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mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

# Environmental Impact Assessment Report
# And
# Environmental Management Plan

## for Listed Activities Associated with the proposed Mogale Tailings Retreatment Operation, situated in the West Rand

## DMRE Reference Number GP30/5/1/2/2/ (206) MR

## PART G

## Environmental Authorisation in Support of the Mogale Tailings Retreatment Operation

*SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 (ACT NO. 59 OF 2008) (NEM:WA) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) (MPRDA) (AS AMENDED).*

# Appendix S: Closure Plan and Environmental Risk Report


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# Mogale Tailings Retreatment Operations Environmental Application Process

## Closure Plan and Environmental Risk Report

**Prepared for:**
Pan African Resources PLC

**Project Number:**
PAR7273

August 2022

Digby Wells and Associates
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This document has been prepared by Digby Wells Environmental.

| | |
|---|---|
| **Report Type:** | Closure Plan and Environmental Risk Report |
| **Project Name:** | Mogale Tailings Retreatment Operations Environmental Application Process |
| **Project Code:** | PAR7273 |

| Name | Responsibility | Signature | Date |
|---|---|---|---|
| Anja Esterhuizen & Modiegi Monaledi | Report compiler |  | August 2022 |
| Anthony Lamb | Closure cost assessment, technical inputs and report compiler |  | August 2022 |
| Brett Coutts | Project Manager and Reviewer |  | August 2022 |

# DECLARATION OF INDEPENDENCE

**Digby Wells and Associates (South Africa) (Pty) Ltd**

**Contact person: Anthony Lamb**


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I, Anthony Lamb, as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Pan African Resources PLC, other than fair remuneration for work performed.

_____

| | |
|---|---|
| **Full name:** | Anthony Lamb |
| **Title/ Position:** | Principal Closure Consultant |
| **Qualification(s):** | BSc Honours Geography and Environmental Management |
| **Experience (years):** | 24 years |

# Details of Author(s)

The details of the specialist closure team who contributed to the compilation of this closure planning document are summarise din the table below.

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|---|---|
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# Project information

## Proponent's contact details

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## Rights, permits, licenses and authorisations associated with the operation

- Mogale Cluster Mining Right (GP30/5/1/2/2 (206) MR)

# EXECUTIVE SUMMARY

## Structure of This Document

Digby Wells Environmental (hereinafter Digby Wells) has been appointed to undertake an Environmental Application Process and associated specialist studies for the Mogale Gold Mining Right with reference number: (GP) 30/5/1/2/2 (206) (MR) and, more specifically for the proposed construction of a Mogale Tailings Retreatment Operations.

Mogale Tailings Retreatment (Pty) Ltd (MTR) a wholly owned subsidiary of Pan African Resources PLC (PAR) has entered into a Sale and Purchase Agreement for the acquisition of the shares in and claims against Mogale Gold (Pty) Ltd (Mogale Gold). The agreement was entered into between PAR and the liquidators of Mintails Mining SA (Pty) Ltd (in liquidation) (MMSA). MMSA is the holding company of Mogale Gold. The intended transaction is subject to a due diligence investigation to be completed by 30th September 2022. The proposed transaction has now been concluded and was announced on the 6th October 2022.

PAR has closed the transaction to acquire the total share capital and claims of Mogale Gold and Mintails SA Soweto Cluster Proprietary Limited (MSC), (collectively, the Sale Transaction). Both Mogale Gold and MSC are 100% owned by Mintails Mining SA Proprietary Limited (Mintails SA), which was placed in provisional liquidation during 2018. Based on this PAR has now acquired the assets associated with MR 206, based on the conclusion of the transaction noted above.

The project entails the reclamation of historical unlined Tailings Storage Facilities (TSFs). The reprocessed tailings will be first discarded into West Wit Pit and possibly other nearby small pits. Any extra processed tailings will be stored on a ground TSF (West Wits Pit TSF and 1L23-1L25 TSF). It is proposed that the footprint of 1L23-1L25 footprint will be lined and the footprint of West Wits Pit TSF will not be lined.

This document consolidates the necessary closure planning reports for PAR in terms of the Financial Provisioning Regulations, 2015 (GN R.1147 of 20 November 2015) (as amended) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

The reports required for compliance with the Financial Provisioning Regulations, 2015 (as amended) are included in this report as follows:

- **Part A**: Final Rehabilitation, Decommissioning and Mine Closure Plan (Appendix 4);
- **Part B**: Environmental Risk Assessment (Appendix 5); and
- **Part C**: Annual Rehabilitation Plan (Appendix 3) – excluded at this initial stage.

A regulatory check list detailing what is required in terms of the Financial Provisioning Regulations, 2015 (as amended) is included at the beginning of each Part and provides cross references to the relevant sections of the report where these requirements are addressed.

An overarching introduction and site context information pertaining to PAR is included in the beginning of the report and is relevant to each Part of the report listed above.

## Part A: Final Rehabilitation, Decommissioning and Mine Closure Plan (RCP)

The closure measures set out in the closure plan (Section 14) are based on a screening level risk assessment undertaken for PAR (Section 9) (Part A), which is informed by relevant biophysical information, available specialist studies and a site visit undertaken on 4 October 2021. The closure measures developed are then costed in the Digby Wells closure costing model to determine the closure costs required for financial provisioning for PAR.

The planned closure costs were determined using third party/contractor rates and Digby Well's rates database, where applicable. Quantities used to determine the closure cost estimates were taken from available plans, maps and information provided by PAR.

The Closure Cost estimates for the Current Disturbance and the Life of Mine closure scenarios (MR206) are **R 257,891,255** and **R 107,094,839,** respectively, as reflected in Section 22 (Part A) of this report. The costs exclude VAT but includes P&Gs at 12% and contingencies at 10%.

## Part B: Environmental Risk Report (ERR)

This Part relates to the identification and costing of residual and latent environmental risks. Initial indications are that additional seepage due to rainfall infiltration from the in pit and above ground TSFs for the LOM closure scenario will be very low.

Instead of making an allowance to manage very low (or negligible) recharge volumes, costs have been determined for additional measures to reduce any potential recharge through the addition of bentonite to the upper surface and side slopes of the TSFs. The addition of bentonite will further reduce the permeability of the TSF surfaces and reduce the recharge values even further.

The cost for incorporating the bentonite is based on the following:

- Purchasing bentonite at R3645/ton;
- Transport costs for delivering the bentonite to site of R425/ton (assumed 50 km);
- Incorporating bentonite at 1 kg/m2 (reduced amount due to fine tailings, normal soil applications are between 6-14 kg/m2); and
- Estimated labour costs of R532.66R/ha assuming eight labourers can complete 100 ha in a 5 day working week (9 hour day) with sufficient transport and supervision.

Based on the above, the bentonite implementation costs of R7,517,000 should be retained as a provisional amount to address potential seepage due to recharge as/if required.

Ongoing work required to address the identified knowledge gaps to confirm the long term water management strategy, is outlined in Section 10.1 (Part B).

## Part C: Annual Rehabilitation Plan (ARP)

This Part typically assesses planned rehabilitation at the mine for the next 12 months, and the rehabilitation undertaken on site to date. As the Project has not yet commenced, The ARP is excluded from this RCP and will be addressed as required in subsequent annual updates.

The wetland rehabilitation planned for the first year of operations is deemed an operational cost and is not included in the CCA.

| TERMS AND ABBREVIATIONS | |
|---|---|
| **Terms** | |
| **Care and maintenance** | The action is performed over rehabilitated areas and includes application of soil ameliorants (fertiliser, manure, irrigation etc.) and any minor corrective action that may be required over the rehabilitated area. |
| **Closure** | The time at which the mine reaches its life of mine due to resource depletion. |
| **Contingencies** | A percentage allowance applied to account for risk associated with uncertainty. |
| **Preliminary and Generals (P&Gs)** | A percentage allowance applied to account for third-party contractors setting up on site, and includes costs such as establishment and de-establishment of equipment, electricity, water consumption etc. |
| **Remediation** | A process undertaken to remove and stop contamination. |
| **Rehabilitation** | A process undertaken to rehabilitate disturbed land to a functional end use, which usually includes backfilling, contouring, soil placement, ripping, soil amelioration and seeding to establish a vegetation cover. |
| **Planned closure** | The year the mine plans to cease production after life of mine has been reached, as per the current mine plan. |
| **Immediate closure** | The closure scenario for unexpected closure of the mine for whatever reason. |
| **Site relinquishment** | The mine closure period that commences once all rehabilitation and post-closure activities are complete. |
| **Abbreviations** | |
| **AIP** | Alien Invasive Plants |
| **AMD** | Acid Mine Drainage |
| **ARP** | Annual Rehabilitation Plan |
| **ASM** | Artisanal and small-scale mining |
| **BPGs** | Best Practice Guidelines |
| **DEA** | Department of Environmental Affairs |
| **Digby Wells** | Digby Wells Environmental |
| **DMRE** | Department of Mineral Resources and Energy |

| | |
|---|---|
| **DWA** | Department of Water Affairs |
| **DWS** | Department of Water and Sanitation |
| **EIA** | Environmental Impact Assessment |
| **EIS** | Environmental Importance and Sensitivity |
| **EMP** | Environmental Management Plan |
| **EMPr** | Environmental Management Programme |
| **ERR** | Environmental Risk Assessment Report |
| **FLFD** | Final Landform Design |
| **FP** | Financial Provision |
| **GDARD** | Gauteng Department of Agriculture and Rural Development |
| **GG** | Government Gazette |
| **GIS** | Geographic Information System |
| **GN R. 1147** | Financial Provisioning Regulations, 2015 (Government Notice No. 1147 published in GG 39425 |
| **I&APs** | Interested and Affected Parties |
| **ICMM** | International Council for Ming and Metals |
| **IDP** | Integrated Development Plan |
| **LoM** | Life of Mine |
| **LUP** | Land Use Plan |
| **MAMSL** | Metres Above Mean Sea Level |
| **MAP** | Mean Annual Precipitation |
| **MPRDA** | Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) |
| **MR** | Mining Right |
| **MRA** | Mining Rights Area |
| **MWP** | Mine Works Programme |
| **NEM: AQA** | National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) |

| | |
|---|---|
| **NEMA** | National Environmental Management Act, 1998 (Act No. 107 of 1998) |
| **NEMBA** | National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) |
| **NHRA** | National Heritage Resources Act |
| **NWA** | National Water Act, 1998 (Act No. 36 of 1998) |
| **PCD** | Pollution Control Dam |
| **PES** | Present Ecological State |
| **RA** | Risk Assessment |
| **RCP** | Rehabilitation, Decommissioning and Mine Closure Plan |
| **SANS** | South African National Standards |
| **SCC** | Species of Conservation Concern |
| **SHEQ** | Safety, Health, Environment and Quality |
| **SLP** | Social and Labour Plan |
| **SoW** | Scope of Work |
| **TDS** | Total Dissolved Solids |
| **VAT** | Value Added Tax |
| **WMA** | Water Management Area |
| **WTP** | Water Treatment Plant |
| **WUL** | Water Use License |
| **Units of Measure** | |
| **%** | Percent |
| **Bq** | Becquerel |
| **°C** | Degree Celsius |
| **cm** | Centimetre |
| **ha** | Hectare |
| **kg** | Kilogram |
| **km** | Kilometre |

| | |
|---|---|
| **$km^2$** | Square kilometre |
| **l/s** | Litres per second |
| **m** | Metre |
| **mamsl** | Metres above mean sea level |
| **m/s** | Metres per second |
| **$m^2$** | Square metre |
| **$m^3$** | Cubic metre |
| **me/%** | Milliequivalents/percent |
| **me/100g** | Milliequivalents/100 grams |
| **mg/kg** | Milligram per kilogram |
| **mg/l** | Milligram/litre |
| **$mg/m^2/d$** | Milligram per square metre per day |
| **Ml/d** | Megalitres per day |
| **mm** | Millimetres |
| **$Mm^3/y$** | Mega cubic metre per year |
| **mS/m** | MilliSiemens/metre |
| **Mt** | Megatonne |
| **$W/m^2$** | Watt per square metre |
| **t** | Tonne |
| **Ω** | Ohm |

# TABLE OF CONTENTS

# LIST OF FIGURES

# LIST OF TABLES

# LIST OF APPENDICES

# 1 Introduction

Digby Wells Environmental (hereinafter Digby Wells) has been appointed to undertake an Environmental Application Process and associated specialist studies for the Mogale Gold Mining Right with reference number: (GP) 30/5/1/2/2 (206) (MR) and, more specifically for the proposed construction of a Mogale Tailings Retreatment Operations.

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Mogale Gold owns the right to extract and process gold from tailings recourses by reprocessing old gold mine slimes dams and sandy mine dumps left by the extensive historic mining activities that have taken place in the area since 1888. MTR (PAR) is only interested in the surface operations associated with Mining Right (MR) 206 (i.e., Tailings Storage Facilities (TSFs) for reclamation, processing and deposition), and therefore the focus of this application process.

The Project consists of 120 Mt of tailings to be reprocessed and firstly deposited into the West Wits Pit (current authorisation in place for in-pit deposition) and then undertake deposition of the footprint of 1L23-1L25 footprint (New Tailings Facility) once capacity has been reached within the West Wits Pit.

Alternatives are being considered for potential deposition of tailings material into the other pits in the area.

Digby Wells Environmental (Digby Wells) was appointed by PAR to compile the closure planning documents and calculate the associated closure costs in terms of the Financial Provisioning Regulations, 2015 (GN R.1147 of 20 November 2015) (as amended)

promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

# 2 Project Approach

The approach followed in compiling this closure planning document is as follows:

- Undertake a kick-off meeting with the relevant site personnel, to ensure scope alignment and to source updated site information;
- Conduct a document review and hold technical discussions with Mogale to confirm data sets, infrastructure planning and site battery limits;
- Conduct a site visit (4 October, 2021) to familiarize the team with site specific conditions, confirm the status of the old plant infrastructure and visit the TSFs, Sand Dumps and West Wits Open pit;
- Compile itemized site layout plans and associated measurements for each to inform the closure planning and costing;
- Develop closure measures based on the experience gained from similar projects;
- Compile initial closure costs for financial provisioning based on the closure measures;
- Compile the project background description based on planned reprocessing, scoping reports, specialist studies and engineering layout designs received (refer to Table 3-1);
- Conduct the Environmental Risk Assessment (ERA) based on specialist reports received;
- Develop preliminary site relinquishment criteria based on the envisioned final land use;
- Identify the residual/ latent risks presented that may manifest on site (refer to Part B of this report); and
- An Annual Rehabilitation Plan (ARP) as required by GN R.1147 is not required at this stage as no rehabilitation will be required for the next 12 months.

A high-level overview of the mine closure planning processes is presented in Figure 2-1.

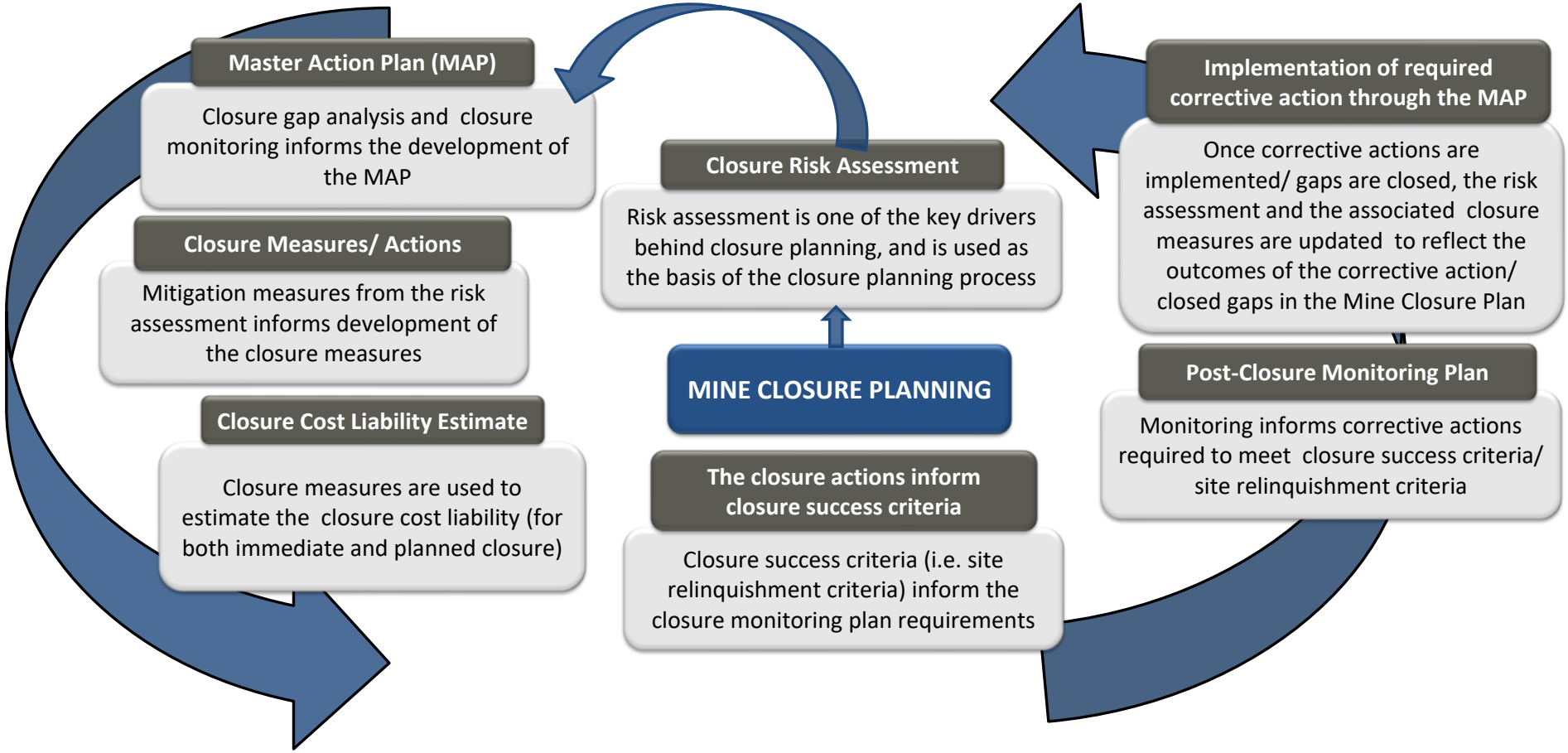



**Figure 2-1: High-Level Mine Closure Planning Process**

# 3 Supporting Information

The information and specialist studies made available for the compilation of the closure planning document is summarised in Table 3-1.

**Table 3-1: Supporting Information**

| Report/ Plan Title | Author | Date |
|---|---|---|
| Fauna and Flora Specialist Study: Mogale Tailings Retreatment Operations Environmental Application Process | Digby Wells Environmental | 2022 |
| Fauna and Flora Specialist Study: Mogale Tailings Retreatment Operations Environmental Application Process | Digby Wells Environmental | 2022 |
| Heritage Impact Assessment: Mogale Tailings Retreatment Operations Environmental Application Process | Digby Wells Environmental | 2021 |
| Soils, Land Use and Land Capability Impact Assessment: Mogale Tailings Retreatment Operations Environmental Application Process | Digby Wells Environmental | 2021 |
| Definitive Feasibility Study for Mogale Tailings Retreatment Operations Environmental Authorisation Application Process | Digby Wells Environmental | 2022 |
| Hydrogeological Specialist Study: Mogale Tailings Retreatment Operations Environmental Application Process | Digby Wells Environmental | 2022 |
| Scoping Report: Pan African Resources Gold Bearing Tailings Retreatment Project, Situated in the West Rand | Digby Wells Environmental | 2022 |
| Soils Scoping Report: Mogale Tailings Retreatment Operations Environmental Application Process | Digby Wells Environmental | 2022 |
| Wetland Impact Assessment: Mogale Tailings Retreatment Operations Environmental Application Process | Digby Wells Environmental | 2022 |
| Final Scoping Report: Pan African Resources Gold Bearing Tailings Retreatment Project, Situated in the West Rand | Digby Wells Environmental | 2022 |
| Mogale Tailings Retreatment Operations Gold Bearing Tailings Retreatment Project: Radiological Public Safety and Impact Assessment | Aquisim Consulting (Pty) Ltd | 2022 |

# 4 Legal Requirements

The legislation pertinent to mine closure is summarised in Table 4-1.

Section 41 (1) of the MPRDA has been repealed and in terms of Section 24(P) of the NEMA, as amended, which provides that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision must guarantee the availability of sufficient funds to undertake the following:

- Rehabilitation of the adverse environmental impacts of the listed or specified activities;
- Rehabilitation of the impacts of the prospecting, exploration, mining or production activities, including the pumping and treatment of polluted or extraneous water;
- Decommissioning and closure of the operations;
- Remediation of latent and / or residual environmental impacts which become known in the future;
- Removal of building structures and other objects; and/or
- Remediation of any other negative environmental impacts.

In addition to Section 24(P), the Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations were promulgated on the 20 November 2015 (GN R.1147). For the purposes of this report, the financial provision estimate and respective reports are in line with the requirements of the Financial Provisioning Regulations, 2015.

Regulation 11 of the Financial Provisioning Regulations, 2015 requires a holder of a mining right to determine the quantum of the financial provision through detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:

- Annual rehabilitation as reflected in the ARP as per the minimum content prescribed by Appendix 3 of the Regulations;
- Final rehabilitation, decommissioning and closure as reflected in a Closure Plan as per the minimum content prescribed by Appendix 4 of the Regulations; and
- The remediation of latent and/ or residual environmental impacts including (but not limited to) the pumping and treatment of polluted or extraneous water, as reflected in the ERR, as per the requirements of Appendix 5 of the Regulations.

There are several guideline documents which provide recommendations on how rehabilitation and closure should be undertaken. For the purpose of the plan, the following guideline documents were considered:

- Land Rehabilitation Guidelines for Surface Coal Mines. Land Rehabilitation Society of Southern Africa, CoalTech, Minerals Council of Southern Africa (2019);

- Best Practice Guidelines (BPGs) series developed by the Department of Water Affairs (DWA) (2007); and
- Integrated Mine Closure, good practice guideline 2nd edition. International Council of Mining and Metals, 2019 (ICMM, 2019).

## Table 4-1: Applicable Closure Related Legislation

| Applicable legislation and guidelines | Details |
|---|---|
| **Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)** | Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that – |
| | a) Prevent pollution and ecological degradation; |
| | b) Promote conservation; and |
| | c) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development |
| **National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)** | The NEMA, as amended was set in place in accordance with section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that:<br>*The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.* |
| **National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NE<BA)** | NEMBA regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species. This Act works in accordance to the framework set under NEMA. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance:<br>• Alien and Invasive Species Lists, 2014 published (GN R.599 in GG 37886 of 1 August 2014) ;<br>• National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations; and<br>• National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GG 34809, GN R.1002, 9 December 2011). |

| Applicable legislation and guidelines | Details |
|---|---|
| **National Water Act, 1998 (Act No. 36 of 1998) (NWA)** | The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA. |
| **National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA)** | According to the NEM: AQA the Department of Environmental Affairs (DEA), the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEM: AQA. A fundamental aspect of the new approach to the air quality regulation, as reflected in the NEM: AQA is the establishment of National Ambient Air Quality Standards (NAAQS) (GN R 1210 of 2009). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans is measured. |
| **The Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983) (CARA)** | The Conservation of Agricultural Resources Act 43 of 1983 states that the degradation of the agricultural potential of soil is illegal; and |
| | The Conservation of Agricultural Resources Act 43 of 1983 requires that protection of land against soil erosion and the prevention of water logging and salinization of soils means of suitable soil conservation works to be constructed and maintained. |
| **Mineral and Petroleum Resource Development Act. 2002 (Act No. 28 of 2002) (MPRDA)** | The MPRDA sets out the requirements relating to the development of the nation's mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining related activities;<br>Section 41 (1) of Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) has been repealed and in terms of Section 24P in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended which provides that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision must guarantee the availability of sufficient funds to undertake the-<br>a) Rehabilitation of the adverse environmental impacts of the listed or specified activities;<br>b) Rehabilitation of the impacts of the prospecting, exploration, mining or production activities, including the pumping and treatment of polluted or extraneous water;<br>c) Decommissioning and closure of the operations; |

| Applicable legislation and guidelines | Details |
|---|---|
| | d) Remediation of latent or residual environmental impacts which become known in the future;<br>e) Removal of building structures and other objects; and/or<br>f) Remediation of any other negative environmental impacts.<br>In addition to Section 24(P), the Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations were promulgated on the 20 November 2015 (Government Notice No. 1147 published in GG 39425).<br>Regulation 6 of the Financial Provision Regulations requires a holder of a mining right to determine the quantum of the financial provision through detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:<br>a) Annual rehabilitation, as reflected in Annual Rehabilitation Plans (ARPs);<br>b) Final rehabilitation, decommissioning and closure of the mining operations as per the RCPs which includes the findings of the Environmental Risk Assessment Report (ERR); and<br>c) Remediation of latent or residual environmental impacts as identified in the ERR. |
| **National Nuclear Regulator Act No. 47 of 1999 (NNRA)** | The NNRA does not apply where the level of radioactivity concentration of each radioactive nuclide in materials is below 0.5 Becquerel (Bq) per gram of naturally occurring radioactive nuclides;<br>Exemption, and specifically exemption without further consideration, requires the following criteria to be met for all feasible situations:<br>• The radioactivity in the material is associated with naturally occurring radioactive nuclides and are not processed for their radioactive, fissile or fertile properties, and the effective dose expected to be incurred by any member of the public due to the exempted action is less than 0.25 milli-Sievert (mSv) per annum;<br>Actions that do not meet the criteria for exemption must meet the requirements set out in section 4 of the NNRA. Including but not limited to: safety assessments, operational controls, maintenance and inspection programmes, staffing and medical and environmental surveillance that meet the requirements; |

| Applicable legislation and guidelines | Details |
|---|---|
| | Actions authorised in terms of the NNRA will require a decommissioning strategy in terms of section 5 specifically relating to the decommissioning of any installation, plant or equipment having an impact on radiation protection and nuclear safety, or the release of contaminated land for other uses; and<br>A site subject to an authorised action may be released for unrestricted use if the activity concentrations are below the levels for exclusion. |

# 5 Mine Description and Context

The following section outlines the setting of the Project Area as well as the mining and processing plan as detailed within the Scoping Report (2022) compiled by Digby Wells Environmental (DWE, 2022).

## 5.1 Background

Digby Wells Environmental (hereinafter Digby Wells) has been appointed to undertake an Environmental Application Process and associated specialist studies for the Mogale Gold Mining Right with reference number: (GP) 30/5/1/2/2 (206) (MR) and, more specifically for the proposed construction of a Mogale Tailings Retreatment Operations.

Mogale Tailings Retreatment (Pty) Ltd (MTR) a wholly owned subsidiary of Pan African Resources PLC (PAR) has entered into a Sale and Purchase Agreement for the acquisition of the shares in and claims against Mogale Gold (Pty) Ltd (Mogale Gold). The agreement was entered into between PAR and the liquidators of Mintails Mining SA (Pty) Ltd (in liquidation) (MMSA). MMSA is the holding company of Mogale Gold. The intended transaction is subject to a due diligence investigation to be completed by 30th September 2022. The proposed transaction has now been concluded and was announced on the 6th October 2022.

PAR has closed the transaction to acquire the total share capital and claims of Mogale Gold and Mintails SA Soweto Cluster Proprietary Limited (MSC), (collectively, the Sale Transaction). Both Mogale Gold and MSC are 100% owned by Mintails Mining SA Proprietary Limited (Mintails SA), which was placed in provisional liquidation during 2018. Based on this PAR has now acquired the assets associated with MR 206, based on the conclusion of the transaction noted above.

The project entails the reclamation of historical unlined Tailings Storage Facilities (TSFs). The reprocessed tailings will be first discarded into West Wit Pit and possibly other nearby small pits. Any extra processed tailings will be stored on a ground TSF (West Wits Pit TSF and 1L23-1L25 TSF). It is proposed that the footprint of 1L23-1L25 footprint will be lined and the footprint of West Wits Pit TSF will not be lined.

## 5.2 Regional and Local Setting

Figure 5-1 illustrates the regional setting of the Mogale Tailings Retreatment Operations.

The Project is within the Mogale City Local Municipality (MCLM), which is located within the West Rand District Municipality (WRDM). MCLM is the regional services authority, and the area falls under the jurisdiction of the Krugersdorp Magisterial District (Refer to Figure 5-2 for the Local Setting of the Project Area).

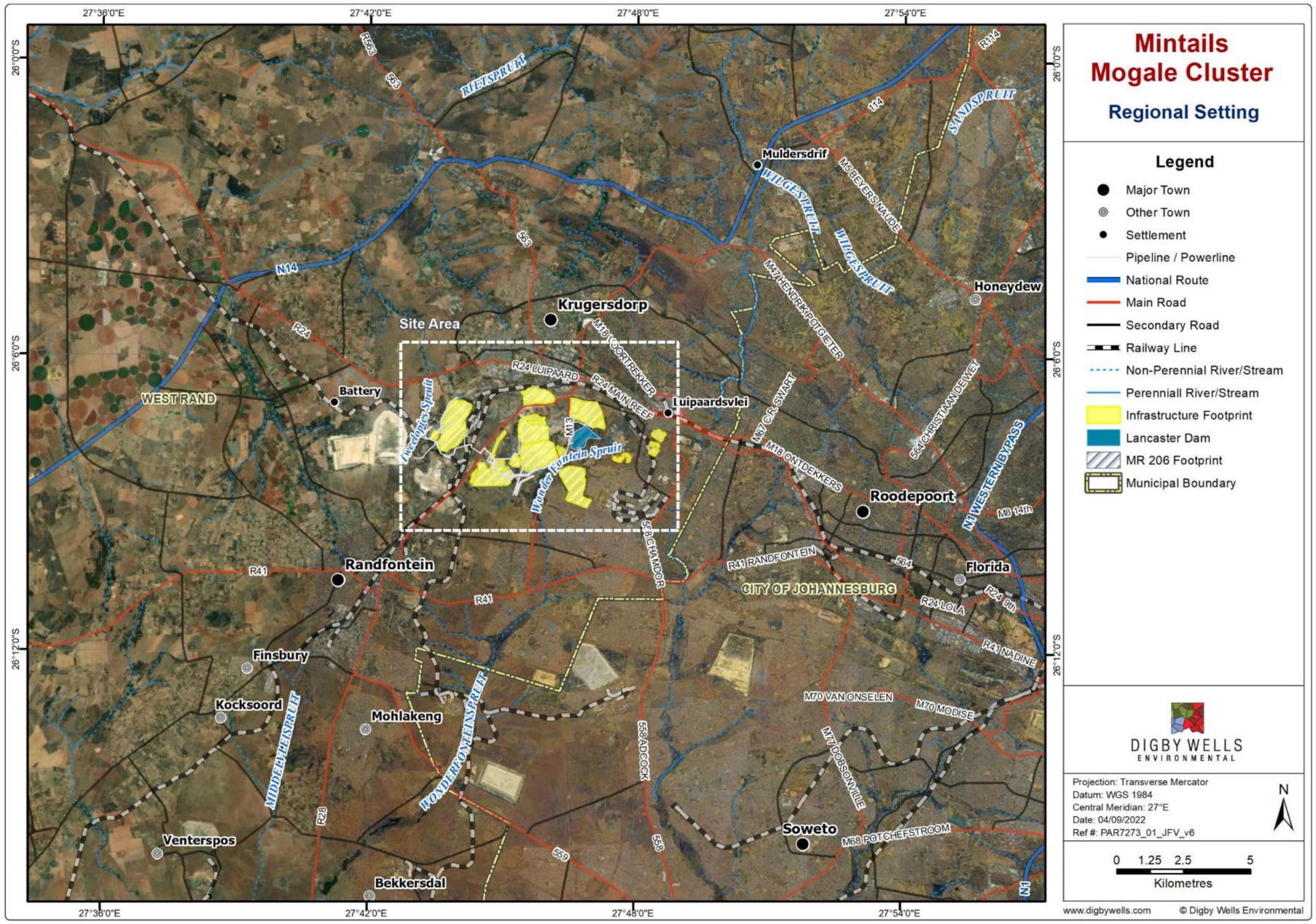



**Figure 5-1: Regional Setting of the Project Area**

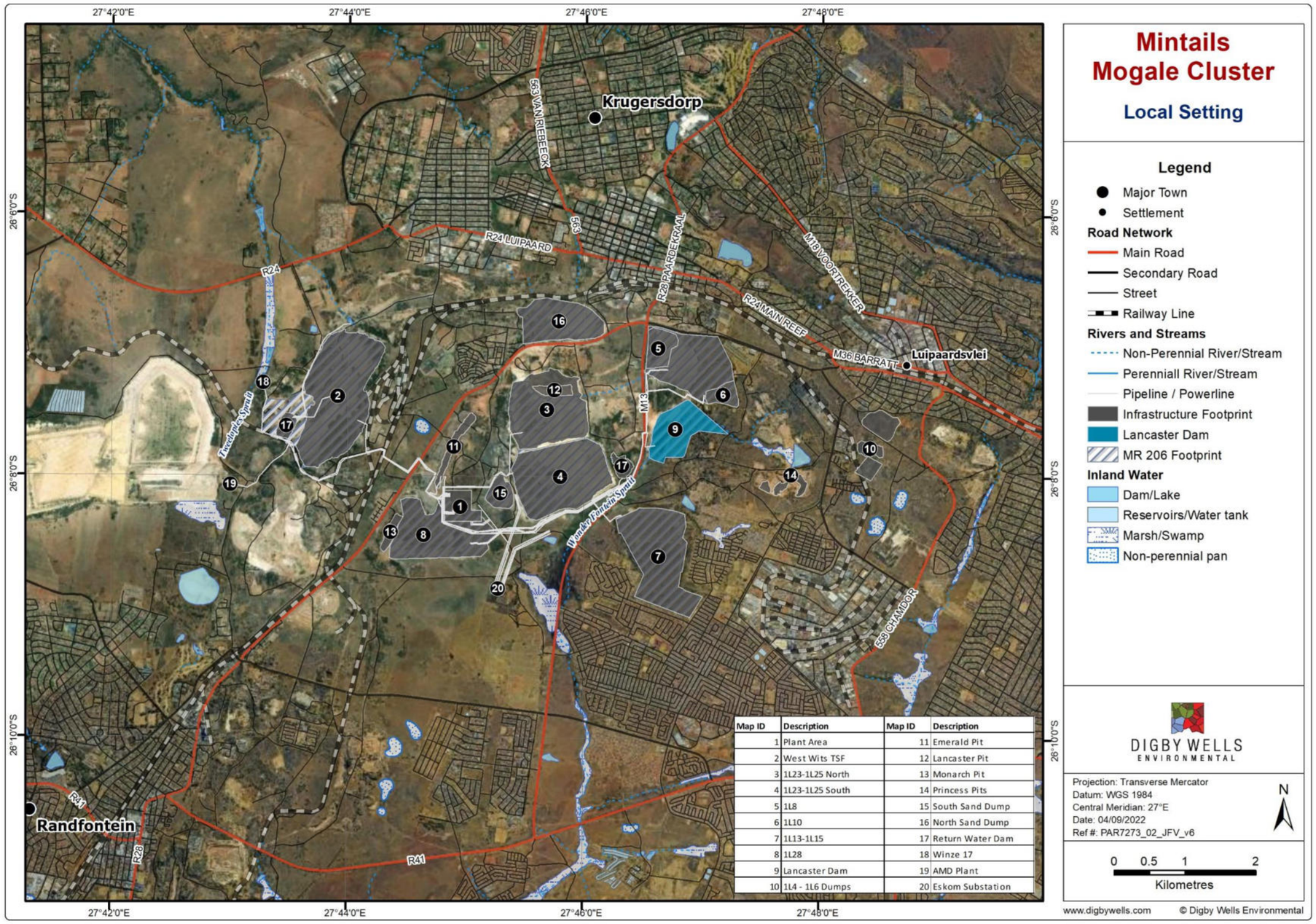



**Figure 5-2: Local Setting of the Project Area**

## 5.3 Resource Description

The Measured and Indicated portion of the Mineral Resources utilised in the Life-of-Mine schedule as presented in Table 5-1 could be converted to Prove and Probable Mineral Reserves. This is due to the mine scheduling yielding positive financial results during the Pre-Feasibility Study (PFS) that was concluded in August 2021.

The tabulated Mineral Reserves are reported in Table 5-1.

**Table 5-1: Mineral Reserves Reported by Mogale (2021)**

| Dump | Tonnage | Gold | | |
|---|---|---|---|---|
| | Mt | g/t | kg | koz |
| **Probable** | | | | |
| 1L25 | 47.53 | 0.33 | 15,684.90 | 504,281 |
| 1L13 | 22.96 | 0.25 | 5,740.00 | 184,545 |
| 1L28 | 21.57 | 0.24 | 5,176.80 | 166,438 |
| 1L10 | 0.51 | 0.41 | 209.10 | 6,723 |
| **Total Probable** | **92.57** | **0.29** | **26,810.80** | **861,987** |

## 5.4 Mining Method and Operational Processes

A standard hydraulic remining method (as utilised in other tailings retreatment operations by Mogale) was used in compiling the preliminary mine design and scheduling. It is assumed that TSF 1L23-25 would be the first TSF to be retreated with mining commencing at the north western edge of the TSF, progressing south towards the pump station in a standard launder-haring bone style of reclamation. Individual cuts of reclamation are assumed to be no more than 20 m wide with a bench height of not more than 25 m. Face angles of 45° and less was used.

Once the 1L23-25 TSF has been reclaimed, mining will progress to the 1L13-15 TSF and the high-grade North Sand dump. A regrind mill would have been installed in the plant to cater for the regrinding of 250 ktpm of sand material.

Once 1L13-15 has been depleted, mining will progress to 1L28, 1L8 and 1L10 for the remainder of the life-of-mine. A total life of 13 years (153 months) is estimated on the Mogale Cluster TSFs.

The scheduling also assumes that all available material on the TSFs will be retreated and that no retainer walls or started walls for re-deposition will be left on the footprint.

## 5.4.1 Detailed Processed Description

### 5.4.1.1 Hydraulic Mining

The hydraulic mining circuit aims to effectively wash the reclaimed tailings into suspension by means of high-pressure water monitor guns. The liberated material from the tailings dam is collected in a satellite pit pumping station situated near the re-mining operations.

The slurry is then pumped over a vibrating screen (via a feed box) to separate out the trash. Undersize material is then collected in a surge tank equipped with a running / standby pumping configuration to pump material to slurry receiving. An event pond and spillage pump have been provided for, to pump any spillages back to the vibrating screen feed box.

### 5.4.1.2 Slurry Receiving and Trash Screening

Slurry from the hydraulic mining operations is pumped over two trash screens via a feed box. Trash is collected via the oversize chute in a bunker. Undersize material is collected in the 1,600 $m^3$ receiving surge tank equipped with agitation. The surge tank is dosed with lime (supplied via a ring main) to allow for pH correction before cyanidation takes place. Slurry is then pumped from the surge tank to the pre-oxidation tank via a running / standby pumping configuration.

A safety shower and spillage handling has been provided for in this area.

### 5.4.1.3 Carbon in Leach Circuit

The slurry is pumped to the pre-oxidation tank where lime is dosed to achieve a pH of >10 for cyanide safety. Oxygen is also added to this tank to ensure that the Dissolved Oxygen (DO) levels are adequate before the cyanide addition. Slurry from the pre-oxidation tank is pumped through eight Aachen shear reactors for particle surface cleaning and additional oxygen introduction into the slurry. The Carbon-in-Leach (CIL) tanks have been equipped with three spargers each through which oxygen is introduced at 4.5 BAR to enhance leaching kinetics and maintain DO levels in the circuit. Cyanide addition is possible in the first and second CIL tanks to allow for flexibility in operation. Additionally, lime dosing in tanks one to three have been allowed for and can be used for further pH corrections, if necessary.

### 5.4.1.4 Elution Circuit

Nine tonne of loaded carbon is transferred from the carbon harvesting screen to the measuring hopper. The batch is then transferred into the 9-tonne acid wash column. Concentrated HCl solution drawn from the concentrated HCl tank is mixed with water in the acid wash water tank yielding a 3% HCL solution. This solution is circulated through to the acid column at a flowrate of two bed volumes per hour (BV/hr) to remove chemically bound impurities. The acid solution is allowed to soak for a period of 60 minutes before it is rinsed out with one Bed Volume (BV) of water. Upon completion of the acid wash cycle, the solution is pumped to a neutralisation tank, where lime is added before being transferred to the tailings tank and then pumped to the TSF. Water is pumped through the acid wash column to neutralise the carbon and essentially to wash off all residual HCl before the elution cycle. This solution is then sent to the

neutralisation tank for lime dosing. Provision for caustic dosing has been made in the neutralisation tank in order to speed up the neutralisation process.

Acid washed carbon is then educed into either of the two 9 tonne elution columns operating at a pressure of 300 kPa. One BV of elution solution, containing 3% NaOH and 1% NaCN, is pumped from the strip solution make-up tank into the column. This solution is pre-heated to 125°C by recirculating the solution through the two-stage heat exchanger circuit. Once the operating pressure and temperature are achieved in the column, the solution soaks in the column for one-hour whereafter it is transferred to one of the CIL pregnant solution tanks (duty/standby) with an additional four BVs drawn from the intermediate tank passed through the elution column. On completion of the elution cycle, the carbon is rinsed and cooled by pumping four BV of soft water through the column and stored in the intermediate tank to be used in the next elution cycle.

Eluted carbon is educed from the column and reports to the carbon regeneration kiln via a sieve bend using pressurised water flow. Drained carbon is then fed to the kiln by means of a screw feeder at a rate of 750 kg/h dry solids and treated at a temperature of 700 to 800°C. The regenerated carbon is then transferred via a quench box into a regenerated carbon tank from where it is pumped with two pumps (one running, one standby) to the vibrating screen on top the last two CIL tanks. The screen undersize collects in the fines carbon tank before being pumped to the fines carbon treatment area, whilst the screen oversize is fed into either of the last two CIL tanks.

A system consisting of a tank and circulation pump is provided for descaling the heating equipment. Sulphuric acid would be pumped into the tank by means of an air pump after which the cleaning process can start. Safety showers, HCN, $NH_3$ gas detection and a two spillage pumps will be installed.

#### 5.4.1.5 Gold Room

Considering the requirement of two elution cycles per day, four dedicated pregnant solution tanks and four electrowinning cells have been allowed to ensure flexibility in operation and metal accounting targets are achieved.

The pregnant solution tank receives pregnant solution from the elution circuit. A running/ standby pumping configuration is used to circulate the solution through the electrowinning circuit consisting of two cells in parallel (per circuit). The electrowinning circulation continues for 18 hours, or until gold in solution value drops below a pre-set value measured by manual sampling, after which time the liquid is deemed barren and pumped back to the CIL.

Caustic solution is dosed into the pregnant solution tank aimed at creating elevated conductivity levels necessary for electrowinning and to protect the anodes against corrosion. Manual conductivity analysis will dictate the addition of caustic.

Cathodes removed from the electrowinning cell is transferred to the calcining ovens, whilst the sludge reports to the sludge settling tank. The sludge settling tank overflow is pumped to the CIL circuit.

Sludge from the sludge settling tank is transferred to the calcining oven after decanting the water. Product from the calcining oven is moved by hand to an induction smelting furnace. Borax, Silica, Potassium Nitrate and Sodium Carbonate is added to the furnace as flux chemicals to collect impurities in the melt and form a slag that will float on top of the molten gold.

Gold and slag from the furnace are decanted into the mould trolley where pure gold is recovered as the final product. The final product is kept in the safe with combination lock and key. The slag is crushed and pulverized before being introduced to the CIL circuit aiming to leach any gold encapsulated in the slag during the gold smelting process.

HCN and $NH_3$ gas detection will be installed, together with various extraction systems, safes, scales, and various security systems. Spillage pumps in the tank farm as well as in the gold room will be used to pump the spillage to various destinations.

#### *5.4.1.6 Tailings Disposal*

CIL tails is fed to two carbon recovery vibrating screens. The screen oversize is collected in a basket ensuring that any carbon passing through the CIL circuit is recovered. The screen undersize is collected in the final tailings disposal tank before being pumped to the TSF by means of a running / standby pumping configuration. Carbon fines, AMD sludge and trash spillage are also sent to the tailing's disposal tank.

A single spillage pump installed in the tailing's bund pumps the spillage to the final tailings tank. Provision for HCN, $NH_3$, a WAD cyanide monitoring system, as well as a safety shower has been made.

### 5.4.2 Infrastructure Associated with the Mine

Figure 5-3 represents a schematic and the final design and location of the processing plant is still being assessed and forms part of the DFS phase. This will be updated during the EIA phase. The plant infrastructure (refer to Figure 5-3 below) associated with the Mogale Tailings Retreatment Operations includes, but is not limited to:

- Process Water Dam;
- Offices;
- Change Rooms;
- Weighbridge;
- Acid Tanks;
- Carbon Regeneration Facility;
- Reagent Facility;
- Laboratory;
- Car Ports;
- Mini Substation;
- Elution Tanks;
- Workshop;
- Carbon Store;
- Elution Heaters;

- Tailings Disposal;
- Clean Water Tanks;
- PFC Yard;
- PCD Dam;
- CL Tank;
- Process Water Dam;
- Diesel Storage Tank;
- Transformers;
- Clarifier;
- Event Pond;
- MCC;
- Generator.

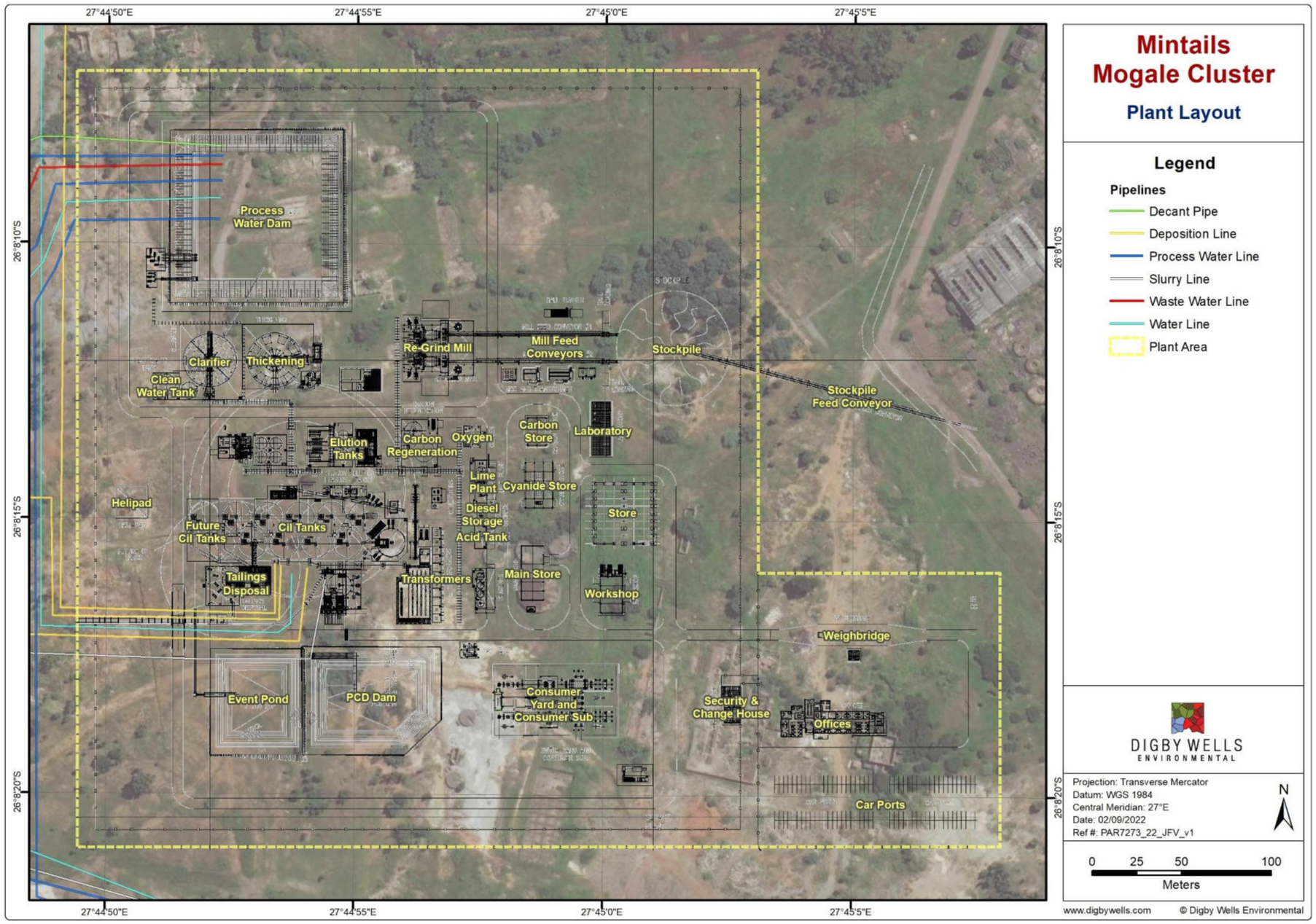



**Figure 5-3: Proposed Process Plant Infrastructure Layout**

## 5.5 Life of Mine

The current proposed Life of Mine (LoM) is 13 years.

## 5.6 Mine Battery Limits for Immediate Closure and LoM Closure Scenarios

The closure costing battery limits, cross referenced to the closure costing model (Section 22), for the immediate closure (current disturbance) and LoM closure scenarios are outlined in the table below.

**Table 5-2: LoM Closure Scenario**

| Closure Cost Component | Current Disturbance | Life of Mine |
|---|---|---|
| **Area 1**: New Plant and related dams (Layout B) | Not applicable. | Full decommissioning and rehabilitation. |
| **Area 2**: 9 Shaft remnant Mill and Main Plant | Demolish remnant concrete/brick structure and rehabilitate. | Not applicable. |
| **Area 3**: Tailings Storage Facilities (Rehabilitation monitoring and maintenance included) | TSFs: 1L23-1L25, 1L13-1L15, 1L28, 1L8 and 1L10 | Remaining side slopes and final rehabilitation of the West Wits in Pit TSF, new 1L23-1L25 North and South TSF. |
| **Area 4**: Sand Dumps | North and South Sand Dumps, CAM sand dump footprint and Outside Area. | Not applicable. |
| **Area 5**: Opencast Pits | Rehabilitate current disturbance for the West Wits Pit | In pit TSF rehabilitation included in Area 3. |
| **Area 6**: Water Storage Dams - Lancaster and Reticulation SW dams | Lancaster dam rehabilitation to address DWA directive. | Decommission and rehabilitate Storm Water Management Dams 1 and 2. |
| **Area 7**: Proposed Pump Stations | Not applicable. | Full decommissioning and rehabilitation for four pump stations and the reclamation site. |
| **Area 8**: Pipelines and Powerlines | Not applicable. | Dismantle and remove water supply pipelines, tailings pipelines and site powerlines. |

# PART A: FINAL REHABILITATION, DECOMMISSIONING AND MINE CLOSURE PLAN

## 6 NEMA Compliance Checklist

The Final Rehabilitation, Decommissioning and Mine Closure Plan (RCP) is structured to align with the minimum requirements set out in Section 3 of Appendix 4 of the Financial Provisioning Regulations, 2015 (as amended). The requirements are provided in Table 6-1 which includes reference to the relevant section where the requirement is addressed in this report.

**Table 6-1: Minimum Requirements of the Final Rehabilitation, Decommissioning and Mine Closure Plan (Financial Provisioning Regulations, 2015, as amended)**

| Ref | Requirement | Section |
|---|---|---|
| 3a | Details of-<br>(i) the person or persons that prepared the plan; and<br>(ii) the professional registrations and experience of the preparers. | See Page i at the beginning of this document |
| 3b | The context of the project, including—<br>(i) material information and issues that have guided the development of the plan;<br>(ii) an overview of—<br>aa) the environmental context, including but not limited to air quality, quantity and quality of surface and groundwater, land, soils and biodiversity; and<br>bb) the social context that may influence closure activities and post-mining land use or be influenced by closure activities and post-mining land use.<br>(iii) stakeholder issues and comments that have informed the plan; and<br>(iv) the mine plan and schedule for the full approved operations, and must include—<br>aa) appropriate description of the mine plan;<br>bb) drawings and figures to indicate how the mine develops;<br>cc) what areas are disturbed; and<br>dd) how infrastructure and structures (including ponds, residue stockpiles etc.) develops during operations. | See Section 5 at the beginning of the document<br>Section 7 (Part A)<br>Section 8 (Part A) |
| 3c | Findings of an environmental risk assessment leading to the most appropriate closure strategy, including—<br>(i) a description of the risk assessment methodology including risk identification and quantification, to be undertaken for all areas of infrastructure or activity or aspects for which a holder of a right or permit has a responsibility to mitigate an impact or risk at closure; | Section 9 (Part A) |

| Ref | Requirement | Section |
|---|---|---|
| | (ii) an identification of indicators that are most sensitive to potential risks and the monitoring of such risks with a view to informing rehabilitation and remediation activities;<br>(iii) an identification of conceptual closure strategies to avoid, manage and mitigate the impacts and risks;<br>(iv) a reassessment of the risks to determine whether, after the implementation of the closure strategy, the residual risk has been avoided and / or how it has resulted in avoidance, rehabilitation and management of impacts and whether this is acceptable to the mining operation and stakeholders; and<br>(v) an explanation of changes to the risk assessment results, as applicable in annual updates to the plan; | |
| 3d | Design principles, including—<br>(i) the legal and governance framework and interpretation of these requirements for the closure design principles;<br>(ii) closure vision, objectives and targets, which objectives and targets must reflect the local environmental and socio-economic context and reflect regulatory and corporate requirements and stakeholder expectations;<br>(iii) a description and evaluation of alternative closure and post closure options where these exist that are practicable within the socioeconomic and environmental opportunities and constraints in which the operation is located;<br>(iv) a motivation for the preferred closure action within the context of the risks and impacts that are being mitigated;<br>(v) a definition and motivation of the closure and post closure period, taking cognisance of the probable need to implement post closure monitoring and maintenance for a period sufficient to demonstrate that relinquishment criteria have been achieved;<br>(vi) details associated with any on-going research on closure options; and<br>(vii) a detailed description of the assumptions made to develop closure actions in the absence of detailed knowledge on site conditions, potential impacts, material availability, stakeholder requirements and other factors for which information is lacking. | Section 0 (at the beginning of this document)<br>Section 11 (Part A)<br>Section 12 (Part A)<br>Section 14 (Part A)<br>Section 15 (Part A)<br>Section 19 (Part A) |
| 3e | A proposed final post-mining land use which is appropriate, feasible and possible of implementation, including—<br>(i) descriptions of appropriate and feasible final post-mining land use for the overall project and per infrastructure or activity and a description of the methodology used to identify final post-mining land use, including the requirements of the operations stakeholders; and<br>(ii) a map of the proposed final post-mining land use. | Section 13 (Part A) |
| 3f | Closure actions, including— | Section 14 |

| Ref | Requirement | Section |
|---|---|---|
| | (i) the development and documenting of a description of specific technical solutions related to infrastructure and facilities for the preferred closure option or options, which must include all areas, infrastructure, activities and aspects both within the mine lease area and off of the mine lease area associated with mining for which the mine has the responsibility to implement closure actions; and<br>(ii) the development and maintenance of a list and assessment of threats and opportunities and any uncertainties associated with the preferred closure option, which list will be used to identify and define any additional work that is needed to reduce the level of uncertainty. | Section 16 |
| 3g | A schedule of actions for final rehabilitation, decommissioning and closure which will ensure avoidance, rehabilitation, management of impacts including pumping and treatment of extraneous water—<br>(i) linked to the mine works programme, if Greenfields, or to the current mine plan, if brownfields;<br>(ii) including assumptions and schedule drivers; and<br>(iii) including a spatial map or schedule, showing planned spatial progression throughout operations. | Section 18 (Part A) |
| 3h | An indication of the organisational capacity that will be put in place to implement the plan, including—<br>(i) organisational structure as it pertains to the plan;<br>(ii) responsibilities; and<br>(iii) training and capacity building that may be required to build closure competence. | Section 21 (Part A) |
| 3i | An indication of gaps in the plan, including an auditable action plan and schedule to address the gaps. | Section 17 (Part A) |
| 3j | Relinquishment criteria for each activity or infrastructure in relation to environmental aspects with auditable indicators. | Section 20 (Part A) |
| 3k | Closure cost estimation procedure, which ensures that identified rehabilitation, decommissioning, closure and post-closure costs, whether on-going or once-off, are realistically estimated and incorporated into the estimate, on condition that—<br>(i) cost estimates for operations, or components of operations that are more than 30 years from closure will be prepared as conceptual estimates with an accuracy of ± 50 per cent. Cost estimates will have an accuracy of ± 70 per cent for operations, or components of operations, 30 or less years (but more than ten years) from closure and ± 80 per cent for operations, or components of operations ten or less years (but more than five years) from closure. Operations with 5 or less years will have an accuracy of ± 90 per cent. Motivation must be provided to indicate the accuracy in the reported number and as | Section 22 (Part A) |

| Ref | Requirement | Section |
|---|---|---|
| | accuracy improves, what actions resulted in an improvement in accuracy;<br>(ii) the closure cost estimation must include—<br>aa) an explanation of the closure cost methodology;<br>bb) auditable calculations of costs per activity or infrastructure; and<br>cc) cost assumptions.<br>(iii) the closure cost estimate must be updated annually during the operation's life to reflect known developments, including changes from the annual review of the closure strategy assumptions and inputs, scope changes, the effect of a further year's inflation, new regulatory requirements and any other material developments. | |
| 3l | Monitoring, auditing and reporting requirements which relate to the risk assessment, legal requirements and knowledge gaps as a minimum and must include—<br>(i) a schedule outlining internal, external and legislated audits of the plan for the year, including—<br>aa) the person responsible for undertaking the audit(s);<br>bb) the planned date of audit and frequency of audit; and<br>cc) an explanation of the approach that will be taken to address and close out audit results and schedule.<br>(ii) a schedule of reporting requirements providing an outline of internal and external reporting, including disclosure of updates of the plan to stakeholders; and<br>(iii) a monitoring plan which outlines—<br>aa) parameters to be monitored, frequency of monitoring and period of monitoring; and<br>bb) an explanation of the approach that will be taken to analyse monitoring results and how these results will be used to inform adaptive or corrective management and/or risk reduction activities. | Section 19 (Part A) |
| 3m | Motivations for any amendments made to the final rehabilitation, decommissioning and mine closure plan, given the monitoring results in the previous auditing period and the identification of gaps as per 2(i). | Section 24 (Part A) |

# 7 Biophysical Closure Knowledge Base

This section describes the environmental knowledge base available to inform closure planning and is distilled from the information provided (Table 3-1). This section will be updated in annual iterations of this closure planning document, as more specialist studies become available to close the knowledge gaps identified.

## 7.1 Climate and Climate Change

As stated in the Scoping Report (2022) compiled by Digby Wells Environmental (DWE, 2022), the Project Area is characterised by a climate that is typical of the Gauteng Province with warm, wet summers and colder, dry winters (South African Weather Bureau, 1986). The town of Krugersdorp, which is 4 km from the Project Area, is generally warm and temperate with an average annual temperature of approximately 16.1 Degree Celsius (°C) (Climate-data.org). The climate here is classified as *Cwb* (Subtropical highland climate or monsoon-influenced temperate oceanic climate) by the Köppen-Geiger system (Köppen & Geiger, 1936). The mean annual rainfall is approximately 716 millimetres (mm) with the bulk of precipitation occurring in summer (November, December and January) with frequent thunderstorms. Annual average maximum, minimum and mean temperatures for the study area are given in Figure 7-1 below.

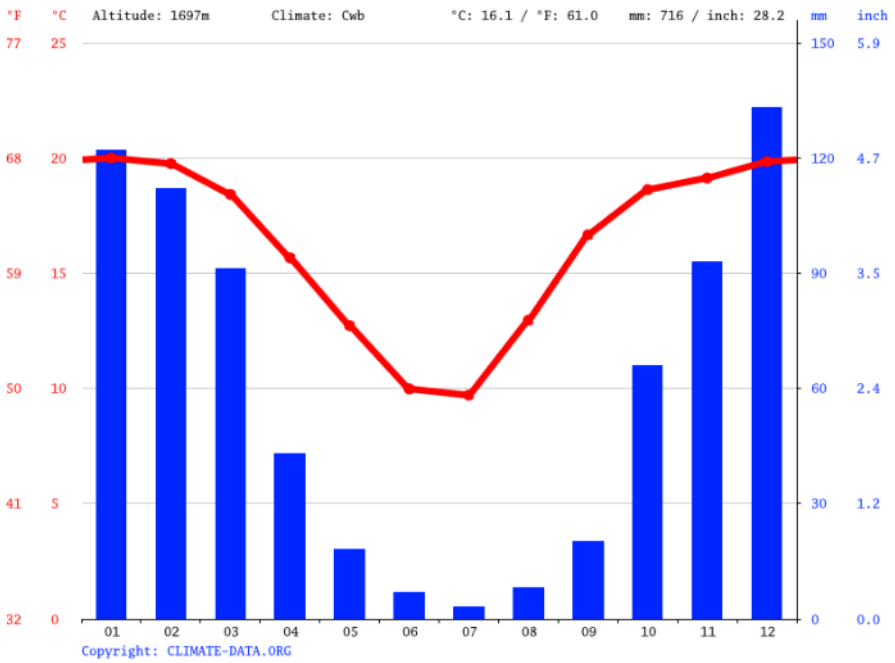



**Figure 7-1: Annual Climate trends in Krugersdorp[1]**

[1] Source: Climate-data.org

Total monthly and average precipitation values and monthly average temperature values are indicated in Table 7-1 and Table 7-2 respectively.

**Table 7-1: Total Monthly and Average Precipitation Values [2]**

| Precipitation (mm) | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Ann |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Monthly Rainfall (Max). | 204.2 | 115.1 | 70.9 | 46.2 | 6.9 | 4.1 | 0.5 | 8.6 | 53.1 | 178.3 | 148.6 | 228.1 | 1065 |
| Average Total Monthly Rainfall | 122.0 | 64.1 | 35.8 | 25.1 | 2.6 | 1.4 | 0.3 | 5.8 | 19.2 | 72.9 | 99.1 | 142.5 | 591 |

**Table 7-2: Monthly Average Temperature Values[3]**

| Temp(°C) | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Ann |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly Max. | 18.2 | 18.2 | 17.9 | 14.9 | 13.5 | 11.4 | 8.8 | 14.1 | 15.3 | 16.0 | 17.2 | 17.3 | **15.2** |
| Monthly Average | 13.2 | 12.8 | 11.6 | 6.9 | 4.8 | 3.2 | 2.4 | 4.0 | 7.4 | 9.1 | 9.5 | 12.4 | **8.1** |

The mean annual evaporation is estimated as 1,675 mm. The months with the highest evaporation are December, January and February, while July has the lowest value. The evaporation trend correlates to the rainfall trend but clearly higher evaporation is experienced than incident rainfall (DWE, 2022).

Reed and Stringer (2015) defines climate as “a statistical description of the weather, taking into account variables including temperature, wind speed and direction, and rainfall, over a long time period”. This period can range from more than 30 years to several millions of years. Climate change on the other hand refers to a variation in climate which continues over decades or longer, which is “statistically significant in terms of its mean state or its variability”.

Different models have been used to predict the increase in temperature, and studies that have used these models have indicated that the annual mean surface temperature could increase by 2 to 6 ºC by 2050. The rise in temperature will possibly lead to changes in the hydrological cycle (thus changes in evapotranspiration, precipitation, soil moisture and runoff) and possibly cause the inland areas of large continents to experience further drying (Verstraete & Schwartz, 1991; Ragab & Prudhomme, 2002).

[2] Source: Climate-data.org

[3] Source: Climate-data.org

The above mentioned should be taken into account as operations move closer to the closure and rehabilitation phase as this will affect the success of the rehabilitation activities with regards to vegetation establishment, growth and the sustainability thereof.

**Closure considerations**

- Cool, dry and windy winter's provide good conditions for desiccation of the environment and wind entrainment of loose material;
- Soil preparation, amelioration and seeding for rehabilitation purposes must be cognisant of good growing conditions provided by hot, wet summers;
- Post mining landform construction should be robust against increased storm events and based on geomorphic principles to combat soil loss to erosion;
- Additional storm water management measures should be based on dedicated hydrological modelling and consider extreme climate events (e.g., increased rainfall intensity, drought, severe frost);
- Potentially longer dry seasons should be considered in developing rehabilitation strategies and species selection; and
- Extreme climate events and climate change (e.g. increased rainfall intensity, drought, severe frost) could affect long term landform viability due to an increased risk of erosion.

## 7.2 Topography and Visual Aspects

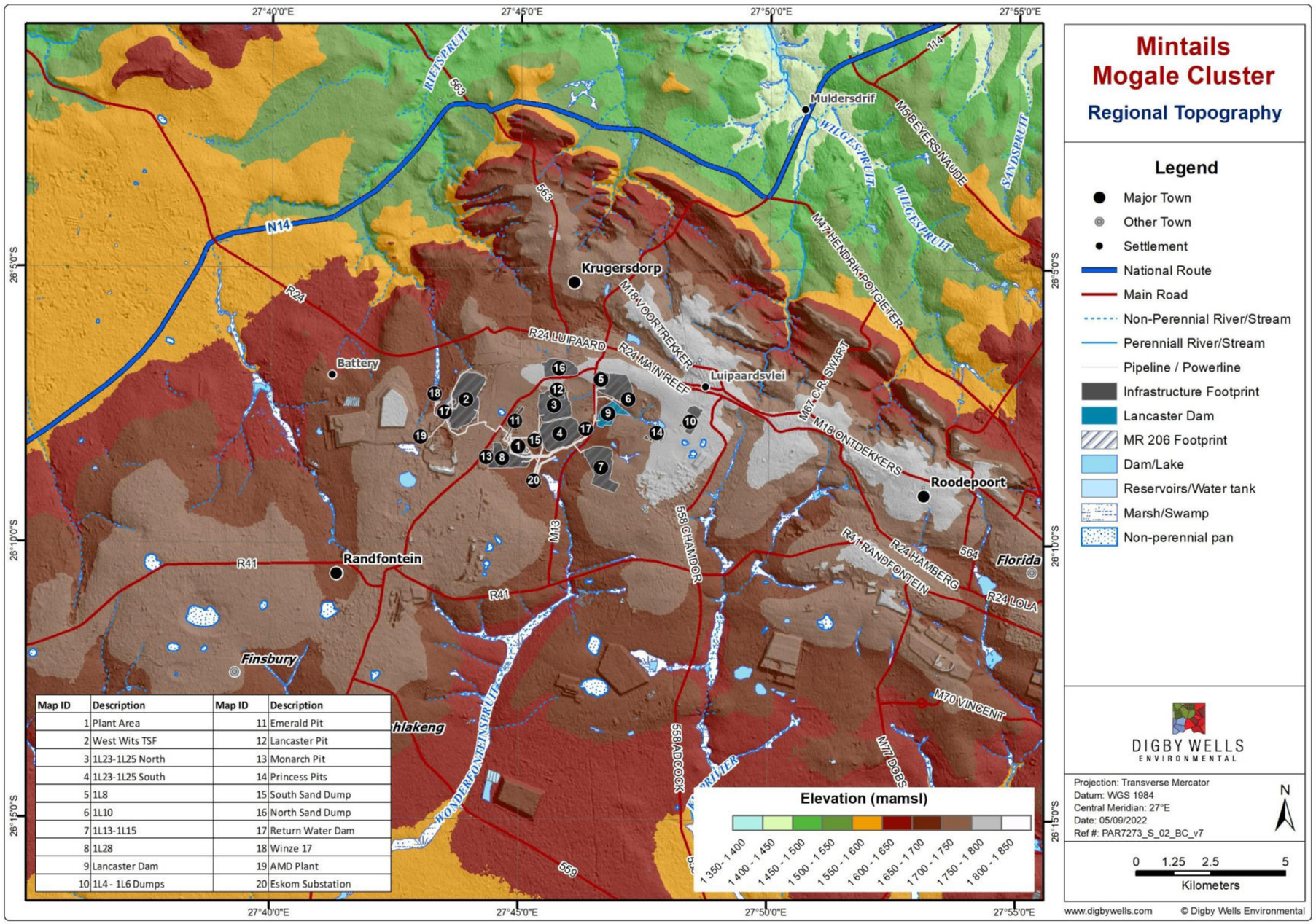
The regional topography has ridge and mountain features in the north-west and more undulating topography towards the eastern parts. The topography of MCLM ranges from 1,220 m above mean sea level (mamsl) in the east (northeast of the Magalies plain) to 1,840 mamsl at the Magaliesberg in the north-west (DWE, 2022).

The towns of Magaliesberg, Krugersdorp, Muldersdrift and Kagiso are located at higher elevations than Hekpoort and Maanhaarand. The ridges in the western sector of the municipality have a direct impact on development and activities. Municipal services such as sanitation and storm water are directly linked to the drainage patterns while the slope of the area determines where and what can be developed. There are limits to the slope on which urban development can take place and severe slopes might restrict crop farming or certain mining techniques. The topographical features of the western sector create a niche environment for agricultural, recreational and conservation activities (DWE, 2022).

The Mogale Project Area lies in the upper reaches of the Tweelopiespruit and is thus also a wide gently sloping valley to the north. The topography has been heavily impacted by historical mining activities, with the West Wits Pit leaving a deep incision and the overburden rock dumps round about altering the horizon (DWE, 2022).

**Closure considerations**

- Post mining landforms should be constructed to ensure alignment of surface water runoff with the surrounding macro-drainage framework;
- Ensure alignment with the commitments made in terms of the planned final end land-use; and
- Identify areas of high risk to erosion and devise additional storm water management measures to ensure long term landform viability.




| Map ID | Description | Map ID | Description |
|---|---|---|---|
| 1 | Plant Area | 11 | Emerald Pit |
| 2 | West Wits TSF | 12 | Lancaster Pit |
| 3 | 1L23-1L25 North | 13 | Monarch Pit |
| 4 | 1L23-1L25 South | 14 | Princess Pits |
| 5 | 1L8 | 15 | South Sand Dump |
| 6 | 1L10 | 16 | North Sand Dump |
| 7 | 1L13-1L15 | 17 | Return Water Dam |
| 8 | 1L28 | 18 | Winze 17 |
| 9 | Lancaster Dam | 19 | AMD Plant |
| 10 | 1L4 - 1L6 Dumps | 20 | Eskom Substation |

**Figure 7-2: Regional Topography**

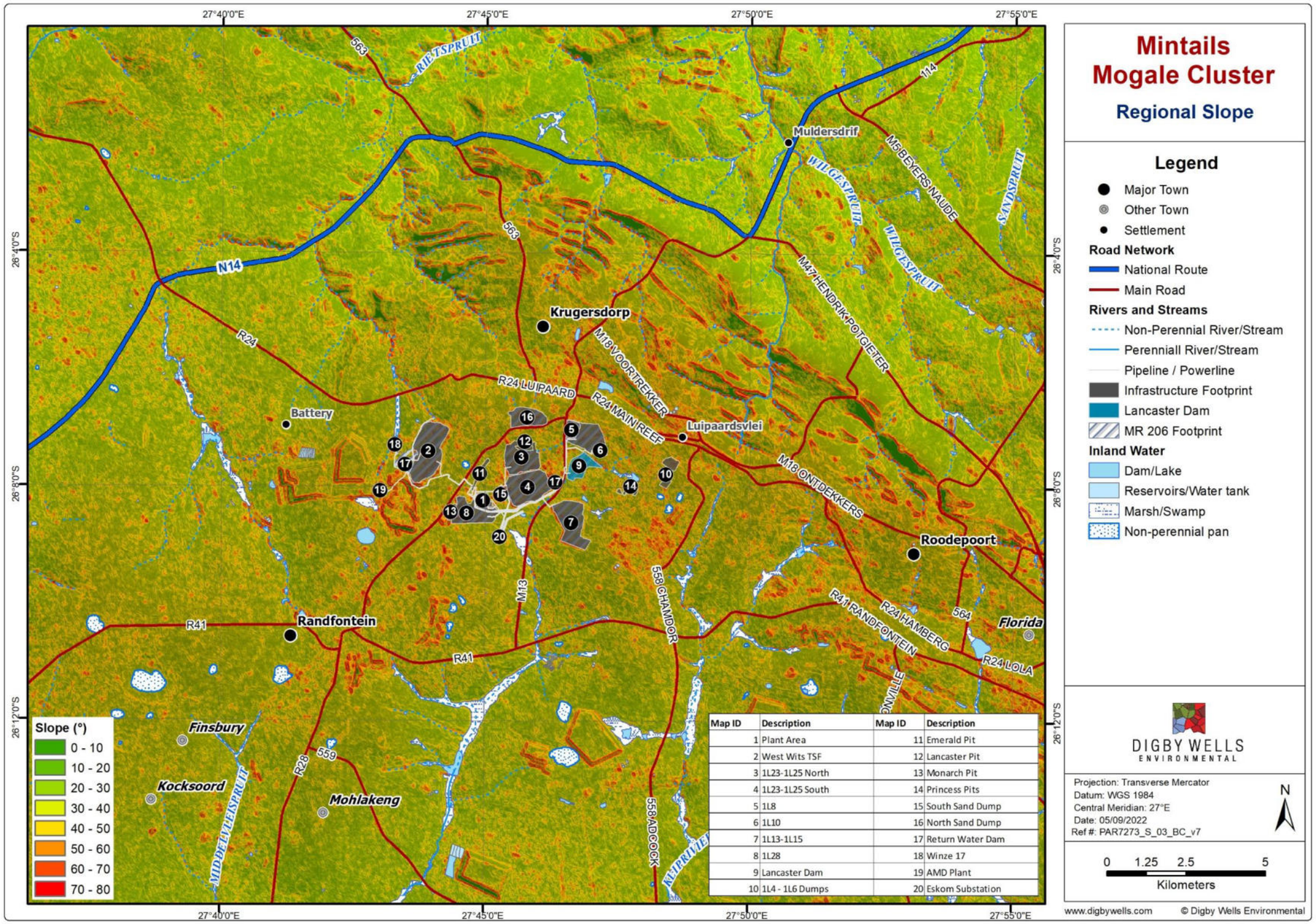



**Figure 7-3: Regional Slope of the Project Area**

## 7.3 Surface water

A surface water assessment was conducted by Digby Wells Environmental as part of the Environmental Authorisation Application Process in February 2022.

The Project Area is situated on a watershed divide of quaternary catchments A21D and C23D within the Vaal Water Management Area (WMA 5), and is located within the Western Water Basin of the West Rand area in Gauteng. The basin, as well as the proposed gold recovery operations, are situated on the continental watershed divide for two major transboundary rivers in South Africa namely the Orange River and the Limpopo River (DWE, 2022).

The Tweelopiesspruit runs adjacent to the proposed Project Area whereafter it drains through the Krugersdorp Game Reserve and further downstream, joins the Limpopo River. The Wonderfonteinspruit runs through the operations and feeds into the Orange River within the Vaal Water Management Area (refer to Figure 7-4 for the hydrological setting of the Project Area) (DWE, 2022).

The assessment outcomes indicate poor surface water quality in proximity to the TSFs (high acidity, elevated sulphates and TDS) and Lancaster Dam, upstream of the Wonderfonteinspruit and in tributaries of the Rietspruit (DWE, 2022).

Possible impacts on surface water resources of the proposed gold reclamation project include potential sedimentation from dust generated by reclamation activities, tailings spillages and leakages of hydrocarbon and general waste. Implementation of adequate storm water, erosion and sediment management measures will reduce the significancy of the identified potential impacts. Once the existing TSFs are removed through the proposed reclamation project, there will be a considerable reduction of pollutant sources (DWE, 2022).

Most of the Mogale infrastructure fall outside the 1:50-year and 1:100-year floodlines delineated as part of this assessment. Portions of the TSF 1L23-25 South and the RWD, encroach into the 1:50-year and 1:100-year flood lines. A berm constructed on the edges of the right riverbank at the point of contact will help to ensure separation of water resources from potentially contaminating TSF and RWD structures (DWE, 2022).

The current and proposed storm water storage structures (i.e. paddocks, berms and RWDs) in the reclamation areas, should be adequate to contain stormwater on site (DWE, 2022).

### Closure considerations

- Project footprints should be kept as small as possible to limit exposure of base areas to erosion
- Develop, implement and maintain a storm water management plan for the operational and closure phases;
- Ensure clean and dirty water separation throughout the operations aligned with the relevant legislation;
- Surface water quality monitoring should be implemented and continued throughout the LoM to establish a baseline for setting closure criteria aligned with the relevant authorisations;
- Surface water monitoring should continue for at least ten (10) years after closure or mining ceases; and
- Concurrent rehabilitation is to be undertaken as far as practical during the operational period to protect the integrity of surface water bodies.

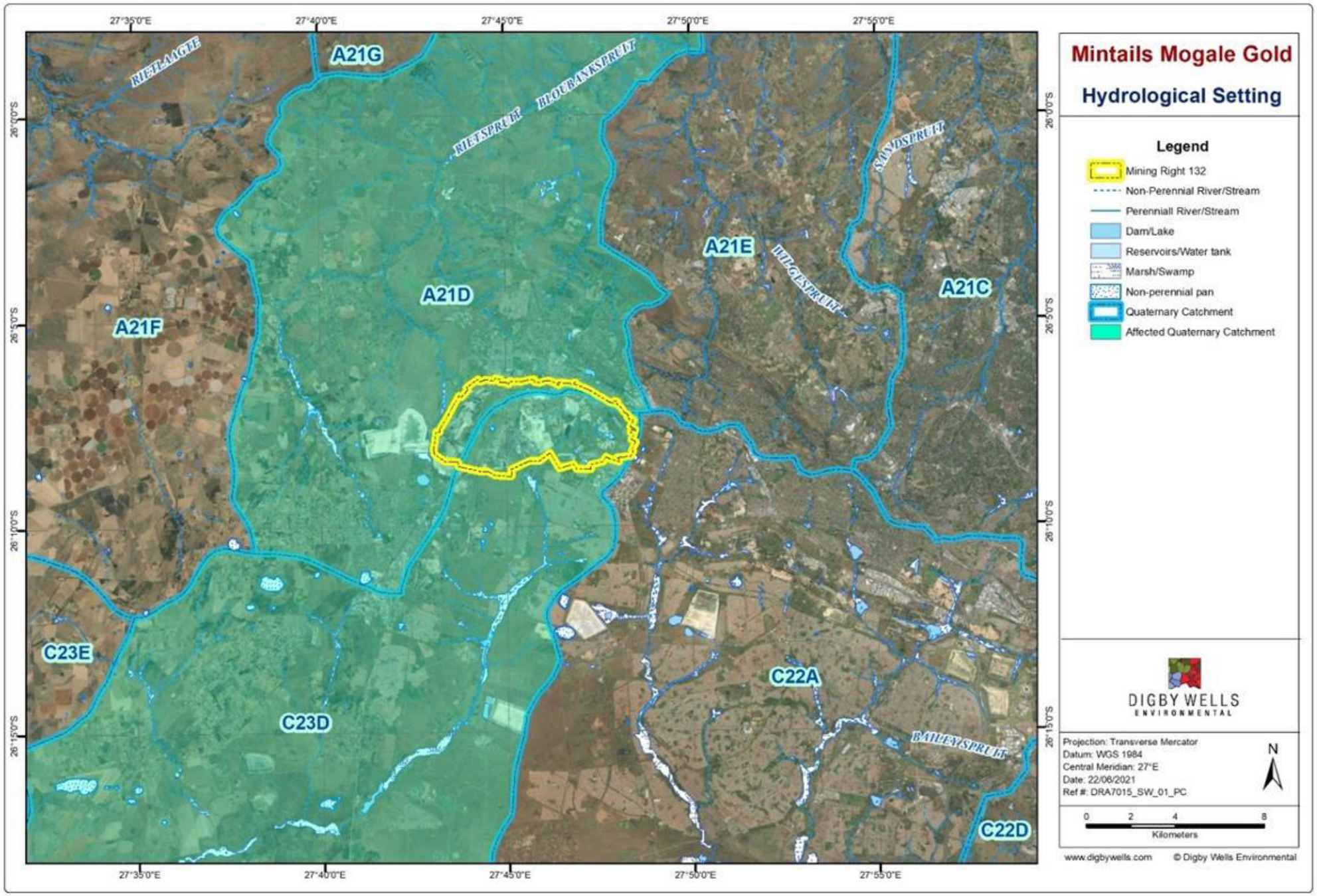



**Figure 7-4: Hydrological Setting of the Gold Recovery Project Site**

## 7.4 Wetlands and Hydropedology

A Wetland Impact Assessment Report was compiled as part of the Mogale Tailings Retreatment Operations Environmental Application Process in 2022 (DWE, 2022).

A wetland survey was conducted in October 2021 to delineate the wetlands within the Project Area and determine their Present Ecological State (PES), WET-EcoServices (EcoServices) and Ecological Importance and Sensitivity (EIS) values. The wetlands within the Project Area cover approximately 494.7 ha and were categorised into hydro-geomorphic (HGM) types, namely:

- Seasonal pan wetlands;
- Hillslope seepage wetlands;
- Valley bottom wetlands with a channel;
- Valley bottom wetlands without a channel; and
- Artificial wetlands.

The wetlands within the 500m zone of regulation of the proposed activities are currently impacted by historical mining activities. The wetland PES scores were categorised as Category E (Seriously Modified) and Category F (Critically Modified) wetlands. The EcoServices of the delineated wetlands were rated as Very Low to Moderately Low while the EIS scores were found to range from Low/Marginal to Moderate due to the modified nature of the wetlands (DWE, 2022).

A Wetland Rehabilitation Plan, to address historical impacts, was also compiled by Digby Wells Environmental in 2022 (DWE, 2022). The recommended rehabilitation actions include the following:

- Blocking and rehabilitating the roads which transect wetlands and using an alternative road;
- Fill trenches to reduce impacts to the wetland hydrology;
- Construct culverts to promote water flow;
- Level soil dumps to reduce the erosion potential and sedimentation within wetlands;
- Remove the AIPS, specifically the *Eucalyptus sp*. and *Acacia sp.* which are prevalent across the site;
- Remove berms to promote water flow across the wetland;
- Remove tailings sedimentation within and around the wetland and install sedimentation prevention berms; and
- Reprofile and rehabilitate areas to promote natural wetland conditions.

### Closure considerations

- Project footprints should be kept as small as possible to limit exposure of base areas to erosion;
- Implement concurrent rehabilitation as soon as practical during the operational period;
- Consider the functionality and continued connectivity of natural drainage features and wetlands in designing the post mining landforms; and
- Develop and implement an Alien Invasive Plant management plan to continually identify and remove invasive species.

## 7.5 Soils, Land Capability and Land Use

### 7.5.1 Land Type and Soil Forms

A Soils Scoping Report was compiled as part of the Mogale Environmental Application Process in 2022 (DWE, 2022). For the compilation of this report, existing land type and soil data was used to obtain generalised soil patterns and terrain types for the Project Area. Land Type data exists in the form of published 1:250 000 maps. These maps indicate delineated areas of similar climate and pedosystems which includes areas of uniform terrain and soil patterns (Land Type Survey Staff, 1972 - 2006).

According to the report, baseline data suggested that the land types for the Project Area are of the **Bb35** and **Ba36** types. The land types and dominant soil forms are briefly described below in Table 7-3 as per the Land Type Survey Staff (1972 - 2006) and illustrated in Figure 7-5 (DWE, 2022).

### Table 7-3: Land Type and Dominant Soil Forms

| Land Type | Soil Forms | Geology | Characteristics |
|---|---|---|---|
| **Ba35** | • Avalon<br>• Cartref<br>• Clovelly<br>• Dundee<br>• Fernwood<br>• Glencoe<br>• Glenrosa<br>• Hutton<br>• Katspruit<br>• Kroonstad<br>• Longlands<br>• Mispah<br>• Rensburg<br>• Westleigh<br>• Willowbrook | • Witwatersrand quartzite, slate, grit and conglomerate predominantly;<br>• Black Reef quartzite, shale, grit and conglomerate in the western part;<br>• Ecca shale and sandstone with occasional dolerite sills in the east;<br>• Sporadic occurrence of Basement Complex granite, dolomite and Ventersdorp lava mainly to the west; and<br>• Pans occupy 1% of land type. | • Red and yellow, dystrophic/mesotrophic, apedal soils with plinthic subsoils;<br>• Plinthic soils comprise >10% of the land type; and<br>• Red soils comprise >33% of the land type. |
| **Bb36** | • Avalon<br>• Clovelly<br>• Cartref<br>• Dundee<br>• Fernwood<br>• Glencoe<br>• Glenrosa<br>• Hutton<br>• Katspruit<br>• Kroonstad<br>• Longlands<br>• Mispah<br>• Rensburg<br>• Westleigh<br>• Willowbrook | • Witwatersrand quartzite, slate, grit and conglomerate predominantly;<br>• Black Reef quartzite, shale, grit and conglomerate in the western part;<br>• Ecca shale and sandstone with occasional dolerite sills in the east;<br>• Sporadic occurrence of Basement Complex granite, dolomite and Ventersdorp lava mainly to the west; and<br>• Pans occupy 0.4% of land type. | |

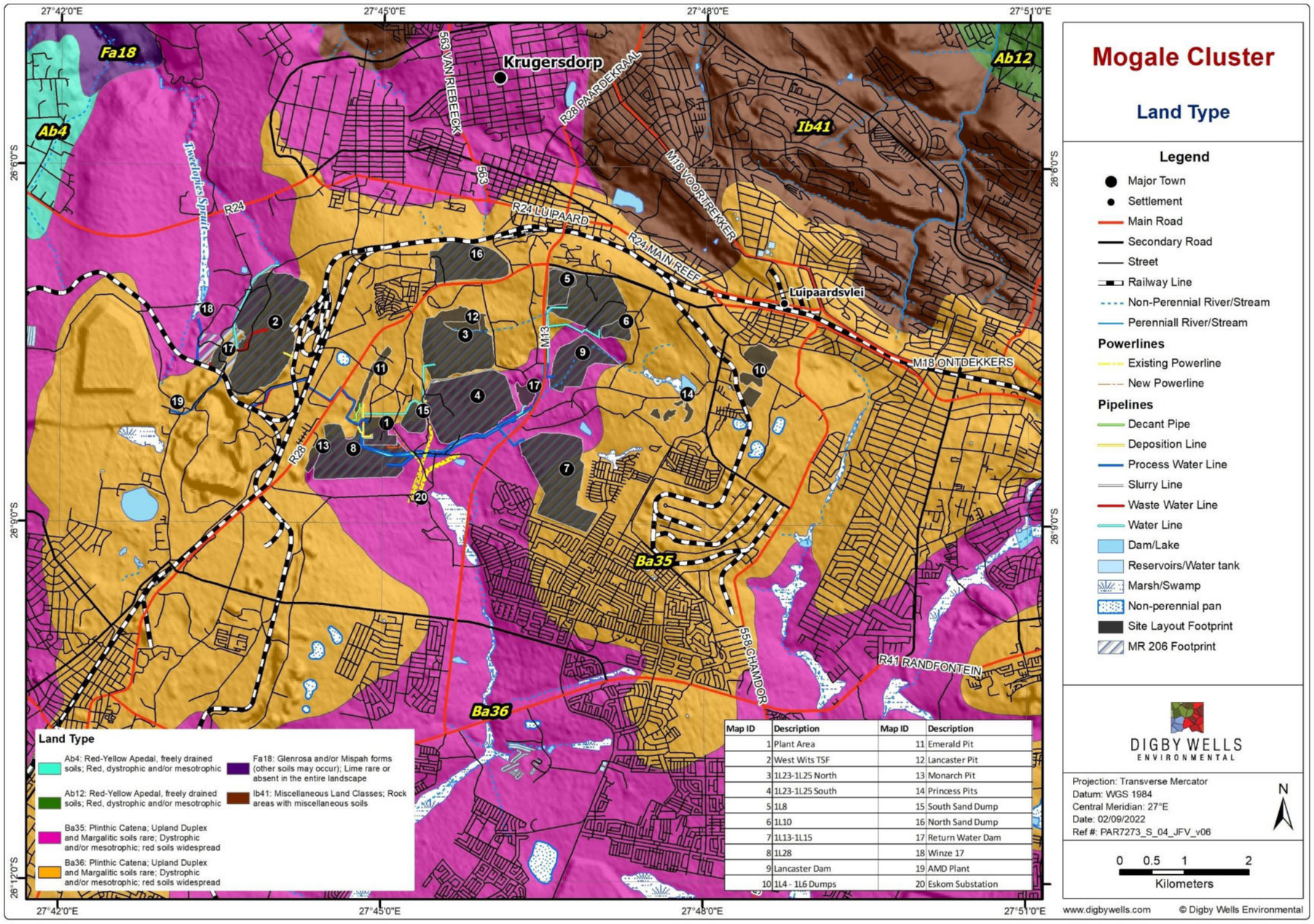



Figure 7-5: Land Type Map for the Project Area

### 7.5.2 Land Capability

The Soils Scoping Report states that the land capability was determined by assessing a combination of soil type, terrain and climate features. Land capability is defined as the most intensive long-term sustainable use of land under rain-fed conditions (Soil Conservation Service: U.S. Department of Agriculture, 1973; Schoeman, et al., 2000). The dominant land capability class in the Project Area is **Class III** (Arable Land – Moderate Cultivation/Intensive Cultivation). A detailed breakdown for the class is given below (Table 7-4) (DWE, 2022).

**Table 7-4: Land Capability Classification of the Project Area**

| Class | Classification | Dominant Limitation Influencing the Physical Suitability for Agricultural Use |
|---|---|---|
| III | Arable Land – Moderate Cultivation/Intensive Cultivation | Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both. |

Class III is described as Moderate Cultivation/Intensive Grazing land. The land may be used for cultivated crops, pasture, woodland, range, wildlife food or cover (DWE, 2022). Cultivation, timing of planting, tillage, harvesting and crop choice are limited due to:

- Steep slopes;
- High susceptibility to wind and water erosion, or adverse effects of past erosion;
- Frequent overflow, accompanied by crop damage;
- Slow permeability of the subsoil;
- High waterlogging;
- Shallow depths which limits the rooting zone and water storage;
- Low moisture-holding capacity;
- Low fertility;
- Moderate salinity/sodium; and
- Moderate climatic conditions.

### 7.5.3 Land Use

As part of the EIA done for the Mogale Environmental Application Process, the dominant land uses were identified during the desktop assessment utilizing aerial imagery, and verified during a site survey (DWE, 2021). The dominant land uses include the following:

- Historical mining areas (including TSF tailings material, infrastructure, mine dams and artificial wetlands due to mining activities);
- Historical and current Illegal Mining Activities (IMA) areas (e.g. excavations, stockpiles, mine pits, infrastructure and scattered houses);

- Agricultural areas (grazing, historical and current cultivated areas, infrastructure, dams, roads, houses and feeding lot);
- Anthropological activities (e.g. infrastructure, developed areas, dump sites, roads, railways); and
- Wetlands / grazing areas.

The current impacts to the soils, land use and land capability are mainly associated with historical and current mining activities (i.e., mine pits, TSFs and infrastructure), anthropological activities (i.e. historical land fill sites, roads, dams, powerlines, pipelines, culverts and bridges) and agricultural activities. The area is heavily impacted with large areas of erosion gullies, sedimentation into the low-lying areas, tailings material scattered throughout the area, large excavations and infillings, informal mine pits and infrastructure (DWE, 2021).

IMA is currently a major activity / land use in the area, causing various impacts to the soils, geomorphology and land. The area is excavated to extensive depths, specifically within low lying areas and wetlands, affecting the functionality thereof and causing large areas of sedimentation and potential soil and water contamination (DWE, 2021).

**Closure considerations**

- The large-scale removal of TSFs and the rehabilitation of the cleared footprints will open these areas to beneficial land uses, although limited by the lack of topsoil conservation during historical mining activities;
- Suitable chemical and physical amelioration measures must be devised to rehabilitate in situ material (subsoils related to TSF footprints) based on dedicated fertility sampling, analysis and interpretation of results.
- Accepted soil management principles should be adhered to on-site for infrastructure development, including but not limited to: Reduce the affected footprint as far as possible, limit traffic over soil, limit the height of soil stockpiles and utilise suitable equipment to strip, stockpile and replace soils;
- The stripped soils should be replaced to specified depths over backfilled areas and the cleaned stockpile footprint. The compaction must be alleviated prior to amelioration and revegetation once the stockpiles are removed; and
- Monitoring and maintenance programmes should be developed to ensure rehabilitation success.

## 7.6 Geology and Groundwater

### 7.6.1 Regional Geology

According to the Soils Scoping Report, the Project Area is situated within the Witwatersrand Supergroup (DWE, 2022). The West Rand and Central Rand Groups are collectively known as the Witwatersrand Supergroup (refer to Figure 7-6). Economic concentrations of gold are mainly found on the northern and western margins of the Witwatersrand Basin (McCarthy, 2013).

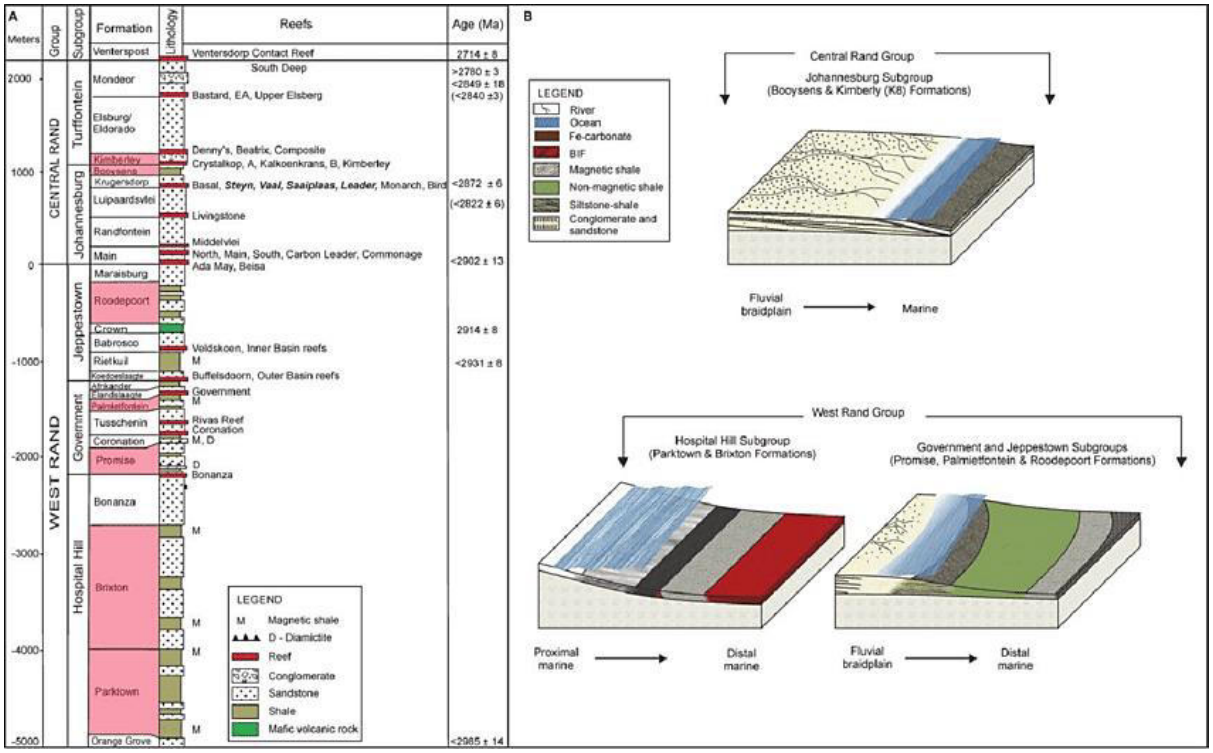



**Figure 7-6: Stratigraphic column of the Witwatersrand Supergroup**
(Nwaila, Frimmel, & Minter, 2017)

### 7.6.2 Local Geology

The Project Area consists mostly out of the following geology (refer to Figure 7-7):

- Rbo: Shale and subordinate quartzite;
- Rg: Quartzite, shale and minor/subordinate conglomerate;
- Rjo: Quartzite, subordinate conglomerate, shale and amygdaloidal lava;
- Rk: Tholeiitic basalt;
- Rt: Quartzite and conglomerate;
- Vbr: Quartzite, subordinate conglomerate and shale; and
- Vma: Dolomite, subordinate chert, minor carbonaceous shale, limestone and quartzite.

The area is highly faulted, folded and eroded, resulting in a complex geology with varied rock formations (Golder Associates Africa (Pty) Ltd, 2014; Golder Associates Africa (Pty) Ltd, 2014b). The geology includes, in chronological order:

- Witwatersrand Supergroup;
- Ventersdorp Supergroup;
- Transvaal Supergroup; and
- Karoo Supergroup.

Dykes and sills of at least four different ages have intruded the Witwatersrand strata. The intrusion of the dykes has often taken place along fault planes (Golder Associates Africa (Pty) Ltd, 2014; Golder Associates Africa (Pty) Ltd, 2014b). The oldest dykes are usually diabase, representing feeder dykes to the overlying Ventersdorp lavas. There are intrusions of pyroxenite, gabbro and dolerite, probably of Bushveld age. A third group belongs to the basic or alkaline dyke swarm related to the Pilanesberg alkaline complex. Finally the youngest intrusions are of Karoo dolerite (Golder Associates Africa (Pty) Ltd, 2014; Golder Associates Africa (Pty) Ltd, 2014b).

The conglomerates within the Witwatersrand Supergroup comprise numerous reefs, namely: Main, South, North, Johnstone, Livingstone, White, Monarch, Upper Monarch, Leopard, Kimberley North, Boulder and Battery reef (Golder Associates Africa (Pty) Ltd, 2014). One major fault, the Witpoortje Fault, traverses the area in a concave nature. Numerous other faults parallel to the Witpoortje Fault are present in the north-eastern portion of the area. There are no sills evident in the area (Golder Associates Africa (Pty) Ltd, 2014).

**Closure considerations**

- Continually develop the body of knowledge and understanding of how the flow and mass transport of the area is influenced by geological structures in relation to the hard rock aquifer;
- Understanding of how the opencast and underground mining activities intercept and interact with the local geology; and
- Ensure potential preferred pathways through fault zones that could contain highly transmissive fracture zones, and the role of the intrusive dykes are understood and incorporated into the geohydrological models.

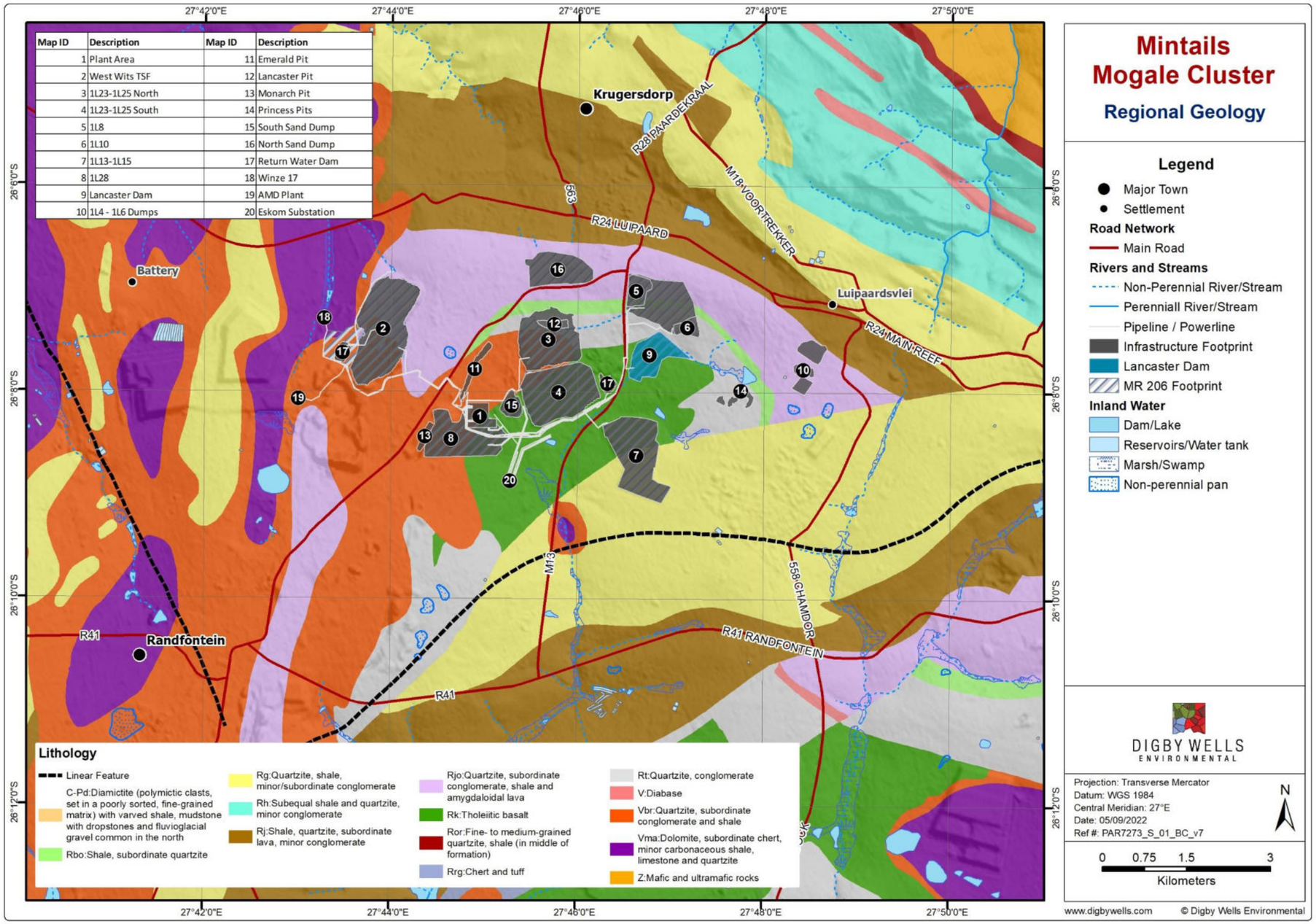



**Figure 7-7: Geology of the Project Area**

## 7.7 Groundwater

### 7.7.1 Site Specific Aquifers and Current Baseline

A Hydrogeological Specialist Study was conducted by Digby Wells Environmental as part of the Mogale Environmental Application Process. This study determined that there are four aquifer layers at the Project Area, namely the top weathered aquifer, the fractured aquifer, the dolomitic aquifer and the mine void aquifer (DWE, 2022).

The shallow aquifer is in direct contact with the existing historical TSFs and is vulnerable to contamination due to seepage. Many of the shallow boreholes (less than 30 m deep) are highly contaminated with sulphate reaching up to a maximum of 6000 mg/L. This is significantly higher than the 400 mg/L drinking standards (SAWQG, 1998). The unlined TSFs are also rich with pyrite and are exposed to oxidation reaction which results in acidic (low pH) solution. As rainfall infiltrates through the tailings, the acidic water infiltrates to the shallow aquifer, dissolving and transporting Fe, Mn and other metals on its way.

The average groundwater flux (Darcy velocity) along the weathered zone is in the order of mm/year at the project site. This is not unusual rate for groundwater, but it means that, even if the tailings are removed, it will take decades for the plume that is already existing on site to be flushed away under natural groundwater flow. One option of enhancing the removal of the plume is to pump and treat the polluted water from boreholes.

The fractured aquifer and dolomitic aquifers are generally cleaner than the weathered aquifer. Once the shallow aquifer is contaminated from the TSF seepage, the groundwater dominantly flows laterally towards the local streams and rivers. Unless there are sub-vertical permeable structures connecting the fractured aquifer with the shallow aquifer, the contamination plume is mostly restricted in the shallow aquifer and the streams. The sulphate level in the fractured and dolomitic aquifers are usually less than 150 mg/L.

The mine void aquifer is sampled at the shafts for quality assessment. The water quality of all the shafts is similar as they are interconnected. The mine void quality has been improving continuously from approximately 4000 mg/L in 2009 to 648 mg/L in 2021. Dissolved metals and TDS have also shown similar improving trends. The Department of Water and Sanitation (DWS), through Trans Caledon Tunnel Authority (TCTA) pumping and treatment activities of the mine void aquifer seem to be playing a major role on this.

The groundwater elevation in the top weathered aquifer is not connected with the mine void, as it mimics the topography. The flow direction follows the topography and is towards the local streams.

The hydraulic head and groundwater flow direction in the mine void is controlled by the decant, abstraction that is taking place at 9 Shaft, mine interconnectivity, and geological structures connecting the mine void with the shallow aquifer. When mining was discontinued in the area, it started to flood and, in September 2002, the mine water started to decant at the Black Reef Incline next to the Tweelopie East Stream. The decant point, referred to as the Black Reef

Incline (BRI), is at an elevation of 1662.98 mamsl. This decant is currently under control with the ongoing pump and treat taking place from 9 shaft.

### 7.7.2 Current and Historical Impacts from TSFs

The historical TSFs in the region are not lined and seepage is contaminating the underlying aquifer. Many of the shallow boreholes (less than 30 m deep) are highly contaminated with sulphate reaching up to a maximum of 6000 mg/L. This is significantly higher than the 400 mg/L drinking standards (Department of Water Affairs and Forestry, 1996). The unlined TSFs are also rich with pyrite and are exposed to oxidation reaction which results in acidic (low pH) solution. As rainfall infiltrates through the tailings, the acidic water infiltrates to the shallow aquifer, dissolving and transporting Fe, Mn and other metals on its way (DWE, 2022).

The fractured aquifer and dolomitic aquifers are generally cleaner than the weathered aquifer. Once the shallow aquifer is contaminated from the TSF seepage, the groundwater dominantly flows laterally towards the local streams and rivers. Unless there are sub-vertical permeable structures connecting the fractured aquifer with the shallow aquifer, the contamination plume is mostly restricted in the shallow aquifer and the streams. The sulphate level in the fractured and dolomitic aquifers are usually less than 150 mg/L (DWE, 2022).

### 7.7.3 Cumulative Impacts from All Sources

There are a few municipal waste dump, sewage wastewater treatment plants and mines operating in West Rand. Sources of future surface and groundwater impacts in the affected catchments will therefore not be from the old TSFs reclamation only.

The current water qualities of the Tweelopiespruit and the Wonderfonteinspruit are poor. This is mainly due to decant from the old mine workings, seepage from the unlined TSFs and also discharge of partially treated mine water. There is also a Waste Water Treatment Plant that discharges into the catchments and this could possibly have contributed onto the existing water quality status.

The closure and rehabilitation of the old TSFs and surrounding pits will definitely have a positive impact on the surface and groundwater environment. However, a rehabilitation strategy that encompasses the nearby mines and municipal treatment activities is required for a lasting improvement with a regional footprint.

**Closure considerations**

- Groundwater quality and levels monitoring should be implemented and continued throughout the LoM to establish a baseline for setting closure criteria aligned with the relevant authorisations;
- Develop and regularly update a geohydrological model, geochemical model and a salt and water balance for the operational and closure phases;
- Removal of the current TSFs, sand dumps and resulting footprint rehabilitation will definitely have a positive impact on the surface and groundwater environment.;
- The West Wits Pit planned as an In pit TSF is hydraulically linked to the underground workings, Potential water make from the Pit TSF will be captured in the existing pumping and treatment operation for reuse;
- Consolidating reprocessed tailings on two previously disturbed footprints will have a limited continued impact on ground water qualities; and
- Groundwater quality and levels monitoring should continue for at least ten (10) years after closure or when mining ceases.

## 7.8 Fauna and Flora

### 7.8.1 Vegetation type and habitat

The Project Area is situated in the Soweto Highveld Grassland (Mucina & Rutherford, 2006). This vegetation was previously classified as the veld type *Themeda*-veld by Acocks (1988). *Themeda* veld comprises a dense grassland, with limited trees, dominated by the climax grass *Themeda triandra* (Red Grass). Other dominant grasses include *Elionurus muticus, Eragrostis racemosa, Heteropogon contortus* and *Tristachya leucothrix*. This veld type is known to occur in association with black turf soils. Although a dominant grassland vegetation, shrubland can occur on rocky outcrops where there is protection from fire and grazing (Mucina & Rutherford, 2006). In general, the higher the rock cover, the higher the relative cover of woody species to herbaceous species (DWE, 2021).

The Fauna and Flora Specialist Study conducted by Digby Wells Environmental as part of the Mogale Environmental Application Process indicated that the Project Area is in a heavily modified state due to numerous historic anthropogenetic alterations such as: extensive gold reef mining resulting in large unexploited mine dumps; and continued illegal mining of these dumps and scavenging of old mining infrastructure. These alterations have modified the landscape from its natural grassland state. Within certain areas adjacent to the disturbed

portions, patches of grassland vegetation can be found which is interspersed with rocky outcrops and riparian vegetation (DWE, 2021).

The following vegetation communities were identified during a site visit conducted as part of the specialist study (September 2021):

- Grassland (Modified) Community - dominant graminoid component as well as a moderate forb component;
- Rocky Grassland - occurs across the dolomite and quartzite geology of the area;
- Wetland Vegetation – vegetation mostly associated with the wetlands; and
- Transformed - large portions of natural vegetation which have been replaced by alien vegetation.

### 7.8.2 Flora Species of Conservation Concern

A total of 109 plant species were recorded during the single season visit in September 2021. Of these, no Species of Conservation Concern (SCC) were encountered (DWE, 2021).

### 7.8.3 Declared Alien Invasive species

The cumulative impacts of the land and habitat alterations have resulted in the establishment of Alien Invasive Plant (AIP) species in the transformed habitats as well as within identified vegetation communities (DWE, 2021).

Forty (40) invasive or alien species were recorded during the site visit and categorised according to the Alien and Invasive Species Lists, 2014 (GN R599 in *GG* 37886 of 1 August 2014) of the NEMBA (Act 10 of 2004) (DWE, 2021).

Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM:BA):

- Category 1a: Species requiring compulsory control;
- Category 1b: Invasive species controlled by an invasive species management programme;
- Category 2: Invasive species controlled by area; and
- Category 3: Invasive species controlled by activity.

The table below (Table 7-5) lists the recorded AIPs and their respective NEM:BA category listing.

**Table 7-5: Aline Invasive Plants Recorded on site**

| *Scientific Names* | *Common Names* | *Habitat* | *NEM:BA Category* |
|---|---|---|---|
| *Acacia mearnsii* | *Black Wattle* | *Tree* | *2* |
| *Argemone ochroleuca* | *Mexican Poppy* | *Herb* | *1b* |

| *Scientific Names* | *Common Names* | *Habitat* | *NEM:BA Category* |
|---|---|---|---|
| *Arundo donax* | *Spanish Reed* | *Grass* | *1b* |
| *Canna indica* | *Indian Shot* | *Herb* | *1b* |
| *Cirsium vulgare* | *Scotch Thistle* | *Herb* | *1b* |
| *Cortaderia selloana* | *Pampas Grass* | *Grass* | *1b* |
| *Datura stramonium* | *Common Thorn Apple* | *Herb* | *1b* |
| *Eucalyptus camaldulensis* | *River Red Gum* | *Tree* | *1b* |
| *Gleditsia triacanthos* | *Honey Locust* | *Tree* | *1b* |
| *Melia azedarach* | *Syringa* | *Tree* | *1b* |
| *Morus alba* | *White Mulberry* | *Tree* | *3* |
| *Opuntia ficus-indica* | *Sweet Prickly Pear* | *Tree* | *1b* |
| *Pennisetum clandestinum* | *Kikuyu Grass* | *Grass* | *1b* |
| *Phytolacca octandra* | *Forest Inkberry* | *Herb* | *1b* |
| *Populus x canescens* | *Grey Poplar* | *Tree* | *2* |
| *Solanum mauritianum* | *Bugweed* | *Tree* | *1b* |
| *Solanum sisymbriifolium* | *Dense-thorned Bitter Apple* | *Herb* | *1b* |
| *Tamarix ramosissima* | *Pink Tamarisk* | *Tree* | *1b* |
| *Verbena bonariensis* | *Wild Verbena* | *Herb* | *1b* |
| *Verbena rigida* | *Veined Verbena* | *Herb* | *1b* |

(DWE, 2021).

### 7.8.4 Mammals

The survey conducted by Digby Wells (2021) recorded very few mammals within the Project Area. The low count is primarily due to the modified nature and the on-going anthropogenic activities within the site. A total of five (5) mammal species were recorded within the Project Area, namely Cape Ground Squirrel (*Xerus inauris*), Yellow Mongoose (*Cynictis penicillata*), Scrub Hare (*Lepus saxatilis*), African Mole Rats (*Cryptomys hottentotus*) and Brown Rat (Rattus norvegicus) (DWE, 2021).

No mammal Species of Conservation Concern (SCC) were recorded from the surveys. Aligned with the minimum requirements from GDARD, the following mammal species were specifically searched for in the wetland habitat: Rough-haired Mole (Chrysospalax villosus) (VU), White-tailed Mongoose (*Mystromys albicaudatus*) (EN), African Clawless Otter (*Aonyx capensis*) (LC), Spotted-necked Otter (*Lutra maculicollis*) (NT), Highveld Golden Mole (*Amblysomus septentrionalis*) (NT) and African Marsh Rat (*Dasymys incomtus*) (LC) and none were confirmed. This does not necessarily infer that they do not occur in this region at all (DWE, 2021).

### 7.8.5 Birds

According to the SABAP2, 207 species of birds have been identified in the area (DWE, 2021), most of these birds are comprised of grassland species. The infield assessment recorded twenty-one (21) species of birds with no record of listed or Red Data species within the Project Area (Table 7-6). An unexpected sighting of a Paleartic migrant (non-breeding), the European Nightjar, was recorded adjacent to the Rocky Grassland near the II10 tailings. This is not a listed species, but is known to migrate in the winter mainly in the south and east of Africa and therefore an unusual occurrence in the disturbed area (DWE, 2021).

**Table 7-6: Birds recorded at site**

| Scientific Name | Common Name | Conservation Status |
|---|---|---|
| *Acridotheres tristis* | Common Myna | Least concern |
| *Acrocephalus baeticatus* | African Reed-Warbler | Least concern |
| *Alopochen aegyptiacus* | Egyptian Goose | Least concern |
| *Anas erythrorhyncha* | Red-billed Teal | Least concern |
| *Anas undulata* | Yellow-billed Duck | Least concern |
| *Apus affinis* | Little Swift | Least concern |
| *Apus caffer* | White-rumped Swift | Least concern |
| *Bubulcus ibis* | Cattle Egret | Least concern |
| *Charadrius tricollaris* | Three-banded Plover | Least concern |
| *Colius striatus* | Speckled Mousebird | Least concern |
| *Elanus caeruleus* | Black-shouldered Kite | Least concern |
| *Euplectes orix* | Southern red Bishop | Least concern |
| *Euplectes progne* | Longtailed Widow | Least concern |
| *Plocepasser mahli* | White-browed sparrow-weaver | Least Concern |
| *Ploceus velatus* | Masked Weaver | Least concern |
| *Saxicola torquatus* | African Stonechat | Least concern |
| *Streptopelia capicola* | Cape Turtle Dove | Least concern |
| *Streptopelia senegalensis* | Laughing Dove | Least concern |
| *Vanellus coronatus* | Crowned Plover | Least concern |
| *Vanellus lugubris* | Lesser Blackwinged Plover | Least concern |
| *Caprimugus europaeus* | European Nightjar | Least concern |

### 7.8.6 Herpetofauna (Reptiles and Amphibians)

Based on the fauna and flora assessment conducted by Digby Wells (2021), the presence of rupicolous (rock-dwelling) habitat was identified and two reptile species were encountered within this portion, a Common Girdled Lizard (*Cordylus vittifer*) and Southern Rock Agama (*Agama atra*).

No amphibian species were recorded during the time of the survey, this may be due to the timing as it was not the optimal season and poor water quality of the watercourses not suitable for many amphibious species within the Project Area. The species assemblage was expectantly low as the few remaining terrestrial and aquatic habitats are fragmented and isolated due to the anthropogenic activities (DWE, 2021).

**Closure considerations**

- Limit vegetation clearing to the minimum area required for construction and operations;
- Develop rehabilitation methodologies that will ensure post mining vegetation communities congruent with the surrounding communities and promote habitat cohesion and functionality;
- Endemic vegetation species should, as far as possible, be utilised with rehabilitation, thereby facilitating the achievement of biodiversity and visual/aesthetic objectives for mine closure where practical;
- Rehabilitate all disturbed areas as soon as possible;
- Actively monitor and manage (eradicate) alien invasive species throughout the operations; and
- Actively continue surveys for Red List and protected flora across the proposed Project development footprints and implement a relocation programme for these species, prior to initiation of any construction activities.

## 7.9 Heritage and Palaeontology

Digby Wells undertook a pre-disturbance survey in October 2021 (DWE, 2021). During this assessment, five heritage resources within the proposed Project Area were identified – two burial grounds and graves, one layer of historical material which may comprise a historical landfill (or similar dump), one historical structure and one historical *werf*. These heritage resources have negligible to very high Cultural Significance. Table 7-7 below, presents a summary of the Cultural Significance of the identified heritage resources (DWE, 2021).

**Table 7-7: Summary of the Cultural Significance of Identified Heritage Resources**

| Resource ID | Description | INTEGRITY | Cultural Significance |
|---|---|---|---|
| BGG01 and BGG02 | Burial grounds and graves | 4 | Very High |
| Historical Landfill | Concentrated layer of historical material that may represent a landfill | 2 | Low |
| STE01 | Historical Structure | 1 | Negligible |
| Wf01 | Historical werf | 1 | Negligible |

Given their location relative to the proposed infrastructure and the preferred plant location, no heritage impacts are envisaged. However, there is the potential that the proposed Eskom and Plant Switch Yards and pipeline routes could impact on the Historical Landfill Site. The table below presents a summary of this assessment (DWE, 2021).

Additionally, the proposed Project presents a risk of direct negative impact to heritage resources that may exist within the Project area and which have not been identified to date. The table below summarises the risk to these resources.

**Table 7-8: Summary of the Potential Risk to Heritage Resources**

| Unplanned event | Potential impact |
|---|---|
| Accidental exposure of fossil bearing material implementation of the Project. | Damage or destruction of heritage resources generally protected under Section 35 of the NHRA. |
| Accidental exposure of *in situ* archaeological material during the implementation of the Project. | |
| Accidental exposure of *in situ* historical built environment sites during the implementation of the Project. | Damage or destruction of heritage resources generally protected under Section 34 of the NHRA |
| Accidental exposure of *in situ* burial grounds or graves during the implementation of the Project. | Damage or destruction of heritage resources generally protected under Section 36 of the NHRA. |
| Accidental exposure of human remains during the construction phase of the Project. | |

**Closure considerations**

- Develop a chance find protocol to ensure potential heritage and archaeological resources are dealt with appropriately during the development and operational phases;
- Consider fencing off the identified areas of cultural significance during the operational phase if required.

# 8 Social Closure Knowledge Base

## 8.1 Population and Demography

Based on the Community Survey (2016), the Gauteng province had a population of 13 399 724 people, which accounts for approximately 24.1% of the national population (Wazimap, 2017). The province includes five district municipalities, of which the WRDM (West Rand District Municipality) is the smallest in terms of population. According to the Mogale City IDP Review (2020), the district included 843 391 residents in 2017 (6.3% of the population of the province). WRDM is itself divided into three local municipalities. Of these, MCLM (Mogale City Local Municipality) and RWCLM (Rand West City Local Municipality) are the larger of the local municipalities in terms of population and they included 390 162 people (46.3% of the population in the WRDM) and 269 192 people (31.9%) respectively.

Mogale City Local Municipality (MLCM) is the most populated local municipality in the West Rand District. According to IHM Markit 2021, the population of MLM is 434 188 which is almost half the population of WRDM. The population size is not static, expecting it could have changed over time depending on the natural population growth and migration patterns in and out of the area. The population growth rate of MCLM is the highest in the district, with an average annual growth rate of approximately 2%. According to IHS Markit, the population is expected to increase over. On average there are 315 79 people per km$^2$

## 8.2 Health and Wellness

In the West Rand District Municipality, the leading cause of death for both males and females aged 1 – 4 years old are maternal neonatal, nutritional diseases, diarrheal diseases, lower respiratory infections, and pre-term birth complication. For females aged 5 to 14, TB (12.4%), HIV/AIDS (11.6%) and lower respiratory infections (11.5%) are the leading cause of death (WRDM, 2021). Death in males is mostly caused by drowning (11.6%), HIV/AIDS (11.1%) and lower respiratory infections (11.8%). The leading cause of death in females aged 15 – 24 are HIV/AIDS and TB (37%); for males it is injuries related to interpersonal violence (22.6%), accidental threats to breathing (14.2%) and mechanical forces (11.5%) (WRDM, 2021). Both males and females aged 25 – 64 leading causes of death include HIV/AIDS and TB. The cause of death in both males and female aged 65+ are hypertension, heart disease and lower respiratory infections (WRDM, 2021).

The district has a total of 66 health care facilities with 40 located in Mogale City (WRDM, 2021).

## 8.3 Economy

The West Rand is one of the districts in Gauteng displaying some of the highest unemployment rates (32.3 percent) with poverty and inequality also being high. In 2019, the West Rand's share of the population living below the food poverty line was recorded at 21.5 percent. The West Rand is largely known for its rich mining potential (gold and uranium), which is the core of the district's economy (Gauteng Provincial Government, 2021).

South Africa benefitted substantially from the robust global economic recovery in 2021. The steep rise in world trade volumes lifted demand for a wide variety of goods, extending well beyond mining and mineral products. Exports of mining products increased by 48.8% or by R284.9 billion to R868.2 billion. Exports of platinum group metals (PGMs) increased by 95% to R341.7 billion, while coal exports increased by 47.3% to R88.8 billion. Iron ore exports were 39.2% higher at R149.1 billion (Department of Research and Information, 2022)

## 8.4 Regional Frameworks and Planning

The West Rand District Municipality consist of Mogale City, Merafong City and Rand West local municipalities. There are key projects within these local municipalities which are to be undertaken to ensure successful prioritisation and implementation of the Integrated Development Plan (IDP) (WRDM, 2021). The Table 8-1 below summarises the prioritised IDP projects within WRDM (WRDM, 2021).

**Table 8-1:Priority IDP projects within WRDM**

| Municipality | Priority | Project | Estimated budget |
|---|---|---|---|
| Regional | Municipal Infrastructure and Maintenance | West Rand District Integrated Infrastructure Master Plan | R20 million |
| Mogale | Provision of Land to Enable Economic Growth, Settlements of Communities and Urbanisation | Land Resource Mobilisation and Partnership unit has been newly established to manage the Land on behalf of Mogale | R19 million |
| Merafong | SMME Support Programmes | Establishment of Enterprise Development Centre (One-stop shop) in collaboration with AngloGold Ashanti – SLP project | R15 million |
| Rand West | Municipal Infrastructure and Maintenance | Upgrade water and sanitation infrastructure over a period of five years | R200 million |

## 8.5 Closure-Related Stakeholder Engagement

During this closure planning process, no formal stakeholder engagements have been conducted, however, consultations have been done as part of the EIA/EMP processes. All future stakeholder engagement should inform the update of this Closure plan in the future.

**Closure considerations**

- Land use planning should be defined throughout the operation of the mine, taking account of stakeholder expectations and the local economic development planning;
- Foster on-going transparent relationships and communication with local communities, clearly communicating intended next land uses and closure scheduling, to align expectations at closure;
- Align mine closure and local/regional municipal planning (Integration Development Plan, Local Economic Development Plan and Spatial Development Framework specifically);
- Implement a rehabilitation strategy to achieve the site wide closure and end land use objectives; and
- Develop and implement appropriate training programmes as the mine approaches closure, empowering employees to find work in sectors other than mining at closure.

# 9 Environmental Risk Assessment

An initial closure related Environmental Risk Assessment (ERA) was completed with the aim of informing the rehabilitation and closure measures required to meet the closure objectives and promote sustainable mine closure.

The ERA is based on the supporting information (see Table 3-1). The identified risks should be revisited and updated annually to incorporate new information as closure planning progresses and the knowledge gaps identified are closed.

The objectives of the ERA, as outlined in the Financial Provisioning Regulation, 2015 (as amended) are as follows:

- Ensure timeous risk reduction through appropriate interventions;
- Identify and quantify the potential latent or residual environmental risks related to post-closure;
- Detail the approach to managing the risks;
- Quantify the potential liabilities associated with the management of the risks; and
- Outline monitoring, auditing and reporting requirements.

## 9.1 Risk Assessment Methodology

Closure related risks were identified and ranked based on the review of information supplied by the mine and site observations made.

The approach followed during the ERA is outlined below (detailed methodologies and ERA outcomes are provided in Appendix A):

- Review of available information supplied by the mine;
- Identifying possible closure risks during the site visit undertaken on 04 October 2021;
- Including possible closure related risk and in the Digby Wells RA model, which is based on a standard 5X5 risk matrix;
- Ranking the risks in terms of likelihood and consequence pre-mitigation;
- Developing mitigation measures to reduce the likelihood of the risk occurring; and
- Reranking the risk for likelihood of occurrence, with the assumption that the mitigation measure is effectively applied;
- Summarising the significant and high level risks in this report to emphasise the need for their mitigation.

The risk ratings used to classify the risks are presented in Table 9-1, these ratings are based on the likelihood and consequence rating applied, as reflected in Table 9-2.

**Table 9-1: Risk Rankings**

| Risk Rating | Risk Level | Guidelines for Risk Matrix |
|---|---|---|
| 21 to 25 | High | A high risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised immediately. |
| 13 to 20 | Significant | A significant risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised as soon as possible. |
| 6 to 12 | Medium | A moderate risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised as part of the normal management process. |
| 1 to5 | Low | A low risk exists that management's objectives may not be achieved. Monitor risk, no further mitigation required. |

## 9.2 Significant Closure-Related Risks Identified

The significant and high risks identified during the RA (i.e. risks with a risk level of 13 or higher) are summarised in Table 9-3. The complete RA, showing the full suite of closure risks identified is presented in Appendix A.

The residual/ latent risks identified for mine closure as part of the RA are presented and discussed in the Environmental Risk Report (Part B of this report).

## 9.3 Significant Closure-Related Risks Identified

The significant and high risks identified during the RA (i.e. risks with a pre-mitigated risk level of 13 or higher) are summarised in Table 9-3. The complete RA, showing the full suite of closure risks identified is presented in Appendix A.

The residual/ latent risks identified for mine closure as part of the RA are presented and discussed in the Environmental Risk Report (Part B of this report).

## Table 9-2: Risk Estimation Matrix (5x5 AngloPLc)

| **Capital Projects Risk Matrix** | | **CONSEQUENCE** (Where an event has more than one 'Consequence Type', choose the 'Consequence Type' with the highest rating) | | | | |
|---|---|---|---|---|---|---|
| **Consequence Type** | | **1 - Insignificant** | **2 - Minor** | **3 - Moderate** | **4 - High** | **5 - Major** |
| Schedule | | Less than 1% impact on overall project timeline | May result in overall project timeline overrun equal to or more than 1% and less than 3% | May result in overall project timeline overrun of equal to or more than 3% and less than 10% | May result in overall project timeline overrun of equal to or more than 10% and less than 30% | May result in overall project timeline overrun of 30% or more |
| Cost | | Less than 1% impact on the overall budget of the project | May result in overall project budget overrun equal to or more than 1% and less than 3% | May result in overall project budget overrun of equal to or more than 3% and less than 10% | May result in overall project budget overrun of equal to or more than 10% and less than 30% | May result in overall project budget overrun of 30% or more |
| Safety | | First aid case | Medical treatment case | Lost time injury | Permanent disability or single fatality | Numerous permanent disabilities or multiple fatalities |
| Environment | | Lasting days or less; affecting small area (metres); receiving environment highly altered with no sensitive habitats and no biodiversity value (e.g. urban / industrial areas). | Lasting weeks; affecting limited area (hundreds of metres); receiving environment altered with little natural habitat and low biodiversity value | Lasting months; affected extended area (kilometres); receiving environment comprising largely natural habitat and moderate biodiversity value | Lasting years; affecting area on sub-basin scale; receiving environment classified as having sensitive natural habitat with high biodiversity value | Permanent impact; affecting area on a whole basin or regional scale; receiving environment classified as highly sensitive natural habitat with very high biodiversity value |
| Legal & Regulatory | | Technical non-compliance. No warning received; no regulatory reporting required | Breach of regulatory requirements; report/involvement of authority. Attracts administrative fine | Minor breach of law; report/investigation by authority. Attracts compensation/ penalties/ enforcement action | Breach of the law; may attract criminal prosecution, penalties/ enforcement action. Individual licence temporarily revoked | Significant breach of the law. Individual or company law suits; permit to operate substantially modified or withdrawn |
| Social / Communities | | Minor disturbance of culture/ social structures | Some impacts on local population, mostly repairable. Single stakeholder complaint in reporting period | On going social issues. Isolated complaints from community members/ stakeholders | Significant social impacts. Organized community protests threatening continuity of operations | Major widespread social impacts. Community reaction affecting business continuity. "License to operate" under jeopardy |
| Reputation | | Minor impact; awareness/ concern from specific individuals | Limited impact; concern/ complaints from certain groups/ organizations (e.g. NGOs) period | Local impact; public concern/ adverse publicity localised within neighbouring communities | Suspected reputational damage; local/ regional public concern and reactions | Noticeable reputational damage; national/ international public attention and repercussions |
| **PROBABILITY** | | **RISK LEVEL** | | | | |
| **5 - Almost Certain** >90% | 90% and higher likelihood of occurring | **11 (Medium)** | **16 (Significant)** | **20 (Significant)** | **23 (High)** | **25 (High)** |
| **4 - Likely** 30%-90% | Between 30% and less than 90% likelihood of occurring | **7 (Medium)** | **12 (Medium)** | **17 (Significant)** | **21 (High)** | **24 (High)** |
| **3 - Possible** 10%-30% | Between 10% and less than 30% likelihood of occurring | **4 (Low)** | **8 (Medium)** | **13 (Significant)** | **18 (Significant)** | **22 (High)** |
| **2 - Unlikely** 3%-10% | Between 3% and less than 10% likelihood of occurring | **2 (Low)** | **5 (Low)** | **9 (Medium)** | **14 (Significant)** | **19 (Significant)** |
| **1 - Rare** <3% | Less than 3% likelihood of occurring | **1 (Low)** | **3 (Low)** | **6 (Medium)** | **10 (Medium)** | **15 (Significant)** |

**Table 9-3: Significant and High Level Risks Identified**

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| **Mine Infrastructure** | | | |
| *Demolition of infrastructure* | *Ineffective decontamination during decommissioning and demolition* | *Potential exposure to radiation during decommissioning* | *Continue specialist investigations - Ensure rubble contamination requirements are investigated and aligned with relevant legislation.*<br>*Clear areas only when necessary and conduct concurrent rehabilitation as soon as possible.* |
| *Waste management* | *Unplanned or haphazard disposal of potentially hazardous waste* | *Potential safety hazard and increased liability* | *Run down inventories of consumables on site in the run up to closure*<br>*Include removal and clean-up clauses in contracts with suppliers*<br>*Include regular removal and disposal of hazardous waste from site by a certified contractor during operations* |
| *New Plant - Infrastructure handed to next land user* | *No formal hand-over agreements in place or capacity building and training for next users* | *Derelict and unsafe infrastructure* | *Ensure formal agreements are in place with next land users for any infrastructure that will remain after closure.*<br>*Demolish and remove all infrastructure where such agreements have not been concluded*<br>*Ensure hand-over procedures are developed and that training or capacity building is provided as required* |
| *Old Plant - Infrastructure handed to next land user* | *Not completing the demolition and removal of the derelict remnant old plant infrastructure* | *Derelict and unsafe infrastructure, devalued end land use.* | *Demolish and remove old plant infrastructure during the operations and implement rehabilitation measures aligned with the end land use planning and surrounding plant communities* |
| **Water Management Facilities** | | | |

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| *Water Management impoundments remaining at closure* | *Changed hydrology and safety* | *Surface water runoff to the natural catchment reduced and safety hazard of open water bodies with steep lined sides* | *Decommission and rehabilitate constructed surface water impoundments no longer required at closure*<br>*Remove sediment from dam basins at closure*<br>*Remove and dispose of all liners*<br>*Shape and level the dams to be free draining and align with the site wide surface drainage framework*<br>*Rehabilitate all shaped dam footprints, including:*<br>*Shaping, topsoil replacement, ripping to alleviate compaction and establishing vegetation aligned with the end land use planning and surrounding plant communities* |
| *Lancaster Dam* | *Contaminated surface and ground water* | *Continued contamination of surface and ground water resources due to historical spillages* | *Recover contaminated sediment from the dam basin and process through the new plant*<br>*Shape the dam basin to be free draining, aligned with the site wide surface drainage framework*<br>*Ripping to alleviate compaction*<br>*Establish vegetation including in-situ soil amelioration based on dedicated sampling and analysis, establish vegetation including in-situ soil amelioration based on dedicated sampling and analysis, seed bed preparation and the application of an appropriate seed mix* |
| **Mining Areas** | | | |
| *Remined Tailings Storage Facility and Sand Dump Footprints* | *Incomplete tailings recovery and footprint clearing* | *Failed rehabilitation and not meeting end land use criteria and potential safety hazard* | *Develop and implement rehabilitation and management protocols including:*<br>*Footprint roll-up and final clearing aligned with the. remining schedule (Removal of all TSF material, no* |

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| *Remined Tailings Storage Facility and Sand Dump Footprints* | *Over excavation across footprint* | *Final landform not aligned with site wide surface water runoff framework - increased ponding and erosion* | *Starter walls or retainer walls will remain on the footprint);*<br>*Final levelling and shaping according to a landform design informed by dedicated hydrological calculations;*<br>*Construction of additional surface water management measures as required based on a detailed design;*<br>*Ripping to alleviate compaction:*<br>*Establish vegetation including in-situ soil amelioration based on dedicated sampling and analysis, seed bed preparation and the application of an appropriate seed mix*<br>*Develop and implement rehabilitation trials during the operations to determine effective rehabilitation methodologies*<br>*A rehabilitation monitoring and maintenance programme to highlight and address deficiencies and ensure rehabilitation success criteria are met.* |
| *Remined Tailings Storage Facility and Sand Dump Footprints* | *Poor storm water management planning* | *Unstable post mining landform, increased erosion and end land use criteria not met* | |
| *Remined Tailings Storage Facility and Sand Dump Footprints* | *Negative Material balance, no topsoil stripped and stored historically* | *Reduced land capabilities due to rehabilitating in-situ material* | |
| *Tailings Storage Facility remains at closure* | *Crest and side slope stability* | *Failed rehabilitation resulting in an unstable landform and increased erosion* | *Develop and implement rehabilitation and management protocols including:*<br>*Construct the in-pit and 1L23-1L25 TSFs to engineering design specifications that have considered the final configuration for closure*<br>*Construct additional storm water management measures based on dedicated hydrological modelling as required to combat erosion*<br>*Rehabilitation trials during the operations to determine effective rehabilitation methodologies* |
| *Tailings Storage Facility remains at closure* | *Negative Material balance, no topsoil stripped and stored historically* | *Reduced land capabilities due to rehabilitating in-situ material* | |

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| *Tailings Storage Facility remains at closure* | *Failed storm water management on final configuration* | *Increased erosion and unstable final landform* | *Concurrent rehabilitation on the side slopes during operations*<br>*Establish vegetation including soil amelioration based on dedicated sampling and analysis, seed bed preparation and the application of an appropriate seed mix*<br>*Management protocols to ensure accurate implementation*<br>*Rehabilitation monitoring and maintenance programme to highlight and address deficiencies and ensure rehabilitation success criteria are met.* |
| *Tailings Storage Facility remains at closure* | *Multiple TSFs and Sand Dumps will be removed reducing the sources of pollution in the area. Redeposition of retreated tailings material on the 1L23-1L25 footprint could still be a source of contaminated seepage* | *Contaminated seepage horizontally to the surrounding shallow aquifer and streams and vertical seepage to the deep aquifer.* | *Reprocessed tailings will be limed in the metallurgical plant and deposited at higher pH values (about 10-11) providing a positive impact on the groundwater quality on the underground mine void;*<br>*Design and implement measures (potentially cut-off trenches and berms) on the downstream side of the TSF to intercept potential contamination due to surface water runoff and shallow aquifer seepage;*<br>*Rehabilitate the in-pit and 1L23-1L25 TSFs to limit recharge via vegetation cover interception of rainfall and increased evapotranspiration;*<br>*Investigate and quantify the potential vertical recharge and salt load increase for the post-closure scenario to replace generic estimated recharge values.*<br>*Use the outcomes to determine further risk based mitigations if required.* |
| *Tailings Storage Facility remains at closure* | *Radioactive tailings material* | *Radioactive contamination result from dust fallout from the TSF and impacting the surrounding communities and environment (soils, surface water and groundwater)* | *Remove all TSFs and Sand Dumps and rehabilitate the footprints*<br>*Closure measures for the West Wits and 1L23-1L25 TSFs should ensure that the potential dust fallout is* |

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| | | | *mitigated as far possible post-closure. This should include the implementation of effective vegetation establishment methodologies* |
| **Biodiversity (over rehabilitated areas and within in MRA in the post-closure period)** | | | |
| *Alien invasives* | *Uncontrolled infestation of alien invasive plants* | *Alien invasive plants outcompeting indigenous plants resulting in a reduction of biodiversity* | *The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining. The following is recommended:*<br>*Develop a site wide Closure Plan and detailed end land use plan to guide all rehabilitation activities*<br>*Aligned with the closure objectives, develop and implement a Biodiversity Action Plan during the operational phase and implement through to closure*<br>*Mine planning should limit the mine disturbance footprint as far as possible to reduce the impacts of biodiversity loss*<br>*Ensure an alien invasives management plan is developed during the operational period and effectively implemented to reduce occurrences of infestation*<br>*Identify and delineate sensitive habitats as No-go areas throughout the construction, operation and decommissioning phases*<br>*Select suitable locally occurring seed mixes for rehabilitation to ensure rehabilitated areas are consistent with surrounding plant communities*<br>*Implement rehabilitation measures for disturbed areas as soon as possible*<br>*Conduct monitoring and maintenance of rehabilitated areas including identification and removal of AIPs* |
| *Flora* | *Mining and rehabilitation activities* | *Poor rehabilitation and use of inappropriate seed mixes inconsistent with surrounding plant communities and misaligned with the end land use planning* | |

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| **Soils, Land Capability and Land Use** | | | |
| *Land use* | *Failure to develop and implement coherent site wide rehabilitation and closure plan* | *End land use / capability not aligned with surrounding land use mix. Limited post mining opportunities* | *"Develop and coherent site wide closure plan to guide all rehabilitation activities*<br>*Develop annual rehabilitation plans to incrementally achieve the closure objectives and reduce risks over the LoM"* |
| *Land use* | *Lack of monitoring and maintenance of rehabilitated areas* | *Poor vegetation establishment and basal cover, AIP encroachment, increased erosion and lower land capability and land use potential, increased financial liability* | *"Implement concurrent rehabilitation soon as possible,*<br>*Develop and implement effective rehabilitation methodologies with known outcomes*<br>*Ensure effective contractual and quality control agreements are in place*<br>*Develop implementation standards and procedures with specific sign-off criteria*<br>*Develop end land use plan to ensure alignment of activities towards an end goal"* |
| **Surface and groundwater** | | | |
| *Surface water* | *Failure to implement integrated rehabilitation and storm water management at closure* | *Failed rehabilitation, high runoff velocities and drainage densities, increased erosion and downstream sedimentation* | *"Develop a site wide Closure Plan and detailed end land use plan to guide all rehabilitation activities*<br>*Implement concurrent rehabilitation measures as soon as possible*<br>*Develop a site wide closure storm water management plan to limit drainage densities and velocities while aligning surface water runoff with the surrounding drainage framework"* |
| *Surface water* | *Mining aspects remain as features in land scape* | *Reduced contribution to catchment yield* | *"The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical* |

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| | | | *mining. The following mitigations should be implemented:*<br>*TSFs will be removed during remining and redeposited on the existing 1L23-1L25 footprint and the in pit TSF (West Wits Pit)*<br>*All tailings material will be removed from reclaimed TSFs, including retainer and starter walls*<br>*All material will be removed from the Sand Dumps*<br>*Cleared Footprints will be shaped to be free draining aligned with the site wide surface water drainage framework and revegetated to meet the end land use planning"* |
| *Groundwater* | *Seepage due to continued storage of Tailings above ground* | *Potential groundwater contamination affecting sensitive downstream habitats and local groundwater users.* | *The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining. The following mitigations should be implemented:*<br>*TSFs will be removed during remining and redeposited on the existing 1L23-1L25 footprint and the in pit TSF (West Wits Pit)*<br>*All tailings material will be removed from reclaimed TSFs, including retainer and starter walls*<br>*All material will be removed from the Sand Dumps*<br>*Cleared Footprint The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining. No further wetlands will be impacted by the planned activities and the following mitigations should be implemented:*<br>*TSFs will be removed during remining and redeposited on the existing 1L23-1L25 footprint and the in pit TSF (West Wits Pit)* |

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| | | | *All tailings material will be removed from reclaimed TSFs, including retainer and starter walls*<br>*All material will be removed from the Sand Dumps*<br>*Cleared Footprints will be shaped to be free draining aligned with the site wide surface water drainage framework and revegetated to meet the end land use planning*<br>*The in-pit TSF will not decant to surface and the final landform will be above natural ground level. The backfilled pit will remain hydraulically linked with the underground workings*<br>*Seepage from the redeposited and rehabilitated TSF 1L23-1L25 may migrate horizontally through the weathered zone and vertically into the underground mine void* |
| **Internal (SLP alignment with the closure planning documents)** | | | |
| *Employees* | *The cessation of the operations causing the laying off of workers.* | *Loss of employment opportunities and income source* | *Continuous compliance with regulatory framework*<br>*Continually engage with stakeholders and authorities to align expectations*<br>*Develop engagement platforms that allow for an inclusive process in developing and implementing the end land use plan* |
| **External (social closure engagement and considerations)** | | | |
| *Interested and affected parties* | *Failure to address social closure* | *Misalignment of expectations, deferred closure and potential increase in liabilities* | *Continuous compliance with regulatory framework*<br>*Continually engage with stakeholders and authorities to align expectations* |

| Aspect | Risk driver | Consequence | Mitigation Measure(s) |
|---|---|---|---|
| | | | *Develop engagement platforms that allow for an inclusive process in developing and implementing the end land use plan* |
| *Local economy* | *Closure of mining operation taking away the source of income for the local economy* | *Loss of business opportunities.* | *Develop and implement a Social and Labour Plan (SLP) aligned with the relevant legislation*<br>*Continuous compliance with regulatory framework*<br>*Ensure effective and transparent communication with authorities and other affected parties* |

### 9.3.1 Receptors Most Sensitive to Closure Related Risks

The receptors most sensitive to risk for the Project, include the following:

- **Downstream water users**: The potential seepage and contaminant transport onto the underground mine voids through the West Wits TSF and 1L23-1L25, could impact ground and surface water resources. This potential risk needs to be investigated and quantified.
- **Surrounding farmers**: should land disturbed by mining not be reinstated to its previous land capability (especially where this land was previously arable), farmers looking to lease this land post-closure could be negatively impacted, since the arable capability of the land could be lost.
- **Mine employees**: once mining operations cease, employees face the risk of job losses, leading to an increase in unemployment and poverty in the area. Approved partners should be used to reskill employees, to enable them to find alternative employment and to explore opportunities for alternative industry/livelihoods.

## 9.4 Risk Monitoring

Ground and surface water monitoring will be undertaken quarterly through the operational phase to track contaminant levels and develop mitigation measures to ensure key contaminants are kept under the legislated threshold. Groundwater models will be updated regularly based on actual monitoring results to replace initial assumptions.

AIPs should be monitored and eradicated as part of a site wide biodiversity Action Plan.

Dust fallout will be monitored on a monthly basis as proposed in the Air Quality Study undertaken by Digby Wells (DWE, 2022).

Radon gas monitoring will be undertaken quarterly for a period of two to three months (Aquisim Consulting, 2022).

Concurrent rehabilitation progress should be tracked based on regularly updated survey data aligned with the minimum requirements for an ARP outlined in Appendix 3 of GN R.1147.

A monitoring and maintenance programme should be implemented across areas which have been concurrently rehabilitated during the operations. Learnings are to be incorporated into the rehabilitation planning and methodologies as part of continual improvement to ensure known outcomes at closure.

# 10 Assumptions Applied in the Closure Plan Development

The compilation of this RCP is based on the following assumptions and limitations:

- All infrastructure on site will be demolished unless these assets can be legally transferred to a third party and a contract is in place detailing the conditions of transfer;
- Decommissioning and rehabilitation activities will follow directly after the cessation of mining;
- Information, mitigation measures and recommendations provided in this report are based on the specialist studies completed as part of the EIA;
- Vegetation monitoring and maintenance will take place for five years post-closure, and groundwater and surface water monitoring for ten years post-closure. It is noted that these monitoring periods may need to be extended in order to prove that site relinquishment criteria have been met;
- The recommendations contained within this report currently exclude any comments or issues raised by stakeholders and/or Interested and Affected Parties (I&APs). Comments from stakeholders or I&APs will be incorporated into subsequent annual updates of the RCP as and when received;
- This report must be considered as a living document and should be updated as additional information become available and as monitoring and rehabilitation progresses; and
- This report should be updated and submitted annually as additional information becomes available and as monitoring and rehabilitation progresses (as stipulated in GN R.1147).

# 11 Closure Vision

According to the ICMM good practice guideline 2nd edition (2019), “the closure vision provides a high-level aspirational description of what an operation or company and stakeholders want to achieve through implementation of the closure plan”.

Due to the obvious challenges of implementing remining activities within a derelict and degraded environment due to historical mining activities and subsequent neglect, an initial mine closure vision was outlined to rehabilitate and restore as far as possible these damages by (Golder, 2017):

- Recovering the remaining mineral resource and thereby removing the historical contamination point sources across the site;
- Conducting the associated rehabilitation and restoring these areas appropriately for the next beneficial land use; and
- Facilitating broader environmental related improvements related to in-stream water quality, aquatic habits, reinstated surface water flow and reduced radiation levels.

The closure vision is therefore summarised below and provides a framework to guide the mine's rehabilitation, closure planning and implementation.

*PAR aims to rehabilitate and restore, as far as possible, the derelict and degraded environment caused by previous mining activities to be sustainable over the long-term while achieving the desired end land use.*

## 12 Closure Objectives

Outlined below are specific objectives which support the overall closure vision. The closure measures will be developed by considering what is possible and what objectives need to be achieved:

- Remove historical derelict infrastructure, existing TSFs and Sand dumps, restoring the resulting footprints as meaningful components of the post mining land use mix;
- Physically and chemically stabilise any remaining mining structures (West Wits TSF and 1L23-1L25 TSF), where required, to minimise residual risk post-closure;
- Ensure that contamination of surrounding areas by mine impacted water is limited as far as possible;
- Remove mine infrastructure that cannot be used by a subsequent landowner or a third party. Where buildings can be used by a third party, arrangements will be made to ensure their long-term sustainable use;
- Clean up all operational stockpile footprint areas and loading areas and rehabilitate these areas to a land capability similar to that which existed prior to mining;
- Follow a process of closure that is progressive and integrated into the short and long term mine plans and that will assess the closure impacts proactively at regular intervals throughout project life;
- Rehabilitate the disturbed land to a state that facilitates compliance with applicable environmental quality objectives,
- Landscape the rehabilitated areas to align with the site wide surface drainage framework, promoting improved connectivity of natural surface water bodies;
- Leave a safe and stable environment for both humans and animals;
- Prevent any soil and surface/groundwater contamination by effectively managing water on site, and ensure clean/ dirty water separation during the operational period to minimise post-closure contamination potential; and
- Comply with local and national regulatory requirements.

# 13 Final Land Use Plan

The final land use plan is the end land use to which the mine would like to return the land disturbed by mining activities. The closure objectives set as part of the mine closure planning process aims to support achievement and effective implementation of the final land use plan. The plan should ensure long-term sustainability and strive to promote post-closure land productivity for the potential offset of post-closure costs (i.e. monitoring and maintenance).

Refer to Section 7.5.3 for a discussion on the current dominant land uses associated with the Project Area.

## 13.1 Post-Mining Land Capability Commitments

No post mining land capabilities have been set for the Project Area yet.

Once targets have been set, radiological and land capability assessments should be done over rehabilitated areas as they become available, to ensure these commitments are achieved.

## 13.2 Post-Mining Land Use

A Land Use Plan (LUP) should be developed for this site within the first year of operation. The LUP must align with overarching (and available) regional, municipal and local planning (Integrated Development Plan, Local Economic Development Plan and Spatial Development Framework specifically), and be revisited during annual RCP updates to incorporate improved knowledge maturity and refined rehabilitation methodologies.

An initial land use evaluation was undertaken, to assess the potential land use options for the site. The land use options were evaluated based on the following criteria, and are reflected in Table 13-1:

- **Likely end land uses:** Primary or anchoring end land uses, that are likely to be functionally self-sufficient over the long term;
- **Possible end land uses:** Secondary or supporting land uses, that are reliant on likely uses or other external factors to be sustainable; and
- **Unlikely end land uses:** Undesirable end land uses, or land uses that are unlikely to be sustainable or that would be contextually inappropriate.

**Table 13-1: Evaluation of Post-Mining Land Use Options**

| Likely | Possible | Unlikely |
|---|---|---|
| • Ecological conservation areas along floodplains of spruits aligned with the downstream Krugersdorp Nature Reserve | • Expansion of transport routes across the area to improve congestion and access. Potentially including further | • Dry-land agriculture (dependent on post mining land capability)<br>• Large-scale commercial or urban development |

| Likely | Possible | Unlikely |
|---|---|---|
| • Managed grazing and /or a mix of traditional agricultural activities<br>• Residential or high-density residential development (an extension of the existing land use surrounding portions of the site)<br>• Industrial development across the already transformed footprint and potentially utilising services provided for the new plant<br>• Recreational facilities or the expansion of existing outdoor sport facilities | development of public transport routes (Gautrain)<br>• Agricultural processing<br>• Intensive agriculture (dependent on post mining land capability) | • Large-scale solar energy generation<br>• Forestry/timber production<br>• Aquaculture |

Although the above land uses (or a suitable mixture of them) have been indicated as being feasible, a dedicated SWOT (strength, weakness, opportunity, threat) analysis should be conducted as part of the LUP development and included within the update of this RCP.

# 14 Closure Actions and Measures

The closure measures are presented in Table 14-1. The closure measures are developed in support of achieving the final land use and mitigating post-closure contamination potential over the site.

The closure measures should be refined once more detailed supporting information becomes available (i.e. engineered landform designs, contaminated land assessments, land capability assessments, geohydrological studies, radiation studies, etc.).

The assumptions applied in the development of these closure measures are included in the closure cost section (Section 22).

## Table 14-1: Closure and Rehabilitation Measures

| Aspect | Rehabilitation measures |
|---|---|
| Area 1: New Plant and related dams | General infrastructure:<br>• Demolish and remove all concrete structures to 1 m below ground level<br>• Dismantle streel structures and store in designated salvage yard prior to removal/selling off<br>• Demolish any brick structures including concrete foundations.<br>• Demolish prefabricated buildings<br>• Remove linear items such as conveyors and fencing, road to be removed up to a central location (rest will be used by 3rd party)<br>• General footprint rehabilitation<br>Water Management Structures (dams; ponds):<br>• Remove liner and contaminated sediment<br>• Load and haul within 1km<br>• Shape and level<br>• Rip area<br>• Ameliorate and establish vegetation |
| Area 2: 9 Shaft remnant Mill and Main Plant | • Demolish and remove all concrete structures to 1 m below ground level<br>• Demolish any brick structures including concrete foundations<br>• General footprint rehabilitation |
| Area 3: Tailings Storage Facilities (Rehabilitation monitoring and maintenance included) | • Construct stormwater management structures<br>• Ameliorate and establish vegetation |
| Area 4: Sand Dumps | • Level and shape the cleared footprint to align the site wide surface drainage framework<br>• Ameliorate and establish vegetation |
| Area 5: West Wits Opencast Pit | • The pit will be used for tailings deposition. The final landform will be above natural ground level and constructed to an engineered design. Rehabilitation measures included in Area 3. |
| Area 6: Water Storage Dams - Lancaster and Reticulation SW dams | • Remove liner and contaminated sediment<br>• Load and haul within 1km<br>• Shape and level to be free draining<br>• Rip area to alleviate compaction<br>• Ameliorate and establish vegetation |

| Aspect | Rehabilitation measures |
|---|---|
| Area 7: Proposed Pump Stations | • Dismantle streel structures and store in designated salvage yard prior to removal/selling off<br>• Demolish and remove all concrete structures to 1 m below ground level<br>• Demolish any brick structures including concrete foundations<br>• Remove liners<br>• General footprint rehabilitation |
| Area 8: Pipelines and Powerlines | • All pipelines and powerlines will be removed<br>• General footprint rehabilitation |

# 15 Alternative Closure Measures

There are currently no prominent alternative options for the mine closure measures on site. The closure and rehabilitation measures provided as part of this RCP are aligned with industry good practice and are considered the preferred option for closure at this stage. The proposed closure actions and measures (reflected in Section 14) are designed to support the closure objectives included in Section 12.

# 16 Threats, Opportunities and Uncertainties

Initial threats, opportunities and uncertainties associated with closure of the mine site are reflected in Table 16-1.

**Table 16-1: Threats, Opportunities and Uncertainties Analysis for Mine Closure**

| | |
|---|---|
| **Threats** | • Current planned changes to the legislation and relevant regulatory bodies<br>• Production orientated environment and potentially limited influence of rehabilitation professionals in the day-to-day operations<br>• Level of accuracy required to ensure effective rehabilitation and achievement of end land use objectives<br>• Ability to achieve end land use and land capability objectives<br>• Effectively engaging all stakeholders and ensuring alignment of expectations related to closure processes and outcomes |
| **Opportunities** | • Mine planning and construction can be managed to address key aspects highlighted in the EIA to limit future risks<br>• Historical wetland impacts can be addressed early on in project development (year 1) to improve functionality and connectivity<br>• Detailed concurrent rehabilitation planning can be integrated into the mining plan to ensure remaining footprints are rehabilitated as soon as they are available;<br>• Proximity to major transport routes, industrial hubs and residential areas |

| | |
|---|---|
| | • Increased surface and groundwater quality due to the removal of historical pollution sources (i.e. tailings facilities, dams, Sand Dumps)<br>• Restoring previously denuded and derelict areas as gainful components of the post closure end land use mix<br>• Returning reprocessed tailings, with reduced contamination potential to already disturbed footprints<br>• Reducing or eliminating opportunities for illegal mining and Increased safety, security and social cohesion |
| **Uncertainties** | • Changing international and local approaches and priorities regarding power generation<br>• Current planned changes to the legislation and relevant regulatory bodies<br>• Status of the footprints once tailings have been reclaimed<br>• Safety and security of the area during operations and the closure operations |

# 17 Closure Planning Knowledge Gaps Identified

The following knowledge gaps, presented in Table 17-1, were identified during the compilation of this closure plan and need to be addressed during the operational period to inform further updates of this closure plan and to mitigate identified environmental risks related to closure.

**Table 17-1: Identified Knowledge Gaps**

| Identified Knowledge Gap | Schedule |
|---|---|
| **Post-closure Monitoring Network:**<br>• It is recommended that the following be commissioned during the operational phase to be able to refine the post-closure monitoring network:<br>  • Dust monitoring network;<br>  • Regular Radiological surveys;<br>  • Groundwater monitoring (quality and depth);<br>  • Surface water monitoring (quality);<br>  • Biodiversity monitoring (including monitoring of invasive species; | As soon as operations commence. |
| **Determination of long-term water management strategy and associated costs:**<br>• The outcomes of a geohydrological model (including the post treatment tailings geochemistry) for the closure period should be used to inform the development of a post-closure water management strategy for the site. Additional measures and implementation costs to reduce potential recharge through the remaining TSFs is indicated in Part B of this report. Once confirmed and refined the measures should be included in the provision as required. | Within the next two years of operations commencing. |

| Identified Knowledge Gap | Schedule |
|---|---|
| **Site wide rehabilitation planning and methodologies:**<br>• Compile a detailed site wide rehabilitation and end land use planning;<br>• Develop final landform designs for the cleared footprints based on available materials and informed by the specialist studies to ensure improved connectivity of wetlands and the achievement of the end land use objectives. | Within the next two years of operations commencing and as footprints are cleared. |
| **Refinement of the Final Land Use Plan:**<br>• Develop a detailed post-mining end land use plan and continually refine during the operations to successfully plan and work towards LoM closure;<br>• A feasibility study should also be conducted to determine whether the end land use will be sustainable;<br>• Ensure this plan is shared with the relevant stakeholders through effective stakeholder engagement. These engagements should ensure the buy-in of local communities and any input supplied by stakeholders should be included in the land use plan where appropriate. | As soon as operations commence. |
| **Further develop and implement the Wetland Rehabilitation Plan:**<br>• Implement the initial wetland rehabilitation measures planned for the first year of operation;<br>• Implement the remaining planned interventions during the operational phase. | During operations |
| **Social closure planning during the operational phase:**<br>• Closure costs and actions for the social component should be developed as soon as operations commence;<br>• The actions incorporated into the SLP should be aligned across various planning documents (including) this RCP. | As soon as operations commence. |

# 18 Preliminary Mine Closure Schedule

The mine closure schedule addresses the timing of rehabilitation and closure activities performed during the decommissioning and post-closure phases (Figure 18-1). The schedule presented is high level and identifies the key activities Mogale will conduct during the decommissioning and post-closure phases. It is expected that the decommissioning phase will last three years after which monitoring, and maintenance will continue for an estimated period of five years. Monitoring and maintenance will need to continue until the site relinquishment criteria are met and a closure certificate is issued by the DMRE. Any potential water treatment requirements will most likely affect the pre-site relinquishment phase.

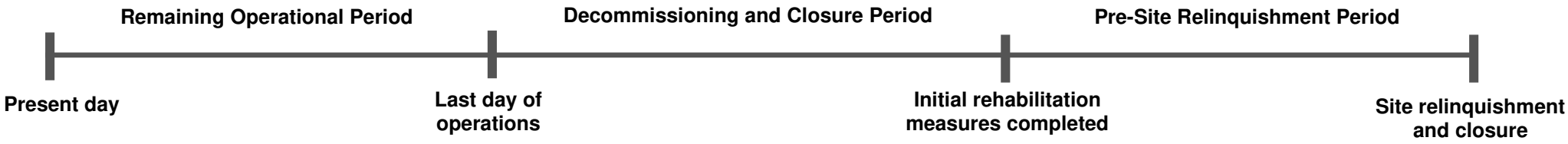



**Figure 18-1: Preliminary Mine Closure Schedule**

| Remainining Oprational Period, including Construction Phase | Decommissioning and Closure Period | Pre-site Relinquishment Period |
|---|---|---|
| **2022 - 2038** | **2038 - 2040** | **2040 – onwards** |
| Update the closure plan, annual rehabilitation plan, closure costing and environmental risk assessment annually. | Demolish surface infrastructure and ensure that access to the mining areas is prevented. | Undertake rehabilitation monitoring as per the post-closure monitoring programme to confirm success of rehabilitation measures, by assessing whether site relinquishment criteria are being achived. |
| Reduce the identified theats and uncertanties identified in the plan by closing the identified closure knowledge gaps, through undertaking the required additional studies. | Rehabilitate the disturbed footprints once infrastructure is removed. | Undertake care and maintenance (corrective action) where applicable. This will be informed by the rehabilitation monitoring. |
| Engage with the relevant stakeholders regarding the final land use plan. | Complete all outstanding rehabilitation on site, in line with the mine's closure objectives and final land use plan. | Continue surface and groundwater monitoring until site relinquishment criteria area achieved |
| Identify potential infrastructure for third-party transer and ensur ethe required agreements/ contracts are in place. | Continue rehabilitation monitoring and undertake land capability assessments over rehabilitated areas (if not completed operationally). | Continue monitoring for the manifestation of residual risks (subsidence monitoring, decant monitoring) and continue mitigation of long-term closure risks (contineous water treatment) |

# 19 Monitoring Auditing and Reporting

Initial monitoring, auditing and reporting requirements which relate to the risk assessment, legal requirements and knowledge gaps are shown in Table 19-1.

The management measures for the post closure phase at specific areas on the mine are provided, and primarily consist of environmental monitoring. Monitoring provides data to prove whether the rehabilitation techniques implemented have been successful (i.e. whether site relinquishment criteria are being met). Monitoring should provide an early indication of problems that may arise so that corrective action can be taken.

The post-closure monitoring period will begin once the decommissioning phase and pre-site relinquishment phase are completed. Negative monitoring findings should be clearly linked to specific corrective actions.

The duration of post-closure monitoring will be determined based on environmental performance and until it can be demonstrated that the rehabilitation work has achieved the agreed endpoints and is sustainable; however, at present, it has been assumed that post-closure monitoring will not continue for more than five years. The purpose of monitoring is to ensure that the objectives of rehabilitation are met, and that the rehabilitation process is followed.

For the radiation component, refer to the specific monitoring programme outlined in the Radiological Public Safety Survey Assessment completed in August 2022.

## Table 19-1: Post Closure Monitoring, Auditing and Reporting Programme

| Component / Aspect | Monitoring | | Performance / success criteria | Corrective action |
|---|---|---|---|---|
| | Methodology | Frequency / duration | | |
| **Soil Management** | | | | |
| Erosion | • Conduct a visual assessment to determine areas of potential erosion<br>• Undertake field investigations, fixed point photography to document the significance of the erosion occurring on site | • Bi-annually for at least five years after decommissioning or as deemed necessary | • No evidence of significant erosion<br>• Vegetation basal cover should be at least 15% at all times. | *As required:*<br>• Re-shape areas to ensure that they are free-draining<br>• Establish vegetation on bare patches if practical<br>• Repair and stabilisation of erosion gullies and sheet erosion |
| Soil fertility | • Undertake a visual assessment and delineate areas where poor vegetation growth has occurred<br>• Submit soil samples to an accredited soil laboratory to conduct soil fertility analysis | • Annually until soil fertility supports the final land use or for at least five years after decommissioning or as deemed necessary | • Soil analysis results comply with remediation targets at a 95-percentile level in line with best practice; and<br>• Self-sustaining vegetation establishment. | • Apply amelioration where required as informed by sampling undertaken |
| General site status | • Conduct a visual assessment with respect to compliance of the afore-mentioned closure measures and to ensure that the site is aesthetically neat and tidy, and that no health or safety risks exist on site | • Once-off following implementation of rehabilitation measures | • Waste/rubble free sites | As required:<br>• Clear remnant rubble and dispose of as arequired by relevant legislation |
| Post-mining end land use | • Assess activities completed, as well as legal and related documentation completed and signed-off; and<br>• Ensure rehabilitation measures are aligned to the LUP. | • Once off, at mine closure. | • Area has been rehabilitated to an aesthetic quality not to compromise potential land uses;<br>• Transfer to third party operator has taken place once the area has been proven to be safe for redevelopment;<br>• Legal and zoning issues have been addressed; and<br>• Vegetation re-establishment, cover and composition are sustainable. | As required:<br>• Refine aligned with LUP in subsequent annual updates |
| Topography | • Conduct a visual assessment to determine areas of potential erosion; and<br>• Undertake regular digital surveys of rehabilitated areas to confirm that final topography is aligned with landform designs and site wide drainage framework. | • During rehabilitation phase | • No evidence of significant erosion;<br>• No evidence of water ponding on rehabilitated areas; and<br>• The final profile achieved must be acceptable in terms of surface water drainage requirements and the end land use objectives. | As required:<br>• Re-shape areas to ensure that they are free-draining; and<br>• Refine aligned with LUP in subsequent annual updates |
| **Terrestrial- and Aquatic Ecosystem Health Management** | | | | |
| Vegetation establishment | • Determine whether re-establisment of vegetation communities are on a course of achieving a stable self-sustaining community | • Yearly for at least five years after decommissioning or as deemed necessary | • Vegetation basal cover should be at least 15% at all times;<br>• Limited to no erosion; and<br>• Self-sustaining vegetation ecosystem. | As required:<br>• Rip and prepare areas to promote re-growth of vegetation |

| Component / Aspect | Monitoring | | Performance / success criteria | Corrective action |
|---|---|---|---|---|
| | **Methodology** | **Frequency / duration** | | |
| | dominated by species typical of the climax-species present in the adjacent areas<br>• Inspect rehabilitated areas to assess vegetation re-establishment and provide for early detection of erosion in recently planted/seeded areas<br>• Undertake fixed point photography at specific points at the rehabilitated sites to obtain a long term directly comparable method of determining changes in the landscape<br>• Conduct evaluation of rehabilitated areas by means of field inspections. During these assessments measurement of growth performance and species abundance will be carried out to determine<br>• Plant basal cover and species abundance in the grassed areas. Estimates of vegetation canopy and ground cover as well as height<br>• Distribution, growth and survival of woody species<br>• Dominant plant species (woody and herbaceous)<br>• Presence of exotic invasive species, and degree of encroachment<br>• Notes regarding erosion, such as, type, severity, degree of sediment build-up<br>• Species composition and richness. | | | • Re-vegetate poorly established rehabilitated areas where practical<br>• Apply additional fertiliser and/or organic matter, depending on the condition of the vegetation and the initial organic material application |
| Invasive alien species | • Visually inspect areas where invasive species have been previously eradicated and areas prone to invasive species (e.g. eroded/degraded areas, along drainage lines, etc.)<br>• Undertake surveys on relevant sites where bush encroachment has previously been identified to determine the status quo of invasive vegetation | • Yearly for at least five years after decommissioning or as deemed necessary | • Limit and/or prevent declared Category 1a,1b, 2 and 3 invader species establishing<br>• Minimise extended threat to ecosystems, habitats or other species<br>• Increase the potential for natural systems to deliver goods and services<br>• Minimise economic or environmental harm or harm to human health | • Saplings of alien trees establishing on rehabilitated areas should be removed before they reach 1m in height<br>• Revisit mitigation measures<br>• Continue control and management |
| Wetlands bio-monitoring | • Continue with the current wetland bio-monitoring programme | • Annual for at least five years after decommissioning or as deemed necessary | • In situ water quality within ranges of the WUL and/or DWS standards<br>• Free movement of wetland species, including migratory species<br>• Maintained levels of biodiversity | • Refer to the objectives set-out in the wetland management and rehabilitation plan; and<br>• Revisit mitigation measures |

| Component / Aspect | Monitoring | | Performance / success criteria | Corrective action |
|---|---|---|---|---|
| | **Methodology** | **Frequency / duration** | | |
| **Surface Water and Groundwater Management** | | | | |
| Surface water flow | • Determine whether the rehabilitated mine site is free draining and that unnecessary impoundment of surface run-off is prevented<br>• Conduct a site inspection after the onset of the rainy period, after all closure related measures have been implemented<br>• Inspect all notable drainage lines on the rehabilitated mine site and establish whether these lines are free draining and have a limited potential for scouring<br>• Check the catchments of the respective drainage lines for possible unnecessary impoundment of surface run-off | • Annually for five years after decommissioning or as deemed necessary | • Free-draining landforms<br>• Re-instated surface water flow patterns maximising the clean surface water runoff into natural drainage lines | As required:<br>• In-fill erosion gullies<br>• Amelioration and re-vegetate as required<br>• Re-instate surface drainage<br>• Manage the spread of invasive plant species |
| Surface water quality | • Visually assess the functionality of the surface water drainage systems feeding surface water runoff from rehabilitated areas.<br>• Monitor surface water quality in terms of the monitoring network that is aligned to the closure monitoring network<br>• Carry out analysis in accordance with the methods prescribed by and obtainable fro South African National Standards (SANS) | • After major rains during the season and after major storms.<br>• Annually for at least a 10 year period after decommissioning or as deemed necessary | • No evidence of significant erosion and water pooling on rehabilitated areas.<br>• Acceptable threshold levels of salts, metals and other potential contaminants over the rehabilitated sites allocated in terms of the land use and downstream users<br>• No possible surface contaminant sources remaining on the rehabilitated mine site that could compromise the planned land use and/or pose health and safety threats<br>• Water quality results within ranges of the WUL and/or DWS standards | As required:<br>• Undertake a source-pathway-receptor investigation;<br>• Devise measures to clean-up sources of contamination; and<br>• Refer to end land use approach and refine measures to be implemented in achieving the desired final land use. |
| Groundwater quality | • Monitor groundwater quality and levels in terms of the monitoring network that is aligned to the closure monitoring network;and<br>• Carry out analysis in accordance with the methods prescribed by and obtainable fro South African National Standards (SANS) | • Annually for at least a 10 year period after decommissioning or as deemed necessary | • Acceptable threshold levels of salts, metals and other potential contaminants over the rehabilitated sites allocated in terms of the land use;<br>• The applicable thresholds do not pose a threat to surrounding land uses or land users;<br>• Water quality results within ranges of the WUL and/or DWS standards. | As required:<br>• Increase monitoring frequency and detect point sources;<br>• Optimise monitoring plan if needed;<br>• Revise long term water management strategy based on update groundwater modelling. |

| Component / Aspect | Monitoring | | Performance / success criteria | Corrective action |
|---|---|---|---|---|
| | Methodology | Frequency / duration | | |
| Groundwater levels | • Sample and monitor groundwater balance and levels in the vicinity of the mine. | • Annually for at least a 10-year period after decommissioning or as deemed necessary | • Water quality results within ranges of the WUL and/or DWS standards<br>• No evidence of dewatering and lowering of water tables within the vicinity of the mine. | As required:<br>• Implementation of water treatment plant<br>• Revise long term water management strategy based on update groundwater modelling;<br>• Increase monitoring frequency and detect point sources.<br>• Optimise monitoring plan if needed. |
| **Dust Management** | | | | |
| Dust | • Continuous $PM_{10}$ and $PM_{2.5}$ monitoring buy designated air quality officer at a sensitive receptor location | • Quarterly for at least a 3-year period after decommissioning or as deemed necessary | • Acceptable threshold levels that meet the South African National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) Dust Control Regulations (2013) | As required:<br>• Undertake an investigation to the source of the dust<br>• Devise measures to reduce dust to acceptable levels |
| • **General** | | | | |
| Audit Reports | • Auditing against the conditions outlined within the approved EMP and EIA/EMP Performance Assessment) or RCP at time of mine closure.<br>• To determine compliance to EMP or RCP conditions.<br>• To ensure that the mine is compliant with the financial provision regulations and that there is enough funding provided by the mine for closure and rehabilitation cost and meets the requirements as stipulated in Regulation 11 of the Financial Provision Regulations. | • Annually and must be audited by an independent auditor. | • Annual Performance Assessment. | As required:<br>• Environmental Officer/Independent Third Party and update annually. |

# 20 Site Relinquishment Criteria

Site relinquishment requires formal acceptance from the regulatory authority to ensure that all obligations associated with closure are achieved, prior to a closure certificate being issued. To achieve site relinquishment, criteria need to be set, measured and met for all parties to understand what needs to be done to obtain a closure certificate.

This provides all parties involved in the process a target that needs to be achieved and sets the standards that closure, and rehabilitation are measured against. Table 20-1 provides the preliminary site relinquishment criteria for the mine. These criteria will need to be updated once the final land use and post-closure water management requirements have been confirmed/ finalised.

## Table 20-1: Site Relinquishment Criteria

| Environmental Aspect | Initial Closure criteria | Monitoring Requirement | Reporting Requirement |
|---|---|---|---|
| Biodiversity | Ensure establishment of vegetation has a basal cover of a reference site 5 years post-closure and that it is self-sustaining and can be measured over a 5 year period after mine closure, indicating that natural succession has occurred. | Bi-annual vegetation monitoring and rehabilitation monitoring for 3 years after mine closure. | Vegetation Monitoring Reports. |
| Groundwater | Groundwater qualities after mine closure need to comply with the qualities as stipulated in the Water Use Licence Application (WULA) and the appropriate standards set by the Department of Water and Sanitation (DWS) and South African National Standards (SANS). | Monthly and quarterly groundwater monitoring for 10 years after mine closure. | Groundwater Monitoring Reports. |
| Surface Water | Surface water qualities after mine closure need to comply with the qualities as stipulated in the WULA and the appropriate standards set by the DWS and SANS. | Monthly and quarterly surface water monitoring for 10 years after mine closure. | Surface Water Monitoring Reports. |
| Social | Engagement with stakeholders and employees regarding closure related aspect and formulisation of a retrenchment and downscaling policy demonstrating training initiatives and skills development assisting in employees being up-skilled, which would help individuals to seek for alternative employment at the time of closure. | Engagement, training and skills development policies during operational phase. | Records of correspondence, training matrices and records of training. |

| Environmental Aspect | Initial Closure criteria | Monitoring Requirement | Reporting Requirement |
|---|---|---|---|
| Air Quality | Dust, $PM_{10}$ and $PM_{2.5}$ must comply with the minimum standards and limits as set by the NEM:AQA and applicable regulations and guidelines. | Monthly air quality monitoring during the decommissioning and rehabilitation phase. | Air Quality Monitoring Reports |
| Soil, Land Capability and Land Use | Post land use mining assessment to determine status of rehabilitated areas with respect to soil quality and that rehabilitated areas have been rehabilitated to an agreed upon land use. In addition to the above, inspections should be undertaken to identify areas of erosion and that erosion measures have been constructed. | Yearly soil chemistry and physical properties analysis during the rehabilitation phase.<br>Daily soil erosion monitoring during the rehabilitation phase. | Soil Quality and Erosion Monitoring Reports. |
| Erosion | Implementation or construction of erosion control measures. | Geotechnical and hydrological studies of existing structures.<br>Evidence in rehabilitation report that appropriate risk assessment has been | Erosion Monitoring Reports. |
| Safety | Ensure dangerous mining areas, such as TSFs and cleared footprints, have been appropriately constructed and/or rehabilitated. | Visual inspections and sign off report by a registered engineer. | Signed off report by registered engineer. |

# 21 Organisational Capacity

The responsibility of management, at both the corporate and operations level, and all personnel on site, including contractors form part of the organisational structure and responsibilities. Specific roles and accountabilities should be included in job descriptions. Performance against responsibilities and specific performance indications are assessed as part of annual performance appraisals of employees.

This section aims to establish and guide the organisational structure required for closure implementation, and guide capacity building to ensure this is successfully carried out.

## 21.1 Organisational Structure

The following closure organisational considerations have emerged as good practice and is suggested for consideration by the mine. Once the relevant persons have been selected then the training and capacity building needed for closure can be determined.

The establishment of a closure committee, which has emerged as international best standard, is key to ensure that closure planning is carried out in terms of the relevant legal requirements and company policies. Although closure planning forms part of the environmental management function, the establishment of a multi-disciplinary committee can help ensure that closure planning is an integrated activity which is incorporated into mine planning. Figure 21-1 below shows typical key roles that may be identified for a closure committee as defined by ICMM (2019).

The role of the closure champion in a committee is critical, as the champion will be responsible for liaising with other key leaders within the organisation. The community liaison and development officer engages with the relevant stakeholders, which can be actioned through a stakeholder forum. Human resources consider the transition into closure and develops plans to minimise job losses. The technical specialists focus on addressing the knowledge gaps and guide rehabilitation implementation. The finance officer ensures that sufficient funds are available for closure.

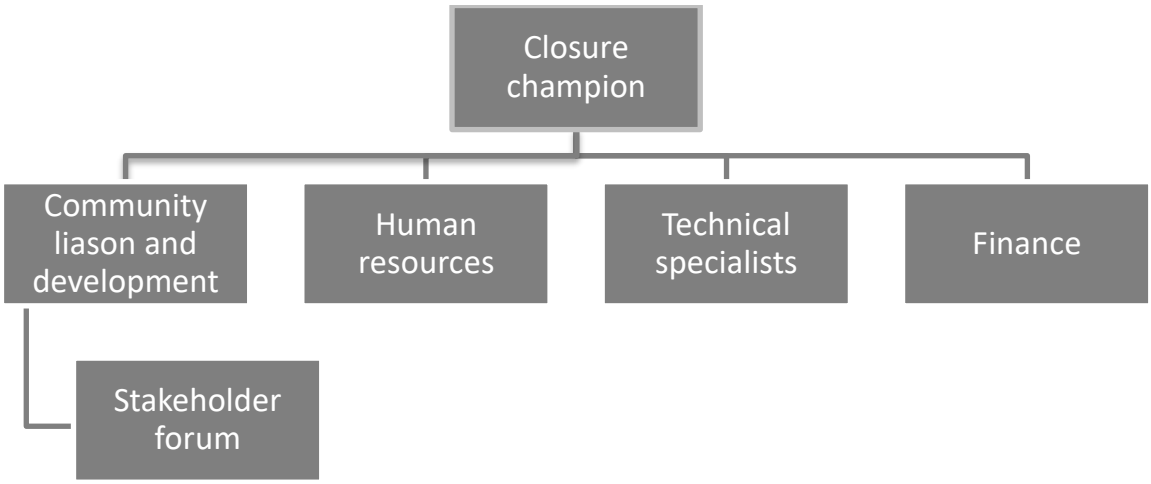



**Figure 21-1: Typical Closure Committee**

# 22 Closure Cost Determination

The Section details the approach and assumptions applied in the closure cost estimate undertaken in support of the financial provisioning requirements for mine closure.

The closure cost estimate was undertaken using third party rates from Digby Wells' database and contractor rates form implementation projects Digby Wells is involved in, where applicable. The methodology followed in aligned with the requirements of the Financial Provisioning Regulations, 2015 (as amended).

## 22.1 Approach and Methodology

The following approach was applied in the estimation of the closure costs:

- Conduct an internal project meeting to discuss the broader Project, implementation timelines and available information;
- Review the following information and define CCA battery limits:
  - Mintails Closure Plan and Closure Costing related to MR206 (Golder, 2018);
  - Mogale Gold Closure Cost calculation (Irene Lea, 2012);
  - Review of the Mintails Financial Provision Estimates (Digby Wells, 2017);
  - Presentation to the Department of Mineral Resources (Mintails, 2018);
  - Legal Review of the Pre-feasibility Study Due Diligence of the Mintails SA Operations on Behalf of DRA and Mogale (Digby Wells, 2021);
  - Pan Africa Resources Mogale Cluster Gold Project: Pre-feasibility Study (Digby Wells, 2021); and
  - General survey data, contour sets and site layout planning provide by Mogale.
- Conduct a Geographic Information System (GIS) analysis based on the survey data received to quantify areas of the various closure components;
- Develop a site-specific closure costing model based on the Digby Wells template;
- Compile a dedicate units rates sheet using the Digby Wells rates data base;
- Populate the closure costing model and determine the closure costs for the Current Disturbance and the Planned Life of Mine scenarios;
- Engage the Mogale and Epoch technical teams for input and clarification as required;
- Present the initial outcomes of this desktop CCA to the broader project team; and
- Compile a succinct CCA report.
- The review and update included the following actions:
  - Conduct an initial internal project meeting to discuss the changes to the planning and design since the PFS;

- Conduct a site visit on 4 October 2021 to verify site conditions and status of the infrastructure, Sand Dumps, TSFs and pit against assumptions included in the PFS desktop assessment;
- Update the Closure Costing Model with new and updated quantities;
- Update the site wide itemised layout plans;
- Calculate a provisional allowance to limit potential long term seepage from the LOM TSFs should additional measures be required (reported separately); and
- Update the CCA report.

## 22.2 Closure Costing Assumptions and Qualifications

The following closure cost assumptions were applied in the closure cost estimation. These should be reviewed and updated in future iterations of the closure cost estimate to ensure they remail appropriate.

## 22.3 General Closure Costing Assumptions

The CCA is based on the following general costing assumptions:

- It is assumed that third party contractors would be commissioned to establish on site (preliminary and general costs included) and implement the mass earthworks, demolition, site clean-up, related rehabilitation work and the post rehabilitation monitoring and maintenance;
- The preliminary and general costs are included as 12% of the site decommissioning and rehabilitation costs. Current proposed amendments to GN R.1147 indicate that this percentage could increase significantly if the amendments are ratified;
- The CCA is compiled to a suitable level of accuracy for a PFS and a contingency allowance of 10% is included based on the infrastructure and rehabilitation total;
- The closure costing is calculated as at December 2021;
- Aligned with the requirements of international accounting standards and GN R.1147, no discounting of potential value recovered from the sale of the plant, steel or other material removed from site is considered;
- Unless firm agreements with the next land users are in place, it is assumed that all infrastructure will be demolished and removed;
- No design or detailed layout plans were available for the proposed pump stations and reclamation site. A nominal allowance has been included for the decommissioning and rehabilitation of these areas based on similar projects Digby wells has recently been involved in;
- The wetland rehabilitation planned for the first year of operations is deemed an operational cost and is not included in the CCA;

- All survey data received is assumed to be correct; and
- The closure cost estimate does not include VAT.

## 22.4 Site Specific Costing Assumptions

The closure costing is informed by the following site-specific assumptions.

### 22.4.1 Infrastructure

- Concrete will only be demolished up to 1,000 mm below natural ground level, remaining tunnels and voids will be backfilled prior to application of general rehabilitation measures;
- All inert waste (i.e. building rubble) will be disposed on site during decommissioning;
- A maximum load and haul distance of 1 km was allowed for disposing building rubble;
- 60% of the usual rates are applied for the demolition of the remnant single and double story brick structures due to vandalism and stripping;
- All steel structures, pipelines, powerlines, conveyors and fencing will be dismantled and stored at a central managed location onsite prior to selling-off or removal (no discounting for the selling off steel is included);
- All diesel tanks will be removed by the owner prior to closure and the related infrastructure will need to be demolished;
- Recover all asphalt surfaces and store in central managed location prior to removal by third party for reuse;
- Fugitive tailings material will be recovered from the old plant and incorporated into the nearest TSF prior to rehabilitation; and
- All areas where structures have been removed will be shaped, ripped, top soiled and vegetated.

### 22.4.2 Rehabilitation TSFs and Sand Dumps

Based on a high-level evaluation of aerial images for the site, the following percentages have been applied to vegetation establishment for the current disturbance closure scenario:

- 1L23 – 1L25 North compartments:
  - Construct contour walls on TSF tops – assumed 20% of top surface area;
  - Establish vegetation on the upper surface – assumed 30% of top surface area; and
  - Establish vegetation on side slopes – 100% of measured side slopes.
- 1L23 – 1L25 South compartments:
  - Construct contour walls on TSF tops – assumed 60% of top surface area;

    - Establish vegetation on the upper surface – assumed 90% of top surface area; and
    - Establish vegetation on side slopes – 100% of measured side slopes.
- 1L23 – 1L25 Southwest compartments:
    - Construct contour walls on TSF tops – assumed 90% of top surface area;
    - Establish vegetation on the upper surface – assumed 90% of top surface area; and
    - Establish vegetation on side slopes – 40% of measured side slopes.
- 1L13 – 1L15 North compartments:
    - Construct contour walls on TSF tops – assumed 10% of top surface area;
    - Establish vegetation on the upper surface – assumed 20% of top surface area; and
    - Establish vegetation on side slopes – 50% of measured side slopes.
- 1L13 – 1L15 South compartments:
    - Construct contour walls on TSF tops – included in North area;
    - Establish vegetation on the upper surface – assumed 40% of top surface area; and
    - Establish vegetation on side slopes – included in North area.
- 1L28 North compartments:
    - Construct contour walls on TSF tops – assumed 40% of top surface area;
    - Establish vegetation on the upper surface – assumed 40% of top surface area; and
    - Establish vegetation on side slopes – 100% of measured side slopes.
- 1L8 North compartments:
    - Construct contour walls on TSF tops – allowance to repair existing paddocks;
    - Establish vegetation on the upper surface – assumed 20% of top surface area; and
    - Establish vegetation on side slopes – 50% of measured side slopes.
- 1L10 North compartments:
    - Construct contour walls on TSF tops – allowance to repair existing paddocks;

- Establish vegetation on the upper surface – assumed 40% of top surface area; and
- Establish vegetation on side slopes – Included in 1L8 measurement.

- North and South Sand Dumps – hydroseed 100% of measured area; and
- CAM Sand Dump – hydroseed 50% of the measured area.

### 22.4.3 General Rehabilitation

The following assumptions are applicable:

- Levelling and shaping will be implemented to align the surface water runoff of rehabilitated areas with the site wide drainage framework (where applicable);
- No topsoil is available on site;
- TSFs and Sand Dumps can be rehabilitated in situ (no engineered covers have been allowed for);
- Disturbed footprints will be ripped to alleviate compaction prior to hydroseeding;
- Seeding and soil/growth medium amelioration will be done via hydroseeding; and
- Amelioration will be determined through dedicated soil fertility sampling and analysis by a qualified soil scientist.

### 22.4.4 Long Term Groundwater Management Plan

No allowances have been included for potential long-term water management measures for the current disturbance. Refer to Section 10.1 for an initial provisional calculation for additional measures to address potential long-term seepage for the LOM scenario should it be required.

### 22.4.5 Monitoring and Maintenance

The following is included:

- An allowance is included for monitoring surface and groundwater on a quarterly basis for 10 years post closure;
- Rehabilitation monitoring and maintenance cost for the TSFs and sand dumps are included in the calculations for Area 3 and 4; and
- Monitoring and maintenance costs for other components are calculated separately and will continue for 5 years post closure.

## 22.5 Residual/ Latent Closure Costs

The residual/ latent risks are addressed in the Environmental Risk Report, which is provided in Part B of this report.

## 22.6 Key Changes Made in the Update of the Closure Costs

The closure costing for the current disturbance and LoM costing increased from R247,490,748 and R106,906,188 to **R 257,891,255** (32% increase) and **R 107,094,839** (0.2% increase) respectively since the pre-feasibility study.

## 22.7 Closure Cost Summary

The closure cost calculation is aligned with the Financial Provision Regulations, 2015 (GN R.1147) as amended.

The Closure Cost estimates for the Current Disturbance and the Life of Mine closure scenarios (MR206) are **R 257,891,255** and **R 107,094,839** respectively. The closure costs are calculated as at December 2021. The closure cost estimate breakdown is included Table 22-1 below. Detailed costing sheets are provided in Appendix B (excluding VAT and including P&Gs and Contingencies at 12% and 10%, respectively).

## Table 22-1: Planned closure cost summary

| | Digby Wells Environmental | | |
|---|---|---|---|
| | Pan African Resources (Pty) Ltd, MR206, PAR7273 Revision: 0 | | |
| **Area and Description** | **Current disturbance 2021** | **Life of Mine 2035** | **Comment** |
| **Infrastructure and Rehabilitation** | | | |
| Area 1: New Plant and related dams | R0 | R12 544 279 | New plant based on layout received and rehabilitation of the footprint. Includes all plant dams. |
| Area 2: 9 Shaft remnant Mill and Main Plant | R7 708 371 | R0 | Includes remnant concrete and brick structures and rehabilitation of the affected footprint |
| Area 3: Tailings Storage Facilities (Rehabilitation monitoring and maintenance included) | R71 809 453 | R46 319 676 | All TSFs for immediate closure. LoM includes the West Wits Pit TSF and 1L23-II25 North and South |
| Area 4: Sand Dumps | R77 184 922 | R0 | All sand dumps and related disturbed footprints, allowance for shaping to 1:3 prior to amelioration and vegetation establishment. Includes allowance for the "outside area tailings recovery and footprint rehabilitation". |
| Area 5: Opencast Pits | R38 696 949 | R0 | West wits pit included in the current closure scenario. In-pit TSFs addressed under Area 3. |
| Area 6: Water Storage Dams - Lancaster and Reticulation SW dams | R3 284 351 | R11 454 808 | Immediate closure includes only the Lancaster dam upgrades with a 50% contingency on the quote received. LoM will include the two proposed storm water dams |
| Area 7: Proposed Pump Stations | R0 | R4 362 478 | Pump stations and reclamation site |
| Area 8: Pipelines and Powerlines | R0 | R6 407 744 | Pipelines and powerlines |
| **Sub-total** | **R198 684 046** | **R81 088 985** | |
| **Monitoring and Maintenance** | | | |
| Monitoring Costs (Groundwater and Surface water) | R1 263 200 | R1 263 200 | |
| Monitoring Costs (Vegetation) | R215 921 | R51 921 | Vegetation monitoring and maintenance costs for the TSFs and Sand Dumps are included in Area 3 and 4 |
| Maintenance Costs (Vegetation) | R8 517 598 | R1 351 157 | |
| Specialist studies - Full EIA | R5 500 000 | R5 500 000 | Full Closure EIA with specialist studies |
| **Sub-total** | **R15 496 719** | **R8 166 277** | |
| Preliminary and General (12%) | R23 842 085 | R9 730 678 | |
| Contingency (10%) | R19 868 405 | R8 108 898 | |
| **TOTAL** | **R257 891 255** | **R107 094 839** | |

## 22.8 Current Closure Cost Accuracy

Given the Project's remaining LoM the accuracy level required for the closure cost estimation is **-30 to +30%.** This is according to the Draft Financial Provisioning Regulations, 2019, which give guidance on the level of accuracy required based on the remaining LoM, as reflected in Table 22-2.

**Table 22-2: Required Accuracy Based on Remaining LoM (Financial Provisioning Regulations, May 2019)**

| End of life of operation (or components of operation) from year of assessment | Design effort | Degree of accuracy in cost estimation |
|---|---|---|
| **> 30 years** | Pre -Conceptual 1 Class 5 Estimate I up to 2% of complete definition | -50% to + 50% |
| **10 to 30 years** | Conceptual / Pre-feasibility 1 Class 4 Estimate / up to 15% of complete definition | -30% to + 30% |
| **5 to 10 years** | Preliminary 1 Feasibility 1 Class 3 Estimate / up to 40% of complete definition | -20% to + 20% |
| **Less than 5 years** | Detailed Designs I Bid 1 Tender 1 Class 2 estimate up to 75% of complete definition | -10% to + 10% (or less) |
| The calculations for operations with five or less years must include a line item for carrying out specialist studies up to Detailed Design effort to improve the degree of accuracy to +1 -10% as well as a contingency to ensure sufficient funds for closure by a third party. Motivation must be provided to indicate the accuracy in the reported number and as accuracy improves, what actions resulted in an improvement in accuracy. | | |

## 22.9 Actions Required for Improvement of Closure Cost Accuracy

The following actions are recommended to refine the closure cost estimation going forward:

- Revise and update the quantities for the new plant infrastructure based on detailed designs and planning once available;
- Review and update the existing closure planning to incorporate and reflect the outcomes of the planned technical studies and address the end land use component as a driver for rehabilitation measures;

- Investigate and explore the implementation of known rehabilitation methodologies to improve the potential for successful rehabilitation and reducing the closure costs;
- Improve the understanding of the drying time required for the TSFs prior to accessibility for rehabilitation and closure activities; and
- Engage with the authorities and other stakeholders to ensure alignment regarding operational and closure planning.

# 23 Recommendations for Improvement

The following recommendations are made to improve the RCP in future updates:

- Develop an ARP aligned with the overarching site wide RCP objectives to ensure integration of mining and rehabilitation activities at the start of the operation;
- Develop an optimised post mining landform design and rehabilitation plan for the remaining footprint areas once TSFs and sand Dumps have been removed based on conditions encountered;
- Implement concurrent rehabilitation as soon as possible to reduce the financial burden at closure;
- Geohydrological modelling based on the closure period must be undertaken to inform the post-closure water management strategy as required, to enable the required provisioning to be made for both the immediate and planned closure scenario's;
- Regular groundwater monitoring should take place to determine possible changes in groundwater flow and groundwater quality, which should feed into updating the geohydrological model for the site;
- A post-mining land use plan should be developed early in the project life cycle to inform the closure measures and site relinquishment criteria;
- There should be regular interaction and communication with local stakeholders and local farmers, so that their requirements can be taken into consideration in the rehabilitation process, and particularly the post-mining land use plan development;
- Invasive alien plants should be removed on an on-going basis; and
- Monitoring and maintenance of the rehabilitated areas should take place on an annual basis for at least five years post-closure and should also be implemented during the operational period. This enables corrective rehabilitation to be implemented during operations and reduces the residual risk associated with post-closure vegetation failure.

# 24 Motivation for Amendments

No amendments are made at this stage of reporting. Should any amendments to the closure plan be made in future updates/ iterations of this plan, details of the amendments made will be included in this Section.

Amendments will be made if the current mine plan changes and could also be applicable once the identified knowledge gaps in this closure plan are addressed through undertaking the required specialist studies to support improvement of this closure planning document.

# PART B: ENVIRONMENTAL RISK ASSESSMENT FOR SCHEDULED AND UNSCHEDULED POST-CLOSURE RESIDUAL/ LATENT RISKS

## 1 NEMA Compliance Checklist

The Environmental Risk Assessment report (ERA) is structured to align with the minimum requirements set out in Appendix 5 of the Financial Provisioning Regulations, 2015 (as amended). The requirements are provided in Table 1-1, which includes reference to the relevant section where the requirement is addressed in this report.

**Table 1-1: Minimum Requirements of the Environmental Risk Assessment Report for Scheduled Closure**

| Content of An Environmental Risk Assessment for Scheduled Closure | Section |
|---|---|
| The Environmental Risk Assessment report must contain information that is necessary to determine the potential financial liability associated with the management of latent environmental liabilities post closure, keeping in mind the planned post-mining end state of the land, once the initial risk threshold criteria have been achieved and must include- | |
| a) Details of-<br>(i) The person or persons who prepared the plan<br>(ii) The professional registrations and experience of the person or persons who prepared the plan<br>(iii) The applicant or holder including but not limited to name, physical address, postal address, contact details; and<br>(iv) Rights, permits, licences and authorisations associated with the operation including the right or permit number, environmental authorisation number, and similar details of all other authorisation received e.g. water use licence, waste licence etc. | See page i at the beginning of this document |
| b) Details of the assessment process used to identify and quantify the residual risks, including-<br>(i) A description of the risk assessment methodology inclusive of risk identification and quantification; | Section 2 (Part B) |
| (ii) Substantiation why each risk is residual, including why the risk was not or could not be mitigated during concurrent rehabilitation and remediation or during the implementation of the final rehabilitation, decommission and closure plan; | Section 2<br>Section 4 |
| (iii) A detailed description of the drivers that could result in the manifestation of the risks after closure; | Section 4 (Part B)<br>Section 5 (Part B) |
| (iv) A description of the expected timeframe in which the risk is likely to manifest, typically as expected years after closure, and the duration of the impact, including motivation to support these timeframes; | Section 8 (Part B) |

| Content of An Environmental Risk Assessment for Scheduled Closure | Section |
|---|---|
| (v) A detailed description of the triggers which can be used to identify that the risk is imminent or has manifested, how this will be measured and any cost implications thereof; | Section 6 (Part B) |
| (vi) Results and findings of the risk assessment or risks which will occur post closure; and | Section 4 (Part B)<br>Appendix A |
| (vii) An explanation of changes to the risk assessment results as applicable in annual updates to the plan. | Section 9 (Part B) |
| c) Management activities, including-<br>(i) Monitoring of results and findings, which informs adaptive or corrective management and/or risk reduction activities<br>(ii) An assessment of alternatives to mitigate or manage the impacts once the risk has become manifested, which must be focussed on practicality as well as cost of the implementation<br>(iii) Motivation why the selected alternative is the appropriate approach to mitigate the impact; and<br>(iv) A detailed description of how the alternative will be implemented. | Section 6 (Part B) |
| d) Calculation of costs for implementing the activities to manage and monitor residual and latent impacts until the agreed risk threshold is reached using market related figures and the current value of money and no discounting or net present value calculations which must-<br>(i) Include costs to determine whether the risk is imminent or has manifest are to be included in the assessment as there are monitoring costs likely to be incurred during the implementation of the strategy to manage or mitigate the impacts once the risk has become manifest;<br>(ii) Be based on the management, rehabilitation, remediation, maintenance and long-term monitoring of activities undertaken by a third party<br>(iii) Be calculated for the management, rehabilitation, remediation, maintenance and long-term monitoring of residual and latent impacts for all disturbed areas and associated environmental impacts<br>(iv) Include the costs for the management, rehabilitation, remediation, maintenance and long-term monitoring of activities for residual and latent impacts must include cost assumptions and auditable calculations of costs per activity or infrastructure<br>(v) Include the risk modelling and the calculation of post closure cost estimation must be updated annually during the operation's life to reflect known developments, including changes from the annual review of the closure strategy assumptions and inputs, scope changes; and | Section 10 (Part B) |

<table>
<tr><th>Content of An Environmental Risk Assessment for Scheduled Closure</th><th>Section</th></tr>
<tr><td>(vi) Include the cost estimates for modelling and calculating the post closure costs must be calculated using accuracy estimations as follows:
<table>
<tr><th>End of life of operation (or components of operation) from year of assessment</th><th>Design effort</th><th>Degree of accuracy in cost estimation</th></tr>
<tr><td>>30 years</td><td>Pre -Conceptual / Class 5 Estimate / up to 2% of complete definition</td><td>-50% to +50%</td></tr>
<tr><td>10 to 30 years</td><td>Conceptual / Pre - feasibility / Class 4 Estimate / up to 15% of complete definition</td><td>-30% to +30%</td></tr>
<tr><td>5 to 10 years</td><td>Preliminary / Feasibility / Class 3 Estimate / up to 40% of complete definition</td><td>-20% to + 20%</td></tr>
<tr><td>Less than 5 years</td><td>Detailed Designs / Bid / Tender / Class 2 estimate up to 75% of complete definition</td><td>-10% to +10% (or less)</td></tr>
</table>
*The calculations for operations with 5 or less years must include a line item for carrying out specialist studies up to Detailed Design effort to improve the degree of accuracy to +/-10% as well as a contingency to ensure sufficient funds for closure by a third party. Motivation must be provided to indicate the accuracy in the reported number and as accuracy improves, what actions resulted in an improvement in accuracy.</td><td></td></tr>
</table>

# 2 Introduction

The main intention of the ERA report is to identify residual and latent risks that remain, or will manifest, after site relinquishment, and to determine the likely financial liability associated with managing these risks in the long-term.

Risk assessment is the overall process of risk identification, risk analysis and risk evaluation followed by the development of mitigation measures to reduce the likelihood and consequence rankings of the risks identified.

Residual risks are defined as post site relinquishment risks that remain after the implementation of sound mitigation measures at closure and during the post-closure period. These risks typically will only require management in the long-term since there is a delay in risk manifestation. Latent risks are unforeseen risks that could manifest post-closure.

The residual/ latent environmental risks were identified and assessed during the ERA undertaken for the mine (as reported on in Section 9 – Part A). This Part of the closure planning document focuses on the residual/ latent risks identified and the recommended mitigation measures to manage these risks post-closure. The costs for management/ mitigation of these risks is also addressed, where these costs were able to be determined.

# 3 Risk Assessment Methodology

Closure related risks were identified and ranked based on the review of information supplied by the mine and site observations made.

The approach followed during the ERA is outlined below (detailed methodologies and ERA outcomes are provided in Part A: Section 9 and Appendix A):

- Review of available information supplied by the mine;
- Identifying possible closure risks during the site visit undertaken on 04 October 2021;
- Including possible closure related risk and in the Digby Wells RA model, which is based on a standard 5X5 risk matrix;
- Ranking the risks in terms of likelihood and consequence pre-mitigation;
- Developing mitigation measures to reduce the likelihood of the risk occurring; and
- Reranking the risk for likelihood of occurrence, with the assumption that the mitigation measure is effectively applied; and
- Summarising the significant and high level risks in this report to emphasise the need for their mitigation.

# 4 Significant Residual/ Latent Risks Identified

No significant (more severe) residual/ latent risks were identified during the ERA undertaken. The full suite of risks, including their risk rankings and mitigation measures, are included in Appendix A.

Based on available information, pumping and treating extraneous water will not be required for vertical seepage from the remaining West Wits and 1L23-1L25 TSFs. (refer to Section 7.7 in Part A of this report.

# 5 Risk Drivers Identified

This section will be addressed is required in subsequent annual updates of the RCP based on dedicated groundwater modelling of the post-closure phase.

# 6 Auditing and Monitoring Risk Manifestation

The auditing and monitoring that will be required post-closure to assess, measure and mitigate the identified residual/ latent risks will be included in more detail once there is sufficient information available to support this requirement. Post closure monitoring and maintenance requirements are outlined in Part A Table 19-1.

# 7 Alternative Mitigation Measures

Refer to Section 10 below.

# 8 Estimation of Risk Manifestation Timeframes

## 8.1 Groundwater Modelling outcomes

This section will be addressed is required in subsequent annual updates of the RCP based on dedicated groundwater modelling of the post-closure phase.

# 9 Amendment Made to the Risk Assessment

This section will be updated with any amendments that may be made to the residual/ latent risk assessment in annual updates of this closure planning document. As knowledge gaps are addressed and new information becomes available to further inform the risks, the risks and the associated rankings and mitigation measures will be amended accordingly.

# 10 Residual/ Latent Risk Costs

## 10.1 LOM Groundwater Contingency

Initial indications are that additional seepage due to rainfall infiltration from the in pit and above ground TSFs for the LOM closure scenario will be very low.

Instead of making an allowance to manage very low (or negligible) recharge volumes, costs have been determined for additional measures to reduce any potential recharge through the addition of bentonite to the upper surface and side slopes of the TSFs. The addition of Bentonite will further reduce the permeability of the TSF surfaces and reduce the recharge values even further.

The cost for incorporating the bentonite is based on the following:

- Purchasing bentonite at R3645/ton;
- Transport costs for delivering the bentonite to site of R425/ton (assumed 50 km);
- Incorporating bentonite at 1 kg/m$^2$ (reduced amount due to fine tailings, normal soil applications are between 6-14 kg/m$^2$); and
- Estimated labour costs of R532.66R/ha assuming eight labourers can complete 100 ha in a 5 day working week (9 hour day) with sufficient transport and supervision.

Based on the above, the bentonite implementation costs of R7,517,000 should be retained as a provisional amount to address potential seepage due to recharge as/if required.

# 11 Knowledge Gaps Identified for Residual/ Latent Risks

The following additional work should be undertaken to improve the knowledge maturity:

- Develop a geohydrological model for the immediate and post closure scenarios and based on the geochemistry of the reprocessed tailing material to be deposited on the West Wits and 1L23-1L25 TSF; and
- Continually update and calibrate the groundwater modelling and salt / water balances for the post closure phase based on actual monitoring data;

# 12 Conclusions

The identification and ranking of residual/ latent risks for closure will continue to be assessed on an annual basis. The risk rankings and the required mitigation measures may change once the work detailed in Section 10.1 becomes available to further inform the likelihood and consequence of potential seepage. This additional work will also be used to assess the cost for mitigation of the risks where applicable.

# 13 Closing Statement

Closure and rehabilitation is a continuous series of iterative activities that should begin with planning prior to the project's design and construction; and end with achievement of long-term site stability and the establishment of a self-sustaining ecosystem.

Not only will the implementation of this concept result in a more satisfactory environmental outcome, but it will also reduce the financial burden of closure and rehabilitation. This closure plan provides a sound foundation for developing detailed rehabilitation measures to close the operational activities safely and sustainably and according to its closure objectives.

Figure 13-1 illustrates that there are feedback loops between each element resulting in the iterative planning process as the knowledge base is expanded.

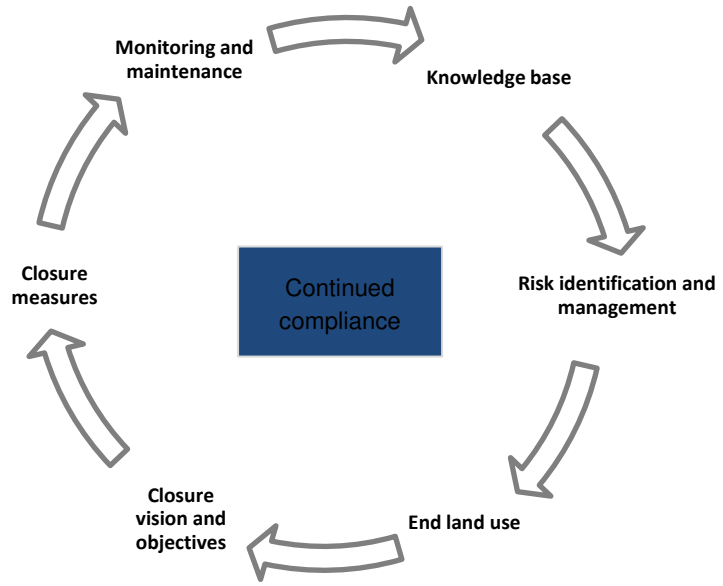



Figure 13-1: Iterative process of mine closure planning elements

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DIGBY WELLS
ENVIRONMENTAL

# Appendix A: Environmental Risk Assessment

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **ENVIRONMENTAL RISKS RELATED TO MINE CLOSURE** | | | | | | | | | | |
| **1,1** | **Mine Infrastructure** | | | | | | | | | | |
| 1.1.1 | Demolition of infrastructure | Hydrocarbon decontamination during decommissioning and demolition | Potential contamination of surface water and groundwater systems | Environment | 2 | 3 | 9 (M) | Maintain operational storm water measures and clean and dirty water separation during closure operations<br>Ensure rubble contaminated with hydrocarbons is appropriately cleaned and disposed of aligned with relevant legislation. | 1 | 2 | 3 (L) |
| 1.1.2 | Demolition of infrastructure | Ineffective decontamination during decommissioning and demolition | Potential exposure to radiation during decommissioning | Health & safety | 3 | 4 | 18 (S) | Continue specialist investigations - Ensure rubble contamination requirements are investigated and aligned with relevant legislation. | 1 | 2 | 3 (L) |
| 1.1.3 | Plant and workshop areas | Heavy equipment management during decommissioning and rehabilitation | Potential soil contamination from hydrocarbon spills | Environment | 2 | 3 | 9 (M) | Limit activities to the already disturbed footprint<br>Operational standards for vehicle maintenance, hydrocarbon storage and spillage management to continue through decommissioning<br>Investigate methodologies for bioremediating hydrocarbon contaminated soils on site for reuse in the rehabilitation process<br>Prior to closure, ensure that hydrocarbon spillages are identified and appropriately cleaned during the operational phase to reduce mine closure costs and safeguard surface water systems. | 1 | 2 | 3 (L) |
| 1.1.4 | Plant and workshop areas | Heavy equipment management during decommissioning and rehabilitation | Potential soil compaction and increased disturbance footprint which may result in failed rehabilitation and unstable landforms | Environment | 2 | 3 | 9 (M) | Limit activities to the already disturbed footprint<br>Rehabilitate all areas to align with the site wide surface drainage framework, including:<br>Shaping, topsoil replacement, ripping to alleviate compaction and establishing vegetation aligned with the end land use planning and surrounding plant communities | 1 | 2 | 3 (L) |
| 1.1.5 | Waste management | Unplanned or haphazard disposal of building rubble from infrastructure demolition | Devalued end land use and potential safety hazard | Environment | 2 | 3 | 9 (M) | Investigate appropriate on site disposal aligned with relevant legislation and agreed to with the authorities. | 1 | 2 | 3 (L) |
| 1.1.6 | Waste management | Unplanned or haphazard disposal of potentially hazardous waste | Potential safety hazard and increased liability | Health & safety | 3 | 3 | 13 (S) | Run down inventories of consumables on site in the run up to closure<br>Include removal and clean-up clauses in contracts with suppliers<br>Include regular removal and disposal of hazardous waste from site by a certified contractor during operations | 1 | 2 | 3 (L) |
| 1.1.7 | New Plant - Infrastructure handed to next land user | No formal hand-over agreements in place or capacity building and training for next users | Derelict and unsafe infrastructure | Reputation | 3 | 4 | 18 (S) | Ensure formal agreements are in place with next land users for any infrastructure that will remain after closure.<br>Demolish and remove all infrastructure where such agreements have not been concluded<br>Ensure hand-over procedures are developed and that training or capacity building is provided as required | 1 | 2 | 3 (L) |
| 1.1.8 | Old Plant - Infrastructure handed to next land user | Not completing the demolition and removal of the derelict remnant old plant infrastructure | Derelict and unsafe infrastructure, devalued end land use. | Reputation | 3 | 3 | 13 (S) | Demolish and remove old plant infrastructure during the operations and implement rehabilitation measures aligned with the end land use planning and surrounding plant communities | 1 | 1 | 1 (L) |
| **1,2** | **Water Management Facilities** | | | | | | | | | | |

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.2.1 | Water Management impoundments remaining at closure | Changed hydrology and safety | Surface water runoff to the natural catchment reduced and safety hazard of open water bodies with steep lined sides | Environment | 3 | 3 | 13 (S) | Decommission and rehabilitate constructed surface water impoundments no longer required at closure<br>Remove sediment from dam basins at closure<br>Remove and dispose of all liners<br>Shape and level the dams to be free draining and align with the site wide surface drainage framework<br>Rehabilitate all shaped dam footprints, including:<br>Shaping, topsoil replacement, ripping to alleviate compaction and establishing vegetation aligned with the end land use planning and surrounding plant communities | 1 | 2 | 3 (L) |
| 1.2.2 | Lancaster Dam | Contaminated surface and ground water | Continued contamination of surface and ground water resources due to historical spillages | Environment | 3 | 3 | 13 (S) | Recover contaminated sediment from the dam basin and process through the new plant<br>Shape the dam basin to be free draining, aligned with the site wide surface drainage framework<br>Ripping to alleviate compaction<br>Establish vegetation including in-situ soil amelioration based on dedicated sampling and analysis, establish vegetation including in-situ soil amelioration based on dedicated sampling and analysis, seed bed preparation and the application of an appropriate seed mix | 1 | 2 | 3 (L) |
| **1,3** | **Mining Areas (Open Pits, Shafts, Underground Workings, WRDs etc.)** | | | | | | | | | | |
| **1.3.1** | Open Pit remains at closure | Open pit easily accessible | Open water bodies and continued access for public and illegal mining | Health & safety | 2 | 2 | 5 (L) | West Wits pit will be backfilled with tailings from the reprocessing activities, final landform will be above natural ground level. | 1 | 1 | 1 (L) |
| **1.3.2** | Remined Tailings Storage Facility and Sand Dump Footprints | Incomplete tailings recovery and footprint clearing | Failed rehabilitation and not meeting end land use criteria and potential safety hazard | Environment | 3 | 3 | 13 (S) | Develop and implement rehabilitation and management protocols including:<br>Footprint roll-up and final clearing aligned with the. remining schedule (Removal of all TSF material, no Starter walls or retainer walls will remain on the footprint);<br>Final levelling and shaping according to a landform design informed by dedicated hydrological calculations;<br>Construction of additional surface water management measures as required based on a detailed design;<br>Ripping to alleviate compaction:<br>Establish vegetation including in-situ soil amelioration based on dedicated sampling and analysis, seed bed preparation and the application of an appropriate seed mix<br>Develop and implement rehabilitation trials during the operations to determine effective rehabilitation methodologies<br>A rehabilitation monitoring and maintenance programme to highlight and address deficiencies and ensure rehabilitation success criteria are met. | 2 | 2 | 5 (L) |
| | | Over excavation across footprint | Final landform not aligned with site wide surface water runoff framework - increased ponding and erosion | Environment | 3 | 4 | 18 (S) | | 2 | 2 | 5 (L) |
| | | Poor storm water management planning | Unstable post mining landform, increased erosion and end land use criteria not met | Environment | 3 | 3 | 13 (S) | | 2 | 2 | 5 (L) |
| | | Negative Material balance, no topsoil stripped and stored historically | Reduced land capabilities due to rehabilitating in-situ material | Environment | 3 | 3 | 13 (S) | | 2 | 2 | 5 (L) |

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.3.3** | Tailings Storage Facility remains at closure | Crest and side slope stability | Failed rehabilitation resulting in an unstable landform and increased erosion | Environment | 3 | 4 | 18 (S) | Develop and implement rehabilitation and management protocols including:<br>Construct the in-pit and 1L23-1L25 TSFs to engineering design specifications that have considered the final configuration for closure<br>Construct additional storm water management measures based on dedicated hydrological modelling as required to combat erosion<br>Rehabilitation trials during the operations to determine effective rehabilitation methodologies<br>Concurrent rehabilitation on the side slopes during operations<br>Establish vegetation including soil amelioration based on dedicated sampling and analysis, seed bed preparation and the application of an appropriate seed mix<br>Management protocols to ensure accurate implementation<br>Rehabilitation monitoring and maintenance programme to highlight and address deficiencies and ensure rehabilitation success criteria are met. | 2 | 2 | 5 (L) |
| | | Negative Material balance, no topsoil stripped and stored historically | Reduced land capabilities due to rehabilitating in-situ material | Environment | 3 | 4 | 18 (S) | | 2 | 2 | 5 (L) |
| | | Failed storm water management on final configuration | Increased erosion and unstable final landform | Environment | 3 | 4 | 18 (S) | | 2 | 2 | 5 (L) |
| | | Multiple TSFs and Sand Dumps will be removed reducing the sources of pollution in the area. Redeposition of retreated tailings material on the 1L23-1L25 footprint could still be a source of contaminated seepage | Contaminated seepage horizontally to the surrounding shallow aquifer and streams and vertical seepage to the deep aquifer. | Environment | 3 | 4 | 18 (S) | Reprocessed tailings will be limed in the metallurgical plant and deposited at higher pH values (about 10-11) providing a positive impact on the groundwater quality on the underground mine void;<br>Design and implement measures (potentially cut-off trenches and berms) on the down stream side of the TSF to intercept potential contamination due to surface water runoff and shallow aquifer seepage;<br>Rehabilitate the in-pit and 1L23-1L25 TSFs to limit recharge via vegetation cover interception of rainfall and increased evapotranspiration;<br>Investigate and quantify the potential vertical recharge and salt load increase for the post-closure scenario to replace generic estimated recharge values.<br>Use the outcomes to determine further risk based mitigations if required. | 2 | 3 | 9 (M) |
| | | Radioactive tailings material | Radioactive contamination result from dust fallout from the TSF and impacting the surrounding communities and environment (soils, surface water and groundwater) | Environment | 3 | 4 | 18 (S) | Remove all TSFs and Sand Dumps and rehabilitate the footprints<br>Closure measures for the West Wits and 1L23-1L25 TSFs should ensure that the potential dust fallout is mitigated as far possible post-closure. This should include the implementation of effective vegetation establishment methodologies | 2 | 3 | 9 (M) |
| **1,4** | **Biodiversity (over rehabilitated areas and within in MRA in the post-closure period)** | | | | | | | | | | |

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.4.1** | Biodiversity on site | Mining and rehabilitation activities | Mining disturbance resulting in reduced biodiversity due to clearing of land and residual contamination | Environment | 2 | 2 | 5 (L) | The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining. The following is recommended:<br>Develop a site wide Closure Plan and detailed end land use plan to guide all rehabilitation activities<br>Aligned with the closure objectives, develop and implement a Biodiversity Action Plan during the operational phase and implement through to closure<br>Mine planning should limit the mine disturbance footprint as far as possible to reduce the impacts of biodiversity loss<br>Ensure an alien invasives management plan is developed during the operational period and effectively implemented to reduce occurrences of infestation<br>Identify and delineate sensitive habitats as No-go areas throughout the construction, operation and decommissioning phases<br>Select suitable locally occurring seed mixes for rehabilitation to ensure rehabilitated areas are consistent with surrounding plant communities<br>Implement rehabilitation measures for disturbed areas as soon as possible<br>Conduct monitoring and maintenance of rehabilitated areas including identification and removal of AIPs | 1 | 1 | 1 (L) |
| **1.4.2** | Alien invasives | Uncontrolled infestation of alien invasive plants | Alien invasive plants outcompeting indigenous plants resulting in a reduction of biodiversity | Environment | 3 | 4 | 18 (S) | | 1 | 1 | 1 (L) |
| **1.4.3** | Fauna | Mining and rehabilitation activities | Poor rehabilitation leading to permanent habitat loss and segregation | Environment | 2 | 2 | 5 (L) | | 1 | 1 | 1 (L) |
| **1.4.4** | Flora | Mining and rehabilitation activities | Poor rehabilitation and use of inappropriate seed mixes inconsistent with surrounding plant communities and misaligned with the end land use planning | Environment | 3 | 3 | 13 (S) | | 1 | 1 | 1 (L) |
| **1,5** | **Wetlands and Other Sensitive Receptors** | | | | | | | | | | |
| 1.5.1 | Aquatic ecosystems | Contaminated seepage from TSFs, sand dumps, remined footprints and open pit affecting aquatic ecosystems | Potential to cause deterioration in water chemistry and the ecological condition of the receiving watercourses | Environment | 2 | 2 | 5 (L) | The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining. No further wetlands will be impacted by the planned activities and the following mitigations should be implemented:<br>TSFs will be removed during remining and redeposited on the existing 1L23-1L25 footprint and the in pit TSF (West Wits Pit)<br>All tailings material will be removed from reclaimed TSFs, including retainer and starter walls<br>All material will be removed from the Sand Dumps<br>Cleared Footprints will be shape to be free draining aligned with the site wide surface water drainage framework and revegetated to meet the end land use planning | 1 | 1 | 1 (L) |

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5.2 | Wetlands | Rehabilitation of site and dismantling of infrastructure | Erosion onset, sedimentation and establishment of alien plants | Environment | 3 | 2 | 8 (M) | Maintain operational storm water measures and clean and dirty water separation during closure operations<br>Limit activities to the already disturbed footprint<br>Rehabilitate all areas to align with the site wide surface drainage framework, including:<br>Shaping, topsoil replacement, ripping to alleviate compaction and establishing vegetation aligned with the end land use planning and surrounding plant communities | 1 | 1 | 1 (L) |
| 1.5.3 | Wetlands | Permanent loss of wetlands and habitat connectivity | Loss of wetlands, habitat connectivity and associated ecosystem goods and services | Environment | 2 | 2 | 5 (L) | The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining.<br>No further wetlands will be negatively impacted/lost during implementation. The following measures will be implemented in year one to restore historically affected wetlands (Digby Wells Wetland Rehabilitation Plan, 2022):<br>Blocking and rehabilitating the roads which transect wetlands and using an alternative road<br>Filling trenches to reduce impacts to the wetland hydrology<br>Construction of culverts to promote water flow<br>Level soil dumps to reduce the erosion potential and sedimentation within wetlands<br>Removing the AIPS, specifically the Eucalyptus sp. and Acacia sp. which are prevalent across the site<br>Remove berms to promote water flow across the wetland<br>Remove tailings sedimentation within and around the wetland and install sedimentation prevention berms<br>Reprofile and rehabilitate areas to promote natural wetland conditions | 1 | 1 | 1 (L) |
| **1,6** | **Soils, Land Capability and Post-Mining Land Use** | | | | | | | | | | |
| 1.6.1 | Loss of soil resources and reduced land capability | Failure to implement soil management measures throughout the operation | Failed rehabilitation due to soil losses and irreparable damage to chemical and physical structure | Environment | 2 | 3 | 9 (M) | Develop and implement soil management measures for infrastructure development to ensure that soils are stripped, stored, replaced and ameliorated aligned with industry good practice<br>Rehabilitate cleared historical mining areas (where no topsoil stripping or stockpiling was done) by:<br>Shaping the area to be free draining<br>Ripping the shaped area to combat compaction<br>Ameliorating the insitu material based on dedicated fertility sampling and analysis<br>Establish vegetation including soil amelioration based on dedicated sampling and analysis, seed bed preparation and the application of an appropriate seed mix<br>Develop and implement a monitoring and maintenance programme for at least three years to address shortcomings and ensure rehabilitation success. | 1 | 2 | 3 (L) |
| 1.6.2 | Soils compaction and erosion | Inappropriate rehabilitation of TSF, WRD, roads, open pits and associated mine infrastructure | Potential soil compaction could occur which could result in poor vegetation establishment, ultimately increasing risk of erosion. | Environment | 2 | 3 | 9 (M) | | 1 | 2 | 3 (L) |

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.6.3 | Land use | Failure to develop and implement coherent site wide rehabilitation and closure plan | End land use / capability not aligned with surrounding land use mix. Limited post mining opportunities | Social | 3 | 4 | 18 (S) | Develop and coherent site wide closure plan to guide all rehabilitation activities<br>Develop annual rehabilitation plans to incrementally achieve the closure objectives and reduce risks over the LoM | 2 | 2 | 5 (L) |
| 1.6.4 | Land use | Lack of monitoring and maintenance of rehabilitated areas | Poor vegetation establishment and basal cover, AIP encroachment, increased erosion and lower land capability and land use potential, increased financial liability | Cost | 3 | 4 | 18 (S) | Implement concurrent rehabilitation soon as possible,<br>Develop and implement effective rehabilitation methodologies with known outcomes<br>Ensure effective contractual and quality control agreements are in place<br>Develop implementation standards and procedures with specific sign-off criteria<br>Develop end land use plan to ensure alignment of activities towards an end goal | 2 | 2 | 5 (L) |
| **1,7** | **Surface and Groundwater** | | | | | | | | | | |
| 1.7.1 | Surface water | Failure to implement integrated rehabilitation and storm water management at closure | Failed rehabilitation, high runoff velocities and drainage densities, increased erosion and down stream sedimentation | Environment | 3 | 4 | 18 (S) | Develop a site wide Closure Plan and detailed end land use plan to guide all rehabilitation activities<br>Implement concurrent rehabilitation measures as soon as possible<br>Develop a site wide closure storm water management plan to limit drainage densities and velocities while aligning surface water runoff with the surrounding drainage framework | 1 | 2 | 3 (L) |
| | | Spillages of hydrocarbons (oils, fuels and grease) during infrastructure demolition activities | Spillages of hydrocarbons (oils, fuels and grease) by vehicles and machinery used during demolition and transportation of material from the decommissioned mine will contaminate surface water resources when washed into the Moto Lagoon and its tributaries. | Environment | 3 | 2 | 8 (M) | Continue operational management measures through the decommissioning phase ensuring continued clean and dirty water separation<br>Run down inventories of chemicals and hydrocarbons prior to closure<br>Include the removal and clean-up of hydrocarbons from site in contractual agreements with contractors | 1 | 2 | 3 (L) |
| | | Mining aspects remain as features in land scape | Reduced contribution to catchment yield | Environment | 3 | 4 | 18 (S) | The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining. The following mitigations should be implemented:<br>TSFs will be removed during remining and redeposited on the existing 1L23-1L25 footprint and the in pit TSF (West Wits Pit)<br>All tailings material will be removed from reclaimed TSFs, including retainer and starter walls<br>All material will be removed from the Sand Dumps<br>Cleared Footprints will be shape to be free draining aligned with the site wide surface water drainage framework and revegetated to meet the end land use planning | 1 | 2 | 3 (L) |

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.7.2 | Groundwater | Seepage due to continued storage of Tailings above ground | Potential groundwater contamination affecting sensitive downstream habitats and local groundwater users. | Environment | 3 | 4 | 18 (S) | The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining. The following mitigations should be implemented:<br>TSFs will be removed during remining and redeposited on the existing 1L23-1L25 footprint and the in pit TSF (West Wits Pit)<br>All tailings material will be removed from reclaimed TSFs, including retainer and starter walls<br>All material will be removed from the Sand Dumps<br>Cleared Footprint The remining and rehabilitation activities will restore an area heavily impacted and denuded by historical mining. No further wetlands will be impacted by the planned activities and the following mitigations should be implemented:<br>TSFs will be removed during remining and redeposited on the existing 1L23-1L25 footprint and the in pit TSF (West Wits Pit)<br>All tailings material will be removed from reclaimed TSFs, including retainer and starter walls<br>All material will be removed from the Sand Dumps<br>Cleared Footprints will be shape to be free draining aligned with the site wide surface water drainage framework and revegetated to meet the end land use planning<br>The in-pit TSF will not decant to surface and the final landform will be above natural ground level. The backfilled pit will remain hydraulically linked with the underground workings<br>Seepage from the redeposited and rehabilitated TSF 1L23-1L25 may migrate horizontally through the weathered zone and vertically into the underground mine void | 2 | 3 | 9 (M) |
| | | Seepage due to continued storage of Sand Dumps above ground | Potential groundwater contamination affecting sensitive downstream habitats and local groundwater users. | Environment | 2 | 2 | 5 (L) | | 2 | 2 | 5 (L) |
| | | Remined TSFs - Seepage due to incomplete removal or footprint rehabilitation | Potential groundwater contamination affecting sensitive downstream habitats and local groundwater users. | Environment | 3 | 2 | 8 (M) | | 2 | 2 | 5 (L) |
| | | Decant from the open pit | Potential contamination of soils, water resources and downstream sensitive habitats | Environment | 1 | 1 | 1 (L) | | 1 | 1 | 1 (L) |
| **1,8** | **Noise** | | | | | | | | | | |
| **1.8.1** | Noise | Decommissioning activities involving the movement of machinery and vehicles. | Minor implications on the surrounding area are anticipated. | Social | 2 | 2 | 5 (L) | Restrict decommissioning activities to daylight hours where possible.<br>Regularly service machines and vehicles to ensure noise suppression mechanisms are effective e.g., installed exhaust mufflers.<br>Switch off equipment when not in use. | 1 | 1 | 1 (L) |
| **1,9** | **Air Quality** | | | | | | | | | | |
| **1.9.1** | Noise | Generation of dust from the dismantling of mine infrastructure and rehabilitation. | Nuisance and health effects from exposure to fine particulate matter and reducing ambient air quality | Environment | 2 | 2 | 5 (L) | Application of dust suppressant on the haul roads and exposed areas.<br>Limit activity to non-windy days (wind speed less than 5.4 m/s), where possible.<br>Ensure proper rehabilitation of disturbed areas to allow for vegetation establishment | 1 | 1 | 1 (L) |
| **1,1** | **Financial and Regulatory** | | | | | | | | | | |

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.10.1** | Closure Provision | Insufficient funds to implement CP | Increased financial liability to address unforeseen costs at closure | Cost | 2 | 3 | 9 (M) | Update Closure Plan and Closure Cost Assessment annually to ensure risks are adequately understood and addressed<br>Continually address the identified gaps to improve the site body of knowledge<br>Implement rehabilitation trial sites to ensure that all rehabilitation methodologies produce known outcomes<br>Continually engage with stakeholders and authorities to align expectations<br>Implement concurrent rehabilitation to reduce the financial burden at closure | 1 | 1 | 1 (L) |
| **1.10.2** | Authorised closure | Failure to achieve authorized closure | Uncertainty regarding closure regulatory requirements and misalignment with authorities | Legal & regulatory | 2 | 3 | 9 (M) | Update CP and CCE annually to ensure risks are adequately understood and addressed<br>Continually engage with stakeholders and authorities to align expectations<br>Maintain a legal register and incorporate changes as required in the CP annual updates | 2 | 2 | 5 (L) |
| **2** | **SOCIAL RISKS RELATED TO MINE CLOSURE** | | | | | | | | | | |
| **2,1** | **Internal (SLP alignment with the closure planning documents)** | | | | | | | | | | |
| 2.1.1 | Employees | The cessation of the operations causing the laying off of workers. | Loss of employment opportunities and income source | Social | 4 | 3 | 17 (S) | Develop and implement a Social and Labour Plan (SLP) aligned with the relevant legislation<br>Continuous compliance with regulatory framework<br>Ensure effective and transparent communication with authorities and other affected parties | 2 | 2 | 5 (L) |
| **2,2** | **External (social closure engagement and considerations)** | | | | | | | | | | |
| 2.2.1 | Interested and affected parties | Failure to address social closure | Misalignment of expectations, deferred closure and potential increase in liabilities | Social | 4 | 3 | 17 (S) | Continuous compliance with regulatory framework<br>Continually engage with stakeholders and authorities to align expectations<br>Develop engagement platforms that allow for an inclusive process in developing and implementing the end land use plan | 2 | 2 | 5 (L) |
| 2.2.2 | Local economy | Closure of mining operation taking away the source of income for the local economy | Loss of business opportunities. | Social | 4 | 3 | 17 (S) | Develop and implement a Social and Labour Plan (SLP) aligned with the relevant legislation<br>Continuous compliance with regulatory framework<br>Ensure effective and transparent communication with authorities and other affected parties | 2 | 2 | 5 (L) |
| **3** | **RESIDUAL RISKS AND LATENT RISKS RELATING TO MINE CLOSURE (These risks manifest after site relinquishment)** | | | | | | | | | | |
| **3,1** | **Residual Risks** | | | | | | | | | | |

| | Aspect | Risk Driver | Consequence (unwanted event) | Risk Type | Probability | Consequence | Risk Ranking (pre-mitigation) | Mitigation measure(s) | Probability | Consequence | Risk Ranking (post-mitigation) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.1.2 | Contaminated seepage | Multiple TSFs and Sand Dumps will be removed reducing the sources of pollution in the area. Redeposition of retreated tailings material on the 1L23-1L25 footprint could still be a source of contaminated seepage | Contaminate seepage horizontally to the surrounding shallow aquifer and streams and vertical seepage to the deep aquifer. | Environment | 3 | 4 | 18 (S) | Reprocessed tailings will be limed in the metallurgical plant and deposited at higher pH values (about 10-11) providing a positive impact on the groundwater quality on the underground mine void;<br>Design and implement measures (potentially cut-off trenches and berms) on the down stream side of the TSF to intercept potential contamination due to surface water runoff and shallow aquifer seepage;<br>Rehabilitate the in-pit and 1L23-1L25 TSFs to limit recharge via vegetation cover interception of rainfall and increased evapotranspiration;<br>Investigate and quantify the potential vertical recharge and salt load increase for the post-closure scenario to replace generic estimated recharge values.<br>The impact of vertical recharge is potentially negligible | 2 | 3 | 9 (M) |
| **3,2** | **Latent Risks** | | | | | | | | | | |
| 3.2.1 | Climate | Failure to consider predicted climate change impacts in closure models and planning | Failed landforms due to increased surface water runoff volumes and drainage densities | | 3 | 4 | 18 (S) | Develop integrated postmining landform designs and ensure storm water management design criteria is based on predictive analysis | 1 | 2 | 3 (L) |

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# Appendix B: Detailed Costing Sheets

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | | | | | | | | | | | | | | | |
| **Area 1** | | **New Plant and related dams** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Demolish infrastructure** | | | | | | | | | | | | | | |
| 4 | Lab | Demolish single storey brick structure | 101 | | | m² | R329,62 | R0,00 | | 101 | | 93 | m² | R329,62 | R30 739,97 | |
| 5 | Offices | Demolish single storey brick structure | 101 | | | m² | R329,62 | R0,00 | | 101 | | 349 | m² | R329,62 | R114 960,09 | |
| 6 | Workshop | Dismantle steel structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 579 | m² | R390,23 | R225 984,12 | |
| | | Demolish and remove concrete base | 108 | | | m³ | R466,56 | R0,00 | | 108 | | 174 | m³ | R466,56 | R81 054,96 | assume 300mm |
| 7 | Main Store | Dismantle steel structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 439 | m² | R390,23 | R171 249,99 | |
| | | Demolish and remove concrete base | 108 | | | m³ | R466,56 | R0,00 | | 108 | | 132 | m³ | R466,56 | R61 423,17 | assume 300mm |
| 26 | Carbon Store | Dismantle steel structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 261 | m² | R390,23 | R101 878,21 | |
| | | Demolish and remove concrete base | 108 | | | m³ | R466,56 | R0,00 | | 108 | | 78 | m³ | R466,56 | R36 541,22 | assume 300mm |
| 27 | Reagents | Dismantle steel structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 417 | m² | R390,23 | R162 742,91 | |
| | | Demolish and remove concrete base | 108 | | | m³ | R466,56 | R0,00 | | 108 | | 125 | m³ | R466,56 | R58 371,89 | assume 300mm |
| 28 | Acid Tank | Dismantle steel tank | 142 | | | Item | R69 207,09 | R0,00 | | 142 | | 1 | Item | R69 207,09 | R69 207,09 | Treat as steel tank <10m |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 57 | m³ | R466,56 | R26 782,71 | assume 300mm |
| 29 | Single storey brick structure | assumed - not labelled | 101 | | | m² | R329,62 | R0,00 | | 101 | | 43 | m² | R329,62 | R14 129,64 | |
| 30 | Steel structure | assumed over CL tank (no 501) | 137 | | | m² | R468,99 | R0,00 | | 137 | | 42 | m² | R468,99 | R19 614,48 | |
| 32 | CIL Tank Infrastructure | Dismantle steel structure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 1164 | m² | R468,99 | R545 995,77 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 349 | m³ | R466,56 | R162 949,72 | assume 300mm |
| 33 | Single storey brick structure | assumed - not labelled | 101 | | | m² | R329,62 | R0,00 | | 101 | | 44 | m² | R329,62 | R14 393,00 | |
| 34 | Tailings Disposal Infrastructure | assumed single storey brick - not labelled | 101 | | | m² | R329,62 | R0,00 | | 101 | | 28 | m² | R329,62 | R9 172,22 | |
| 35 | Tailings Disposal Infrastructure | assumed single storey brick - not labelled | 101 | | | m² | R329,62 | R0,00 | | 101 | | 28 | m² | R329,62 | R9 172,22 | |
| 36 | Tailings Disposal Infrastructure | Dismantle steel tank | 141 | | | Item | R18 874,66 | R0,00 | | 141 | | 1 | Item | R18 874,66 | R18 874,66 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 35 | m³ | R466,56 | R16 143,34 | assume 500mm |
| 38 | Tailings Disposal Infrastructure | Assumed steel structure over tank | 137 | | | m² | R468,99 | R0,00 | | 137 | | 12 | m² | R468,99 | R5 839,37 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| 39 | CIL Tank Infrastructure | Dismantle steel structure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 309 | m² | R468,99 | R144 884,45 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 93 | m³ | R466,56 | R43 240,04 | assume 300mm |
| 40 | Store | Dismantle steel structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 1107 | m² | R390,23 | R431 871,22 | |
| | | Demolish and remove concrete base | 108 | | | m³ | | R0,00 | | 108 | | 332 | m³ | R466,56 | R154 901,61 | assume 300mm |
| 41 | Offices | Demolish single storey brick structure | 101 | | | m² | R329,62 | R0,00 | | 101 | | 890 | m² | R329,62 | R293 285,51 | |
| 42 | Oxygen | Dismantle steel structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 129 | m² | R390,23 | R50 332,29 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 64 | m³ | R466,56 | R30 088,27 | assume 500mm |
| 43 | Clean Water Tank | Dismantle steel tank | 141 | | | Item | R18 874,66 | R0,00 | | 141 | | 1 | Item | R18 874,66 | R18 874,66 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 31 | m³ | R466,56 | R14 308,84 | assume 300mm |
| 44 | Elution Tanks | Dismantle steel structures | 136 | | | m² | R390,23 | R0,00 | | 136 | | 256 | m² | R390,23 | R100 036,31 | |
| | | Dismantle steel tanks | 164 | | | | | R0,00 | | 164 | | 20106 | m³ | R91,08 | R1 831 284,66 | Elusion tanks and contingency for additional tanks - verify at bankable feasibility |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 128 | m³ | R466,56 | R59 800,95 | assume 500mm |
| 45 | Elution Heaters | Dismantle steel structures | 136 | | | m² | R390,23 | R0,00 | | 136 | | 271 | m² | R390,23 | R105 835,18 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 136 | m³ | R466,56 | R63 267,47 | assume 500mm |
| 46 | CL Tanks Infrastructure | Dismantle steel infrastructure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 325 | m² | R390,23 | R126 962,41 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 98 | m³ | R466,56 | R45 538,30 | assume 300mm |
| 47 | Clarifier | Dismantle steel tank | 142 | | | Item | R69 207,09 | R0,00 | | 142 | | 1 | Item | R69 207,09 | R69 207,09 | Steel tank >10m |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 357 | m³ | R466,56 | R166 413,91 | assume 500mm |
| 48 | Process Water | Dismantle steel tank | 141 | | | Item | R18 874,66 | R0,00 | | 141 | | 1 | Item | R18 874,66 | R18 874,66 | Steel tank <10m |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 168 | m³ | R466,56 | R78 211,30 | assume 500mm |
| 49 | PFC Yard | Demolish concrete slab | 108 | | | m³ | R466,56 | R0,00 | | 108 | | 95 | m³ | R466,56 | R44 342,05 | assume 300mm bunded |
| 50 | Steel tank | outside perimeter not labelled - assumed steel tank | 141 | | | Item | R18 874,66 | R0,00 | | 141 | | 1 | Item | R18 874,66 | R18 874,66 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 177 | m³ | R466,56 | R82 477,96 | assume 500mm |
| 51 | Single storey brick structure | outside perimeter not labelled - assumed brick | 101 | | | m² | R329,62 | R0,00 | | 101 | | 323 | m² | R329,62 | R106 442,82 | |
| 52-59 | CL Tanks | Dismantle steel structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 261 | m² | R390,23 | R101 665,54 | Concrete included |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 78 | m³ | R466,56 | R36 464,93 | assume 300mm |
| 59 | Slurry Receiving Infrastructure | Dismantle steel structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 202 | m² | R390,23 | R78 819,33 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 101 | m³ | R466,56 | R47 117,60 | assume 500mm |
| 498 | Tailings Disposal Infrastructure | Demolish single storey brick structure | 101 | | | m² | R329,62 | R0,00 | | 101 | | 24 | m² | R329,62 | R7 921,00 | assumed single storey brick structure |
| 499 | Tailings Disposal MCC | Demolish single storey brick structure | 101 | | | m² | R329,62 | R0,00 | | 101 | | 70 | m² | R329,62 | R23 017,40 | assumed single storey brick structure |
| 500 | Tailings Disposal | Demolish steel structure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 336 | m² | R468,99 | R157 486,15 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 168 | m³ | R466,56 | R78 334,93 | assume 500mm |
| 501-510 | CL Tanks Infrastructure | Dismantle steel tanks | 164 | | | m³ | R91,08 | R0,00 | | 164 | | 20106,19 | m³ | R91,08 | R1 831 284,66 | 10 tanks based on volume |
| | | Concerte bases | 108 | | | m³ | R466,56 | R0,00 | | 108 | | 624 | m³ | R466,56 | R291 313,57 | assume 300mm |
| 511 | Tailings Disposal Infrastructure | Dismantle steel tank | 141 | | | Item | R18 874,66 | R0,00 | | 141 | | 1 | Item | R18 874,66 | R18 874,66 | Steel tank <10m |
| | | Concerte bases | 108 | | | m³ | R466,56 | R0,00 | | 108 | | 20 | m³ | R466,56 | R9 553,88 | assume 300mm |
| 512 | IRB roofing | Assumed carport/shelter associated with road | 105 | | | m² | R102,32 | R0,00 | | 105 | | 184 | m² | R102,32 | R18 807,02 | |
| 513 | Carbon Regeneration | Dismantle steel structure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 268 | m² | R468,99 | R125 754,43 | |
| | | Concrete bases | 108 | | | | | R0,00 | | 108 | | 134 | m³ | R466,56 | R62 551,31 | |
| 514 | Acid Tank Infrastructure | Dismantle steel infrastructure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 4 | m² | R468,99 | R1 851,56 | assumes steel gantries, stairs |
| 515 | Elution Tank Infrastructure | Dismantle steel infrastructure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 4 | m² | R468,99 | R2 089,34 | |
| 516 | Acid Tank Infrastructure | Dismantle steel infrastructure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 4 | m² | R468,99 | R1 920,51 | |
| 517 | Mini Sub | Dismantle and demolish | 140 | | | m² | R533,29 | R0,00 | | 140 | | 16 | m² | R533,29 | R8 275,59 | |
| 518 | Single storey brick structure | Not labelled - assumed brick | 101 | | | m² | R329,62 | R0,00 | | 101 | | 60 | m² | R329,62 | R19 727,50 | |
| 519 | Single storey brick structure | Not labelled - assumed brick | 101 | | | m² | R329,62 | R0,00 | | 101 | | 51 | m² | R329,62 | R16 843,04 | |
| 520 | Single storey brick structure | Not labelled - assumed brick | 101 | | | m² | R329,62 | R0,00 | | 101 | | 76 | m² | R329,62 | R24 961,14 | |
| 521 | Diesel Storage | Dismantle steel structure | 135 | | | m² | R266,62 | R0,00 | | 135 | | 30 | m² | R266,62 | R8 062,45 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 9 | m³ | R466,56 | R4 232,61 | assume 300mm |
| 522 | Generators | Dismantle and demolish | 140 | | | m² | R533,29 | R0,00 | | 140 | | 48 | m² | R533,29 | R25 552,05 | |
| 523 | Transformers | Dismantle and demolish | 140 | | | m² | R533,29 | R0,00 | | 140 | | 240 | m² | R533,29 | R128 042,90 | |
| 524 | Steel structure | assumed - no labelled and fenced in | 137 | | | m² | R468,99 | R0,00 | | 137 | | 47 | m² | R468,99 | R22 252,07 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 24 | m³ | R466,56 | R11 068,37 | assume 500mm |
| 525-528 | MCC | Dismantle steel structure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 512 | m² | R468,99 | R240 286,91 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 256 | m³ | R466,56 | R119 520,73 | assume 500mm |
| 529 | Clarifier | Demolish structure | 136 | | | m² | R390,23 | R0,00 | | 136 | | 36 | m² | R390,23 | R14 004,69 | Steel tank <10m |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 18 | m³ | R466,56 | R8 371,90 | assume 500mm |
| 530 | | not labelled | | | | | | | | | | 3 | | | R0,00 | |
| 531 | | not labelled | | | | | | | | | | 3 | | | R0,00 | |
| 532 | | not labelled | | | | | | | | | | 4 | | | R0,00 | |
| 533 | | not labelled | | | | | | | | | | 4 | | | R0,00 | |
| 534 | | not labelled | | | | | | | | | | 4 | | | R0,00 | |
| 536 | Car Ports | Dismantle IRB carport structure | 105 | | | m² | R102,32 | R0,00 | | 105 | | 865 | m² | R102,32 | R88 549,85 | Assume 2 3rds of surface area |
| | tar surface | Remove to central location - recovery and reuse by 3rd party | 133 | | | m² | R12,64 | R0,00 | | 133 | | 1442 | m² | R12,64 | R18 228,95 | Total surface area |
| 537 | Carports | Dismantle IRB carport structure | 105 | | | m² | R102,32 | R0,00 | | 105 | | 862 | m² | R102,32 | R88 193,78 | Assume 2 3rds of surface area |
| | tar surface | Remove to central location - recovery and reuse by 3rd party | 133 | | | m² | R12,64 | R0,00 | | 133 | | 1437 | m² | R12,64 | R18 155,65 | Total surface area |
| 538 | Elution Tanks Infrastructure | Dismantle steel structure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 71 | m² | R468,99 | R33 315,03 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 21 | m³ | R466,56 | R9 942,70 | assume 300mm |
| 539 | CL Tanks Infrastructure | Dismantle steel structure | 137 | | | m² | R468,99 | R0,00 | | 137 | | 86 | m² | R468,99 | R40 332,96 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 26 | m³ | R466,56 | R12 037,17 | assume 300mm |
| 540 | Change Rooms | Demolish single storey brick structure | 101 | | | m² | R329,62 | R0,00 | | 101 | | 289 | m² | R329,62 | R95 285,32 | |
| 541 | Elution Tanks | Dismantle steel structures | 136 | | | m² | R390,23 | R0,00 | | 136 | | 169 | m² | R390,23 | R65 754,32 | |
| | | Demolish concrete base | 108 | | | | | R0,00 | | 108 | | 84 | m³ | R466,56 | R39 307,43 | assume 300mm |
| 542 | CIL Tank Infrastructure | Demolish single storey brick structure | 101 | | | m² | R329,62 | R0,00 | | 101 | | 66 | m² | R329,62 | R21 799,47 | |
| | Weighbridge | Dismantle steel | 138 | | | t | R2 624,83 | R0,00 | | 138 | | 3 | t | R2 624,83 | R7 874,48 | assumed tonnage |
| | | Demolish single storey brick structure | 101 | | | | | R0,00 | | 101 | | 16 | m² | R329,62 | R5 273,85 | |
| | | Demolish concrete base | 108 | | | m³ | R466,56 | R0,00 | | 108 | | 117 | m³ | R466,56 | R54 647,83 | |
| | **Plant Dirty water impoundments** | | | | | | | | | | | | | | R0,00 | |
| 2 | Event Pond | Remove liner | 112 | | | m² | R8,10 | R0,00 | | 112 | | 2683 | m² | R8,10 | R21 740,98 | |
| | | Contaminated sediment - excavate | 113 | | | | | R0,00 | | 113 | | 537 | m³ | R38,25 | R20 527,33 | 200mm across plant dams |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | Load and haul fugitive tailngs etc within 1km | 126 | | | m³ | R33,80 | R0,00 | | 126 | | 537 | m³ | R33,80 | R18 138,43 | Dispose of on TSF prior to rehabilitation |
| | | Shape and level dam basin | 130 | | | m³ | R16,99 | R0,00 | | 130 | | 5366 | m³ | R16,99 | R91 182,38 | Align with site wide drainage framework |
| 3 | PCD Dam | Remove liner | 112 | | | m² | R8,10 | R0,00 | | 112 | | 2616 | m² | R8,10 | R21 193,24 | |
| | | Contaminated sediment - excavate | 113 | | | | | R0,00 | | 113 | | 523 | m³ | R38,25 | R20 010,17 | 200mm across plant dams |
| | | Load and haul fugitive tailngs etc within 1km | 126 | | | m³ | R33,80 | R0,00 | | 126 | | 523 | m³ | R33,80 | R17 681,46 | Dispose of on TSF prior to rehabilitation |
| | | Shape and level dam basin | 130 | | | m³ | R16,99 | R0,00 | | 130 | | 5231 | m³ | R16,99 | R88 885,15 | Align with site wide drainage framework |
| 535 | Process Water Dam | Remove liner | 112 | | | m² | R8,10 | R0,00 | | 112 | | 5256 | m² | R8,10 | R42 589,86 | |
| | | Contaminated sediment - excavate | 113 | | | | | R0,00 | | 113 | | 1051 | m³ | R38,25 | R40 212,37 | 200mm across plant dams |
| | | Load and haul fugitive tailngs etc within 1km | 126 | | | m³ | R33,80 | R0,00 | | 126 | | 1051 | m³ | R33,80 | R35 532,59 | Dispose of on TSF prior to rehabilitation |
| | | Shape and level dam basin | 130 | | | m³ | R16,99 | R0,00 | | 130 | | 10513 | m³ | R16,99 | R178 623,26 | Align with site wide drainage framework |
| | | | | | | | | R0,00 | | | | | | | R0,00 | |
| | **Plant Linear infrastructure** | | | | | | | R0,00 | | | | | | | R0,00 | |
| | Conveyor | Dismantle and remove conveyors | 149 | | | m | R496,19 | R0,00 | | 149 | | 313 | m | R496,19 | R155 307,95 | |
| | Fence | Dismantle and remove | 147 | | | m | R16,31 | R0,00 | | 147 | | 2533 | m | R16,31 | R41 303,39 | |
| | PW | Demolish concrete drains | 107 | | | m³ | R333,26 | R0,00 | | 107 | | 1019 | m³ | R333,26 | R339 735,53 | |
| | S | Demolish concrete drains | 107 | | | m³ | R333,26 | R0,00 | | 107 | | 440 | m³ | R333,26 | R146 632,22 | |
| 1 | Road - tar | Remove to central location - recovery and reuse by 3rd party | 133 | | | m² | R12,64 | R0,00 | | 133 | | 6966 | m² | R12,64 | R88 039,60 | Tar recovery only - rehabilitation included below |
| | | | | | | | | | | | | | | | | |
| | | **Demolition Total** | | | | | | **R0,00** | | | | | | | **R11 568 641,87** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | Grade an area | | | | | | | | 123 | | 3 | ha | R2 677,02 | R9 317,87 | |
| | | General clean up | | | | | | | | 124 | | | m² | R13,85 | R0,00 | |
| | | Rubble | | | | | | | | 125 | | 6307 | m³ | R36,00 | R227 052,08 | |
| | | Bulldoze material | | | | | | | | 130 | | 34807 | m³ | R16,99 | R591 415,45 | |
| | Load and haul 1 km radius | Load and haul soils within 1km | | | | | | | | 126 | | | m³ | R33,80 | R0,00 | Assuming no topsoil available |
| | Load and haul extra over | extra over /m3/km | | | | | | | | 127 | | | m³ | R6,50 | R0,00 | Built on disturbed ground |
| | | Rip soil | | | | | | | | 132 | | 3 | ha | R9 267,60 | R32 257,60 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | Revegetate areas | | | | | | | | 128 | | 3 | Ha | R33 210,25 | R115 594,43 | |
| | | Dust suppression | | | | | | | | 156 | | | Sum | R202 073,39 | R0,00 | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R0,00** | | | | | | | **R975 637,43** | |
| | | | | | | | | | | | | | | | | |
| | | **Area 1 Total** | | | | | | **R0,00** | | | | | | | **R12 544 279,30** | |
| | | | | | | | | | | | | | | | | |
| **Area 2** | | **9 Shaft remnant Mill and Main Plant** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Demolish infrastructure** | | | | | | | | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | **Old Mill Plant - concrete only** | | | | | | | | | | | | | | | |
| 1.1.2 | Training Centre | Demolish concrete foundations | 107 | | 28 | m² | R333,26 | R9 331,14 | | | | | m² | | | Assumed to be removed at closure |
| 1.1.3 | Offices | Demolish concrete foundations | 107 | | 220 | m² | R333,26 | R73 232,80 | | | | | m² | | | |
| 1.1.4 | Change house & Ablutions | Demolish concrete foundations | 107 | | 81 | m² | R333,26 | R26 827,03 | | | | | m² | | | |
| 1.1.5 | Store room | Demolish concrete foundations | 107 | | 80 | m² | R333,26 | R26 577,09 | | | | | m² | | | |
| 1.1.6 | Guard post | Demolish concrete foundations | 107 | | 2 | m² | R333,26 | R749,82 | | | | | m² | | | |
| 1.1.7 | Store | Demolish concrete foundations | 108 | | 10 | m² | R466,56 | R4 758,88 | | | | | m² | | | |
| 1.1.8 | Motor store | Demolish concrete foundations | 109 | | 70 | m² | R777,60 | R54 120,62 | | | | | m² | | | |
| 1.1.9 | Workshop and store room | Demolish concrete foundations | 108 | | 92 | m² | R466,56 | R42 969,91 | | | | | m² | | | |
| 1.1.10 | Workshop | Demolish concrete foundations | 108 | | 110 | m² | R466,56 | R51 367,93 | | | | | m² | | | |
| 1.1.11 | Substation | Demolish concrete foundations | 107 | | 15 | m² | R333,26 | R4 998,83 | | | | | m² | | | |
| 1.1.12 | Main substation | Demolish concrete foundations | 108 | | 29 | m² | R466,56 | R13 716,78 | | | | | m² | | | |
| 1.1.13 | Standby power generation (old plant area) | Demolish concrete foundations | 108 | | 196 | m² | R466,56 | R91 258,56 | | | | | m² | | | |
| 1.1.14 | Office | Demolish concrete foundations | 107 | | 6 | m² | R333,26 | R2 082,84 | | | | | m² | | | |
| 1.1.16 | Change room | Demolish concrete foundations | 107 | | 12 | m² | R333,26 | R3 999,06 | | | | | m² | | | |
| 1.1.18 | Winder house | Demolish concrete foundations | 109 | | 74 | m² | R777,60 | R57 153,24 | | | | | m² | | | |
| 1.1.21 | Building next to thickener 1 | Demolish concrete foundations | 108 | | 21 | m² | R466,56 | R9 797,70 | | | | | m² | | | |
| 1.1.22 | Thickeners | Demolish concrete foundations | 109 | | 520 | m² | R777,60 | R404 349,47 | | | | | m² | | | |
| 1.1.23 | Clarifier overflow tank | Demolish concrete foundations | 109 | | 70 | m² | R777,60 | R54 042,86 | | | | | m² | | | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| 1.1.24 | Clarifiers | Demolish concrete foundations | 109 | | 534 | m² | R777,60 | R415 235,80 | | | | | m² | | | |
| 1.1.25 | Aeration tank | Demolish concrete foundations | 109 | | 159 | m² | R777,60 | R123 637,63 | | | | | m² | | | |
| 1.1.26 | Water treatment plant | Demolish concrete foundations | 108 | | 15 | m² | R466,56 | R6 998,36 | | | | | m² | | | |
| 1.1.27 | Lime tank | Demolish concrete foundations | 108 | | 7 | m² | R466,56 | R3 359,21 | | | | | m² | | | |
| | **Old Mill Plant - Remnant Brick structures** | | | | | | | R0,00 | | | | | | | | |
| 1.1.3 | Offices | Removal of single storey brick building | 157 | | 879 | m² | R197,77 | R173 839,35 | | | | | | | | |
| 1.1.4 | Change house & Ablutions | Removal of single storey brick building | 157 | | 322 | m² | R197,77 | R63 681,77 | | | | | | | | |
| 1.1.6 | Guard post | Removal of single storey brick building | 157 | | 9 | m² | R197,77 | R1 779,93 | | | | | | | | |
| 1.1.11 | Substation | Removal of double storey brick building next to sub-station | 158 | | 60 | m² | R267,45 | R16 046,92 | | | | | | | | |
| 1.1.12 | Main substation | Removal of double storey brick building next to sub-station | 158 | | 98 | m² | R267,45 | R26 209,97 | | | | | | | | |
| 1.1.14 | Office | Removal of single storey brick building | 157 | | 25 | m² | R197,77 | R4 944,24 | | | | | | | | |
| 1.1.16 | Change room | Removal of single storey brick building | 157 | | 48 | m² | R197,77 | R9 492,93 | | | | | | | | |
| 1.1.21 | Building next to thickener 1 | Removal of single storey brick building | 157 | | 70 | m² | R197,77 | R13 843,86 | | | | | | | | |
| | | | | | | | | R0,00 | | | | | | | | |
| | **Old Main Plant - concrete only** | | | | | | | R0,00 | | | | | | | | |
| 1.2.1 | Laboratory 1 | Demolish concrete foundations | 107 | | 121 | m³ | R333,26 | R40 323,86 | | | | | m² | | | |
| 1.2.2 | Laboratory 2 | Demolish concrete foundations | 107 | | 65 | m³ | R333,26 | R21 578,26 | | | | | m² | | | |
| 1.2.4 | Workshop and store room | Demolish concrete foundations | 108 | | 229 | m³ | R466,56 | R106 934,88 | | | | | m² | | | |
| 1.2.5 | Workshop | Demolish concrete foundations | 108 | | 147 | m³ | R466,56 | R68 723,86 | | | | | m² | | | |
| 1.2.6 | Pump station | Demolish concrete foundations | 107 | | 42 | m³ | R333,26 | R14 080,03 | | | | | m² | | | |
| 1.2.7 | Store | Demolish concrete foundations | 108 | | 6 | m³ | R466,56 | R2 799,34 | | | | | m² | | | |
| 1.2.8 | Store | Demolish concrete foundations | 108 | | 6 | m³ | R466,56 | R2 799,34 | | | | | m² | | | |
| 1.2.9 | Smelt house | Demolish concrete foundations | 109 | | 700 | m³ | R777,60 | R544 316,59 | | | | | m² | | | |
| 1.2.10 | Old concrete base | Demolish concrete foundations | 107 | | 3 | m³ | R333,26 | R1 041,42 | | | | | m² | | | |
| 1.2.11 | Building next to smelt house | Demolish concrete foundations | 108 | | 215 | m³ | R466,56 | R100 216,46 | | | | | m² | | | |
| 1.2.13 | Sub-station next to water tank | Demolish concrete foundations | 107 | | 12 | m³ | R333,26 | R4 082,37 | | | | | m² | | | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| 1.2.14 | CIL Plant | Demolish concrete foundations | 109 | | 302 | m³ | R777,60 | R234 833,73 | | | | | m² | | | |
| 1.2.15 | Tailings disposal & cyanide destruction | Demolish concrete foundations | 108 | | 37 | m³ | R466,56 | R17 075,99 | | | | | m² | | | |
| 1.2.16 | Store next to CIL tanks | Demolish concrete foundations | 108 | | 8 | m³ | R466,56 | R3 639,15 | | | | | m² | | | |
| 1.2.17 | Screening area | Demolish concrete foundations | 108 | | 52 | m³ | R466,56 | R24 354,28 | | | | | m² | | | |
| 1.2.18 | Thickener area | Demolish concrete foundations | 108 | | 613 | m³ | R466,56 | R285 952,83 | | | | | m² | | | |
| 1.2.19 | Office | Demolish concrete foundations | 107 | | 33 | m³ | R333,26 | R11 080,73 | | | | | m² | | | |
| 1.2.20 | Office | Demolish concrete foundations | 107 | | 14 | m³ | R333,26 | R4 498,94 | | | | | m² | | | |
| 1.2.21 | Office | Demolish concrete foundations | 107 | | 12 | m³ | R333,26 | R3 915,75 | | | | | m² | | | |
| 1.2.22 | Office | Demolish concrete foundations | 107 | | 12 | m³ | R333,26 | R4 082,37 | | | | | m² | | | |
| 1.2.23 | Shelter | Demolish concrete foundations | 107 | | 38 | m³ | R333,26 | R12 663,69 | | | | | m² | | | |
| 1.2.24 | Security point & office | Demolish concrete foundations | 107 | | 30 | m³ | R333,26 | R9 997,65 | | | | | m² | | | |
| 1.2.25 | Change rooms & ablutions | Demolish concrete foundations | 107 | | 41 | m³ | R333,26 | R13 580,14 | | | | | m² | | | |
| 1.2.26 | Ablutions | Demolish concrete foundations | 107 | | 2 | m³ | R333,26 | R583,20 | | | | | m² | | | |
| 1.2.28 | Diesel off loading area | Demolish concrete foundations | 108 | | 8 | m³ | R466,56 | R3 639,15 | | | | | m² | | | |
| 1.2.29 | CIL Area | Demolish concrete foundations | 108 | | 595 | m³ | R466,56 | R277 694,77 | | | | | m² | | | |
| 1.2.30 | Cyanide destruction area | Demolish concrete foundations | 108 | | 184 | m³ | R466,56 | R85 799,85 | | | | | m² | | | |
| 1.2.32 | Office in maintenance area | Demolish concrete foundations | 107 | | 125 | m³ | R333,26 | R41 490,25 | | | | | m² | | | |
| 1.2.33 | Workshop / store in maintenance area | Demolish concrete foundations | 108 | | 203 | m³ | R466,56 | R94 757,74 | | | | | m² | | | |
| 1.2.35 | Zozo's | Demolish concrete foundations | 107 | | 43 | m³ | R333,26 | R14 396,62 | | | | | m² | | | |
| 1.2.36 | Chemical tank farm | Demolish concrete foundations | 108 | | 155 | m³ | R466,56 | R72 502,97 | | | | | m² | | | |
| 1.2.39 | Lime plant / Metabisulfied plant | Demolish concrete foundations | 108 | | 45 | m³ | R466,56 | R21 135,04 | | | | | m² | | | |
| 1.2.40 | Sewage pump station | Demolish concrete foundations | 108 | | 9 | m³ | R466,56 | R4 338,98 | | | | | m² | | | |
| 1.2.41 | Site offices | Demolish concrete foundations | 107 | | 64 | m³ | R333,26 | R21 411,64 | | | | | m² | | | |
| | | | | | | | | R0,00 | | | | | | | | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | **Old Main Plant - remnant brick structures** | | | | | | | R0,00 | | | | | | | | |
| 1.2.1 | Laboratory 1 | Removal of double storey brick building | 158 | | 484 | m² | R267,45 | R129 445,17 | | | | | m² | | | |
| 1.2.2 | Laboratory 2 | Removal of double storey brick building | 158 | | 259 | m² | R267,45 | R69 269,21 | | | | | m² | | | |
| 1.2.6 | Pump station | Removal of single storey brick building | 157 | | 169 | m² | R197,77 | R33 423,04 | | | | | m² | | | |
| 1.2.13 | Sub-station next to water tank | Removal of double storey brick building next to sub-station | 158 | | 49 | m² | R267,45 | R13 104,99 | | | | | m² | | | |
| 1.2.19 | Office | Removal of single storey brick building | 157 | | 133 | m² | R197,77 | R26 303,34 | | | | | m² | | | |
| 1.2.20 | Office | Removal of single storey brick building | 157 | | 54 | m² | R197,77 | R10 679,55 | | | | | m² | | | |
| 1.2.21 | Office | Removal of single storey brick building | 157 | | 47 | m² | R197,77 | R9 295,16 | | | | | m² | | | |
| 1.2.22 | Office | Removal of single storey brick building | 157 | | 49 | m² | R197,77 | R9 690,70 | | | | | m² | | | |
| 1.2.23 | Shelter | Removal of single storey brick building | 157 | | 152 | m² | R197,77 | R30 060,96 | | | | | m² | | | |
| 1.2.24 | Security point & office | Removal of single storey brick building | 157 | | 120 | m² | R197,77 | R23 732,33 | | | | | m² | | | |
| 1.2.25 | Change rooms & ablutions | Removal of single storey brick building | 157 | | 163 | m² | R197,77 | R32 236,42 | | | | | m² | | | |
| 1.2.26 | Ablutions | Removal of single storey brick building | 157 | | 7 | m² | R197,77 | R1 384,39 | | | | | m² | | | |
| 1.2.31 | Sub-stations in CIL area | Removal of sub-station 002 | 157 | | 25 | m² | R197,77 | R4 944,24 | | | | | m² | | | |
| 1.2.31 | Sub-stations in CIL area | Removal of sub-station 003 | 157 | | 25 | m² | R197,77 | R4 944,24 | | | | | m² | | | |
| 1.2.31 | Sub-stations in CIL area | Removal of sub-station 004 | 157 | | 25 | m² | R197,77 | R4 944,24 | | | | | m² | | | |
| 1.2.31 | Sub-stations in CIL area | Removal of sub-station 005 | 157 | | 25 | m² | R197,77 | R4 944,24 | | | | | m² | | | |
| 1.2.31 | Sub-stations in CIL area | Removal of sub-station 006 | 157 | | 25 | m² | R197,77 | R4 944,24 | | | | | m² | | | |
| 1.2.31 | Sub-stations in CIL area | Removal of sub-station next to sewage pump station | 157 | | 18 | m² | R197,77 | R3 559,85 | | | | | m² | | | |
| 1.2.31 | Sub-stations in CIL area | Removal of sub-station building next to Eskom sub-station | 157 | | 25 | m² | R197,77 | R4 944,24 | | | | | m² | | | |
| 1.2.32 | Office in maintenance area | Removal of single storey brick building | 157 | | 498 | m² | R197,77 | R98 489,19 | | | | | m² | | | |
| 1.2.35 | Zozo's | Removal of single storey brick building | 157 | | 144 | m² | R197,77 | R28 478,80 | | | | | m² | | | |
| | | - | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Demolition Total** | | | | | | **R4 509 544,93** | | | | | | | **R0,00** | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation** | | | | | | Plant footprint 2018 - 17 ha | | | | | | | | |
| | | | | | | | | Concrete within footprint - 1.9 ha | | | | | | | | |
| | | Grade an area | 123 | | 17 | ha | R2 677,02 | R45 509,34 | | 123 | | | ha | R2 677,02 | R0,00 | |
| | | General clean up | 124 | | | m² | R13,85 | R0,00 | | 124 | | | m² | R13,85 | R0,00 | |
| | | Rubble | 125 | | 8656 | m³ | R36,00 | R311 618,70 | Building rubble (concrete factor 1, bricks 0.25) | 125 | | | m³ | R36,00 | R0,00 | |
| | | Bulldoze material | 130 | | 11400 | m³ | R16,99 | R193 701,38 | 500mm across concrete footprint*20% | 130 | | | m³ | R16,99 | R0,00 | |
| | Load and haul 1 km radius | Load and haul soils, fugitive tailngs etc within 1km | 126 | | 51000 | m³ | R33,80 | R1 723 800,00 | Fugitive tailings - dispose of at neartest TSF | 126 | | | m³ | R33,80 | R0,00 | |
| | Load and haul extra over | extra over /m3/km | 127 | | | m³ | R6,50 | R0,00 | | 127 | | | m³ | R6,50 | R0,00 | |
| | | Rip soil | 132 | | 17 | ha | R9 267,60 | R157 549,19 | | 132 | | | ha | R9 267,60 | R0,00 | |
| | | Revegetate areas | 128 | | 17 | Ha | R33 210,25 | R564 574,20 | | 128 | | | Ha | R33 210,25 | R0,00 | |
| | | Dust suppression | 156 | | 1 | Sum | R202 073,39 | R202 073,39 | | 156 | | | Sum | R202 073,39 | R0,00 | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R3 198 826,20** | | | | | | | **R0,00** | |
| | | | | | | | | | | | | | | | | |
| | | **Area 2 Total** | | | | | | **R7 708 371,13** | | | | | | | **R0,00** | |
| | | | | | | | | | | | | | | | | |
| **Area 3** | | **Tailings Storage Facilities (Rehabilitation monitoring and maintenance included)** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Tailings Storage Facility Rehabilitation** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | Assume no shaping of side slopes, or cover material placement |
| | **1L23 – 1L25** | **North compartments** | | | | | | | | | | | | | | |
| | TSF tops | Tops - Construct contour walls | 159 | | 7 | ha | R28 333,55 | R192 381,40 | Assumed 20% of top surface area | 159 | | 52 | ha | R28 333,55 | R1 465 071,14 | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | Tops - Vegetate upper surfaces and areas between contour walls - dryland | 160 | | 10 | ha | R88 774,52 | R904 152,54 | Assumed 30% of top surface area | 160 | | 52 | ha | R88 774,52 | R4 590 353,06 | |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 41 | ha | R305 138,46 | R12 469 391,51 | 100% of measured side slopes | 161 | | 12 | ha | R305 138,46 | R3 635 929,16 | Assuming 25% requiring rehab at closure |
| | | Vegetation maintenance/annum for 3 years | 162 | | 51 | ha | R48 793,19 | R2 490 869,08 | Based on vegetated areas | 162 | | 64 | ha | R48 793,19 | R3 104 402,01 | Tops and sides as measured |
| | | **South Compartments** | | | | | | R0,00 | | | | | | | R0,00 | |
| | TSF tops | Tops - Construct contour walls | 159 | | 23 | ha | R28 333,55 | R658 979,41 | Assumed 60% of top surface area | 159 | | 67 | ha | R28 333,55 | R1 887 487,52 | |
| | | Tops - Vegetate upper surfaces and areas between contour walls - dryland | 160 | | 35 | ha | R88 774,52 | R3 097 066,15 | Assumed 90% of top surface area | 160 | | 67 | ha | R88 774,52 | R5 913 865,80 | |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 36 | ha | R305 138,46 | R11 019 373,56 | 100% of measured side slopes | 161 | | 8 | ha | R305 138,46 | R2 519 451,96 | Assuming 25% requiring rehab at closure |
| | | Vegetation maintenance/annum for 3 years | 162 | | 71 | ha | R48 793,19 | R3 464 296,21 | Based on vegetated areas | 162 | | 75 | ha | R48 793,19 | R3 653 314,70 | Tops and sides as measured |
| | TSF tops | Tops - Construct contour walls | 159 | | 31 | ha | R28 333,55 | R882 059,36 | Assumed 90% of top surface area | 159 | | 0 | ha | R28 333,55 | R0,00 | |
| | | Tops - Vegetate upper surfaces and areas between contour walls - dryland | 160 | | 31 | ha | R88 774,52 | R2 763 663,66 | Assumed 90% of top surface area | 160 | | 0 | ha | R88 774,52 | R0,00 | included already in LOM costing above |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 7 | ha | R305 138,46 | R2 248 077,07 | 40% of measured side slopes | 161 | | 0 | ha | R305 138,46 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 38 | ha | R48 793,19 | R1 878 473,04 | Based on vegetated areas | 162 | | 0 | ha | R48 793,19 | R0,00 | |
| | | - | | | | | | | | | | | | | R0,00 | |
| | **1L13 – 1L15** | **North compartment** | | | | | | | | | | | | | R0,00 | |
| | TSF tops | Tops - Construct contour walls | 159 | | 2 | ha | R28 333,55 | R63 876,57 | Assumed 10% of top surface area | 159 | | | ha | R28 333,55 | R0,00 | |
| | | Tops - Vegetate upper surfaces and areas between contour walls - dryland | 160 | | 5 | ha | R88 774,52 | R400 275,45 | Assumed 20% of top surface area | 160 | | | ha | R88 774,52 | R0,00 | |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 22 | ha | R305 138,46 | R6 577 015,33 | 50% of measured side slopes | 161 | | | ha | R305 138,46 | R0,00 | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | Vegetation maintenance/annum for 3 years | 162 | | 26 | ha | R48 793,19 | R1 271 701,87 | Based on vegetated areas | 162 | | | ha | R48 793,19 | R0,00 | |
| | | **South Compartment** | | | | | | R0,00 | | | | | | | R0,00 | |
| | TSF tops | Tops - Construct contour walls | 159 | | 0 | ha | R28 333,55 | R0,00 | Included above | 159 | | | ha | R28 333,55 | R0,00 | |
| | | Hydroseed topsoil cover | 160 | | 18 | ha | R88 774,52 | R1 597 941,42 | Assumed 40% of topsoiled top surface area | 160 | | | ha | R88 774,52 | R0,00 | |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 0 | ha | R305 138,46 | R0,00 | Included above | 161 | | | ha | R305 138,46 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 0 | ha | R48 793,19 | R0,00 | Included above | 162 | | | ha | R48 793,19 | R0,00 | |
| | | - | | | | | | R0,00 | | | | | | | R0,00 | |
| | **IL28** | - | | | | | | R0,00 | TSF only - does not include adjacent pit and overburden stockpile. | | | | | | R0,00 | |
| | TSF tops | Tops - Construct contour walls | 159 | | 9 | ha | R28 333,55 | R264 915,28 | Assumed 40% of top surface area | 159 | | | ha | R28 333,55 | R0,00 | |
| | | Tops - Vegetate upper surfaces and areas between contour walls - dryland | 160 | | 9 | ha | R88 774,52 | R830 031,14 | Assumed 40% of top surface area | 160 | | | ha | R88 774,52 | R0,00 | |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 29 | ha | R305 138,46 | R8 902 872,19 | 100% of measured side slopes | 161 | | | ha | R305 138,46 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 39 | ha | R48 793,19 | R1 879 825,09 | Based on vegetated areas | 162 | | | ha | R48 793,19 | R0,00 | |
| | | - | | | | | | R0,00 | | | | | | | R0,00 | |
| | **1L8** | - | | | | | | R0,00 | | | | | | | R0,00 | |
| | TSF tops | Tops - Construct contour walls | 159 | | 4 | ha | R28 333,55 | R126 137,56 | Allowance to repair padocks | 159 | | | ha | R28 333,55 | R0,00 | |
| | | Tops - Vegetate upper surfaces and areas between contour walls - dryland | 160 | | 7 | ha | R88 774,52 | R658 689,21 | Assumed 20% of top surface area | 160 | | | ha | R88 774,52 | R0,00 | |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 1 | ha | R305 138,46 | R246 767,00 | 50% of measured side slopes | 161 | | | ha | R305 138,46 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 8 | ha | R48 793,19 | R401 495,03 | Based on vegetated areas | 162 | | | ha | R48 793,19 | R0,00 | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | Remined footprint | Clean up residual tailings | 126 | | 75000 | m³ | R33,80 | R2 535 000,00 | measured area | 161 | | | ha | R305 138,46 | R0,00 | |
| | | grade cleaned area | 123 | | 25 | ha | R2 677,02 | R66 925,50 | measured area | | | | | | R0,00 | |
| | | Rip to alleviate compaction | 132 | | 25 | ha | R9 267,60 | R231 689,99 | cleaned footprint | 162 | | | ha | R48 793,19 | R0,00 | |
| | | Establish vegetation on cleaned area | 128 | | 25 | Ha | R33 210,25 | R830 256,17 | cleaned footprint | 162 | | | ha | R48 793,19 | R0,00 | |
| | | | | | | | | R0,00 | | | | | | | R0,00 | |
| | **1L10** | - | | | | | | R0,00 | | | | | | | R0,00 | |
| | TSF tops | Tops - Construct contour walls | 159 | | 3 | ha | R28 333,55 | R97 959,00 | Allowance to repair padocks | 159 | | | ha | R28 333,55 | R0,00 | |
| | | Tops - Vegetate upper surfaces and areas between contour walls - dryland | 160 | | 7 | ha | R88 774,52 | R613 849,20 | Assumed 40% of topsoiled top surface area | 160 | | | ha | R88 774,52 | R0,00 | |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 5 | ha | R305 138,46 | R1 557 072,72 | Included above | 161 | | | ha | R305 138,46 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 12 | ha | R48 793,19 | R586 374,15 | Included above | 162 | | | ha | R48 793,19 | R0,00 | |
| | | - | | | | | | R0,00 | | | | | | | R0,00 | |
| | **West Wits Pit TSF** | - | | | | | | R0,00 | | | | | | | R0,00 | |
| | TSF tops | Tops - Construct contour walls | 159 | | 0 | ha | R28 333,55 | R0,00 | Assumed 20% of top surface area | 159 | | 64 | ha | R28 333,55 | R1 812 225,12 | |
| | | Tops - Vegetate upper surfaces and areas between contour walls - dryland | 160 | | 0 | ha | R88 774,52 | R0,00 | Assumed 30% of top surface area | 160 | | 64 | ha | R88 774,52 | R5 678 054,03 | |
| | TSF sides | Sides - Vegetate and leach for 18 months (labour only no water costs included) | 161 | | 0 | ha | R305 138,46 | R0,00 | 100% of measured side slopes | 161 | | 25 | ha | R305 138,46 | R7 706 396,84 | Assuming 25% requiring rehab at closure |
| | | Vegetation maintenance/annum for 3 years | 162 | | 0 | ha | R48 793,19 | R0,00 | Based on vegetated areas | 162 | | 89 | ha | R48 793,19 | R4 353 124,23 | Tops and sides as measured |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R71 809 452,85** | | | | | | | **R46 319 675,58** | 46319675,58 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Area 3 Total** | | | | | | **R71 809 452,85** | | | | | | | **R46 319 675,58** | |
| | | | | | | | | | | | | | | | | |
| **Area 4** | | **Sand Dumps** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Sand Dump Rehabilitation** | | | | | | | | | | | | | | |
| | | - | | | | | | | 2018 shaping volumes | | | | | | | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | **North Sand Dump** | - | | | | | | | | | | | | | | |
| | | Shape side slopes | 131 | | 1776132 | m³ | R27,40 | R48 674 384,43 | shape to 1:3 degrees | 131 | | | m³ | R27,40 | R0,00 | |
| | | Lime addition | 168 | | 22 | ha | R37 500,00 | R841 282,50 | | 168 | | | ha | R37 500,00 | R0,00 | |
| | | Hydroseed with additional binder | 163 | | 22 | ha | R36 500,00 | R818 848,30 | Hydroseed whole dump (measured) | 163 | | | ha | R36 500,00 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 22 | ha | R48 793,19 | R1 094 636,25 | Based on vegetated areas | 162 | | | ha | R48 793,19 | R0,00 | |
| | | - | | | | | | R0,00 | | | | | | | | |
| | **South Sand Dump** | - | | | | | | R0,00 | | | | | | | | |
| | | Shape side slopes | 131 | | 625416 | m³ | R27,40 | R17 139 344,83 | shape to 1:3 degrees | 131 | | | m³ | R27,40 | R0,00 | |
| | | Lime addition | 168 | | 15 | ha | R37 500,00 | R545 524,88 | | 168 | | | ha | R37 500,00 | R0,00 | |
| | | Hydroseed with additional binder | 163 | | 15 | ha | R36 500,00 | R530 977,55 | Hydroseed whole dump (measured) | 163 | | | ha | R36 500,00 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 15 | ha | R48 793,19 | R709 810,68 | Based on vegetated areas | 162 | | | ha | R48 793,19 | R0,00 | |
| | | - | | | | | | R0,00 | | | | | | | | |
| | **CAM Sand Dump** | - | | | | | | R0,00 | Allowance for additional cleanup measures - 1L8 (and remined footprint) and 1L10 addressed above | | | | | | | |
| | | Shape and level footprint | 130 | | 101125 | m³ | R16,99 | R1 718 250,22 | shape to align with drainage framework | 130 | | | m³ | R16,99 | R0,00 | |
| | | Lime addition | 168 | | 40 | ha | R37 500,00 | R1 516 875,00 | | 168 | | | ha | R37 500,00 | R0,00 | |
| | | Hydroseed with additional binder | 163 | | 40 | ha | R36 500,00 | R1 476 425,00 | Hydroseed 50% of measured area | 163 | | | ha | R36 500,00 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 40 | ha | R48 793,19 | R1 973 684,66 | Based on vegetated areas | 162 | | | ha | R48 793,19 | R0,00 | |
| | | - | | | | | | R0,00 | | | | | | | | |
| | **Additional outside area?** | - | | | | | | R0,00 | | | | | | | | |
| | | Load and haul soils, fugitive tailngs etc within 1km | 126 | | 300 | m³ | R33,80 | R10 140,00 | | 126 | | | m³ | R33,80 | R0,00 | |
| | | Grade the area | 123 | | 1 | ha | R2 677,02 | R2 677,02 | 300mm across 1 ha footprint | 123 | | | ha | R2 677,02 | R0,00 | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | Lime addition | 168 | | 1 | ha | R37 500,00 | R37 500,00 | | 168 | | | ha | R37 500,00 | R0,00 | |
| | | Rip to alleviate compaction | 132 | | 1 | ha | R9 267,60 | R9 267,60 | | 132 | | | ha | R9 267,60 | R0,00 | |
| | | Hydroseed with additional binder | 163 | | 1 | ha | R36 500,00 | R36 500,00 | Hydroseed whole dump (measured) | 163 | | | ha | R36 500,00 | R0,00 | |
| | | Vegetation maintenance/annum for 3 years | 162 | | 1 | ha | R48 793,19 | R48 793,19 | Based on vegetated areas | 162 | | | ha | R48 793,19 | R0,00 | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R77 184 922,10** | | | | | | | **R0,00** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Area 4 Total** | | | | | | **R77 184 922,10** | | | | | | | **R0,00** | |
| | | | | | | | | | | | | | | | | |
| **Area 5** | | **Opencast Pits** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation** | | | | | | | | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | **West Wits open pit** | **Southern portion not backfilled** | | | | | | | | 101 | | | m² | R329,62 | | TSF at closure, costing included above |
| | | Load and haul soils, fugitive tailngs etc within 1km | 126 | | 0 | m³ | R33,80 | R0,00 | | | | | | | | |
| | | Shape highwall | 131 | | 97500 | m³ | R27,40 | R2 671 959,34 | Shape from repose to 1:3 | | | | | | | |
| | | Level and shape lowwall area | 131 | | 165000 | m³ | R27,40 | R4 521 777,34 | 500mm across footprint | | | | | | | |
| | | Cover area - 200mm overburden | 126 | | 46000 | m³ | R33,80 | R1 554 800,00 | | | | | | | | |
| | | Revegetate areas | 128 | | 33 | Ha | R33 210,25 | R1 095 938,15 | | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | | **Backfilled portion** | | | | | | | | 101 | | | m² | R329,62 | | |
| | | Shape and level | 131 | | 145000 | m³ | R27,40 | R3 973 683,12 | assume 500mm across footprint | | | | | | | |
| | | Cover existing tailings | 126 | | 58000 | m³ | R33,80 | R1 960 400,00 | Cover portions backfilled with tailings | | | | | | | |
| | | Shape highwall | 131 | | 0 | m³ | R27,40 | R0,00 | Included above | | | | | | | |
| | | Revegetate areas | 128 | | 29 | Ha | R33 210,25 | R963 097,16 | | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | | **Northern disturbed area** | | | | | | | | 101 | | | m² | R329,62 | | |
| | | Load and haul soils, fugitive tailngs etc within 1km | 126 | | 128000 | m³ | R33,80 | R4 326 400,00 | Allowance for recovering fugitive tailings | | | | | | | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | Shape and level | 131 | | 145000 | m³ | R27,40 | R3 973 683,12 | 1000mm across 50% of the area | | | | | | | |
| | | Cover existing tailings | 126 | | 0 | m³ | R33,80 | R0,00 | Cover portions backfilled with tailings | | | | | | | |
| | | Shape highwall | 131 | | 0 | m³ | R27,40 | R0,00 | Included above | | | | | | | |
| | | Revegetate areas | 128 | | 45 | Ha | R33 210,25 | R1 487 819,06 | Vegetation establishment across 70% | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | | **Overburden stockpile areas** | | | | | | | | 101 | | | m² | R329,62 | | |
| | | Load and haul soils, fugitive tailngs etc within 1km | 126 | | 0 | m³ | R33,80 | R0,00 | | | | | | | | |
| | | Shape and level | 131 | | 396000 | m³ | R27,40 | R10 852 265,62 | 1000mm across whole area | | | | | | | |
| | | Cover existing tailings | 126 | | 0 | m³ | R33,80 | R0,00 | Included above - assumed to be overburden | | | | | | | |
| | | Revegetate areas | 128 | | 40 | Ha | R33 210,25 | R1 315 125,78 | Vegetation establishment across 120% (shaping) | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R38 696 948,67** | | | | | | | **R0,00** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R0,00** | | | | | | | **R0,00** | |
| | | | | | | | | | | | | | | | | |
| | | **Area 5 Total** | | | | | | **R38 696 948,67** | | | | | | | **R0,00** | |
| | | | | | | | | | | | | | | | | |
| **Area 6** | | **Water Storage Dams - Lancaster and Reticulation SW dams** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation** | | | | | | | | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | **Lancaster dam** | - | | | | | | | | | | | | | | |
| | Upgrade and rehabilitate | ECOE quote included as sum total | A | | 1 | Item | R3 284 351,07 | R3 284 351,07 | Immediate closure only | 102 | | | m² | R445,75 | | Work completed by planned closure |
| | | - | | | | | | | | | | | | | | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | **Storm water management dam 1** | - | | | | | | | | | | | | | | Part of reticulation system |
| | | Remove liner | | | | | | | | 112 | | 80264 | m² | R8,10 | R650 349,58 | |
| | | Contaminated sediment - excavate | | | | | | | | 113 | | 16053 | m³ | R38,25 | R614 045,13 | 200mm across sw dams |
| | | Load and haul fugitive tailngs etc within 1km | | | | | | | | 126 | | 16053 | m³ | R33,80 | R542 584,64 | Dispose of on TSF prior to rehabilitation |
| | | Shape and level dam basin | | | | | | | | 131 | | 144475 | m³ | R27,40 | R3 959 301,12 | Align with site wide drainage framework |
| | | Rip to alleviate compaction | | | | | | | | 132 | | 10 | ha | R9 267,60 | R89 262,55 | measured area increased by 20% |
| | | Revegetate areas | | | | | | | | 128 | | 10 | Ha | R33 210,25 | R319 870,47 | measured area increased by 20% |
| | | **Rip to aleviate compaction** | | | | | | | | | | | | | | |
| | **Storm water management dam 2** | - | | | | | | | | | | | | | | Part of reticulation system |
| | | Remove liner | | | | | | | | 112 | | 64055 | m² | R8,10 | R519 014,04 | |
| | | Contaminated sediment - excavate | | | | | | | | 113 | | 12811 | m³ | R38,25 | R490 041,12 | 200mm across sw dams |
| | | Load and haul fugitive tailngs etc within 1km | | | | | | | | 126 | | 12811 | m³ | R33,80 | R433 011,80 | Dispose of on TSF prior to rehabilitation |
| | | Shape and level dam basin | | | | | | | | 131 | | 128110 | m³ | R27,40 | R3 510 817,55 | Align with site wide drainage framework |
| | | Rip to alleviate compaction | | | | | | | | 132 | | 8 | ha | R9 267,60 | R71 236,33 | measured area increased by 20% |
| | | Revegetate areas | | | | | | | | 128 | | 8 | Ha | R33 210,25 | R255 273,88 | measured area increased by 20% |
| | | - | | | | | | | | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | | - | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R3 284 351,07** | | | | | | | | **R11 454 808,22** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Area 6 Total** | | | | | | **R3 284 351,07** | | | | | | | | **R11 454 808,22** | |
| | | | | | | | | | | | | | | | | |
| **Area 7** | | **Proposed Pump Stations** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Demolish infrastructure** | | | | | | | | | | | | | | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | | | | | | | | | | | | | | | |
| | Pump stations | Dismantle steel, demolish concrete/brick, remove liners, rehabilitate sumps and footprint | | | | | | | | B | | 4 | Sum | R680 000,00 | R2 720 000,00 | |
| | Proposed reclamation site | Dismantle steel, demolish concrete/brick, remove liners, rehabilitate sumps and footprint | | | | | | | | C | | 1 | Sum | R1 600 000,00 | R1 600 000,00 | |
| | | | | | | | | | | | | | | | | |
| | | **Demolition & Rehabilitation Total** | | | | | | **R0,00** | | | | | | | **R4 320 000,00** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | Grade an area | 123 | | | ha | R2 677,02 | | | 123 | | | ha | R2 677,02 | | |
| | | General clean up | 124 | | | m² | R13,85 | | | 124 | | | m² | R13,85 | | |
| | | Rubble | 125 | | | m³ | R36,00 | | | 125 | | | m³ | R36,00 | | |
| | | Bulldoze material | 130 | | | m³ | R16,99 | | | 130 | | | m³ | R16,99 | | |
| | Load and haul 1 km radius | Load and haul soils, fugitive tailings etc within 1km | 126 | | | m³ | R33,80 | | | 126 | | | m³ | R33,80 | | |
| | Load and haul extra over | extra over /m3/km | 127 | | | m³ | R6,50 | | | 127 | | | m³ | R6,50 | | |
| | | Rip soil | 132 | | | ha | R9 267,60 | | | 132 | | 1 | ha | R9 267,60 | R9 267,60 | |
| | | Revegetate areas | 128 | | | Ha | R33 210,25 | | | 128 | | 1 | Ha | R33 210,25 | R33 210,25 | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R0,00** | | | | | | | **R42 477,85** | |
| | | | | | | | | | | | | | | | | |
| | | **Area 7 Total** | | | | | | **R0,00** | | | | | | | **R4 362 477,85** | |
| | | | | | | | | | | | | | | | | |
| **Area 8** | | **Pipelines and Powerlines** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Demolish infrastructure** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | Water Supply Pipelines | Pipes > 351mm but < 600mm | | | | | | | | 167 | | 29 | Km | R102 667,99 | R3 004 789,20 | |
| | Tailings Pipelines | Pipes > 351mm but < 600mm | | | | | | | | 167 | | 24 | Km | R102 667,99 | R2 513 090,63 | |
| | Powerlines | Dismantle powerlines | | | | | | | | 169 | | 13 | km | R32 600,00 | R433 270,56 | |
| | | | | | | | | | | | | | | | | |
| | | **Demolition Total** | | | | | | **R0,00** | | | | | | | **R5 951 150,39** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

| Map Ref. | Aspect Name | Description | Current disturbance 2021 | | | | | | | Life of Mine 2035 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Class | | Quantity | Unit | Rate | Amount | Comments | Class | | Quantity | Unit | Rate | Amount | Comments |
| | | **Rehabilitation** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | Grade an area | 123 | | | ha | R2 677,02 | | | 123 | | | ha | R2 677,02 | | |
| | | General clean up | 124 | | | m² | R13,85 | | | 124 | | | m² | R13,85 | | |
| | | Rubble | 125 | | | m³ | R36,00 | | | 125 | | | m³ | R36,00 | | |
| | | Bulldoze material | 130 | | | m³ | R16,99 | | | 130 | | | m³ | R16,99 | | |
| | Load and haul 1 km radius | Load and haul soils, fugitive tailings etc within 1km | 126 | | | m³ | R33,80 | | | 126 | | | m³ | R33,80 | | |
| | Load and haul extra over | extra over /m3/km | 127 | | | m³ | R6,50 | | | 127 | | | m³ | R6,50 | | |
| | | Rip soil | 132 | | | ha | R9 267,60 | | | 132 | | 11 | ha | R9 267,60 | R99 617,22 | |
| | | Revegetate areas | 128 | | | Ha | R33 210,25 | | | 128 | | 11 | Ha | R33 210,25 | R356 976,21 | |
| | | Dust suppression | 156 | | | Sum | R202 073,39 | | | 156 | | | Sum | R202 073,39 | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **Rehabilitation Total** | | | | | | **R0,00** | | | | | | | **R456 593,44** | |
| | | | | | | | | | | | | | | | | |
| | | **Area 8 Total** | | | | | | **R0,00** | | | | | | | **R6 407 743,82** | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | **GRAND TOTAL (Excl. VAT)** | | | | | | **R198 684 045,83** | | | | | | | **R81 088 984,76** | |

# Appendix T: Extension Letter for Scoping Report

mineral resources
& energy
Department:
Minerals Resources and Energy
REPUBLIC OF SOUTH AFRICA

Private Bag X 5, Braamfontein, 2017, 78 De Korte Street, Mineralia Building, Braamfontein, 2017.
Tel: 011 358 9700 Email:Vhudzisani.Mudau@dmre.gov.za Ref No: **GP 30/5/1/2/2 (206) MR**

**From:** Mineral Regulation: Gauteng Office **Enquiries:** Vhudzisani Mudau

**By Registered Mail**
Mogale Gold (Pty) Ltd
Turnberry Office Park
48 Grosvernor Road
Bryanston
2191

Email: info@digbywell.com
Attention: Mr. Brett Coutts

**RESPONSE TO THE REQUEST FOR AN EXTENSION TO SUBMIT THE FINAL SCOPING REPORT IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) (NEMA): ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 FOR PAN AFRICAN RESOURCES GOLD BEARING TAILINGS RETREATMENT PROJECT, SITUATED IN THE WEST RAND MOGALE CLUSTER MINING RIGHT (GP) 30/5/1/2/2 (206) MINING RIGHT. SITUATED IN THE MAGISTERIAL DISTRICT OF KRUGERSDORP.**

Your letter submitted to this Department on **23 May 2022** is hereby acknowledged.

Kindly be informed that your request for an extension to submit scoping report on **13 June 2022** has been granted.

Yours faithfully,

.....

**REGIONAL MANAGER**
**GAUTENG REGION**
**DATE** 31/05/2022

# Appendix U: Acceptance Letter of the Scoping Report

mineral resources
& energy
Department:
Minerals Resources and Energy
**REPUBLIC OF SOUTH AFRICA**

Private Bag X 5,Braamfontein,2017, 78 De Korte Street,1st Floor Mineralia Building, Braamfontein, 2017.
Tel: 011 358 9700 Email: Jimmy.Sekgale@dmre.gov.za Ref No: **GP 30/5/1/2/3/2/1 (206) EM / GP30/5/1/2/2(206) MR**
**From:** Mineral Regulation: Gauteng Office **Enquiries:** Mr Jimmy Sekgale

***Per Mail***

**Mogale Gold (Pty) Ltd**
P.O. Box 2663
**PINEGOWRIE**
2123

**Attention: Mr JJ Moolman**
**Email: johanjmoolman@outlook.com**

**APPLICATION FOR AN INTEGRATED ENVIRONMENTAL AUTHORISATION FOR VARIOUS ACTIVITIES LISTED IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998): EIA REGULATIONS (983 AND 984) 2014 (AS AMENDED) COVERING THE VARIOUS PORTIONS OF FARMS WATERVAL 174IQ, LUIPAARDSVLEI 246 IQ, UITVALFONTEIN 244 IQ, WITPOORTJE 245 IQ, RIETVALEI 241 IQ AND RANDFONTEIN 247 IQ, SITUATED IN THE MAGISTERIAL DISTRICT OF KRUGERSDORP.**

A Scoping Report (SR) and Plan of Study for Environmental Impact Assessment dated **13 June 2022** as received by this Department refers.

1. The Department is hereby acknowledges the amended SR as referred above.
2. The Department is satisfied that the abovementioned amended SR and Plan of Study for Environmental Impact Assessment complies with the minimum requirements of Appendix 2(2) of the EIA Regulations, 2014(as amended).
3. The SR is hereby accepted by the Department in terms of regulation 22(a) of the EIA Regulations, 2014 (as amended).
4. You may proceed with the Environmental Impact Assessment process in accordance with the abovementioned SR.
5. Please ensure that comments from all relevant stakeholders are submitted to the Department with the Environmental Impact Assessment Report (EIAR). This includes but is not limited to the Land Claims Commission, Provincial Heritage Resources Authority, Gauteng Department of Agriculture and Rural Development (GDARD), Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS) and the Local Municipality.

6. The applicant is hereby reminded to comply with the requirements of Regulation 3 of the EIA Regulations, 2014 with regards to the stipulated timeframes for complying with the requirements of the Regulations.
7. Further, it must be reiterated that, should an application for Environmental Authorisation be subjected to any permits or authorisations in terms of the provisions of any Specific Environmental Management Acts (SEMAs), proof of such application will be required.
8. You are requested to submit three (3`) hard copies of the EIAR inclusive of any specialist reports and EMPr and at least one electronic copy, through SAMRAD, of the complete EIAR and EMPr to this Regional Office on or before 10 November 2022. The EIAR and EMPr must have been subjected to the public participation process of at least 30 days. Kindly refer to section 24N(2) of the NEMA and Appendix 2, 4 and 6 of the EIA Regulations, 2014 for the minimum requirements set for the aforementioned reports. The public participation process should be conducted as stipulated in chapter 6 of the EIA Regulations and taking into considerations any guidelines applicable to public participation.
9. Kindly note that acceptance of your scoping report application does not grant you a right to commence with the listed activities applied for. Acceptance simply confirms that your application will be processed further and a recommendation on granting or refusal of an environmental authorisation will be forwarded to the Minister or his delegate for consideration, and the decision will be communicated as stipulated in regulation 4(1) of the EIA Regulations, 2014.
10. Further note that in terms of regulation 45 of the EIA Regulations, 2014, failure to submit the documents or meet any timeframes prescribed in terms of the EIA Regulations, 2014 will result in your application deemed as having lapsed.
11. Your attention is brought to Section 24F of the NEMA which stipulates "that no activity may commence prior to an environmental authorisation being granted by the competent authority". Commencement with a listed activity without an environmental authorisation contravenes the provisions of section 24F(1) of NEMA and constitutes an offence in terms of section 49A (1) (a) of NEMA.

Yours faithfully

**REGIONAL MANAGER**
**MINERAL AND PETROLEUM REGULATION**
**GAUTENG REGION**
**DATE:** 27/07/2022

*CC: Mia Smith/Brett Couts (Digby Wells and Associates (South Africa) (Pty) Ltd Email: mia.smith@digbywells.co./brett.coutts@digbywells.com*