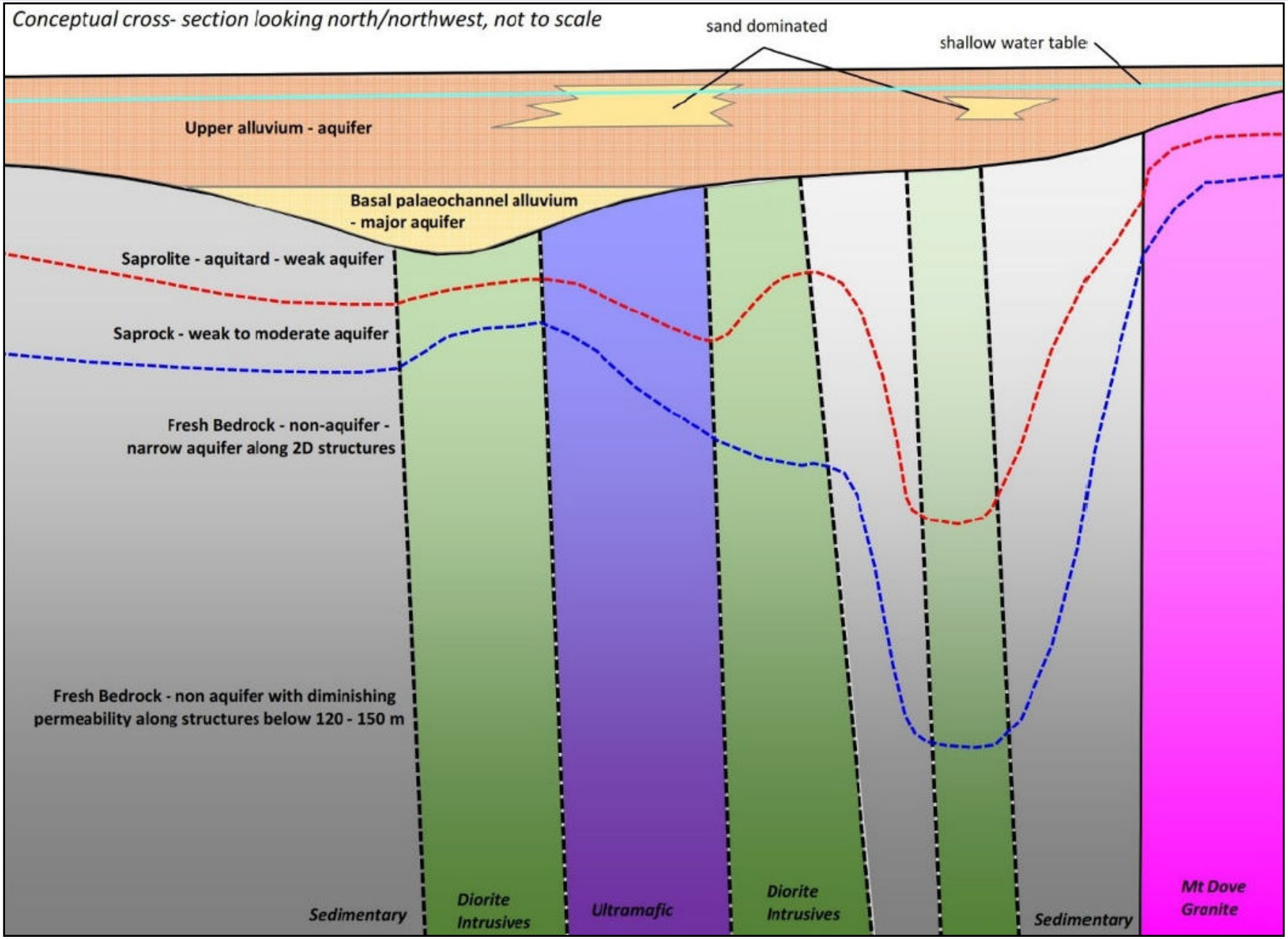
5.7.1 Conceptual Hydrogeological Model

A feasibility level hydrogeological assessment of the Proposed Action was completed by Geowater in 2023 (Appendix 4). The assessment included the development of a groundwater model across a domain of 1,520 km2, inclusive of the Yule and Turner Rivers. The following hydrogeological units have been identified within the modelled domain:

- Upper Alluvium – laterally extensive surficial aquifer system with low to moderate, but significant permeability and saturated thickness; the saturated extent includes the Yule, but not the Turner River.
- Lower Alluvium (Palaeochannel) – basal palaeochannel sands and gravels with high permeability and storage values. This Palaeochannel is generally 1 km to 2 km wide and drains northwards towards the coast. Note that in the Geowater report the terms ‘lower alluvium’ and ‘basal alluvium’ are used interchangeably when referring to this hydrogeological unit.
- Saprolite Zone – uppermost sections of weathered bedrock with limited permeability.
- Saprock Zone – lower section of weathered profile consisting of moderately to slightly weathered rock. Moderate fractured rock permeability in the igneous intrusive.

Fresh bedrock – unweathered rock with limited permeability, particularly at depth.

Depth to groundwater is typically 5 m – 10 m and hydraulic gradients and flow directions are relatively uniform. Regional groundwater flow is to the north northwest. Conceptual aquifer mapping is shown in (red and blue dotted lines illustrate the base of aquifers).



Source: Geowater 2023

PROJECT		CLIENT
July 2024	Hemi Gold Project - Conceptual Mine Closure Plan	
Figure 5-9		
ADV-AU-00673	Project Aquifer Mapping	

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5.7.2 Groundwater Quality

Groundwater quality at Hemi is generally fresh to brackish (800 – 1,100 mg/L Total Dissolved Solids), circum-neutral to alkaline (pH 7.5 – 8.5), with elevated hardness (average 270 mg/L as CaCO3). Groundwater in alluvium and saprock have similar salinities and is suitable for existing pastoral and mining purposes.

Groundwater quality along the Turner River is more variable than at Hemi. Zones of higher salinity (1,000 – 1,350 mg/L) near southern monitoring bores (4 km upstream of the proposed dewatering outfall) indicate limited recharge during flood events in bedrock dominated reaches of the river. Lower salinities further north indicate recharge zones.

Studies on the groundwater quality across Hemi conclude:

- Arsenic levels are quite variable ranging from 0.6 µg/L to 797 µg/L, where the occurrences of high concentrations occur in deep bores (drilled into basement rocks). Groundwater associated with the ore body with arsenic levels higher than 24 µg/L will be reinjected into the borefield upgradient of the open pits.
- Chromium in alluvium is higher up gradient of known ore zones than down gradient. This suggests that the gold deposit is not the contributing source of chromium.
- Groundwater near the Turner River typically has lower arsenic, chromium and uranium levels relative to groundwater in the region of the Hemi deposits.
- Uranium and vanadium levels are similar in bedrock zones and up-gradient and down-gradient alluvium suggesting that the distribution of these metals is not specifically related to the gold deposit. The presence of these metals may be due to Hemi being down-gradient of a large granodiorite dome located to the south-east.

The project water management strategy distinguishes two dewatering discharge stream types, primarily related to concentrations of arsenic and other trace metals:

- Type I contains <24 µg/L of dissolved arsenic (As).
- Type II contains >24 µg/ L of dissolved arsenic (As).

The Project has characterised Type I and Type II water streams based on analysis of over 350 water quality samples collected to date. The threshold of 24 µg/L of dissolved arsenic was defined based on the Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) guidelines, which safeguard 95% of aquatic species. Groundwater with naturally elevated concentrations of dissolved Arsenic (Type II) will be reinjected into the RBS and become available for re-abstraction after two to ten years, at which time it will be directed for use in the processing plant.

Groundwater with naturally lower concentration of dissolved Arsenic (Type I) will be suitable for discharge to the Turner River, aquifer reinjection at both Reinjection Borefield North (RBN) and Reinjection Borefield South (RBS) and for camp and potable water supplies (once treated).

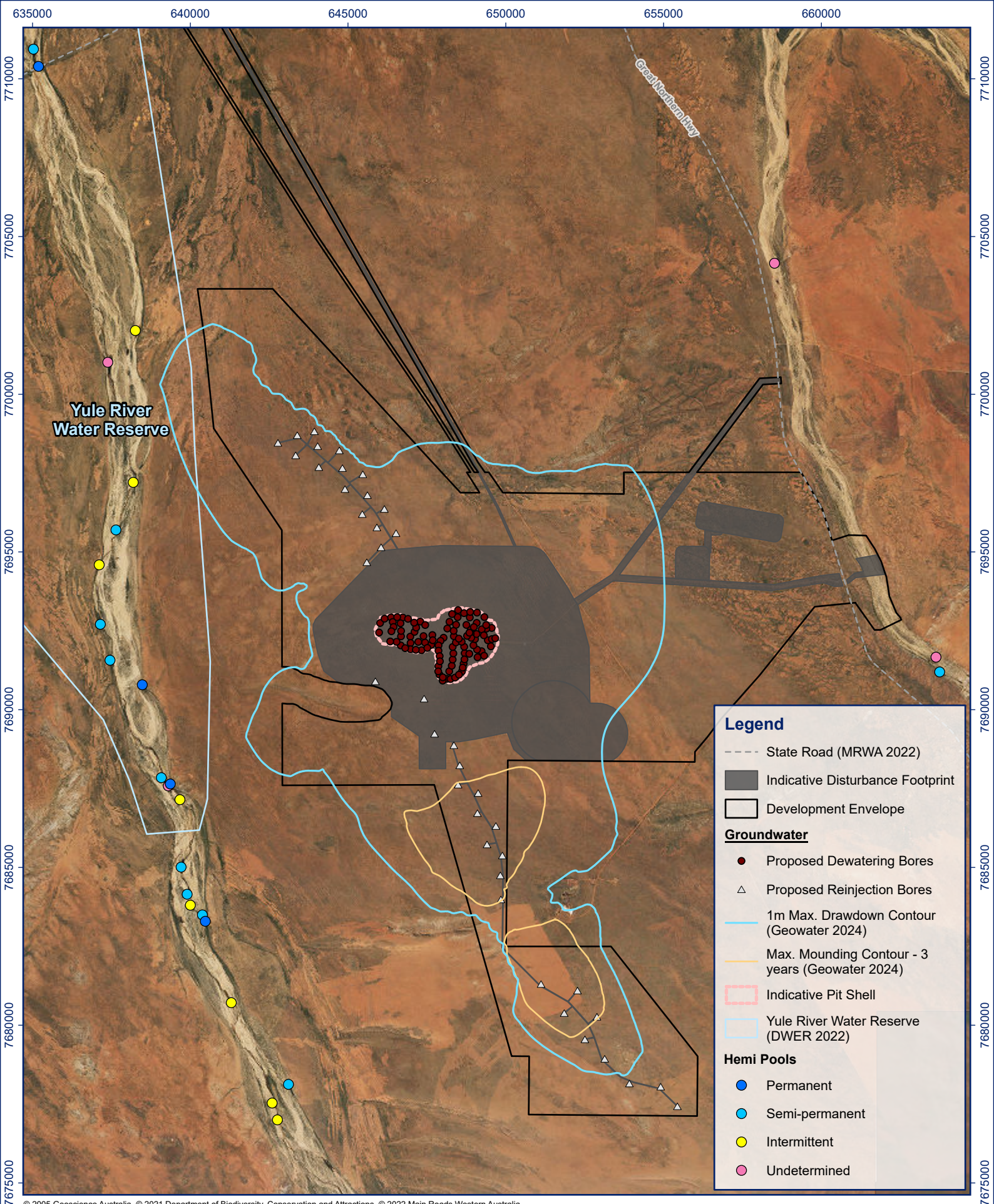
As boreholes are drilled, developed, and pump tested, water quality sampling will be conducted to determine whether the water falls under Type I or Type II classification.

5.7.3 Dewatering Drawdown

Geowater prepared a detailed numerical groundwater model to assess the potential impacts of the Proposed Action. The modelled extent of groundwater drawdown and mounding at reinjection bores are shown in Figure 6 2. It is important to note that this mounding is expected to be temporary, occurring only in the first three years of operation before the water drawdown cone reaches the mounded area. Furthermore, mitigation measures will be implemented to ensure any mounding remains at least 2 meters below the ground surface.

Drawdown and reinjection are not predicted to impact either the Yule or Turner Rivers, or the Yule River Borefield situated north of the Development Envelope on Reserve 33015. By year 15, the model shows that the 1m drawdown will be at a distance of approximately 300 m from the Yule River channel. Therefore, no impacts are expected on potential groundwater dependent vegetation (GDV) or on riverine pools.

The drawdown area is predicted to reach a small portion of the Yule River Water Reserve (YRWR), between years 9 and 15. This Public Drinking Water Source Area (PDWSA), classified as a P1 protection zone, aims to prevent any degradation to the quality of groundwater. The PDWSA prioritises the protection of the Yule River channel, which is the primary source for aquifer recharge. Therefore, the extension of the water drawdown of less than 2 m towards the YRWR is not expected to impact the quality of water at the Yule River Borefield.



Projection: GDA2020 MGA Zone 50

Scale: 1:150,000

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Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Hemi Gold Project - Conceptual Mine Closure Plan

Groundwater Drawdown and Mounding

Figure 6-2 | ADV-AU-00673 | July 2024

CLIENT

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5.7.4 Post-Closure Pit Lakes

With the cessation of dewatering at closure, groundwater flow into pit voids together with rainfall and surface water run-off, will accumulate to form pit lakes. Groundwater flow will occur due to the natural flow path becoming re-established and due to the presence of a hydraulic gradient associated with the groundwater drawdown depression created by the dewatering.

Preliminary post closure hydrogeological modelling indicates that due to low groundwater flow rates and high evaporation rates, the hydraulic gradient will remain post closure. Thus, the pit lakes will act as a groundwater sink, continually drawing in groundwater as it evaporates from lake surfaces. This continual cycle of recharge and evaporation can lead to increased salinisation of the pit lakes; chemical modelling is currently underway to determine the potential steady-state water quality.

Detailed hydrogeological and geochemical studies are ongoing to scientifically characterise the pit lakes and any risks they may pose. Preliminary modelling indicates that the post closure groundwater drawdown depression will not adversely affect the Yule River or its permanent groundwater fed pools.

The data available considerably influences the accuracy of hydrogeological modelling, with the intended use of the modelled results matched to the appropriate calibration standards set out in the Australian Modelling Guidelines (Barnett B et al., 2012). While De Grey's model is appropriately calibrated, once dewatering and monitoring commence, the model's performance can be further enhanced, through ongoing recalibration-based on monitoring data.

DEMIRS will be updated on the ongoing collection of data and the current status of pit lake modelling as part of future revisions of the Mine Closure Plan. Kinetic leach column testing that is currently underway will be used to assign source terms to the pit walls as part of ongoing refinement of the pit lake water quality modelling.

5.8 Aquatic Ecology

A dual-phase baseline aquatic ecology survey was undertaken in the Yule and Turner Rivers by Stantec Limited (Stantec, 2022) in November 2021 (dry season) and May 2022 (wet season). Unless otherwise referenced the text in this section is drawn from this report. Detailed monitoring results can be found in Stantec report (2022).

The 2022 Pilbara wet season was unusually dry, with typical wet season conditions not eventuating until later in the year. Stantec subsequently undertook an additional opportunistic survey in July 2022 to characterise the Yule and Turner Rivers after rainfall.

The ecological characteristics of the Yule and Turner Rivers are described in Table 5-9. Pools on the Turner and Yule Rivers were characterised by:

- Nutrient enrichment from livestock.
- Increase in salinity due to evaporation.
- Natural mineralisation of surface waters (Al, As, B, Cu, Zn and U).

- Natural mineralisation of sediments (Cr and Ni).

Pools on the Turner River are seasonal and semi-permanent and considered to be of low to moderate ecological value. Several pools were in a recessional phase or dry during the wet season survey. By comparison, pools on the Yule River were larger, more permanent, groundwater fed and considered to be of moderate to high ecological value.

The Turner River, like many Pilbara river systems comprise a range of aquatic habitats from permanent and semi-permanent pools to reaches that are subject to extended dry periods and flow only after substantial rainfall events generally associated with tropical low weather systems.

The following aquatic fauna were recorded in the Turner River:

- Six aquatic macrophytes.
- 58 phytoplankton.
- 42 diatoms.
- 116 aquatic invertebrates.
- 10 fish.

The following terrestrial vertebrates were identified in the Turner River. Impacts to these are considered in the Terrestrial Fauna Section 5.9.

- Seven waterbirds.
- One amphibian.
- One mammal.

None of the aquatic species recorded in the Yule and Turner Rivers were listed as threatened under the EPBC Act or BC Act or listed as Priority species. One species listed as Vulnerable and one as Near Threatened on the International Union for the Conservation of Nature (IUCN) Red List was recorded in the Turner River; three species were considered endemic to the Pilbara. Further details on these species are provided in Table 5-9.

Table 5-9 Summary of Ecological Values of the Yule and Turner Rivers

Aspect	Turner	Yule
Hydrology/ Habitat	• Semi-permanent pools influenced by rainfall, contracting or drying during low rainfall conditions (except for one (TR1) located upstream of the outfall, which retains water due to underlying bedrock). • Limited instream habitat in smaller pools characterised by sandy substrate, absence of submerged macrophytes and turbid water.	• Larger permanent, groundwater fed pools (except two (YRU1 and YRU2) that are semi-permanent). • Dominantly on substrate with minimal seasonal variation in pool size and depth between wet and dry season. • Complex instream habitats (macrophytes, undercut banks, woody debris, detritus, and overhanging trees), characterised by silt-clay substrate, dense macrophytes and increased water clarity.

Aspect	Turner	Yule
Water Quality	• Moderately to strongly alkaline pH. • Freshwater (<5,000µS/cm) except for two locations with >5,000µs/cm (TR1 – upstream of outfall and TRD2 – downstream of outfall). • Elevated nutrients (TN & TP) due to unrestricted livestock access. • Generally low metals except for some minor exceedances of ANZG (2018) Guideline Values for Al, As, B, Cu, Zn, and U across sites. • Similar water quality results across seasons, due to low rainfall conditions.	• Circumneutral to strongly alkaline pH. • Freshwater (<5,000µS/cm) except for one location (YRU1) (>8,000µs/cm). • Elevated nutrients (TN & TP) due to unrestricted livestock access. • Generally low metals except for some minor exceedances of ANZG (2018) Guideline Values for B, Cu, Zn, and U across sites. • Similar water quality across seasons, due to low rainfall conditions.
Sediment Quality	• Circumneutral to strongly alkaline pH. • Generally low salinity, low nutrients and low metals. • Ni slightly above ANZG (2018) Guideline Values for one location (TR1-A).	• Circumneutral to strongly alkaline pH. • Generally low salinity, nutrients and metals levels. • Cr slightly above ANZG (2018) Guideline Values for one location (YR3). • Ni above ANZG (2018) Guideline Values for several sites and above the high guideline value for one location (YR3).
Primary Producers	• Six macrophytes. • 58 phytoplankton. • 42 diatoms. • All have a Pilbara wide, or more diverse distribution. • Limited primary productivity in receding pools.	• Nine macrophytes. • 55 phytoplankton. • 45 diatoms. • All have a Pilbara wide, or more diverse distribution. • Primary productivity generally higher and more diverse than Turner River.
2nd and 3rd order consumers	• 116 aquatic invertebrates. • 10 fish (five new records for the river). • Seven waterbirds. • One frog. • One mammal. • Most species with a common and widespread distribution across the Pilbara and Northern Australia.	• 159 aquatic invertebrates. • 12 fish species (three new records for the river). • Nine waterbirds. • One reptile. • Most species with a common and widespread distribution across the Pilbara and Northern Australia.
EPBC Act and BC Act Listed Taxa	• *Dasyurus hallucatus* (Northern Quoll).	• None recorded.
IUCN-Listed taxa	• *Eurysticta coolawanyah* (damselfly) – Vulnerable.	• *Eurysticta coolawanyah* (damselfly) – Vulnerable. • *Hemicordulia koomina* (dragonfly) – Vulnerable. • *Anguilla bicolor* (Indonesian short-finned eel) – Near Threatened.
Pilbara endemic species	• *Sternopriscus pilbaraensis.* • *Tiporus tambreyi.* • *Laccobius billi.*	• *Tiporus tambreyi.* • *Laccobius billi.* • *Anisops nabillus.* • *Ictinogomphus dobsoni.*
Ecological Value	• Low to Moderate. **Justification:** smaller, more ephemeral pools with less habitat complexity.	• Moderate to High. **Justification:** larger, more permanent pools with complex structural habitats.

5.9 Terrestrial Fauna

5.9.1 Vertebrate Fauna

Western Wildlife completed a detailed vertebrate fauna survey over two seasons in September 2021 and March 2022, with additional targeted surveys in August 2022. The survey area encompasses the Project's Development Envelope and extends to the Yule and Turner Rivers, covering 34,688 ha. Unless otherwise referenced the text in this section of the document is drawn from Western Wildlife's survey report, with detailed monitoring results available in the report.

Aquatic ecology surveys undertaken by Stantec also identified terrestrial vertebrate species along the Yule and Turner Rivers and confirmed the presence of the Northern Quoll along the Turner River (Stantec, 2022).

Six fauna habitats were identified and mapped within the survey area. None of the identified habitats supports a particularly unique faunal assemblage and although relatively diverse, the fauna present are typical of the Pilbara Bioregion. Two of the habitats present – Rocky Outcrop and Sand Dune (which have been excluded from the Development Envelope) – are limited in extent in the study area and the bioregion.

The faunal assemblage in the survey area comprises predictions drawn from a literature review and Western Wildlife's survey recordings, and is as follows:

- 10 frog species predicted, six recorded.
- 115 reptile species predicted, 56 recorded.
- 165 bird species predicted, 83 recorded.
- 36 native mammal species predicted, 22 recorded.
- Eight introduced mammal species predicted, six recorded.

Thirty-one conservation significant species were predicted to potentially occur in the study area, consisting of:

- Seven Threatened Species (listed under the EPBC Act and BC Act).
- 14 Migratory Species (listed under the EPBC Act and BC Act).
- One Specially Protected Species (listed under the BC Act).
- Eight Priority Species (listed by DBCA).
- One Locally Significant Species (identified by Western Wildlife).

5.9.2 Short Range Endemic Fauna

Bennelongia undertook a desktop assessment of SRE fauna followed by field surveys in November 2021 and April 2022.

Five SRE habitats were identified, however, most of the Project area does not contain suitable SRE habitat. The Project area is unlikely to host SRE species and no impacts are anticipated.

5.10 Subterranean Fauna

Subterranean fauna surveys for the Project were undertaken by Bennelongia and consisted of desktop assessment followed by field studies.

Desktop assessment identified that the shallow alluvial aquifer in the Project area is considered high prospective habitat for stygofauna and subsequently a level 2 survey was completed. The shallow water table is less prospective for troglofauna although there is some habitat in the vicinity of the proposed pits and a level 1 survey was undertaken. Surveys consisted of three rounds of sampling for stygofauna and one round of sampling for troglofauna.

A single troglofauna species was collected. This low number was attributed to the lack of suitable habitat at the Project due to the shallow water table. Significant impacts to troglofauna and troglofauna habitat as a result of mining above the water table and groundwater reinjection are not anticipated.

Sampling for stygofauna focused on the stygofauna impact area, which is the zone where dewatering drawdown is expected to be 2m or more as well as on suitable reference sites. The impact area has a diameter of about 15 km.

A total of 3,360 stygofauna specimens were collected representing at least 45 species. Of these, 27 were collected from the impact area. Of these:

- Sixteen are widespread.
- Six are known to occur beyond the impact area.
- Five were only found within the impact area, however, are expected to be widespread.
    - *Parastenocaris* `BHA392`: DNA analysis shows the species is 24.5% divergent to species recorded outside the impact area. Most species of *Parastenocaris* appear to have small ranges.
    - *Brevisomabathynella* `BSY226: a single specimen was recorded. Relatively uniform surface geology suggests it may extend beyond the impact area.
    - Microcerberidae `BIS464`: Single specimen recorded within groundwater drawdown area.
    - Microcerberidae `BIS544': known from 19 specimens from six records at four locations. Species appears to have a small range.
    - Paramelitidae `BAM210`: recorded from two locations approximately 7 km apart. Unlikely to have a very small distribution.

No Threatened or Priority species were identified, and no stygofauna were associated with a TEC or PEC.

5.11 Flora and Vegetation

Detailed flora and vegetation surveys were undertaken for the Project in March 2021 and March to July 2022.

The following were identified in flora surveys:

- 17 native vegetation types.

- Six Priority 3 species.
- One Priority Ecology Community (PEC) Priority 3 – Gregory Land System (excluded from the Development Envelope).
- One potentially undescribed species (*Polymeria* sp. Nov).
- Ten introduced flora species.

No species or ecological communities listed as Threatened under the EPBC Act or BC Act were recorded during the flora surveys.

Vegetation types with small extents in the flora survey area are unlikely to be regionally restricted and apart from the Gregory Land System PEC (excluded from the Development Envelope). All sampled vegetation is likely to occur over relatively large areas in the region (Umwelt, 2023).

The Project is on an active pastoral lease. Although cattle are known to impact native vegetation, the vegetation at the Project is mostly undisturbed and in excellent or very good condition. The exception being areas which have been disturbed by exploration activities and infrastructure corridors, as well as by cattle grazing and trampling.

5.12 Air Quality

There has been no specific modelling done for the closure phase of the project. Air quality is mainly a concern during the operation phase when the maximum use of plant and equipment will occur. The finding from the operational phase modelling showed that dust deposition criteria are not exceeded for any sensitive receptor and aesthetic and environmental impacts from dust deposition are not anticipated.

Modelled PM_{10} and $PM_{2.5}$ levels exceed guideline values at the Project's accommodation village and Mt Dove camp at certain times of year under certain conditions. It was determined that use of standard dust suppression techniques as well as air quality monitoring will ensure that air quality is maintained, and emissions are minimised. This dust management approach will continue through mine closure phase.

Table 5-10 Receptors of Interest

Receptor	Criteria	Impact Assessed			
		PM_{10}	$PM_{2.5}$	TSP	Dust Deposition
Mount Dove Camp	Human Health| Amenity| Nuisance	✓	✓	✓	✓
Accommodation Village		✓	✓	✓	✓
Jelliabidina Pool	Amenity| Nuisance	×	×	✓	✓
Mardagubbidina Pool		×	×	✓	✓
Mt Dove, Portree		×	×	✓	✓
Mt Dove, Upper Yule		×	×	✓	✓

5.12.1 Background Air Quality

Background air quality levels for the Project were modelled using assumed natural background concentrations of air quality in the Pilbara:

- PM_{10}: 18 µg/m^3 (24-hour average) derived from the BHP Pilbara Strategic Proposal (BHP, 2016).
- $PM_{2.5}$: 3 µg/m^3 (24-hour average; taken as 15% of the PM_{10} background).

5.12.2 Post Closure Air Quality

Upon completion of rehabilitation of the Project area to meet closure objectives and post mining land use (Section 6) De Grey is confident that dust generation will return to pre-mining levels consistent with the post mining land use of an active pastoral lease and existing land uses include pastoralism, mineral exploration and traditional land uses.

5.13 Heritage

Native Title members of Kariyarra unanimously voted in favour of the Native Title Mining agreement on 28 November 2022 and execution took place on 16 December 2022. The agreement, in part, comprises a Cultural Heritage Management Plan (CHMP) that addresses many of the issues identified in stakeholder negotiations, together with matters concerning social surroundings, amenity, environmental values, and access. The implementation of this CHMP will provide a comprehensive framework for the management of issues of concern to the Kariyarra People and will sit alongside the *Aboriginal Cultural Heritage Act 2021* and/or the *Aboriginal Heritage Act 1972* processes. Future versions of this Mine Closure Plan will align with the CHMP.

6. POST MINING LAND USE AND CLOSURE OBJECTIVES

6.1 Post Mining Land Use

The Project is on an active pastoral lease and existing land uses include pastoralism, mineral exploration and traditional land uses. As part of ongoing stakeholder engagement discussed in Section 4, De Grey will work with stakeholders to determine the most appropriate post-mining land uses.

The Project is on a flat, sandy, floodplain with no significant landforms. A single sand dune, forming part of the Gregory Land System PEC has been entirely excluded from the approval area.

De Grey will build permanent waste landforms and a tailings facility which will be a permanent change to the landscape. These waste landforms and tailings facility have been designed to have a similar height and shape as the existing landforms within the broader regional landscape. De Grey will utilise suitable seed mixes where necessary to promote vegetation establishment to align with the acceptable post mining land uses as land becomes available for progressive rehabilitation.

The waste landforms and tailings facility will be profiled to the agreed slope, ripped on the contour to blend into the existing landscape, and suitable native seed mix applied as required to limit the change to the area's social surroundings.

For features other than its landforms, De Grey will re-profile, rip on the contour and apply seed as necessary to rehabilitate the Project to a state suitable for existing pastoral, traditional or other land uses that may be identified by stakeholders during the mine closure planning consultation process.

6.2 Closure Objectives

To achieve the final land use, and in line with the ANZMEC/MCA 2000 framework for mine closure, the primary objectives for closure of the Project should be to leave the site:

- Safe for future land uses with access to hazardous areas restricted.
- Stable, with post-mining landforms resistant to failure and erosion, and downstream sediment depositing minimised or contained.
- Non-polluting, with adverse drainage from post-mining landforms prevented or contained.
- Revegetated, to the extent practicable.

These broad closure objectives have been considered in the design and operation of the proposed mining activities and are listed in Table 6-1.

Table 6-1 Summary of Hemi Gold Project Closure Objectives

Closure Area	Objectives
Safety	• Ensure access to pits is restricted. • Ensure contaminated materials are managed in such a manner that no impacts to human health will occur.
Physical stability	• Ensure long-term stability of final landforms. • Ensure long-term stability and functionality of drainage structures. • Attain stable landforms with conditions suitable for the natural establishment of a self-sustaining vegetation community.
Chemical stability	• Ensure that the long-term water quality of local and regional surface water and groundwater resources is not compromised. • Ensure soils are free of contamination. • Ensure no pollution will migrate into the surrounding environment upon closure (e.g., acidic/alkaline/saline seepage).
Ecological function	• To re-establish self-sustaining ecological communities on disturbed areas.
Heritage Values	• Ensure that culturally significant heritage sites are not permanently impacted.
Visual amenity	• Final landforms integrate with the natural surroundings as far as practical.
Final land use	• Rehabilitate disturbed areas to a state that enables sustainable post mining land use. • Any known mineral resources and other mineralised zones with potential value to future generations is, where practically possible, preserved for potential future exploitation. • Retain transport facilities considered of value to stakeholders, where practical.
Regulatory compliance	• Compliance with mine closure permitting and regulatory requirements. • Agreed closure indicators and criteria developed to the satisfaction of the relevant authority.

7. CLOSURE RISK ASSESSMENT AND CONSIDERATIONS

7.1 Risk Assessment

A preliminary project risk assessment has been completed as part of project-wide planning processes; however, a dedicated Closure Risk Assessment is yet to be completed due to ongoing studies and development of site-specific Completion Criteria. A detailed Closure Risk Assessment will be included in the version of the Mine Closure Plan that accompanies the Project's Mining Proposal to DEMIRS for approval under the Mining Act (WA). Potential closure related issues identified through studies completed to date and experience on other similar projects are detailed in Table 7-1.

Table 7-1 Potential Project Impacts Relevant to Closure and Post Closure

Aspects	Potential Impact	Mitigation Measures
Safety	Development of permanent pit voids with potential for death or injury from uncontrolled public access post closure.	• Construct abandonment bunds around pits and install signage to prevent inadvertent access.
Safety	Human health impacts due to exposure to fibrous minerals.	• Material containing fibrous minerals and/or transported material will not be placed on outer surface of constructed landforms.
Soils	Erosion of soil from cleared areas resulting in habitat loss.	• Undertake rehabilitation progressively where feasible. • Limiting clearing to the minimum required. • Using previously disturbed areas to the extent possible. • Implementation of an internal permitting system for clearing.
Soils	Erosion due to inadequate surface water management causing increased sediment loads to local waterways.	• The mining area avoids creeks or drainage. • Diversions designed to return surface water to natural flows paths where possible. • Install suitable sediment controls within disturbed catchment. • Progressively rehabilitate disturbed areas where feasible. • Landforms to be rock armoured at the base to prevent erosion.
Soils	Loss of soil biota due to inappropriate stockpiling of harvested topsoil negatively impacting rehabilitation outcomes.	• Topsoil stockpiles to be no more than 2 m high. • Topsoil register will be maintained. • Progressive rehabilitation where practicable to minimise stockpiling time.
Soils	Insufficient topsoil for rehabilitation at closure.	• Topsoil will be stripped from cleared areas prior to earthworks. • Topsoil will not be used for purposes other than rehabilitation. • Topsoil stockpiles will be within the Project's flood diversion bund, thus protect from scouring during flood events. • Topsoil register will be maintained.
Soils	Physical dispersion of waste material into environment.	• Competent material will be placed on outer surfaces of constructed landforms. • Toe drains to be constructed at the base of constructed landforms where necessary will intercept any sediments. • Transported material with lower stability will not be placed on outer surface of constructed landforms, unless mixed with a suitable competent material. • At closure, topsoil will be respread on constructed landforms which will be revegetated. • The final batter slope of any constructed landform and suitable berm intervals will be considered in each review of the MCP.

Aspects	Potential Impact	Mitigation Measures
Soils	AMD, NMD or Saline mine drainage impacting soils.	• Any potentially problematic tailings will not be stored on the outer surfaces of constructed landforms; and will be appropriately encapsulated. • Toe drains to be constructed at the base of constructed landforms will capture run-off to ensure any effects are localised. • Groundwater flow is anticipated to be towards the pits during operations and closure ensuring that any seepage will remain at the Project. • TSF will be capped with a store and release cover to minimise the seepage of rainfall into the tailings.
Soils/Surface Water/Groundwater	Residual land contamination due to: • Oil/diesel spills. • Tailings/return water pipeline breaches. • Chemical spills.	• Containment measures included in the design of relevant infrastructure. • Clean water will be diverted around operational areas. • Any spills will be promptly cleaned. • Project to be implemented in accordance with an environmental licence. • De Grey will comply with Dangerous Goods Licencing requirements. • Chemicals and hydrocarbons to be stored in accordance with Australian Standards and Dangerous Goods Legislation. • Contaminated land assessments will be completed where necessary as part of decommissioning processes.
Soils/Surface Water/Groundwater	Residual contamination at processing plant and TSF at closure.	• Processing plant to be decommissioned and removed from the Project as part of closure activities. • Tailings within TSF are contained at closure to prevent residual contamination of surrounding soils and water. • Project to be closed in accordance with approved MCP. • Contaminated sites assessment to be completed prior to relinquishment of tenement.
Soils/Surface Water/Groundwater	Loss of tailings containment following closure.	• TSF designed to ANCOLD standards by certified engineer. • TSF design accounts for limited availability of high stability rock, which will be prioritised for TSF placement. • Certified engineer to provide construction report after each embankment lift. • TSF to be operated in accordance with operating strategy to be developed by certified tailings engineer. • TSF to be capped with competent material at closure. • Regular site inspections by certified tailings engineer as part of post-closure monitoring.
Surface Water	Impacts to local waterways due to alteration of drainage lines/increased sediment loads.	• Mining activities avoids creeks and drainage lines. • Diversions designed to return surface water to natural flows where possible. • Landforms to be rock armoured at the base to prevent erosion where modelling indicates erosion risk.

Aspects	Potential Impact	Mitigation Measures
Surface Water	Contamination of surface water from water seepage from WRLs and low-grade stockpiles at the cessation of mining.	• Placement of PAF material within the interior of the WRL to ensure it is not exposed on final surfaces. • Design WRLs to ensure they are safe, stable and non-polluting. • Rehabilitate low grade stockpiles remaining at closure in line with WRL specifications.
Groundwater	Contamination of groundwater due to seepage from TSF.	• Compacted foundation and compacted clay liner around decant reduce permeability and minimise seepage. • Cut-off trench to prevent any seepage at base of tailings from flowing out under embankments. • Operation of underdrainage system to collect seepage from base of tailings. • Recovery of decant water for reuse in the processing plant. • Piezometers for environmental monitoring of water levels and quality. • Operation in accordance with Environmental Licence. • Operation in accordance with Operating Strategy under Mining Act.
Groundwater	Post-closure pit lakes with deteriorating water quality over time.	• Further pit lake modelling to be completed during operational phases of the project. • Ongoing water quality monitoring.
Groundwater	Post-closure pit lakes creating groundwater sinks through recharge and evaporation, causing extending drawdown of groundwater table beneath the Yule River impacting ecological and heritage receptors.	• Undertake additional hydrogeological modelling/modelling to more accurately determine potential impacts. • Where necessary, De Grey will consider options to implement additional measures to minimise groundwater recharge to pits.
Groundwater	Contamination of groundwater due to seepage from landfill following closure.	• Any landfill to be operated in accordance with Environmental Licence. • No waste will be disposed of below the pre mining water table. • A waste management system will be implemented to ensure that no unauthorised wastes are disposed of. • Waste will be progressively covered. • Once cells are completed, cells backfilled with appropriate cover material. • Inspections of landfill sites will be included as part of post-closure monitoring.
Flora	Loss of conservation significant flora resulting from clearing.	• Stripping and stockpiling of topsoil for subsequent rehabilitation to preserve seed bank. • Undertake progressive rehabilitation where feasible.
Flora	Spread of weeds out competing native species.	• Implementation of standard weed monitoring and management controls for all project phases. • Including weed monitoring and control as part of post-closure monitoring and maintenance requirements.
Fauna	Habitat loss and fragmentation impacting fauna populations	• Stripping and stockpiling of topsoil for subsequent rehabilitation to preserve seed bank. • Undertake progressive rehabilitation where feasible.

Aspects	Potential Impact	Mitigation Measures
Fauna	Mortality or injury from vehicle interaction during closure, and during post-closure monitoring.	• Speed limits will be assigned and enforced. • Driving at night will be limited to the extent possible. • Speeding and off-road incidents will be reported. • Personnel will be educated on conservation significant fauna.
Fauna	Collision with fences.	Project is on an active pastoral lease where cattle fencing is used. De Grey will manage the potential impacts of fencing by: • At closure, remove fencing not required for ongoing safety reasons. • Not using barbed wire fencing where practicable. • If barbed wire fencing is required, the top strands will be plain wire and/ or10 cm disc bat reflectors to be used. • Regular inspections of fenced areas. • Reporting of all fauna related incidents.
Fauna	Fauna/stock becoming trapped and drowning in water ponds, pit lakes.	• Decommission water infrastructure at the cessation of mining. • Construction of abandonment bunds around pit voids to limit access.
Fauna	Evapo-concentration of metals and metalloids in mine voids causing sickness or death of fauna that drink or are exposed to pit lake water.	• Construction of abandonment bunds around pit voids to limit access. • Pits are expected to become saline as they approach steady-state conditions. This will limit exposure and ingestion by fauna.
Fauna	Clearing of surface vegetation leading to sedimentation impacting subterranean fauna.	• Surface water management measures including stormwater drains and sedimentation ponds. • Progressive rehabilitation where feasible.
Fauna	Leaching of nutrients and wastewater from landfill impacting subterranean fauna.	• No disposal of waste below the pre mining water table. • Landfill waste to be regularly covered with clean fill. • Only authorised wastes to be disposed of in site landfill. • Once cells are completed, cells backfilled with appropriate cover material. • Landfill operated in accordance with Environmental Licence.
Visual Amenity	Visual impact of WRLs and TSF on surrounding landscape.	• Design of landforms to conform with existing landscape taking into consideration height and slope angles. • Revegetation of landforms at closure. • Topographical survey of constructed landforms. • Construction report to be provided to DWER and DEMIRS prior to commissioning of TSF and after each lift.

Aspects	Potential Impact	Mitigation Measures
Air Quality	Dust generated from undertaking closure activities impacts.	• Modelling predicts that dust deposition criteria are not exceeded for any sensitive receptor and aesthetic and environmental impacts from dust deposition are not anticipated. • Implement a dust monitoring program to verify accuracy of modelling. Should unacceptable dust impacts be identified, or complaints from stakeholders received, increased dust control measures shall be implemented, or activities to be delayed to align with more favourable climatic conditions (eg wind speed/direction)..
Regulatory compliance	• Compliance with mine closure permitting and regulatory requirements. • Agreed closure indicators and criteria met and to the satisfaction of the relevant authority.	• Regular audits and inspections to assess performance against regulatory requirements and closure indicators and criteria during operational and closure phases to identify and rectify any compliance issues.

7.2 Considerations for Closure

7.2.1 Soil Management and Handling

The following topsoil management and handling measures have been recommended (Mine Earth, 2022b) which can optimise soil resource salvaging and the success of future rehabilitation for the project:

- The upper 0.2 m (topsoil) of the soil profiles within all of the proposed disturbance areas is stripped (where possible) and stockpiled for use as a surface rehabilitation medium.
- Any surface litter present within the soil profiles should be collected and stockpiled with the topsoil.
- Machinery operators should minimise the frequency and intensity of topsoil disturbance, to minimise degradation to the structural integrity of the material.
- Soil stripping should occur as close as possible to the time when the proposed disturbance is scheduled to commence.
- Where possible, stripped topsoil should be paddock-dumped into piles no greater than two metres in height. The piles should have adequate distance between them to create a series of mounds and troughs to capture surface water and organic matter.
- Disturbance to stockpiles should be minimised to prevent erosion and degradation of soil structure. Care should be taken to minimise the handling of the soils where possible.
- Topsoil should not be stripped or handled when wet.
- As a general rule, topsoil rehabilitation materials should not be placed at depths greater than 0.2 m on rehabilitated areas. This is particularly the case for sloped areas of rehabilitation.
- Where topsoil is placed on the batters of constructed waste rock landforms, it should be incorporated into underlying competent waste rock via contour ripping, to armour the surface and mitigate erosion as far as practicable.

7.2.2 Waste Rock Landforms

Mine waste will be deposited into external WRLs, as well as be utilised to construct an integrated waste landform for tailings disposal. The WRLs will be located outside of zone of instability of the open pits, but as close as possible to minimise haulage distances.

Waste characterisation studies for the project (further detailed in Section 7.2.3) show that most of the waste at Hemi does not pose a risk of acid mine drainage and only a small proportion (<5%) of samples were potentially acid forming. Some non-acid forming samples had a significant sulphide content and may pose a neutral or saline mine drainage risk.

Kinetic leach studies are currently being undertaken to further characterise the environmental risk of mine waste. Waste lithologies with saline, neutral or acidic mine drainage risk will be placed away from the edges of mine waste landforms to limit exposure to the oxygen and water required for acid mine drainage reactions to proceed. Measures to manage mine waste will be detailed in the Mining Proposal and future versions of the MCP required for the Hemi Project under the Mining Act and be assessed by DEMIRS.

7.2.3 Waste Characterisation

Waste rock and tailings characterisation studies were undertaken by SRK to assess the risk of acid and metalliferous drainage (AMD); neutral metalliferous drainage (NMD); and saline mine drainage. The presence of any saline, erosive, fibrous and/or radioactive materials in waste, tailings and ore, together with forward work requirements were also assessed.

SRK undertook static deionised leach tests at a 1:3 ratio with a 24-hour contact time. The results indicate the leachates that may be released from pore water and percolate to the base of the waste rock landforms, TSF, and low-grade stockpiles regardless of whether wastes are acid forming. While the results provide an indication of the leachates that might be generated, in practice, actual dilution with rainfall will vary considerably and additional dilution will should leachate percolate into groundwater.

Most mine waste leachate solutions had low salinity (EC < 600 µS/cm) and circum-neutral to alkaline pH. Leachable trace elements, above the limit of reporting, included Al, As, B, Ba, Fe, Ga, Li, Mn, Mo, Ni, Sb, Sr, Ru, Ti, U, V, W, and Zn.

Tailings leachate was alkaline (pH 8) and moderately saline (2,400 µS/cm) with sulphate and calcium, the dominant major ions. Tailings supernatant was alkaline (pH 9.4) and moderately saline (3,700 µS/cm) with detectable cyanide species and elevated concentrations of silver, arsenic, cadmium, cobalt, copper, nickel and zinc. Leachate analysis on final tailings indicates that cyanide and some of these metals remain elevated.

WRLs and the TSF have been constructed inside the modelled dewatering drawdown for the Project. During operations, groundwater under these structures will be drawn towards the pits, abstracted, and reused as process water. At the cessation of dewatering, groundwater will continue to flow towards the pits for several years as they approach their steady-state water levels and any leachates that enter the groundwater are likely to remain at the Project.

Kinetic leach column tests on 14 waste rock samples are currently well advanced with 12 monthly leachate solutions completed on five samples and 10 monthly leachate solutions completed on nine samples. The objectives of the kinetic testing are to measure: the rate of sulfide oxidation; the concurrent rate of acid neutralisation; and solute release rates. To date, the results indicate that leachates are circum-neutral, and concentrations of trace metals are typically low or below detection limits.

Final results of waste characterisation study's will be used to support the Project's MP and future iterations of the MCP.

7.2.4 Post-Closure Pit Lakes

As detailed in Section 5.7.4, pit lakes are expected to form in some of the pits with the potential to become groundwater sinks due to evaporation rates resulting in post-closure extended drawdown. This continual cycle of recharge and evaporation can lead to increased salinisation of the pit lakes and chemical modelling is currently underway to determine the potential steady-state water quality. Final results of the study will be used to support the Project's MP and future iterations of the MCP.

7.3 Closure Knowledge Gaps

At the current stage of Project proposal, there are a number of knowledge gaps identified. Ongoing assessment of the Project will continue throughout the life of mine and knowledge gaps and work programs will be updated with future iterations of the CP. Initial knowledge gaps in environmental data associated with aspects of planning for the closure of the Project are detailed in Table 7-2.

Table 7-2 Knowledge Gaps

Item	Description of Knowledge Gap	Proposed Study/Further Work
Leachate Composition	Only static deionised leach tests of waste rock and ore samples have been completed to date. They indicate leachates that may be released from pore water and percolate to the base of the waste rock landforms, TSF, and low-grade stockpiles regardless of whether wastes are acid forming.	Kinetic testing of waste rock and ore samples to determine likely leachate composition to further delineate the risk to environmental receptors.
WRL construction, materials placement and tailings management	Waste rock characterisations completed to date has identified that there is potential for waste rock material to generate AMD, saline mine drainage or NMD, or contain fibrous materials.	• Development of a waste management strategy, and WRL designs to ensure that materials that are likely to generate AMD and NMD, and materials that may contain fibrous minerals are managed appropriately. • Assessment to Neutral and Saline Mine drainage risks and identification of potentially problematic wastes. • Development of WRL construction sequence to ensure that PAF, AMD and NMD materials are appropriately encapsulated. • Further characterisation and development of systems and procedures specific to the mine plan to ensure that risks associated with waste rock material chemical characteristics are appropriately planned for and managed,
TSF Cover Design	While the need for a store and release cover for the final TSF landform to reduce infiltration of water into the tailings profile has been identified, a final design has not yet been established.	Development of a conceptual cover design for the TSF.
TSF Construction	Limited ‘fresh’ rock with a high erosion stability classification will be available for the construction of landforms, it is therefore recommended that it is prioritised for placement on final landform slopes where possible. When adequate volumes of suitable material will be available within the mine schedule is a current knowledge gap.	Construction of the TSF embankment will be integrated with the ongoing mine planning, to ensure that adequate volumes of construction materials are available and scheduled.
Landforms	Conceptual landform designs	The final batter slope of any constructed landform and suitable berm intervals will be considered in each review of the MCP.

Item	Description of Knowledge Gap	Proposed Study/Further Work
Pit Lakes	Pit lakes are expected to form in Diucon-Eagle (DE) and Brolga-Crow-Aquila-Falcon (BCAF) pits at closure, and preliminary closure modelling indicates the potential for the pit lakes to become permanent groundwater sinks due to evaporation rates exceeding recharge rates. Knowledge gaps exist regarding the accuracy of model predictions.	Further investigations and monitoring over the LOM and required to enable the development of a final closure design that ensures the pit lakes are safe, stable and non-polluting. These include: • Expanding and continuing baseline groundwater monitoring. • Expanding and continuing baseline surface water monitoring. • Use of the above data to refine recharge domains and rates in the groundwater model. • Desktop level assessment to identify mitigation options for closure and undertake cost-benefit ranking of options. • Undertaking an iterative process of revision of groundwater model calibration to re-run Operations and Closure models inclusive of mitigation options to decide closure phase water impact mitigations measures.
Soils	Rehabilitation performance	Rehabilitation trials will be instigated after commencement to determine optimal rehabilitation methodology.

8. CLOSURE OUTCOMES AND COMPLETION CRITERIA

8.1 Closure Outcomes

The closure outcomes have been developed based on guidance from DEMIRS and the EPA. As a minimum the standard outcomes for rehabilitation are:

- The site has safe, stable and non-polluting landforms.
- The final closed landscape considers visual amenity, retains heritage values and is suitable for the post closure land use.
- The closed landscape has the appropriate hydrology.
- The established ecosystem is resilient and consists of self-sustaining vegetation comprised of local provenance species adapted to local conditions.
- The site is reaching agreed targets for vegetation recovery and suitable habitats.

Given the expectations of the regulators, the Project's proposed closure outcomes are identified in the Table 8-1.

Table 8-1 Proposed Closure Outcomes

Aspect	Outcome
Public Safety All disturbed areas will be safe for future land uses with access to hazardous areas restricted	All excavations will be made safe by constructing a perimeter safety bund in accordance with the Guidelines on Safety Bund Walls Around Abandoned Open Pit Mines(DoIR, 1997)
	No infrastructure will be left on site unless agreed to by the relevant authorities and post-mining land managers/owners.
Stable Post Mining landforms will be resistant to failure and erosion, and downstream sediment deposition will be minimised or contained.	Rehabilitated areas including waste landforms will be constructed to minimise erosion over the long term.
Non-polluting Adverse drainage from post-mining landforms will be minimised or contained and contaminated sites will be managed in accordance with current DWER guidelines	Long term local and regional surface and groundwater quality is maintained such that the beneficial uses of these resources are not compromised.
	Contaminated areas will be remediated such that they no longer pose a threat to human health, stock or environmental receptors.
Self-Sustaining Ecosystem Disturbed areas will be rehabilitated to form a self-sustaining ecosystem that is as close as practicable to surrounding areas.	Infrastructure areas, which are predominantly flat (e.g., roads, laydown, hardstand) will be rehabilitated to promote self-sustaining ecosystem that, in time, will be comparable to the surrounding area with respect to vegetation density and diversity.
	Significantly altered natural landforms or manmade landforms will be rehabilitated to promote self-sustaining ecosystem that is compatible with the final land use.

Aspect	Outcome
Groundwater Dependent Permanent Pools Post-closure formation of pit lakes will not result in extended drawdown that impacts culturally significant river pools.	Mitigation measures will be employed that minimise the impacts of post closure groundwater drawdown on culturally significant permanent pools in the Turner and Yule Rivers that result from the formation of pit lake formation at the cessation of mining.

8.2 Development of Completion Criteria

Detailed completion criteria will be developed and included in future versions of the MCP. These will be developed for each of the closure outcomes based on legislation and commitments, stakeholder consultation, baseline data, the post mining land use, closure objectives and the risk assessment using the SMART principle to ensure that they are 'Specific', 'Measurable', 'Achievable', 'Relevant' and 'Time-bound' where possible.

Given the number of years until scheduled closure, and the early phase of the project, the completion criteria contained in this MCP are considered high-level and indicative, representing the base level of closure activities that the Project would complete as a minimum.

The completion criteria will be refined and updated in future versions of this MCP as further work and research aimed to further the closure outcomes of the operation are undertaken over the life of the operation, and further stakeholder input, particularly from KAC is received.

8.3 Completion Criteria

The closure completion criteria are outlined in Table 8-2.

Table 8-2 Closure Outcomes and Completion Criteria

Closure Objective	Closure Outcomes	Completion Criteria Description	Measurement Tool
Public Safety All disturbed areas will be safe for future land uses with access to hazardous areas restricted.	All excavations will be made safe by constructing a perimeter safety bund in accordance with DEMIRS Guidelines on Safety Bund Walls Around Abandoned Open Pit Mines	All excavations have an abandonment bund in place that meets or exceeds the requirements of DEMIRS Guidelines on Safety Bund Walls Around Abandoned Open Pit Mines	Abandonment bund audit prior to final closure.
	No infrastructure will be left on site unless agreed to by the relevant authorities and post-mining land managers/owners.	All infrastructure removed or buried, unless otherwise agreed.	• Final audit upon termination of decommissioning activities. • Compliance with landowner agreements.
Stable Post Mining landforms will be resistant to failure and erosion, and downstream sediment deposition will be minimised or contained**.**	Rehabilitated areas including all mine waste landforms will be constructed to minimise erosion over the long term.	• Mine waste landforms constructed/remediated in accordance with the provisions detailed in the Closure Task Register (i.e., detailed engineering designs including slope angles, cover designs, and armouring). • Rehabilitation performance monitoring shows no measurable changes to erosion features over a running five-year period.	• Audit of compliance with engineering design. • Site specific rehabilitation performance monitoring program that includes a geomorphic assessment derived from interpretation of high-resolution digital elevation data with ground truthing.
		TSF final landform constructed in accordance with engineering designs.	• Audit of compliance with engineering design. • Geotechnical audits (structural audits).
		Tailings consolidation and settlement aligns with or exceeds predictions.	• Comparison of predicted performance against real time performance data with respect to piezometers measuring static water level, pore water pressure, seepage rate. • Survey pick-up.
		Monitoring shows drainage structures remain free flowing and do not impede surface water runoff over five consecutive wet seasons.	• Visual inspections. • Geotechnical audits (structural audits). • Rehabilitation performance monitoring.

Closure Objective	Closure Outcomes	Completion Criteria Description	Measurement Tool
Non-polluting Adverse drainage from post-mining landforms will be minimised or contained and contaminated sites will be managed in accordance with current DWER guidelines.	Long term local and regional surface and groundwater quality is maintained such that the beneficial uses of these resources are not compromised.	Water quality monitoring (groundwater and surface water) over the defined closure period indicates that water levels and toxicant values associated with mine seepage remain within or better than predicted (as modelled).	• Continuation of operational groundwater and surface water monitoring program. Groundwater quality monitoring in accordance with AS/NZS 5667. • Measurement of standing water levels in bores.
	Contaminated areas will be remediated such that they no longer pose a threat to human health, stock or environmental receptors and in consultation with DWER.	Known or potentially contaminated sites investigated and managed in accordance with the latest DWER contaminated sites guidelines.	• Soil sampling and analysis program. • Soil validation sampling and analysis program.
Groundwater Dependent Permanent Pools Post-closure formation of pit lakes will not result in extended drawdown that impacts culturally significant river pools.	Mitigation measures will be employed to minimise the impacts of post closure groundwater drawdown on culturally significant permanent pools in the Turner and Yule Rivers that result from the formation of pit lake formation at the cessation of mining	No permanent loss of culturally significant permanent river pools as a result of post-closure pit lakes.	• Visual inspections. • Measurement of standing water levels in bores.
Self-Sustaining Ecosystem Disturbed areas will be rehabilitated to promote a self- sustaining ecosystem that is as close as practicable to surrounding areas.	Lightly to moderately altered natural landforms (e.g., roads, laydown, hardstand) will be rehabilitated to promote a self-sustaining ecosystem that, in time, is considered comparable to the surrounding area with respect to vegetation density and diversity.	Rehabilitation on lightly to moderately altered landforms trends towards values of the surrounding areas with respect to vegetation density and diversity[1]	Site specific rehabilitation performance monitoring program.

[1] Specific criteria will be developed based on information gained from the rehabilitation performance monitoring program. This will be updated in subsequent MCPs once available.

Closure Objective	Closure Outcomes	Completion Criteria Description	Measurement Tool
	Significantly altered natural landforms or manmade landforms will be rehabilitated to have a self-sustaining ecosystem that is compatible with the final land use.	Rehabilitation on significantly altered natural landforms or manmade landforms will trend towards values of target analogue sites with respect to vegetation density and diversity[1]	

9. CLOSURE IMPLEMENTATION

9.1 Closure Implementation Strategy

De Grey is developing a Closure Implementation Strategy for the project that will be included in future versions of the MCP, and detail how the Project will be restored to an acceptable post-mining land use. This will include:

- Removal and/or burial of infrastructure such as buildings, concrete and the processing plant.
- Capping of dewatering and reinjection bores, and removal of pumps and pipelines.
- Closure earthworks to ensure that mine landforms are safe, stable and non-eroding.
- Development of landform designs to minimise impact on visual amenity.
- Respreading of topsoil, ripping on the contour and spread of native seed.
- Construction of abandonment bunds around pits.
- Construction of permanent surface water management infrastructure where required.
- Identification and removal of any residual contamination.
- Stakeholder engagement commitments.

To the extent practicable De Grey will rehabilitate the Project in a progressive manner prior to closure, and exploration areas will be rehabilitated within six months, in line with POW requirements.

9.2 Planned Closure

The life of the operation is currently 13 years of mining and processing. Closure of the operation will occur once mining and processing activities have ceased.

The following closure activities will be undertaken as part of mine closure:

- Decommissioning - equipment that is no longer required will be identified and decommissioned before being removed from site. Buildings and plant will likely be sold and removed from site. The process plant, tanks, pumps etc. will all be evaluated and sold if possible or taken off site for recycling or disposal. Tanks that have held hydrocarbons will be adequately cleaned and then either sold or sent to salvage yards for disposal.
- Demolition - some infrastructure will have no value at the completion of mining. This will be broken down and buried on site. This may include concrete footings and parts of the process plant that pose no long-term issues.
- Rehabilitation - once infrastructure is removed, residual bulk earthworks will be undertaken to return the area to as close to the natural topography as possible. Constructed landforms will be blended into the environment, areas will be reprofiled, topsoil replaced and ripped on the contour to undo the impacts of compaction and clearing. Seeding will occur as determined by trials.

9.3 Closure Task Register

A closure task register will be developed and included in future versions of this MCP. Tasks relevant to each of the closure domains that will be included in the register are detailed in the sections below at a conceptual level.

Timings of when these closure tasks will be completed will be developed for future iterations of this MCP.

9.3.1 Infrastructure and Plant

- Power, water and services will be disconnected.
- Fixtures, fitting and buildings will be dismantled.
- All materials with value will be sold and removed from site.
- Non-contaminating unsaleable materials will be broken up and buried in a designated approved location on site.
- Potentially contaminating unsaleable materials will be broken up and disposed of at appropriately licensed waste facilities.
- Pipes, cabling, etc. that is on the surface will be removed and sold, or where suitable buried on site.
- All excavations that occur due to removal of buried infrastructure will be backfilled.
- Buried services will be disconnected and left in place.
- Some infrastructure may be proposed to be left in place and ownership transferred based on the outcomes of stakeholder discussions. This infrastructure will be included in further iterations of the plan.
- Some surface water management infrastructure will be retained to manage post-closure risks associated with erosion and run-off.

9.3.2 Borefields

- Pumps and headworks will be removed from bores.
- Pipeline will be cut up and removed from site for disposal or buried in a designated approved location on site.
- Bores will be capped, locked and left in place if still suitable for future use.
- Decommissioned bores will have the collars cut, plugged and backfilled. The GPS coordinates will be provided to DWER.

9.3.3 Pits

- Subject to the outcome of further groundwater modelling and modelling relating to pit lake hydrogeology, implementation of recharge mitigation measures may be considered.
- Access ramps to pits will be blocked to prevent access once no longer required.
- Abandonment bunds will be placed around all open pits.
- Appropriate signage installed.

At this stage of feasibility planning, backfilling of mine waste into pits is not possible due to scheduling constraints and mineralisation being open at depth. Should the option become feasible, De Grey would seek appropriate approvals.

9.3.4 Waste Rock Landforms

The overarching objective for all landforms is to create safe, stable and non-polluting landforms which are capable of maintaining an agreed post-mining land use.

Waste rock mined from the pits will be stockpiled on surface, forming permanent waste rock landforms. Waste characterisation studies for the project show that most of the waste at Hemi does not pose a risk of acid mine drainage and only a small proportion (<5%) of samples were potentially acid forming. Waste rock landforms have been designed to ensure long-term geochemical and physical stability is achieved.

Tasks required to achieve desired outcomes for waste rock landforms:

- Build each waste rock landform to agreed closure design including surface water management features and ensuring PAF and NMD material are suitably encapsulated.
- Final landform designs are developed to minimise impacts on visual amenity (e.g. shallow, concave slope profiles that mimic the surrounding ridges and hills).
- Placement of 100 mm topsoil growth medium.
- Contour rip all waste rock landforms.
- Seed with local provenance seed to promote germination, nutrient storage, and water infiltration.
- Monitor and manage waste rock landforms to ensure no unacceptable AMD or erosion impacts and landforms progress to support a self-sustaining eco-system suitable for the post mining end land use.

9.3.5 Low Grade Stockpiles

Low grade stockpiles will either be processed in future should higher prices or more efficient processing make them viable or will be rehabilitated as though they were WRLs. Ongoing waste characterisation studies suggest that low-grade ore is less likely to generate harmful leachates than waste rock.

9.3.6 TSF

The closure objectives for the TSF are to leave the facility in a safe, stable, erosion resistant and non-polluting state. The closure concept for the TSF, as detailed in the TSF Design Report (CMW, 2022), provides for:

- The surface of the TSF and embankment batters will need to be erosion resistant.
- A store and release cover system likely to be made up of a number of cells, and designed to reduce infiltration of water into the tailings profile and allow excess water which may form temporary ponds to evaporate.
- The downstream slopes of the TSF perimeter embankments will be rehabilitated as part of the waste dump rehabilitation. The final downstream slopes as designed by Mine Earth will comprise a 17 m wide berm, at 15 m vertical height and batter slopes at 18°, in order to allow for waste dump construction utilising predominantly oxide waste materials.

- The final tailings surface will slope toward the central decant area. Final cover designs are to be finalised and described in future iterations of the MCP.
- The TSF concept requires the integration of the planning, construction, and closure of the TSF with waste dump construction. Materials for rehabilitation of the top-surface will be sourced from waste dumps. The rehabilitation program will include the identification of appropriate cover materials and local flora species to be included in rehabilitation of the facility.

Other works that will be required as part of closure involve:

- Decommissioning the decants
- Decommissioning the underdrainage system.

The underdrainage system will be operated until such time as the underdrainage flow stops or is very low. The underdrainage system would then the decommissioned by 'sealing' the outlet pipework. Rehabilitation closure criteria for the TSF including observations specific to the tailings and consolidation will be developed and progressed as part of a future versions of the MCP.

As the TSF has been designed to be raised by downstream methods, the settlement of the tailings will have a negligible impact on the structural integrity or the operational performance of the TSF. Cone Penetrometer Testing (CPT) investigations of the TSF will be required prior to closure, to test the tailings to extract the information necessary to assess for the final consolidation to ensure an appropriate closure cover design which can function and accommodate long term settlements. The CPT work should be supplemented with undisturbed samples taken at 2 m intervals for density moisture testing.

9.4 Early Closure- Permanent Closure or Suspended Operations under Care and Maintenance

The unlikely event of early and unforeseen closure of mining operations may occur due to a number of reasons including market forces, company business reasons and overestimation of mineral resources.

Unplanned permanent closure of the entire Project will be undertaken in accordance with the measures established for planned closure, however some mine waste landforms (e.g., WRDs, TSFs) will not have been constructed to final design (e.g., height and extent). The landforms will be rehabilitated using the same principles as for planned closure, notably surface water management measures, final slope angles and cover designs.

Residual ore is likely to remain within the open pit shells, below surface should unplanned closure occur. Rehabilitation activities will not be impacted and will be undertaken in accordance with the measures outlined for planned closure. An abandonment bund will encircle all open pits.

Should the entire Project enter a phase of care and maintenance, a site-specific Care and Maintenance Plan will be developed in accordance with Section 42 of the *Mines Safety and Inspection Act 1994* and submitted to DEMIRS. Provisioning for care and maintenance includes basic ongoing caretaker and maintenance functions, and necessary minimal services including power, water, communication and waste disposal. In general, the care and maintenance period can range from months to years.

Should the Project be placed on care and maintenance, the following activities will be undertaken site wide:

- Environmental audit of the site to determine the status (environmental risk) of all components of the site.
- Construction of fencing or bunding to prevent unauthorised access to mine voids.
- Retention of any service lines such as power and water pipelines until such time as a final decision is made on probability of recommencing operations in the short to medium term.
- Maintenance of relevant roads and drainage systems.
- Continued monitoring and reporting to DEMIRS and other government agencies as required. Where monitoring identifies any potential environmental or safety concerns, the Project will undertake the necessary steps, in consultation with DEMIRS, to rectify the issue.

10. CLOSURE MONITORING AND MAINTENANCE

A closure monitoring and maintenance program will be developed to align with the completion criteria in future versions of the Mine Closure Program.

The program will likely include the following:

- Groundwater monitoring, for groundwater levels, particularly related to drawdown, and groundwater quality. The groundwater monitoring locations will be determined based on the location of receptors potentially impacted by mining activities, including those where modelling has predicted post-closure impacts with or without control measures being implemented.
- Groundwater monitoring for potential leachate from the TSF and WRLs, particular in areas where PAF material has been encapsulated.
- Surface water monitoring of water ways down-gradient of the project and where discharges have occurred during the operational phase of the mine.
- Vegetation densities, species composition and health for areas that have been revegetated as part of rehabilitation.
- Landform stability.

11. FINANCIAL PROVISION FOR CLOSURE

Under the *Mining Rehabilitation Fund Act 2012*, all mining companies in Western Australia must contribute annually to the Mine Rehabilitation Fund (MRF). The purpose of the MRF is to ensure that funding is available for closure after a bankruptcy event.

An estimated financial provision amount will be calculated as further detailed project planning and technical studies are progressed and will be referenced in the MCP submission to DEMIRS. Calculations will be based on the methodology outlined in the *Mining Rehabilitation Fund Regulations 2013* and guidance from the *Mining Rehabilitation Fund Reporting Guidelines – September 2021.*

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