

DER BROCHEN-MOTOTOLO MINE COMPLEX

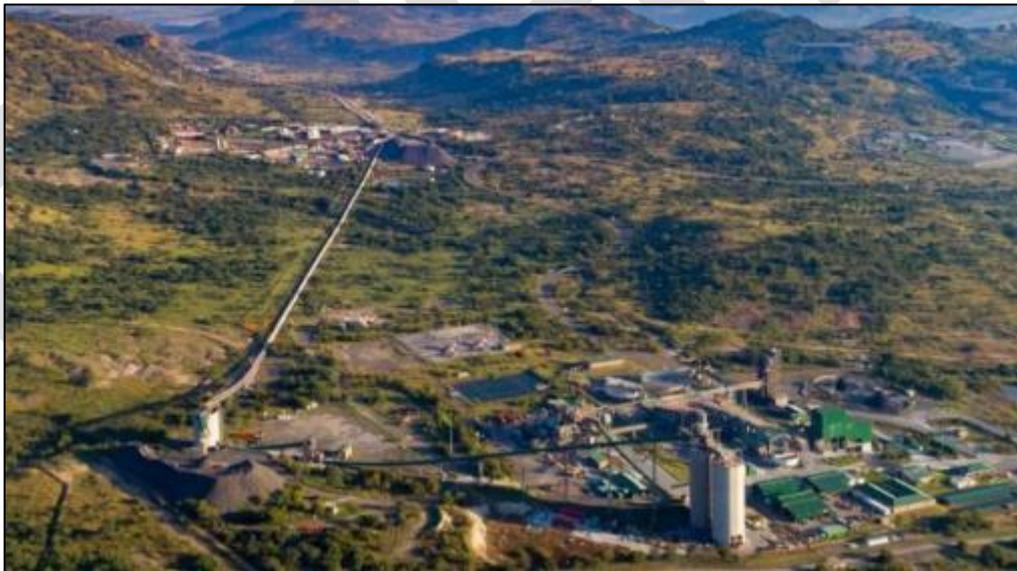
Consolidated Environmental Management Programme –

DRAFT FOR PUBLIC REVIEW

Report Prepared for

Anglo American Platinum: Rustenburg Platinum Mines Limited

Report Number 554304



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DER BROCHEN AND MOTOTOLO MINE COMPLEX

Consolidated Environmental Management Programme

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Anglo American Platinum: Rustenburg Platinum Mines Limited

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Executive Summary

INTRODUCTION

Rustenburg Platinum Mines (Pty) Ltd (RPM), a wholly owned subsidiary of Anglo American Platinum (AAP) and Glencore Operations South Africa (Pty) Ltd (Glencore) established the Mototolo Joint Venture (JV) in 2005, known as the Mototolo Mine, which is located approximately 25 km south-west of the town of Steelpoort and 40 km west of Mashishing (Lydenburg), in the Limpopo Province.

RPM acquired Glencore's shares in the Mototolo JV during November 2018, with the intention to combine the Mototolo JV area with the downdip and adjacent Der Brochen resource to create a major platinum hub for the company.

The Mototolo Mine involved the underground mining of the platinum bearing reefs by Glencore and the processing of ore at the Mototolo Concentrator Plant operated by RPM, as part of the Der Brochen Mine. Tailings derived from the processing of the ore was disposed onto RPM's existing Helena Tailings Storage Facility (TSF).

The Mototolo Mine's mining area was shared respectively by Glencore and RPM as detailed below:

- In respect of RPM's mining right - portions 1 and 2 and the remaining extent of Richmond 370 KT; and
- In respect of Glencore's mining right - a portion of portion 3, a portion of portion 7 and a portion of the remaining extent of the farm Thorncliffe 374 KT.

RPM has on 2nd November 2018 lodged through DMRE SAMRAD System (Ref: LP-00066-MR/102) a Section 102 Application to the DMR in accordance with the Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA) to amend the Der Brochen Mining Rights area to include the farms and relevant farm portions associated with Mototolo Mine.

In addition to the Section 102 Application, RPM also submitted an application to the DMRE to amend the Environmental Authorisation (EA) of the Der Brochen Project in accordance with Regulation 31 of the Environmental Impact Assessment (EIA) Regulations, promulgated under the National Environmental Management Act, Act 107 of 1998 (NEMA), to include the approved activities and farm portions applicable to the Mototolo Mine. This document, therefore serves as the consolidation of the approved Mototolo Mine EMPr (previously held by Glencore) and the Der Brochen EMPr of 2015 (held by AAP-RPM), into a single EMPr that will provide RPM with a more effective environmental management tool to manage their current and latest acquired operations as it will:

- Describe the existing approved infrastructure and activities associated with the Mototolo Mine and Der Brochen Mine in one document;
- Holistically describe the environment within which RPM will now operate;
- Update the status of environmental impacts and associated management measures based on the current activities associated with each of the operations;
- Allow for a greater level of alignment between the different EMPrs in terms of management measures and monitoring reporting requirements;
- Bring the authorised activities in line with what is taking at place each of the operations; and
- Rationalise repeated information and management measures contained within the approved EMPr's.

STRUCTURE OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

This Consolidated EMPr has been compiled in terms of the provisions contained within Appendix 4 of 2014 EIA Regulations, as amended.

The requirements of an EMPr, as detailed in the EIA Regulations, are summarised in Executive Table 1 and includes cross-references to the various sections contained in this Consolidated EMPr.

This report is a consolidation of the existing approved EMPr's of the Der Brochen Project and Mototolo Mine and has been developed in accordance with the current legislative requirements, as detailed in the 2014 EIA Regulations.

Executive Table 1: EIA Regulations EMPr Report requirements

Legislated requirements (Appendix 4 of the EIA Regulations)		Section Reference
An EMPr Report must include:		
1 (a)	details of-	Section 2
	(i) the EAP who prepared the EMPr;	
	(ii) the expertise of the EAP, including a curriculum vitae;	
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 3
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 3
(d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	Sections 8 & 9
	(i) planning and design;	
	(ii) pre-construction activities;	
	(iii) construction activities;	
	(iv) rehabilitation of the environment after construction and where applicable post closure; and	
(v) where relevant, operation activities;		
(e)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -	Sections 8 & 9
	(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	
	(ii) comply with any prescribed environmental management standards or practices;	
	(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable		
(f)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (e);	Section 18
(g)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (e);	Section 18
(h)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 9
(i)	the time periods within which the impact management actions contemplated in paragraph (e) must be implemented;	Section 9
(j)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (e);	Section 18

Legislated requirements (Appendix 4 of the EIA Regulations)		Section Reference
An EMPr Report must include:		
(k)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 18
(l)	an environmental awareness plan describing the manner in which-	Section 19
	(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
(m)	any specific information that may be required by the competent authority	Section 15 – Financial Provision
2	Where a government notice gazette by the minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Not applicable

PROJECT LOCATION

The Der Brochen-Mototolo Mine Complex is located approximately 30 km south of the town of Steelpoort (approximately 40 km by road) and 35 km west of Mashishing (Lydenburg) (approximately 65 km by road), in the Limpopo Province.

The Der Brochen-Mototolo Mine Complex area extends across seven farms. The details and ownership of the farms are described in Executive Table 2.

Executive Table 2: Der Brochen-Mototolo Mine Complex property

Farm name	Portion	Surface Owner	SG Code
Thornccliffe 374 KT	Remaining portion	Glencore Operations South Africa (Pty) Ltd	T0KT00000000037400000
	3	Glencore Operations South Africa (Pty) Ltd	T0KT00000000037400003
	7	Glencore Operations South Africa (Pty) Ltd	T0KT00000000037400007
Richmond 370 KT	1	Rustenburg Platinum Mines Limited	T0KT00000000037000001
	2	Rustenburg Platinum Mines Limited	T0KT00000000037000002
St George 2 JT	Remaining portion	Rustenburg Platinum Mines Limited	T0JT0000000000200000
	1	Rustenburg Platinum Mines Limited	T0JT0000000000200001
	2	Rustenburg Platinum Mines Limited	T0JT0000000000200002
Hermansdal 3 JT	Remaining portion	Johannes Jacobus Joubert	T0JT0000000000300000
Hebron 5 JT	Remaining portion	Booyensdal Platinum (Pty) Ltd	T0JT0000000000500000
Hebron 5 JT	1	Booyensdal Platinum (Pty) Ltd	T0JT0000000000500001
Helena 6 JT	Remaining portion	Rustenburg Platinum Mines Limited	T0JT0000000000600000
	3	Rustenburg Platinum Mines Limited	T0JT0000000000600003
Der Brochen 7 JT	Remaining portion	Rustenburg Platinum Mines Limited	T0JT0000000000700000

Farm name	Portion	Surface Owner	SG Code
Mareesburg 8 JT	Ptn 7	Rustenburg Platinum Mines Limited	TOJT00000000000800007
Grey shade indicates properties associated with the mining right's area of the previously known Mototolo Mine JV, and the Red line indicates properties associated with the original Der Brochen mining right's area.			

As indicated in the table above, AAP-RPM also holds the surface right to Portion 7 of the farm Mareesburg 8 JT which falls outside, but adjacent to, AAP-RPM's mining right's area associated with the original Der Brochen Project. The existing authorised Mareesburg tailings storage facility (TSF), associated return water dams (RWDs) and tailings-return water pipeline system, which form part of the Der Brochen Project, are located on this farm and relevant farm portion.

PROJECT DESCRIPTION

The operation of the Der Brochen-Mototolo Mine Complex include the processing of platinum and chrome bearing ore at the existing Mototolo Concentrator Plant that is received from the underground workings at the Borwa and Lebowa shafts via an existing conveyor belt system. The Borwa and Lebowa shafts formed part of the previously known Mototolo Mine.

The final concentrate from the Mototolo Concentrator Plant is transported via trucks to the Polokwane Smelter for further processing, whilst the tailings material from the plant is disposed of on the existing Helena TSF and recently constructed Mareesburg TSF via pipeline systems. The water contained in the tailings' slurry settles on top of the TSFs and collects in the existing RWDs associated with the Helena TSF and Mareesburg TSF respectively. From the RWDs the water is pumped back to the Mototolo Concentrator Plant for reuse via return water pipeline systems.

The table below provides a summary of the main activities and infrastructure associated with the Der Brochen-Mototolo Mine Complex, as authorised through the Der Brochen Mine's approved Environmental Management Programmes (EMPr's) and associated Water Use Licences (WULs) as well as the Mototolo Mine's EMPr and associated WULs.

Executive Table 3: Der Brochen-Mototolo Mine Complex's current and authorised activities and facilities

Historical, current and other authorised activities	
Existing activities and facilities	Activities previously authorised, but which has not yet commenced
<ul style="list-style-type: none"> Underground mining at the Lebowa and Borwa decline shafts; Taking water from underground and using it for mining purposes; Operating conveyor systems; Processing of platinum and chrome bearing ore at the Mototolo Concentrator Plant; Deposition of tailings material onto the Helena TSF and operating the two associated RWDs; Deposition of tailings material onto the Mareesburg TSF and operating the four associated RWDs; Utilisation of the offices and access roads; Construction and utilisation of contractors' laydown area; Undertaking prospecting activities comprising of site preparation, drilling of prospecting 	<ul style="list-style-type: none"> The Helena and Richmond wellfields (<i>only two of the authorised boreholes per well field currently in use</i>); Two Open Pits (Northern and Southern Pits) and associated waste rock dumps (WRDs) and pollution control dam; Re-routing of a 132 kV powerline; Fish raceways; A Co-Disposal Facility (<i>tailings disposal with a rock embankment in the north pit</i>).
	Activities authorised and completed

Historical, current and other authorised activities	
boreholes, site rehabilitation and monitoring within the mining right area; <ul style="list-style-type: none"> • Abstraction of water from existing lawful use boreholes; • Abstraction of water from the Der Brochen Dam; • Waste management activities. 	stockpile and waste rock dump are well vegetated); <ul style="list-style-type: none"> • Helena and Richmond shafts and associated WRDs (<i>one adit on Richmond opened and bulk sample taken. There after the project was closed and WRDs rehabilitated</i>).

MOTIVATION FOR CURRENT MINING OPERATION

Mining in the Limpopo Province forms a critical sector of the province's economy, contributing 22% to its Gross Domestic Product (GDP), owing to the rich mineral resource deposits located within the province.

The Bushveld Igneous Complex, which extends for 400 kilometres in the Limpopo Province, contains the world's largest known deposits of Platinum Group Metals (PGMs) - platinum, palladium, rhodium, ruthenium, iridium and osmium. The geological complex further consists of the Merensky and UG2 Reefs as well as the Platreef in the northern extension. The Merensky Reef accounts for over 80% of the platinum mined in South Africa, with the highest PGM values being associated with the UG2 Reef which lies approximately 200 m to 300 m below the Merensky Reef.

The two shafts associated with the Mototolo Mine were developed on the western boundary of the farm Thorncliffe 347 KT (on Portions 3 and 7) to mine the UG2 layer for its high platinum content. The acquisition of Glencore's stake by AAP-RPM in the Mototolo Mine increases AAP-RPM's interest in a mechanised, low-cost, high quality resource, creating another major PGM hub for the mining company. The transaction unlocks significant opportunities for the Company in its wholly-owned Der Brochen resource, located downgradient of the Mototolo Mine.

SUMMARY OF THE BASELINE ENVIRONMENT

A summary of the environmental and social setting within which the Der Brochen-Mototolo Mine Complex operates, are provided in the table below.

Executive Table 3: Der Brochen-Mototolo Mine Complex's environmental and social baseline

Aspect	Description
Geology	<p>The Der Brochen-Mototolo Mine Complex is located within the 66 000 km² eastern limb of the Bushveld Complex. It comprises an assemblage of layered ultramafic to felsic Proterozoic plutonic and volcanic rocks. The operation lies approximately 40 km south-east of the Steelpoort fault in the Rustenburg Layered Suite of the complex.</p> <p>Approximately 9 km of Upper Group 2 (UG2) reef and 13 km of Merensky Reef (MR) horizons outcrop within the Der Brochen Project area, with a 170 m reef parting. The UG2 reef dips to the west at an average angle of 10° on Richmond farm, on the northern and central portions of Helena, as well as on Der Brochen farm.</p>
Topography	<p>The area is characterised by a rugged topography with the relief measuring between 940 m and over 2 000 m above sea level. The prominent north-south trending Steenkamps Mountains extend across the study area, with two deeply incised valleys lying in a north-south direction between the mountain ranges. Within these valley floors are the Groot-Dwars River in the east and the Klein-Dwars River in the west (both flowing northwards through the area).</p>
Climate	<p>The operation falls within the Highveld climatic region. This climatic region is associated with warm temperature and summer rainfall. The average daily maximum temperature for the region is 27°C in January and 17°C in July, and average daily minimum for the region vary from 13°C in January to 0°C in July.</p>

Aspect	Description
	<p>The average annual rainfall for this climatic region is approximately 737 mm and varies from 900 mm in the east to 680 mm in the west, while the average annual evaporation is 1 731 mm. Rainfall is almost entirely derived from heavy showers and thunderstorms and occurs mostly in the summer (85%) from October to March, with a maximum in January. The prevailing wind directions on the site are north-westerly and south-easterly due to the topographical orientation of valleys and ridges in the area.</p>
Soils, Land Capability and Land Use	<p>Soils found in the operational area can be summarised as follows:</p> <ul style="list-style-type: none"> • Helena farm: broadscale land types include Mispah, Arcadia, Glenrosa, Hutton and Clovelly soils, all having grazing land capabilities, with the Mispah and Hutton soils tending towards wilderness status when shallow and rocky; detailed soil surveys indicated deep and shallow Arcadia and shallow rocky Mispah soils as dominant, with arable/grazing and wilderness/grazing land capabilities respectively; • Der Brochen farm: the land types of the farm are Ib154b (Mispah soils of wilderness land capability), Dc31b (Arcadia soils of grazing/arable potential) and Ib30c (Glenrosa soils of grazing capability); specialists indicated that the rocky Mispah soils have an inherent grazing land capability and Arcadia erosion; and • Mareesburg farm: broadscale land types include Ab29 (Arcadia/Hutton – grazing); Ib31 (Mispah/Glenrosa – grazing); Dc31 (Arcadia/Hutton – grazing) and Fa327 (Glenrosa – grazing); the detailed soil survey in the vicinity of the proposed TSF found rocky Glenrosa soils to dominate (grazing land capability), followed by rocky Mispah soils (grazing land capability) and rocky Arcadia soils (also of grazing land capability).
Biodiversity	<p>The operation is located within the Sekhukhuneland Centre of Plant Endemism (SCPE). The SCPE is a micro-regional centre of plant endemism because of its exceptionally rich biodiversity and high degree of species endemism. Species are considered endemic because they are unique to a specific region.</p> <p>In addition to the above, the study area is also located within a South African National Biodiversity Institute (SANBI) Priority Area as well as the Sekhukhune Mountainlands Threatened Ecosystem and Critical Biodiversity Area within the Limpopo Conservation Plan (C-Plan). It is also recognised as the Highest Biodiversity Risk for Mining under the recently released (2013) Mining and Biodiversity Guidelines.</p>
Vegetation	<p>The operation falls within two of the SCPE sub-centres, namely the Roosenekal sub-centre and the Steelpoort sub-centre. The area is located within the Savanna Biome, with the most recent national vegetation classification indicating it to be part of the Sekhukhune Mountain Bushveld vegetation type according to Mucina and Rutherford (2006). This vegetation type is restricted to only the Limpopo and Mpumalanga provinces, occurring strictly at altitudes of 900 – 1 600 mamsl and is listed to be as Least Threatened. However, Mucina & Rutherford state that there are no protected areas for this vegetation type.</p> <p>From the National Herbarium Pretoria Computerised Information System (PRECIS) data, 667 plant species of 109 families have been recorded for quarter degree grid's (QDG) square where the Der Brochen is located (PRECIS data accessed May 2014).</p>
Fauna	<p>The cicada species <i>Pycna sylvia</i>, previously thought to be extinct within the region for 95 years, was encountered on the Helena farm during the survey conducted by the Transvaal Museum in 2002. <i>Pycna sylvia</i> is very habitat specific with the majority of individuals found within the eastern and south-eastern sloping areas in conjunction with <i>Vitex obovata</i> subsp <i>wilmsii</i>.</p>
Surface water	<p>The operation falls within the Groot-Dwars River catchment within the B41G quaternary in Water Management Area 4. Water quality on the site is good (within guideline standards) and is well suited for all uses. Elevated calcium and magnesium levels are considered due to the natural geology.</p>

Aspect	Description
Groundwater	<p>Primary aquifers are present in locally distributed unconsolidated alluvial sediment deposits along the lower reaches of the Klein-Dwars River and Groot-Dwars River. Due to their limited size and/or probable low transmissivity and connectivity to the river baseflow, the primary aquifers are not considered suitable groundwater production targets.</p> <p>Groundwater use within the Der Brochen-Mototolo Mine Complex area is limited to potable water supply purposes. Drinking water is monitored monthly and forms part of the quarterly monitoring programme. All other potable and process water is currently obtained from the Lebalelo Water User Association via a Pipeline.</p> <p>The quality of the groundwater is slightly alkaline (pH in the range of 7.2 to 8.2) with average mineralisation (TDS between 300 to 1 000 mg/l). This is typical for groundwater in the Bushveld Complex.</p>
Air Quality	<p>The slope of the terrain accounts for the increased frequency of occurrence of northerly and north-westerly winds during the day-time and increased south-easterly winds during the night time. The differential heating and cooling of the air along a slope typically results in down-slope (katabatic) flow at night, with low-level up-slope (anabatic) airflow occurring during the day.</p> <p>The operation has an existing dust fallout monitoring network.</p>
Cultural Heritage	<p>No National or Provincial Monuments of conservation importance exist within the operational area. There are a number of graves within the site of high significance, requiring fencing or relocation. Other sites of significance include <i>Eiland</i> dagas, tenant households, kraals, ruins and <i>Eiland</i> or <i>Leolo</i> pottery.</p>
Socio-Economic	<p>The Der Brochen-Mototolo Mine Complex falls within the boundaries of the Greater Tubatse Local Municipality of the Sekhukhune District Municipality and borders the Thaba Chweu Local Municipality of the Ehlanzeni District Municipality. The area is characterised by high levels of poverty, low levels of education and low levels of employment. Communities within and around the operational area include:</p> <ul style="list-style-type: none"> • Ga-Mawela; • Maganae and Leshaba; • Matjomane and Mogashoa; • Pakaneng; and • Mawela. <p>Services within and around the project area include sanitation, refuse removal, water and power supply.</p>

CONSOLIDATED ENVIRONMENTAL MANAGEMENT PROGRAMME

The Consolidated Environmental Management Programme (EMPr) provides information on the following:

- Objectives, management measures, management criteria and responsibilities of potential impacts (biophysical and socio-economic) during construction, operation, decommissioning and closure. Management recommendations followed the management hierarchy:
 - Avoidance;
 - Prevention;

- Minimisation;
- Mitigation; and
- Management.

This EMPr incorporates commitments made in the existing approved Der Brochen EMPr of 2015 as well as the commitments stipulated in the Mototolo Mine's EMPr.

The Consolidated EMPr also includes the following:

- Environmental Awareness planning;
- Monitoring of the EMPr and environmental related aspects;
- Closure liability assessments; and
- Financial Provision.

CONCLUSION

The Consolidated EMPr for the Der Brochen-Mototolo Mine Complex has been prepared because of AAP-RPM's acquisition of Gencore's shares in the Mototolo Mine JV. The document has been structure to meet the requirements of the EIA Regulations of 2014 (as amended in 2017) and will be submitted to the DMRE for consideration, as part of AAP-RPM's application to amend the Der Brochen Project's EA to include the approved activities and related farm portions associate with the Mototolo Mine.

The consolidation process involved the assessment of all existing and approved EMPrs and consolidating the relevant information, specialist studies/ findings and management measures into a comprehensive document. The consolidated EMPr includes all environmental and socio-economic commitments contained in the existing EMPrs of both the Der Brochen Project and the Mototolo Mine.

All aspects of the previous EMPrs have been included into this consolidated report. The management measures will be implemented during the construction, operation, and closure/ post-closure phases of the Der Brochen-Mototolo Mine Complex operation and activities.

As the consolidation process involves the consolidation of existing and understood impacts and mitigation measures, no impact assessment has been undertaken as part of the consolidation process. The consolidation process does not provide for any new/additional infrastructure or activities not currently contained in the approved Der Brochen Project's or Mototolo Mines approved EMPr's.

This consolidated EMPR provides management measures in order to reduce the potential negative environmental impacts whilst positive impacts are strived to be enhanced as a result of the continued mining and processing operations at the Der Brochen-Mototolo Mine Complex.

It is the opinion of the EAP that the Consolidated EMPr of the Der Brochen-Mototolo Mine Complex is approved and accepted as it comprehensively details all the management measures required to avoid, prevent, and if not possible avoid, then to minimise, mitigate and manage the impacts that may be associated with the operation during the life of mine. The Consolidated EMPr will also provide AAP-RPM with a more effective environmental management tool to manage their current and latest acquired operations.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by Anglo American Platinum - Rustenburg Platinum Mines Limited (AAP-RPM). SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

Draft

List of Abbreviations

AAP	Anglo American Platinum Limited
ARDML	Acid Rock Drainage Metal Leaching
BPG	Best Practice Guidelines
CMA	Catchment Management Authority
DB	Der Brochen Mine
DBAP	Der Brochen Amendment Project
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EC	Electrical Conductivity
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
EMS	Environmental Management System
GNR	Government National Regulations
GW	Ground water
HCT	Humidity cell testing
IRP	Integrated Resource Plan
LC	Leachate Concentrate
LCT	Leachable concentration threshold
LEDET	Limpopo Economic Development, Environment and Tourism
LoM	Life of Mine
mamsl	meters above mean sea level
MPRDA	Mineral and Petroleum Resources Development Act (No. 68 of 2002)
Mtpa	Metric tons per annum
NAG	Non-acid generating
NEM:BA	The National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEMA	National Environmental Management Act (No. 107 of 1998)
NEMAA	National Environmental Management Amendment Act (No. 62 of 2008)
NEM:AQA	National Environmental Management Air Quality Act (No. 39 of 2004)
NEM:PA	National Environmental Management: Protected Areas Act (No. 57 of 2003)
NEM:WA	National Environmental Management Waste Act (No. 59 of 2008)
NEM:WAA	National Environmental Management Waste Amendment Act
NP	Neutralisation potential
NNP	Net neutralising potential
NPR	Neutralising potential ratio
NWA	National Water Act (No. 36 of 1998)

PAG	Potentially acid generating
PCD	Pollution Control Dam
PCLU	Post Closure Land Use
PGM	Platinum Group Metals
RSRD	Residue Stockpiles and Residue Deposits
RWD	Return Water Dam
SANS	South African National Standards
SEAT	Socio-Economic Assessment Toolbox
SLP	Social and Labour Plan
SRK	SRK Consulting (South Africa) (Pty) Ltd.
STP	Sewage Treatment Plant
SW	Surface water
TC	Total Concentrate
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
VMP	Vegetation Management Plan
WML	Waste Management Licence
WRD	Waste Rock Dump
WUL	Water Use Licence

1 Introduction and background

Anglo American Platinum – Rustenburg Platinum Mines Limited (AAP-RPM), established the Mototolo Mine Joint Venture (JV) with Glencore Operations South Africa (Pty) Ltd (Glencore) in 2003. The Mototolo Mine JV is located approximately 25 km south-west of the town of Steelpoort and 40 km west of Mashishing (Lydenburg) on the Eastern Limb of the Bushveld Complex in Limpopo, South Africa.

As part of the JV arrangement, AAP-RPM and Glencore each contributed a similar amount of in-situ platinum group metals (PGM) reserves and resources from Glencore's Thorncliffe farm (farm Thorncliffe 374 KT), adjacent to its Thorncliffe Chrome Mine and AAP-RPM's bordering farm Richmond (farm Richmond 370 KT), part of its Der Brochen Project's mining right area.

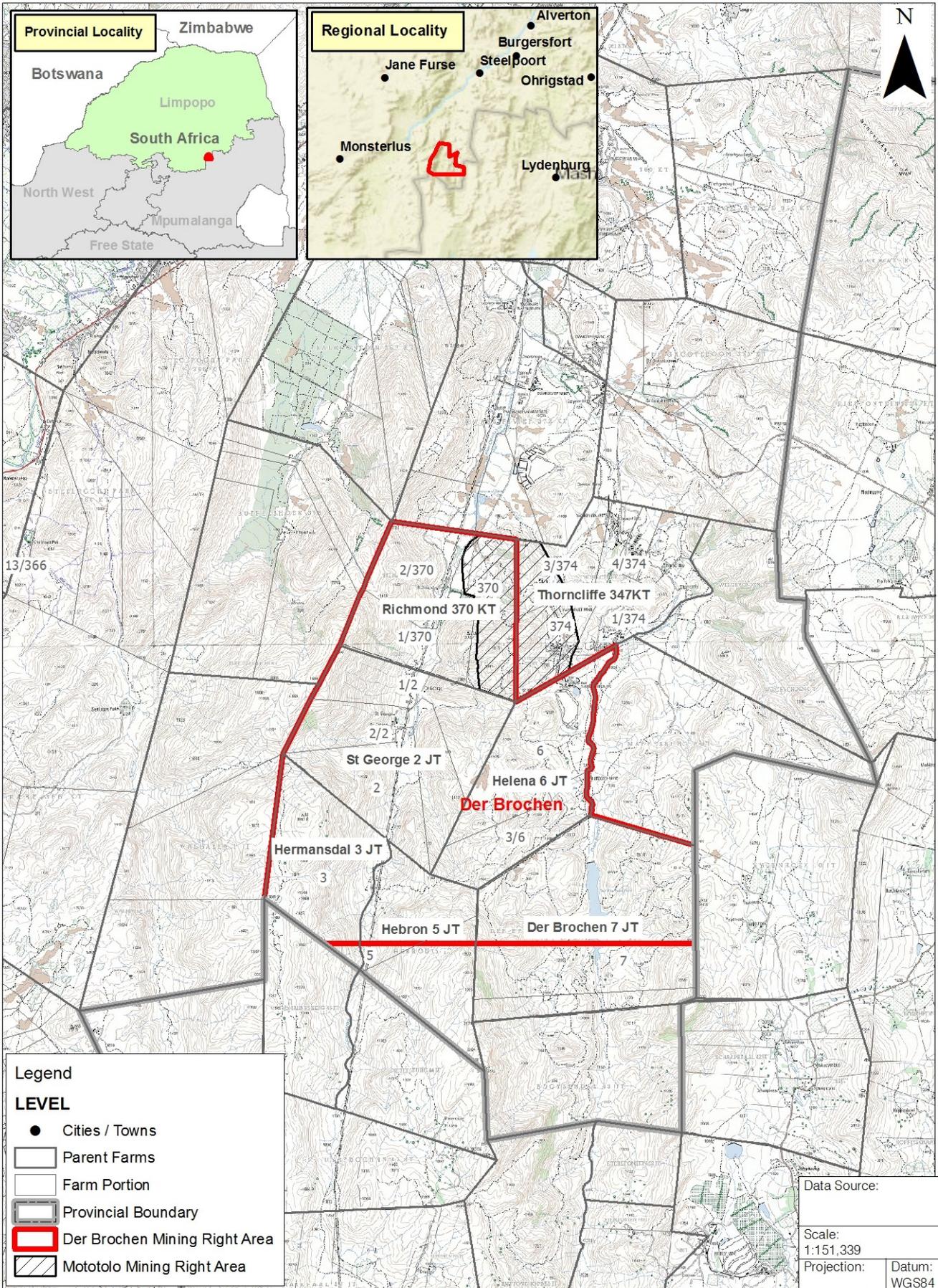
Under the JV, Glencore was responsible for developing and operating the underground room and pillar mining operations, while AAP-RPM constructed and managed the PGM concentrator plant (known as the Mototolo Concentrator). In addition, Glencore also constructed a chrome beneficiation plant next to the Mototolo Concentrator to process the Upper Group 2 (UG2) tailings arising from the concentrator plant. The final tailings derived from the Mototolo Concentrator was disposed onto AAP-RPM's Helena Tailings Storage Facility (TSF).

Refer to Figure 1-1 for the location of the Mototolo Mine JV in relation to the Der Brochen Project area.

In November 2018, AAP-RPM acquired Glencore's shares in the Mototolo Mine JV with the intention to combine the Mototolo Mine with the downdip and adjacent Der Brochen resource to create a major platinum hub for the company, referred to in this report as the Der Brochen-Mototolo Mine Complex.

As part of the acquisition, AAP-RPM intends to combine the approved Environmental Management Programmes (EMPr's) associated with the Der Brochen Project and the Mototolo Mine into a single concise EMPr that will provide AAP-RPM with a more effective environmental management tool to manage their current and latest acquired operations, as it will:

- Describe the existing approved infrastructure and activities associated with the Der Brochen Project and the Mototolo Mine in one document;
- Holistically describe the environment within which AAP-RPM will now operate;
- Update the status of environmental impacts and associated management measures based on the current activities associated with each of the operation;
- Allow for a greater level of alignment between the different EMPr's in terms of management measures and monitoring reporting requirements;
- Bring the authorised activities in line with what is taking place at each of the operations; and
- Rationalise repeated information and management measures contained within the approved EMPr's.



Legend	
LEVEL	
●	Cities / Towns
□	Parent Farms
□	Farm Portion
▭	Provincial Boundary
▭	Der Brochen Mining Right Area
▨	Mototolo Mining Right Area

Data Source:	
Scale: 1:151,339	
Projection:	Datum: WGS84
Central Meridian/Zone:	

Date: 04/05/2020	Compiled by: FOWL
Project No. 554304	Fig No. 1-1



DER BROCHEN MINING PROJECT
 MOTOTOLO MINE JV IN RELATION TO THE
 DER BROCHEN PROJECT AREA

The EMPr's to be consolidated are the Mototolo Mine EMPr (previously held by Glencore) and the Der Brochen EMPr of 2015 (held by AAP-RPM). The Der Brochen EMPr of 2015 involved the alignment and amendment of the previous Der Brochen Project's EMPs, which also included additional mining related activities and infrastructure. Refer to Table 1-1 for a list of the EMPr associated with the Der Brochen Project that were consolidated in 2015 and the additional mining related activities and infrastructure that were included in the amended EMPr.

Table 1-1: Summary of the Der Brochen EMPs consolidated in 2015, including the approved additional mining related activities and infrastructure

EMP Name	Approved activities
Der Brochen Mine EMP Approved in 2003	2 x 100 ktpm twin UG2 declines (Helena and Der Brochen) with a LOM of 65 years Concentrator plant on Helena 6 JT with a capacity of 400 ktpm Mareesburg TSF
EMP Amendment: Trial Mining Phase Approved in 2004	Access to UG2 reef via 2 declines (on Helena) and via 4 adits on Richmond, LOM 9 months Ore stockpiles on Helena and Richmond farms Helena WRD (0.16ha) Richmond WRD (0.8ha)
EMP Amendment: Klein Dwarsrivier Wellfields Approved in 2004	A Wellfield to supply water to Der Brochen Project.
EMP Amendment: Helena TSF Approved in 2005	45ha TSF with a capacity of 200ktpm, height of 42m Two return water dams.
EMP Amendment: Helena Chrome Plant Approved in 2006	Chrome recovery spiral plant within the Concentrator area. Stockpile of chrome concentrate – 4200m ² Final tailings returned to the Concentrator
EMP Amendment for ongoing prospecting Approved in 2007	382 prospecting drill holes
EMP Amendment: Richmond early mine Approved in 2010	Mining via portal 5 and adit 4 at 12.5 ktpm. LOM of 16 years Temporary ore stockpiles for future processing, 1.1ha and 2.6 ha Temporary Waste Rock Dump of 1.7ha
EMP Amendment: Raising the height of the Helena TSF Approved in 2014	The approved and existing Helena TSF's height will be raised
EMPr Alignment and Amendment of 2015 Approved in 2015 by the Limpopo Department of Economic Development, Environment and Tourism, and 2016 by the Department of Mineral Resources (now known as the Department of Mineral Resources and Energy (DMRE))	Consolidation of the approved EMPs dated 2002 till 2014 Two open pits (North and South pits) and associated Waste Rock Dumps (WRDs) Re-routing of a 132 kV powerline; A Co-Disposal Facility (tailings disposal with a rock embankment in the north pit) A small expansion to the previously approved Mareesburg TSF and associated infrastructure

AAP-RPM appointed SRK Consulting (South Africa) (Pty) Ltd (SRK) as an independent Environmental Assessment Practitioner (EAP) to combine the approved EMPr's of the Der Brochen Project and the Mototolo Mine into one concise EMPr, that will be submitted to the Department of Mineral Resources (DMR) for approval. SRK will combine and align the Mototolo Mine and Der Brochen EMPr's in

accordance with Regulation 31 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended in 2017) promulgated under the National Environmental Management Act, Act 107 of 1998 (NEMA).

2 Proponent and practitioner details

Details of the proponent (applicant) of the consolidation project and the EAP that will undertake the consolidation and alignment process, are provided in the sections below.

2.1 Details of the proponent

For the purpose of this Consolidated EMPr, the following persons may be contacted at Der Brochen-Mototolo Mine Complex:

Table 2-1: Details of Mine Owner

Proponent:	Anglo American Platinum - Rustenburg Platinum Mines Limited (AAP-RPM)
Name of Mine:	Der Brochen-Mototolo Mine Complex
Address:	Helena Farm, Lydenburg, 1120
Anglo Platinum Executive Head: Projects and Environmental	Prakashim Moodliar
Der Brochen Project Manager:	Johan van Tonder
Telephone No.:	013 230 5601
Email address:	Johan.vantonder@angloamerican.com

2.2 Details of the Environmental Assessment Practitioner

SRK was appointed by AAP-RPM as the independent EAP consultancy to consolidate the approved EMPr's associated with the Der Brochen Project and the Mototolo Mine into one concise EMPr.

SRK has more than 45 years' experience in environmental consulting and has assigned a lead EAP and associated project team to undertake the necessary environmental authorisation amendment process. SRK has no vested interest in the proposed project and hereby declares its independence as required by the NEMA EIA Regulations.

SRK assigned Selma Nel, a principal environmental scientist, and Karabo Maruapula, an environmental scientist as the EAPs to undertake the required EMPr consolidation and alignment project. Details of the EAP team are provided in Table 2-2.

Table 2-2: Details of the Environmental Assessment Practitioner

EAP Name	Contact Number	Fax Number	Email Address
Franciska Lake	011 441 1024	086 555 0886	flake@srk.co.za
Selma Nel	011 441 1127	086 751 4709	snel@srk.co.za
Karabo Maruapula	011 441 1015	086 230 1462	kmaruapula@srk.co.za

2.2.1 Expertise of the Environmental Assessment Practitioner

A summary of the EAP team's qualifications and past experiences are provided in the following sub-sections.

2.2.1.1 Qualifications

The qualifications held by the EAP are summarised in Table 2-3 below. Please refer to Appendix 1 for copies of the qualifications.

Table 2-3: EAP qualifications

EAP Name	Qualifications	University
Franciska Lake	B.Sc. Hons (Zoology)	Rand Afrikaans University
Selma Nel	MA (Environmental Management)	University of Johannesburg
Karabo Maruapula	B.Sc. Hons (Environmental & Geographical Science)	University of Johannesburg

2.2.1.2 Summary of past experience

Table 2-4 provides a summary of the EAP expertise. Detailed CVs of the EAP team are provided in Appendix 2.

Table 2-4: EAP Expertise

EAP Name	Expertise
Franciska Lake	Franciska Lake is a registered natural science practitioner (Pr.Sci.Nat. - 400248/05) involved in water and waste management as well as environmental impact assessments and the development of environmental management programmes for the last 20 years. Her expertise includes: <ul style="list-style-type: none"> • Water and waste management • Water use licensing for mines and industry • General environmental management • Environmental impact assessments • Environmental management programmes • Environmental audits
Selma Nel	Selma Nel has over 13 years of experience in the environmental consulting field. Her experience thus far focussed mainly on environmental authorisation processes relating to mining developments. Her expertise includes: <ul style="list-style-type: none"> • General environmental management • Waste management • Environmental impact assessments • Environmental management programmes • Environmental and waste audits
Karabo Maruapula	Karabo Maruapula has been involved in the field of environmental science for the past 2 years. Her expertise includes: <ul style="list-style-type: none"> • Environmental impact assessments • Social impact assessments • Resettlement action plans • Post-relocation monitoring surveys • Water use license audits

2.2.2 Statement of independence

Neither SRK nor any of the authors of this Consolidated EMPr report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK's fee for completing this Report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report

3 Der Brochen-Mototolo Mine Complex's locality, infrastructure and activities

Details of the location, infrastructure and activities associated with the Der Brochen-Mototolo Mine Complex are provided below.

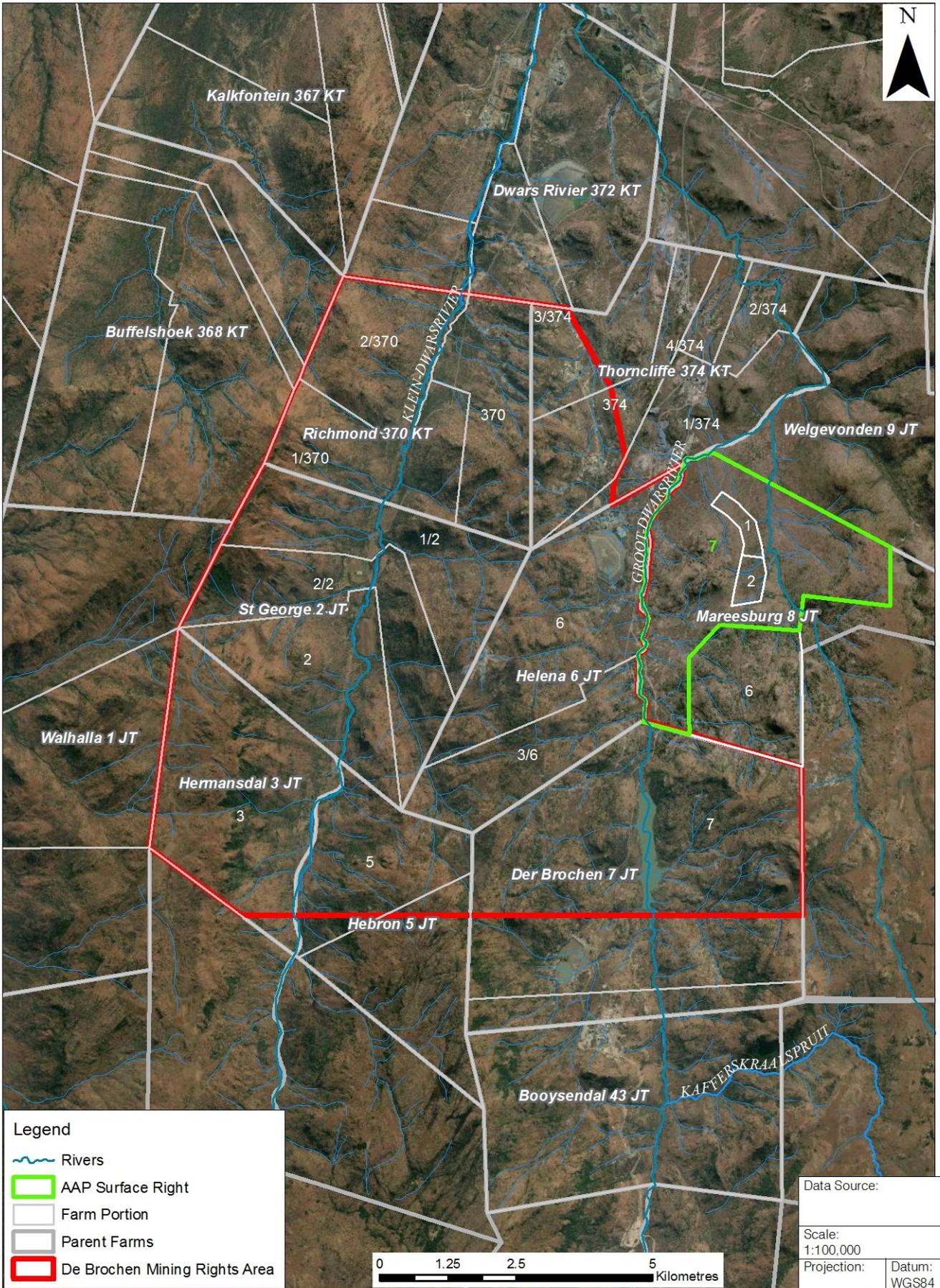
3.1 Locality and property description

The Der Brochen-Mototolo Mine Complex is located approximately 30 km south of the town of Steelpoort (approximately 40 km by road) and 35 km west of Mashishing (Lydenburg) (approximately 65 km by road), in the Limpopo Province. The project area falls within the Greater Tubatse Local Municipality, under jurisdiction of the Greater Sekhukhune District Municipality. The nearest main towns to Der Brochen-Mototolo Mine Complex are listed in Table 3-1.

Table 3-1: Location of Der Brochen-Mototolo Mine Complex in relation to adjacent towns

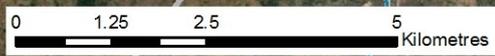
Town	Approximate distance and direction in relation to the Der Brochen-Mototolo Mine Complex (line of sight)
Steelpoort	30 km north
Roosenekal	25 km south-west
Mashishing	35 km east
Burgersfort	43 km north-east
Groblersdal	74 km west

Refer to Figure 3-1 for a locality map of the Der Brochen-Mototolo Mine Complex.



Legend

- Rivers
- AAP Surface Right
- Farm Portion
- Parent Farms
- De Brochen Mining Rights Area



Data Source:

Scale:
1:100,000

Projection: Datum:
WGS84

Central Meridian/Zone:



DER BROCHEN MINING PROJECT
DER BROCHEN-MOTOTOLO MINE COMPLEX LOCALITY

Date: 04/05/2020 Compiled by: FOWL

Project No. 554304 Fig No. 3-1

The Der Brochen-Mototolo Mine Complex area extends across seven farms. The details and ownership of the farms are described in Table 3-2.

Table 3-2: Der Brochen-Mototolo Mine Complex property description

Farm name	Portion	Surface Owner	SG Code
Thornccliffe 374 KT	Remaining portion	Glencore Operations South Africa (Pty) Ltd	T0KT00000000037400000
	3	Glencore Operations South Africa (Pty) Ltd	T0KT00000000037400003
	7	Glencore Operations South Africa (Pty) Ltd	T0KT00000000037400007
Richmond 370 KT	1	Rustenburg Platinum Mines Limited	T0KT00000000037000001
	2	Rustenburg Platinum Mines Limited	T0KT00000000037000002
St George 2 JT	Remaining portion	Rustenburg Platinum Mines Limited	T0JT0000000000200000
	1	Rustenburg Platinum Mines Limited	T0JT00000000002000001
	2	Rustenburg Platinum Mines Limited	T0JT00000000002000002
Hermansdal 3 JT	Remaining portion	Johannes Jacobus Joubert	T0JT0000000000300000
Hebron 5 JT	Remaining portion	Booyensdal Platinum (Pty) Ltd	T0JT0000000000500000
Hebron 5 JT	1	Booyensdal Platinum (Pty) Ltd	T0JT00000000005000001
Helena 6 JT	Remaining portion	Rustenburg Platinum Mines Limited	T0JT0000000000600000
	3	Rustenburg Platinum Mines Limited	T0JT00000000006000003
Der Brochen 7 JT	Remaining portion	Rustenburg Platinum Mines Limited	T0JT0000000000700000
Mareesburg 8 JT	Ptn 7	Rustenburg Platinum Mines Limited	T0JT00000000008000007
<p>Grey shade indicates properties associated with the mining right's area of the previously known Mototolo Mine JV, and the Red line indicates properties associated with the original Der Brochen mining right's area, as shown in Figure 3-1.</p>			

As indicated in Table 3-2, AAP-RPM also holds the surface right to Portion 7 of the farm Mareesburg 8 JT which falls outside, but adjacent to, AAP-RPM's mining right's area associated with the original Der Brochen Project. The existing authorised Mareesburg tailings storage facility (TSF), associated return water dams (RWDs) and tailings-return water pipeline system, which form part of the Der Brochen Project, are located on this farm and relevant farm portion.

3.1.1 Area of mining authorisation

The Der Brochen mining right (LP 30/5/1/3/2/1 (182) MR) held by AAP-RPM covers the following farms and relevant portions, as detailed in Table 3-2:

- Richmond 370 KT (Remaining extent, portions 1 and 2);
- St George 2 JT (Remaining extent, portions 1 and 2);
- Hermansdal 3 JT (Remaining extent);
- Hebron 5 JT (Remaining extent and portion 1);

- Helena 6 JT (Remaining extent and portion 3); and
- Der Brochen 7 JT (Remaining extent).

With respect to the farm portions associated with the previously known Mototolo Mine JV, AAP-RPM lodged a Section 102 application in accordance with the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) with the Department of Mineral Resources (DMR) on 02 November 2019 to amend the Der Brochen mining right's area to include the farm portions associated with the Mototolo Mine.

3.1.2 Minerals mined and mining rights

AAP-RPM is permitted to mine primarily platinum group metals (PGM's) and related minerals such as chrome in respect of the Der Brochen mining right. Table 3-3 provides a breakdown of the minerals AAP-RPM is permitted to mine in respect of the farm portions covered by the Der Brochen mining right.

Table 3-3: Authorised minerals in respect of the Der Brochen mining right (LP30/5/1/3/2/1(182)MR)

Farm name	Portion	Mineral authorised for mining
Richmond 370 KT	Remaining extent, Portions 1 and 2	All precious and base metals and mineral substances of whatever nature
St George 2 JT	Remaining extent, Portions 1 and 2	All minerals
Hermansdal 3 JT	Remaining portion	All rights to precious metals, including but not limited to platinum, together with all other metals or minerals found in the ores of precious metals associated with the mining of precious metal reefs and horizons
Hebron 5 JT	Remaining portion and Portion 1	Platinum, palladium, rhodium, iridium, ruthenium, osmium, gold, silver, copper and nickel
Helena 6 JT	Remaining portion and Portion 3	Precious and base metals and minerals excluding chrome
Der Brochen 7 JT	Remaining portion	Platinum Group Metals and associated gold, silver, copper, nickel, excluding chromite or chrome ores, except where contained in residues or tailings

In light of AAP-RPM's acquisition of Glencore's undivided share in the Mototolo Mine JV, Glencore will transfer the portion of Glencore's mining right (LP30/5/1/2/2/176MR) relating only to chrome and PGMs in the UG2 reef on Portion 3, Portion 7 and the Remaining Extent of the farm Thornccliffe 374 KT to AAP-RPM through a separate Section 102 application.

3.1.3 Surrounding communities and mines

Several communities reside on the Der Brochen mining right area and immediate surrounding area. These are listed in Table 3-4 and their locality in relation to the Der Brochen-Mototolo Mine Complex is illustrated in Figure 3-2.

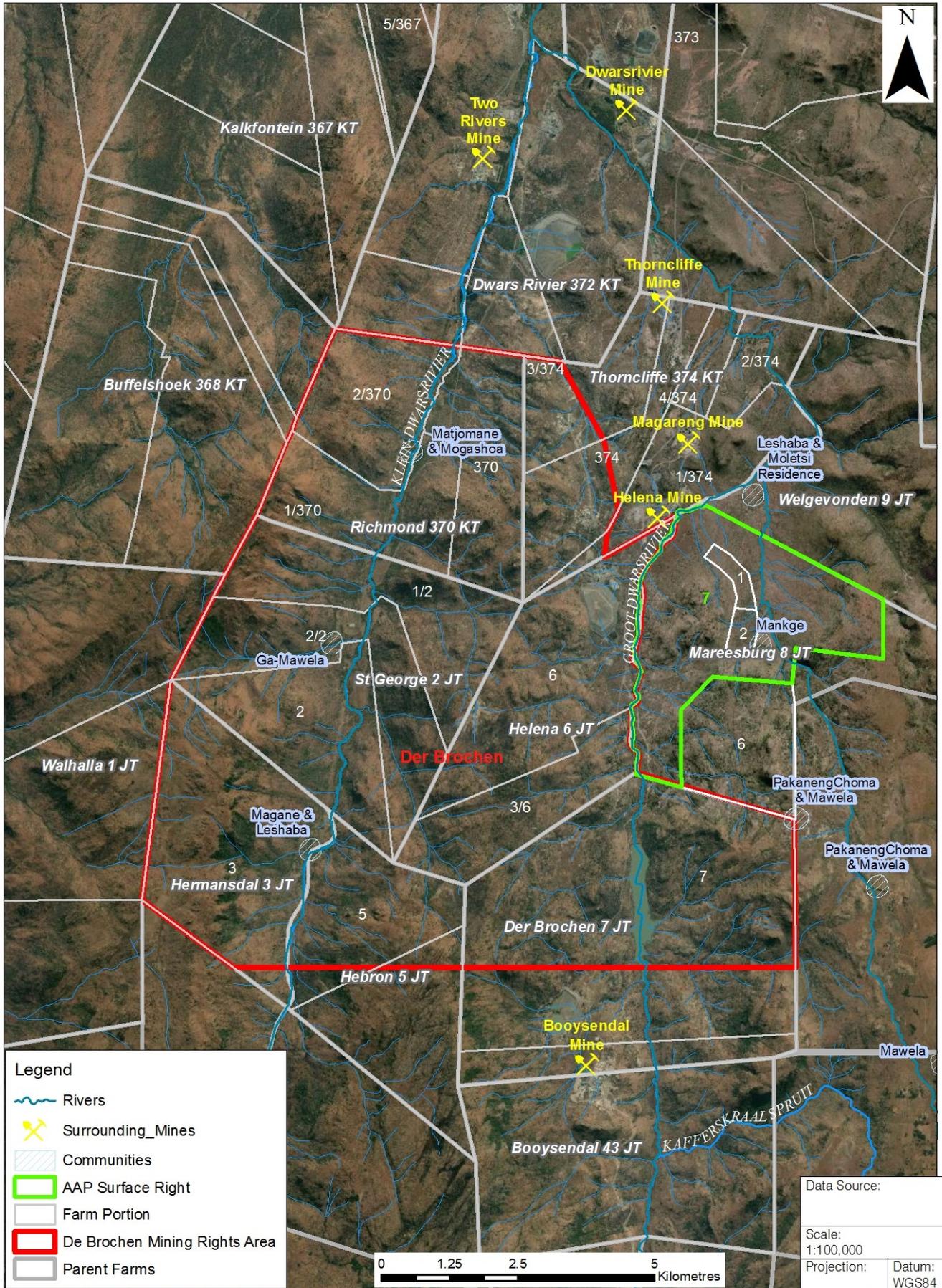
Table 3-4: Communities located within and around the Der Brochen mining right area

Communities	Farm name	Families
The Gamawela and Ditsabeng Tsa Moletsi community	St George 2 JT	Gamawela
	Hermansdal 3 JT	Magane and Leshaba
	Richmond 370 KT	Matjomane and Mogashoa
	Mareesburg 8 JT	Mankge
The Moletsi community	Welgevonden 9 JT	Leshaba
The Pakaneng Choma community	Schaapkraal 42 JT	Pakaneng, Choma
	Vygenhoek 10 JT	

The mines located in close proximity to the Der Brochen-Mototolo Mine Complex are listed in Table 3-5 and their locations shown in Figure 3-2.

Table 3-5: Surrounding mines around the Der Brochen-Mototolo Mine Complex area

Mine	Mine Owner	Distance and direction from Der Brochen-Mototolo Mine Complex
Tweefontein Mine	Samancor	14 km north
Dwarsrivier Mine	Assmang	10 km north
Two Rivers Platinum Mine	Impala Platinum-African Rainbow Minerals JV	9 km north-north-west
Magareng Mine	Glencore-Merafe Chrome JV	4 km north-east
Thorhcliffe Mine	Glencore	6 km north-east
Helena Mine	Glencore	2.5 km north-east
Booyesdal Mine	Northam Mines Limited	9 km south



Legend

- Rivers
- Surrounding_Mines
- Communities
- AAP Surface Right
- Farm Portion
- De Brochen Mining Rights Area
- Parent Farms

Data Source:
 Scale: 1:100,000
 Projection: Datum: WGS84
 Central Meridian/Zone:



3.2 Current and authorised operations

In general, the operation of the Der Brochen-Mototolo Mine Complex include the processing of platinum and chrome bearing ore at the existing Mototolo Concentrator Plant that is received from the underground workings at the Borwa and Lebowa shafts via an existing conveyor belt system. The Borwa and Lebowa shafts formed part of the previously known Mototolo Mine.

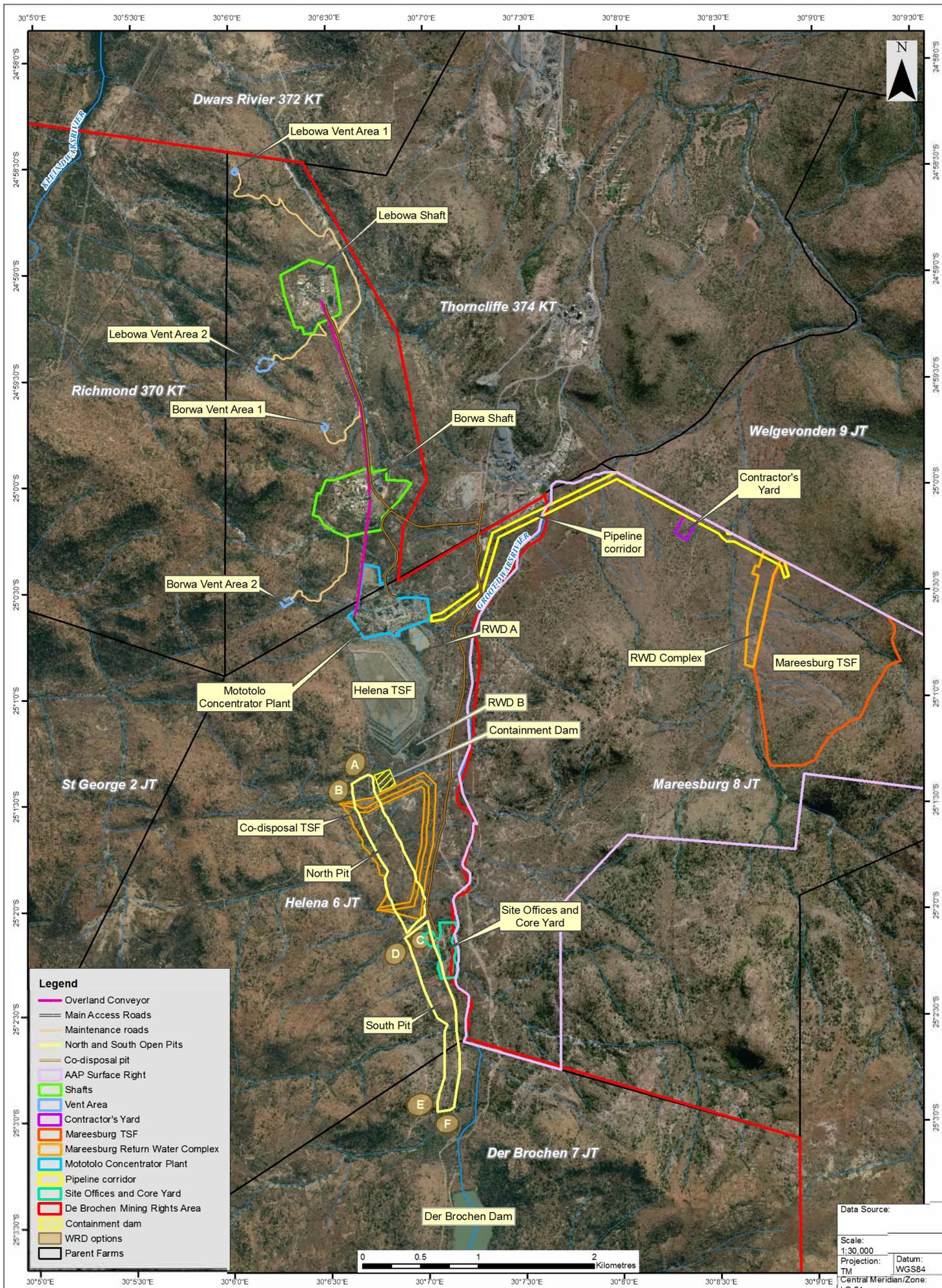
The final concentrate from the Mototolo Concentrator Plant is transported via trucks to the Polokwane Smelter for further processing, whilst the tailings material from the plant is disposed of on the existing Helena TSF and recently constructed Mareesburg TSF via pipeline systems. The water contained in the tailings' slurry settles on top of the TSFs and collects in the existing RWDs associated with the Helena TSF and Mareesburg TSF respectively. From the RWDs the water is pumped back to the Mototolo Concentrator Plant for reuse via return water pipeline systems.

Table 3-6 provides a summary of the main activities and infrastructure associated with the Der Brochen-Mototolo Mine Complex, as authorised through the Der Brochen Mine's approved Environmental Management Programmes (EMPr's) and associated Water Use Licences (WULs) as well as the Mototolo Mine's EMPr and associated WULs:

Table 3-6: Der Brochen-Mototolo Mine Complex's current and authorised activities and facilities

Historical, current and other authorised activities	
Existing activities and facilities	Activities previously authorised, but which has not yet commenced
<ul style="list-style-type: none"> • Underground mining at the Lebowa and Borwa decline shafts; • Taking water from underground and using it for mining purposes; • Operating conveyor systems; • Processing of platinum and chrome bearing ore at the Mototolo Concentrator Plant; • Deposition of tailings material onto the Helena TSF and operating the two associated RWDs; • Deposition of tailings material onto the Mareesburg TSF and operating the four associated RWDs; • Utilisation of the offices and access roads; • Construction and utilisation of contractors' laydown area; • Undertaking prospecting activities comprising of site preparation, drilling of prospecting boreholes, site rehabilitation and monitoring within the mining right area; • Abstraction of water from existing lawful use boreholes; • Abstraction of water from the Der Brochen Dam; • Waste management activities. 	<ul style="list-style-type: none"> • The Helena and Richmond wellfields (<i>only two of the authorised boreholes per well field currently in use</i>); • Two Open Pits (Northern and Southern Pits) and associated waste rock dumps (WRDs) and pollution control dam; • Re-routing of a 132 kV powerline; • Fish raceways; • A Co-Disposal Facility (<i>tailings disposal with a rock embankment in the north pit</i>).
	Activities authorised and completed

The current and authorised activities and infrastructure as summarised above are illustrated in Figure 3-3. The sections below provide further details of the activities and infrastructure listed above.



3.2.1 Mining related activities and surface infrastructure

For the purpose of this section the Der Brochen-Mototolo Mine Complex have been divided into the following three key areas, as illustrated in Figure 3-3:

- The underground mining operation;
- The Mototolo Concentrator area; and
- The Der Brochen project.

Details of the key activities and infrastructures associated with the above listed areas are provided below.

3.2.1.1 *Underground mining operation*

PGMs and chrome are mined underground through the bord-and-pillar mining method at both the existing Lebowa and Borwa decline shafts, located on Portion 3 and Portion 7 of the farm Thornccliffe 374 KT, respectively. The underground mining operation was designed to produce 132 000 ounces of platinum and 82 000 ounces of palladium per annum over the 20-year life of the mine. Mining commenced in 2005/6. Each shaft system produces roughly 100 000 tons per month.

The underground mining operation has developed into a fully mechanised operation where the UG2 horizon is mined exclusively at approximately 450 metres below surface. Each shaft is equipped with two ventilation shafts

Ore abstracted from the two shafts is transported by overland conveyor to the existing Mototolo Concentrator Plant for processing.

Each shaft operation consists of the following infrastructure (the shafts are almost identical in terms of infrastructure):

- Security guard house;
- Parking area with car ports;
- Conference Hall;
- Main office buildings (one for each shaft);
- Workshop and wash bays;
- Diesel and oil storage and handling facilities at each shaft;
- The mining complex's with associated infrastructure (e.g. lamp room and change houses);
- Compressor houses;
- Electricity sub-stations at each shaft;
- Overhead powerlines;
- One explosive depot and explosive shaft head delivery bay;
- Emulsion bays;
- Vent fans;
- Laundry;
- A high-tension substation;
- Cable yard;
- Transformer bays;
- Salvage yard;
- Overland conveyor systems;
- Sewage treatment plants;
- Potable water treatment plants;
- Storm water dams;
- Access and maintenance roads.

3.2.1.2 Mototolo Concentrator area

The Mototolo Concentrator area consists of the Mototolo Concentrator Plant and associated infrastructure as well as the Helena TSF and its associated infrastructure. As the Mareesburg TSF is also linked to the Mototolo Concentrator Plant area, details of the Mareesburg TSF is also provided under this section.

Mototolo Concentrator Plant

Ore is transported via overland conveyors from the Lebowa and Borwa shafts to the Mototolo Concentrator Plant, located on the remaining extent portion of the farm Helena 6 JT, where it is stored in silos before being fed into the concentrator plant.

The ore is conveyed to the milling area where it undergoes milling and flotation. The flotation circuits produce a concentrate, which is pumped as slurry to the concentrate thickeners, where it is partially dewatered before it is transported via trucks to the Polokwane Smelter for further processing. The tailings material from the plant is disposed of on the existing Helena TSF and recently constructed Mareesburg TSF via pipeline systems. The water contained in the tailings' slurry settles on top of the TSFs where it drains into the penstock and collects in the existing RWDs associated with the Helena TSF and Mareesburg TSF respectively. From the RWDs the water is pumped back to the Mototolo Concentrator Plant for reuse via return water pipeline systems.

The Mototolo Concentrator Plant also produces a chromite concentrate which is pumped through a pipeline system to the chrome recovery spiral plant located within the Mototolo Concentrator area. From the chrome recovery spiral plant, the chrome product is stockpiled on site where it is collected and transported in trucks to a smelter for further processing.

Other surface infrastructure associated with the Mototolo Concentrator Plant area includes:

- Workshops;
- Offices, canteens, control rooms and change rooms;
- Run of Mine (RoM) stockpiles and silos;
- A substation;
- Water containment facilities;
- Water and electricity reticulation infrastructure;
- Stormwater management infrastructure;
- Storage facilities for dangerous goods;
- General stores;
- Access and maintenance roads;
- Security and access control points;
- Sewage treatment plant.

Helena TSF

Tailings from the Mototolo Concentrator Plant is pumped via a slurry delivery pipeline to the Helena TSF. The TSF has cut-off walls and trenches, paddocks and solution trenches, penstocks and under-drains. Seepage water is recycled back to the concentrator.

The water contained in the tailings settles out on top of the TSF where it drains into a penstock whereafter the water flows into two clay lined return water dams located below the TSF, i.e. RWD A and RWD B. RWD A has a storage capacity of 170 000 m³ (retention capacity of 15 days, well above the minimum three-day design requirements to cater for well-field water in future) and Return Water Dam B has a storage capacity of 35 000 m³ (retention capacity of three days).

Seepage from the dams is contained in two seepage sumps. Water from the sumps is pumped back to the return water dams.

Table 3-7 summarises the key characteristics of the Helena TSF.

Table 3-7: Characteristics of the Helena TSF

Characteristics	Approved values and units
Ore processing rate	200 ktpm
TSF footprint	48.8 ha
Terminal height	63 m
Elevation	1 145 mamsl
Capacity of TSF	13.75 Mt

Mareesburg TSF

This section provides details on the infrastructure associated with the Mareesburg TSF operation; Mareesburg TSF and Return water dam complex.

The Mareesburg TSF is a lined hillside tailings storage facility where tailings from the Mototolo Concentrator Plant is deposited onto. The Mareesburg TSF is developed in phases. The characteristics of the Mareesburg TSF is described below.

- Total footprint area - 133 ha (excluding return water dam complex).
- Maximum operational deposition area - 76 ha;
- Starter wall height - approximately 14 metres;
- Maximum height at closure - 115 metres (elevation 1190.0 mamsl);
- Target dry density - 1.86 tonnes per cubic metre;
- Maximum storage capacity - 64.6 million cubic metres or 120.1 million tonnes; and
- Maximum operational life of TSF based on 250 Kt/month - 40 to 41 years (2018 –2060¹).

Tailings is delivered to the TSF via a steel pipeline system, consisting of three pipelines; two pipelines dedicated for tailings (one active and one standby pipeline) and one pipeline dedicated to transport water back from the TSF to the Mototolo Concentrator where the water is reused as process water. Scour valves have been placed at intervals along the delivery pipelines to allow for clearing and maintenance purposes.

The pipeline system is placed next to each other on concrete plinths within a 50 m wide corridor that stretches from the Mareesburg TSF all along the delivery pipeline system to the Mototolo Concentrator Plant. A maintenance road runs along the pipeline system and is also located within the corridor.

Water collecting on the surface of the Mareesburg TSF drains via the penstock into four lined return water dams located downslope and west of the TSF footprint area. The RWDs have been sized to accommodate the operating volume plus the 1:50 year storm event.

The RWDs, which are located next to each other, are linked to make sure that water cascades down to the Primary Dam where a suction line for the return water pump station is located. From there the water is pumped back to the Concentrator via the delivery pipeline system.

An 11 kV overhead powerline supplies the required electricity to the Mareesburg TSF operation. The powerline is located in the services corridor between the TSF and the Concentrator.

¹ Estimated end date – may vary due to production rate variations, operational maintenance and shut-down periods, and any other unforeseen circumstances that may require the Mototolo Concentrator not to operate.

For the construction of the Maresburg TSF, a contractor's yard has been established in close proximity to the construction site/TSF site consisting of pre-fabricated offices, kitchenette, ablution facilities, workshops, wash bays, stores and a bunded fuel storage area.

A salvage yard, equipped with a concreted surface and berms to capture possible contaminated runoff, is provided for at the contractor's camp for the temporary storage of general, industrial and hazardous waste generated during the construction phase.

3.2.1.3 Der Brochen Project

The Der Brochen Project consists of existing infrastructure and planned infrastructure for which authorisations have been obtained previously but the activities have not yet commenced.

Existing infrastructure and activities

Office, core yard and access road

An old farm house on the farm Helena 6 JT is being used as the project offices and there is a geological core yard located to the north-west of the offices. This area is accessible via a gravel access road, which is linked to the existing main tar road.

Prospecting

Prospecting activities are undertaken within the Der Brochen Project's mining right area. This is an on-going activity and authorisation needs are covered in previous EIA/EMPr Amendment associated with the Der Brochen Project.

The main prospecting activities consist of pre-drilling (site preparation), drilling of exploration boreholes, site rehabilitation and monitoring. Other activities associated with prospecting include construction of temporary roads, clearings and levelling at drill pads and erecting the temporary camp sites (approximately 20 m x 20 m) near drill rigs. Once drilling is completed at a prospecting site, all temporary infrastructures are removed, waste material disposed of in the correct manner and the site rehabilitated.

Planned authorised infrastructure and activities

AAP-RPM is authorised to undertake certain additional mining related activities, but which have not yet commenced. These activities and the location of such activities are summarised in Table 3-8.

Table 3-8: Authorised activities, not yet commenced, associated with Der Brochen Project

Activity	Farm name and portion
North Pit	Helena 6 JT, Portion 3 and Remaining Extent
South Pit	Helena 6 JT, Portion 3; and Der Brochen 7 JT, Remaining Extent
Co-disposal Facility (CDF)	Helena 6 JT, Remaining Extent
Re-routing of 132 kV powerline	Helena 6 JT, Remaining Extent; Maresburg 8 JT, Portion 7; and Der Brochen 7 JT, Remaining Extent

Further details on the above listed authorised activities are provided below.

Open Pits (North and South Pits)

AAP-RPM is authorised to develop two open pits to mine through open-cast mining methods the near-surface layer of the Upper Group 2 (UG 2) Reef. The open pit operation will consist of a North Pit (life of mine 3.5 to 4 years) and a South Pit (life of mine 2 years) and will be operated as a 24-hour operation.

Based on geological studies it was found that the ore near the surface layer is unsuitable for processing in the Mototolo Concentrator and will be transported off site for processing. Ore production in both pits will be at 35 000 to 45 000 tonnes per month (tpm) respectively. The ore will be crushed in a mobile crusher. The crusher operation will consist of a crusher with a short conveyor feeding a stockpiling conveyor. There will be one pre-fabricated control room and one pre-fabricated office at each pit.

Ore from the proposed pits will be trucked and transported via the existing Booyensdal tar road to an off-site processing facility. It is also anticipated that night-time transport of ore will take place.

Power supply to the open pit operation will be sourced from the 132 kV overhead powerline.

Groundwater inflows into the North and South Pit operations will necessitate continuous dewatering of the pits during life of mine.

Co-Disposal Facility (CDF)

AAP-RPM received environmental authorisation for the construction of a Co-disposal Facility (CDF) that will serve as an additional tailings storage facility. Waste rock from the open pits will be used to construct the embankment for the CDF, after the North Pit has been mined out. Following this, tailing will be deposited within the pit and the surrounding embankment wall. The selection and implementation of the CDF will be dependent on cost considerations and the timing of the availability of the completed structure to receive tailings from the Mototolo Concentrator .

Alternatively, should the CDF be considered not feasible, the North Pit will be closed in a manner similar to the South Pit. Closure of the South Pit will entail the backfilling of the pit with overburden stripped ahead of mining. Temporary Waste Rock Dumps (WRDs) to create an initial void will be provided on the edges of the pit highwall side and the waste rock will be dozed into the pit to fill the final void. The majority of the pit will be backfilled during operations, with this roll over mining method being practiced.

If the CDF is to be constructed, an underdrain system at the highwall/footwall using drainage pipes connected to the second compartment of the sump at the southern corner of the North Pit will be installed. The tailings water reporting to the sump will be pumped to the main sump and from there to the Helena RWD for recycling to the Mototolo Concentrator.

If the CDF is not to be constructed the seepage water, considered to be polluted, will be pumped to the surface containment dam situated to the north of the North Pit and from there transferred to the Mototolo Concentrator, after settling, for reuse as process water in the Concentrator.

Re-routing of a 132 kV powerline

One of Eskom's existing 132 kV powerlines runs along the western side of the Groot-Dwars River in the vicinity of the open pit areas. To accommodate the South Pit, this powerline will be re-routed to run along the eastern side of the river Groot Dwars River. The re-routing of the 132 kV powerline will be undertaken by Eskom.

3.2.2 Water supply

3.2.2.1 Underground operation

Potable water for domestic use at the Lebowa and Borwa decline shafts is supplied by boreholes as authorised in the existing WULs (refer to Section 4.3 for further details), as well as from the authorised Lebalelo containment dam located at the Mototolo Concentrator. Groundwater seeping into the underground working areas is authorised to be stored and reused for mining purposes.

3.2.2.2 Mototolo Concentrator & Der Brochen Project

Raw water is supplied to the Mototolo Concentrator by the Lebalelo Water Users Association (LWUA) via the Lebalelo pipeline. The water is stored in a raw water dam situated at the Mototolo Concentrator area.

Make-up water supply for the Mototolo Concentrator includes tailings return water (from the Helena TSF and Mareesburg TSF) and final treated sewage effluent.

Water supply to the Der Brochen Mine will be mainly from boreholes of the Helena and Richmond well-fields. Only two boreholes per Wellfield are currently in use.

Water for the current approved prospecting activities undertaken within the Der Brochen Mining Right area, is sourced from the existing, authorised boreholes.

3.2.3 Electricity supply

Electricity to the Der Brochen-Mototolo Mine Complex is supplied by Eskom from the Der Brochen Distribution Sub-station that is fed from the Steenberg Distribution Sub-station via an existing 132 kV overhead powerline.

The Steenberg Distribution Sub-Station is connected to the Simplon Main Transmission Sub-station fed from the Arnot power station by a 400 kV powerline.

At the Der Brochen Distribution Sub-Station provision has been made for a 33 kV off-take and 11 kV off-take, which feed the Mototolo Concentrator operation and the Lebowa and Borwa decline shafts, respectively. Electricity to offices and other project related infrastructure such as the Helena TSF and Mareesburg TSF are supplied via overhead powerlines fed by the off-takes from the Der Brochen Distribution Sub-Station.

3.2.4 Sanitation

Sewage treatment plants are located within the Mototolo Concentrator area as well as at the Lebowa and Borwa shaft areas. Each sewage treatment plant consists of a package plant. Treated effluent is directed to the settler dams located at each shaft. Treated effluent is directed back to the Settlers ponds to be underground working where it is used as process water for drilling purposes. Wet sludge from each of the sewage treatment plants is removed from site by an external contractor.

Sewage effluent at the project offices and the Der Brochen security gate is managed through the use of septic tanks. Here wet sludge is also removed from site by an external contractor.

3.2.5 Access to site

The Der Brochen-Mototolo Mine Complex is surrounded by a road network with the R577 regional road north and east of the mining area and the R555 regional road aligned in a north – south direction to the west. The main access road to the Der Brochen-Mototolo Mine Complex, that consists of a tar road of approximately 8 km long, intersects at a T junction with the R577.

The main access road is also used by other mines in the vicinity to transport goods and people to and from these mining activities. The main access road includes a section of road from the R577 to the existing dual security gate, which is shared between Der Brochen Project (AAP-RPM) and the Booyendal Mine (Northam Platinum Limited). Each company has a dedicated security control point where visitors and staff enter and exit.

Beyond the dedicated security control point however, both streams of traffic merge onto one road and proceed further south until the Der Brochen Project access road splits onto a gravel road.

Access to the Mototolo Concentrator area is obtained via the main access road that turns in a westerly direction, just before the dual security gate access point. Along this road access is also obtained to the Lebowa and Borwa decline shafts.

3.3 Authorised listed activities

3.3.1 NEMA Listed Activities

In 2006, the Minister of Environmental Affairs published a list of activities under NEMA's EIA Regulations that would require environmental authorisations prior to the commencement of that activity. However, both the Der Brochen Project and the Mototolo Mine JV commenced in 2001 and 2003 respectively.

Yet as the Brochen Project and the Mototolo Mine developed and expanded, some of the proposed infrastructure/activities required environmental authorisation in terms of NEMA. Table 3-9 presents a list of the NEMA listed activities for which environmental authorisation was required and obtained in accordance with the NEMA EIA Regulations in respect of the Der Brochen-Mototolo Mine Complex. Refer to Appendix 3 for Der Brochen-Mototolo Mine Complex's authorisation listed activities map.

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Table 3-9: Listed activities that have been authorised previously

Activity description	Activity footprint / extent	Listed activity	Relevant Listing Notice
Mototolo Mine's Listed Activities			
Four new ventilation shafts and associated access roads at Mototolo Mine	Combined 6400 m ²	Activity 20: Any activity that requires a mining right or renewal thereof as contemplated in sections 22 and 24 of the MPRDA.	GNR 545 (18 June 2010) - Listing notice 2
Above ground oil storage facilities at Lebowa and Borwa shafts.	<u>Borwa shaft:</u> 2 x 14 000 ℓ 1 x 4 500 ℓ <u>Lebowa shaft:</u> 2 x 14 000 ℓ 1 x 4 500 ℓ	Activity 10 (a)(ii)(bb): The construction of facilities or infrastructure for the storage or storage and handling of a dangerous good where such storage occurs in containers with the combined capacity of 30 but not exceeding 80 cubic meters.	GNR 546 (18 June 2010) - Listing notice 3
Der Brochen Project's Listed Activities			
Tailings delivery and return water pipelines from the Mototolo Concentrator to the Mareesburg TSF and CDF.	<u>Mareesburg TSF:</u> Length of pipelines: 2.77 km Internal diameter: <ul style="list-style-type: none"> • Tailings lines: 0.35 m • Return water: 0.35 m Peak throughput: <ul style="list-style-type: none"> • Tailings lines: approximately 150 ℓ/s • Return water: approximately 100 ℓ/s <u>CDF:</u> Length of pipelines: ± 1.5 km Internal diameter: <ul style="list-style-type: none"> • Tailings line: 0.3 m • Return water: 0.3 m Peak throughput: <ul style="list-style-type: none"> • Tailings line: approximately 120 ℓ/s • Return water: approximately 100 ℓ/s 	Activity 9: The construction of facilities for infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water – (i) with an internal diameter of 0.36 metres or more; or (ii) with a peak throughput of 120 litres per second or more, excluding where: a) such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or b) where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.	GNR 544 (02 August 2010) - Listing notice 1
The pipelines to transport tailings material from the Mototolo	The construction of the river/stream crossing required the excavation of	Activity 18:	GNR 544 (02 August 2010) - Listing notice 1

Activity description	Activity footprint / extent	Listed activity	Relevant Listing Notice
Concentrator to the Mareesburg TSF and return water back to the Concentrator crosses the Groot-Dwars River and tributaries including the Mareesburg Stream.	more than 5 m ³ river bed material in a watercourse.	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from: (i) a watercourse; (ii) the sea; (iii) the seashore; (iv) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing, dragging, excavation, removal or moving: (i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (ii) occurs behind the development setback line.	
Roads required for the Der Brochen Project	<ul style="list-style-type: none"> • Mine roads around the North and South pits (12 m wide); • Service road alongside the Mareesburg TSF pipeline. The Mareesburg pipeline corridor is 50 m wide) 	Activity 22: The construction of a road, outside urban areas: (i) with a reserve wider than 13.5 metres or, (ii) where no reserve exists where the road is wider than 8 metres, or (iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	GNR 544 (02 August 2010) - Listing notice 1
Part of the existing Eskom 132 kV powerline may be demolished and re-routed to accommodate the proposed Open Pits.		Activity 27: The decommissioning of existing facilities or infrastructure or – (i) electricity generation with a threshold of more than 10 MW; (ii) electricity transmission and distribution with a threshold of more than 132 kV; (iii) nuclear reactors and storage of nuclear fuel; (iv) activities, where the facility or the land on which it is located is contaminated;	GNR 544 (02 August 2010) - Listing notice 1

Activity description	Activity footprint / extent	Listed activity	Relevant Listing Notice
		(v) storage, or storage and handling, of dangerous goods of more than 80 cubic metres.	
A Water Use Licence is required for the disposal of waste or water containing waste in a manner which may detrimentally impact on a water resource.	Waste or water containing waste is disposed of at: <ul style="list-style-type: none"> • Pollution control dams at the Mareesburg TSF; • Waste rock dumps at Open pits; • Ore stockpiles at Open pits; and • Pollution control dam at Open pits and Co-disposal area. 	Activity 5 The construction of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	GNR 545 (02 August 2010) - Listing notice 2
The Der Brochen Project expanded to include the following structures: <ul style="list-style-type: none"> • North pit (including WRDs): 47 ha • South pit: (including WRDs): 45 ha • CDF: 35 ha (additional to already disturbed North pit) • Mareesburg TSF: 150 ha 	A total footprint of 277 ha of undeveloped land was altered for industrial use as part of the Der Brochen Project.	Activity 15 Physical alteration of undeveloped, vacant or derelict land for residential, retail commercial, recreational, industrial, or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for: <ul style="list-style-type: none"> (i) linear development activities, or (ii) agriculture or afforestation where activity 16 in the Schedule will apply. 	GNR 545 (02 August 2010) - Listing notice 2
A total footprint of 277 ha of undeveloped land was altered for industrial use as part of the Der Brochen Project.	As the Der Brochen Project is situated in the Sekhukhune land Centre of Plant Endemism and more than 300 m ² will be developed, this activity was triggered.	Activity 12 The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.	GNR 546 (02 August 2010) - Listing notice 3
<i>This report is compiled in support of a NEMA EIA Regulation 31 amendment; therefore, no new activities have been included as part of the EMPr consolidation process.</i>			

3.3.2 NEM:WA Listed Activities

Similar to the NEMA Listed Activities described above, the Minister of Environmental Affairs also published a list of waste management activities in November 2013 (GNR 921) that have, or are likely to have, a detrimental effect on the environment. The list was later updated in July 2015 to include additional waste management activities relating to residue stockpiles and residue deposits.

In order to undertake any of the listed waste management activities, a licence is required to be obtained before such activities may commence from the competent authorities in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA).

With regards to the Der Brochen Project, none of the waste management activities undertaken on site required authorisation under NEM:WA as the waste management activity either did not exceed the waste volumes/thresholds stipulated in the Listed Waste Management Activities or the relevant NEM:WA Regulations (GNR 921, as amended) were not yet published and promulgated.

In terms of the Lebowa and Borwa shafts, both operations received separate Waste Management Licences (WMLs) from the Department of Environmental Affairs in March 2010 for the storage of general and hazardous waste on site. Details of the waste management listed activities authorised by the relevant WMLs are provided in Table 3-10 below.

Table 3-10: Lebowa and Borwa shaft's authorised waste management activities

Shaft	Lebowa Shaft	Borwa Shaft
Licence Number	12/9/11/L225/5	12/9/11/L224/5
Licence Class and description	H:H – Hazardous waste landfill that can receive high risk waste	H:H – Hazardous waste landfill that can receive high risk waste
Name of waste management facility	Mototolo North Salvage Yard	Mototolo South Salvage Yard
Location	Portion 3 of the farm Thorncliffe 374 KT	Portion 7 of the farm Thorncliffe 374 KT
Authorised waste management activity	The temporary storage of general and hazardous waste	The treatment and transfer of general and hazardous waste

4 Policy and legislative context

This section provides a brief overview of the regulatory requirements that must be met by the EMPr consolidation and alignment project.

4.1 National Environmental Management Act (Act 107 of 1998)

In order for AAP-RPM to operate the Der Brochen-Mototolo Mine Complex under a single Environmental Authorisation (EA), AAP-RPM has applied for the amendment of the Der Brochen Project's EA to the DMRE to include the activities and properties associated with Mototolo Mine's EAs.

The amendment of Der Brochen Project's EA will be undertaken through a non-substantive amendment process in accordance with Regulation 31 of the Environmental Impact Assessment (EIA) Regulations under the National Environmental Management Act's (Act 107 of 1998) (NEMA).

Regulation 31 of the NEMA EIA Regulations states that:

An environmental authorisation may be amended if the amendment will result in a change to the scope of a valid environmental authorisation where such change will result in an increased level or nature of impact where such level or nature of impact was not-

- (a) assessed and included in the initial application for environmental authorisation; or*
- (b) taken into consideration in the initial environmental authorisation;*

and the change does not, on its own, constitute a listed or specified activity.

The consolidation process does not make provision for the inclusion of additional infrastructure or activities not currently contained in Der Brochen Project's or Mototolo Mines approved EMPr's. Therefore, no new listed or specified activities will be triggered by the consolidation and alignment process.

4.2 Mineral and Petroleum Resources Development Act (Act 28 of 2002)

In order for AAP-RPM to operate the Der Brochen-Mototolo Mine Complex under a single concise EMPr, AAP-RPM is required to amend and align the Der Brochen Project's approved EMPr to include the approved Mototolo Mine's EMPr. The amendment of the Der Brochen Project's EMPr will need to be undertaken in accordance with Section 102 of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA).

In addition to the above, AAP-RPM also lodged a Section 102 Application through DMR SAMRAD System (Ref: LP-00066-MR/102) on 02 November 2019, to amend the Der Brochen mining rights to include the farms and relevant farm portions associated with Mototolo Mine.

4.3 National Water Act (Act 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) is the primary legislation regulating both the use of water and the pollution of water resources. It is applied and enforced by the Department of Water and Sanitation (DWS).

The Der Brochen-Mototolo Mine Complex is operated under four approved water use licences (WULs) in terms of the NWA relating to the Mototolo Concentrator and Der Brochen Project respectively. AAP-RPM will be consolidating the WULs in the near future.

The existing approved WULs applicable to the Der Brochen-Mototolo Mine Complex are presented in Table 4-1 with the main activities covered per WUL indicated in the table.

Table 4-1: Water Use Licences relating to the Der Brochen-Mototolo Mine Complex

Licence and file no.	Date of issue	Licensee	Activities (existing and operational unless indicated otherwise)
2011 WUL			
WUL: 24072959 File: 16/2/7/B400/C100/1 and Amendment Licence No. 24072959	11 April 2011	AAP-RPM: Mototolo Joint Venture*	<ul style="list-style-type: none"> • Mototolo Concentrator • Helena tailings storage facility (TSF) • Helena and Richmond wellfields (not developed) • Existing lawful use boreholes • Flow monitoring weirs • Helena and Richmond shafts (not constructed)
	26 May 2016	AAP-RPM: Mototolo Joint Venture*	
Amendment Licence No. 24072959	6 July 2018	AAP-RPM: Mototolo Joint Venture*	<ul style="list-style-type: none"> • Abstraction from Der Brochen Dam for operational phase of Der Brochen Mine
2016 WUL			
WUL: 04/B41G/CI/4141 File: 27/2/2/B741/8/4	22 February 2016	AAP-RPM: Mototolo Joint Venture*	<ul style="list-style-type: none"> • Mototolo Concentrator access road crossing and watercourse diversion • Helena TSF irrigation and watercourse diversion
Amendment Licence No. 04/B41G/CI/4141	8 May 2018		
2017 WUL			
WUL: 06/B41G/ABCFGIJ/5329 File: 27/2/2/B741/9/9	10 May 2017	AAP-RPM: Der Brochen	<ul style="list-style-type: none"> • Der Brochen open-pit mining (only North pit is planned to be developed) • Mareesburg TSF (under construction; Phase 1 of 7 completed and in operation) • Watercourse diversions and crossings (pipelines, powerlines and access roads) largely constructed) • Helena TSF scavenger wells (installed)
2019 WUL			
Mototolo Mine WUL 06/B41G/IACGJ/8944 File: 27/2/2/B741/19/1**	26 April 2019	RPM: Mototolo Mine	<ul style="list-style-type: none"> • Mototolo Mine: Lebowa and Borwa shafts • Watercourse crossings and diversion • Abstraction from authorised boreholes • Storm water dams

*Appendix I, Condition 3 of the 2011 and 2016 WULs requires "The Licensee must immediately inform the Provincial Head of any change of name, address, premises and/or legal status." A notification letter from Glencore, and jointly signed by Glencore and RPM, was submitted to DWS on 21 November 2018, to inform DWS of the disposal of the Joint Venture to RPM. The Joint Venture no longer exists and thus the Licensee name requires amending (to be addressed in future consolidation of the WULs).

**Replaces WUL No, 04/B41G/ACGIJ/1676, issued on 18 May 2012, which was split and reissued as two separate WULs, one for Mototolo Mine (now owned by RPM) and one for Thornccliffe Mine (retained by Glencore).

In addition to the application to amend the Der Brochen Project's EMPr and EA to include the Mototolo Mine's EMPr and associated EA, AAP-RPM will also amend their current approved Water Use Licence for the Der Brochen Project with the DWS to include the water uses associated with the Mototolo Mine.

4.4 National Environmental Management Waste Act (Act 59 of 2008)

The National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) commenced on 1 July 2009. In terms of this Act, all listed waste management activities must be licensed and in terms of Section 44 of the Act, the licensing procedure must be integrated with the environmental impact assessment process.

Government Notice 921, which commenced on 29 November 2013, lists the waste management activities that require licensing in terms of the NEM:WA. Licence applications for activities involving hazardous waste must be submitted to the national authority, the Department of Environmental Affairs (DEA) and those for general waste to the provincial authority.

One of the major amendments effected by the National Environmental Management Amendment Act 2014 is the insertion of section 24S, as a result of which the NEM:WA became applicable to mining residue deposits and residue stockpiles, as follows:

“Management of residue stockpiles and residue deposits 24S.

Residue stockpiles and residue deposits must be deposited and managed in accordance with the provisions of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), on any site demarcated for that purpose in the environmental management plan or environmental management programme in question.”

Mining residues were classified as hazardous wastes by default in terms of Section 18, Schedule 3 of the National Environmental Management: Waste Amendment Act, 2014 (Act No. 26 of 2014) (NEMWAA), which commenced on 2 June 2014. In terms of Regulations GNR 632 and 633, which commenced on 24 July 2015, mining residues must be characterised and classified, and the design and management of residue stockpiles and deposits must be based on an assessment of the potential impacts and risks.

AAP-RPM does not hold a Waste Management Licence (WML) in respect of the Der Brochen Project, as the above-mentioned legislation was not applicable at the time of the initial application for environmental authorisation in respect of the Der Brochen Project.

Glencore was issued with a WML (Licence No. 12/9/11/L224/5) by the DEA on 23 March 2010 in respect of Mototolo Mine's Borwa Shaft operation's general and hazardous temporary storage facility located on Portion 7 of the farm Thorncliffe 347 KT.

Glencore was also issued with a separate WML (Licence No. 12/9/11/L225/5) by the DEA on 29 March 2010 in respect of Mototolo Mine's Lebowa Shaft operation's general and hazardous temporary storage facility located on Portion 3 of the farm Thorncliffe 347 KT.

Copies of the WMLs relating to the Mototolo Mine is provided in Appendix 4.

Refer to Table 3-10 for a summary of the waste management activities authorised through the WMLs.

With respect to the EMPr consolidation process, a Waste Management Licence will not be required as the consolidation process does not entail the inclusion of any new/additional waste related activities or infrastructure for the Der Brochen-Mototolo Mine Complex.

4.5 National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act 2004 (Act 10 of 2004) (NEM:BA) aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA, the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bio-

prospecting involving indigenous biological resources. The Act places severe restrictions on activities that could have adverse effects on threatened or protected species.

The Der Brochen-Mototolo Mine Complex falls within the Sekhukhune land Centre of Plant Endemism (SCPE). The SCPE is a micro-regional centre of plant endemism because of its exceptionally rich biodiversity and high degree of species endemism. Species are considered endemic because they are unique to a specific region (NSS, 2014).

In addition to the above, the study area is also located within a South African National Biodiversity Institute (SANBI) Priority Area as well as the Sekhukhune Mountainlands Threatened Ecosystem and Critical Biodiversity Area within the Limpopo Conservation Plan (C-Plan). It is recognised as the Highest Biodiversity Risk for Mining under the recently released (2013) Mining and Biodiversity Guidelines (NSS, 2014).

As the consolidation process does not provide for any new/additional infrastructure or activities not currently contained in the approved Der Brochen Project's or Mototolo Mines approved EMPr's, it is not anticipated that there will be any new/additional impact on the biodiversity of the project area.

4.6 National Environmental Management: Air Quality Act (Act 45 of 1965)

The main objectives of the National Environmental Management: Air Quality Act 2004 (Act No. 39 of 2004) (NEM:AQA) are to protect the environment by providing reasonable legislative and other measures to:

- Prevent air pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development in alignment with Sections 24a and 24b of the Constitution of the Republic of South Africa.

The Act has devolved the responsibility for air quality management from the national sphere of government to local spheres of government (district and local municipal authorities), who are tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and development of emissions reduction strategies.

The National Ambient Air Quality Standards (NAAQS) for common pollutants, as set in terms of the NEM:AQA. The National Dust Control Regulations (GNR 827), which were promulgated on 1 November 2013, define acceptable dust fall rates for residential areas as <600 (mg/m²/day) taken over a 30 day average (with no more than 2 exceedances per year, in non-sequential months), and non-residential areas as dust fallout >600<1200 (mg/m²/day) taken over a 30 day average (with no more than 2 exceedances per year, in non-sequential months).

In terms of the current operations and activities undertaken at the Der Brochen-Mototolo Mine Complex, an AEL is not required.

As the Consolidated EMPr will not require any surface infrastructure, it is anticipated that there will be no additional impact on air quality.

4.7 National Heritage Resources Act (Act 25 of 1999)

The National Heritage Resources Act aims to promote good management of cultural heritage resources and encourages the nurturing and conservation of cultural legacy so that it may be bestowed to future generations.

The Act requires all developers (including mines) to undertake cultural heritage impact assessment studies where cultural resources may be disturbed by development activities.

Numerous heritage assessments have historically been undertaken within the Der Brochen Project and Mototolo Mine areas, respectively. The location of the identified heritage sites within the Der Brochen-Mototolo Mine Complex has been included in Section 7.10 of this consolidated EMPr.

As the consolidation process will not provide for any additional infrastructure or activities not currently contained in the approved Der Brochen Project's or Mototolo Mines approved EMPr's, no new/additional impact on cultural and archaeological environment is anticipated.

5 Public participation process

The public participation process, as guided through NEMA and the 2014 EIA Regulations (as amended), is designed to provide information to and receive feedback from interested and affected parties (I&AP) throughout the environmental authorisation process, thereby providing stakeholders with an opportunity to raise concerns and make comments and suggestions regarding a proposed project.

The public participation process undertaken in respect of the Der Brochen-Mototolo Mine Consolidation process, is designed to provide sufficient and accessible information to I&APs in an objective manner in order to enable them to:

- Understand the context of the Consolidated EMPr;
- Become informed and educated about the overall project; and
- Raise issues of concern and/or suggestions for enhanced benefits.

The sections below provide an overview of the public participation process followed to date for the Der Brochen-Mototolo Mine EMPr Consolidation process.

5.1 Identification of I&APs

The 2014 EIA Regulations (as amended) require identification of and consultation with communities and I&AP's. I&APs for this consolidation project were identified through the pre-existing Der Brochen and Mototolo Mine I&AP registers.

The following state departments were also identified and recognised as commenting authorities on aspects of this Consolidated EMPr.

- Department of Water and Sanitation (DWS), Limpopo;
- Limpopo Department of Economic Development, Environment and Tourism (LEDET); and
- Department of Agriculture, Land Reform and Rural Development (DALRRD).

The EIA Regulations also requires that the I&AP register contain full contact details of all registered I&APs and that the register is submitted to the competent authority along with the final Consolidated EMPr. To maintain privacy of the registered I&APs for this project, the I&AP register included in this report does not contain contact details. Such details will be provided to the competent authority after the public review period of the Consolidated EMPr has lapsed and the report updated and finalised with all comments received from I&APs.

Refer to Appendix 5 for the I&AP register in respect of the Der Brochen-Mototolo Mine Consolidation project.

5.2 Project Announcement Phase including the availability of the Draft Consolidated EMPr for public review

As part of the public participation process, the draft Consolidated EMPr of the Der Brochen-Mototolo Mine Complex will be made available to all identified I&APs for a 30-day review period from

19 February to 20 March 2021. During the review period I&APs will have the opportunity to raise any comments or issues relating to the Der Brochen-Mototolo Mine Consolidated EMPr with the EAP.

Since none of the public libraries / public places have fully reopened due to COVID-19 and lockdown situation, an alternative method of making the Draft Consolidated EMPr available to the public had to be identified. Based on an assessment of available platforms, it was decided that SRK's website will be used for making the report available to the public.

All I&AP (as identified and described under Section 5.1) will be informed of the availability of the Draft Consolidated EMPr via SMS and the distribution of stakeholder letters via email. I&APs will be invited to request a telephonic consultation with the SRK project teams, if required, to discuss any questions or concerns relating to consolidation process and report.

All comments and issues received telephonically or in writing during the comment period will be incorporated into the Final Consolidated EMPr to be submitted to the DMRE for consideration.

5.3 Authority Decision Phase

Registered I&APs will receive written notification (via email and/or SMS) of the authority decision on the Final Consolidated EMPr including details on the appeal process should anyone wish to appeal the authority decision. An electronic copy of the decision from the DMRE will also be made available via SRK's website.

6 Motivation for current mining operation

Mining in the Limpopo Province forms a critical sector of the province's economy, contributing 22% to its Gross Domestic Product (GDP), owing to the rich mineral resource deposits located within the province.

The Bushveld Igneous Complex, which extends for 400 kilometres in the Limpopo Province, contains the world's largest known deposits of PGMs - platinum, palladium, rhodium, ruthenium, iridium and osmium. The geological complex further consists of the Merensky and UG2 Reefs as well as the Platreef in the northern extension. The Merensky Reef accounts for over 80% of the platinum mined in South Africa, with the highest PGM values being associated with the UG2 Reef which lies approximately 200 m to 300 m below the Merensky Reef.

The two shafts associated with the Mototolo Mine were developed on the western boundary of the farm Thorncliffe 347 KT (on Portions 3 and 7) to mine the UG2 layer for its high platinum content. The acquisition of Glencore's stake by AAP-RPM in the Mototolo Mine increases AAP-RPM's interest in a mechanised, low-cost, high quality resource, creating another major PGM hub for the mining company. The transaction unlocks significant opportunities for the Company in its wholly-owned Der Brochen resource, located downgradient of the Mototolo Mine.

This Consolidated EMPr includes the detail for all the existing and approved activities associated with the Der Brochen Project as well as the Mototolo Mine, as described in Section 3. All project alternatives and preferred site locations were assessed during the compilation of the respective original EIA Reports and EMPr's.

Furthermore, this Consolidated EMPr is compiled in support of a Regulation 31 application in terms of the NEMA's EIA Regulations of 2014, as amended, assists with the transfer of the Mototolo Mine EMPr and associated environmental authorisation into AAP-RPM's name.

7 Description of the environment

This section of the report presents an overview of the baseline environment within which the Der Brochen-Mototolo Mine Complex is located. Each environmental aspect is described holistically in relation to the entire complex area, however, where significant differences exist between the Der Brochen Project area and the Mototolo Mine environment distinctions are made.

7.1 Geology

The Der Brochen-Mototolo Mine Complex is located on the Eastern Limb of the Bushveld Complex in Limpopo, approximately 40 km south-east of the Steelpoort fault associated with the regional Rustenburg Layered Suite of the Bushveld Complex.

7.1.1 Mototolo Mine geology

The current underground mining operation is undertaken on the farms Thornccliffe 374 KT and Helena 6 JT, which are situated on the Critical and Main Zones of the Bushveld Complex. The main economic layers in this part of the Bushveld are the Merensky Reef (MR), the UG2 Chromitite Layer and the MG1 Chromitite Layer. The MR occurs between 165 and 170 m above the UG2 Chromitite Layer that is developed 350 m above the MG1 Chromitite Layer. The reefs also outcrop along the Groot Dwars River and dips to the west at 9 to 10 degrees. The regional strike of the layering is north-south parallel to the long axis within the valley.

Through the Lebowa and Borwa Shaft operations, the mine exploits the chrome layers in the UG1, UG2, Dwars River Chromite layer, MG4, MG3, MG2, MG1 and LG7, LG6, LG5, LG3, LG1. The LG6 gradually flattens from 15 - 16 degrees at surface to 12 degrees down-dip. This may be a reflection of the proximity of the floor rocks to the east.

A thin (less than 1 cm) chromitite leader or set of two leaders are present some 0 to 30 cm above the LG-6. In general, the LG-6 comprises:-

- A top section containing variable pyroxenite lenses and disseminations,
- A middle section of spotted, good quality chromitite,
- A lower section containing minor pyroxenite lenses and disseminations with a characteristic wavy lower contact.

No major faulting is evident, although some significant dolerite intrusion and minor faulting, with horizontal displacements has taken place within the reserve associated with the Lebowa and Borwa Shaft operations.

Magnetic anomalies were identified that are inferred as Dunite Pipes. Regional dolerite dykes that strike north-northeast, were determined from surface mapping and exploration boreholes. The most dominant structure in the area is a zone with a north-south trend underlying the Groot Dwars River. This zone appears to be narrowing towards the south.

7.1.2 Der Brochen geology

In terms of the Der Brochen Project area, approximately 80 % of the total area is underlain by both UG2 and MR reef horizons. Nearly 9 km of Upper Group 2 (UG2) reef and 13 km of Merensky Reef (MR) horizons outcrop within the Der Brochen Project area. The UG2 reef dips to the west at an average angle of 10 degrees on the farm Richmond 370 KT, on the northern and central portions of the farm Helena 6 JT, as well as on the farm Der Brochen 7 JT.

The MR is located at the top of a thick pyroxenite (approximately 5 m) sequence and is fairly consistent with the thin chromitite stringer located approximately 30 cm from the top of the Merensky pyroxenite/norite contact. The most prominent PGM mineralisation usually occurs within the upper two

metres of the pyroxenite. A second Merensky facies has been identified and is termed the “Sunk Facies”. These facies are known to occur fairly extensively on the farm Helena 6 JT and is characterised by mineralisation occurring at a lower stratigraphic position within the pyroxenite.

The UG2 reef is characterised by a single thick chromitite layer overlain by a pyroxene hanging wall. A series of chromitite bands/stringers classified as the Triplets occurs above the pyroxenite.

Exploitation of the reefs in the Der Brochen Project area is complicated by various features such as the rugged topography limiting easy access via declines, as well as geological features present in the region, in particular the St George Fault. The St George Fault displacement is approximately 35-41 m. Various dyke swarms have been delineated across the project area, being predominantly dolerite and diabase in composition and trending either north-northeast or north-south. The overall geological losses estimated (including internal waste) are 19.6% MR and 21.5% UG2.

7.2 Topography

The area is characterised by a rugged topography with steep gradients measuring between 940 m and over 2 000 m above mean sea level (mamsl). The prominent north-south trending Steenkamps Mountains extend across the Der Brochen-Mototolo Mine Complex area, with two deeply incised valleys lying in a north-south direction between the mountain ranges. Within these valley floors are the Groot-Dwars River in the east and the Klein-Dwars River in the west (both flowing northwards through the area). Relatively flat topography is limited to the few valley bottoms.

The highest elevation of 2 300 mamsl is located to the extreme south of the project area, and the lowest elevation of 1 035 mamsl is located to the northern drainage path of the Groot Dwars River.

7.3 Climate

The Der Brochen-Mototolo Mine Complex falls within the Highveld climatic region characterised by warm temperatures and summer rainfall events. The average daily maximum temperature for the region is 27°C in January and 17°C in July, and average daily minimum for the region vary from 13°C in January to 0°C in July (SRK, 2002). The average annual rainfall for this climatic region varies from 900 mm in the east to 680 mm in the west, while the average annual evaporation is 1 731 mm.

The sections below provide further details on the local climate conditions associated with the Der Brochen-Mototolo Mine Complex area.

7.3.1 Temperature

Summer temperatures are high, and infrequent frost occurs in winter. The average daily temperature ranges from 24.1°C in January to 12.4°C in July. The mean annual temperature is 19.5°C. Minimum, mean and maximum temperatures and humidity for Mashishing (weather station 0554816A7, period 2013) are provided in Table 7-1 below.

During the day, temperatures increase to reach maximum at about 15:00 in the late afternoon. Ambient air temperature decreases to reach a minimum at between 06:00 and 07:00.

Table 7-1: Minimum, maximum and mean temperature and humidity measured at Lydenburg (weather station 0554816A7).

Month	Jan	Feb	Mrt	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min humidity	46.8	46	37.3	43.7	36.5	37	31.9	27.5	27.2	32.5	41.8	40.4
Max humidity	94.9	95.8	94.2	94.8	94.5	94.8	91.5	89.5	88.1	88.1	91.5	93.1
Ave temp	24.4	23.8	22.7	19.9	15.9	13.2	12.4	15.9	18.6	21.5	22.2	23.6
Max temp	31.4	31.6	30.2	27.7	25.5	23.2	23.2	26	28.1	29.8	29.2	31
Min temp	18.1	17.6	16.2	12.9	7.4	4.5	3.5	7.3	10.1	14.2	16.1	17.8

7.3.2 Mean monthly and annual precipitation

Historical weather data was gathered from the closest South African weather stations, Mashishing (0554816A7) and Maartenshoop (Gauge W0593419), which are located approximately 35 km south-east and 0 km east of Der Brochen, respectively.

The average annual rainfall for the Der Brochen area is approximately 729 mm. Rainfall is almost entirely derived from heavy showers and thunderstorms that occurs mostly in the summer from October to April, with a maximum in January. The mean average evaporation rate for the area, however, exceeds the mean annual rainfall as indicated in Table 7-2

Table 7-2: Mean monthly rainfall and evaporation (mm)

Month	Mean monthly rainfall (mm)	Mean evaporation (mm)
Jan	133.2	176.0
Feb	87.9	154.7
Mrt	82.2	148.9
Apr	51.4	114.6
May	12.9	102.6
Jun	4.7	88.2
Jul	3.6	103.2
Aug	6.1	137.7
Sep	19.0	170.6
Oct	74.2	184.2
Nov	127.3	186.9
Dec	126.4	182.0
Ave	728.9	1749.6

7.3.3 Wind

The prevailing wind direction on the site is south-easterly with a >15% frequency of occurrence, as illustrated in Figure 7-1. Thermo-topographical induced airflow is also indicated in Figure 7-1 with significant differences evident between day-time and night-time wind field characteristics. The slope of the terrain accounts for the increased frequency of occurrence of northerly and north-westerly wind during the day-time and increased south-easterly winds during the night-time. The differential heating and cooling of the air along a slope typically results in down-slope (katabatic) flow at night, with low-level up-slope (anabatic) airflow occurring during the day (Airshed, 2014).

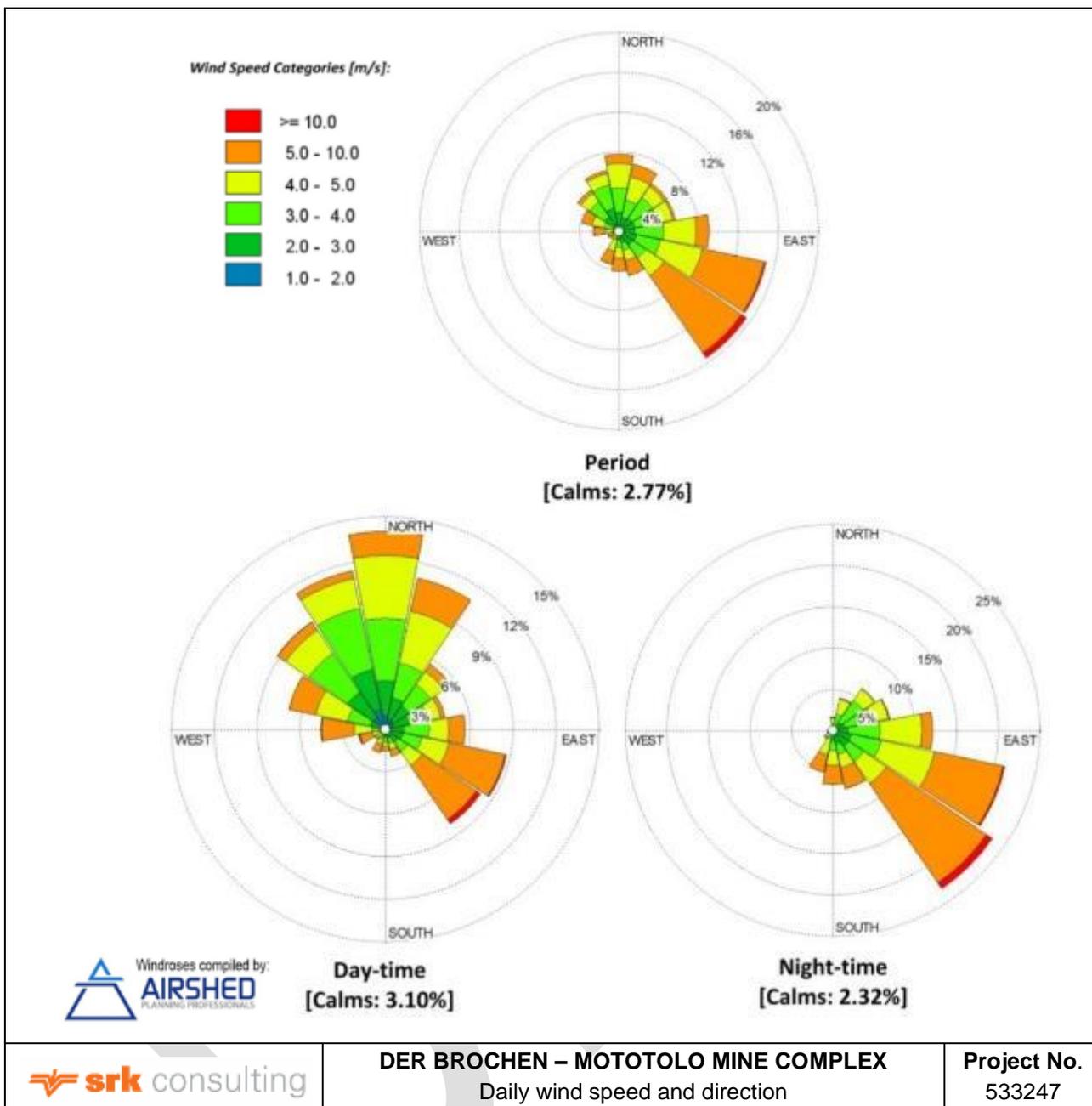


Figure 7-1: Period day and night time wind roses for the Der Brochen-Mototolo Mine Complex area (Airshed)

The meteorological data also showed that during the summer months, wind from the southeast sector dominates, with stronger winds of more than 6 m/s occurring. Infrequent but strong winds occur from the northerly and north-easterly sectors. During autumn, the winds are more frequent from the south-easterly sector. Winter months reflect an increase in flow from the south. During the Spring, wind flow is still predominant from the south-easterly with an increase in winds from the northern sector. Seasonal wind roses are provided in Figure 7-2

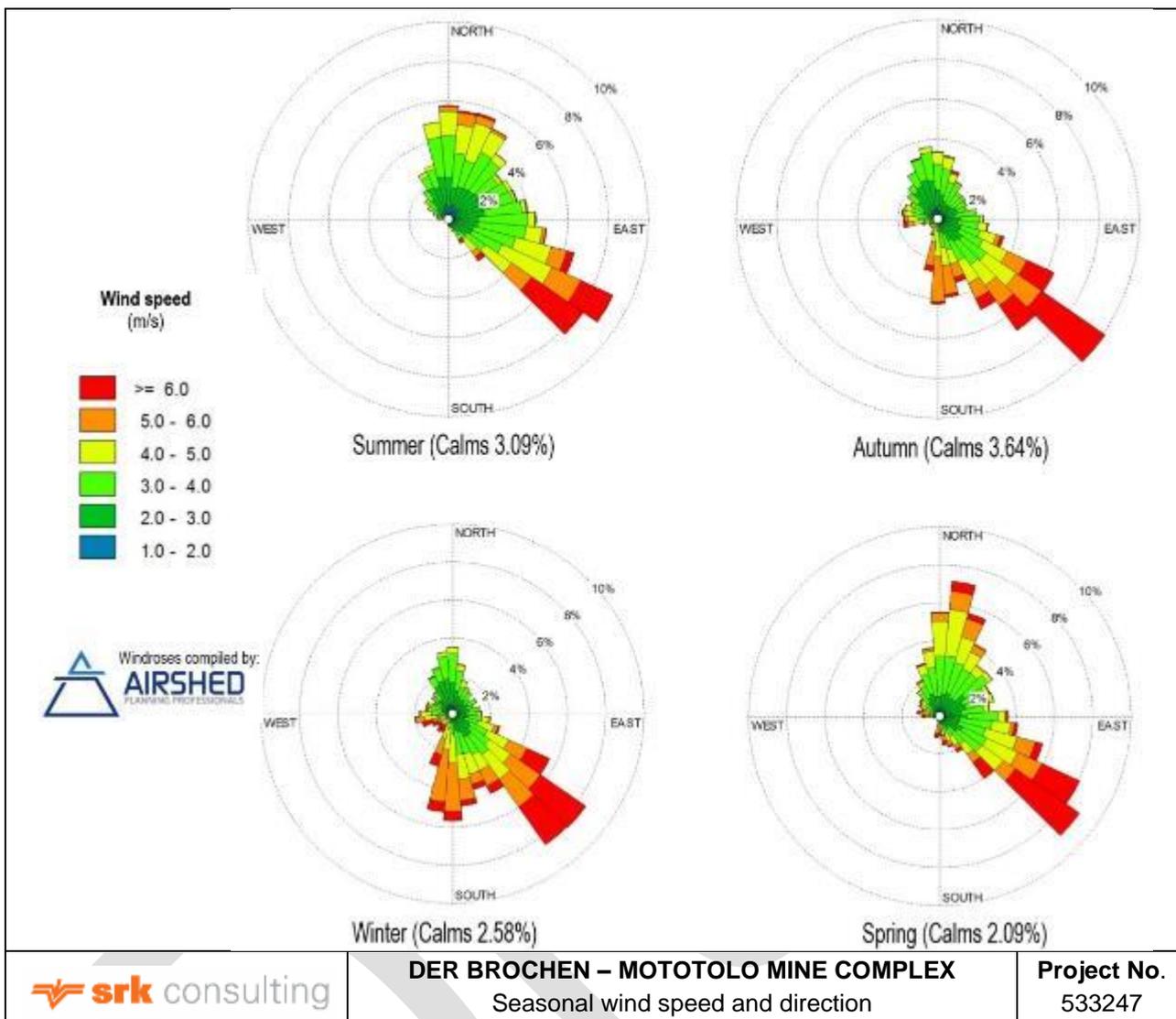


Figure 7-2: Seasonal wind roses (Airshed)

7.4 Air Quality

Airshed Planning Professionals (Pty) Ltd (Airshed) conducted numerous air quality impact assessment and baseline determination studies in respect of both the Der Brochen Project and the Mototolo Mine. Based on their studies various sources of air pollutant emissions were identified around the Der Brochen-Mototolo Mine Complex area.

7.4.1 Existing sources of emissions around the Der Brochen-Mototolo Mine Complex area

The sources of sulphur dioxide (SO₂) and oxides of nitrogen (NO_x) that occur in the region include veld burning, vehicle exhaust emissions and household fuel burning. Since both SO₂ and NO_x emissions can cause health problems, focus have been placed on these gases in terms of reporting on air quality.

Various local and far-a-field sources are expected to contribute to the suspended fine particulate matter (PM) (which would include PM₁₀² and PM_{2.5}) in the region. Local sources include wind erosion

² PM₁₀ - Particulate Matter of 10 Microns in diameter & PM_{2.5} - Particulate Matter of 2.5 Microns in diameter

from exposed areas, fugitive dust from agricultural and mining operations, vehicle entrainment from roadways and veld burning.

7.4.1.1 Materials handling

Materials handling operations associated with mining related activities in the area include the transfer of material by means of tipping, loading and off-loading of trucks. The quantity of dust generated from such loading and off-loading operation depend on various climatic parameters, such as wind speed and precipitation, in addition to non-climatic parameters such as the nature (i.e. moisture content) and volume of the material handled.

7.4.1.2 Household fuel burning

Despite the intensive national electrification program, a large number of households still continue to burn coal, wood and paraffin to meet all or a portion of their energy requirements.

Coal burning emits a large amount of gaseous and particulate pollutants including SO₂, heavy metals, total and respirable particulates including heavy metals and inorganic ash, carbon monoxide, polycyclic aromatic hydrocarbons, and benzo(a)pyrene. Polyaromatic hydrocarbons are recognised as carcinogens - a substance capable of causing cancer in living tissue.

Pollutants arising due to the combustion of wood include respirable particulates, nitrogen dioxide (NO₂), carbon monoxide, polycyclic aromatic hydrocarbons, particulate benzo(a)pyrene and formaldehyde. The main pollutants emitted from the combustion of paraffin are NO₂, particulates carbon monoxide and polycyclic aromatic hydrocarbons.

7.4.1.3 Biomass burning

The biomass burning includes the burning of evergreen and deciduous forests, woodlands, grasslands, and agricultural lands. Within the project vicinity, crop-residue burning and wild fires (locally known as veld fires) may represent significant sources of combustion-related emissions.

The biomass burning is an incomplete combustion process, with carbon monoxide, methane and NO₂ gases being emitted. Approximately 40% of the nitrogen in biomass is emitted as nitrogen, 10% is left in the ashes, and it may be assumed that 20% of the nitrogen is emitted as higher molecular weight nitrogen compounds (Held et al, 1996). The visibility of the smoke plumes is attributed to the aerosol (particulate matter) content. In addition to the impact of biomass burning within the vicinity of the proposed mining activity, long-range transported emissions from this source can be expected to impact on the air quality between the months August to October. It is impossible to control this source of atmospheric pollution loading; however, it should be noted as part of the background or baseline condition before considering the impacts of other local sources.

7.4.1.4 Vehicle exhaust emissions

Air pollution from vehicle emissions may be grouped into primary and secondary pollutants. Primary pollutants are those emitted directly into the atmosphere, and secondary, those pollutants formed in the atmosphere as a result of chemical reactions, such as hydrolysis, oxidation, or photochemical reactions. The significant primary pollutants emitted by motor vehicles include carbon dioxide and monoxide, hydrocarbon compounds, SO₂, NO_x and particulate matter. Secondary pollutants include NO₂, photochemical oxidants (e.g. ozone), sulphur acid, sulphates, nitric acid and nitrate aerosols.

7.4.1.5 Fugitive dust emissions from mining operations

Although the majority of mines located in close proximity to the Der Brochen-Mototolo Mine Complex area are underground mining operations (refer to Table 3-5 for the list of mines), most of these mining

operations include product stockpiles, TSFs and WRDs, which could be sources for fugitive dust emissions, if not properly managed.

7.4.1.6 Fugitive dust emissions from other sources

Fugitive dust emissions may also occur as a result of vehicle entrained dust from local paved and unpaved roads, wind erosion from open areas and dust generated by agricultural activities. The extent of particulate emissions from the main roads depend on the number of vehicles using the roads and on the silt loading on the roadways.

Windblown dust generates from natural and anthropogenic sources. For wind erosion to occur, the wind speed needs to exceed a certain threshold, called the threshold velocity. This relates to gravity and the inter-particle cohesion that resists removal. Surface properties such as soil texture, soil moisture and vegetation cover influence the removal potential. Conversely, the friction velocity or wind shear at the surface is related to atmospheric flow conditions and surface aerodynamic properties. Thus, for particles to become airborne, its erosion potential has to be restored; that is, the wind shear at the surface must exceed the gravitational and cohesive forces acting upon them, called the threshold friction velocity. Every time a surface is disturbed, its erosion potential is restored (US EPA, 2004). Erodible surfaces may occur because of industrial, agricultural or grazing activities.

7.4.2 Dust monitoring results

Both Der Brochen and Mototolo Mine have implemented a dust fallout monitoring programme. Each entity has been monitoring their dust fallout levels in respect of their own operational areas. The measured dust fallout rates are compared to Dust Control Regulations that specify rates not to exceed 1 200 mg/m²/day for industrial areas and 600 mg/m²/day for residential areas.

AAP-RPM is considering the amalgamation of the dust fallout monitoring programmes going forward.

The following sections provide a summary of the latest results obtained in respect of the Der Brochen and Mototolo Mine dust fallout monitoring programme. Figure 7-3 provides the locality map of the dust monitoring points that are currently associated with the Der Brochen-Mototolo Mine Complex as detailed below.

7.4.2.1 Der Brochen Project's dust fallout monitoring results

Der Brochen has a dust fallout monitoring network (conducted by GCS (Pty) Ltd (GCS)) that consists of ten single dust buckets and three multi-directional dust buckets. The location of the dust buckets is described in Table 7-3.

Results for 2019 indicated that dust fallout rates remained low in all single dust buckets, only dust bucket S8 exceeded the residential limits during February and March 2019. In terms of the multi-directional dust buckets, the dust fallout rates remained compliant with all relevant limits.

Table 7-3: Location and description of Der Brochen dust fallout monitoring points

ID	Latitude	Longitude	Description	Purpose
Single Dust Bucket				
S1	S25.03136	E30.11573	Near planned North Pit area	Baseline monitoring
S2	S25.02513	E30.11031	Between planned North Pit area and Cicada primary habitat area	Baseline monitoring
S3	S25.04232	E30.11512	Near planned waste rock dump	Baseline monitoring
S4	S25.02826	E30.11791	Near main access road	Baseline monitoring
S5	S25.00809	E30.15068	Directly north of Mareesburg TSF	Mareesburg TSF dust monitoring
S6	S25.03119	E30.12510	East of Der Brochen Site office	Baseline monitoring

ID	Latitude	Longitude	Description	Purpose
S7	S24.98054	E30.08749	Near historical Trail Mining Project on farm Richmond 370 KT	Baseline monitoring
S8	S25.06090	E30.11743	Near planned South Pit area	Baseline monitoring
S9	S25.02029	E30.14353	Located south of Mareesburg TSF	Mareesburg TSF dust monitoring
S10	S25.01189	E30.14170	Located west of Mareesburg TSF	Mareesburg TSF dust monitoring
S11	S25.02217	E30.14283	Located south of the Mareesburg TSF	Mareesburg TSF dust monitoring
S12	S25.01638	E30.14376	Located west of the Mareesburg TSF	Mareesburg TSF dust monitoring
S13	S25.00477	E30.12098	Compliance point next to D2 bucket	Baseline monitoring
S14	S25.00031	E30.13169	Located northwest of the Mareesburg TSF	Mareesburg TSF dust monitoring
S15	S25.01440	E30.15408	Located southeast of the Mareesburg TSF	Mareesburg TSF dust monitoring
S16	S24.99844	E30.14132	Located north of the Mareesburg TSF	Mareesburg TSF dust monitoring
Multi-directional dust buckets				
D1	S25.07117	E30.1191	Southern end of the valley	Baseline monitoring
D2	S25.00485	E30.12100	Northern end of the valley	Baseline monitoring
D3	S25.01088	E30.1415	Located next to S10 west of the Mareesburg TSF	Mareesburg TSF dust monitoring

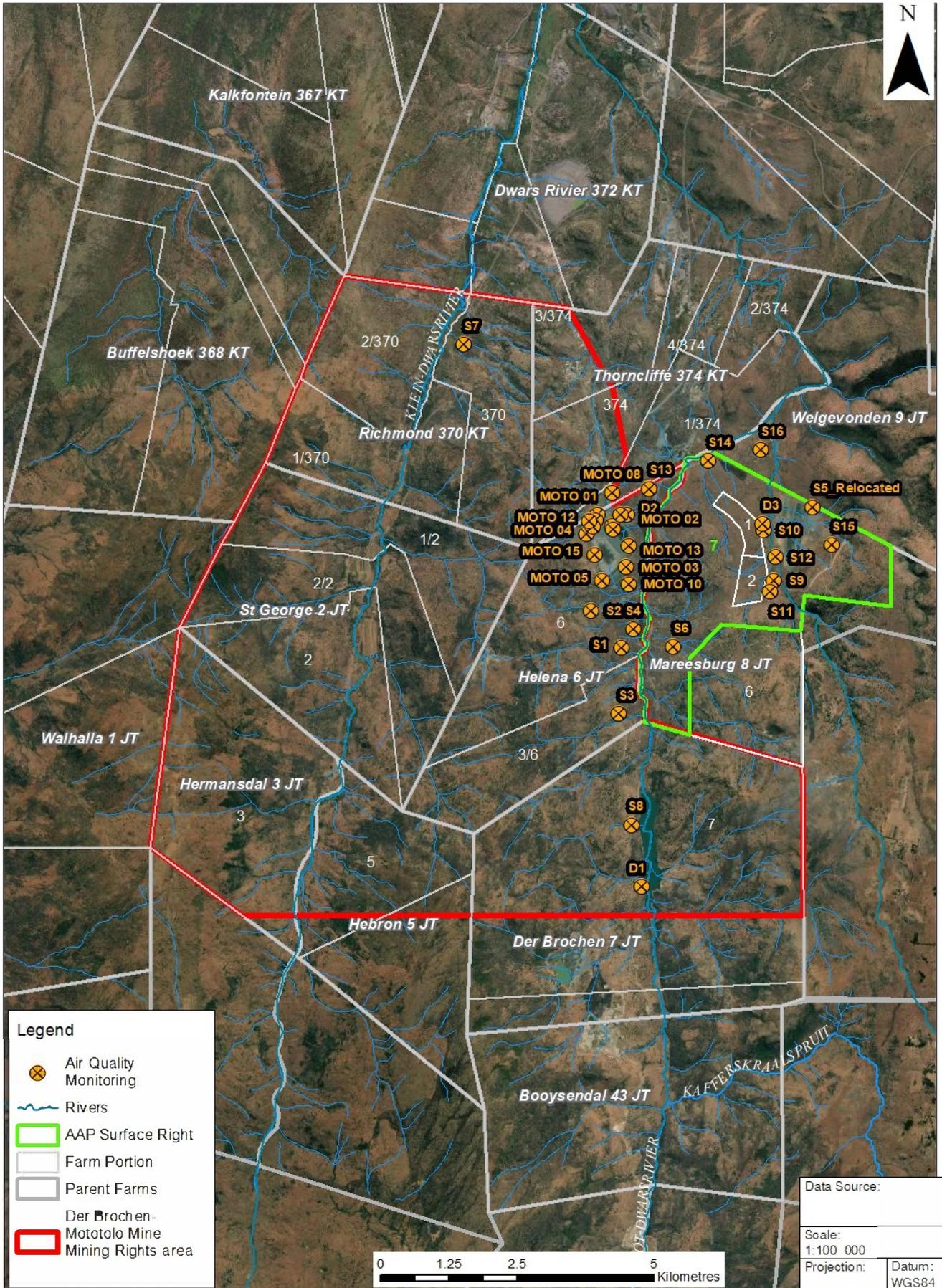
7.4.2.2 Mototolo Mine's dust fallout monitoring results

The Mototolo Mine's dust fallout monitoring network consists of 15 monitoring points which are detailed in Table 7-4.

From the dust fallout results for the period 2017-2018 it was evident that the non-residential receptor, (DGM01) complied with the non-residential limit ($D < 1200 \text{ mg/m}^2/\text{day}$) during each sampling month, except during February 2017. The annual average dust fallout rate for all site-internal monitors remained well below the industrial limit.

Table 7-4: Location and description of Mototolo Mine dust fallout monitoring points

Locality	Latitude	Longitude	Description
MOTO 01	S25.00915	E30.11148	Eskom Substation
MOTO 02	S25.00921	E30.11691	PCD 1
MOTO 03	S25.01790	E30.11674	Between Dam A & B1
MOTO 04	S25.01230	E30.10942	Slimes dam B
MOTO 05	S25.02018	E30.11235	Slimes dam A
MOTO 06	S25.01105	E30.11421	Offices
MOTO 07	S25.01006	E30.11125	Crusher Plant
MOTO 08	S25.00549	E30.11416	Plant main access road
MOTO 09	S25.01158	E30.11437	Return Water Dam A
MOTO 10	S25.02072	E30.11721	Return Water Dam B
MOTO 11	S25.01116	E30.11072	Behind Stockpile
MOTO 12	S25.01016	E30.11008	Behind ROM Silo
MOTO 13	S25.01436	E30.11715	Between Dam A & B2
MOTO 14	S25.00911	E30.11565	PCD 2
MOTO 15	S25.01583	E30.11094	TSF hillside



Legend

- Air Quality Monitoring
- Rivers
- AAP Surface Right
- Farm Portion
- Parent Farms
- Der Brochen-Mototolo Mine Mining Rights area



Data Source:	
Scale: 1:100 000	
Projection:	Datum: WGS84
Central Meridian/Zone:	

	DER BROCHEN-MOTOTOLO MINE CONSOLIDATION AIR QUALITY MONITORING		Date: 28/01/2021	Compiled by: SCHB
			Project No. 554304	Fig No. 7-3
Path: J:\Proj\554304_Der_Brochen_Mototolo\8GIS\GISPROJ\MXD\554304_A4P_DB_MineComplex_Air Quality_20210128.mxd			Revision: A	Date: 01 2021

7.5 Soil, Land Use and Land Capability

Various soil, land use and land capability surveys have been conducted in respect of the Der Brochen Project as well as for the Mototolo Mine. The following sections provide a summary of the overall soil, land capability and land use applicable to the Der Brochen-Mototolo Mine Complex area.

7.5.1 Soil and land capability

In summary, the following soil types are associated with the farms on which the Der Brochen-Mototolo Mine Complex is located:

- Helena farm: broadscale land types include Mispah, Arcadia, Glenrosa, Hutton and Clovelly soils, all having grazing land capabilities, with the Mispah and Hutton soils tending towards wilderness status when shallow and rocky; detailed soil surveys indicated deep and shallow Arcadia and shallow rocky Mispah soils as dominant, with arable/grazing and wilderness/grazing land capabilities respectively;
- Der Brochen farm: the land types of the farm are Ib154b (Mispah soils of wilderness land capability), Dc31b (Arcadia soils of grazing/arable potential) and Ib30c (Glenrosa soils of grazing capability); specialists indicated that the rocky Mispah soils have an inherent grazing land capability and Arcadia erosion;
- Mareesburg farm: broadscale land types include Ab29 (Arcadia/Hutton – grazing); Ib31 (Mispah/Glenrosa – grazing); Dc31 (Arcadia/Hutton – grazing) and Fa327 (Glenrosa – grazing); the detailed soil survey in the vicinity of the proposed TSF found rocky Glenrosa soils to dominate (grazing land capability), followed by rocky Mispah soils (grazing land capability) and rocky Arcadia soils (also of grazing land capability); and
- Richmond farm: broadscale land types Ib154 (Mispah soils with wilderness/grazing land capability); Ib30 (Glenrosa soils with grazing land capability); Ib31 (Bonheim and Swartland soils with grazing land capability) and Dc31 (Arcadia soils with mixed arable/grazing land capability); the specialist identified shallow rocky soils (Glenrosa/Mispah/Mayo/ Steendal/Milkwood/Dundee) of grazing/wilderness land capability; structured non-swelling soils of the Valsrivier form having grazing potential; structured swelling soils namely Arcadia/ Bonheim/ Steendal/ Mayo /Inhoek/ Oakleaf being of grazing potential; transported and/or eroded Dundee/ Mispah/Augrabies soil forms of either wetland or wilderness land capability; young alluvial Hutton/Clovelly/Oakleaf/ Augrabies/Addo/Etoshia/Molopo and Kimberley forms having inherent wilderness potential and lastly, young alluvial Dundee soils being of wetland land capability.
- Thornccliffe farm: soils are generally shallow and varies between soils of a colluvial nature i.e. Glenrosa, Family Dumisa to Mispah form, Family Myhill. Rockiness varies between 30% to 70% (Glenrosa) and 65 % on the Mispah form. More fertile clayey soils occur on the plains and slightly undulating plains, although shallower soils also occur at the base of the outcrop. The soils in this area tend to be sensitive to grazing and anthropogenic pressures in that small effects have large consequences in terms of the loss of soil. This is a problem especially in those areas where the soils are very shallow. Soils tend to be highly erodible and soil loss occurs rapidly when plant cover is removed.

7.5.2 Land use

Historical land use in the area consisted of large areas of open wilderness with some game farming and cattle grazing activities. This was mainly due to the following topographical characteristics of the area:

- The steep Dwars-River valley combined with the rocky soils and low rainfall, which is not suitable for crop agriculture in the area;
- The steep gradients in the area and rocky soils leading to stock farming being marginal in the area; and
- The Dwars-River valley that is bordered by tall mountains to the east, west and south making accessibility and thoroughfare difficult, therefore limiting human activity in the area.

Game farming is still being undertaken on Der Brochen and Mareesburg farms. Land uses on the broader surrounding properties also include crop and trout farming, eco-tourism, chicken farming, mining and forestry.

In more recent times mining development and operations have become the most dominant land use feature in the area.

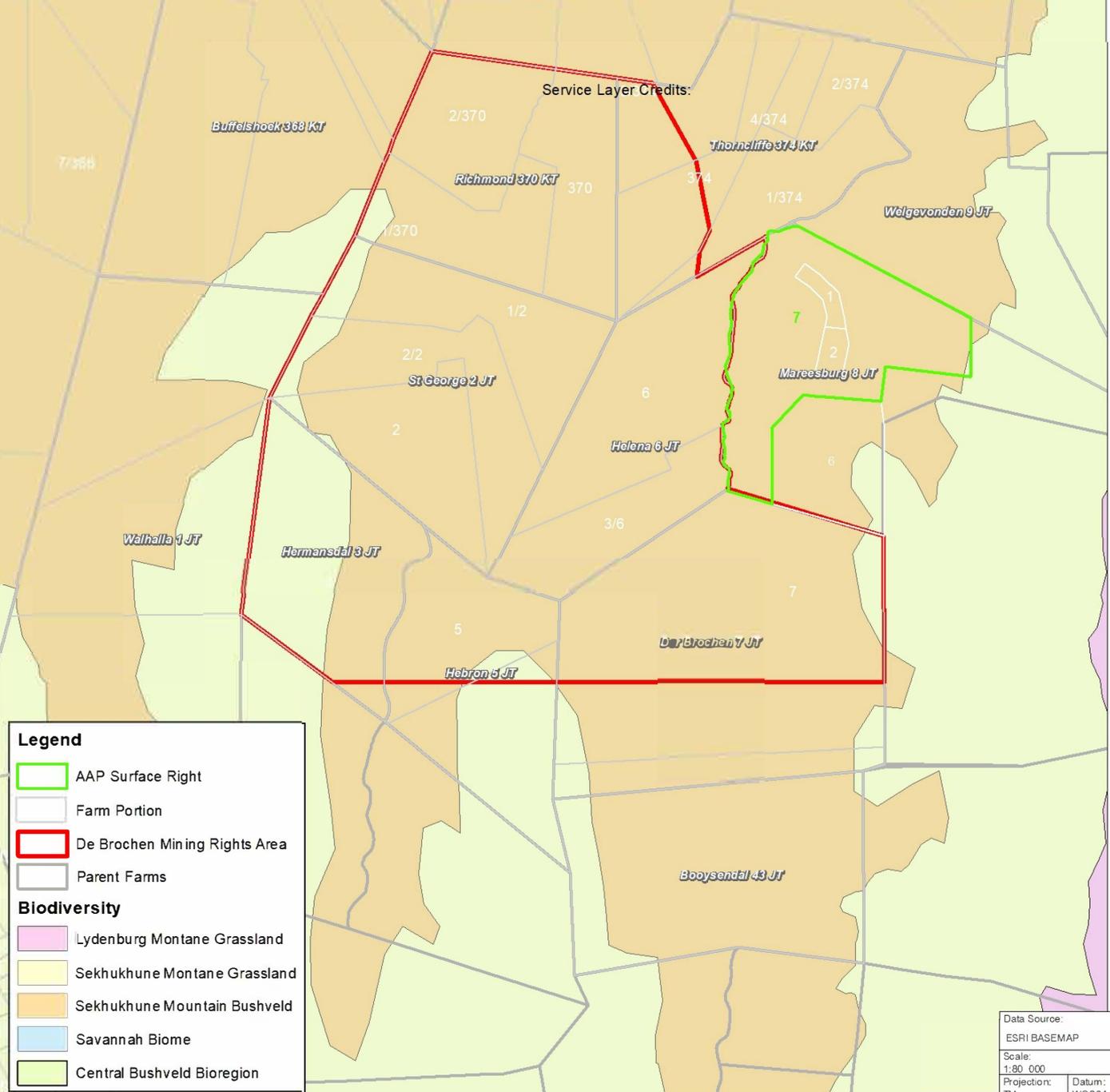
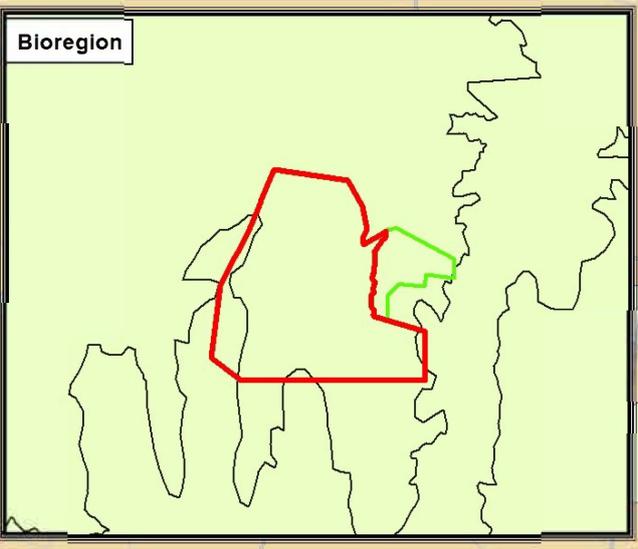
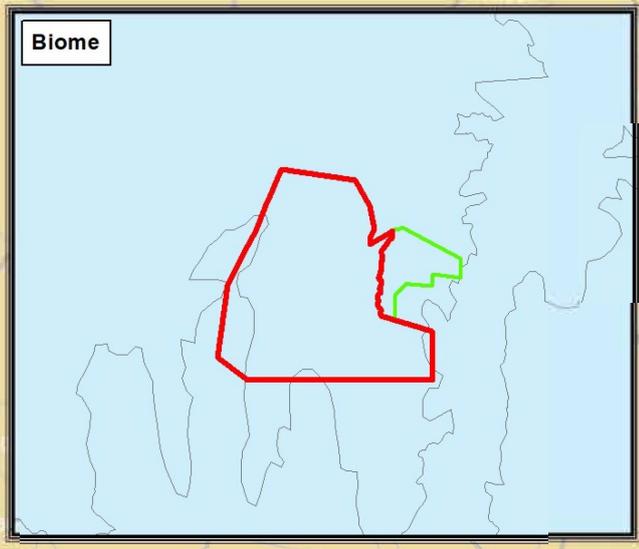
7.6 Biodiversity

The Der Brochen-Mototolo Mine Complex is located within the Sekhukhuneland Centre of Plant Endemism (SCPE) that forms part of the greater Central Bushveld Bioregion. The SCPE is a micro-regional centre of plant endemism because of its exceptionally rich biodiversity and high degree of species endemism. Species are considered endemic because they are unique to a specific region (NSS, 2014).

The SCPE consists of five major vegetation types, i.e. wetlands, grasslands, rocky outcrops, mountain bushveld and arid bushveld. Two of these vegetation types are found within the Der Brochen-Mototolo Mine Complex area, i.e. the grasslands and mountain bushveld, as illustrated in Figure 7-4. Due largely to the uniqueness and endemic richness of these areas, the larger Sekhukhune Mountain lands has been described in the NEM:BA's National List of Threatened Ecosystems as an Endangered System.

In addition, the project area is also located within a Critical Biodiversity Area³ in terms of the Limpopo Conservation Plan (C-Plan).

³ Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species, and ecological processes, as identified in a systematic biodiversity plan relevant to a region/province.



Legend

- AAP Surface Right
- Farm Portion
- De Brochen Mining Rights Area
- Parent Farms

Biodiversity

- Lydenburg Montane Grassland
- Sekhukhune Montane Grassland
- Sekhukhune Mountain Bushveld
- Savannah Biome
- Central Bushveld Bioregion

Data Source: ESRI BASEMAP	
Scale: 1:80 000	
Projection: TM	Datum: WGS84
Central Meridian/Zone:	
Date: 27/08/2020	Compiled by: SCHB
Project No. 554304	Fig No. 7-4
Revision: A Date: 08 2020	

The following sections provide a summary of the flora (plant) and fauna (animals) species that have been identified within the Der Brochen-Mototolo Mine Complex area or which may be associated with the area.

Where significant flora and/or fauna differences exist between the Der Brochen Project area and the Mototolo Mine, distinction has been made and described as such.

7.6.1 Flora

Based on the previous ecological studies undertaken in respect of the Der Brochen Project and the Mototolo Mine respectively, it has been established that the certain habitats are associated with the area within which the Der Brochen-Mototolo Mine Complex is located. These habitats and the sub-community plant species related to each habitat are summarised in Table 7-5.

Table 7-5: Vegetation habitats and sub-communities of the Der Brochen-Mototolo Mine Complex

Habitats	Sub-community	Habitat Description
Hillslope and Rock		
Rocky Hillslopes	<i>Lydenburgia cassinoides</i> – <i>Kirkia wilmsii</i>	South-facing slopes
Woodland Rocky Gorge	<i>Lydenburgia cassinoides</i>	Contains large boulders and dominated by large trees, Smaller systems with similar traits
Doleritic Community	<i>Combretum molle</i> – <i>Aloe longibracteata</i>	A conspicuous dolerite dyke habitat supports a distinctive plant community
Quartzite Rubble Plains	<i>Euclea affinity linearis</i> - <i>Gnidia capitata</i> - <i>Loudetia sp.</i>	This community occupies plains lying between the hills and the river, covered in quartzite rocks and stones
Sheetrock Mat Formation	<i>Xerophyta schlechteri</i> - <i>X villosa</i> - <i>Myrothamnus flabellifolius</i>	Smooth, exfoliating rock surfaces are exposed on the lower slopes of the hills, containing some form of seeps
Rocky Wooded Hillslopes	<i>Combretum zeyheri</i> - <i>Acacia caffra</i> - <i>Acacia gerrardii</i> - <i>Aloe marlothii</i>	Norite covered hills
Wooded Hillslopes	<i>Peltophorum africanum</i> - <i>Heteropogon contortus</i>	Dense Vegetation Community
	<i>Themeda triandra</i> - <i>Acacia caffra</i>	Wooded Community - occupies the slopes on both sides of the river system.
Rocky Wooded Hillslopes	<i>Protea</i> – <i>Tristachya</i> - <i>Loudetia</i>	Open Wooded Community - occupies the slopes on the eastern side of the river system.
Watercourse & Wetland Systems		
Drainage Line Communities	<i>Euclea crispa</i> - <i>Nuxia gracilis</i>	Drainage lines leading to the Groot-Dwars River can be fairly wide (up to 8 m) and some contain running water, even in early summer.
	<i>Acacia caffra</i> - <i>Combretum zeyheri</i>	These drainage lines are located on the eastern side of the Groot-Dwars River.
	<i>Adiantum capillis veneris</i> - <i>Crotalaria monteiroi</i>	Uniform vegetation within drainage lines to the Groot-Dwars River.
	<i>Combretum erythrophyllum</i> - <i>Euclea crispa</i>	Wooded Drainage Community.
	<i>Phragmites mauritianus</i> * - <i>Combretum erythrophyllum</i>	Banks of the Groot-Dwars River on Helena Farm and strong flowing tributaries.

Habitats	Sub-community	Habitat Description
	<i>Searsia keetii</i> - <i>Cyperus sexangularis</i>	This vegetation community is a typical drainage line community, with selected patches supporting rock pools.
Turfsoil Thornveld - Wetlands	<i>Acacia karroo</i> - <i>Imperata cylindrica</i>	The north-west corner of Helena Farm supports an Acacia community on dark turf soils. This was also located within certain patches in the northern and southern pit areas.
Shrublands		
Shrubby Grassland	<i>Loudetia sp.</i> - <i>Euclea affinity linearis</i> .	Shrubs and small trees constitute the woody vegetation layer in this community.
	<i>Acacia caffra</i> - <i>Euclea aff. linearis</i>	This heavily grazed community occupies magnesite covered turf soils.
Shrubland	<i>Themeda triandra</i> - <i>Euclea aff. linearis</i>	Sparsely tree'd community occupying level ground between the Groot-Dwars River and the hills to the west.
Woodland		
Woodland Mixed Sparse & Grassland Closed	<i>Acacia caffra</i> - <i>Acacia karroo</i> (similar to H7)	Lower slopes within the proposed opencast area.
Open Woodland	<i>Acacia caffra</i> - <i>Aristida sp.</i>	Lower hill slopes
	<i>Faurea saligna</i> - <i>Tristachya leucothrix</i> - <i>Loudetia simplex</i>	These areas support relatively sparse woody vegetation.
Woodland Open Plain	<i>Acacia caffra</i> - <i>Combretum zeyheri</i> - <i>Acacia gerrardii</i>	Positioned on rocky quartzite plains with some norite nearer the hills. These wooded plains are bounded by drainage lines on either side, making an abrupt transition with M3.
	<i>Faurea saligna</i> - <i>Themeda triandra</i>	Relatively flat area descending to the drainage lines and Groot-Dwars River (deeper soils than the rocky hillslopes).
Transformed		
Disturbed Areas/Borrow Pits	<i>Melinis repens</i> - <i>Aristida sp.</i>	A number of disturbed areas located between the existing dirt road and the Groot-Dwars River. Further disturbed areas within the proposed opencast area.

7.6.1.1 Conservation Important Species

According to the Plants of Southern Africa (POSA) website, the Threatened Plant Species Programme's (TSP) interim Red Data list of South African plant taxa shows that within the Der Brochen-Mototolo Mine Complex area there are potentially two Endangered species, seven Near Threatened and ten Vulnerable species. Three of these listed species have been recorded in the project area by past ecological studies. These species are listed in Table 7-6.

Table 7-6: National Floral Species Status Listings for the Der Brochen-Mototolo Mine Complex

Species	Common name	Type	Status	Habitat
<i>Jamesbrittenia macrantha</i> (Codd) Hilliard	Sutera macrantha Codd	Forb	Near Threatened	Grassy slopes with other scattered shrubs, restricted to norite.

Species	Common name	Type	Status	Habitat
<i>Lydenburgia cassinoides</i> <i>N.Robson</i>	Sekhukhuni Bushman's Tea	Tree	Near Threatened	Exposed norite bedrock and dolomite.(dolomite not found on Der Brochen)
<i>Searsia sekhukhuniensis</i> (Moffett) Moffett	Rhus sekhukhuniensis Moffett	Tree	Rare	Rocky hillsides in bushveld, on pyroxenitic substrates of the eastern rim of Bushveld Complex.

In terms of the Lebowa and Borwa Shaft operations, minimum natural vegetation remains within these areas, however the rocky areas surrounding the shafts can be considered sensitive as part of the centre of endemism. During 2003 a vegetation survey of the Mototolo Mine area was undertaken. Based on the survey it was found that the **tree layer** of the surveyed area is dominated by *Acacia caffra*, *A. karroo*, *A. nilotica*, *Faurea saligna*, *Lydenburgia cassinoides*, *Ozoroa sphaerocarpa* and *Vitex obovata*. The **shrub layer** is dominated by *Elephantorrhiza praetermissa*, *Euclea crispa*, *E aff linearis* as well as *Acacia caffra*, *A karroo* and *Vitex obovata spp. wilmsii*. The **herbaceous layer** is dominated by the *Themeda triandra*, *Aristida canescens*, *Brachiaria nigropedata* and *Setaria sphacelata*. The most dominant forms included *Commelina Africana*, *Berkheya insignis*, *Rhynchosia nitens*, *R. totta* and *Vigna vexillata*.

Table 7-7 provides a summary of endangered, rare and or endemic plant species observed within the footprint area of the Mototolo Mine during the 2003 vegetation survey.

Table 7-7: Endangered, rare and endemic species associated with the Mototolo Mine area

Species Name	Conservation Status	Red data or endemic
<i>Callilepis leptohylla</i> harv.	Not Threatened	Red data
<i>Elepahntorrhiza praetermissa</i>	Insufficiently known	Red data, Endemic to Sekhukhune
<i>Euclea sp. Nov. aff. Linearis</i>	Not assessed	Endemic to Sekhukhune
<i>Grewia vernmiscoosa</i> Schinz	Not assessed	Endemic to Sekhukhune
<i>Gymnosporia sp. A</i>	Not assessed	Endemic to Sekhukhune
<i>Lydenburgia cassinoides</i>	Not threatened	Red data, Endemic to Sekhukhune
<i>Nuxia gracillis</i>	Insufficiently known	Red data
<i>Pavetta zeyheri</i>	Not threatened	Red data
<i>Rhoicissus sekhukhuniensis</i>	Not assessed	Endemic to Sekhukhune
<i>Rhus sekhukhuniensis</i>	Rare	Red data, Endemic to Sekhukhune
<i>Triaspis glaucophylla</i>	Not threatened	Red data, Endemic to Sekhukhune

7.6.1.2 Medicinal/Culturally significant plant species

Almost 30% of the species that could be identified within the Der Brochen-Mototolo Mine Complex area contained a more common form of medicinal or cultural use. These species are listed below in Table 7-8. It is important to note, that traditional plant use in the “pharmacopoeia” of rural areas and its economic value, although difficult to estimate, is significant and entirely dependent on natural biodiversity. Many plants used in traditional medicine are slow-growing and, once lost, are unlikely to return to an area. Their presence depends on sustainable harvesting as well as on the maintenance of vegetation condition. A majority of the medicinal plants are indigenous and found within the relatively “pristine” areas.

Table 7-8: Medicinal plants within the Der Brochen-Mototolo Mine Complex area

Family	Scientific Name	Common Name
Acanthaceae	<i>Justicia flava</i> (Vahl) Vahl	Yellow Justicia

Family	Scientific Name	Common Name
Amaranthaceae	<i>Amaranthus hybridus</i> L. **	Pigweed
Amaranthaceae	<i>Achyranthes aspera</i> L. **	Burrweed
Amaryllidaceae	<i>Scadoxus af. puniceus</i> (L.) Friis & Nordal	Blood Lily
Amaryllidaceae	<i>Crinum af. bulbispermum</i>	Orange River Lily
Anacardiaceae	<i>Searsia sekhukhuniensis</i> (Moffett) Moffett	Mountain Karee
Anacardiaceae	<i>Searsia pyroides</i> (Burch.) Moffett var. <i>pyroides</i>	Common Wild Currant
Anacardiaceae	<i>Searsia lancea</i> (L.f.) F.A.Barkley	Karee
Anacardiaceae	<i>Sclerocarya birrea</i> (A.Rich.) Hochst. subsp. <i>Caffra</i> (Sond.) Kokwaro	Marula
Apocynaceae	<i>Sarcostemma viminale</i>	Caustic Vine
Araceae	<i>Stylochiton natalensis</i>	Bushveld Arum
Asphodelaceae	<i>Aloe marlothii</i> A.Berger subsp. <i>marlothii</i>	Mountain Aloe
Asteraceae	<i>Helichrysum nudifolium</i> (L.) Less. var. <i>nudifolium</i>	Hottentot's Tea
Asteraceae	<i>Aster af.lydenburgensis</i> W.Lippert	
Asteraceae	<i>Senecio tamoides</i> DC.	Canary Creeper
Asteraceae	<i>Tagetes minuta</i> L. **	Khaki Weed
Asteraceae	<i>Hilliardiella oligocephala</i>	Bicoloured-leaved Vernonia
Asteraceae	<i>Gerbera piloselloides</i> (L.) Cass.	Small Yellow Gerbera
Asteraceae	<i>Bidens pilosa</i> L. **	Black Jack
Asteraceae	<i>Dicoma schinzii</i> O.Hoffm.	Stomach Bush
Boraginaceae	<i>Ehretia rigida</i> (Thunb.) Druce	Ehretia rigida (Thunb.) Druce
Celastraceae	<i>Catha edulis</i> (Vahl) Forssk. ex Endl.	Bushman's Tea
Combretaceae	<i>Combretum zeyheri</i> Sond.	Large – fruit Bushwillow
Combretaceae	<i>Combretum hereroense</i> Schinz	Russett Bushwillow
Combretaceae	<i>Combretum apiculatum</i> Sond. subsp. <i>apiculatum</i>	Hairy Red Bushwillow
Combretaceae	<i>Combretum molle</i> R.Br. ex G.Don	Velvet Bushwillow
Combretaceae	<i>Combretum erythrophyllum</i> (Burch.) Sond	River Bushwillow
Commelinaceae	<i>Commelina africana</i> L. var. <i>africana</i>	Yellow Commelina
Dipsacaceae	<i>Scabiosa columbaria</i> L.	Wild Scabiosa
Ebenaceae	<i>Euclea crispa</i> (Thunb.) Gürke Form A	Blue Guarri
Ebenaceae	<i>Diospyros whyteana</i> (Hiern) F.White	Bladder Nut
Ebenaceae	<i>Diospyros lycioides</i> Desf. subsp. <i>guerkei</i> (Kuntze) De Winter	Transvaal Bluebush
Euphorbiaceae	<i>Croton gratissimus</i> Burch. var. <i>gratissimus</i>	Lavender Fever Berry
Fabaceae	<i>Schotia brachypetala</i> Sond.	Weeping Boer – bean
Fabaceae	<i>Erythrina lysistemon</i> Hutch.	Common Coral Tree
Fabaceae	<i>Acacia caffra</i> (Thunb.) Willd	Common Hookthorn
Fabaceae	<i>Elephantorrhiza elephantina</i> (Burch.) Skeels	Elephant's Root
Fabaceae	<i>Elephantorrhiza burkei</i> Benth.	Sumach Bean
Fabaceae	<i>Mundulea sericea</i> (Willd.) A.Chev. subsp. <i>sericea</i>	Cork Bush
Fabaceae	<i>Acacia gerrardii</i> Benth. Subsp. <i>gerrardii</i> var. <i>gerrardii</i>	Red Thorn
Fabaceae	<i>Dichrostachys cinerea</i>	Sickle Bush
Fabaceae	<i>Peltophorum africanum</i> Sond.	African Wattle
Fabaceae	<i>Acacia karroo</i> Hayne	Sweet – thorn
Fabaceae	<i>Acacia nigrescens</i> Oliv.	Knob Thorn
Fabaceae	<i>Bolusanthus speciosus</i> (Bolus) Harms	Tree Wisteria

Family	Scientific Name	Common Name
Gentianaceae	<i>Thunbergia atriplicifolia</i> E.Mey. ex Nees	Large – flowered Sebaea
Hypoxidaceae	<i>Hypoxis rigidula</i> Baker var. <i>rigidula</i>	Silver-leaved Starflower
Kirkiaceae	<i>Kirkia wilmsii</i> Engl	Mountain Syringa
Lamiaceae	<i>Leonotis leonurus</i> (L.) R. Br.	Wild Dagga
Lamiaceae	<i>Rothea louwalbertsii</i> (P.P.J.Herman) P.P.J.Herman and Retief	Grassland Clerodendrum
Leguminosae	<i>Sphenostylis angustifolia</i> Sond.	Wild Sweetpea
Meliaceae	<i>Melia azedarach</i> L.**	Syringa
Olacaceae	<i>Ximenia americana</i> L. var. <i>americana</i>	Small Sourplum
Oleaceae	<i>Olea europaea</i> L. subsp. <i>africana</i> (Mill.) P.S.	Green African Olive
Orchidaceae	<i>Gladiolus dalenii</i> Van Geel subsp. <i>dalenii</i>	African Gladiolus
Oxalidaceae	<i>Oxalis corniculata</i> L. **	Jimson Weed
Papaveraceae	<i>Argemone mexicana</i> L. **	Yellow Mexican Poppy
Pedaliaceae	<i>Ceratotheca triloba</i> (Bernh.) Hook.f.	Wild Foxglove
Polygonaceae	<i>Polygala hottentotta</i> C.Presl	Small Purple Broom
Proteaceae	<i>Protea caffra</i> Meisn. subsp. <i>caffra</i>	Common Sugarbush
Ranunculaceae	<i>Clematis brachiata</i> Thunb.	Traveller's Joy
Rhamnaceae	<i>Ziziphus mucronata</i> Willd. subsp. <i>mucronata</i>	Buffalo Thorn
Rhamnaceae	<i>Berchemia zeyheri</i> (Sond.) Grubov	Red Ivory
Rubiaceae	<i>Vangueria infausta</i> Burch. subsp. <i>infausta</i>	Wild Medlar
Rubiaceae	<i>Kohautia caespitosa</i> Schnizl. subsp. <i>Brachyloba</i> (Sond.) D.Mantell	Tremble Tops
Rutaceae	<i>Zanthoxylum capense</i>	Small Knobwood
Sapindaceae	<i>Pappea capensis</i> Eckl. & Zeyh	Jacket Plum
Sinopteridaceae	<i>Pellaea calomelanos</i> (Sw.) Link var. <i>calomelanos</i>	Hard Fern
Solanaceae	<i>Solanum panduriforme</i> E.Mey	Poison Apple
Sterculiaceae	<i>Dombeya rotundifolia</i> (Hochst.) Planch. var. <i>rotundifolia</i>	Wild Pear
Tiliaceae	<i>Grewia flava</i> DC.	Velvet Raisin Bush
Velloziaceae	<i>Xerophyta retinervis</i> Baker	Black Stick Lily
Verbenaceae	<i>Lantana rugosa</i> Thunb	Birds' Brandy
Vitaceae	<i>Rhoicissus tridentata</i> (L.f.) Wild & R.B.Drumm. subsp. <i>cuneifolia</i> (Eckl. & Zeyh.) Urton	Bushman's Grape

7.6.1.3 Floral species supporting Conservation Important faunal species

In terms of faunal species, there are a number of habitats that support Conservation Importance (CI) fauna species within the Der Brochen-Mototolo Mine Complex region, including the Vitex species. This species is the host plant for the CI Cicada species – *Pycnia sylvia*. Vitex is most prolific on the slopes and open areas and is a positive indicator of *Pycnia sylvia* as they are found in places where the plant is plentiful (clumpings) but separated by several metres (possibly convenient flying distances).

In terms of the authorised pipeline area and the Mareesburg TSF, limited Vitex species were recorded and therefore this region does not provide a good habitat for the Cicada species, however, the potential

relocated powerline route, the planned North and South Pits as well as the CDF all contain good habitat for this species.

7.6.1.4 Alien and invasive plant species

Few alien species are present within the Der Brochen-Mototolo Mine Complex area. Alien species are emerging along the main roads, the pipelines that traverses the area, as well as within the areas of the planned North and South Pits. Species include Category 1 (1b⁴) *Datura*, *Ricinus* and *Xanthium* species. There is also a limited number of alien species in past disturbed areas such as the old kraals, past livestock feeding areas (dominated by *Cynodon dactylon*) and borrow pits.

Category 1 (1b) species require an alien control programme as per the draft Listing 3 NEM:BA 9 April 2009 Government Gazette. The Category 1 (1b) alien species found in the Der Brochen-Mototolo Mine Complex area can be seen in Table 7-9.

Table 7-9: Category 1 (1b) alien invasive species within Der Brochen-Mototolo Mine Complex

Family	Scientific Name	Common Name
Amaranthaceae	<i>Achyranthes aspera</i> L.	Burrweed
Asphodelaceae	<i>Opuntia ficus-indica</i> (L.) Mill.	Prickly Pear
Asteraceae	<i>Xanthium strumarium</i>	Large Cocklebur
Euphorbiaceae	<i>Ricinus communis</i> L. var. <i>communis</i>	Castor-oil plant
Fabaceae	<i>Pueraria lobata</i> (Willd.) Ohwi var. <i>lobata</i>	Kudu Vine
Papaveraceae	<i>Argemone ochroleuca</i> L.	Mexican Poppy
Phytolaccaceae	<i>Phytolacca octandra</i> L.	Inkberry
Solanaceae	<i>Datura ferox</i> L.	Large Thorn Apple
Solanaceae	<i>Solanum mauritianum</i> Scop.	Bugweed

7.6.2 Fauna

From the various ecological studies undertaken in respect of the Der Brochen Project and the Mototolo Mine, it was derived that the habitats associated with the Der Brochen-Mototolo Mine Complex meet the requirements of a large number of animal species.

A section of the original Der Brochen Project area is currently managed as a game reserve and as such a variety of mammal species occur. Large mammals that currently occur include Kudu (*Tragelaphus strepsiceros*), Impala (*Aepyceros melampus*), Baboon (*Papio cynocephalus ursinus*) and Leopard (*Panthera pardus*).

Due to the diversity of habitat types present in the area, a wide variety of bird species occur in the Der Brochen-Mototolo Mine Complex area. Bird species that were identified during previous surveys are, among others, Carmine Bee-eater (*Merops nubicoides*), Grey-headed Bush-Shrike (*Malaconotus blanchoti*) and Speckled Mousebird (*Colius striatus*).

The Der Brochen-Mototolo Mine Complex area also provides a variety of habitats suitable for reptile species. During previous ecological surveys wide variety of reptile species were identified such as the Sekhukhune Flat Lizard (*Platysaurus orientalis orientalis*), White Throated Monitor (*Varanus albigularis*) and Flap Neck Chameleon (*Chamaeleo dilepsis*).

In terms of invertebrate species, the Der Brochen-Mototolo Mine Complex area also presents a high diversity of habitats for such species. During a regional survey performed by the Transvaal Museum an extremely high diversity and abundance of invertebrate species were encountered in the

⁴ Category 1b - Prohibited / Exempted if in possession or under control – as defined in NEM:BA's Alien and Invasive Species Lists of 2016

Sekhukhuneland region. The most important of these is the Cicada, *Pycna sylvia*, which was recently rediscovered in the Groot-Dwars River Valley. This species was previously thought to be extinct, and further research has been undertaken to determine the exact habits, breeding and feeding requirements and distribution of *Pycna Sylvia*. This arthropod has a very limited range, due to specific habitat requirements and those of its host plant, *Vitex obovata* subsp. *wilmsii*, as aforementioned. Although the Cicada, *Pycna sylvia*, is likely to occur in the regional area, this invertebrate specie has not yet confirmed to occur on site.

Though none of the previous ecological studies recorded any red data listed species at the time of the respective surveys, there is a probability that red data listed species can occur within the area. This confirms the importance of the Der Brochen-Mototolo Mine Complex area in terms of biodiversity and conservation (SAS, 2011).

Table 7-10 provides a list of fauna species included in the International Union for Conservation of Nature's red data lists that can potentially be found within and around the Der Brochen-Mototolo Mine Complex area.

Table 7-10: Potential fauna that may be located within and around the Der Brochen-Mototolo Mine Complex area

Scientific name	Vernacular name	Conservation status	Probability of occurrence
Mammals			
<i>Atelerix frontalis</i>	South African Hedgehog	Near Threatened	Low
<i>Cleotis percivali</i>	Short-eared Trident Bat	Critically endangered	Very Low
<i>Crocidura cyanea</i>	Reddish-grey Musk Shrew	Data deficient	High
<i>Crocidura flavescens</i>	Greater Musk Shrew	Data deficient	High
<i>Crocidura fuscomurina</i>	Tiny Musk Shrew	Data deficient	High
<i>Crocidura hirta</i>	Lesser Red Musk Shrew	Data deficient	High
<i>Crocidura silacea</i>	Lesser Grey-brown Musk Shrew	Data deficient	Moderate
<i>Elephantulus brachyrhynchus</i>	Short-snouted Elephant-shrew	Data deficient	High
<i>Graphiurus platyops</i>	Rock Dormouse	Data deficient	High
<i>Hipposideros caffer</i>	Sundevall's Leaf-nosed Bat	Data deficient	Very Low
<i>Hyaena brunnea</i>	Brown Hyaena	Near Threatened	Low
<i>Lemniscomys rosalia</i>	Single -striped Mouse	Data deficient	High
<i>Manis temminckii</i>	Pangolin	Vulnerable	Low
<i>Mellivora capensis</i>	Honey Badger	Near Threatened	Moderate
<i>Miniopterus schreibersii</i>	Schreiber's Long-fingered Bat	Near Threatened	Very Low
<i>Myotis tricolor</i>	Temminck's Hairy Bat	Near Threatened	Very Low
<i>Myotis welwitschii</i>	Welwitsch's Hairy Bat	Near Threatened	Moderate
<i>Pipistrellus rusticus</i>	Rusty Bat	Near Threatened	Moderate
<i>Poecilogale albinucha</i>	African Weasel	Data deficient	Moderate
<i>Raphicercus sharpei</i>	Sharp's Grysbok	Near Threatened	Very Low
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	Near Threatened	Very Low
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	Near Threatened	Very Low
<i>Rhinolophus hildebrandtii</i>	Hildebrandt's Horseshoe Bat	Near Threatened	Very Low
<i>Rhynchogale melleri</i>	Meller's Mongoose	Data deficient	Moderate
<i>Suncus infinitesimus</i>	Least Dwarf Shrew	Data deficient	Moderate
<i>Suncus lixus</i>	Greater Dwarf Shrew	Data deficient	Moderate
<i>Suncus varilla</i>	Lesser Dwarf Shrew	Data deficient	Low - moderate
<i>Tatera leucogaster</i>	Bushveld Gerbil	Data deficient	Moderate

Scientific name	Vernacular name	Conservation status	Probability of occurrence
Birds			
<i>Buphagus erythrorhynchus</i>	Red-billed Oxpecker	Near Threatened	Low
<i>Ciconia nigra</i>	Black Stork	Near Threatened	Low
<i>Circus macrourus</i>	Pallid Harrier	Near Threatened	Very Low
<i>Circus maurus</i>	Black Harrier	Vulnerable	Very Low
<i>Crex</i>	Corn Crane	Vulnerable	Very Low
<i>Eupodotis barrowii</i>	Barrow's Korhaan	Vulnerable	Very Low
<i>Falco biarmicus</i>	Lanner Falcon	Near Threatened	Moderate
<i>Falco naumanni</i>	Lesser Kestrel	Vulnerable	Moderate
<i>Falco peregrinus</i>	Peregrine Falcon	Near Threatened	Low
<i>Gyps coprotheres</i>	Cape Vulture	Vulnerable	Low
<i>Heteromirafra ruddi</i>	Rudd's Lark	Critically endangered	Very Low
<i>Hieraaetus ayresii</i>	Ayres's Hawk-Eagle	Near Threatened	Very Low
<i>Leptoptilos crumeniferus</i>	Marabou Stork	Near Threatened	Moderate
<i>Mirafra cheniana</i>	Melodious Lark	Near Threatened	Low
<i>Neotis denhami</i>	Denham's Bustard	Vulnerable	Very Low
<i>Polemaetus bellicosus</i>	Martial Eagle	Vulnerable	Moderate
<i>Sagittarius serpentarius</i>	Secretarybird	Near Threatened	Low - moderate
<i>Tyto capensis</i>	African Grass-Owl	Vulnerable	Very Low
<i>Vanellus melanopterus</i>	Black-winged Lapwing	Near Threatened	Very Low
Reptiles			
<i>Homoroselaps dorsalis</i>	Striped Harlequin Snake	Near Threatened	Moderate
<i>Lamprophis swazicus</i>	Swazi Rock Snake	Near Threatened	Low
<i>Python natalensis</i>	Southern African Python	Vulnerable	Low - moderate

7.6.3 Aquatic ecology

Der Brochen-Mototolo Mine Complex falls within the Eastern Bankenveld Aquatic Ecoregion and the B41G quaternary catchment. According to the ecological importance classification for the B41G quaternary catchment, the system can be classified as a sensitive system. The most significant riverine resource within the Der Brochen-Mototolo Mine Complex area, and within the B41G quaternary catchment, is the Groot Dwars River and Klein Dwars River. The Mareesburg Stream, a tributary of the Groot Dwars River, is also considered to be an important riverine resource within the project area.

The National Freshwater Ecosystem Priority Areas (NFEPA) (2011) databases were consulted to define the ecology of the river systems within the Der Brochen-Mototolo Mine Complex area that may be of ecological importance. Aspects applicable to the Der Brochen-Mototolo Mine Complex area and surroundings are as follows:

- The Der Brochen-Mototolo Mine Complex consist of numerous non-perennial drainage lines which drain into the Groot Dwars River, Klein Dwars River, Mareesburg Stream, and mountainous areas. Several artificial dams were also identified on the portions of the farm Mareesburg 8 JT;
- The NFEPA database indicates that there are no RAMSAR wetlands within the Der Brochen-Mototolo Mine Complex area; and
- According to the NFEPA database, the aquatic resources within the Der Brochen-Mototolo Mine Complex area are not considered important on a macro scale for fish migration or breeding habitat. However, based on observations made during the biomonitoring programme implemented in respect of the original Der Brochen Project, the Groot-Dwars River and Mareesburg Stream are important migratory corridors and breeding grounds for a variety of fish species, with specific mention of the confluence of the Groot-Dwars River and Mareesburg Stream.

7.7 Surface Water

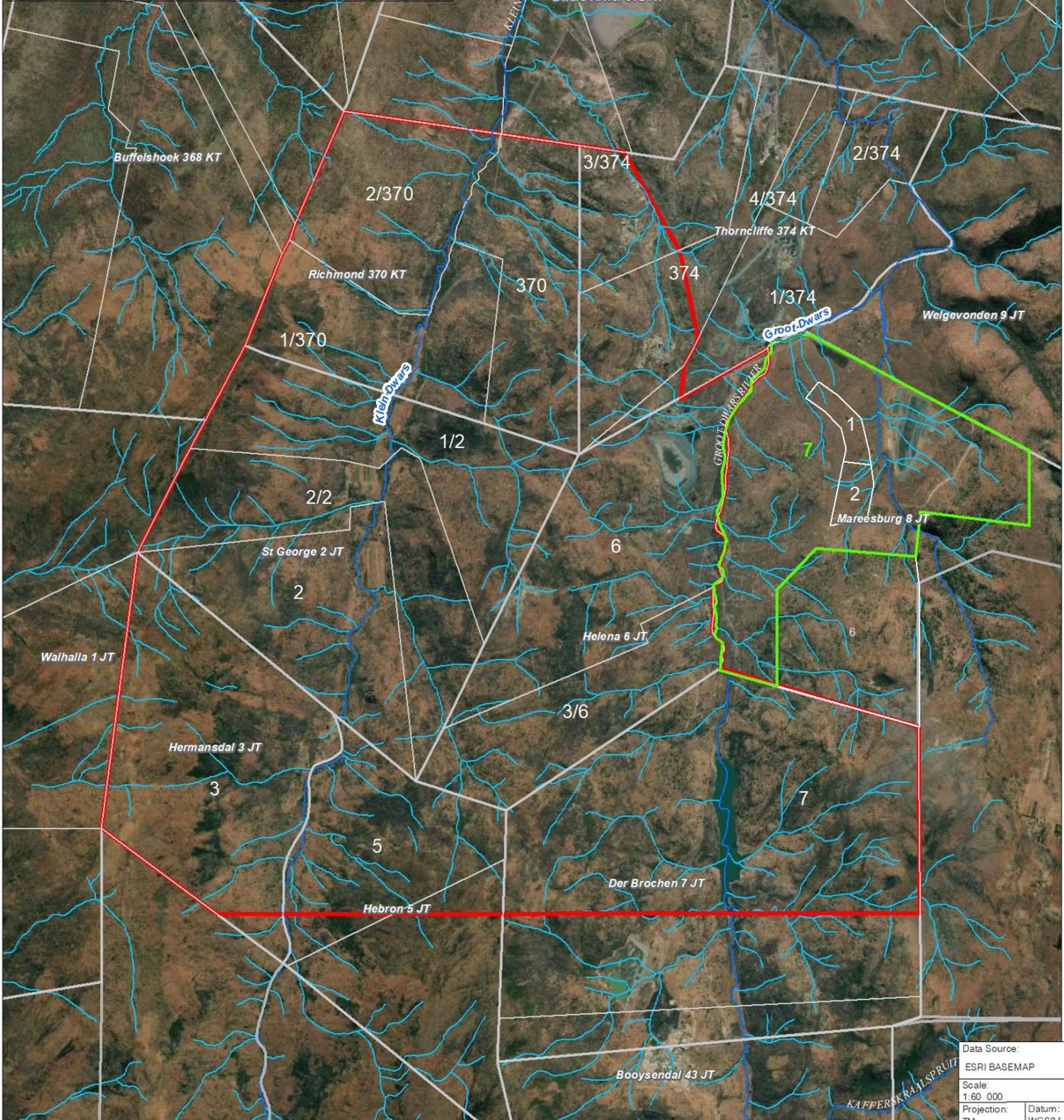
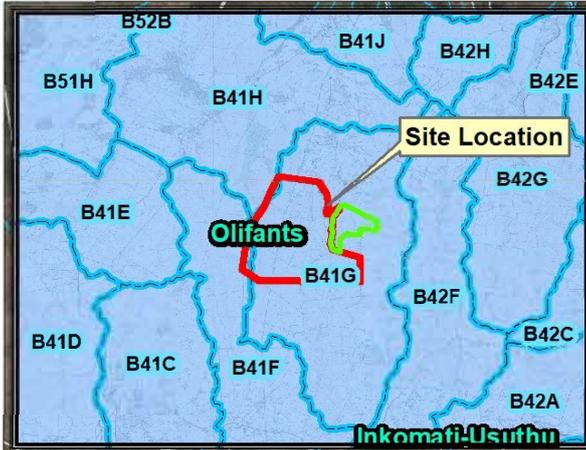
Der Brochen-Mototolo Mine Complex is located between the Groot Dwars River and the Klein Dwars River, which falls within the B41G quaternary catchment of the Olifants River Water Management Area (WMA) as illustrated in Figure 7-5.

The areas surrounding Der Brochen-Mototolo Mine Complex drains towards the Klein Dwars River and the Groot Dwars River. The confluence of the Groot and Klein Dwars Rivers into the Dwars River is approximately 8 km north of Der Brochen-Mototolo Mine Complex. The Dwars River then joins the Tubatse River (formerly Steelpoort River), which in turn feeds into the Olifants River.

The Der Brochen dam is situated on the Groot Dwars River upstream of the Der Brochen-Mototolo Mine Complex area. The main tributary of the Groot Dwars River in the Der Brochen-Mototolo Mine Complex area is the ephemeral Mareesburg Stream, which is adjacent to the partially constructed and operational Mareesburg TSF.

7.7.1 Surface water uses

Surface water in the project area supports a wide diversity of sensitive aquatic species and is currently utilised for game and limited cattle farming. Communities on the neighbouring farms utilise surface water for domestic purposes and limited cattle farming, but borehole water is also used for potable domestic use.



7.8 Groundwater

Information on groundwater levels were sourced from groundwater monitoring data and previous groundwater studies relating to the Mototolo Mine and Der Brochen Project respectively.

Groundwater in the project area is primarily controlled by the subsurface geology which includes the following important geological layers and features (AGES, 2009):

- The weathered, layered norite/anorthosite present at a vertical depth of 5-10 m and is more pronounced in the topographic low-lying areas.
- The fractured/solid bedrock aquifer that underlies the weathered zone is formed by the basal pyroxenite and gabbro, norite and anorthosite at depths of 10 m to + 50 m.
- Dyke structures and dyke – contact zones occur, and they strike north-north-east and east-west.

The primary aquifers are present in locally distributed unconsolidated alluvial sediment deposits along the lower reaches of the Klein-Dwars River, Groot-Dwars River and Mareesburg stream. Alluvial sediment development in the Groot-Dwars valley consists of mixed boulders, cobbles, gravel and sand.

Lateral distribution of the alluvial sediment in the Groot- Dwars River is restricted to the immediate banks of the current active channel (SRK, 2012).

These aquifers provide groundwater storage and recharge to the underlying secondary weathered bedrock aquifers with which they are in hydraulic continuity, as well as interacting and contributing to the baseflow of the main rivers. Due to their limited size and/or probable low transmissivity and connectivity to the river baseflow, the primary aquifers are not considered suitable groundwater production targets (SRK, 2012). The intergranular and fractured aquifer' has a typical potential yield of 0.1 to 2.0 litres per second.

Based on a study conducted by Delta H in 2018, the aquifers vulnerability to contamination is low to medium. According to the Delta H study, it is expected that contamination of the deeper aquifer will be limited due to limited hydraulic connectivity between the shallow and deep aquifers. Flow and transport are furthermore compartmentalized by the more competent dyke structures at depth.

7.8.1 Groundwater levels

Based on the available information, the groundwater levels within the Der Brochen-Mototolo Mine Complex area varies between 2 m and 37 metre below ground level (mbgl).

The variation in the groundwater level can be attributed to the natural rugged topography as groundwater usually mimics surface topography and regional groundwater flow is from higher lying ground towards lower lying valleys, where it accumulates in the alluvial deposits and contributes potentially to river baseflow. Local flow patterns may differ due to the fractured and partially compartmentalised nature of aquifers in the area.

7.8.2 Groundwater uses

The overall groundwater use within the catchment at present is estimated at 2.9 ML/d (1.06 Mm³/a). Due to the high groundwater contribution to baseflow within the catchment, the groundwater Reserve is set at 17.78 ML/d (6.49 Mm³/a), while the average groundwater recharge (input) is 42.9 ML/d (15.66 Mm³/a).

While a surplus recharge (inflow of 19.61 ML/d or 7.16 Mm³/a) exists for allocation, most of the groundwater potential (availability) is limited to the valley bottoms and hillslopes of the Groot- and Klein Dwars Rivers.

7.9 Water quality

Both the Mototolo Mine and Der Brochen Project areas are subject to monthly surface water and quarterly groundwater monitoring programmes, respectively.

The sections below provide a summary of the latest surface water monitoring data as obtained from the respective water quality monitoring reports.

7.9.1 Surface water quality

The Groot Dwars River is sampled upstream and downstream of the Der Brochen-Mototolo Mine Complex. Recent monitoring results indicated that the river has not been affected by any activities undertaken at the complex. All water quality parameters were found to be within the set water quality target values as determined by DWS for domestic use.

In terms of the Mareesburg Stream, recent water monitoring results indicated compliant water quality with only naturally elevated calcium, magnesium and sodium concentrations, exceeding the Reserve Water Quality Limits, recorded at the direct upstream and downstream monitoring sites. Elevated iron concentrations, when compared to the South African Water Quality Guidelines, were however noted at the monitoring point located downstream of the Mareesburg TSF.

7.9.2 Groundwater quality

The quality of the groundwater is slightly alkaline (pH in the range of 7.2 to 8.2) with average mineralisation (TDS between 300 to 1 000 mg/l). The groundwater type is generally calcium / magnesium – bicarbonate (Ca/Mg-HCO₃) rich, which is typical of shallow groundwater in the Bushveld Complex (BC). The magnesium and calcium dominance for the cations can be directly linked to the underlying geology (with magnesium and calcium rich gabbroic norites), while the bicarbonate anion dominance of the samples indicates relatively young or fresh groundwater in equilibrium with carbon-dioxide in the atmosphere and soil zone.

Numerous analysed constituents exceed the current WUL (2011) and South African Drinking water quality (2011) limits in pollution source monitoring boreholes, which are generally downstream/ adjacent of the Helena TSF and RWDs, suggesting an impact of leachate from these sources on the ambient groundwater quality. As a result of the potential contamination from the Helena TSF, AAP-RPM has implemented a system of abstraction boreholes to abstract the contaminated groundwater (as authorised through the Der Brochen Water Use Licence) in order to contain the pollution plume. The water abstracted from these boreholes are then used as process water within the mining operation.

7.10 Heritage

Since 2002, various heritage surveys have been undertaken within the broader area of the Der Brochen-Mototolo Mine Complex area and have recorded heritage sites, ranging from the Middle Stone Age to the recent households of farm labourers. The distribution of the heritage sites within the landscape indicate different land use patterns.

Many agriculturally orientated societies (making Eiland, Leolo and Marateng pottery) built their villages in the valleys near cultivatable alluvium. Others (probably Ndebele) built terraced-settlements on basal slopes of the valley edge, while farm labourers usually lived in the valleys as well. During the 19th Century, farmers lived around the edge of high meadows as a measure of protection. A few Middle Iron Age Eiland sites were also cited in this plateau environment.

7.10.1 Stone Age

A few Middle Stone Age (MSA) (250 000 years ago) localities have been recorded on the Richmond and Mareesburg farms, but the lack of raw material for flaking has affected the archaeological record for this time period. In addition, a few Late Stone Age (LSA) (25 000 years ago) bored stones have also been identified on the Richmond and Helena farms which are the only evidence for Late Stone Age (LSA) occupation in the project area.

7.10.2 Iron Age

Artefacts from the Iron Age is divided into three periods, namely the Early (EIA: AD 400-1000), Middle (MIA: AD 1000-1300) and Late (LIA: AD 1300-1840). In the project area, *Mzonjani*⁵ occurs on the Helena farm and possibly St George farm. A single *Mzonjani* period shard, an isolated mid-Moloko pot and two Late Iron Age (LIA) stonewalled kgotla were recorded, potentially indicating that this small hill could have had ritual significance. Several sites on Richmond, Mareesburg, Thorncliffe, Booyesdal and Helena farms yielded *Eiland* pottery dating to this time. As elsewhere, these Middle Iron Age (MIA) settlements followed the common 'valley pattern' in that villagers lived next to cultivatable alluvium. Some of the *Eiland* sites on Helena contain burnt daga features that may well have climatic implications.

The Late Iron Age begins with the first appearance of pottery associated with Sotho-Tswana (the Moloko Branch) and with Nguni (the Blackburn branch). Some archaeologists have identified early Moloko pottery on Thorncliffe, Richmond and Helena farms as the first phase known as *Icon* (ARM, 2012).

7.10.3 Heritage sites within the Der Brochen Project area

Table 7-11 provides a summary of the heritage sites identified in the Der Brochen Project area through numerous archaeological studies undertaken since 2002, and are shown in Figure 7-6, Figure 7-7 and Figure 7-8. The South African Heritage Resources Agency (SAHRA) recognises National and Provincial Monuments for conservation purposes. None of these exist in the original Der Brochen Project area.

Table 7-11: Cultural heritage sites within the Der Brochen project area

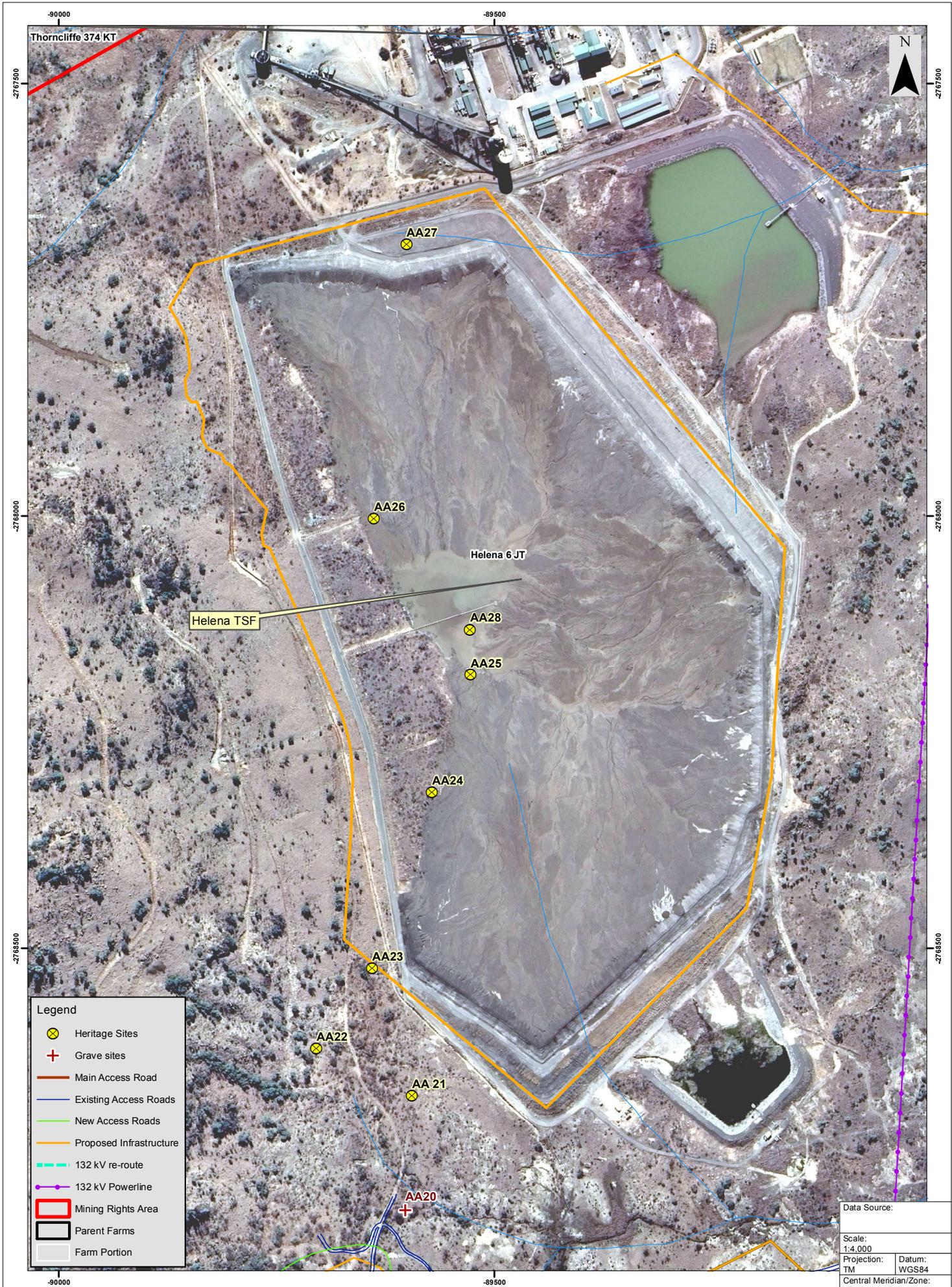
Site No.	Farm Name	Co-ordinates	Artefact description	Significance	Location
Helena TSF					
AA21	Helena 6 JT	25° 01' 15.5"S 30° 06' 44.5"E	Tenants	No importance	Outside footprint
AA22	Helena 6 JT	25° 01' 13.7"S 30° 06' 40.6"E	Household of African tenants	No importance	Outside footprint
AA23	Helena 6 JT	25° 01' 10.7"S 30° 06' 42.9"E	Oval stone kraal	Low importance	Within 100m of footprint
AA24	Helena 6 JT	25° 01' 04.1"S 30° 06' 45.4"E	Tenants	No importance	N/A
AA25	Helena 6 JT	25° 00' 59.7"S 30° 06' 47"E	Tenants	No importance	N/A
AA26	Helena 6 JT	25° 00' 53.8"S 30° 06' 43.1"E	Tenants	No importance	N/A
AA27	Helena 6 JT	25° 00' 43.5"S 30° 06' 44.5"E	Tenants	No importance	N/A

⁵ Mzonjani, dated to the third/fourth century AD represents the earliest expression of the Iron Age in South Africa (Natal specifically).

Site No.	Farm Name	Co-ordinates	Artefact description	Significance	Location
AA28	Helena 6 JT	25° 00' 58-56"S 30° 06' 47"E	Tenants, daga	Low importance Impacted by the construction of Helena TSF.	N/A
Northern Pit/Co-disposal					
AA20	Helena 6 JT	25° 01' 19.8"S 30° 06' 44.2"E	5 graves	High social importance	Approximately 500m from footprint
AA41	Helena 6 JT	25° 02' 23.5"S 30° 05' 19.6"E	Isolated <i>Leolo</i> pot, two rectangular kgotla on exposed rock, isolated <i>Mzonjani</i> shard and some MSA clustered around small kopje. Damaged by road and drilling	Medium importance	Within footprint
AA42	Helena 6 JT	25° 01' 28.05"S 30° 06' 34.5"E	Pottery scatter	No importance	Outside footprint
AA43	Helena 6 JT	25° 01' 33.6"S 30° 06' 31.6"E	Terraces	No importance	Outside footprint
AA44a	Helena 6 JT	25° 01' 35.5"S 30° 06' 38.9"E	Original European farmstead	Low importance	Within footprint
AA44b	Helena 6 JT	25° 01' 34.2"S 30° 06' 39.3"E	Grave	High social importance	Within footprint
AA110a	Helena 6 JT	25° 01' 37.2"S 30° 06' 39.2"E	Water tank for hotel (ruins)	Medium importance	Within footprint
AA110b	Helena 6 JT	25° 01' 38.3"S 30° 06' 40.4"E	Main hotel complex. This complex includes many plastered walls (some with painted designs), stone walls and stone steps (ruins)		
AA110c	Helena 6 JT	25° 01' 38.5"S 30° 06' 41.6"E	More rooms of main hotel complex (ruins)		
AA111	Helena 6 JT	25° 01' 56.8"S 30° 06' 49.5"E	Clearing with pottery and stone lines	No importance	Within footprint
AA124	Helena 6 JT	25° 02' 03.9"S 30° 06' 52.2"E	Cemetery with two graves	High social importance	Within footprint
AA127	Helena 6 JT	25° 01' 46.1"S 30° 06' 29.9"E	<i>Eiland</i> daga	Medium importance	Outside footprint
Southern Pit					
AA33	Helena 6 JT	25° 02' 13.2 - 11.8"S 30° 06' 54 - 53.2"E	Tenants	Not rated	Outside footprint
AA34	Helena 6 JT	25° 02' 29.3"S 30° 06' 59.7"E	Household of African tenants	No importance	Outside footprint
AA34a	Helena 6 JT	25° 02' 33"S 30° 06' 56.8"E	pottery, mud and stone walls and headstones placed against tree. Headstones removed by 2012	No importance	Outside footprint
AA35	Helena 6 JT	25° 03' 01.5"S 30° 07' 07.1"E	Tenants – already destroyed	Not rated	Outside footprint
AA113	Der Brochen 7 JT	25° 02' 39.9"S 30° 07' 06.9"E	Tenant household destroyed to make storage area. Steep and stony and therefore no sites on hillside	No importance	Within footprint

Site No.	Farm Name	Co-ordinates	Artefact description	Significance	Location
AA117	Helena 6 JT	25° 02' 30.7"S 30° 06' 28.7"E	Daga	Low importance	Outside footprint
Powerline					
AA96	Mareesburg 8 JT	25° 01' 44.9"S 30° 07' 42.2"E	Several stone lines marking household of African tenants	No importance	Outside footprint
AA97	Mareesburg 8 JT	25° 01' 51.6"S 30° 07' 44.9"E	Tenant household in good state of preservation with extant mud walls and front lapa wall	High importance	Outside footprint
AA98	Mareesburg 8 JT	25° 02' 04.9"S 30° 07' 26.5"E	Poor stone tool industry in quartz	No importance	Within in 100m of proposed powerline
AA99	Mareesburg 8 JT	25° 01' 41.5"S 30° 07' 27.8"E	Tenants	Low importance	Outside footprint
AA100	Mareesburg 8 JT	25° 01' 38.3"S 30° 07' 35"E	Tenants	Low importance	Outside footprint
AA101	Mareesburg 8 JT	25° 01' 43"S 30° 07' 36.9"E	Tenants, lower grinding stone, pots	Low importance	Outside footprint
AA102	Mareesburg 8 JT	25° 02' 18.3"S 30° 07' 25.1"E	Walls and grindstones marking household of African tenants	Low importance	Within in 100m of proposed powerline
AA103	Mareesburg 8 JT	25° 02' 20.3"S 30° 07' 25.1"E	Stone kraal and mud houses marking household of African tenants	Medium importance	Within in 100m of proposed powerline
AA104	Mareesburg 8 JT	25° 02' 24.9"S 30° 07' 27"E	Twelve graves	High social importance	Within in 100m of proposed powerline
AA105	Mareesburg 8 JT	25° 02' 11.9"S 30° 07' 19.9"E	Graves	High social importance	Outside footprint
Mareesburg TSF					
AA16	Mareesburg 8 JT	25° 00' 46"S 30° 08' 57.8"E	Stone lines, maize grindstones and pottery marking household of African tenants	No importance	Within footprint
AA17	Mareesburg 8 JT	25° 00' 23.9"S 30° 08' 49.9"E	<i>Eiland</i> or <i>Leolo</i> pottery and slag as well as <i>Marateng</i> pottery	Low importance	Within footprint
AA18	Mareesburg 8 JT	25° 01' 02"S 30° 09' 00.4"E	Cemetery with three graves	High social importance	Within footprint (relocated)
AA19	Mareesburg 8 JT	25° 01' 00.2"S 30° 08' 48.2"E	Cleared area with stone lines marking household of African tenants	No importance	Within footprint
AA88a	Mareesburg 8 JT	25° 00' 21.5"S 30° 08' 28.8"E	Stone terraces, upper maize grindstone and sundried brick marking household of African tenants	Low importance	Outside footprint
AA88b	Mareesburg 8 JT	25° 00' 22.5"S 30° 08' 27.8"E			Outside footprint
AA89	Mareesburg 8 JT	25° 00' 29.8"S 30° 08' 24.2"E	Cemetery with 5 graves, three with headstones	High social importance	Outside footprint
AA90	Mareesburg 8 JT	25° 00' 13.2"S 30° 08' 31.4"E	Single terrace line, lower maize grindstone, upper grindstones on boundary	Low importance	Within footprint of pipeline

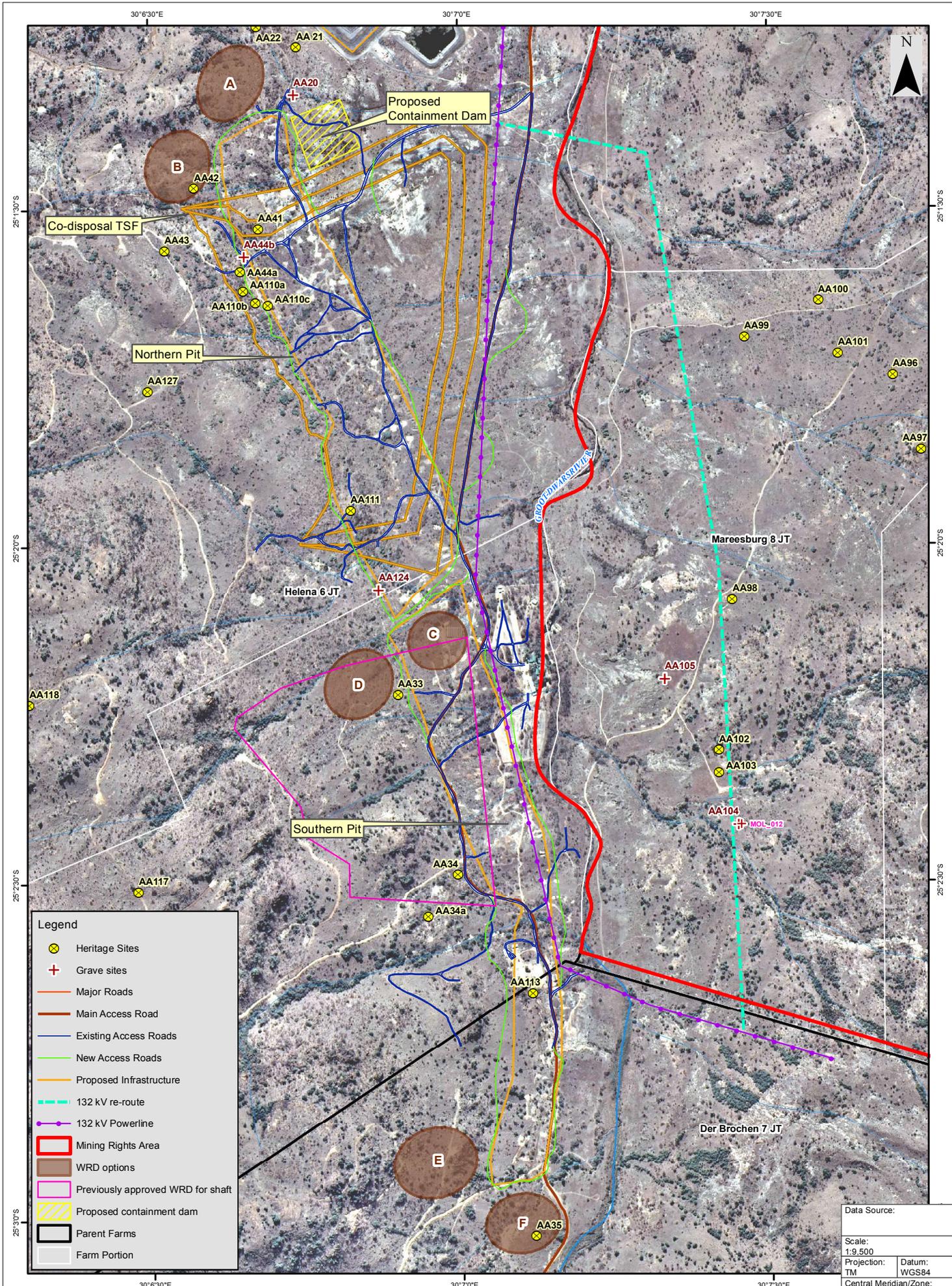
Site No.	Farm Name	Co-ordinates	Artefact description	Significance	Location
			road marking household of African tenants		
AA91	Mareesburg 8 JT	25° 01' 00.2"S 30° 08' 34.9"E	Rectangular house foundations, lower maize grindstone and midden marking household of African tenants.	Low importance	Outside footprint
AA92	Mareesburg 8 JT	25° 01' 06.7"S 30° 08' 53.7"E	Well-preserved household of African tenants with terrace lines, house remains, grindstones and midden. <i>Leolo pottery</i> underneath.	High social importance	Within footprint
AA93	Mareesburg 8 JT	25° 00' 38.4"S 30° 08' 38.6"E	MSA artefacts including triangular point, blade and scraper, all made from a black dolerite-like stone.	Not <i>in situ</i> and therefore of no importance	Within 100m of footprint
AA94a	Mareesburg 8 JT	25° 00' 20 - 21"S 30° 08' 46 - 47"	Stonewalled kraal, rectangular house foundation and lower grindstone marking household of African tenants. <i>Leolo pottery</i> eroding out of the road.	Low importance	Within footprint
AA95	Mareesburg 8 JT	25° 00' 22.6"S 30° 08' 51.6"E	Scatter of small slag pieces in road upslope of Site AA94.	Medium importance	Within footprint
AA108	Mareesburg 8 JT	25° 01' 15.9"S 30° 08' 36"E	<i>Leolo pottery</i> in old ploughed field next to Mareesburg house	Low importance	Outside footprint



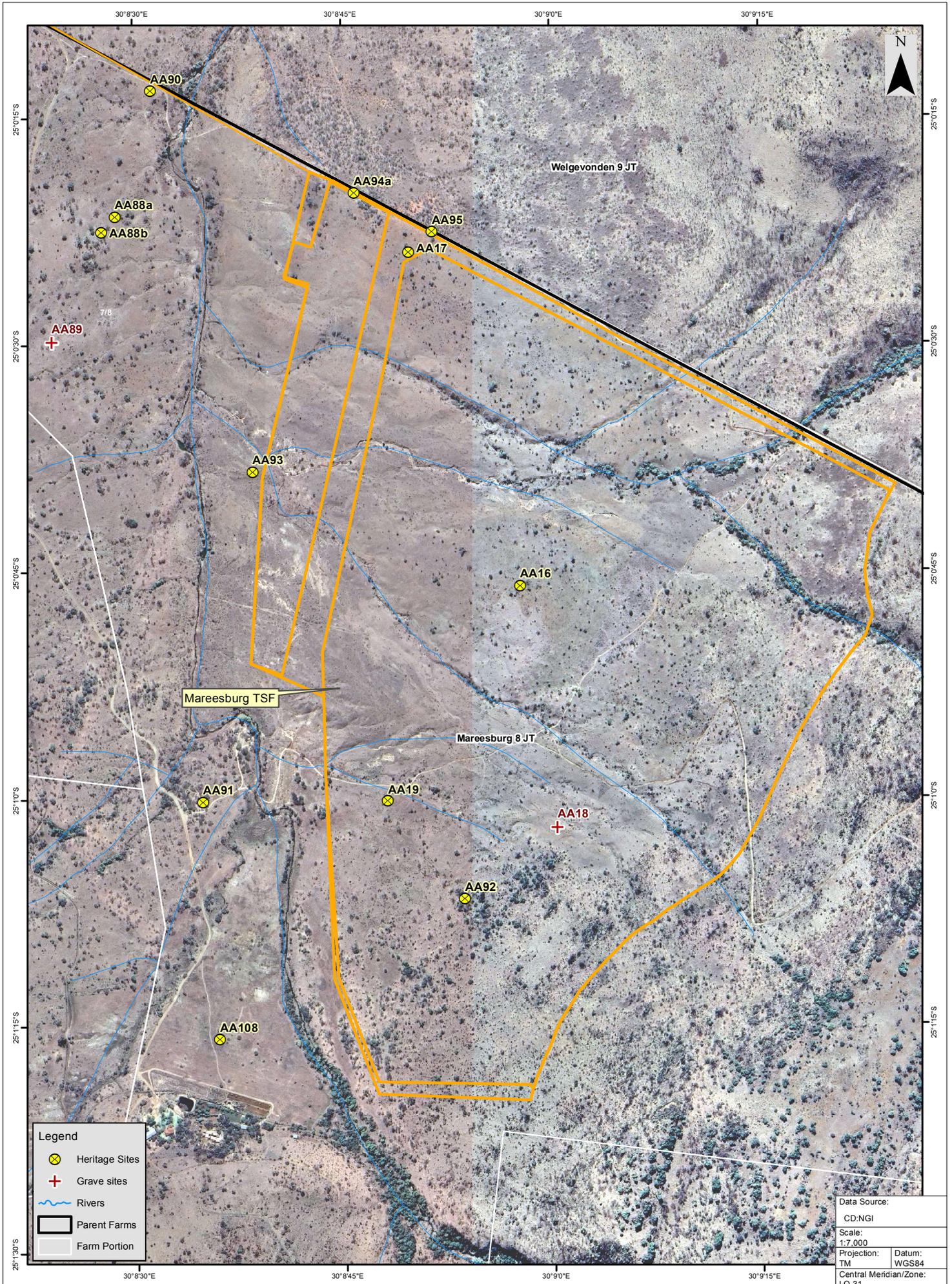
Legend

- ⊗ Heritage Sites
- + Grave sites
- Main Access Road
- Existing Access Roads
- New Access Roads
- Proposed Infrastructure
- - - 132 kV re-route
- - - 132 kV Powerline
- Mining Rights Area
- Parent Farms
- Farm Portion

Data Source:	
Scale: 1:4,000	
Projection: TM	Datum: WGS84
Central Meridian/Zone: LO 31	
Date:	Compiled by:
30/10/2014	ELSA
Project No. 554304	Fig No. 7-6



Data Source:	
Scale: 1:9,500	
Projection: TM	Datum: WGS84
Central Meridian/Zone: LO 31	
Date:	Compiled by:
30/10/2014	ELSA
Project No. 554304	Fig No. 7-7



Legend	
	Heritage Sites
	Grave sites
	Rivers
	Parent Farms
	Farm Portion

Data Source:	
CD:NGI	
Scale:	
1:7,000	
Projection:	Datum:
TM	WGS84
Central Meridian/Zone:	
LO 31	
Date:	Compiled by:
30/10/2014	ELSA
Project No.	Fig No.
554304	7-8

7.10.4 Heritage sites within the Mototolo Mine area

A heritage study by Mr Neels Kruger from Exigo in 2014 indicated that the area around the Borwa South shaft contains some heritage remains. As a result of the study, the operation has taken reasonable measures to safely demarcate and fence off the particular areas with heritage remains to prevent unauthorised access and any possible damage/disturbance to these areas. This gives effect to the preservation and protection of the graves. AAP-RPM understands that the necessary permits need to be applied for and obtained before any identified heritage site require relocation or removal.

The findings of the 2014 heritage study are summarised below and depicted in Figure 7-9.

Human Burials / Cemeteries

Two individual burial grounds were identified along, or in close proximity of the Borwa South ventilation shaft access road alignment. In this area graves and cemeteries generally occur within settlements, often around homesteads where ancestral graves are usually located within homestead precincts. As such, it is highly probable that these heritage resources might be encountered in this area.

- **EXIGO-TH374-BP01 (S25.00832 E30.10589)** Two unmarked graves, dressed with stone cairns occur in association with the remains of a Historical Period farmstead adjacent to a western section of the road alignment near the ventilation shaft location. The graves are not marked and are poorly preserved.
- **EXIGO-TH374-BP02 (S25.00850 E30.10888)** A small cemetery occurs along a drainage line in association with the remains of a large Historical Period settlement south of the road alignment. The cemetery contains at least 5 graves, some of which are dressed with marble tombstones. Other burials are indicated by stone cairns. Grave goods on the grave dressings include clay pots, glass bottles and metal objects. The burials are in differing conditions of preservation.

Historical / Colonial Period Sites

At least two Historical Period settlement areas were identified along, or in close proximity of the proposed Borwa South Ventilation shaft access road alignment and it is highly likely that Historical Period / Recent settlements and remnants will occur in the area.

- **EXIGO-TH374-HP01 (S25.00839 E30.10581)** The remains of a Historical Period homestead occurs north-east of the ventilation shaft location in close proximity of the road alignment. At the site, a number of dilapidated single and multi-room square and rectangular mud brick wall and foundation structures remain and material culture such as clay pot fragments, glass, metal and plastic were noted. The site is poorly preserved.
- **EXIGO-TH374-HP02 (S25.00764 E30.10967)** A large Historical Period settlement area was documented along a central portion of the road alignment. The site is characterised by a number of square and rectangular foundation structures demarcating individual homesteads in the settlement. Material culture such as upper and lower grindstones and glass were noted in the area. The site and its features are generally very poorly preserved.
- **EXIGO-TH374-HP03 (S25.00825 E30.10806)** A number of upper and lower grindstones were observed along the road alignment west of Site EXIGO-TH374-HP02. Even though features and material culture generally associated with settlement areas are absent in this area, the artefacts probably form part of the settlement area at Site EXIGO- TH374-HP02.

In itself, the Historical Period sites and features documented along the road alignment are generally of medium-low significance due to poor preservation of the sites. However, considering the fact that human burials are commonly found around or within such homesteads, the general area of human settlement is sensitive and potentially of significance.

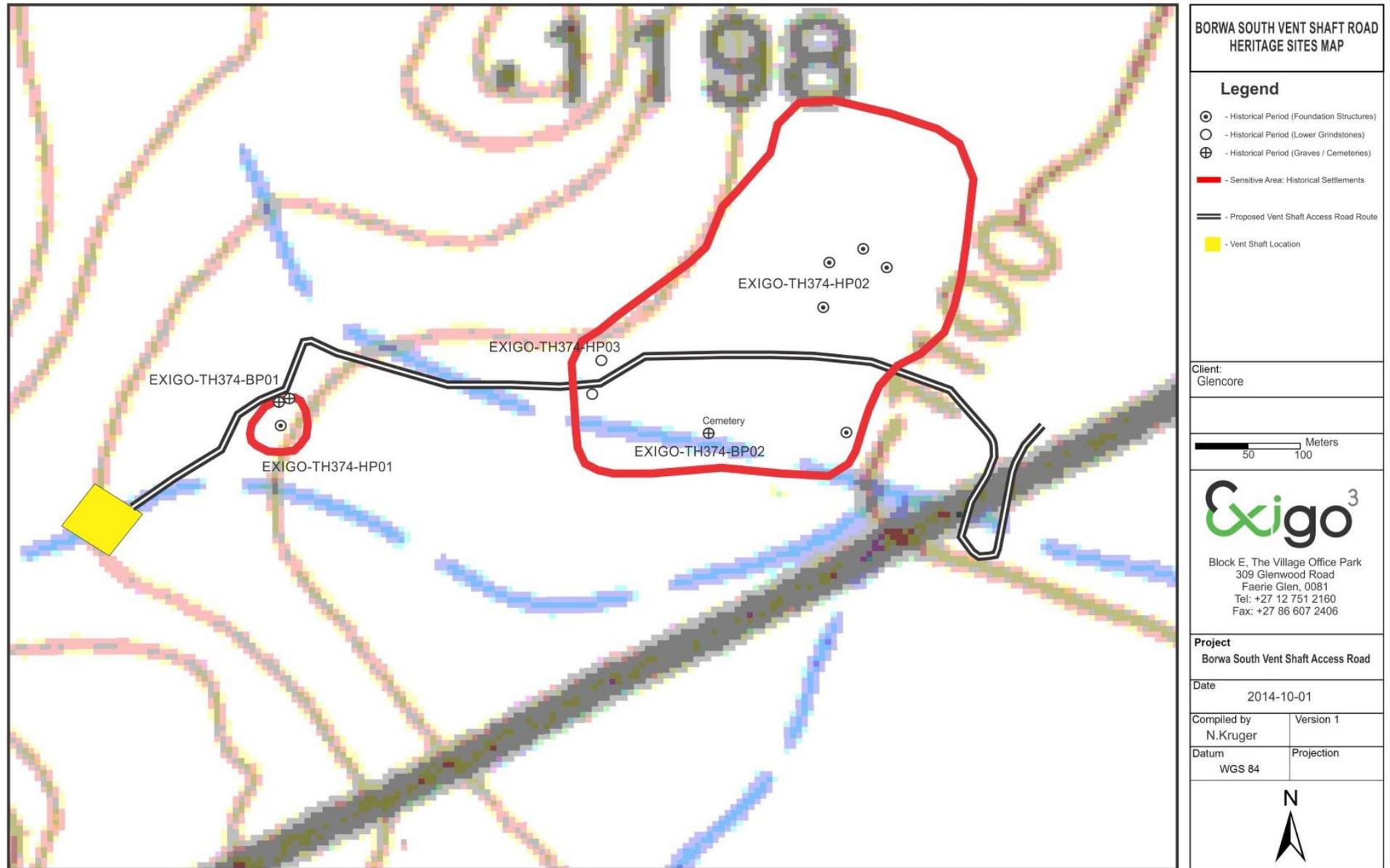


Figure 7-9: Heritage sites located within the original Mototolo Mine area (Exigo)

7.10.5 Palaeontology

Dr JF Durand conducted a palaeontological desktop assessment the Mototolo Mine area in 2018. The palaeontological heritage gives insight in i.e. the origin of life, dinosaurs and humans. Fossils are also used to identify rock strata and determine the geological context of the geological formations and the chronostratigraphy of Southern Africa.

The Heritage Act of South Africa stipulates that fossils and fossil sites may not be altered or destroyed. The purpose of this study was therefore to determine the probability of finding fossils in a greater study area (which included the Mototolo area), which may be impacted by the future development.

The project area is underlain by norite and pyroxenite of the Dwars River Subsuite of the Rustenburg Layered Suite of the Bushveld Igneous Complex and is therefore of no palaeontological importance. Parts of the Thorncliffe study site are overlain by Quaternary sediments however. There is a very low probability that these sediments may be fossiliferous.

In the unlikely event that fossils are found in the sediment covering the igneous rocks in the project area the Environmental officer of the mine should follow the procedure noted in the report should fossils or fossil sites be exposed.

7.10.6 Living Heritage

The Gamawela community that lives in the Klein Dwars River valley to the west of the mine holds a direct and pronounced cultural and social connection with the landscape around the Thorncliffe mine, specifically on the farm St George 2 JT farm. As such, portions of this farm were returned to the community after a successful land restitution process. It is to be expected that a number of sites of heritage and cultural meaning to this community remain in the area. These sites include rivers, pools, remains of kraals and places used for grinding grains (malwala). One such site is the Gamawela Cave Site, situated in a deep valley on the farm St Georges. According to local knowledge, this cave was used as shelter in times of warfare and later acted as a ceremonial centre for local communities. To this day, members of the Gamawela community visit the site for ritual purposes.

7.11 Noise

The Der Brochen-Mototolo Mine Complex area is dominated by existing mining operations and has a rural character (generally sparsely settled). Traffic servicing the Booyendal Mine also uses the access road through the Der Brochen-Mototolo Complex site, and currently influences the ambient sound character along the main route.

The topography and natural vegetation cover provide acoustic screening, limiting the noise levels mainly to within the valley.

Increased noise levels are anticipated to be directly linked with the various activities associated with the construction of the approved mining related infrastructure, as well as the operational phase of the activity as described below:

- Construction phase: Various activities including traffic;
- Operational phase; and
- Mining activities associated with the opencast mining activity at the northern and southern pits.

The surrounding terrain would significantly assist in the attenuation of ambient sound levels, with the higher hills effectively acting as sound barriers between the operation and potential noise-sensitive developments.

7.12 Visual

The aesthetic value of an environment is the composition that it forms with the elements of land, air, water, biota and man-made objects. This includes the thoughts, emotions, and the subjective interpretation of the observer. The aesthetic experience includes the relationship of the observer to society and the transient relationship between the observer and the landscape. It is, therefore, a highly subjective experience.

Based on historical visual impact assessments, including viewshed simulations, lines of sight modelling, spatial and 3D analysis, the dense vegetation, high trees and rugged topography in the area prevents extensive views of the infrastructure from ground level. The increased exploration and mining activities surrounding Der Brochen-Mototolo Mine Complex have furthermore reduced the natural scenic integrity and value of the area. This is mainly due to cleared gravel roads and access tracks being visible over extensive areas, specifically where these cross higher up on steep hills.

7.12.1 Landscape character

Landscape character types are landscape units refined from Mucina and Rutherford (2009) vegetation types, the regional physiographic and cultural data derived from 1:50 000 topographical maps, aerial photographs and information gathered on the site visit. Dominant landform and land use features (e.g., hills, rolling plains, valleys and mining areas) of similar physiographic and visual characteristics, typically define landscape character types.

The nature and character of the Der Brochen-Mototolo Mine Complex's landscape are:

- Natural hills and plains with scarring from surrounding exploration and prospecting activities;
- Riverine areas associated with the Dwars river drainage system;
- Tourism (although limited);
- Abandoned agriculture; and
- Existing mines and associated infrastructure (powerlines, access roads – tarred and gravel).

7.12.2 Sense of Place

The sense of place for the project area derives from the combination of all landscape types and their impact on the senses. The savannah rich and dramatic hills and valleys of the project area and region provide a dramatic backdrop to the existing mining activities. However, the extent of mining activities contained within the valley areas have altered the original landscape, leaving the viewer with a sense of irreversible landscape change occurring within the project area.

However, the nature of the primary landscape types focusses the senses on the mountains resulting in a strong sense of place, which has a distinct natural character despite the existing mining activities.

7.12.3 Visual Receptors

Visual receptors include people travelling along the R555 and connector road in the north-east sector of the project area as well as the local road within the project area, which is the main access route to the mining areas.

7.13 Socio-economy

The Der Brochen-Mototolo Mine Complex is located within the Fetakgomo-Greater Tubatse Local Municipality (FGTLM), under jurisdiction of the Greater Sekhukhune District Municipality (GSDM) within the Limpopo Province. Thaba Chweu Local Municipality (TCLM) is an important labour sending area for the mine and as such, has been included in this report. The TCLM falls under the Ehlanzeni District Municipality, within the Mpumalanga Province.

According to the FGTLM Integrated Development Planning (IDP) of 2019, 50.3% of the population in the FGTLM is unemployed and 62% households are living on less than R76,400 per annum. The TCLM has a much lower unemployment rate (20.5%). 59.6% of economically active youth is unemployed in the FGTLM. More than half of those employed in the FGTLM work in the mining and quarrying sector, while mining, agriculture and trade are significant employment sectors in the TCLM.

43.2% of the FGTLM population have completed some primary school education, while 39.3% completed their secondary school education. Only 0.8% have received higher education, while 1.6% have no schooling. The TCLM has poorer education levels, with 38.6% having some primary school education, 15.4% having completed their secondary school education and slightly more having achieved higher education (1.5%) than the FGTLM.

Sanitation and water delivery are a constant constraint, while over 16.0% of the population do not have access to energy for warmth in the colder months in the FGTLM. Service delivery in the TCLM is better than the FGTLM; however, many rural and informal settlements find themselves with poor service delivery. Minimal health facilities and a growing population will be a cause for concern for both municipalities as populations continue to increase.

Owing to FGTLM's rural nature, the municipality is plagued by challenges of poor or backlogged service delivery. The provision and maintenance of services become costly because most of the settlements are situated far apart. Some areas are also not large enough to achieve the economic threshold required to make social facilities available in a manner that is economically viable (FGTLM IDP, 2016/17). Majority of infrastructural projects within FGTLM are Expanded Public Works Programme related projects. Such projects aid in the generation of employment opportunities and the assurance of the improvement of the socio-economic conditions within the area. 800 jobs were created in the 2014/2015 financial year through the construction of the small access bridges and other related projects.

8 Environmental impacts and risks in their respective phases

Various impact assessments were undertaken in respect of the Der Brochen Project and Mototolo Mine's original and subsequent approved EIAs and EMPs, respectively. Refer to Appendix 6 for the comprehensive list of potential impacts that have been identified and included in the approved Der Brochen Project EMP of 2015 and the Mototolo Mine EMP, respectively.

The impact assessments considered impacts of the Der Brochen Project and the Mototolo Mine, respectively, in respect of the following environmental components:

- Geology;
- Climate;
- Topography;
- Soils;
- Land Use / Land Capability;
- Flora;
- Fauna;
- Surface Water;
- Groundwater;
- Air Quality;
- Noise and Vibration;
- Visual Aspects;
- Sites of cultural / heritage significance;
- Socio-economic; and
- Interested and Affected Parties.

Environmental impacts can occur during the construction, operational and closure phases of a project. This section of the report provides a summary of the current key environmental impacts and risks associated with the different phases of the operation.

8.1 Construction

The Der Brochen Project has been operational since 2002 and the Mototolo Mine since 2003. Apart from the initial construction phase associated with the establishment of the mine and associated infrastructure, numerous projects were embarked on over the years that involved construction.

The construction phase addressed in this EMPr Consolidation will be applicable to the approved, but not yet constructed, expansion of the previously approved Maresburg TSF footprint (currently undertaken), the development of the North and South Pit operations and associated infrastructure, the re-routing of a 132 kV power line to accommodate the South Pit and the potential construction of a co-disposal facility.

8.1.1 Continuation of the construction/expansion of the Maresburg TSF

Approval was obtained from the relevant competent authorities for the expansion of the previously approved Maresburg TSF footprint. Pipelines were developed from the Mototolo Concentrator to the Maresburg TSF to transport tailings to the Maresburg TSF and to transport water back from the Maresburg TSF to the Mototolo Concentrator to be used as process water.

The characteristics of the hillside Maresburg TSF are described below:

- Maximum footprint area - 133 ha (excluding return water dam complexes).
- Maximum operational deposition area - 76 ha;
- Starter wall height - approximately 14 metres;
- Maximum height at closure - 115 metres (elevation 1190.0 mams!);
- Target dry density - 1.86 tonnes per cubic metre;
- Maximum storage capacity - 64.6 million cubic metres or 120.1 million tonnes;
- Maximum operational life of TSF based on 250 Kt/month - 40 to 41 years (2018-2060).

8.1.2 Development of the North and South Pit

AAP-RPM has obtained the necessary environmental and water authorisation for the development of two Open Pits to mine the near-surface layer of the Upper Group 2 (UG 2) Reef. The open pit operation will consist of a Northern Pit (life of mine 3.5 to 4 years) and a Southern Pit (life of mine 2 years).

Waste Rock Dumps (WRDs) will be established for the placement of material excavated during the initial voids and will be located along the edges of the pit highwall sides and the waste rock will be dozed into the pits to fill the final void. The majority of the pits will be backfilled during operations, with this roll over mining method being practiced.

Two WRD options, A and B, are considered for the northern section of the North Pit. WRD C is proposed in the southern section. Two WRD options, E and F, are considered for the southern section of the South Pit, and WRD D is proposed for northern section.

Table 8-1 summarises the specification of the proposed temporary WRDs.

Table 8-1: Waste Rock Dumps details

Waste Dump	Rock	Size		Volume	Approximate area
		m ²	Ha	m ³	
North Pit A or B		79 524	8	1 518 923	282 m x 282 m
North Pit C		79 524	8	1 518 923	282 m x 282 m
South Pit D		93 025	9	1 8282 365	305 m x 305 m
South Pit E or F		93 025	9	1 8282 365	305 m x 305 m

8.1.3 Re-routing of a 132 kV powerline

An existing 132 kV power line runs along the western side of the Groot-Dwars River on the project site. To accommodate the proposed southern open pit, this powerline will be re-routed to run along the eastern side of the river Groot Dwars River. This activity will be undertaken by Eskom.

8.1.4 Potential Co-Disposal Facility

An additional tailings disposal option being considered by RPM is the construction of a Co-disposal Facility (CDF) which will have a starter wall constructed of waste rock obtained from the Northern Pit, following which tailings will be deposited within the pit and the surrounding starter wall. This facility was approved in 2017. However, the execution of this option will be dependent on cost considerations and the timing of the availability of the completed structure to receive tailings from the Mototolo Concentrator. These aspects will be taken into consideration during the Feasibility Study.

8.1.5 Potential impacts and risks associated with construction phase

The key potential impacts and risks, as assessed in previously approved EIAs and EMPs, that may be associated with the construction activities of the Mareesburg TSF expansion, the development of the North and South Pits, re-routing of the 32 kV powerline and potential co-disposal facility are summarised in Table 8-2.

Table 8-2: Potential impacts and risks associated with the construction phase

Environmental component	Nature of the impact
Soils	Contamination of soil resources due to accidental spills of hydrocarbons
	Loss of soil resources as a result of sterilisation from TSF, pipeline and road
Air Quality	Increase in nuisance dust
	Increased dust levels during construction of infrastructure and roads
Noise	Increase in ambient noise levels to surrounding communities
Biodiversity	Removal and loss of vegetation communities
	Loss of conservation important plant taxa
	Loss of natural habitat
Visual	Decrease in visual aesthetics of the area
Surface water	Deterioration of surface water quality due to increased sediment loads as a result of erosion from bare soil areas
	Deterioration of surface water quality due to contamination of runoff by oil and fuel spills and leaks, and other construction activities
	Increase in erosion from areas of exposed soils during site clearing and grubbing
	Increased potential for damming and flooding and subsequent damage to property and infrastructure due to hardstanding areas

8.2 Operations

The operational activities at the Der Brochen-Mototolo Mine Complex have been on-going for more than 18 years. The operational activities are associated with the extraction and beneficiation of platinum and chrome bearing ore at the existing Mototolo Concentrator Plant received from the underground workings at the Borwa and Lebowa shafts via an existing conveyor belt system. If and when the North and South Pits are operational, platinum bearing ore will be sent to the Mototolo Concentrator Plant for processing.

The final concentrate from the Mototolo Concentrator Plant is transported via trucks to the Polokwane Smelter for further processing, whilst the tailings material from the plant is disposed of on the existing Helena TSF and recently constructed and partially operated Mareesburg TSF via pipeline systems. The water contained in the tailings' slurry settles on top of the TSFs and collects in the existing RWDs associated with the Helena TSF and Mareesburg TSF respectively. From the RWDs the water is

pumped back to the Mototolo Concentrator Plant via return water pipeline systems for reuse as process water.

8.2.1 Potential impacts and risks associated with operational phase

The key potential impacts and risks, as assessed in previously approved EIAs and EMPs, that may be associated with the operational phase of the overall Der Brochen-Mototolo Mine Complex are summarised in Table 8-3.

Table 8-3: Potential impacts and risks associated with the operational phase

Environmental component	Nature of the impact
MOTOTOLO MINE OPERATIONS (including underground mining; operation of ventilation shafts, water management infrastructure; utilisation of access roads)	
Soils	Degradation (chemical, biological & physical properties) due to removal and stockpiling Pollution of soil by chromite particles, oils, diesel and other wastes or cleaning materials
Air Quality	Impact on ambient air quality
Noise	Impact on ambient noise quality
Biodiversity	Fauna displacement
Surface water	Sedimentation of surface water
	Surface water pollution
	Alteration of surface flows and drainage patterns
OPERATION OF THE HELENA AND MAREESBURG TSF's	
Air Quality	Decreased ambient air quality due to wind-blown respirable particulates (increased PM ₁₀ concentrations) affecting Cicada habitats
	Increase in nuisance dust during operations
Biodiversity	Changes in community structure and population dynamics of floral species
	Loss of insect species / communities of conservation value due to direct impacts such as loss of habitat or habitat fragmentation and indirect impacts such as dust
Visual	Decrease in visual aesthetics of the area
Surface water	Alteration of drainage patterns
	Deterioration in surface water quality due to increased sediment load
	Contamination of surface water bodies due to diffuse pollution
Groundwater	Potential deterioration of groundwater quality due to volume of leachate seeping into the underlying aquifer from the TSFs and RWDs
MOTOTOLO CONCENTRATOR AND CHROME PLANT	
Air Quality	Decreased ambient air quality due to the operation of the processing plant
Noise	Increase in ambient noise levels due to operation of the processing plant
Biodiversity	Effects of fugitive dust on vegetation
	Disturbance/loss of aquatic animal species due to a deterioration in surface water quality due to contamination from various forms of pollution from operational activities, increased sediment loads, oil and fuel spills and leaks
Visual	Decrease in visual aesthetics of the area
Surface water	Deterioration of stormwater and surface water quality due to operational activities at the processing plant
	Deterioration of surface water quality due to erosion, spillages and accidental discharges on roads
NORTHERN AND SOUTHERN PITS	
Air Quality	Increase in nuisance dust during operations
Noise	Increase in ambient noise levels
Biodiversity	Increase in alien invasive species impacting on natural plant community structures
Surface water	Reduced availability of water to surrounding water users due to physical obstruction from the Open Pits resulting in loss of mean annual runoff.
	Alteration of catchment hydrology causing increased risk of flooding and scouring

Environmental component	Nature of the impact
	Deterioration in water quality in the Dwars River due to release of contaminated water from the open pit operations
OPERATION OF THE WELLFIELD AND ONGOING PROSPECTING BOREHOLES	
Air Quality	Increase in nuisance dust during ongoing prospecting
Biodiversity	Disturbance/loss of plant species of conservation importance, habitat, endemism and biodiversity
Visual	Reduced quality of scenic value from vantage points
Surface water	Reduction in baseflow of the Klein-Dwars River

8.3 Closure and decommissioning

A number of potential alternatives for closure of infrastructure associated with the various aspects of the Der Brochen-Mototolo Mine Complex can and are likely to be considered as the operation progresses. These alternatives include:

- Rehabilitation methods on the embankments. Given that the soils are limited, growth medium covers are likely to require a combination of in situ soils and other materials that have similar water retention characteristics as the growth media. This could include utilising a combination of stockpiled soil and possibly tailings material.
- There may be opportunities to have multiple slope angles on the TSFs, dependent on the slope's aspect, slope length and where individual benches are located on the facility. Reshaping of the entire facility may therefore not be required as the closure strategy.
- There is an expectation that after closure, groundwater levels will recover in the underground workings, albeit that recovery would take approximately 77 years after mining ceases. Although the mine floor elevation of workings is below surface, decant will be driven by the elevation of the portals. Should the rebounding groundwater level in the underground area rise above the elevations of these portals decant can occur. The shaft portals should be sealed-off to avoid any direct surface decant from the workings. However, if required post closure treatment requirements will be considered and where practical and feasible, implemented.
- Post closure water management on the top and side slopes of the two conventional TSF (Helena and Mareesburg TSF) as well as on the co-disposal facility that may be associated with the North Pit.
- A number of structures may have the potential to be utilised in closure for a variety of activities. These may include medical, educational or light and heavy industry. These opportunities will be explored as the mine develops and the end of LoM approaches.

As further assessment and trials are required to develop the alternatives, and then the required authorisation obtained, the alternatives described above have not been costed in the assessment of liability. Rather the costing is based on the obligations as they currently exist.

8.3.1 Potential impacts and risks associated with closure and decommissioning phase

The key potential impacts and risks, as assessed in previously approved EIAs and EMPrs, that may be associated with the closure and decommissioning phase of the overall Der Brochen-Mototolo Mine Complex are summarised in Table 8-4.

Table 8-4: Potential impacts and risks associated with the closure and decommissioning phase

Environmental component	Nature of the impact
Soils	Pollution of soil by chromite particles, oils, diesel and other wastes or cleaning materials used during the demolition work
	As buildings and infrastructure are demolished, large areas consisting of bare soil will be created. These freshly disturbed areas will be potentially vulnerable to soil erosion.

Environmental component	Nature of the impact
Air Quality	Impact on ambient air quality due to demolition work undertaken during decommissioning
	The TSFs are a potential significant source of wind-blown dust impacting intermittently on the land in and around the TSFs from sections that still require vegetation
Visual	Impact on visual aesthetics of the area as the TSFs will remain on site after closure
Noise	Impact on ambient noise quality due to demolition work undertaken during decommissioning
Biodiversity	There might be a continual loss of aquatic animal species due to continual deterioration in water quality due to pollution from seepage of facilities such as the TSFs
	Re-establishment of flora habitats
	Re-establishment of fauna communities
Surface water	Deterioration of surface water quality due to contamination of runoff by oil and fuel spills and leaks, and other demolition activities
	Increase in sedimentation loads of surface water due to exposure of cleared areas
	Deterioration of surface water quality due potential seepage from the TSFs and RWDs. Platinum tailings are usually found to be non-acid generating, although have a potential to generate alkaline, salt-rich drainage dominated by calcium, magnesium, sodium and potassium.
Groundwater	Potential continued deterioration of groundwater quality due to volume of leachate seeping into the underlying aquifer from the TSFs and RWDs

9 Impact management objectives and statements

To make sure that the local environment is not adversely affected by physical and/or chemical impacts that may arise from the mine and its operations by, AAP-RPM has set the following objectives aligned with the mitigation measures contained in this Consolidated EMPr:

- Limiting dust and emissions generation during construction, operational and decommissioning activities that could cause nuisance and/or health effects to surrounding landowners/communities;
- Monitoring groundwater quality and surface runoff at defined locations and frequencies, as stipulated by the Water Use Licences, during the construction phase, operational phase and for at least 10 years after closure, longer if warranted by the results;
- Providing the required measures to limit at source the generation of contaminants which could adversely affect local groundwater quality;
- To soften the visual impact of the project by applying the recommended mitigation measures; and
- Provide continual environmental awareness training and management measures to demonstrate the protection of the fauna and flora associated with the mining right area.

9.1 Potential risk of acid mine drainage

Previous testing for acid mine drainage at Mototolo Mine and other mines in this region have showed that the reef mined in the area is formally classified as non-acid generating based on its limited sulphide sulphur content and subsequently calculated sulphide acid potential. The sulphide content of the parent rock (norite, anorthosite and pyroxenite) is too low to produce an acid leachate. Therefore, the potential for Acid Mine Drainage as a result of mining the reef is very low.

9.2 Water use license

AAP-RPM has three approved WULs relating to the Mototolo Concentrator and Der Brochen Project. The Mototolo Mine has a separate WUL. It is the intention of AAP-RPM to consolidate the approved WULs subsequent to the consolidation of the EMPrs and EAs.

The list of water uses authorised relating to the Der Brochen-Mototolo Mine Complex is summarised in Table 9-1.

Table 9-1: Water uses authorised associated with the Der Brochen-Mototolo Mine Complex

Activity	Water Use	Description	Volume/Capacity
2011 WUL: Associated with the Der Brochen Project			
Taking water from a water resource	NWA Section 21 (a)	Helena wellfield	Construction Phase: 682 550 m ³ /a Operational Phase: 511 000 m ³ /a
		Richmond wellfield	Operational Phase: 365 000 m ³ /a
		Richmond (Anglo) House - potable water supply	34 697.17 m ³ /a
		Caretaker's home - water supply	33 130.81 m ³ /a
		Unknown water supply	37 670.21 m ³ /a
		Helena Farm House (office) - potable water supply	33 235.15 m ³ /a
		Mareesburg House – potable water supply	122 607.76 m ³ /a
		Borehole water supply	173 479.34 m ³ /a
		Supply via the Groot Dwars River Irrigation Board	75 040 m ³ /a
Clean/potable water storage	NWA Section 21 (b)	Lebalelo water storage	7 700 m ³ /a
		Abstracted groundwater (Richmond wellfield) storage	600 m ³ /a
		Abstracted groundwater (Helena wellfield) storage	1 200 m ³ /a
Impeding flow to measure flow on Klein and Groot Dwars Rivers	NWA Section 21 (c) and (i)	Impeding and diverting the flow of water in a watercourse; altering the bed, banks, course or characteristic of a watercourse.	N/A
Dirty water containment areas	NWA Section 21 (g)	Helena TSF - Tailings storage from Mototolo Concentrator	2 600 000 m ³
		RWD A - Containment of return water from Helena TSF for reuse in the concentrator	Not specified
		RWD B - Containment of return water from Helena TSF for reuse in the concentrator	Not specified
		Pollution control dam - Containment of runoff from Mototolo Concentrator for reuse	Not specified
		Waste rock dump - Storage of rock from underground workings	25 000 t
		Waste rock dump - Storage of rock from underground workings smaller dump for trial mining has been constructed and rehabilitated	25 000 t
Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of any activity or for the safety of the people	NWA Section 21 (j)	Helena shaft fissure water	938 per month
		Richmond shaft fissure water	938 per month
2016 WUL: Associated with the Der Brochen Project			

Activity	Water Use	Description	Volume/Capacity
Road crossings	NWA Section 21 (c) and (i)	Impeding and diverting the flow of water in a watercourse; altering the bed, banks, course or characteristic of a watercourse.	N/A
Clean water diversions	NWA Section 21 (c) and (i)	Impeding and diverting the flow of water in a watercourse; altering the bed, banks, course or characteristic of a watercourse.	Start and end points of diversions provided below:
		Diversion of watercourse around the Mototolo Concentrator	Start: S25° 0' 33.48"; E30° 6' 37.91" End: S25° 0' 37.08"; E30° 6' 58.93"
		Three diversions of watercourse around the Helena TSF	Start: S25° 0' 43.2"; E30° 6' 44.06" End: S25° 0' 41.4"; E30° 7' 1.34" Start: 25° 0' 53.64"; E30° 6' 57.92" End: S25° 0' 42.48"; E30° 6' 59.11" Start: S25° 1' 3"; E30° 6' 48.56" End: S25° 1' 20.28"; E30° 6' 57.74"
Engaging in a controlled activity; irrigation of any land with waste or water containing waste	NWA Section 21 (e)	Irrigation of side slopes of TSF for vegetation establishment using return water: approximately 2000 m ² on any given day	11 000 m ³ /a
2017 WUL: Associated with the Der Brochen Project			
Taking water from a water resource	NWA Section 21 (a)	Open pit dewatering from North Pit	86 436 m ³ /a
		Open pit dewatering from South Pit	2 376 636 m ³ /a
		Helena TSF scavenger wells	39 441 m ³ /a
		Abstraction from Groot Dwars River	52 560 m ³ /a
Pipeline, road and powerline crossing of the Groot Dwars River tributaries	NWA Section 21 (c) and (i)	Impeding and diverting the flow of water in a watercourse; altering the bed, banks, course or characteristic of a watercourse.	N/A
Clean water diversions	NWA Section 21 (c) and (i)	Impeding and diverting the flow of water in a watercourse; altering the bed, banks, course or characteristic of a watercourse.	Start and end points of diversions provided below:
		Two diversions of watercourse around the North Pit	Start: S25° 1' 31.66"; E30° 6' 31.61" End: S25° 1' 19.06"; E30° 6' 50.98" Start: S25° 1' 32.48"; E30° 6' 32.33" E) End: S25° 1' 58.77"; E30° 7' 6.76"
		Diversion of watercourse around the South open-pit	Start: S 25° 2' 57.05"; E30° 7' 2.14" End: S25° 1' 58.26"; E30° 7' 7.21"
		Flood protection berm at South open-pit.	Start: S25° 2' 46.78"; E30° 7' 10.00" End: S25° 2' 18.55"; E30° 7' 5.10"

Activity	Water Use	Description	Volume/Capacity
		Two diversions of watercourse around the around the Mareesburg TSF.	Start: S25° 1' 21.50"; E30° 8' 57.93" End: S25° 0' 40.47"; E30° 9' 25.98" Start: S25° 0' 39.27"; E30° 9' 25.11" End: S25° 0' 17.34"; E30° 8' 42.51"
Discharging waste or water containing waste into a water resource	NWA Section 21 (f)	Discharge of waste water from fish raceway concrete channels into Groot Dwars River	52 560 m ³ /a
Dirty water containment areas	NWA Section 21 (g)	Waste rock storage for rehabilitation (WRD Option A/B)	759 462 m ³
		Waste rock storage for rehabilitation (WRD C)	759 462 m ³
		Waste rock storage for rehabilitation (WRD D)	12 188 243 m ³
		Waste rock storage for rehabilitation (WRD Option E/F)	12 188 243 m ³
		North pit backfill with overburden / waste rock (alternative to G7)	10 730 000 t
		South pit backfill with overburden / waste rock	13 640 000 t
		North pit ore stockpile	Not specified
		South pit ore stockpile	Not specified
		Open pit settling dams – North Pit	110 341 m ³
		Open pit settling dams – South Pit	253 733 m ³
		Open pit PCD - Containment of excess pit water	Containment of excess pit water
		Mareesburg TSF	3 000 000 t
		Mareesburg RWD	1 006 572 m ³
		Dust suppression from PCD or settling dam	109 500 m ³
		Dust suppression from RWD	16 500 m ³
		Dust suppression from Mareesburg RWD	36 230 m ³
Fish raceways	52 560 m ³		
Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of any activity or for the safety of the people	NWA Section 21 (j)	Northern pit fissure water	237 per day
		Southern pit fissure water	651 per day
2019 WUL: Associated with Mototolo Mine			
Taking water from a water resource	NWA Section 21 (a)	Taking water from boreholes at Mototolo North and South (BHMN1, BHMN2 and BHMS4) for domestic purposes.	Maximum quantity of 39 000 m ³ /a
Taking water from a water resource	NWA Section 21 (a)	Taking water from underground on the farm Thorncliffe 374KT on Mototolo North and South for mining purposes.	Maximum quantity of 66 000 m ³ /a
Clean/potable water storage	NWA Section 21 (b)	Storage of clean/potable water.	Five water storage tanks with the following capacities: 50 m ³ 25 m ³ 68 m ³ x 2 600 m ³ (firefighting purposes)

Activity	Water Use	Description	Volume/Capacity
Clean water diversions	NWA Section 21 (c) and (i)	Impeding and diverting the flow of water in a watercourse; altering the bed, banks, course or characteristic of a watercourse. Two clean water diversion	Start: S24°59'15.2"; E30°06'24.7" End: S24°59'01.6"; E30°06'20.7" Start: S24°56'50.6" End: E30°11'66.4"
Conveyor crossing a drainage line	NWA Section 21 (c) and (i)	Impeding and diverting the flow of water in a watercourse; altering the bed, banks, course or characteristic of a watercourse.	N/A
Storm Water Dam (Mototolo South/Borwa)	NWA Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource	Dispose a maximum quantity of 6 570 m ³ /a of dirty storm water into the stormwater dam with the capacity of 8 600 m ³ /a for reuse at the Mototolo South mining operation
Storm Water Dam (Mototolo Lebowa/North)	NWA Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource	Dispose a maximum quantity of 7 081 m ³ /a of dirty storm water into the stormwater dam with the capacity of 6 800 m ³ /a for reuse at the Mototolo South mining operation
Dispose of domestic sewage into two (2) Biogela FMP	NWA Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource	Capacity of 30 113 m ³ /a, water is to be reused in the process
Settling Dams Mototolo Lebowa/North	NWA Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource	66 000 m ³ /a combined for Mototolo North and South
Settling Dams Mototolo Lebowa/North	NWA Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource	66 000 m ³ /a combined for Mototolo North and South

9.3 Impact management outcomes

The objectives of this Consolidated EMPr are to:

- Provide a method to verify performance and compliance with the relevant regulatory provisions and guidelines while monitoring of the commitments allows for continual feedback and opportunities to improve;
- Provide mitigation measures to mitigate the identified potential;
- Provide AAP-RPM with management measures to conduct activities at the Der Brochen-Mototolo Mine Complex;
- Establish a method of monitoring and auditing environmental management practices during all phases of the operation;
- Demonstrate that safety measures are complied with; and
- Specify time periods within which mitigation measures must be implemented, where appropriate.

The main outcomes of the implementation of the management measures, detailed in Sections 8.5 in this report, are to minimise and where possible avoid the impacts that may be associated with the Der Brochen-Mototolo Mine Operation as well as achieve compliance with the standards as summarised in Table 9-2.

Table 9-2: Compliance Standards to be achieved with regards to environmental aspects

Environmental aspect	Phase/Time period	Standard to be achieved	Compliance with standards
Soils, Land Use and Land Capability	Continuous during construction, operations and closure	To minimise soil contamination through the implementation of: <ul style="list-style-type: none"> • Inspection and maintenance Plan; • Leak/Spill Procedure; • Emergency Preparedness Plan; and • Waste Management. 	Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331). Anglo American Policies and Guidelines to manage and remediate spills.
	Continuous during construction, operations and closure	To demonstrate active stewardship of land and biodiversity by: <ul style="list-style-type: none"> • Identifying and removing relevant species of conservation concern if necessary; and • Implementing the Biodiversity Action Plan. 	Anglo American Biodiversity Performance Standards Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331). Anglo American Policies and Guidelines to manage and remediate spills.
Surface water	Continuous during construction, operations and closure	To avoid or where not possible, minimise and remedy pollution of water through: <ul style="list-style-type: none"> • Implementing a Leak/Spill Procedure; • Continuously implementing the surface water monitoring programme, in accordance with the WULs; • Compiling monitoring reports; • Implementing the Stormwater Management Plan; • Responding to complaints and implementing a grievance mechanism; and • Compliance with WULs. 	Water Quality Objectives as specified in the Water Use License issued by DWS Anglo American Policies and Guidelines to manage and remediate spills.
Groundwater	Continuous during construction, operations and closure	To prevent contamination of waterbodies downstream by: <ul style="list-style-type: none"> • Continuously implementing the groundwater monitoring programme and model; • Responding to complaints and implementing a grievance mechanism with regards to groundwater; and • Compliance with WULs. 	Anglo American Policies and Guidelines to manage and remediate spills. Water Quality Objectives as specified in the Water Use License issued by DWS
Air Quality	Continuous during construction, operations and closure	To minimise the entrapment potential of dust. <ul style="list-style-type: none"> • To keep PM_{2.5} and PM₁₀ and dust fallout levels at key receptor sites around the project area within guideline levels. As the guidelines vary depending on the priority area and year, the South African Air Quality Information System (http://www.saaqis.org.za/) should be consulted for the most recent guidelines. <p>These aforementioned standards will be achieved by:</p> <ul style="list-style-type: none"> • Continuously implementing the dust monitoring programme; and • Appropriate dust suppression techniques. 	GNR 893 Minimum Emission Standards. Anglo Air Quality Performance Standards.

Environmental aspect	Phase/Time period	Standard to be achieved	Compliance with standards
Noise	Continuous during construction, operations and closure	To minimise noise impacts on sensitive receptors by: <ul style="list-style-type: none"> Developing a complaints register to record complaints regarding noise. To maintain noise levels at the standards for suburban areas (SANS 10103) as far as practicable. 	Compliance with SANS 10103 Acceptable Ambient Levels and SANS 10210 of 2004, the national standard for calculating and predicting of road traffic noise SANS 10328 of 2008 Noise Control Regulations – General Notice R154 of 10 January 1992
Heritage	Continuous during construction, operations and closure.	To ensure heritage resources are not damaged during the mining process	Ordinance on Excavations (Ordinance no. 12 of 1980) (replacing the old Transvaal Ordinance no. 7 of 1925).
Social	Continuous during construction, operations and closure	<ul style="list-style-type: none"> To enhance benefits from the development of the mine; To maximise opportunities for local residents; To facilitate employment of local labour on the Mine; and To avoid creating unrealistic expectations. <p>These standards will be achieved by the implementation of the SLP.</p>	Anglo American Closure Toolbox. Anglo American Social Way The operation's Social Labour Plan Anglo American Environmental Way

9.4 Impact management actions

Management actions or management measures that will be implemented and are being implemented in respect of the Der Brochen-Mototolo Mine Complex's operation at different phases of the operation are summarised under this section of the EMPr.

9.4.1 Impact management actions during construction phase

The following approved project related infrastructure still needs to be developed and management measures implemented to manage negative impacts that may be associated with the development of these infrastructure and activities. The management measures to be implemented during the construction of the said infrastructure are summarised in the reference table included in the list below.

- North and South Pits – refer to Table 9-3 for the list of required management measures;
- Co-Disposal Facility – refer to Table 9-4 for the list of required management measures;
- Mareesburg TSF – refer to Table 9-5 for the list of required management measures;
- Mareesburg Pipeline – refer to Table 9-6 for the list of required management measures; and
- Removal of existing 132 kV powerline route and construction of the powerline on the proposed new route – refer to Table 9-7 for the list of required management measures.

Table 9-8 provides a summary of the combined social management measures that will need to be implemented during the construction phase of any of the above listed infrastructure.

Table 9-3: Management measures in respect of the development of the North and South Pits

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the North and South Pits						
C1	Soils, Land Capability and Land Use	Loss of soil resources	<ul style="list-style-type: none"> To minimise the loss of soil by removing and storing soil to enable its reuse for rehabilitation. 	<ul style="list-style-type: none"> Soils will be stripped and stockpiled for use during rehabilitation. The following conservation principles will apply: <ul style="list-style-type: none"> Stripped soil will be stored with as little compaction as possible; Ensure the conservation of the seed bank; Single handing will be practiced where possible; Stockpiles that are likely to remain undisturbed for 12 months or more will be revegetated; Land to which soil has been applied will be revegetated 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Contractor 	<ul style="list-style-type: none"> Topsoil stockpiled Development according to block plans Revegetated soil stockpiles
C2		Contamination of soil resource due to hydrocarbon spills during construction	<ul style="list-style-type: none"> To prevent and minimise soil contamination. To remediate contaminated soils. 	<ul style="list-style-type: none"> Conduct daily equipment inspections to detect leaks which may lead to hydrocarbon spills. Regular maintenance of vehicles. Placement of drip trays under vehicles when parked and during fuel transfer. Undertake on-site bioremediation or remove contaminated soils and dispose of at a licensed hazardous waste storage facility. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Contractor Land Manager 	<ul style="list-style-type: none"> Leak/spill Procedure Topsoil stockpiles Environmental Incident Report Inspection and Maintenance Plan
C3	Biodiversity	Removal and loss of vegetation communities with a High / Medium- High Significance	<ul style="list-style-type: none"> To demonstrate active stewardship of land and biodiversity. 	<ul style="list-style-type: none"> The Open Pit footprint areas will be clearly marked to contain activities within the designated area. Prior to construction, the areas surrounding each footprint area will be marked to prevent further destruction of the surrounding vegetation communities, specifically near the riparian areas Protect surrounding sensitive areas. 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Land Manager 	<ul style="list-style-type: none"> Identify and remove relevant species if necessary Established onsite nursery Development according to block plans

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the North and South Pits						
		including wetland/ephemeral systems		<ul style="list-style-type: none"> • Consideration will be given to the harvesting of vegetation (trees and medicinal plants) by stakeholders prior to final stripping of vegetation. Such a programme will be developed in consultation with stakeholders and access to the mine area will be controlled by RPM. • Create biodiversity awareness with construction crew and Environmental Control Officer (ECO) on site through training sessions and the preparation of a Biodiversity Awareness Programme. • Appoint a biodiversity specialist to identify CI species within the Open Pits footprint for potential relocation or to be grown in the on-site nursery for use during rehabilitation. • All CI species identified within the footprint of the Open Pits that can successfully grow ex situ will be translocated and the necessary permits applied for. • Establish an onsite nursery for the growing and storing of plants for use in rehabilitation, including <i>Vitex</i> species. • The Cicada population will be monitored during the mining phases. The mine is participating in ongoing studies of the invertebrate fauna. 		<ul style="list-style-type: none"> • Biodiversity Action Plan • Environmental Awareness Plan
C4		Increase in alien invasive species impacting on natural plant community structures	<ul style="list-style-type: none"> • To prevent the spread of alien invasive species 	<ul style="list-style-type: none"> • Ensure excavation equipment entering the site is cleaned and free of any seed propagules (this includes soil imports into the area- certificates required from source). • An Alien Invasive Management Plan is required for all current and future operations. • Educate the Construction crew on the identification and eradication of the top 10 alien species found within the area. Create 	<ul style="list-style-type: none"> • Environmental Coordinator • Contractor • Land Manager 	<ul style="list-style-type: none"> • Alien Invasive Management Plan • Induction Programme on Alien Invasive species • Biodiversity Action Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the North and South Pits						
				an induction programme at commencement of the project.		
C5	Wetlands	Increase in erosion and sediment loads	<ul style="list-style-type: none"> To prevent or minimise erosion 	<ul style="list-style-type: none"> Clearly demarcate areas to be cleared and ensure that vegetation clearing only occurs within the demarcated areas. Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities. 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Land Manager 	<ul style="list-style-type: none"> Development of method statement for Construction as part of the IWWMP
C6		Impact on riparian zone	<ul style="list-style-type: none"> To minimise the disturbance on riparian zones and habitats 	<ul style="list-style-type: none"> Provide adequate contractor laydown areas. Contractor laydown areas will not encroach into drainage line / riparian areas or their respective buffer zones. Vehicles will remain on demarcated roads and not encroach into drainage line / riparian areas or their respective buffer zones. 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Land Manager 	<ul style="list-style-type: none"> Established contractor laydown area as per the block plan
C7		Impact on drainage line habitats vegetation habitats	<ul style="list-style-type: none"> To minimise disturbance to drainage line habitats 	<ul style="list-style-type: none"> Where possible, infrastructure will be placed outside of drainage line areas to reduce loss of habitats. Topsoil stockpiles will not be placed directly adjacent to drainage line or riparian features and measures such as provision of berms and hessian curtains will be implemented to prevent erosion and sedimentation. Clear separation of clean and dirty water will take place and diversion of clean water around operational areas must ensure minimisation of the loss of catchment yield. 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Land Manager 	<ul style="list-style-type: none"> Topsoil stockpiles Development according to block plans Stormwater Management Plan
C8	Surface Water	Increase in erosion from areas of exposed soils during site clearing and grubbing	<ul style="list-style-type: none"> Prevent/ minimise soil erosion 	<ul style="list-style-type: none"> Flood protection berms will be constructed where the Southern pit footprint falls within the 1:100 year floodline. Erosion control measures in the form of temporary erosion prevention berms will be implemented during construction. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan Erosion Control measures

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the North and South Pits						
				<ul style="list-style-type: none"> • Clean water diversion bunds will be constructed upstream of a construction site prior to clearing areas for new infrastructure. • Paddocks will be constructed downstream of the working activities to minimise uncontrolled runoff from the site. • Areas disturbed by construction activities will be rehabilitated immediately on completion of construction at each area. 		
C9		Increased potential for damming and flooding and subsequent damage to property and infrastructure due to hardstanding areas	<ul style="list-style-type: none"> • Reduce the risk of flooding 	<ul style="list-style-type: none"> • Stormwater measures will be appropriately designed to allow for free flow of water. • Areas will be appropriately graded to prevent ponding. 	<ul style="list-style-type: none"> • Environmental Coordinator • Mining Engineer • Project Manager 	<ul style="list-style-type: none"> • Stormwater Management Plan •
C10		Deterioration in surface water quality due to spillages and accidental discharges	<ul style="list-style-type: none"> • To avoid or where not possible, minimise and remedy pollution of surface water during construction. 	<ul style="list-style-type: none"> • Clean water diversions will be constructed prior to clearing areas for new infrastructure. • Hazardous substances and potentially polluting materials will be stored in appropriately bunded areas located outside of the riparian zone. Bunds will be designed for a capacity of 110% of the stored material. • Servicing and maintenance of vehicles and equipment will be done outside the riparian zone in appropriate facilities designed for this purpose. • Contractors will be adequately trained in handling of hazardous substances and 	<ul style="list-style-type: none"> • Environmental Coordinator • Mining Engineer • Project Manager • Contractor 	<ul style="list-style-type: none"> • Stormwater Management Plan • Leak/spill Procedure • Water monitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the North and South Pits						
				<p>potentially polluting materials especially during transport in the vicinity of the riparian zone, e.g. over river crossings.</p> <ul style="list-style-type: none"> Contractors will be made aware of the WUL conditions that apply during construction and will be held liable for environmental damages caused by spillages. Emergency action plans will be drawn up to deal with spillages. Contaminated runoff (excluding that contaminated by hydrocarbons) will be contained and reused as necessary e.g. for dust suppression. Chemical toilets will be provided at construction sites. 		
C11		Alteration of catchment hydrology causing change in watercourse functionality and increased risk of flooding and scouring	<ul style="list-style-type: none"> Reduce the risk of flooding and scouring 	<ul style="list-style-type: none"> Runoff from the catchment will be diverted away from the open pit areas by cut-off channels and diversion berms designed to handle the 1:50 year storm event. Energy dissipaters will be constructed in areas of concentrated flows. Routine inspections and maintenance will be conducted to keep the diversions free of debris (silt build up, vegetation etc.) and areas suitably graded. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan Inspection and Maintenance Plan Water monitoring reports Routine inspection reports
C12	Air Quality	Increase in nuisance dust potentially impacting sensitive receptors	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints about dust related health and nuisance impacts. 	<ul style="list-style-type: none"> Undertake dust suppression where feasible on stockpiles and materials handling activities. Undertake dust suppression or chemical stabilization of unpaved roads. Haul trucks to be restricted to specified haul roads. Speed limit on unpaved roads not to exceed 40 km/hr. 	<ul style="list-style-type: none"> Project Manager Environmental Coordinator Safety, Health and Environment (SHE) Manager 	<ul style="list-style-type: none"> Monthly air quality monitoring records Complaints register to record complaints regarding nuisance dust Reports advising on establishment of vegetation

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the North and South Pits						
					<ul style="list-style-type: none"> Community Engagement and Development (CED) Manager 	
C13	Noise	Increase in ambient noise levels potentially affecting community well-being	<ul style="list-style-type: none"> To prevent or minimise adverse noise impacts from construction. To respond with corrective action to public complaints about noise. 	<ul style="list-style-type: none"> Construction activities will be confined to daylight hours. Construction vehicles will be serviced at regular intervals to minimise noise generation. The contractors/RPM will respond to public complaints about noise. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager SHE Manager 	<ul style="list-style-type: none"> Complaints register to record complaints regarding noise Record of vehicle services
C14	Cultural Heritage	Demolition or relocation of cultural heritage sites resulting in the disturbance of significant sites and graves	<ul style="list-style-type: none"> To demonstrate active stewardship towards culturally significant heritage sites. To avoid disturbance of sites and activities of cultural significance and where not possible to determine mitigation in consultation with local communities 	<ul style="list-style-type: none"> Graves and cemeteries in the footprint areas are to be exhumed and relocated in accordance with mandated procedure by a qualified Archaeologist. Heritage sites within the footprint areas rated low to high significance, require a permit from SAHRA for the demolition thereof. The necessary permits for grave relocation will be obtained from the South African Heritage Resources Agency (SAHRA). The identified ruins (AA110) will be mapped by a qualified Archaeologist and permits should be obtained prior to demolition. Undertake a Phase 2 Heritage Impact Assessment to further assess heritage sites identified during the impact assessment. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager Project Manager 	<ul style="list-style-type: none"> All findings documented and finds recorded by a qualified (as per SAHRA) specialist
C15	Visual	Decrease in visual aesthetics of the area	<ul style="list-style-type: none"> To minimise the visual impact of the Pits and ensure it blends into the natural environment. 	<ul style="list-style-type: none"> Minimise vegetation clearing to the demarcated footprint area of the Open Pits. 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Mining Engineering 	<ul style="list-style-type: none"> Development according to block plans

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the North and South Pits						
C16	Traffic and Transportation	Increased generation of traffic on existing road networks potentially resulting in an increase in road traffic	<ul style="list-style-type: none"> To minimise/ prevent road accidents. 	<ul style="list-style-type: none"> Traffic conditions to be monitored annually, should traffic congestion increase, appropriate mitigation measures will be explored and implemented. 	<ul style="list-style-type: none"> SHE Manager Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Annual reporting on traffic related incidents and traffic increase.
C17		Impact on pedestrians and cyclists	<ul style="list-style-type: none"> To minimise/ prevent road accidents. 	<ul style="list-style-type: none"> Control access by cyclists and pedestrians to the site 	<ul style="list-style-type: none"> SHE Manager Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Annual reporting on traffic related incidents and traffic increase.
C18		Impact on road safety conditions resulting in a potential increase in road accidents	<ul style="list-style-type: none"> To minimise/ prevent road accidents. 	<ul style="list-style-type: none"> Drivers of heavy construction vehicles should attend a road safety and driving course to sensitise them to the impact they have on driving conditions for other drivers on the road. 	<ul style="list-style-type: none"> SHE Manager Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Annual reporting on traffic related incidents and traffic increase.
C19		Decreased condition of the road network	<ul style="list-style-type: none"> To minimise/ prevent further damage to roads. 	<ul style="list-style-type: none"> Develop a standard operating procedure for mine drivers to identify and report on potholes and road edge breaks to the operations manager who in turn will report it to the relevant authorities. 	<ul style="list-style-type: none"> SHE Manager Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Regular reporting of potholes and poor road conditions.

Table 9-4: Management measures in respect of the development of the co-disposal facility

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Co-Disposal Facility						
C20	Soils, Land Capability and Land Use	Loss of soil resources		<ul style="list-style-type: none"> Refer to C1 in this table for applicable management measures 		
C21		Contamination of soil resource		<ul style="list-style-type: none"> Refer to C2 in this table for applicable management measures 		
C22	Biodiversity	Removal and loss of vegetation communities with a High / Medium-High Significance including wetland/ephemeral systems		<ul style="list-style-type: none"> Refer to C3 in this table for applicable management measures 		
C23		Increase in Alien invasive species		<ul style="list-style-type: none"> Refer to C4 in this table for applicable management measures 		
C24		Wetlands	Increase in erosion and sediment loads		<ul style="list-style-type: none"> Refer to C5 in this table for applicable management measures 	
C25		Impact on riparian zone		<ul style="list-style-type: none"> Refer to C6 in this table for applicable management measures 		
C26		Loss of habitat and increased erosion during construction of the starter wall	<ul style="list-style-type: none"> To prevent/ minimise erosion. To prevent/minimise loss of wetland habitat. 	<ul style="list-style-type: none"> Wherever possible, infrastructure will be placed outside of drainage line areas to reduce loss of habitats. Topsoil stockpiles will not be placed directly adjacent to drainage lines or riparian features and measures such as berms and hessian curtains will be implemented to prevent erosion and sedimentation. 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Land Manager 	<ul style="list-style-type: none"> Development of method statement for construction as part of the IWWMP
C27	Surface Water	Increase in erosion from areas of exposed soils		<ul style="list-style-type: none"> Refer to C8 in this table for applicable management measures 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Co-Disposal Facility						
		during site clearing and grubbing				
C28		Increased potential for damming and flooding and subsequent damage to property and infrastructure due to hardstanding areas		<ul style="list-style-type: none"> Refer to C9 in this table for applicable management measures 		
C29		Deterioration in surface water quality due to spillages and accidental discharges		<ul style="list-style-type: none"> Refer to C10 in this table for applicable management measures 		
C30		Alteration of catchment hydrology causing change in watercourse functionality and increased risk of flooding and scouring	<ul style="list-style-type: none"> To reduce the risk of flooding 	<ul style="list-style-type: none"> Runoff from the catchment will be diverted away from the Co-Disposal Facility by cut-off channels and diversion berms designed to handle the 1:50 year storm event. Energy dissipaters will be constructed in areas of concentrated flows. Routine inspections and maintenance will be conducted to keep the diversions free of debris (silt build up, vegetation etc.) and areas suitably graded. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan Water monitoring reports
C31		Deterioration of surface water quality due to use	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of surface water during construction. 	<ul style="list-style-type: none"> Dirty water that is generated will be contained on site for reuse. Provide chemical toilets at construction sites. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Stormwater Management Plan Leak/spill Procedure Water monitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Co-Disposal Facility						
		of waste rock in construction			• Project Manager	
C32	Air Quality	Increase in nuisance dust		• Refer to C12 in this table for applicable management measures		
C33	Noise	Increase in ambient noise levels	<ul style="list-style-type: none"> • To prevent or minimise adverse noise impacts from construction. • To respond with corrective action to public complaints about noise. 	<ul style="list-style-type: none"> • Construction vehicles will be serviced at regular intervals to minimise noise generation. • The contractors/RPM will respond to public complaints about noise. 	<ul style="list-style-type: none"> • Environmental Coordinator • CED Manager • SHE Manager 	<ul style="list-style-type: none"> • Complaints register to record complaints regarding noise • Record of vehicle services
C34	Cultural Heritage	Impact on cultural heritage sites		• Refer to C14 in this table for applicable management measures		
C35	Visual	Decrease in visual aesthetics of the area	• To minimise the visual impact of the Co-Disposal Facility and ensure it blends into the natural environment.	• Minimise vegetation clearing to the demarcated footprint area of the Co-Disposal Facility.	• Environmental Coordinator	• Closure and Rehabilitation Plan
C36	Traffic and transportation	Increased generation of traffic on existing road networks during construction		• Refer to C16 in this table for applicable management measures		
C37		Impact on pedestrian and cyclists		• Refer to C17 in this table for applicable management measures		
C38		Impact on road safety conditions		• Refer to C18 in this table for applicable management measures		
C39		Decreased condition of the road network		• Refer to C19 in this table for applicable management measures		

Table 9-5: Management measures in respect of the construction of Maresburg TSF

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Maresburg TSF						
C40	Soils, Land Capability and Land Use	Loss of soil resources at sites where Tailings Dam started walls will be located	<ul style="list-style-type: none"> To minimise the loss of soil by removing and storing soil to enable its reuse for rehabilitation. 	<ul style="list-style-type: none"> Topsoil of the Tailings Dam is to be removed to build the starter walls, where feasible, part of the topsoil will be left to form a clay floor layer. Wet tailings are to be deposited into the dam. A soil stripping plan will be developed to ensure that, as far as is practical, sufficient soil can be obtained at each site to provide for the rehabilitation requirements at that site. Soil which has been stripped will be stockpiled for use in rehabilitation. Soil will be cleared only from those areas to be affected by immediate construction. Where the contractors are required to spoil material, spoil sites will be identified which are environmentally acceptable and approved by the ECO. Following construction, all remaining denuded areas such as dam walls will be ripped if necessary, graded to an even surface and covered with available topsoil to a depth of approximately 150 mm prior to re-vegetation. Soil not used for rehabilitation on completion of the Construction Phase will be retained for use in rehabilitation of parts of the site during operations and following closure. Energy dissipaters will be constructed at points where there are concentrated discharges of water to the environment (such as at culverts and outflows of water 	<ul style="list-style-type: none"> Contractor Environmental Coordinator Mining Engineering 	<ul style="list-style-type: none"> Topsoil stockpiles Development according to block plans Revegetated soil stockpiles Stormwater Management Plan Water monitoring reports Soil stripping plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
				<p>from diversion canals) which can cause significant erosion. The effectiveness of these energy dissipaters will be checked periodically.</p> <ul style="list-style-type: none"> Stormwater berms will be provided downslope of areas recently stripped of vegetation to ensure that silt-laden stormwater does not flow directly into the Groot-Dwars River or the Der Brochen dam. Monitoring of the contractors' activities to identify areas of erosion. Eroded areas will be repaired where necessary. Construction of water management infrastructure will commence prior to the construction of Tailings Storage Facility to prevent soil erosion. 		
C41		Loss of land of arable/grazing potential	<ul style="list-style-type: none"> To ensure that the footprint area is not exceeded in order to protect current resources. 	<ul style="list-style-type: none"> The area of land to be disturbed and isolated for the purpose of construction, mining and processing activities will be limited, as far as is practical, to the minimum required for safe and efficient operation. Preparation of a detailed land management plan as part of the feasibility work for the possible conservancy. This plan will determine the use and management of natural areas. The footprint extent of the project has been designed to where possible, only impact on the Tailings Storage Facility and associated infrastructure. Minimise the area that can be potentially impacted on (eroded, compacted, sterilised or de-nitrified). 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager Anglo Legal 	<ul style="list-style-type: none"> Minimise footprint by ensuring construction follows block plans Land Management Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
C42	Biodiversity	Loss of natural habitat	<ul style="list-style-type: none"> • To demonstrate active stewardship of land and biodiversity. • To avoid the damage or loss of plants and where not possible to ensure the conservation of representative habitats. 	<ul style="list-style-type: none"> • The area of land disturbed and isolated for the purpose of construction, mining and processing activities will be limited, as far as is practical, to the minimum required for safe and efficient operation • No unnecessary destruction of vegetation will be allowed and, in particular, construction workers will not be allowed to harvest any trees for use as firewood or any other purpose. • The ECO will undertake periodic audits of the effectiveness of the EMP on site. • The following principles will apply to bush and tree clearing: <ul style="list-style-type: none"> - any bush or tree clearing outside of prescribed areas will require the approval of the ECO; - bush and tree clearing will be kept to the absolute minimum within the prescribed areas; - where temporary structures are to be erected, it will be done so as to maximise the protection of trees and other natural features; - the ECO will inspect all areas, in consultation with a specialist, prior to bush and tree clearing, and mark the species to stay intact or to be transplanted; - all timber derived from bush or tree clearing will be made available, free of charge, to local inhabitants (where applicable). Contractors will not be allowed to sell any wood. 	<ul style="list-style-type: none"> • Environmental Coordinator • CED Manager • Land Manager • Contractor 	<ul style="list-style-type: none"> • Identify and remove relevant species if necessary • Implementation of the Biodiversity Action Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
				<ul style="list-style-type: none"> • The mine will investigate the need to establish a medicinal plant nursery that will be under supervision of the ECO. • Priority, rare and endangered species will be identified and removed. • On completion of the Construction Phase, disturbed areas will be graded and topsoiled. The topsoiled areas will then be re-vegetated using indigenous pasture species. • Prior to revegetating the disturbed areas, soil samples will be collected and analysed. If necessary, the soil will be fertilised in accordance with the findings of the soil analysis. • Following re-vegetation, the site will be monitored and maintained until a sound cover that will prevent erosion has been achieved. • The biodiversity specialists will be required to survey the marked out surface infrastructure area in detail prior to clearing to identify plants (number and location) ahead of clearing for purposes of the permit applications. • The necessary permits will be obtained before any clearing of the site takes place. • Plants that are to be translocated for conservation purposes will be removed under the guidance of a recognized taxonomist/ecologist and planted in a conservation area of similar habitat. • Plants that are to be removed for rehabilitation purposes will be removed and replanted in a nursery under the guidance of a recognized landscaper. The mine will 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
				be responsible for the operation of the nursery until such time as rehabilitation has been completed.		
C43		Disturbance/loss of vegetation species and communities of conservation importance, loss of biodiversity and the risk of losing unknown biodiversity due to clearing of vegetation	<ul style="list-style-type: none"> To demonstrate active stewardship of land and biodiversity. To avoid the damage or loss of plants and where not possible to ensure the conservation of representative habitats. 	<ul style="list-style-type: none"> The necessary permits for removal of CI plants will be obtained before any clearing of the site takes place. A qualified horticulturist will supervise mitigation measures for Priority Plant Species (Conservation Important Species) activities. The horticulturist will search the transportation corridor area for more individuals of the priority species, especially of <i>Cyphostemma wilmsii</i> (which will not be translocated unless unavoidable). Any decisions regarding the fate of populations of these priority species will only be made after consultation with the vegetation specialists. Vegetation specialists will be employed to identify individual specimens or populations for possible relocation. Specialists will be involved in establishing a relocation procedure that will include timing and selecting new locations for the plants. The mine will investigate the need to establish a medicinal plant nursery that will be under supervision of the ECO. Any natural building materials will also be made available to neighbouring rural dwellers following their application to the ECO. The access to the area for harvesting of such materials will be controlled and supervised by the ECO. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager Land Manager Contractor 	<ul style="list-style-type: none"> Identify and remove relevant species if necessary Establishment of an onsite nursery Development according to block plans

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
				<ul style="list-style-type: none"> Specialist interest groups such as Operation Wildflower could be invited to participate in plant rescues prior to the commencement of activities. 		
C44		Displacement or disturbance of animal life (and their migration paths) as a result of construction activities	<ul style="list-style-type: none"> To prevent/ minimise the disturbance to animal life. 	<ul style="list-style-type: none"> The Mareesburg TSF footprint area will be clearly demarcated to contain construction activities within the designated area. The area of habitat disturbed and isolated for the purpose of mining and processing activities will be limited, as far as is practical, to the minimum required for safe and efficient operation. Staff will be instructed that no hunting or unnecessary disturbance of wildlife will be allowed on mine property and that transgressors will be severely dealt with. Strict anti-poaching measures will be enforced and the mine will promptly investigate and respond to complaints of poaching. Measures include: <ul style="list-style-type: none"> Access control; Specific travel routes; Area to be fenced; The area will be patrolled; Disciplining and prosecution of offenders; and Separate rules may emanate from the possible conservancy. Noise disturbance to wildlife will be limited by using only pre-determined access routes and restricting noise. Biodiversity awareness will be created with the construction crew and Environmental Officer on site. 	<ul style="list-style-type: none"> Environmental Coordinator Land Manager Contractor 	<ul style="list-style-type: none"> Monitor footprint clearing by contractor Biodiversity awareness Campaign
C45		Disturbance/loss of insect	<ul style="list-style-type: none"> To prevent/minimise disturbance to habitats. 	<ul style="list-style-type: none"> Following construction, all disturbed areas will be rehabilitated. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Minimise foot print by ensuring

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
		species/communities of conservation value due to loss of habitat and habitat fragmentation		<ul style="list-style-type: none"> The Cicada population will be monitored during the mining phases. The mine is participating in ongoing studies of the invertebrate fauna. If possible, Vitex species identified within the footprint of the Mareesburg TSF will be translocated. 	<ul style="list-style-type: none"> Land Manager Contractor 	construction follows block plans <ul style="list-style-type: none"> Monitoring reports
C46		Loss of communities that have a National, Provincial and Local significance and Conservation Importance species	<ul style="list-style-type: none"> To ensure the protection of Conservation Important species 	<ul style="list-style-type: none"> Consider implementation of biodiversity offsets which will require a detailed investigation to find similar habitat to conserve. Appoint a biodiversity specialist to identify CI species that can successfully grow ex situ. These species must be translocated and the necessary permits from DEFF and LEDET must be applied for. Obtain the necessary regulatory authorisation for crossing any of the streams / drainage lines or wetlands. Where the road/Pipeline traverses a wetland, measures will be implemented to ensure that the road has minimal effect on the flow of water through the wetland, e.g. by using box culverts rather than pipes. 	<ul style="list-style-type: none"> Environmental Coordinator Land Manager Contractor 	<ul style="list-style-type: none"> Implementation of the Biodiversity Action Plan
C47		Increase in Alien invasive species		<ul style="list-style-type: none"> Refer to C4 in this table for applicable management measures 		
C48	Wetlands	Increase in erosion and sediment loads resulting in the loss of wetland habitats and ecoservices	<ul style="list-style-type: none"> To prevent/ minimise erosion. To prevent/minimise edge effects. 	<ul style="list-style-type: none"> Clearly demarcate areas to be cleared and ensure that vegetation clearing only occurs within the demarcated areas. Ensure that erosion management and sediment controls are strictly implemented from the beginning of site Minimise the footprint and control edge effects. Restrict preparation of the construction site to drier months to decrease the potential for erosion caused by rainfall. 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Land Manager 	<ul style="list-style-type: none"> Development of method statement for Construction as part of the IWWMP

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
C49		Impact on riparian zone		<ul style="list-style-type: none"> Refer to C6 in this table for applicable management measures 		
C50		Impact on drainage line habitat		<ul style="list-style-type: none"> Refer to C7 in this table for applicable management measures 		
C51	Surface Water	Deterioration of surface water quality due to increased sediment loads as a result of erosion	<ul style="list-style-type: none"> To prevent/ minimise erosion. 	<ul style="list-style-type: none"> A stormwater management plan, including watercourse diversions, will be implemented at the onset of construction. Construction of water management infrastructure will commence prior to the TSF. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan Water monitoring reports
C52		Deterioration of surface water quality due to contamination of runoff by oil and fuel spills and leaks, and other construction activities	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of surface water during construction. 	<ul style="list-style-type: none"> Construction areas and construction campsites will be provided with earth berms which will divert clean stormwater runoff and prevent this water from entering such working areas. Re-vegetation of all denuded area. A leak/spill detection plan will be devised and implemented for all possible areas of leak/spillage within the construction site. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan Leak/spill Procedure Water monitoring reports
C53		Deterioration of surface water quality due to erosion, spillages and accidental discharges at the Pipeline crossings	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of surface water during construction. 	<ul style="list-style-type: none"> Clean stormwater cut-off drains with diversion berms will be positioned to divert stormwater from the sites. The drains will be designed to accommodate a 1:50 year storm and diversion berms will assist to divert a 1:100 year storm. Stormwater diverted by these drains and berms will be redirected towards the natural watercourses in the area. All storage areas will be bunded and will have a peripheral collection drain, with oil interceptors (if required). Daily checks will be conducted by the contractors on the dispensing mechanism of above-ground storage tanks to ensure the timeous identification of faults. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan Leak/spill Procedure Water monitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
				<ul style="list-style-type: none"> • Collection containers (e.g. drip trays) will be placed under all dispensing mechanisms of hydrocarbon or hazardous liquid substances to ensure contamination from leaks and dispensing is contained. • The dispensing mechanism of diesel will be stored in a container when not in use. • Liquid wastes will not be disposed of in stormwater drains. Details regarding proposed methods for treatment of pollutants will be submitted by contractors to the ECO for acceptance prior to treatment. • Any spillage, irrespective of its size, will be contained and cleaned up immediately. • Contractors will ensure that adequate measures (e.g. attenuation/settlement dams or oil absorbent products) are in place to prevent pollution. A method statement will be required from the contractors to this effect. • Stormwater culverts at watercourse crossings will be designed and constructed to accommodate the 1:50 year storm event. • Areas disturbed by linear construction activities will be rehabilitated immediately on completion of construction of each area. • Erosion protection and energy dissipaters will be constructed at the crossings as applicable. • Contractors will be made aware of the WUL conditions that apply during construction and made liable for environmental damages caused by spillages. • Emergency action plans should be drawn up to deal with spillages. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Maresburg TSF						
				<ul style="list-style-type: none"> Chemical toilets will be provided at construction sites. 		
C54		Increase in erosion from areas of exposed soils during site clearing and grubbing		<ul style="list-style-type: none"> Refer to C8 in this table for applicable management measures 		
C55		Increased potential for damming and flooding and subsequent damage to property and infrastructure due to hardstanding areas		<ul style="list-style-type: none"> Refer to C9 in this table for applicable management measures 		
C56		Deterioration in surface water quality due to spillages and accidental discharges		<ul style="list-style-type: none"> Refer to C10 in this table for applicable management measures 		
C57	Air Quality	Increased dust levels during construction of infrastructure and roads	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints about dust related health and nuisance impacts. 	<ul style="list-style-type: none"> The contractors and the mine will control dust on the site and access roads to acceptable levels, with water, chemical soil stabilisers or temporary surfacing. The mine will undertake monthly dust monitoring at various locations along the main access road and shaft access roads until these are tarred. Fines (cement spills and dried sludge) will be collected at regular intervals so as not to contribute to excessively dusty conditions. Dust control measures (which may also include spraying of water) will be sufficient 	<ul style="list-style-type: none"> Project Manager Environmental Coordinator SHE Manager CED Manager 	<ul style="list-style-type: none"> Monthly air quality monitoring records Complaints register to record complaints regarding nuisance dust Dust suppression

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Maresburg TSF						
				<p>to ensure that dust will not have significant impacts in terms of the biophysical and social environments. These impacts include visual pollution, decreased safety due to reduced visibility, health aspects and ecological impacts due to dust particle accumulation in the watercourses and on vegetation.</p> <ul style="list-style-type: none"> • Vehicle speeds on any gravel or earth roads will be limited to 40 kph. • Movement of vehicles on site will be restricted. • Dust suppression will be undertaken of the service roads and TSF where required. • Only the immediate footprint of the area will be cleared of vegetation. 		
C58		Increase in nuisance dust		<ul style="list-style-type: none"> • Refer to C12 in this table for applicable management measures 		
C59	Noise	Increase in ambient noise levels to surrounding communities (Leshaba family) as a result of construction activities	<ul style="list-style-type: none"> • To prevent or minimise adverse noise impacts from construction • To respond with corrective action to public complaints about noise. 	<ul style="list-style-type: none"> • Machinery and vehicle silencer units will be maintained in good working order. Non-compliant machinery and/or vehicles will be removed from service until repaired. • Should community complaints be received with regard to noise generation, mine management will, at the discretion of the ECO, investigate this, model the noise against the baseline information obtained during the specialist survey and implement appropriate measures. Possible best practice management measures regarding noise mitigation include: • Construction activities will be confined to daylight hours. • A noise monitoring programme will be implemented prior to construction. 	<ul style="list-style-type: none"> • Environmental Coordinator • CED Manager • SHE Manager 	<ul style="list-style-type: none"> • Complaints register to record complaints regarding noise • Record of vehicle services

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg TSF						
				<ul style="list-style-type: none"> Construction vehicles will be serviced at regular intervals to minimise noise generation. 		
C60	Cultural Heritage	Disturbance or destruction of historical and cultural sites	<ul style="list-style-type: none"> To demonstrate active stewardship towards culturally significant heritage sites. To avoid disturbance of sites and activities of cultural significance and where not possible to determine mitigation in consultation with local communities 	<ul style="list-style-type: none"> Cemeteries near infrastructure will be fenced to ensure their protection. Heritage sites within the footprint area rated low to high significance, require a permit from SAHRA for the demolition thereof. Graves identified within the footprint area will be exhumed and relocated, following the mandated procedure by a qualified Archaeologist. The necessary permits for grave relocation will be obtained from SAHRA. Undertake a Phase 2 Heritage Impact Assessment to further assess heritage sites identified during the impact assessment. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager Project Manager 	<ul style="list-style-type: none"> All findings documented and finds recorded by a qualified (as per SAHRA) specialist
C61	Visual	Decrease in visual aesthetics of the area	<ul style="list-style-type: none"> To minimise the visual impact of the TSF and ensure it blends into the natural environment. 	<ul style="list-style-type: none"> Minimise vegetation clearing to the demarcated footprint area of the Mareesburg TSF The Tailings Dam has been placed in a position against a hill where it will not stand out from the surrounding topography and be less noticeable than other potential sites. The starter wall will be covered with a soil layer and will be re-vegetated early in the Operational Phase. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan
C62	Traffic and Transportation	Increased generation of traffic on existing road networks during construction		<ul style="list-style-type: none"> Refer to C16 in this table for applicable management measures 		
C63		Impact on pedestrian and cyclists		<ul style="list-style-type: none"> Refer to C17 in this table for applicable management measures 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Maresburg TSF						
C34		Impact on road safety conditions		<ul style="list-style-type: none"> Refer to C18 in this table for applicable management measures 		
C65		Decreased condition of the road network		<ul style="list-style-type: none"> Refer to C19 in this table for applicable management measures 		

Table 9-6: Management measures in respect of the construction of pipeline system associated with the Maresburg TSF

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Maresburg Pipelines (tailings delivery and return water)						
C66	Soils, Land Capability and Land Use	Loss of soil resources as a result of sterilisation from Pipeline and road	<ul style="list-style-type: none"> To prevent/ minimise loss of soil resources. 	<ul style="list-style-type: none"> Place Pipelines on plinths to avoid compaction of soils. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineering 	<ul style="list-style-type: none"> Topsoil stockpiles Development according to block plans Revegetated stockpiles
C67		Contamination of soil resource		<ul style="list-style-type: none"> Refer to C2 in this table for applicable management measures 		
C68	Biodiversity	Removal and loss of vegetation communities with a High / Medium- High Significance including wetland/ephemeral systems		<ul style="list-style-type: none"> Refer to C3 in this table for applicable management measures 		
C69		Increase in Alien invasive species		<ul style="list-style-type: none"> Refer to C4 in this table for applicable management measures 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg Pipelines (tailings delivery and return water)						
C70	Wetlands	Impact on drainage line features and riparian areas on the Pipeline route	<ul style="list-style-type: none"> To minimise disturbance to drainage lines. To protect drainage line and riparian habitats. 	<ul style="list-style-type: none"> Support structures for the Pipelines will, if possible, be placed outside of drainage line or riparian habitat. The crossing designs of any bridges will ensure that the creation of turbulent flow in the system is minimised in order to prevent downstream erosion. No support pillars will be constructed within the active channels. The Pipelines will be constructed as close as possible to existing or planned roads in order to minimise the need for maintenance personnel to access the Pipeline 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Land Manager 	<ul style="list-style-type: none"> Implementation of the Biodiversity Action Plan
C71	Surface Water	Deterioration of surface water quality due to erosion, spillages and accidental discharges at the Pipeline crossings	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of surface water during construction. 	<ul style="list-style-type: none"> Stormwater culverts at watercourse crossings will be designed and constructed to accommodate the 1:50 year storm event. Areas disturbed by construction activities will be rehabilitated immediately on completion of construction of each area. Erosion protection and energy dissipaters will be constructed at the crossings as applicable Contractors will be made aware of the WUL conditions that apply during construction and made liable for environmental damages caused by spillages. Emergency action plans will be drawn up to deal with spillages. Chemical toilets will be provided at construction sites. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan Leak/spill Procedure Water monitoring reports
C72	Air Quality	Increase in nuisance dust		<ul style="list-style-type: none"> Refer to C12 in this table for applicable management measures 		
C73	Noise	Increase in ambient noise levels		<ul style="list-style-type: none"> Refer to C13 in this table for applicable management measures 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Construction of the Mareesburg Pipelines (tailings delivery and return water)						
C74	Cultural Heritage	Impact on cultural heritage sites		<ul style="list-style-type: none"> Refer to C60 in this table for applicable management measures 		
C75	Traffic and Transportation	Increased generation of traffic on existing road networks during construction		<ul style="list-style-type: none"> Refer to C16 in this table for applicable management measures 		
C76		Impact on pedestrian and cyclists		<ul style="list-style-type: none"> Refer to C17 in this table for applicable management measures 		
C77		Impact on road safety conditions		<ul style="list-style-type: none"> Refer to C18 in this table for applicable management measures 		
C78		Decreased condition of the road network		<ul style="list-style-type: none"> Refer to C19 in this table for applicable management measures 		

Table 9-7: Management measures in respect of the relocation of the 132kV powerline

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Removal of existing 132kV Powerline Route and Construction of the Powerline on the proposed new route						
C79	Soils, Land Capability and Land Use	Impact on soil resources	<ul style="list-style-type: none"> To minimise the loss of soil by removing and storing soil to enable its reuse for rehabilitation. 	<ul style="list-style-type: none"> Topsoil will be stockpiled separately and spread around the foundation at completion of construction to facilitate natural revegetation processes. Backfilled material will be compacted to limit the possibility of erosion. 	<ul style="list-style-type: none"> Contractor Environmental Coordinator Mining Engineering 	<ul style="list-style-type: none"> Topsoil stockpiles Development according to block plans Revegetated soil stockpiles Compacted backfilled material
C80	Biodiversity	Loss of vegetation along the re-routed Powerline route	<ul style="list-style-type: none"> To demonstrate active stewardship towards biodiversity. 	<ul style="list-style-type: none"> Ensure erecting of poles remains out of any wetland/ riparian areas. Limit access to pole positions through existing road networks. 	<ul style="list-style-type: none"> Contractor Environmental Coordinator Land Manager 	<ul style="list-style-type: none"> Identify and remove relevant species if necessary

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Removal of existing 132kV Powerline Route and Construction of the Powerline on the proposed new route						
				<ul style="list-style-type: none"> Remove and replant any CI species within the direct footprint of the pole. 		<ul style="list-style-type: none"> Establishment of an onsite nursery Development according to block plans
C81		Increase in Alien invasive species		<ul style="list-style-type: none"> Refer to C4 in this table for applicable management measures 		
C82	Wetlands	Impact on riparian habitats due to demolition and construction activities	<ul style="list-style-type: none"> To minimise disturbance to riparian habitats 	<ul style="list-style-type: none"> All waste resulting from the demolition of the existing Powerline will be removed from site and disposed of at a Licensed Waste Disposal Facility. Inspect all adjacent drainage lines/ riparian habitats on both the former and new routes for sedimentation on a regular basis. Ensure that support structures for the new Powerline poles are not placed within drainage line areas and their associated buffers. Re-profile topsoil and revegetate disturbed areas once demolition is complete. 	<ul style="list-style-type: none"> Environmental Coordinator Contractor Land Manager 	<ul style="list-style-type: none"> Establishment of contractor laydown areas outside riparian habitats
C83	Surface Water	Increase in erosion from areas of exposed soils exacerbated by increased runoff volume and velocity from soil compacted areas	<ul style="list-style-type: none"> To minimise the loss of soil 	<ul style="list-style-type: none"> Areas disturbed by demolition and construction activities will be rehabilitated immediately on completion in each area. Areas disturbed by linear infrastructure will be rehabilitated progressively as construction progresses. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan
C84	Air Quality	Increase in nuisance dust		<ul style="list-style-type: none"> Refer to C12 in this table for applicable management measures 		
C85	Noise	Increase in ambient noise levels		<ul style="list-style-type: none"> Refer to C13 in this table for applicable management measures 		
C86	Cultural Heritage	Disturbance or destruction of	<ul style="list-style-type: none"> To demonstrate active stewardship towards 	<ul style="list-style-type: none"> Graveyards near infrastructure will be fenced to ensure their protection. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> All findings documented and

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Removal of existing 132kV Powerline Route and Construction of the Powerline on the proposed new route						
		historical and cultural sites	<p>culturally significant heritage sites.</p> <ul style="list-style-type: none"> To avoid disturbance of sites and activities of cultural significance and where not possible to determine mitigation in consultation with local communities 	<ul style="list-style-type: none"> Poles will not be spaced closer than 30 m from graves to ensure that they are not disturbed. Graves beneath or within 30 m of powerlines will be fenced to ensure their protection. The necessary permits for grave relocation will be obtained from the South African Heritage Resources Agency (SAHRA) should grave relocation be required. Heritage sites that were rated low to high require a permit from SAHRA for the demolition thereof, if required. Undertake a Phase 2 Heritage Impact Assessment to further assess heritage sites identified during the impact assessment. 	<ul style="list-style-type: none"> CED Manager Project Manager 	finds recorded by a qualified (as per SAHRA) specialist
C87	Visual	Impact on the visual aesthetics of the area	<ul style="list-style-type: none"> To minimise the visual impact of the Powerline and ensure it blends into the natural environment. 	<ul style="list-style-type: none"> Ensure that the servitude area is maintained and kept neat by clearing the area on a regular basis. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan

Table 9-8: Management measures relation to social aspects to be implemented during construction phase

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
C88	Socio-economic	Contribution to the local and regional economy	<ul style="list-style-type: none"> To enhance benefits from the development of the Project 	<ul style="list-style-type: none"> The mine has developed a SLP which will guide the operation on social issues. This is updated every five years. 	<ul style="list-style-type: none"> CED Manager Environmental Coordinator 	<ul style="list-style-type: none"> Employment records SLP

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
			<ul style="list-style-type: none"> • To maximise opportunities for local residents • To facilitate employment of local labour on the Project 	<ul style="list-style-type: none"> • The mine will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. The mine will strive to direct as much as possible to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. • AAP will inform businesses through appropriate business fora about available opportunities and how business may access these. For example, the Steelpoort Business Forum will be used to engage with businesses in the local and regional areas. • The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as part of AAP's SLP reporting to Government. • AAP will identify potential service providers for longer term procurement. Anglo Zimele can assist Broad Based Black Economic Empowerment (BBBEE) businesses (who meet their requirements) with funding and these 	<ul style="list-style-type: none"> • Construction Manager 	

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
				businesses will be provided with ongoing support. <ul style="list-style-type: none"> Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy. These strategies will be reviewed and monitored for implementation. 		
C89		Contribution to national economic growth	<ul style="list-style-type: none"> To enhance benefits from the development of the Project To maximise opportunities for local residents To facilitate employment of local labour on the Project 	<ul style="list-style-type: none"> The mine will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. The mine will strive to direct as much as possible to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. AAP will inform businesses through appropriate business fora about available opportunities and how business may access these. For example, the Steelpoort Business Forum can be used to engage with businesses in the local and regional areas. The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local suppliers. Contractors will be required to submit annual reports on how they 	<ul style="list-style-type: none"> CED Manager Environmental Coordinator Construction Manager 	<ul style="list-style-type: none"> Employment records SLP

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
				<p>are attaining these targets as part of AAP's SLP reporting to Government.</p> <ul style="list-style-type: none"> AAP will identify potential service providers for longer term procurement. Anglo Zimele can assist BBBEE businesses (who meet their requirements) with funding and these businesses will be provided with ongoing support. Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy. These strategies will be reviewed and monitored for implementation. 		
C90		Social disruption	<ul style="list-style-type: none"> To facilitate continued movement around the site along routes that are as close as possible to existing movement networks To ensure that individuals do not travel any further than they do prior to the Project development 	<ul style="list-style-type: none"> The mine will implement management commitments with respect to noise, dust, safety, blasting and vibrations and other activities. The mine should consult with CPAs and tribal authorities to discuss possibilities of the influx of people into the area. Implementation of an HIV/AIDS awareness campaign targeting construction workers, employees and surrounding communities. Contractors will be required to find their own accommodation. The mine will provide appropriate policies and procedures with regards to employee accommodation and related transport assistance. Construction contractors will not be housed on site. 	<ul style="list-style-type: none"> CED Manager Construction Manager Procurement Manager Human Resources Manager 	<ul style="list-style-type: none"> Complaints register

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
				<ul style="list-style-type: none"> • If incidences of squatting as result of mine development are encountered, the mine will report this to the relevant authorities. Since no permanent housing will be provided on site, the option for some non-locals may simply be to make their own arrangements as close as possible to the workplace. • All construction sites will be fenced where necessary to prevent public access and access by game. No loitering by employees outside the designated working hours will be allowed in the vicinity of the mining areas and mine entrance. No employment at the gate will be allowed. • No traversing or access to neighbouring properties by contractors' staff will be permitted. • Complaints from neighbours and the public with regard to interference from contractors' or mine staff will be promptly addressed and due process followed. • A community forum will be established whereby the mine, its contractors and local residents communicate on a regular basis to ensure that the mine is in a position to attend to valid concerns of the local community in an appropriate manner. • No informal settlement on mine property will be permitted and illegal 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
				<p>structures and their inhabitants will be removed in accordance with the law.</p> <ul style="list-style-type: none"> The site project management staff contractors will be required to comply with all security procedures as determined from time to time on the project. All employees will be issued with a security card and the contractor will be responsible for ensuring these cards are carried by employees at all times whilst on site and that employees are kept fully aware of the applicable security procedures. There will be no accommodation on site. 		
C91		Disturbance of the local community, social infrastructure and services		<ul style="list-style-type: none"> Local communities will be prioritised for local employment to avoid increased pressure on local and sub-regional services and facilities, provided the skills and qualifications are available. 		
C92		Generation of jobs	<ul style="list-style-type: none"> To enhance benefits from the development of the Project To maximize opportunities for local residents To facilitate employment of local labour on the Project To avoid creating unrealistic expectations 	<ul style="list-style-type: none"> It is expected that contractors will bring in their own workers with the required core skills. Contractors must submit annual reports on how they are attaining these targets as part of AAP's. Where it is not possible to meet targets for employing people from the immediately affected areas, contractors will be required to source personnel in the immediate focus area, and then only in the broader focus area. Potential workers in the local area will be assessed for their 	<ul style="list-style-type: none"> CED Manager Construction Manager Procurement Manager Human Resources Manager 	<ul style="list-style-type: none"> Employment records Public Involvement Programme SLP

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
				<p>suitability for contract work at Der Brochen. Dover tests can be conducted to screen potential local contract workers.</p> <ul style="list-style-type: none"> • AAP will investigate the potential and applicability assisting with training of local contract workers on theoretical and safety aspects of pit mining. • Should the mine be able to assist with training a database of trained potential local workers will be generated and provided to contractors to consider for employment. Local contract workers will be registered on the AAP database so that they may have access to other employment options in AAP and other companies AAP shares its database with. • AAP also provides learnerships and bursaries in engineering and hospitality and will implement this programme in the local communities. Upskilling particularly of contract workers from the local area will be undertaken by AAP during the operations phase of Der Brochen. • Procedures for employing locals will be discussed and agreed with the Community Engagement Forum (CEF). Existing fora will be used to implement AAP's local recruitment process, to communicate the recruitment process and to identify and recruit suitable candidates. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
				<ul style="list-style-type: none"> AAP will meet the SLP requirements and commitments for downscaling and retrenchments, including the establishment, implementation and monitoring of a Future Forum. 		
C93		Procurement of goods and services	<ul style="list-style-type: none"> Ensure that local communities benefit from the proposed Project by means of procurement preference. 	<ul style="list-style-type: none"> The mine will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. The mine will strive to direct as much as possible to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. AAP will inform businesses through appropriate business fora about available opportunities and how business may access these. For example the Steelpoort Business Forum and Tubatse Business Forum will be used to engage with businesses in the local and regional areas. The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as part of AAP's SLP. 	<ul style="list-style-type: none"> CED Manager Procurement Manager 	<ul style="list-style-type: none"> Implementation of the Social and Labour Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
				<ul style="list-style-type: none"> • AAP will identify potential service providers for longer term procurement Anglo Zimele can assist BEE businesses (who meet their requirements) with funding and these businesses will be provided with ongoing support. • Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy This strategies will be reviewed and monitored for implementation. 		
C94		Influx of job seekers	<ul style="list-style-type: none"> • To support systems currently in place to control influx • To prevent the introduction of social pathologies 	<ul style="list-style-type: none"> • Enhance employment of people and procurement of service providers in the study area and the region. • Accommodation should preferably be provided in towns in close proximity to the project area and workers bussed in. • Should accommodation be required in close proximity to the operation: <ul style="list-style-type: none"> ○ RPM should require the contractors to promote HIV/AIDS prevention amongst employees. ○ RPM and the contractors should work with the health authorities to provide HIV/AIDS prevention and treatment interventions in a culturally appropriate manner. AAP will confirm if this is possible. ○ Sub-contractors should adhere to the contract with the contractor. ○ A strategy and protocol for camp management should be 	<ul style="list-style-type: none"> • CED Manager • Project Manager • SHE Manager 	<ul style="list-style-type: none"> • Influx Management Plan • Policing forums • Awareness campaigns

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during construction in general						
				developed and implemented, should an existing worker accommodation facility be used.		
C95		Impacts on medicinal plants during land clearing activities during the Construction Phase	<ul style="list-style-type: none"> To prevent/ minimise the destruction/ disturbance of medicinal plants. To enable community access to plants if required. 	<ul style="list-style-type: none"> A land access protocol for visiting graves is currently in place and AAP Land Use Management will explore the possibility of extending this protocol for enabling the collection of medicinal plants on the property where areas are to be disturbed. A complaints register will be kept and issues raised will be investigated, and a grievance procedure will be developed and implemented. 	<ul style="list-style-type: none"> CED Manager 	<ul style="list-style-type: none"> Complaints Register

9.4.2 Impact management actions during operational phase

Activities requiring management during the **operational phase** relates to the following operational areas. Reference to the required management measures as provided in the relevant tables are also provided below:

- North and South Pits - refer to Table 9-9 for the list of required management measures;
- Co-Disposal Facility - refer to Table 9-10 for the list of required management measures;
- Mareesburg TSF and Pipeline - refer to Table 9-11 for the list of required management measures;
- Helena TSF - refer to Table 9-12 for the list of required management measures;
- Mototolo Concentrator and Chrome Plant - refer to Table 9-13 for the list of required management measures;
- Access Roads - refer to Table 9-14 for the list of required management measures;
- Wellfield and ongoing prospecting boreholes - refer to Table 9-15 for the list of required management measures; and
- Borwa and Lebowa Underground workings, including vent shafts - refer to Table 9-16 for the list of required management measures.

Table 9-17 provides a summary of all the social management measures that will need to be implemented during the operation phase.

Table 9-9: Management measures in respect of the operation of the North and South Pits

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the North and South Pits						
O1	Geology	Impact on Geology	<ul style="list-style-type: none"> • To minimise the impact on geological strata. 	<ul style="list-style-type: none"> • Waste rock from the Northern Pit will be used to construct the embankment for the proposed Co-Disposal Facility. • Should the Co-Disposal Facility be deemed not feasible, waste rock will be backfilled to the Northern pit concurrently to mining. • Ongoing rehabilitation of the Southern Pit area will take concurrently as the operation phase progresses. <ul style="list-style-type: none"> ○ The Southern Pit will be backfilled with waste rock material. 	<ul style="list-style-type: none"> • Environmental Coordinator • Project Manager • Mining Engineer 	<ul style="list-style-type: none"> • Delineation of reserves

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the North and South Pits						
O2	Topography	Change in local topography	<ul style="list-style-type: none"> To limit the impact on topography to the footprint of the opencast operations. 	<ul style="list-style-type: none"> Upon Closure, the Co-Disposal Facility and backfilled Southern Pit will be shaped to be free-draining. Stockpiled topsoil will be used to cover the closed Co-Disposal Facility and backfilled Southern Pit and will be revegetated. Should the Co-Disposal Facility be deemed not feasible, waste rock will be backfilled to the Northern pit concurrently to mining. The backfilled Northern pit will be shaped to be free-draining, covered with topsoil and revegetated. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan Development according to block plans Vegetated topsoil stockpiles
O3	Soils, Land Capability and Land Use	No additional impacts are envisaged during the Operational Phase, however management measures for topsoil stockpiling are included.	<ul style="list-style-type: none"> To remove and store soil to enable its reuse for rehabilitation 	<ul style="list-style-type: none"> Soil for the purpose of rehabilitation that has been stripped from cleared areas during the Construction Phase will be stockpiled. The following conservation principles will apply: <ul style="list-style-type: none"> Stripped soil will be stored with as little compaction as possible; Stockpile areas will have their soil stripped to conserve the seed bank; Single handling will be practiced where possible; Stockpiles that are likely to remain undisturbed for 12 months or more will be revegetated; and Usable soil will be respread with as little compaction as possible. Land to which soil has been applied will be revegetated 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Topsoil stockpiles Development according to block plans Revegetated soil stockpiles
O4	Biodiversity	No additional impact expected after the	<ul style="list-style-type: none"> To demonstrate active stewardship towards biodiversity. 	<ul style="list-style-type: none"> Continuous education of staff – both permanent, and contractors is required on the importance of biodiversity in the region and why it will be conserved. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Alien Invasive Management Plan Biodiversity Action Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the North and South Pits						
		Construction Phase (clearing of vegetation), however the surrounding natural area should not be further impacted upon.		<ul style="list-style-type: none"> Dust suppression on the roads will be undertaken when required. No off road driving permitted. Long term monitoring of the Groot-Dwars River is required both in terms of habitat/community structural changes as well as bio-monitoring of the system. Ensure the Alien and Invasive Management Plan and Biodiversity Action Plan is continuously updated 		
O5	Wetlands	No additional impact expected after the Construction Phase (clearing of vegetation), however the surrounding natural area should not be further impacted upon.	<ul style="list-style-type: none"> To ensure the separation of clean and dirty water and compliance to GN704. 	<ul style="list-style-type: none"> Clear separation of clean and dirty water will be undertaken and diversion of clean water around the operational areas will ensure minimisation of the loss of catchment yield. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Biodiversity Action Plan Stormwater Management Plan
O6	Surface Water	Reduced availability of water to surrounding water users due to physical obstruction from the Open Pits	<ul style="list-style-type: none"> To ensure the separation of clean and dirty water and compliance to GN704. 	<ul style="list-style-type: none"> Appropriately placed clean water diversions, designed to handle the 1:50 year storm event, will be constructed to divert water away from the Pits and return it to the natural environment. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan.

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the North and South Pits						
		resulting in loss of MAR				
O7		Alteration of catchment hydrology causing increased risk of flooding and scouring	<ul style="list-style-type: none"> Reduce the risk of flooding 	<ul style="list-style-type: none"> Runoff from the catchment will be diverted away from the open pit areas by cut-off channels and diversion berms designed to handle the 1:50 year storm event. Energy dissipaters will be constructed in areas of concentrated flows. Routine inspections and maintenance will be conducted to keep the diversions free of debris (silt build up, vegetation etc.) and areas suitably graded. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan.
O8		Deterioration in water quality in the Dwars River due to release of contaminated water from the open pit operations	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of surface water during operations. 	<ul style="list-style-type: none"> Dirty water will be contained in a pollution control or return water dams designed to enable settlement of solids and handle the 1:50 year event with a minimum freeboard of 0.8 metres above full supply level. Routine inspections and maintenance will be conducted. The contained dirty water will re-used as process water make-up or for dust suppression. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan. Leak/spill Procedure. Water monitoring reports.
O9	Groundwater	Dewatering of mine void (Reduction in borehole yield and river baseflow)	<ul style="list-style-type: none"> To minimise the impact of loss of water resources 	<ul style="list-style-type: none"> Continuous water level monitoring will be undertaken. Replacement of water supply boreholes in event of yield losses. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer Project Manager 	<ul style="list-style-type: none"> Water monitoring reports Water Balance
O10		Impact on groundwater quality	<ul style="list-style-type: none"> To minimise/ prevent contamination of water resources 	<ul style="list-style-type: none"> Excess groundwater in the Pits will either be used in the Mototolo Concentrator or contained in the pollution control dam. 	<ul style="list-style-type: none"> Environmental Coordinator Plant Manager 	<ul style="list-style-type: none"> Re-use of water in the Mototolo Concentrator

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the North and South Pits						
O11	Air Quality	Increase in nuisance dust during operations	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints about dust related health and nuisance impacts. 	<ul style="list-style-type: none"> Regular water sprays preferably combined with chemicals on unpaved haul roads. Speed limit on haul roads not to exceed 40 km/hr. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager 	<ul style="list-style-type: none"> Dust monitoring records. Complaints register to record complaints regarding nuisance dust.
O12	Noise	Increase in ambient noise levels	<ul style="list-style-type: none"> To prevent or minimise adverse impacts arising from operations To respond with corrective action to public complaints about noise 	<ul style="list-style-type: none"> Ensure that all equipment and machinery are well maintained and equipped with silencers where possible. Environmental awareness training will include a noise component allowing employees and contractors to realise the potential noise risks that activities pose to the surrounding environment. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager 	<ul style="list-style-type: none"> Complaints register to record complaints regarding noise Monitoring reports.
O13	Cultural Heritage	No additional impacts are envisaged during the Operational Phase, however there are cultural heritage sites identified around the Open Pits area. Management measures should apply to these heritage sites.	<ul style="list-style-type: none"> To respect the culture and heritage of the people in the area To avoid disturbance of sites and activities of cultural significance and where not possible to determine mitigation in consultation with local communities 	<ul style="list-style-type: none"> Fence heritage sites near infrastructure with a significance rating of low to high. Provide access to cemeteries and graves to families of the deceased. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager 	<ul style="list-style-type: none"> Complaints register Induction programme
O14	Visual	Decrease in visual aesthetics of the area		<ul style="list-style-type: none"> No mitigation applied. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the North and South Pits						
O15	Traffic and Transportation	Increased generation of traffic on existing road networks during operations	<ul style="list-style-type: none"> To minimise/ prevent road accidents. 	<ul style="list-style-type: none"> Traffic conditions to be monitored annually, should traffic congestion increase, appropriate mitigation measures will need to be explored and implemented. 	<ul style="list-style-type: none"> SHE Manager Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Annual reporting on traffic related incidents.
O16		Impact on pedestrian and cyclists	<ul style="list-style-type: none"> To minimise/ prevent road accidents. 	<ul style="list-style-type: none"> Control access by cyclists and pedestrians to the site. 	<ul style="list-style-type: none"> SHE Manager Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Annual reporting on traffic related incidents.
O17		Impact on road safety conditions	<ul style="list-style-type: none"> To minimise/ prevent road accidents. 	<ul style="list-style-type: none"> Drivers of heavy Operation mining vehicles will attend a road safety and driving course to sensitise them to the impact they have on driving conditions for other drivers on the road. 	<ul style="list-style-type: none"> SHE Manager Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Annual reporting on traffic related incidents.
O18		Decreased condition of the road network	<ul style="list-style-type: none"> To minimise/ prevent further damage to roads. 	<ul style="list-style-type: none"> A standard operating procedure is developed for all mine drivers to identify and report potholes and edge breaks to the operations manager who in turn will report it to the relevant authorities. 	<ul style="list-style-type: none"> SHE Manager Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Regular reporting of potholes and decreased road conditions.
O19	Blasting and Vibration	Ground vibration disturbance to Mototolo Concentrator and Helena TSF due to blasting in the Northern pit	<ul style="list-style-type: none"> To minimise/prevent damage to Mototolo Concentrator and Helena TSF To prevent the Helena TSF possible liquefaction 	<ul style="list-style-type: none"> Undertake survey to determine shear strength of tailings sediments. Develop a blast design report adjusting the maximum “no go” PPV limit according to survey results. Monitoring of the blasting and vibration levels 	<ul style="list-style-type: none"> SHE Manager Plant Manager Mining Engineer 	<ul style="list-style-type: none"> Tailings shear strength survey Blast design report
O20		Ground vibration disturbance to geology offices and core sheds due to blasting in the Northern Pit	<ul style="list-style-type: none"> To ensure safety of AAP employees on site 	<ul style="list-style-type: none"> Evacuate AAP offices during blasting activities when blasting takes place in the centre and southern areas of the pit. Consider relocation of AAP offices. 	<ul style="list-style-type: none"> SHE Manager Mine Engineer 	<ul style="list-style-type: none"> Blast management plan Evacuation procedure during blasting

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the North and South Pits						
O21		Ground vibration disturbance to the Der Brochen dam wall due to blasting in the Open Pits	<ul style="list-style-type: none"> To prevent damage to the Der Brochen dam wall due to blasting 	<ul style="list-style-type: none"> Ensure individual hole firing using electronic detonators. Monitor ground vibrations at the dam wall. Survey dam wall to determine present elevation and path of the top of the wall. Repeat this survey after last blasts to confirm that no movement has taken place. 	<ul style="list-style-type: none"> SHE manager Mine Engineer 	<ul style="list-style-type: none"> Blast management plan Ground vibration monitoring report Der Brochen dam wall surveys
O22		Air blast and unwanted side effects such as fly-rock during blasting of the Open Pits	<ul style="list-style-type: none"> To prevent/ minimise the effects of air blast 	<ul style="list-style-type: none"> Air blast levels to be kept under 130 dB. Evacuate AAP offices during blasting activities. 	<ul style="list-style-type: none"> SHE manager Mine Engineer 	<ul style="list-style-type: none"> Blast management plan

Table 9-10: Management measures in respect of the operation of the co-disposal facility

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the co-disposal facility						
O23	Topography	Permanent alteration of topography due to the Co-Disposal Facility	<ul style="list-style-type: none"> To rehabilitate the Co-Disposal Facility to blend into the natural environment. 	<ul style="list-style-type: none"> On closure, the Co-Disposal Facility will be shaped to be free draining. Erosion protection will be provided. <ul style="list-style-type: none"> The Co-Disposal Facility will be re-vegetated to blend into the natural environment. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Establishment of vegetation on Co-Disposal Facility Closure and Rehabilitation Plan
O24	Soils, Land Capability and Land Use	No additional impacts are envisaged during the Operational		<ul style="list-style-type: none"> Refer to Impact Reference O3. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the co-disposal facility						
		Phase, when tailings will be deposited as topsoil would have been removed and stockpiled in the Construction Phase. Management measures for stockpiling should take place.				
O25	Biodiversity	No additional impacts are envisaged during the Operational Phase, when tailings will be deposited as vegetation would have been cleared during the Construction Phase. However, the surrounding natural area should not be further impact upon. Management measures for the surrounding natural area	<ul style="list-style-type: none"> To demonstrate active stewardship towards biodiversity. 	<ul style="list-style-type: none"> Refer to Impact Reference O4. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Alien Invasive Management Plan Biodiversity Action Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the co-disposal facility						
		should be implemented.				
O26	Wetlands	No additional impacts expected after the Construction Phase. However, the surrounding natural area should not be further impact upon. Management measures for the surrounding natural area should be implemented.	<ul style="list-style-type: none"> To ensure the separation of clean and dirty water and compliance to GN704. 	<ul style="list-style-type: none"> Clear separation of clean and dirty water will take place and diversion of clean water around the operational areas will ensure minimisation of the loss of catchment yield. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan
O27	Surface Water	Deterioration in water quality in the Dwars River due to inadvertent release of tailings, return water or leachate to the natural environment	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of water during operations. 	<ul style="list-style-type: none"> Routine inspections and maintenance will be conducted on all TSF infrastructure including Pipeline routes and crossings. Surface water quality, and quantity, monitoring systems will be established for the open pit and Co-Disposal Facility. Emergency action plans will be drawn up to deal with spillages. 	<ul style="list-style-type: none"> Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Inspection and Maintenance Plan Leak/spill clean-up Procedure Water monitoring reports Environmental Incident Report
O28	Groundwater	Contaminant plume migration (deterioration of groundwater and surface water quality)	<ul style="list-style-type: none"> To minimise the degradation of groundwater and surface quality. Infiltration of process water towards the aquifer will be reduced to a minimum. 	<ul style="list-style-type: none"> Install a lining system of either composite clay or HDPE as stipulated in the WUL. Seepage collection drains will be installed to collect seepage. Rehabilitation and capping of the facility to reduce seepages after closure. 	<ul style="list-style-type: none"> Environmental Coordinator Project Manager Mining Engineer 	<ul style="list-style-type: none"> Installation of a liner system Closure and Rehabilitation Plan.

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the co-disposal facility						
O29	Air Quality	Increase in nuisance dust during operations		<ul style="list-style-type: none"> Refer to Impact Reference O11 for applicable management measures 		
O30	Noise	Increase in ambient noise		<ul style="list-style-type: none"> No mitigation measures required due to the insignificant noise from the Co-Disposal Facility. 		
O31	Cultural Heritage	No additional impacts are envisaged during the Operational Phase, however there are cultural heritage sites identified around the Open Pits area. Management measures should apply to these heritage sites.	<ul style="list-style-type: none"> To respect the culture and heritage of the people in the area. To avoid disturbance of sites and activities of cultural significance and where not possible to determine mitigation in consultation with local communities. 	<ul style="list-style-type: none"> Fence heritage sites near infrastructure with a significance rating of low to high. Where applicable, provide access to cemeteries and graves to families of the deceased. 	<ul style="list-style-type: none"> Environmental Coordinator Social Performance (SP) Manager 	<ul style="list-style-type: none"> Complaints Register
O32	Visual	Decrease in visual aesthetics of the area	<ul style="list-style-type: none"> To minimise the visual impact of the Co-Disposal Facility 	<ul style="list-style-type: none"> Vegetate Co-Disposal Facility walls to blend into the natural environment at closure. 	<ul style="list-style-type: none"> Environmental Coordinator SP Manager 	<ul style="list-style-type: none"> Complaints Register Closure and Rehabilitation Plan. Establishment of vegetation.
O33	Traffic and Transportation	Increased generation of traffic on existing road networks during operations		<ul style="list-style-type: none"> Refer to O15 in this table for applicable management measures 		
O34		Impact on pedestrian and cyclists		<ul style="list-style-type: none"> Refer to O16 in this table for applicable management measures 		
O35		Impact on road safety conditions		<ul style="list-style-type: none"> Refer to O17 in this table for applicable management measures 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the co-disposal facility						
O36		Decreased condition of the road network		<ul style="list-style-type: none"> Refer to O18 in this table for applicable management measures 		

Table 9-11: Management measures in respect of the operation of the Mareesburg TSF and associated infrastructure and pipeline system

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Mareesburg TSF, RWDs and pipeline system						
O37	Topography	Changes in topography as a result of the Tailings Dam	<ul style="list-style-type: none"> To minimise the visual impact of the Mareesburg TSF on the surrounding environment. 	<ul style="list-style-type: none"> Rehabilitation and vegetation of tailings walls: <ul style="list-style-type: none"> The outer slope of the Tailings Dam wall will be covered with soil and will be grassed. On closure, the top surface of the Tailings Dam will be covered and grassed. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan. Establishment of vegetation.
O38	Soils, Land Capability and Land Use	Loss of soil resources in the area to be covered by the Tailings Dam	<ul style="list-style-type: none"> To prevent/ minimise loss of soil resources. 	<ul style="list-style-type: none"> A soil stripping, stockpiling and utilisation plan will be developed. Soil can be stripped sequentially ahead of areas being flooded such that the whole basin does not have to be stripped at the outset. Soil stripped will either be used immediately for rehabilitation of the outer slope of the wall or will be stockpiled for later use. Soil placed in stockpiles will not be compacted. It is anticipated that natural re-vegetation will provide an adequate cover to protect these stockpiles against 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Topsoil stockpiles. Revegetated stockpiles

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
				<p>erosion. In the event that this does not occur the areas will be seeded.</p> <ul style="list-style-type: none"> • Soil stockpiles will be maintained in a weed free condition (i.e. no 'broad-leaved' plants regarded as weeds or those plants regarded as a 'general nuisance' in the area, will be allowed to grow on the stockpiles). The ECO will provide guidance as to which plants are weeds and require removal. • During the Operational Phase, the outer slope of the Tailings Dam will be covered with a layer of soil concurrently with construction. • On closure, the top surface of the Tailings Dam will be covered with a layer of soil. • Stripped soil not used for the starter wall and rehabilitation of the outer slope of the wall will be stockpiled for later use. 		
O39		Loss of soil resources due to erosion	<ul style="list-style-type: none"> • To prevent/ minimise soil erosion 	<ul style="list-style-type: none"> • Erosion control measures will be implemented throughout the site for the entire life of the mine. • Drainage facilities will be designed to minimise the potential for soil erosion. • Energy dissipaters will be provided in areas where concentrated discharges could cause significant erosion, such as the Tailings Dam, return water dam and the access/service roads. • All drainage facilities will be checked at approximately three monthly intervals during the rainy season and any undue erosion or siltation, especially at discharge points, will be noted and repaired. The operation will identify the 	<ul style="list-style-type: none"> • Environmental Coordinator • Mining Engineer 	<ul style="list-style-type: none"> • Erosion control measures

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
				cause of such undue erosion or siltation and suitable remedial measures will be implemented.		
O40		Soil contamination due to leaching of contaminants and seepage	<ul style="list-style-type: none"> To prevent and minimise soil contamination. To minimise seepage and accidental spills. To remediate contaminated soils. 	<ul style="list-style-type: none"> Water pollution management measures are designed to contain all polluted water, thereby minimising the potential for soil contamination from this source. Any spillage will be cleaned up and remediated. Monitoring will be implemented downstream of all Pipeline watercourse crossings to detect any impacts. A leak/spill detection plan will be devised and implemented for possible areas of leaks/spillage. An inspection and maintenance plan will be implemented to ensure that the Tailings Storage Facility and Pipelines always operate within specifications. Storm water containment will be implemented for the TSF as per the Stormwater Management Plan. Continuous rehabilitation on tailings walls during operation. 	<ul style="list-style-type: none"> Environmental Coordinator SHE Manager Land manager 	<ul style="list-style-type: none"> Leak/ spill clean-up Procedure Stormwater Management Plan Inspection and Maintenance Plan Environmental Incident Report Water monitoring reports
O41	Biodiversity	Changes in community structure and population dynamics of floral species	<ul style="list-style-type: none"> To prevent/ minimise the change in plant community structure. To prevent/ minimise the spread of alien invasive weeds. 	<ul style="list-style-type: none"> Continuous education of staff – both permanent staff, and contractors, is required to advise on the importance of biodiversity in the region and why it should be conserved. Dust suppression on gravel roads and TSF will be undertaken when required. No off road driving will be permitted. Long term monitoring of the Groot-Dwars River is required both in terms of habitat/community structural changes as well as bio-monitoring of the system. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Alien Invasive Management Plan Dust suppression on dirt roads Biodiversity Action Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
				<ul style="list-style-type: none"> Ensure the Alien and Invasive Management Plan and Biodiversity Action Plan is continuously updated and implemented. Revegetate areas on the TSF as soon as possible. Rehabilitation will include indigenous species of the area. Collection of seed and storage of plants would have occurred prior to vegetation clearing in the Construction Phase. 		
O42		Displacement or disturbance of animal life (and their migration paths) as a result of operation activities	<ul style="list-style-type: none"> To minimise the disturbance of animal life. 	<ul style="list-style-type: none"> The delineated footprint of the Maresburg TSF will not be exceeded. Dust suppression on the gravel roads and TSF will be implemented to minimise dust fallout on vegetation surrounding the TSF. The area of habitat disturbed and isolated for the purpose of mining and processing activities will be limited, as far as is practical, to the minimum required for safe and efficient operation. Noise disturbance to wildlife will be limited by using only pre-determined access routes and restricting noise to operational sites. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Development according to block plans Dust suppression
O43		Cumulative impacts on biota	<ul style="list-style-type: none"> To prevent/ minimise the impact on biota 	<ul style="list-style-type: none"> To manage the area as a game farm / natural area, the carrying capacity of the total fenced area will be determined by evaluating the veld condition and available water. Fencing requirements will be determined by the Der Brochen's game management plan. The animal populations in the area will be monitored and managed (excess stock sold / culled / harvested). 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Land/Game Management Plan Fencing Biodiversity Management Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
O44		Disturbance/loss of aquatic animal species due to deterioration in surface water quality due to contamination from various forms of pollution from operational activities, increased sediment loads, oil and fuel spills and leaks.	<ul style="list-style-type: none"> To prevent/ minimise the disturbance to aquatic fauna To avoid or where not possible, minimise and remedy pollution of water during operations. 	<ul style="list-style-type: none"> All effort will be made to maintain this “good” biotic status and continuous seasonal biological monitoring will be performed when mining operation commences. Such future monitoring together with the already gathered baseline information will then be used for early detection of possible future biotic degradation to enable mitigation measures. A long term monitoring programme will be implemented to monitor physico-chemical and biological components of the aquatic ecosystems within and below the mining area. The monitoring programme will commence as soon as mining operations start. This would enable the timely identification of required mitigation/environmental management procedures to maintain the high quality of this ecologically important aquatic ecosystem. An appropriate biological index based on fish (such as the Fish Assemblage Integrity Index, Kleynhans, 1997 or Sensitivity-weighted Index of Biotic Integrity will also be included in order to quantify and classify the longer-term changes in biotic integrity. Erosion control measures in the form of temporary erosion prevention berms will be implemented during construction. Clean water diversion bunds will be constructed upstream of the construction site prior to clearing areas for new infrastructure. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan Erosion control measures Environmental Incident Report Leak/ spill clean-up Procedure Emergency Response Plan Biodiversity Action Plan Biomonitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
				<ul style="list-style-type: none"> Emergency action plans will be drawn up to deal with spillages. Chemical toilets will be provided at operations sites. 		
O45	Wetlands	No additional impacts expected after the Construction Phase. However, the surrounding natural area should not be further impact upon. Management measures for the surrounding natural area should be implemented.	<ul style="list-style-type: none"> To ensure the separation of clean and dirty water and compliance to GN704. 	<ul style="list-style-type: none"> Clear separation of clean and dirty water will take place and diversion of clean water around the operational areas will ensure minimisation of the loss of catchment yield. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan
O46	Surface Water	Alteration of drainage patterns caused by mining activities	<ul style="list-style-type: none"> To contain contaminated runoff. To ensure the separation of clean and dirty water and compliance to GN704. 	<ul style="list-style-type: none"> Contaminated runoff from the Tailings Dam will be collected on the dam and recycled to the process water circuit via the penstock and return water dam. Clear separation of clean and dirty water will take place and diversion of clean water around the operational areas will ensure minimisation of the loss of catchment yield. Clean stormwater diversions will assist in directing water to natural river courses. River diversions will be implemented, where necessary. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan Water monitoring reports Establishment of vegetation

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
				<ul style="list-style-type: none"> All rainfall runoff originating on top of the Tailings Dam will be discharged via a penstock to the return water dam. This water, together with all rain falling on the return water dam, will therefore be removed from the catchment. The water will, however, be utilised in the mine's process water circuit thus reducing demand on the mine's primary raw water source. The slope faces will be topsoiled and re-vegetated. Water management and erosion control measures will be inspected regularly, and appropriate remedial measures will be implemented where necessary. 		
O47		Deterioration in surface water quality due to increased sediment load	<ul style="list-style-type: none"> To prevent/ minimise the deterioration of water quality. 	<ul style="list-style-type: none"> Clear separation of clean and dirty water will take place and diversion of clean water around the operational areas will ensure minimisation of the loss of catchment yield. Re-vegetation of all denuded areas. Water management and erosion control measures will be inspected regularly, and appropriate remedial measures will be implemented where necessary. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan Water monitoring reports Establishment of vegetation
O48		Contamination of surface water bodies due to diffuse pollution	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of water during operations. 	<ul style="list-style-type: none"> Stormwater runoff from the small catchment area above the dam, rainfall on the Tailings Dam and supernatant water will be decanted through penstocks and an underdrain into a lined return water dam, from where it will be recycled back into the process. An emergency spillway will be provided to deal with extreme storm events. 	<ul style="list-style-type: none"> Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Water monitoring reports Leak/ spill clean-up procedure Inspection and Maintenance Plan Stormwater Management Plan Closure and Rehabilitation Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
				<ul style="list-style-type: none"> • Runoff from the side slopes of the dam will be caught on the step-in areas where solids will be trapped and the water evaporated. The step-in areas are designed to contain the 1:50 year storm. • The Tailings Dam will be provided with underdrains and a solution trench along the full length of the toe of the starter wall. Seepage water collected in this trench will be discharged to the return water dam. • Revegetation of the Tailings Dam both during the Operational Phase and following closure will greatly reduce groundwater recharge as the resultant evapotranspiration. • Monitoring will be implemented downstream of all Pipeline watercourse crossings to detect any impacts. • Monitoring boreholes will be located below the return water dam solution trenches to detect any possible seepage beyond this point. Should seepage be detected, interceptor boreholes will be installed and the water pumped back to the return water dam. • A leak/spill detection plan will be devised and implemented for all possible areas of leak/spillage. • An inspection and maintenance plan will be implemented to ensure that the Tailings Storage Facility and Pipelines always operate within specifications. • Storm water containment is planned for the TSF as per the Stormwater Management Plan. 		<ul style="list-style-type: none"> • Establishment of Vegetation

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
O49		Contamination of surface water quality at Maresburg stream	<ul style="list-style-type: none"> To prevent/ minimise the deterioration of water quality. To avoid or where not possible, minimise and remedy pollution of water during operations. 	<ul style="list-style-type: none"> Implementation of good housekeeping practices at operational sites. Regular inspections of the Pipeline route will be undertaken in order to detect leaks/ spillages timeously. Greater detail of the monitoring system are dealt with in Chapter 4. Monitoring will be implemented downstream of all Pipeline watercourse crossings to detect any impacts. A leak/spill detection plan will be devised and implemented for all possible areas of leak/spillage. An inspection and maintenance plan will be implemented to ensure that the Tailings Storage Facility and Pipelines always operate within specifications. 	<ul style="list-style-type: none"> Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Water monitoring reports Leak/ spill clean-up procedure Inspection and Maintenance Plan. Stormwater Management Plan Closure and Rehabilitation Plan Establishment of Vegetation
O50	Groundwater	Deterioration of groundwater quality at the Tailings Dam	<ul style="list-style-type: none"> To minimise the degradation of groundwater quality. 	<ul style="list-style-type: none"> The Tailings Dam design will take into consideration the shallow depths to groundwater and close proximity to the Maresburg river and associated primary aquifer. The available runoff and downward/lateral infiltration available to recharge the aquifers and surface flow will be reduced to a minimum through proper Tailings Dam design. Due to the shallow depth of the groundwater aquifer, if the detailed geotechnical work proves the soil permeability to be a problem (<10-6 cm/s), the following management measures will be implemented to reduce seepage: <ul style="list-style-type: none"> The topsoil will be removed; Any clayey subsoil will be removed; 	<ul style="list-style-type: none"> Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Groundwater monitoring records Water manager plan Groundwater monitoring programme

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
				<ul style="list-style-type: none"> Implementation of a groundwater monitoring programme to monitor the boreholes at the Tailings Dam. The water management plan for the tailings will be a closed circuit system with no discharge to the environment. The return water from the Tailings Dam will be pumped in a closed circuit to the Concentrator process water tank. Monitoring of water levels in monitoring boreholes as per the groundwater monitoring programme. Should the groundwater monitoring programme indicate that groundwater resources have been affected by dewatering, an alternative supply of water will be made available. 		
O51		Contaminant plume migration (deterioration of groundwater and surface water quality)	<ul style="list-style-type: none"> To prevent/ minimise the spread of the groundwater pollution plume towards the Maresburg Stream. 	<ul style="list-style-type: none"> Installation of a lining system, either composite clay or HDPE, as per the requirements of the relevant legislation. Seepage collection drains will be constructed to collect seepage emanating from the TSF. Seepage will be pumped to the Pollution Control Dam to be contained. Hydraulic containment system will be implemented during Operational and Closure Phases. 	<ul style="list-style-type: none"> Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Groundwater monitoring reports O1 Modelling of pollution plume
O52	Air Quality	Increased dust levels due to mining operations	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints 	<ul style="list-style-type: none"> During this operation the top of the crest wall will either be similarly treated or provided with some other suitable form of cover such as a waste rock. As areas dry out on the top of the Tailings Dam, a light crust will form. Provided the side walls and the tops of the crest walls are adequately protected, 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager 	<ul style="list-style-type: none"> Dust monitoring records Complaints register to record complaints regarding nuisance dust

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Maresburg TSF, RWDs and pipeline system						
			about dust related health and nuisance impacts.	<p>this crust is expected to remain largely intact for several weeks to months, depending on the prevailing weather conditions. This should therefore provide adequate protection against excessive dust generation.</p> <ul style="list-style-type: none"> Vegetation of the sides of the Tailings Dam wall will be undertaken to reduce surface erosion. A dust monitoring programme is in place and will be continued. Dust suppression will be undertaken of the service roads and Tailings Facility when required. 		<ul style="list-style-type: none"> Establishment of vegetation on side slopes of the TSF
O53	Noise	Increase in ambient noise		<ul style="list-style-type: none"> No mitigation measures required due to the insignificant noise impact of the Maresburg TSF during operations. 		
O54	Visual	Decrease in visual aesthetics of the area	<ul style="list-style-type: none"> To minimise the visual impact of the TSF and ensure it blends into the natural environment 	<ul style="list-style-type: none"> Vegetate tailings walls to blend into the natural environment. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan
O55	Cultural Heritage	Although no additional impacts are envisaged during the Operational Phase, there are cultural heritage sites located around the Maresburg TSF area that must be protected.	<ul style="list-style-type: none"> To respect the culture and heritage of the people in the area. To avoid disturbance of sites and activities of cultural significance and where not possible to determine mitigation in consultation with local communities. 	<ul style="list-style-type: none"> Fence heritage sites near infrastructure with a significance rating of low to high. Provide access to cemeteries and graves to families of the deceased through agreed mechanism. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager 	<ul style="list-style-type: none"> Complaints Register

Table 9-12: Management measures in respect of operating the Helena TSF

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
O56	Topography	Permanent alteration of topography due to the raising of the TSF	<ul style="list-style-type: none"> To minimise the visual impact of the Helena TSF on the surrounding environment. 	<ul style="list-style-type: none"> On closure, the TSF will be shaped to be free draining. Erosion protection will be provided. <ul style="list-style-type: none"> The TSF will be re-vegetated to blend into the natural environment. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Establishment of vegetation Closure and Rehabilitation Plan
O57	Soils, Land Capability and Land Use	Loss of soil resources	<ul style="list-style-type: none"> To prevent/ minimise loss of soil resources. 	<ul style="list-style-type: none"> Soils will be stripped and stockpiled for use during rehabilitation. Shaped TSF to be covered in topsoil from stockpiles. Re-vegetate topsoiled TSF. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineering 	<ul style="list-style-type: none"> Topsoil stockpiles Development according to block plans. Revegetated stockpiles
O58		Contamination of soil resource	<ul style="list-style-type: none"> To prevent and minimise soil contamination. To minimise seepage and accidental spills. To remediate contaminated soils. 	<ul style="list-style-type: none"> Soils will be stripped and stockpiled for use during rehabilitation. Conduct weekly site inspections along the Pipeline to detect any spills or leakages. Immediate remediation of tailings spillages along Pipeline routes. An inspection and maintenance plan will be implemented to ensure that the TSF and Pipelines operate within specifications. 	<ul style="list-style-type: none"> Environmental Coordinator SHE Manager Land manager 	<ul style="list-style-type: none"> Leak/ spill clean-up Procedure Topsoil stockpile Inspection and Maintenance Plan Environmental Incident Report
O59	Biodiversity	Loss of insect species / communities of conservation value due to direct impacts such as loss of	<ul style="list-style-type: none"> To minimise the impact on insect species and habitat 	<ul style="list-style-type: none"> Regular monitoring of the Cicada population, as per the Biodiversity Action Plan. Implementation of measures to reduce dust and noise impacts, including grassing and vegetation of the Tailings Dam and regular maintenance of operational vehicles and equipment. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Biodiversity Action Plan Dust suppression Dust and noise monitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
		habitat or habitat fragmentation and indirect impacts such as dust and noise		<ul style="list-style-type: none"> • Areas of disturbance will be limited to the footprints and vehicular movement outside of these demarcated areas will be restricted. • Method statements will be supplied to the ECO before commencement of any disturbing/destructive construction/operational activities such as removal/disturbance of trees or important species, vegetation, disturbance of streams, dry watercourses, drainage lines or riparian areas) • Sufficient conservation areas, including all Cicada habitat, will remain intact, as part of an integrated conservation management plan for the area. • The top of the Tailings Dam will be vegetated during closure and the side slopes fully vegetated to ensure a wilderness land capability. • Land to which soil has been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Rehabilitation will be progressive throughout the life of the mine, and vegetation will be established as soon as a disturbing activity has ceased, to stabilize soils and re-establish habitats. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
				<ul style="list-style-type: none"> All equipment and vehicles will be maintained in good operating condition. Any worn or faulty exhaust- and/or intake silencers will be replaced immediately. Noise emission levels will be checked regularly during construction and operation, and whenever a change in noise emission characteristics of any equipment is detected, it will be withdrawn for a maintenance check. 		
O60		Loss of biodiversity	<ul style="list-style-type: none"> To prevent/ minimise the loss of biodiversity. 	<ul style="list-style-type: none"> Plants that are to be removed for rehabilitation purposes will be replanted in a nursery under the guidance of a recognized landscaper. The mine will be responsible for the operation of the nursery during the operational and closure phases. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Identify and remove relevant species if necessary Establishment of an onsite nursery Development according to block plans
O61	Surface Water	Deterioration of stormwater and surface water quality due to operations of the Tailings Dam and related activities	<ul style="list-style-type: none"> To prevent/ minimise the deterioration of water quality. 	<ul style="list-style-type: none"> Engineering designs include: <ul style="list-style-type: none"> Cut-off trenches and walls above the Tailings Dam to separate clean water from the Tailings Dam. Decanting of stormwater runoff from the small catchment area above the dam, rainfall on the Tailings Dam and supernatant water through penstocks and an underdrain into return water dams from where it will be recycled back into the process. An emergency spillway to deal with extreme storm events. Collection of runoff from the side slopes of the dam on step-in areas where solids will be trapped and collection of seepage from beneath 	<ul style="list-style-type: none"> Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Stormwater Management Plan Inspection and Maintenance Plan Emergency Preparedness and Response Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
				<p>the Tailings Dam in drains down slope of the dam to be returned into the process.</p> <ul style="list-style-type: none"> ○ Location of the proposed fenced boundary of the site 100 m beyond the estimated 1:100 year flood line of the valley tributary thereby ensuring the upper catchment runoff is not affected. • Good housekeeping practices will be maintained, including but not limited to separation of clean and dirty water, limiting exposed dirty surfaces and maximizing opportunities for re-use of water. • Linear infrastructure such as roads and Pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion. • All surface water management infrastructure constructed from soil (berms, canals and bunds) will be inspected at least monthly, with more frequent inspections during periods of high rainfall and after major rainfall events. • Energy dissipaters will be constructed at points where there are concentrated discharges of water that can cause significant erosion, such as in the clean water diversions around the Tailings Dam or along roads and Pipelines. The effectiveness of these dissipaters will be checked on a monthly basis. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
				<ul style="list-style-type: none"> • If any of the inspections detailed above identify eroded areas, these should be repaired where necessary as soon as practicable. • Clean water diversions and dirty water collection facilities will be established before land clearing and construction commences, to prevent clean rainfall runoff becoming contaminated by construction activities. • Seepage will be monitored through annual sampling of soils around the Tailings Dam. • Any tailings spillage will immediately be cleaned up and the area remediated. • Suitable engineering designs such as lining of the return water dams and perimeter drainage trenches will be implemented. • The outer slope of the rockfill starter wall will be topsoiled and vegetated. The outer side slopes of the Tailings Dam will continuously be vegetated- • The top of the Tailings Dam will be vegetated during closure and the side slopes fully vegetated to ensure a wilderness land capability. • Spillages of oil, grease and hydraulic fluids will be reported, cleaned up by removing the soil and disposing such soil in a waste receptacle or at a licensed site, or through biological treatment. • Contractors, staff and drivers will be trained on how to deal with spillage of tails, hydrocarbons and other potential contaminants. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
				<ul style="list-style-type: none"> A fenced boundary has been constructed for the Tailings Dam site which is located 100 m beyond the 1:100 year floodline of the valley tributary, ensuring the upper catchment runoff is not affected. Stormwater runoff from the small catchment area above the dam, rainfall on the Tailings Dam and supernatant water is decanted through penstocks and an underdrain into return water dams from where it is recycled back into the process. An emergency spillway is provided to deal with extreme storm events. Runoff from the side slopes of the dam is collected on the step-in areas where solids are trapped. Seepage from beneath the Tailings Dam is collected in drains down slope of the dam and returned into the process. The Tailings Dams slopes/walls will be continuously revegetated to reduce surface areas exposed to runoff. 		
O62		Decrease of surface water quality	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of water during operations. To ensure the separation of clean and dirty water and compliance to GN704. 	<ul style="list-style-type: none"> Re-align cut-off trench to divert clean stormwater around the TSF. Manage separation of clean and dirty water as per the Stormwater Management Plan. Update water balance on an annual basis. 	<ul style="list-style-type: none"> Environmental Coordinator Project Manager 	<ul style="list-style-type: none"> Re-aligned cut-off trench Stormwater Management Plan Annual updated water balance Water monitoring reports
O63	Groundwater	Discharge and development of seepage zones	<ul style="list-style-type: none"> Protection of groundwater resources 	<ul style="list-style-type: none"> Cut-off trenches and walls above the Tailings Dam divert clean water from the Tailings Dam, decanting runoff and supernatant water through penstocks 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Groundwater monitoring reports Stormwater Management Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
		along the banks of the Groot-Dwars River channel		and an underdrain into return water dams from where it is recycled back into the process. <ul style="list-style-type: none"> • An emergency spillway to deal with extreme storm events and collection of seepage from beneath the Tailings Dam in drains down slope of the dam to be returned into the process. • Paddocks and solution trenches have been constructed between the foot of the Tailings Dam and the Mareesburg stream channel to intercept migrating slurry water along the soil profile/bedrock contact zone. • Regular monitoring through monitoring boreholes to ensure working of the tailings Pipelines through flow metres and visual inspections. Should seepage be detected, the repair of any damage will be undertaken. • Regular sampling of soils around the Tailings Dam to detect seepage and immediate clean-up and remediation of tailings spillage. • Continuous vegetation of Tailings Dam walls. 		<ul style="list-style-type: none"> • Modelling on pollution plume
O64		Contaminate plume migration (deterioration of groundwater and surface water quality)	<ul style="list-style-type: none"> • To minimise the degradation of groundwater quality. 	<ul style="list-style-type: none"> • Cut-off trenches and walls above the Tailings Dam divert clean water from the Tailings Dam, decanting runoff and supernatant water through penstocks and an underdrain into return water dams from where it is recycled back into the process. • An emergency spillway to deal with extreme storm events and collection of seepage from beneath the Tailings Dam 	<ul style="list-style-type: none"> • Environmental Coordinator 	<ul style="list-style-type: none"> • Groundwater monitoring records

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
				<p>in drains down slope of the dam to be returned into the process.</p> <ul style="list-style-type: none"> • Paddocks and solution trenches have been constructed between the foot of the Tailings Dam and the Maresburg stream channel to intercept migrating slurry water along the soil profile/bedrock contact zone. • Regular monitoring through monitoring boreholes to ensure working of the tailings Pipelines through flow metres and visual inspections. Should seepage be detected, the repair of any damage will be undertaken. • Regular sampling of soils around the Tailings Dam to detect seepage and immediate clean-up and remediation of tailings spillage. • Continuous vegetation of Tailings Dam walls 		
O65		Impact on groundwater quality	<ul style="list-style-type: none"> • To minimise the degradation of groundwater quality. 	<ul style="list-style-type: none"> • Continue with groundwater monitoring on a quarterly basis to detect groundwater contamination. Should groundwater be contaminated, it will be pumped to the TSF for recirculation. • Assessment and facilitation of nitrate degradation or retardation within the TSF or shallow aquifer. • Hydraulic plume containment or reactive barriers to arrest emanating plume 	<ul style="list-style-type: none"> • Environmental Coordinator • Project Manager 	<ul style="list-style-type: none"> • Groundwater monitoring records • As built drawings of Helena TSF
O66	Air Quality	Decreased ambient air quality due to wind-blown respirable	<ul style="list-style-type: none"> • To minimise the impact on Cicada habitat due to wind-blown dust. 	<ul style="list-style-type: none"> • The outer side slopes of the Tailings Dam will continuously be vegetated. • The top of the Tailings Dam will be vegetated during closure and the side slopes fully vegetated to ensure a wilderness land capability. 	<ul style="list-style-type: none"> • Environmental Coordinator 	<ul style="list-style-type: none"> • Dust suppression on the Tailings Dam • Irrigation of Tailings Dam

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
		particulates (increased PM ₁₀ concentrations) affecting Cicada habitats		<ul style="list-style-type: none"> Use of dust suppression and watering on TSF area to reduce dust. If dust is noted on the access roads, applicable measures such as a watercart or chemical dust suppression will be implemented. Frequent monitoring of dust buckets downwind of the Tailings Dam, as well as between the Tailings Dam and Cicada habitat to monitor dust fallout. Should dust monitoring determine that dust fallout levels exceed the limits, dust suppression measures will be put in place. 		<ul style="list-style-type: none"> Establishment of vegetation on the Tailings Dam Dust monitoring reports
O67		Decreased ambient air quality due to increased wind-blown dust fallout	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints about dust related health and nuisance impacts. 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Establishment of vegetation on the Helena TSF Dust monitoring reports Dust suppression
O68		Increase in nuisance dust	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints about dust related health and nuisance impacts. 	<ul style="list-style-type: none"> Continue with dust fallout monitoring programme. Use of dust suppression and watering on TSF area to reduce dust. Vegetate side slopes of TSF continuously during operations. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager 	<ul style="list-style-type: none"> Dust monitoring records Complaints register to record complaints regarding nuisance dust Establishment of vegetation on side slopes of the TSF

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Helena TSF						
O69	Noise	Increase in ambient noise		<ul style="list-style-type: none"> No mitigation measures required. 		
O70	Visual	Reduced integrity of scenic views from roads in the surrounding area	<ul style="list-style-type: none"> To minimise the visual impact of the TSF and ensure it blends into the natural environment 	<ul style="list-style-type: none"> Progressive rehabilitation and dust control will be undertaken regularly. Vegetate tailings walls to blend into the natural environment. The outer side slopes of the Tailings Dam will continuously be vegetated. The top of the Tailings Dam will be vegetated during closure and the side slopes fully vegetated to ensure a wilderness land capability. If dust is noted on the access roads, applicable measures such as a watercart or chemical dust suppression will be implemented. Land to which soil has been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Rehabilitation will be progressive throughout the life of the mine, and vegetation will be established as soon as a disturbing activity has ceased, to stabilize soils and re-establish habitats. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. Areas of disturbance will be limited to the footprints given on the final layout drawings and vehicular movement 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan Revegetated topsoil stockpiles
O71			<ul style="list-style-type: none"> Decrease in visual aesthetics of the area 			

Table 9-13: Management measures in respect of operating the Mototolo Concentrator and Chrome Recovery Plant

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
O72	Topography	Increased visibility and change in topography due to placement of the Mototolo Concentrator and Chrome Plant infrastructure	<ul style="list-style-type: none"> To minimise the visual impact of the Concentrator and Plant on the surrounding environment. 	<ul style="list-style-type: none"> All infrastructure will be demolished on closure of the Mototolo Concentrator and Chrome Plant and all disturbed areas will be reinstated and rehabilitated to a known past state or to an approximation of the natural condition. <ul style="list-style-type: none"> Land to which soils have been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Establishment of vegetation Closure and Rehabilitation Plan
O73	Soils, Land Capability and Land Use	Loss of soil resources due to erosion	<ul style="list-style-type: none"> To prevent/ minimise loss of soil resources. 	<ul style="list-style-type: none"> Special erosion control measures will have to be implemented should erosion be detected Drainage facilities will be designed to minimise the potential for soil erosion. Energy dissipaters will be provided in areas where concentrated discharges could cause significant erosion, such as the plant. All drainage facilities will be checked at approximately three monthly intervals during the rainy season and any undue erosion or siltation, especially at discharge points, will be noted and 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Erosion control measures

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
				<p>repaired. The operation will identify the cause of such undue erosion or siltation and suitable remedial measures will be implemented.</p> <ul style="list-style-type: none"> No random driving across the terrain (outside of authorised routes) will be allowed – this will destroy the soil structure, cause unsightly tracks and lead to unnecessary soil erosion. 		
O74		Disturbance/Loss of soil resources due to accelerated/ human induced soil erosion, or due to contamination of soils from spillages of fuels, oils, chemicals or waste	<ul style="list-style-type: none"> To prevent and minimise soil contamination. To minimise seepage and accidental spills. To remediate contaminated soils. 	<ul style="list-style-type: none"> The clean and dirty water management and separation at the Mototolo Concentrator and Chrome Plant will form part of the overall Mototolo Concentrator water management system. Maintenance of vehicles to ensure vehicles are in good running order. Disturbance will be restricted to footprint areas depicted with no random driving across the terrain allowed All infrastructure will be demolished on closure of the Mototolo Concentrator and Chrome Plant and all disturbed areas will be reinstated and rehabilitated to a known past state or to an approximation of the natural condition. During reinstatement, surfaces will be ripped and stockpiled soil will be graded over previously disturbed/ stripped areas with as little compaction as possible, with vehicles avoiding running over stockpiles by spreading from one side only. Land to which soils have been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species 	<ul style="list-style-type: none"> Environmental Coordinator SHE Manager Land Manager 	<ul style="list-style-type: none"> Leak/ spill clean-up Procedure Inspection and Maintenance Plan Stormwater Management Plan Environmental Incident Report

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
				<p>removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved.</p> <ul style="list-style-type: none"> • Separate clean and dirty water systems will be constructed and will be maintained throughout the life of the Mototolo Concentrator and Chrome Plant. • Drainage, stormwater and erosion control measures/structures will be checked at three monthly intervals and after significant rainfall events for siltation and effectiveness in preventing erosion. Silted, damaged or ineffective structures will be cleaned, repaired or replaced regularly. • Energy dissipaters will be constructed at sites of concentrated stormwater discharge. • Silt and oil traps, and drip trays will be inspected frequently for effectiveness and cleaned/repaired/ replaced regularly. Impermeable hazardous waste containers will be disposed of as required to prevent spillage. All water pumps will be maintained to prevent spills/leaks and placed in impermeable sumps to contain possible leakage. • Vehicles will be inspected regularly and kept in good running order, and leaks repaired immediately. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
O75	Biodiversity	Effects of fugitive dust on vegetation	<ul style="list-style-type: none"> To minimise the entrainment potential of dust. 	<ul style="list-style-type: none"> Dust monitoring to be undertaken as per the Dust Monitoring Plan. Dust suppression to be undertaken on gravel roads. Water sprayers or dust plants, or other suitable methods, will be used to minimise dust at sources. The effect will be monitored and adjusted accordingly. The conveyor will be fitted with doghouse sheeting. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Dust monitoring Plan Dust monitoring records
O76	Surface Water	Disturbance/loss of aquatic animal species due to a deterioration in surface water quality due to contamination from various forms of pollution from operational activities, increased sediment loads, oil and fuel spills and leaks.	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of water during operations. 	<ul style="list-style-type: none"> Regular inspections will be undertaken in order to detect spillages timeously. Monitoring of Groot-Dwars River will be implemented upstream and downstream of the Mototolo Concentrator and Chrome Plant to detect deterioration. A spill detection plan will be devised and implemented for all possible areas of spillage. An inspection and maintenance plan will be implemented to ensure that the Mototolo Concentrator and Chrome Plant are operated within specifications. All effort will be made to maintain this "good" biotic status and continuous seasonal biological monitoring will be performed when mining operation commences. Such future monitoring together with the already gathered baseline information will then be used for early detection of possible future biotic degradation to enable mitigation measures. A long term monitoring programme will be implemented to monitor physico-chemical and biological components of 	<ul style="list-style-type: none"> Environmental Coordinator Plant Manager 	<ul style="list-style-type: none"> Leak/ spill clean-up Procedure Topsoil stockpile Inspection and Maintenance Plan Environmental Incident Report Water monitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
				<p>the aquatic ecosystems within and below the mining area. The monitoring programme will commence as soon as mining operations start. This would enable the timely identification of required mitigation/environmental management procedures to maintain the high quality of this ecologically important aquatic ecosystem.</p> <ul style="list-style-type: none"> An appropriate biological index based on fish (such as the Fish Assemblage Integrity Index, Kleynhans, 1997 or Sensitivity-weighted Index of Biotic Integrity will also be included in order to quantify and classify the longer-term changes in biotic integrity). 		
O77		Deterioration of stormwater and surface water quality due to operational activities at the Chrome Plant	<ul style="list-style-type: none"> To ensure the separation of clean and dirty water on site. 	<ul style="list-style-type: none"> The area around the Mototolo Concentrator, within which the Chrome Plant is positioned, is within a controlled stormwater area. All process water will be recycled and re-used within the Mototolo Concentrator and Chrome Plant, with a zero discharge policy being maintained. Measure and monitor surface water quality in the Groot-Dwarsrivier, within and below the Mototolo Concentrator and Chrome Plant area. Groundwater quality and quantity will be measured and monitored as per the monitoring protocol. The dispersion of wastewater will be limited by using soak-away drains in the wash bay and domestic wash water discharge areas. Wastewater will be returned to the process. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
				<ul style="list-style-type: none"> • Separate clean and dirty water systems will be constructed and will be maintained throughout the life of the Mototolo Concentrator and Chrome Plant. • Drainage, stormwater and erosion control measures/structures will be checked at 3 monthly intervals and after significant rainfall events for siltation and effectiveness in preventing erosion. Silted, damaged or ineffective structures will be cleaned, repaired or replaced regularly. • Energy dissipaters will be constructed at sites of concentrated stormwater discharge. • Silt and oil traps, and drip trays will be inspected frequently for effectiveness and cleaned/repaired/ replaced regularly. Impermeable hazardous waste containers will be disposed of as required to prevent spillage. All water pumps will be maintained to prevent spills/leaks and placed in impermeable sumps to contain possible leakage. • Vehicles will be inspected regularly and kept in good running order, and leaks repaired immediately. • Any spillage will be reported, cleaned up and soils remediated immediately. Any pollution or spills will be reported to the DWS regional director within 24 hours of the occurrence. • Drivers will be trained on how to deal with spillage of ore, hydrocarbons and other potential contaminants. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
O78		Contamination of surface water bodies due to diffuse pollution	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of water during operations. 	<ul style="list-style-type: none"> Implement good housekeeping at operational sites. The final dirty water stream fed from the spiral plant reports to the Mototolo Concentrator process water tank. Monitor pollution control infrastructure and the surrounding boreholes. Much of the terrace areas will be paved with concrete and tar. Remaining areas will be planted to lawns and gardens. Individual components such as stores, sub-stations, stockpiles, workshops and the Concentrator will be individually bunded to contain spills. Bunded areas will be designed to contain at least 110% of the volume of the maximum potential spillage. Spilled material will be recovered and either returned to the process or will be disposed of to an appropriate site. A drain will be provided upslope of the plant terrace to divert clean stormwater runoff away from the terrace. This drain will be designed to cater for the 1:50 year return period flood. The discharge point will be designed to allow for the safe discharge of water without causing any erosion. A drain designed to cater for the 1:50 year return period flood event will be constructed downslope of the terrace to direct contaminated water discharges from this area to the settlers. Water from the immediate plant area will drain to a lined sump designed to retain 	<ul style="list-style-type: none"> Environmental Coordinator Plant Manager 	<ul style="list-style-type: none"> Leak/spill Procedure Water monitoring reports Stormwater Management Plan Complaints register

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
				<p>wash down water and water from small rainfall events.</p> <ul style="list-style-type: none"> All runoff from terraces not catered for by the sumps will flow to lined settlers. This settler system will be designed to provide sufficient capacity to allow for the settlement and containment of the 1:50 year return period flood event. A spillway sized for the 1:50 year event will be provided. Settled water will be recycled for use in the process water circuit. The sumps and settlers will be checked regularly. Silt will be removed and disposed of on the Tailings Dam, as required, in order to retain sufficient capacity in these ponds. The quality of the water in the settlers will be monitored. 		
O79	Groundwater	Deterioration of groundwater quality	<ul style="list-style-type: none"> To minimise/ prevent contamination of water resources 	<ul style="list-style-type: none"> Continue with groundwater monitoring on a quarterly basis to detect groundwater contamination. Should groundwater be contaminated, it will be pumped to the Helena TSF for recirculation. 	<ul style="list-style-type: none"> Environmental Coordinator Plant Manager 	<ul style="list-style-type: none"> Water monitoring reports
O80	Air Quality	Decreased ambient air quality due to the operation of the Chrome Plant	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints about dust related health and nuisance impacts. 	<ul style="list-style-type: none"> Dust generated on access roads will be managed through appropriate measures such as a watercart or chemical dust suppression. Reinstatement and rehabilitation of all disturbed areas at closure. Dust will be controlled on site with water carts or dust suppressants. A speed of 40 kmph will be strictly enforced on all mine access roads. 	<ul style="list-style-type: none"> Environmental Coordinator Plant Manager CED Manager 	<ul style="list-style-type: none"> Complaints register Dust monitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operating the Mototolo Concentrator and Chrome Recovery Plant						
				<ul style="list-style-type: none"> All infrastructure will be demolished on closure of the Mototolo Concentrator and Chrome Plant and all disturbed areas will be reinstated and rehabilitated to a known past state or to an approximation of the natural condition. Land to which soils have been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. 		
O81	Noise	Increase in ambient noise levels due to operation of the Chrome Plant	<ul style="list-style-type: none"> To prevent or minimise adverse impacts arising from operations. To respond with corrective action to public complaints about noise. 	<ul style="list-style-type: none"> Keeping vehicles silencer units in good working order and restricting activities to the dedicated mining areas. Should community complaints be received with regard to noise generation, mine management will investigate these and implement appropriate management measures. 	<ul style="list-style-type: none"> Environmental Coordinator Plant Manager 	<ul style="list-style-type: none"> Complaints register Noise monitoring reports
O82	Visual	Decrease in visual aesthetics of the area		<ul style="list-style-type: none"> Refer to O28 for applicable management measures 		

Table 9-14: Management measures in respect of utilising access roads

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of access roads						
O83	Soils, Land Capability and Land Use	Loss of soil resources due to erosion	<ul style="list-style-type: none"> To prevent/ minimise soil erosion 	<ul style="list-style-type: none"> Erosion control measures will have to be implemented throughout the site for the entire life of the mine. Drainage facilities will be designed to minimise the potential for soil erosion. Energy dissipaters will be provided in areas where concentrated discharges could cause significant erosion, such as access/service roads. All drainage facilities will be checked at approximately three monthly intervals during the rainy season and any undue erosion or siltation, especially at discharge points, will be noted and repaired. The mine will identify the cause of such undue erosion or siltation and suitable remedial measures will be implemented. <ul style="list-style-type: none"> Unused roads will be rehabilitated after exploration, while high traffic roads will be surfaced. Other roads still used will be maintained and any new roads will have proper engineered designs to prevent erosion. No random driving across the terrain (outside of authorised routes) will be allowed – this will destroy the soil structure, cause unsightly tracks and lead to unnecessary soil erosion. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Erosion control measures
O84		Soil contamination due to spillage of	<ul style="list-style-type: none"> To prevent and minimise soil contamination. 	<ul style="list-style-type: none"> Water pollution management measures are designed to contain all polluted water, thereby minimising the potential for soil contamination from this source. 	<ul style="list-style-type: none"> Environmental Coordinator SHE Manager 	<ul style="list-style-type: none"> Leak/spill Procedure Environmental Incident Report

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of access roads						
		fuel, oil and chemicals		<p>Any spillage will be cleaned up and remediated.</p> <ul style="list-style-type: none"> Any spills will be cleaned up. More serious spills will be reported and treated. An inspection and maintenance plan will be implemented to ensure that the ore transportation operates within specifications. Regular servicing of vehicles in well-constructed, bunded areas. Regular cleaning and maintenance of drains and stormwater control facilities. Containment and management of spillage. Spill kits will be provided on site for ad hoc spill clearing. 		<ul style="list-style-type: none"> Stormwater Management Plan Inspection and Maintenance Plan
O85	Surface Water	Deterioration of surface water quality due to erosion, spillages and accidental discharges on roads	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of water during operations. 	<ul style="list-style-type: none"> Stormwater culverts at watercourse crossings will be designed and constructed to accommodate the 1:50 year storm event. Erosion protection and energy dissipaters will be constructed at the crossings as applicable. Emergency action plans will be drawn up to deal with spillages. 	<ul style="list-style-type: none"> Environmental Coordinator SHE Manager CED Manager 	<ul style="list-style-type: none"> Leak/spill Procedure Stormwater Management Plan Complaints register
O86	Noise	Increase in ambient noise levels on the surrounding communities as a result of mining activities	<ul style="list-style-type: none"> To prevent or minimise adverse impacts arising from operations. To respond with corrective action to public complaints about noise. 	<ul style="list-style-type: none"> Regular servicing and maintenance of vehicles. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager 	<ul style="list-style-type: none"> Complaints register Noise monitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of access roads						
O87	Traffic and Transportation	Increased generation of traffic on existing road networks during operations		<ul style="list-style-type: none"> Refer to O15 in this table for applicable management measures 		
O88		Impact on pedestrian and cyclists		<ul style="list-style-type: none"> Refer to O16 in this table for applicable management measures 		
O89		Impact on road safety conditions		<ul style="list-style-type: none"> Refer to O17 in this table for applicable management measures 		
O90		Decreased condition of the road network		<ul style="list-style-type: none"> Refer to O18 in this table for applicable management measures 		

Table 9-15: Management measures in respect of utilising the Helena and Richmond Wellfields and ongoing prospecting activities

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of Wellfields and ongoing prospecting activities						
O91	Soils, Land Capability and Land Use	Soil erosion due to operational activities	<ul style="list-style-type: none"> To prevent/ minimise soil erosion 	<ul style="list-style-type: none"> Stormwater control measures will be implemented along all access roads and will include energy dissipaters such as contour anti-erosion berms. The Pipelines will be trench buried for most of their length except for areas where topography only allows for aboveground structures. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Stormwater Management Plan Establishment of vegetation

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of Wellfields and ongoing prospecting activities						
				<ul style="list-style-type: none"> • Frequent inspection of the effectiveness of stormwater control measures, as well reinstatement and rehabilitation of unused or disturbed areas. • Impermeable plastic liners should be placed on site during drilling to avoid pollution and contamination of soil. <ul style="list-style-type: none"> ○ In the event that a spill occurs, spilled material is dug up and placed in spill bin specific for contaminated soil and disposed of. 		
O92	Biodiversity	Disturbance/loss of plant species of conservation importance, habitat, endemism and biodiversity	<ul style="list-style-type: none"> • To demonstrate active stewardship of land and biodiversity 	<ul style="list-style-type: none"> • All temporary infrastructure will be demolished on mine closure (where not required for communities), and all disturbed areas reinstated and rehabilitated to a known past state or to an approximation of the natural condition. Infrastructure for which post-mining and approved uses have been identified, will not be demolished. • During reinstatement, surfaces will be ripped and stockpiled soil will be graded over previously disturbed/ stripped areas with as little compaction as possible, with vehicles avoiding running over stockpiles by spreading from one side only. • Land to which soil has been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Rehabilitation will be progressive throughout the burying of the Pipelines and throughout the life of 	<ul style="list-style-type: none"> • Environmental Coordinator • CED Manager 	<ul style="list-style-type: none"> • Identify and remove relevant species if necessary • Implementation of the Biodiversity Action Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of Wellfields and ongoing prospecting activities						
				<p>the mine, and vegetation will be established as soon as a disturbing activity has ceased, to stabilise soils and re-establish habitats. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved.</p> <ul style="list-style-type: none"> • Energy dissipaters will be constructed at sites of concentrated stormwater discharge. • Drainage, stormwater and erosion control measures/structures will be checked at 3 monthly intervals and after significant rainfall events for siltation and effectiveness in preventing erosion. Silted, damaged or ineffective structures will be cleaned, repaired or replaced regularly. • Disturbance of vegetation cover and soils will be restricted to footprint areas with no random driving across the terrain allowed. • Vehicles will be inspected regularly and kept in good running order, and leaks repaired immediately. • Any spillage will be reported, cleaned up and soils remediated immediately. • After drilling is completed, sites should be rehabilitated and seeded. 		
O93		Proliferation of alien vegetation and associated impacts on groundwater	<ul style="list-style-type: none"> • To prevent/ minimise the establishment and spread of alien invasive species 	<ul style="list-style-type: none"> • All weeds and invaders will be eradicated to prevent impacts on natural vegetation and groundwater supplies. • Natural eradication methods, and replacement of the reed with indigenous Phragmites reeds will be investigated. 	<ul style="list-style-type: none"> • Environmental Coordinator 	<ul style="list-style-type: none"> • Alien Invasive Management Plan • Biodiversity Action Plan •

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of Wellfields and ongoing prospecting activities						
				<ul style="list-style-type: none"> Regular monitoring and eradication of weeds and invaders along any newly disturbed areas. All disturbed areas will be progressively reinstated and rehabilitated with indigenous species. A land management plan is being compiled and will form part of a possible conservancy feasibility study. This plan will determine the use and management of natural areas. Existing invaders/aliens/weeds/bush encroaches (where considered a problem) will be eradicated on site and on an ongoing basis. The <i>Populus</i> sp. will be eradicated immediately. The ECO will develop an eradication programme in consultation with a specialist. Biological or mechanical eradication methods will be developed for <i>Arundo donax</i> to prevent water contamination and impact on surrounding natural vegetation. Replacement of the reed with indigenous <i>Phragmites</i> will be investigated to maintain river functioning and water quality. Newly disturbed areas, as well as rehabilitated areas, will be monitored for invader/weed seedlings, which will be removed and monitored. 		
O94		Disturbance/loss of animals of conservation importance	<ul style="list-style-type: none"> To prevent/ minimise the impact on <i>Pycna sylvia</i> populations. 	<ul style="list-style-type: none"> Cicada situation will continuously be monitored in the Klein- and Groot-Dwarsrivier valleys during the life of the mine and therefore the life of the Wellfield. Progressive reinstatement and rehabilitation of disturbed areas will 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Biodiversity Action Plan Dust suppression on dirt roads

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of Wellfields and ongoing prospecting activities						
				<p>reduce the likelihood of the impact further.</p> <ul style="list-style-type: none"> • A land management plan is being compiled and will form part of a possible conservancy feasibility study. This plan will determine the use and management of natural areas. • All environmental method statements (for any disturbing/destructive construction/ operational activities such as removal/disturbance of trees or important vegetation, disturbance of streams, dry watercourses, drainage lines or riparian areas) will be submitted to the ECO for approval before commencement of the works. • All areas to be disturbed will be surveyed by the ECO. Marked important/priority plant will remain in situ and where not possible will be removed to designated nurseries by the ECO prior to any disturbance. All species of <i>Vitex obovata</i> subsp. <i>wilmsii</i> will be marked and remain in situ for the life of the mine. These possible Cicada habitats will be continuously monitored. Nurseries will be maintained under supervision of the ECO. Pegged no-go areas will remain natural features and will not be disturbed. Special care will be taken at watercourses and along dongas to avoid spoil material being dumped or sliding downslope into these sensitive areas. • Existing invaders/aliens/weeds/bush encroaches (where considered a problem) will be eradicated on site and 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of Wellfields and ongoing prospecting activities						
				<p>on an ongoing basis. The Populus sp. will be eradicated immediately. The ECO will develop an eradication programme in consultation with a specialist. Biological or mechanical eradication methods will be developed for Arundo donax to prevent water contamination and impact on surrounding natural vegetation. Replacement of the reed with indigenous Phragmites will be investigated to maintain river functioning and water quality.</p> <ul style="list-style-type: none"> Newly disturbed areas, as well as rehabilitated areas, will be monitored for invader/weed seedlings, which will be removed and monitored. 		
O95	Surface Water	Reduction in baseflow of the Klein-Dwars River	<ul style="list-style-type: none"> To minimise the impact on the baseflow of the Klein-Dwars River 	<ul style="list-style-type: none"> The mine will measure and monitor surface water levels and quality in the Klein-Dwars River, within and below the Wellfield area, and compare these with the baseline data. Any indication of lowering of surface water levels due to groundwater abstraction will be reported and adequate mitigation measures implemented. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Water monitoring reports
O96	Groundwater	Reduction in the water table levels of the alluvial aquifer	<ul style="list-style-type: none"> To minimise the impact of loss groundwater resources 	<ul style="list-style-type: none"> Various monitoring boreholes in both aquifers are/will be installed and data will continuously be monitored at the central control room at the Mototolo Concentrator. Data will be compared with the wealth of baseline data and any sign of lowering water table levels in either aquifer will be reported. Due to the management of the Wellfield, and variable abstraction from a large number of boreholes to obtain minimum 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Water monitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of Wellfields and ongoing prospecting activities						
				<p>drawdown, the duration of the impact at one given point (borehole) will also be reduced.</p> <ul style="list-style-type: none"> Groundwater monitoring boreholes are/will be established. A groundwater monitoring programme will be developed. The Wellfield will consist of approximately 53 boreholes from which water will be abstracted at variable rates and intervals to obtain minimum drawdown. 		
O97		Contamination of groundwater resources during ongoing prospecting	<ul style="list-style-type: none"> To prevent/ minimise groundwater contamination during drilling 	<ul style="list-style-type: none"> Impermeable plastic liners will be used beneath drill rigs and in drilling-mud sumps to prevent seepage of any liquids on site to water resources. 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Plastic liners
O98	Air Quality	Increase in nuisance dust during ongoing prospecting	<ul style="list-style-type: none"> To minimise dust emissions 	<ul style="list-style-type: none"> Dust suppression through watering as necessary. Employees will wear appropriate Personal Protective Equipment (PPE) 	<ul style="list-style-type: none"> Environmental Coordinator Mining Engineer 	<ul style="list-style-type: none"> Dust suppression PPE
O99	Visual	Reduced quality of scenic value from vantage points	<ul style="list-style-type: none"> To minimise the visual impact of the Wellfield 	<ul style="list-style-type: none"> The aesthetic quality of the site will be minimised through limiting areas of disturbance, and progressive reinstatement and rehabilitation of disturbed areas. 	<ul style="list-style-type: none"> Environmental Coordinator CED Manager Engineering Manager 	<ul style="list-style-type: none"> Complaints register Closure and Rehabilitation Plan Establishment of Vegetation on rehabilitated areas
O100	Cultural Heritage	Disturbance/destruction of archaeological and cultural significant sites	<ul style="list-style-type: none"> To respect the culture and heritage of the people in the area To avoid disturbance of sites and activities of cultural significance and where not possible to 	<ul style="list-style-type: none"> No random driving will be allowed on site and vehicles will be restricted to designated access roads. Relevant contractors and mine personnel will be trained in the identification of significant archaeological sites. These will 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> All findings documented and finds recorded by a qualified (as per SAHRA) specialist Complaints register

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Utilisation of Wellfields and ongoing prospecting activities						
			determine mitigation in consultation with local communities	immediately be reported to the relevant mine manager and a specialist archaeologist will be informed. <ul style="list-style-type: none"> • Sites of medium and high significance will be avoided (fenced if deemed necessary), while sites to be disturbed along the trench will be inspected and sampled by a specialist during trench excavations. • The Eiland site will be avoided (fenced if deemed necessary by the specialist archaeologist) or test pit excavations conducted by a specialist archaeologist if disturbance is deemed necessary. • Archaeological sites to be disturbed along the trenches, will be inspected (and sampled if necessary) by a specialist during trench excavations along the Klein-Dwarsrivier valley. • Relevant contractors and mine personnel will, as in the past on this project, be trained in the identification of significant archaeological sites. These will immediately be reported to the relevant mine manager and the specialist archaeologist will be informed. 		

Table 9-16: Management measures in respect of the operation of the Borwa and Lebowa shafts and associated ventilation shafts

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
O109	Geology	Loss of a natural resource	<ul style="list-style-type: none"> To ensure that underlying mineral resources are considered when positioning infrastructure 	<ul style="list-style-type: none"> The mine is continuing to mine in accordance with its extraction plan by leaving in situ pillars <ul style="list-style-type: none"> If any infrastructure is to be considered it will be ensured that it is not located where future mineral resources will be sterilized. 	<ul style="list-style-type: none"> MRM Manager Geologist/rock engineer 	
O110	Topography	Alteration of the natural topography and drainage	<ul style="list-style-type: none"> To limit impacts on drainage, land capability and the aesthetic quality of the environment 	<ul style="list-style-type: none"> Ensure the ventilation shafts constructed as per design. Mine management will ensure that rehabilitation does occur according to the mining plan, concurrent with the mining operations. An annual audit will also be performed to monitor the progress of rehabilitation to ensure that large voids and stockpiles are not created unnecessarily. 	<ul style="list-style-type: none"> SHE Manager Environmental Officer 	
O111	Soils	Degradation (chemical, biological & physical properties) due to removal and stockpiling	<ul style="list-style-type: none"> To limit soil erosion and consequent degradation of soil and consequent pollution of air and surface water 	<ul style="list-style-type: none"> Visually inspect the terrain for signs of erosion and stability of surface run-off control structures (Note to be monitored during scheduled inspections and/or after every severe storm event) Usable soil for the purposes of rehabilitation will be stripped from areas to be cleared for construction and operation and stored in designated soil stockpiles. Stripped soil will be stockpiled and stored using the following conservation principles: <ul style="list-style-type: none"> soil will be stockpiled by means of end-tipping to avoid compaction; stockpile areas will have their soils stripped to conserve the seed bank; 	<ul style="list-style-type: none"> SHE Manager / Environmental Officer / Mine engineer / Plant superintendent 	<ul style="list-style-type: none"> NEMA, (Conservation of Agricultural Resources Act (CARA)

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<ul style="list-style-type: none"> ○ single handling will be practiced; ○ stockpiles that are likely to remain unused for more than 12 months will be revegetated to manage dust and erosion and to maintain the soil's viability (further principles regarding rehabilitation will be contained in the soil utilisation plan. ○ usable soils will be re-spread with a minimum of compaction; ○ land to which soil has been reapplied will be revegetated; ● Stockpiles and newly spread soil will be kept clear of invasive vegetation. ● Minimise the area to be cleared that is safe for construction and operation activities, thereby minimising the disturbed footprint and its vulnerability to erosion, pollution of storm water and dust generation. ● Areas to be disturbed will be cleared as close to the start of construction as possible so that bare areas are not left exposed for long periods of time. ● Rehabilitation will be progressive throughout the life of mine and will commence as soon as the disturbing activity has ceased. ● Roads to be constructed as part of the mine will be designed and built to minimise erosion. ● Prevent contamination of soils due to leaching of contaminants from the mine residue deposits and plant area during operation and decommissioning. 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<ul style="list-style-type: none"> Exposed soil shall be rehabilitated with a mixture of local grasses. The soil must be used for rehabilitation as soon as practicable Soil shall only be used for rehabilitation purposes and not for other uses for example construction of roads. Contour structures should be made on slopes > 14° and slope length of more than 5 m. The storm water management infrastructure will be inspected on a monthly basis as well as after storms. Any debris blocking drainage canals will be removed and any damaged sections repaired. Stockpiles shall be kept wet to prevent fine particles from being removed by wind to the surrounding area. 		
O112		Pollution of soil by chromite particles, oils, diesel and other wastes or cleaning materials	<ul style="list-style-type: none"> To minimize the pollution of soil by chromite / platinum particles, oils, diesel and other wastes or cleaning materials 	<ul style="list-style-type: none"> The mine's waste management procedure shall be reviewed annually to include recent changes. Specific reference shall be made to disposal of domestic waste, and hazardous waste and management of contractors. Oil, petrol and other chemicals will be disposed of hazardous waste and not with domestic waste. Oil traps will be installed and maintained in the workshop areas. Particular attention will be given to training of staff and contractors in the handling of oils, diesel and other hazardous substances on site i.e. spills are to be avoided. Surface water draining off contaminated areas containing oil and petrol should be 	<ul style="list-style-type: none"> SHE Manager / Environmental Officer / Mine engineer / Plant superintendent 	<ul style="list-style-type: none"> NEMA, (Conservation of Agricultural Resources Act (CARA)

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<p>channelled towards a sump to separate hydrocarbons and water. The sumps must be cleaned out regularly to ensure its proper functioning.</p> <ul style="list-style-type: none"> Construction vehicles and machines must be maintained properly to ensure that oil spillages are kept at a minimum. Oil residue shall be treated with oil absorbent such as Drizit, and removed to an approved waste site. Spill kits must be easily accessible Old oil to be stored in dedicated area to prevent pollution and recycled via oil recycling companies. 		
O113	Land capability	Loss of agricultural land.	<ul style="list-style-type: none"> To limit permanent destruction of existing land capability To limit the development of incompatible land uses 	<ul style="list-style-type: none"> Disturbed land will be rehabilitated as soon as the activities have ceased. The rehabilitation plan will be updated by the mine to reflect changes and closure objectives. 	<ul style="list-style-type: none"> SHE Manager 	
O114	Flora	Loss of conservation important plant taxa	<ul style="list-style-type: none"> To create awareness To limit habitat disturbance To rehabilitate disturbed land with indigenous vegetation To remove invasive species 	<ul style="list-style-type: none"> Disturbed areas will be rehabilitated as soon as possible in accordance with the rehabilitation principles of the mine. Red data or protected species (All protocols and Acts) must be removed where possible and where not possible must a permit be obtained from the competent authority to remove/destroy it. Ensure the natural vegetation cover between the sections receives the highest level of protection to ensure proper plant material remains. An invasive and alien control programme must be drafted and implemented by the SHEQ department. All illegal exotic or invader plants and weeds shall be eradicated as required in terms of Regulation 15 & 16 of the Act on 	<ul style="list-style-type: none"> SHE Manager / Environmental Officer / Operational Manager / Mine Engineer 	<ul style="list-style-type: none"> National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<p>Conservation of Agricultural Resources, 1983 (Act no. 43 of 1983) which list these plants.</p> <ul style="list-style-type: none"> • Awareness program to all staff must include alien and exotic species identification (species expected on this site only) and eradication measures. • Raise awareness amongst employees by the compilation and onsite posters indicating the names and photos of red data species found on site. • The re-vegetation of the disturbed areas will become an integral part of activities during the operational phase. • The areas where the buildings and plant area are situated will only be re vegetated once the buildings have been removed during the decommissioning phase. • Existing invasive plants will be removed and the mine property will be surveyed at least once a year to check for the return of any new alien invaders. The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) hold landowners legally responsible for the control of invasive alien plants on their properties. 		
O115	Fauna	Loss of habitat and fauna displacement	<ul style="list-style-type: none"> • To limit habitat disturbance and to rehabilitate all disturbed land 	<ul style="list-style-type: none"> • Closure objectives and targets of the Biodiversity Management Plan shall be adhered to. • Re-establish proper specie diverse vegetation cover as soon as possible on rehabilitated areas and bare patches as preventative measurement against 	<ul style="list-style-type: none"> • SHE Manager / • Mine manager / Environmental Officer 	<ul style="list-style-type: none"> • National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<p>erosion, invader specie control and where soil stability is required.</p> <ul style="list-style-type: none"> • Where breeding areas of protected and red data bird and bat species are found, the necessary warning signs must be erected. • Killings etc. must be reported in the incident register. • Game catching, hunting, traps, snares, poaching and any other unnecessary disturbance of animals inside the boundaries of the operation must be a disciplinary offence. • Machine operators and drivers to undergo appropriate level of environmental impact training to ensure they understand their impact on the environment. • Implement Environmental Awareness program 		
O116	Surface water	Water quality deterioration due to site clearance and uncontrolled release of storm water	<ul style="list-style-type: none"> • To ensure that the storm water management is in accordance with GN704 • To ensure that mining activities does not impact negatively on surface water quality and quantity 	<ul style="list-style-type: none"> • In principle the mine will not discharge any water into drainage courses, except where the 1:50 year flood event has been exceeded. • Rainfall on site shall be recorded and archived storm water design should be according to the Redco Report – Mototolo Mine Surface Water Planning. • The stormwater design report should be updated regularly to ensure it stays current and that the impacts to surface water resources are mitigated. • It will be necessary to construct an additional small storm water dam to the 	<ul style="list-style-type: none"> • Mine engineer / • SHE Manager / • Environmental Officer / Safety Officer / • General Engineering Supervisor / • Plant Superintendent / Plant Foreman 	<ul style="list-style-type: none"> • NWA, SANS 241: 2015, GNR 634 of 23 Aug 2013
O117		Water quality deterioration due to vehicle maintenance, hydrocarbons, fuel, oil and lubricants				

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
O118		Contaminated storm water runoff and overtopping of containment dams - operational phase		<p>northeast of the terrain, because the terrain is situated on a local watershed and a portion of the disturbed area drain north to a different watercourse than for the main SWD.</p> <ul style="list-style-type: none"> Flow meters to be installed as indicated in the water balance diagram. Measurements shall be taken on a regular basis, archived and used to update the mine water balance. Losses through the system should be investigated. Effluent quality from the sewage works (north and south) shall comply with the General Standard specified by DWS. Operational and Maintenance plan and schedule for management of sewage facilities should be compiled. An emergency plan should be compiled to deal with system failures and should also include a down-stream notification procedure. The sewerage plants shall be operated by a competent person who received the necessary training. Routine checks should be done on all mechanical instruments for problems such as leaks, overheating, vibration, noise or any other abnormalities. All equipment should be free of obstruction, be properly aligned and be moving at normal speed. Mechanical maintenance must be according to the manufacturer's instructions Pumps should be checked for excessive noise, vibration, overheating and leaks. 		
O119		Stream diversions, stockpiling				

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Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<p>Lubrication of the pump should be in accordance with the manufacturer's instructions.</p> <ul style="list-style-type: none"> • Surface water analysis will be reported in the annual report to DWS. • Any spillages on site will be reported in the quarterly report to DWS detailing corrective actions taken 		
O120	Groundwater	Deterioration of groundwater quality due to blasting explosive residue	<ul style="list-style-type: none"> • To confirm that the inflows of groundwater into the underground workings is low as expected 	<ul style="list-style-type: none"> • Groundwater inflows from both shafts shall be monitored - flow meters to be installed as detailed in the water balance diagram, data archived and used to update the water balance on a monthly basis. 	<ul style="list-style-type: none"> • Mine engineer/ • general engineering supervisor / • environmental officer/ • SHE Manager 	<ul style="list-style-type: none"> • NWA, SANS 241: 2015, GNR 634 of 23 Aug 2013
O121		Deterioration of groundwater quality due to infiltration of contaminated run-off and seepage from residue areas	<ul style="list-style-type: none"> • To ensure that the mine does not impact on the health and welfare of surrounding water users through contamination and depletion of groundwater resources 	<ul style="list-style-type: none"> • A monitoring protocol should be compiled and implemented. • If an incident occurs where water has been contaminated to levels exceeding the maximum acceptable levels agreed to by DWS, RPM will immediately notify the Regional director of DWS. The source of the contamination will be identified and measures will be implemented to prevent further contamination. 	<ul style="list-style-type: none"> • Mine engineer/ • general engineering supervisor / • environmental officer/ • SHE Manager 	<ul style="list-style-type: none"> • NWA, SANS 241: 2015, GNR 634 of 23 Aug 2013
O122		Dewatering of the aquifer	<ul style="list-style-type: none"> • To ensure that the mine does not impact on the health and welfare of surrounding water users through contamination and depletion of groundwater resources 	<ul style="list-style-type: none"> • Any losses detected shall be investigated. • Water from underground shall be re-used and not discharged. 	<ul style="list-style-type: none"> • Mine engineer/ • general engineering supervisor / • environmental officer/ • SHE Manager 	<ul style="list-style-type: none"> • NWA, SANS 241: 2015, GNR 634 of 23 Aug 2013
O123	Air Quality	Impact of mining operations on ambient air quality	<ul style="list-style-type: none"> • To reduce dust to levels that are acceptable in terms of nuisance, road hazards, 	<ul style="list-style-type: none"> • Unpaved roads will be maintained and dust suppressant used where necessary. • Daily inspections of plant and equipment. 	<ul style="list-style-type: none"> • SHE Manager /Environmental officer 	<ul style="list-style-type: none"> • NEM:AQA, Ambient Air Quality Standards, National

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
			aesthetics and health hazards	<ul style="list-style-type: none"> Records of dust suppression interventions. A dust fall out monitoring network shall be implemented. Fugitive dust from roads is suppressed with water. All employees working in dusty environments shall wear protective equipment. Employees working with dust and fumes shall receive annual health checks. 		Dust Control Regulations
O124	Noise	Ambient noise levels to increase due to operation of vent shafts, conveyors, shafts, etc.	<ul style="list-style-type: none"> To limit exposure of the surrounding communities to disturbing noise 	<ul style="list-style-type: none"> Should construction noises become a problem, will noise generating activities for example braking of concrete, compaction, steel works and heavy vehicle transport along the access road take place during daylight hours when the ambient noise level is higher. Construction equipment will be maintained in good working order. Non-compliance machinery will be removed from service until repaired. All vehicle exhaust units will be maintained in good working order. Non-compliant vehicles will be removed from service until repaired. A complaints register should be in place. All complaints, solutions and agreements between the mine and complaining parties will be kept in a specific file in the Community Officers office. Noise level readings will be performed on a continual basis at the plant, underground and on mobile machinery. Note is made of any employees not using 	<ul style="list-style-type: none"> Environmental officer / SHE Manager/ Occupational hygienist 	<ul style="list-style-type: none"> National Noise Control Regulations (GN R154 of 1992); SANS 10103:2008, SANS 10210:2004, SANS 10328:2008, SANS 10357:2004, SANS 10181:2003, SANS 10205:2003.

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				the hearing protection (earplugs) provided by the mine. Any unacceptable noise levels are assessed by the safety manager and rectified.		
O125	Cultural Heritage	Destruction of archaeological sites and graves	<ul style="list-style-type: none"> Avoid destruction of Heritage resources 	<ul style="list-style-type: none"> Heritage resources occur within the proposed project areas and the following recommendations are made based on general observations: The remains of a Historical Period homestead (EXIGO-TH374-HP01) and a large Historical Period settlement area (EXIGO-TH374-HP02, EXIGO-TH374-HP03) are generally of medium-low significance due to poor preservation of the sites. The sites are situated in close proximity of the proposed Borwa South Ventilation shaft access road alignment and it is recommended that the alignment of the proposed road be rerouted as to avoid impact on these sites and that any activities pertaining to the access road construction in the area be closely monitored by an ECO or heritage specialist in order to avoid any possible impact sites of significance in the area, especially previously undetected burials around homesteads. In addition, a conservation buffer zone of at least 20m should be maintained around the sites. However, should the structures be directly impacted by development activities, the sites should be documented by means of a limited Phase 2 investigation. A destruction permit from the relevant heritage resources authority (SAHRA) should be obtained subsequent 	<ul style="list-style-type: none"> SHE Manager / Environmental officer / Operational manager 	<ul style="list-style-type: none"> South African Heritage Resources Act (SAHRA)

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<p>to the documentation of each of the Historical period structures at the impacted sites.</p> <ul style="list-style-type: none"> Two unmarked graves (EXIGO-TH374-BP01) and a small cemetery (EXIGO-TH374-BP02) carry high heritage significance at all levels for their spiritual, social and cultural values. The sites are situated in close proximity of the proposed Borwa South Ventilation shaft access road alignment and it is primarily recommended that the alignment of the road be rerouted as to avoid impact on the graves. In addition, a conservation buffer zone of at least 30m around the graves, as well as the fencing off of all cemeteries and graves are recommended. However, should the graves or the proposed 30m buffer zone inevitably be impacted in any way by the planned activities, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials. - It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. Should any subsurface paleontological / 		

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<p>archaeological / historical material and /or graves/human remains be uncovered, all activities should be suspended and the archaeological specialist should be alerted immediately.</p> <ul style="list-style-type: none"> It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process). In the event of accidental findings, all excavation shall be stopped, SAHRA and archaeologist notified. 		
O126	Socio-Economic, Infrastructure	Employment opportunities	<ul style="list-style-type: none"> To enhance the regional socio-economic benefits of the project 	<ul style="list-style-type: none"> Ensure the complaints register is implemented and treated at the highest level. Ensure the SLP is implemented. Make sure the community forums are implemented and functional. Ensure all the commitment made during the consultation process are implemented or adhered to. The mine will have a dedicated community liaison officer to co-ordinate communications with the surrounding interested and affected parties. The community liaison officer will: a) be sensitive to socio-economic issues; b) be experienced in community liaison; c) have good communication skills; d) have conflict management and facilitation skills, e) is fluent in the local languages. 	<ul style="list-style-type: none"> Admin Manager or HR Manager 	

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<ul style="list-style-type: none"> The mine will participate in relevant local forums and bodies which may be established from time to time. The mine will operate in accordance with the agreed commitments in its SLP. Local contractors are used where possible for any maintenance or services required The mine will attempt to continue to enhance its beneficial socio-economic input into the region, especially to the local community from where the bulk of the labour force is drawn. The mine will continue to support the surrounding towns of the region where supplies and services are obtained. 		
O127	Maintenance	Incorrect replacement leading to operational problems	<ul style="list-style-type: none"> Correct installation of new steel tanks 	<ul style="list-style-type: none"> The only activity involved is to remove the empty plastic vessels and replace it with steel tanks. This will be done by parking the oil truck on the existing solid refuel platform and to lift all the existing plastic containers out of the bunded area on the truck. The next step is to lift the prefabricated steel oil tanks from another vehicle which brought them from the oil supplier and to place them inside the bunded area. The next step is to couple the existing piping system onto the new tanks. As there is no construction phase, the only activity is to test and ensure all coupling are good and that no leakages occur. 	Engineering department	

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
O128		Spillage and lack of oil for required uses	<ul style="list-style-type: none"> To avoid spillages 	<ul style="list-style-type: none"> Re-order oil when a minimum level is reached and to ensure the transfer of new oil into the tank is done properly. Any accidental spillages at the refill point will be washed down to the oil skimmer where the oil is removed and the wash water recycled. Once the tanks reach a specific limit the oil supplier brings new oil by bowser and fill the tanks up. The lifting of storage vessels must be done in a safe way and any spill must be washed down to the oil skimmer unit and the wash water recycled. Care must be taken that the bund wall and any other structure is not damaged during the refit. Proper lifting equipment and the services of a qualified rigger must be obtained to ensure the work is done with the minimum damage to any structure. Ensure the integrity of all civil structures is intact and ensure any residual oil spillages are washed down to the oil skimmer. 	ECO & Engineering Department	
O129			<ul style="list-style-type: none"> To avoid running out of oil 	<ul style="list-style-type: none"> Should the mine decide to decommission these tanks will they be emptied by either using all the oil or by pumping the remaining oil into a special oil removal company. The tanks will then be decoupled from the piping system, the tanks will then be lifted out of the containment area onto trucks and will be transported to either a new site or to the workshops of the oil supplier. 	Engineering department	

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Operation of the Borwa and Lebowa Shaft areas and associated infrastructure						
				<ul style="list-style-type: none"> The bunded area will be cleaned with a suitable chemical solution which is pumped to the existing oil separation facilities. The concrete structures will then be removed and the area levelled a, ameliorated and re- vegetated. 		
O130			<ul style="list-style-type: none"> Monitoring plan/ Replacement 	<ul style="list-style-type: none"> The replacement process must be supervised by a qualified rigger and an environmental person must be present to ensure any unforeseen incident is management according to the existing emergency procedures. The success of the process must be internally audited and will be audited during the annual external audit. 	ECO & Engineering Department	
O131			<ul style="list-style-type: none"> Reporting Programme 	<ul style="list-style-type: none"> The monthly operational statistics will report the usage of oil and this should correlate with the amount of oil purchased. 	ECO	
O132			<ul style="list-style-type: none"> Environmental Awareness Plan 	<ul style="list-style-type: none"> The contractor who does the refitment needs to undergo an induction program and environmental awareness is part of this program. The COP for the handling and management of oil facilities also deals with environmental issues, emergencies and monitoring procedures. 	ECO	

Table 9-17: Social management measures to be implemented during operations

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during operations in general						
O101	Socio-economic	Prolonged employment opportunities	<ul style="list-style-type: none"> To enhance benefits from the prolonged operations . 	<ul style="list-style-type: none"> Enhance local employment and procurement opportunities where possible. 	<ul style="list-style-type: none"> Project Manager CED Manager Human Resources Supply Chain 	<ul style="list-style-type: none"> Employment records Social and Labour Plan (SLP)
O102		Contribution to the local and regional economy	<ul style="list-style-type: none"> To enhance benefits from the development of the Project To maximize opportunities for local residents To facilitate employment of local labour on the Project To avoid creating unrealistic expectations 	<ul style="list-style-type: none"> Participation in Local Economic Development Programmes. The operation will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. The operation will ensure that as much of this as possible is directed to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. AAP will inform businesses, where appropriate, through appropriate business fora about available opportunities and how business may access these. For example, the Steelpoort Business Forum can be used to engage with businesses in the local and regional areas. The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local 	<ul style="list-style-type: none"> CED Manager Procurement Manager Project Manager 	<ul style="list-style-type: none"> Social and Labour Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during operations in general						
				<p>suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as part of AAP's SLP reporting to Government.</p> <ul style="list-style-type: none"> • AAP will identify potential service providers for longer term procurement. <ul style="list-style-type: none"> ○ Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy. These strategies will be reviewed and monitored for implementation. 		
O103		Contribution to national economic growth	<ul style="list-style-type: none"> • To enhance benefits from the development of the Project • To maximize opportunities for local residents • To facilitate employment of local labour on the Project • To avoid creating unrealistic expectations 	<ul style="list-style-type: none"> • The operation will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. The operation will ensure that as much of this as possible is directed to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. • AAP will inform businesses, where appropriate, through appropriate business fora about available opportunities and how business may access these. For example the Steelpoort Business Forum could be used to engage with businesses in the local and regional areas. • The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local 	<ul style="list-style-type: none"> • CED Manager • Procurement Manager • Project Manager 	<ul style="list-style-type: none"> • Social and Labour Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during operations in general						
				<p>suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as part of AAP's SLP reporting to Government.</p> <ul style="list-style-type: none"> • AAP will identify potential service providers for longer term procurement. • Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy. These strategies will be reviewed and monitored for implementation. 		
O104		Social disruption	<ul style="list-style-type: none"> • To facilitate continued movement around the site along routes that are as close as possible to existing movement networks • To ensure that individuals do not travel any further than they do prior to the Project development 	<ul style="list-style-type: none"> • If managed correctly, the proposed development could contribute towards improved social and physical mobility in the medium to long term, as well as a general improvement in safety and security measures. This includes policing services and patrolling by mine security personnel, as well as improved health, education and related social services, and the provision of public transport and telecommunications. • Implement the Social and Labour Plan (SLP). • Implement Local economic development plans, which will include infrastructure and poverty eradication projects in line with the area's Integrated Development Plan. 	<ul style="list-style-type: none"> • CED Manager • Procurement Manager • Project Manager 	<ul style="list-style-type: none"> • Complaints Register
O105		Generation of jobs	<ul style="list-style-type: none"> • To enhance benefits from the development of the Project • To maximize opportunities for local residents 	<ul style="list-style-type: none"> • It is expected that contractors will bring in their own workers with the required core skills. The revised SLP will reflect the levels of local employment that will be required. Contractors must submit annual reports on how they are 	<ul style="list-style-type: none"> • Project Manager • CED Manager • Human Resources Manager 	<ul style="list-style-type: none"> • Employment records • SLP

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during operations in general						
			<ul style="list-style-type: none"> To facilitate employment of local labour on the Project To avoid creating unrealistic expectations 	<p>attaining these targets as part of AAP's reporting to Government. Where it is not possible to meet targets for employing people from the immediately affected areas, contractors will be required to source personnel in the immediate focus area, and then only in the broader focus area. Potential workers in the local area will be assessed for their suitability for contract work at Der Brochen. Dover tests can be conducted to screen potential local contract workers.</p> <ul style="list-style-type: none"> AAP will investigate the potential and applicability of training local contract workers on theoretical and safety aspects of pit mining at its facility in Mogalakwena. The Mogalakwena pit is much larger than the proposed pit at Der Brochen, and different methods and machinery may be employed at the two mines. At this point, it is unclear what machine-specific skills will be required by contractors working at Der Brochen. A database of trained potential local workers will be generated and provided to contractors to consider for employment. Local contract workers will be registered on the AAP database so that they may have access to other employment options in AAP and other companies AAP shares its database with. AAP also provides learnerships and bursaries in engineering and hospitality 	<ul style="list-style-type: none"> Supply Chain 	

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during operations in general						
				<p>and will implement this programme in the operation's local communities. Upskilling particularly of contract workers from the local area will be undertaken by AAP during the Operational Phase of operation.</p> <ul style="list-style-type: none"> Procedures for employing locals will be discussed and agreed with the Community Engagement Forum (CEF). Existing fora will be used to implement AAP's local recruitment process, to communicate the recruitment process and to identify and recruit suitable candidates. AAP will meet the SLP requirements and commitments for downscaling and retrenchments, including the establishment, implementation and monitoring of a Future Forum. 		
O106		Procurement of goods and services	<ul style="list-style-type: none"> Ensure that local communities benefit from the proposed Project by means of procurement preference. 	<ul style="list-style-type: none"> The operation will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. The operation will ensure that as much of this as possible is directed to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. AAP will inform businesses through appropriate business fora about available opportunities and how business may access these. The 	<ul style="list-style-type: none"> CED Manager Procurement Manager Project Manager 	<ul style="list-style-type: none"> Implementation of the Social and Labour Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during operations in general						
				<p>Steelpoort Business Forum will be used to engage with businesses in the local and regional areas.</p> <ul style="list-style-type: none"> • The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as part of AAP's SLP reporting to Government. • AAP will identify potential service providers for longer term procurement. AAP will advise and support these companies using Zimele Hub and other AAP institutions so that they can be incorporated as long term suppliers. • According to the Anglo Social Way, all AAP mines are now required to develop long term strategies so that when the mine closes, the mine leaves a positive legacy where mine communities continue to be economically and socially sustainable. These strategies will be reviewed and monitored for implementation. 		
O107		Influx of employees	<ul style="list-style-type: none"> • To prevent/ minimise the influx of job seekers into local areas. • To prevent/ minimise community disruption. 	<ul style="list-style-type: none"> • Enhance employment of people and procurement of service providers in the study area and the region. • Accommodation should preferably be provided in towns in close proximity to the project area and workers bussed in. • Should accommodation be required in close proximity to Der Brochen: <ul style="list-style-type: none"> ○ RPM should require the contractors to promote HIV/AIDS prevention amongst employees. 	<ul style="list-style-type: none"> • CED Manager • Project Manager • SHE Manager 	<ul style="list-style-type: none"> • Influx Management Plan • Policing forums • Awareness campaigns

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts envisaged during operations in general						
				<ul style="list-style-type: none"> ○ RPM and the contractors should work with the health authorities to provide HIV/AIDS prevention and treatment interventions in a culturally appropriate manner. AAP will confirm if this is possible. ○ Sub-contractors should adhere to the contract with the contractor. ● A strategy and protocol for camp management should be developed and implemented, should an existing worker accommodation facility be used. 		
O108		Collection of medicinal plants during the Operational Phase	<ul style="list-style-type: none"> ● To prevent/minimise hazards to community members collection plants. ● To ensure safeguard measures are in place for community members entering the property. 	<ul style="list-style-type: none"> ● A land access protocol for visiting graves is currently in place and AAP Land Use Management will explore the possibility of extending this protocol for enabling the collection of medicinal plants on the property 	<ul style="list-style-type: none"> ● CED Manager 	<ul style="list-style-type: none"> ● Safeguard measures ● Policing forums

9.4.3 Impact management actions during decommissioning and closure phase

During the **decommissioning and closure phase** of the Der Brochen-Mototolo Mine Complex's operation, activities that will require management, as provided in the relevant tables, will relate to the decommissioning, closure and rehabilitation of:

- Mareesburg, Helena and Co-Disposal TSFs - refer to Table 9-18 for the list of required management measures;
- Der Brochen Project related activities and associated infrastructure - refer to Table 9-19 for the list of required management measures;
- Borwa and Lebowa shafts and associated infrastructure - refer to Table 9-20 for the list of required management measures;

Table 9-21 provides a summary of all the social management measures that will need to be implemented during the decommissioning and closure phase of the Der Brochen-Mototolo Mine Complex's operation.

Table 9-18: Management measures in respect of the decommissioning and closure of the Maresburg, Helena and Co-Disposal TSFs

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Decommissioning and Closure of the Maresburg, Helena and Co-Disposal TSFs						
D1	Topography	Changes in topography	<ul style="list-style-type: none"> To rehabilitate the TSFs to blend into the natural environment. To ensure that the TSFs is free draining at Closure 	<ul style="list-style-type: none"> On closure, the TSFs will be shaped to be free draining. Erosion protection will be provided. Re-vegetation and slope establishment to ensure the TSF is free draining and blends in with the natural environment. 	<ul style="list-style-type: none"> Rehabilitation Officer Environmental Coordinator 	<ul style="list-style-type: none"> Establishment of vegetation Closure and Rehabilitation Plan
D2	Soils, Land Capability and Land Use	Loss of soil resources due to erosion	<ul style="list-style-type: none"> To prevent/ minimise loss of soil resources 	<ul style="list-style-type: none"> Compilation/ update of a detailed Closure Management Plan. 	<ul style="list-style-type: none"> Rehabilitation Officer Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan
D3		Contamination of soils	<ul style="list-style-type: none"> To prevent/ minimise soil contamination. To prevent accidental spills. 	<ul style="list-style-type: none"> Conduct daily site inspections to detect leaks on equipment which may lead to hydrocarbon spills. Regular maintenance of vehicles. Placement of drip trays under vehicles when parked and during fuel transfer. Undertake on-site bioremediation or remove contaminated soils and dispose of at a licensed hazardous waste storage facility. Contaminated soils will be remediated or removed off site where required. Soils will be remediated and used in rehabilitation activities as per the Closure Plan 	<ul style="list-style-type: none"> Rehabilitation Officer Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan Leak/spill clean-up Procedure Maintenance reports Waste disposal certificates
D4	Biodiversity	Loss of aquatic life due to deterioration of water quality	<ul style="list-style-type: none"> To prevent impact on aquatic biodiversity during demolition activities 	<ul style="list-style-type: none"> Monitoring will be conducted until it can be proven that no more seepage and deterioration in water quality will take place. 	<ul style="list-style-type: none"> Rehabilitation Officer Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan Biodiversity Action Plan Biomonitoring reports

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Decommissioning and Closure of the Mareesburg, Helena and Co-Disposal TSFs						
D5	Surface Water	Contamination of surface water resources	<ul style="list-style-type: none"> To prevent/ minimise accidental spills. To ensure the separation of clean and dirty water and compliance to GN704. 	<ul style="list-style-type: none"> During Closure, inflows into the return water dams will be reduced to seepage from the TSF together with direct rainfall onto the TSF. Remaining volumes will be pumped to the Concentrator to allow for additional storage for any major storm event. Maintain stormwater control to divert clean water away from the TSF. Monitoring of seepage from the TSF and the return water dams, together with water quality should be undertaken for a period of ten years after closure. Hydrocarbon spillages will be remediated immediately. 	<ul style="list-style-type: none"> Rehabilitation Officer Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan Surface water monitoring records Leak/spill procedure Closure and Rehabilitation Plan
D6	Groundwater	Contamination of groundwater	<ul style="list-style-type: none"> To minimise contamination of groundwater resources. To avoid or where not possible, minimize and remedy pollution of water during decommissioning and closure. 	<ul style="list-style-type: none"> Continue with groundwater monitoring after rehabilitation to detect groundwater contamination, as per the closure plan. Detailed measures to arrest any unacceptable seepage during this monitoring period will be implemented in consultation with the Competent Authorities 	<ul style="list-style-type: none"> Rehabilitation Officer Environmental Coordinator 	<ul style="list-style-type: none"> Groundwater monitoring records Closure and Rehabilitation Plan
D7	Air Quality	Increase in nuisance dust	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints about dust related health and nuisance impacts. 	<ul style="list-style-type: none"> Re-vegetate levelled and top-soiled areas as soon as possible. Continue to use dust suppression on unpaved roads. 	<ul style="list-style-type: none"> Environmental Coordinator Closure and Rehabilitation Coordinator CED Manager 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan Complaints register to record complaints regarding nuisance dust Dust monitoring records Dust suppression
D8		Dust generation from the Mareesburg,	<ul style="list-style-type: none"> To prevent. Minimise wind-blown dust from the TSFs 	<ul style="list-style-type: none"> Cladding/ vegetation and rehabilitation of Tailings Storage Facility. 	<ul style="list-style-type: none"> Rehabilitation Officer 	<ul style="list-style-type: none"> Rehabilitation Plan. Complaints register to record

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Decommissioning and Closure of the Mareesburg, Helena and Co-Disposal TSFs						
		Helena and Co-Disposal TSFs.		<ul style="list-style-type: none"> Regular inspection of vegetation establishment. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> complaints regarding nuisance dust. Dust monitoring records Dust suppression.
D9	Noise	Increase in ambient noise levels	<ul style="list-style-type: none"> To minimise noise pollution during demolition activities 	<ul style="list-style-type: none"> Demolition and rehabilitation activities will be confined to daylight hours. Vehicles will be serviced at regular intervals to minimise noise generation. 	<ul style="list-style-type: none"> Environmental Coordinator SHE Manager CED Manager 	<ul style="list-style-type: none"> Noise monitoring records. Complaints register to record complaints regarding noise pollution

Table 9-19: Management measures in respect of the decommissioning and closure of the Der Brochen Project and associated infrastructure

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Decommissioning and Closure of the Der Brochen Project and associated infrastructure						
D10	Topography	Changes in topography	<ul style="list-style-type: none"> To rehabilitate the Project area to blend into the natural environment as much as possible, To ensure that the area is free draining at Closure. 	<ul style="list-style-type: none"> Shape mound from backfilled Open Pits to be free-draining. Cover the mound with topsoil and revegetate. 	<ul style="list-style-type: none"> Rehabilitation Officer Environmental Coordinator 	<ul style="list-style-type: none"> Establishment of vegetation Closure and Rehabilitation Plan
D11	Soils, Land Capability and Land Use	Loss of soil resources due to erosion	<ul style="list-style-type: none"> To prevent/ minimise soil erosion in Project the area. 	<ul style="list-style-type: none"> Compilation/ update of a detailed Closure Management Plan. Building foundations will be removed to a depth of 1 m. All land exposed by the demolition of infrastructure and other land disturbed by the mine's activities will be rehabilitated. 	<ul style="list-style-type: none"> Rehabilitation Officer Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Decommissioning and Closure of the Der Brochen Project and associated infrastructure						
				<ul style="list-style-type: none"> Rehabilitation of the surfaces which are disturbed within the proposed Mining Authorisation area will be carried out in compliance with the Environmental Management Plan (as detailed in the Environmental Management Plan Report (EMPR)) and in terms of Anglo Platinum's environmental policy and procedures. This will entail both an ongoing process as well as specific work during and after mine closure. On closure, disused infrastructure will be demolished and the site will be rehabilitated. The available stockpiled soil will be used during this rehabilitation exercise. Disturbed areas will be rehabilitated through landscaping, soil replacement and the establishment of vegetation. Where practical, rehabilitation will take place during the life of the mine (construction, operational and decommissioning phases). The soil which has been conserved in stockpiles will be used strategically in the rehabilitation of disturbed land. Vegetation establishment in disturbed areas will be undertaken as soon as is practical, with growing season and water availability being the primary time constraints. 		
D12	Surface Water	Deterioration of surface water quality due to increased sediment loads	<ul style="list-style-type: none"> To prevent/ minimise deterioration in surface water quality. 	<ul style="list-style-type: none"> A stormwater management plan will be implemented up until Closure Phase. This will include diversion of clean water around demolition sites and containment of dirty water on site. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Stormwater Management Plan Closure and Rehabilitation Plan

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Decommissioning and Closure of the Der Brochen Project and associated infrastructure						
		as a result of erosion				
D13		Deterioration of surface water quality due to contamination of runoff by oil and fuel spills and leaks, and other demolition activities	<ul style="list-style-type: none"> To avoid or where not possible, minimise and remedy pollution of water during operations. 	<ul style="list-style-type: none"> A leak/spill detection plan will be devised and implemented for all possible areas of leak/spillage within the demolition site. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Leak/spill clean-up procedure
D14	Air Quality	Increased nuisance dust during Decommissioning and Closure	<ul style="list-style-type: none"> To minimise the amount of dry material susceptible to wind erosion. To minimise the entrainment potential of dust. To respond with corrective action to public complaints about dust related health and nuisance impacts. 	<ul style="list-style-type: none"> Water sprays will be applied where vehicle activity is high. Ensure site is restored to pre-mining conditions. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan. Complaints register Dust monitoring records
D15	Noise	Increase in ambient noise levels as a result of demolition activities	<ul style="list-style-type: none"> To minimise noise pollution 	<ul style="list-style-type: none"> Demolition activities will be confined to daylight hours. A noise monitoring programme will be implemented during Decommissioning and Closure activities. Heavy vehicles will be serviced at regular intervals to minimise noise generation. 	<ul style="list-style-type: none"> Environmental Coordinator 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan Noise Monitoring Programme. Noise monitoring reports Complaints register

Table 9-20: Management measures in respect of the decommissioning and closure of the Borwa and Lebowa shafts and associated infrastructure

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts during Decommissioning and Closure						
D18	Closing of the mine	Inadequate Closure	<ul style="list-style-type: none"> The main objective is to leave the affected areas safe and secure with all entrances to the underground working sealed. To ensure that the dumps has well established vegetation. To rehabilitate all disturbed land to a state that is suitable for post-closure use. Rehabilitate all disturbed land to a state that facilitates compliance with current environmental quality objectives. Rehabilitate all disturbed land to a state where limited or no maintenance is required. Limit the impact on personnel whose positions become redundant on decommissioning and eventually closure 	<ul style="list-style-type: none"> The mine structures will be dismantled and removed. Any building not required for post-mining purposes, will be demolished together with all the foundations and rubble will be buried in an area as approved by the relevant authorities Terraces and buildings will be shaped where necessary and prepared for re-vegetation. All land exposed by the demolition of infrastructure and other disturbed land associated with the project will be rehabilitated. Monitoring and maintenance of vegetation cover until a self-sustaining plant community is established The spread of invader species on disturbed land will be controlled until the perennial vegetation cover. Soil that has been contaminated by spillage seepage and tailings will be sampled and analysed. If required it will be treated, ameliorated or removed to a suitable disposal site. Diversion canals and cut-off trenches will be maintained to ensure that they are both stable and functional. Groundwater will continue to be monitored at potential seepage sources until the levels of the concentrations are in line with the groundwater quality standards. On-going monitoring of seepage water from the RWD and SWD until the 	<ul style="list-style-type: none"> Mine Engineer / Mine Manager / SHE Manager 	<ul style="list-style-type: none"> DMRE closure requirements

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts during Decommissioning and Closure						
				<p>levels of the concentrations are in line with the water quality standards.</p> <ul style="list-style-type: none"> The entrances to the shafts shall be sealed with concrete plugs. All roads not required for access shall be ripped and planted with endemic vegetation. The mine will continue to submit information for the period after decommissioning activities have ceased, until the time that closure is approved by authorities. After mining operations have ceased, quarterly reports on the progress of the final rehabilitation will be submitted until final closure is approved by the authorities. 		

Table 9-21: Social management measures to be implemented during decommissioning and closure phase

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts during Decommissioning and Closure						
D16	Socio-economic	Sustainability of livelihoods at mine closure	<ul style="list-style-type: none"> To minimise the reversal of benefits that have accrued through the life of the Project 	<ul style="list-style-type: none"> The operation will commission a socio-economic investigation of the impact of mine closure at least 15 years in advance of the event to estimate short term, medium term and long terms impacts of mine closure. The recommendations of the study will be implemented. AAP will meet the SLP requirements and commitments for downscaling and retrenchments, including the 	<ul style="list-style-type: none"> CED Manager Project Manager 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan. Social and Labour Plan (SLP) Socio-Economic Assessment Toolbox (SEAT)

EMPr Ref No.	Aspect	Impact	Management Objectives	Management Measures/ Actions	Responsible Party	Performance Criteria to be adhered to
Socio-economic impacts during Decommissioning and Closure						
				<p>establishment, implementation and monitoring of a Future Forum.</p> <ul style="list-style-type: none"> Identify potential employees in the study area (local) for further training with a view to increasing their potential for being employed at other AAP operations or other mines in the area following cessation of operations at Der Brochen. 		
D17		Negative social and socio-economic impacts as a result of mine decommissioning and closure	<ul style="list-style-type: none"> To minimise the reversal of benefits that have accrued through the life of the Project 	<ul style="list-style-type: none"> The Social and Labour Plan (SLP) developed by the operation includes management measures for downscaling and retrenchment and will be implemented. Management includes the establishment of forums, mechanisms to ameliorate social and economic impacts on individuals and contractors considering mechanisms for creating alternative solutions for creating job security on closure. 	<ul style="list-style-type: none"> CED Manager Project Manager 	<ul style="list-style-type: none"> Closure and Rehabilitation Plan. Social and Labour Plan (SLP) SEAT

10 Impact management outcomes for inclusion in the EMPr

The EMPr addresses the environmental impacts associated with the Der Brochen-Mototolo Mine Complex during Construction, Operation, Decommissioning and Closure Phases. This Consolidated EMPr is prepared as part of the requirements of NEMA's EIA Regulations of 2014, as amended in 2017. The objectives of the EMPr are to provide detailed information that will advise the planning, design and undertaking of all activities in order to avoid and/or reduce impacts that may be detrimental to the environment.

The overall goal for environmental management in respect of the Der Brochen-Mototolo Mine Complex's operation is to construct and operate the mine in a manner that:

- Minimises the ecological footprint of the mine on the local environment;
- Facilitates harmonious co-existence between the mine and other land uses in the area; and
- Contributes to the environmental baseline and understanding of environmental impacts of mines in a South African context.

The environmental management objectives applicable to the Der Brochen-Mototolo Mine Complex, as detailed under Section 8 of this document, are summarised in Table 10-1.

Table 10-1: Management Objectives applicable to the Der Brochen-Mototolo Mine Complex

Environmental aspect	Management Objectives
Soils, Land Capability and Land Use	<ul style="list-style-type: none"> • To minimise the loss of soil by removing and storing soil adequately to enable its reuse for rehabilitation. • To prevent and minimise soil contamination. • To remediate contaminated soils. • To ensure that the footprint area is not exceeded in order to protect current resources.
Biodiversity	<ul style="list-style-type: none"> • To demonstrate active stewardship of land and biodiversity. • To prevent/ minimise the disturbance to animal life and their habitats. • To prevent the spread of alien invasive species. • To demonstrate the protection of conservation important species.
Riparian zones	<ul style="list-style-type: none"> • To prevent or minimise erosion. • To minimise the disturbance on riparian zones and habitats. • To prevent/minimise edge effects.
Surface Water	<ul style="list-style-type: none"> • Prevent/ minimise soil erosion. • Reduce the risk of flooding. • To avoid or where not possible, minimise and remedy pollution of surface water. • Reduce the risk of flooding and scouring.
Air Quality	<ul style="list-style-type: none"> • To minimise the amount of dry material susceptible to wind erosion. • To minimise the entrainment potential of dust. • To respond with corrective action to public complaints about dust related health and nuisance impacts.
Noise	<ul style="list-style-type: none"> • To prevent or minimise adverse noise impacts. • To respond with corrective action to public complaints about noise.
Cultural Heritage	<ul style="list-style-type: none"> • To demonstrate active stewardship towards culturally significant heritage sites. • To avoid disturbance of sites and activities of cultural significance and where not possible to determine mitigation in consultation with local communities.
Visual	<ul style="list-style-type: none"> • To minimise the visual impact of the Pits.
Traffic and Transportation	<ul style="list-style-type: none"> • To minimise/ prevent road accidents. • To minimise/ prevent further damage to roads.
Socio-economic	<ul style="list-style-type: none"> • To enhance benefits from the development of the Project. • To maximise opportunities for local residents. • To facilitate employment of local labour on the Project.

11 Assumptions, uncertainties and knowledge gaps

This Consolidated EMPr has been compiled in accordance with the provisions contained within the 2014 EIA Regulations, as amended. The requirements are cross-referenced with the various sections contained in this report, as detailed in Executive Table 1 of this report.

The objective of the Consolidated EMPr is to provide AAP-RPM with a more effective environmental management tool to manage their current operations associated with the Der Brochen-Mototolo Mine Complex in a continuous environmental and socially acceptable manner.

During the impact assessment phase of previous approved EMPr's, all specialists conducted their individual specialist assessment and compiled the relevant specialist reports. However, during the compilation and assessment of their studies, some specialists have identified gaps within the data they worked with, or highlighted some assumptions made during their discussion of their results or discussed some limitations to their studies. Therefore, all assumptions and information gaps from the previously approved EMPr's consolidated into this EMPr still apply. Please refer to Appendix 7 for a summary of the assumptions and information gaps relevant to the previous approved EMPr's and associated specialist studies.

12 Opinion on whether the activity should be authorised

The Consolidated EMPr provides information on the objectives, management measures, management criteria and responsibilities of potential impacts (biophysical and socio-economic) during construction, operation, decommissioning and closure. Management recommendations followed the management hierarchy:

- Avoidance;
- Prevention;
- Minimisation;
- Mitigation; and
- Management.

Provided that all the environmental management measures described in this Consolidated EMPr are applied diligently, the mining and processing of platinum bearing ore within the Der Brochen-Mototolo Mine Complex area are not expected to have any unacceptable permanent environmental impacts.

It should also be noted that the activities and infrastructure described within this report, have been approved previously by the relevant authorities at the time of initially applying for authorisations in respect of the Der Brochen Project and the Mototolo Mine. The purpose of this report is to essentially consolidate the information contained in the previously approved EMPr's associated with the Der Brochen Project and the Mototolo Mine. The consolidation process does not provide for any new/additional infrastructure or activities not currently contained in the approved Der Brochen Project's or Mototolo Mines approved EMPr's.

Furthermore, utilisation of the already authorised infrastructure allows for the operation to economically and optimally utilise the PGM resources.

Given the absence of significant alternative employment opportunities in the area, mining at Der Brochen-Mototolo Mine is considered to be in the best interest of the public at large as it generates economic benefit locally, regionally and internationally. The socio-economic benefits at a local scale in terms of retaining the existing workforce and regional economy for the ongoing implementation of the mine's associated Social and Labour Plan is considered to be positive.

It is the opinion of the EAP that the Consolidated EMPr of the Der Brochen-Mototolo Mine Complex is approved and accepted as it comprehensively details all the management measures required to avoid,

prevent, and if not possible avoid, then to minimise, mitigate and manage the impacts that may be associated with the operation during the life of mine. The Consolidated EMPr will also provide AAP-RPM with a more effective environmental management tool to manage their current and latest acquired operations

13 Aspects for inclusion as conditions of authorisation

The Environmental Authorisations associated with the Der Brochen Project and the Mototolo Mine must be adhered to.

The conditions of authorisation should include:

- Adherence to the commitments stipulated in the Consolidated EMPr; and
- Compliance with all relevant legislation at all times.

14 Period for which environmental authorisation is required

The life of mine for the Der Brochen-Mototolo Mine Complex, based on the proven PGM reserve, is estimated to be in excess of 45 years and may even continue if ongoing prospecting activities demonstrate additional reserves.

To accommodate the time needed for construction, development, operation, closure and rehabilitation of all authorised activities associated with the Der Brochen-Mototolo Mine Complex, the environmental authorisation required is for a period of 45 years.

15 Financial Provision

The closure liability assessment undertaken for the Der Brochen-Mototolo Mine Complex is provided in Appendix 8 of this consolidated EMPr. Information provided in the following sections have been obtained from the recent assessment.

The National Environmental Management Act (Act No. 107 of 1998) (NEMA) Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (GNR 1147) were promulgated in November 2015. It required that a final rehabilitation, decommissioning and mine closure plan is developed, which includes the determination of financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of mining. This regulation initially required mines to comply with the legislation by end February 2017. However, certain technical issues with the legislation resulted in an extension of the Transitional Arrangements (GNR 991 of 21 September 2018), to be compliant by 19 June 2021.

15.1 Approach to closure planning

To plan for closure, AAP-RPM considers the following:

- Legal and governance framework;
- Environmental regulatory requirements;
- South African good practice; and
- Corporate standards, guidelines and tools.

The sections below provides a summary of the key aspects AAP-RPM takes into consideration when planning for closure of their operations.

15.1.1 Legal and governance framework

There are a number of legal and regulatory frameworks with which AAP-RPM must comply when planning for closure. Below is a list of the key legislation that could materially affect rehabilitation and closure plans:

- Constitution of the Republic of South Africa (Act 108 of 1996) (Constitution).
- National Environmental Management Act (Act 107 of 1998) (NEMA).
- National Environmental Management Amendment Act (Act 62 of 2008) (NEMAA).
- National Environmental Management Act: Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (GN 1147) which replaces the Mineral and Petroleum Resources Development Act (Act 68 of 2002) (MPRDA) – closure and financial provision elements repealed.
- Environmental Impacts Assessment Regulations 2014, as amended in 2017.
- Mineral and Petroleum Resources Development Act (Act 68 of 2002) (MPRDA) as it pertains to the social and labour plan.
- National Environmental Management: Waste Act (Act 59 of 2008) (NEM:WA) and supporting regulations.
- Waste Classification and Management Regulations.
- National Environmental Management: Air Quality Act (Act 39 of 2004) (NEM:AQA).
- National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM:BA).
- National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEM:PA).
- National Water Act (Act 36 of 1998) (NWA).
- The Nuclear Energy Act (Act 131 of 1999) and National Nuclear Regulatory Act (Act 47 of 1999).
- The National Radioactive Waste Disposal Institute Act (Act 53 of 2008).
- Mine Health and Safety Act (Act 29 of 1996).

15.1.2 Environmental regulatory requirements

In addition to the above, AAP-RPM also considers the commitments and conditions stipulated in the approved EMPr's, environmental authorisations and WULs that deals specifically with rehabilitation of the existing operations.

15.1.3 South African good practice

Cognisance of DWS's Best Practice Guidelines (BPG), with specific reference to BPG5, further assist with water management aspects for mine closure. The principles in the BPG5 that are appropriate and that have been used to formulate the rehabilitation strategy are:

- Management measures at closure should primarily be of a passive nature with minimal long-term maintenance and operating costs.
- The final landform must be sustainable, must be free-draining, must minimise erosion and avoid ponding.
- Concurrent rehabilitation must be undertaken in a manner that supports the final closure landform in order to ensure that rehabilitation does not need to be redone at a later stage.
- Land use plan which is directly interlinked with water management issues insofar as water is required to support the intended land use and the land use itself may have an impact on the water resource.
- Biodiversity plan will address issues that are interrelated with the mine water management plan, particularly with regard to the environmental water balance and the effects that mining may have thereon.

15.1.4 Corporate standards, guidelines and tools

15.1.4.1 Anglo American Mine Closure Standard

AAP-RPM has developed Corporate Standards that defines the minimum requirements for mine closure to ensure that all Anglo American projects and managed operations pro-actively plan for closure to manage risks and opportunities.

The Standard incorporates the following requirements:

Planning and design:

- Develop a closure plan that is fundamentally aligned with the Mine Closure Toolbox.
- A closure vision shall be established and maintained with associated specific closure objectives and land-use plans
- A risk assessment and gap analysis aligned with the MCT shall be undertaken in all updates of the closure plan.
- Closure plans shall consider and address regulatory conditions and community and stakeholder commitments.
- Where appropriate, closure liabilities shall be minimised through proactive integrated planning throughout the operational life cycle, involving formal opportunities analysis.
- Closure requirements shall be integrated into the Business Planning and Life of Mine (LoM) planning processes.
- Sites shall have at least a five year concurrent rehabilitation plan with clearly defined targets.

Implementation and management:

- Promote the beneficial re-use of infrastructure post closure wherever possible.
- Demonstrate the existence of a proven rehabilitation technique that meets the closure vision and associated land-use.
- Concurrent rehabilitation shall be planned based on the availability of disturbed areas no longer required for ongoing operations.
- Optimise progressive rehabilitation and develop success criteria as early as possible.
- Minimise post closure active treatment requirements through integrated closure planning.
- Manage and reduce the dependency of relevant surrounding communities through the life cycle of the operation in order to leave behind a positive post closure legacy.
- Include social costs in closure planning as an operational expense until the site is closed when it should be provisioned.
- Calculate both premature and planned closure liabilities utilising the remaining Life of Mine from the approved Life of Mine plan.
- Review and update closure liability estimates (accounting provision) internally at least annually and externally every three years (approval from the Technical Services Mine Closure Department is required for exemptions from the independent review that would only be appropriate for low risk operations or those whose liability has not materially changed).
- Provide a financial provision (cash, guarantee, trust fund) to cover premature closure costs as required by the regulatory requirements of the relevant country.

Performance Monitoring:

Include all post production monitoring and maintenance costs in the closure liability estimates and allow sufficient time for realistic lease relinquishment (minimum of 10 years post the decommissioning phase unless otherwise agreed with the Group closure team).

15.1.4.2 Anglo American Rehabilitation Guideline

The purpose of this guideline is to ensure that all Anglo American projects rehabilitate disturbed land safely and responsibly to avoid or mitigate potential adverse impacts on the environment (Anglo American 2009). Rehabilitation of on-site disturbances need to ensure that there is no detrimental

effect on future land use, resource access, ground and surface water quality and quantity. Anglo American shall ensure where possible that no residual risks remain without an on-going and sustainable management plan. For the purpose of annual rehabilitation plan, the implementation of environmental programmes and operational controls will include, as appropriate:

- Progressive rehabilitation maintenance, in accordance with the approved closure and post closure plan;
- Measures to prevent rehabilitation, being used for purposes other than its intended use/capability;
- Monitoring programmes to confirm the rehabilitation stability and effectiveness;
- Soil fertility and content for deterioration, vegetation and soil covers will be monitored where appropriate for stability, land use and productivity; and
- Finally progress of, and expenditure on, rehabilitation activities should be monitored.

15.1.4.3 Anglo American Mine Closure Toolbox

In addition to the Anglo Technical Standards for rehabilitation of disturbed land, a guidance tool was launched in 2008 called Anglo Mine Closure Toolbox. The toolbox details what is needed to achieve a successful mine closure that leaves the positive and sustainable legacy for the host communities after our operations have closed.

15.2 Closure vision and objectives

The closure vision for the Der Brochen-Mototolo Mine Complex is to progressively re-instate an area that is safe, stable, and non-polluting with the final landform not adversely affecting water resources.

This closure vision underpins the following closure objectives, which will drive the closure criteria:

- Decommissioning all surface infrastructure that has no beneficial post-closure use;
- Identify potential post-closure uses of the land occupied by mine infrastructure in consultation with the surrounding land owners and land users. Should a suitable use for mine infrastructure not be found, it will be removed;
- Rehabilitate all disturbed land to a state that is suitable for its post-closure uses;
- Rehabilitate all disturbed land to a state that facilitates compliance with applicable environmental quality objectives (air quality objectives and water quality guidelines);
- Reduce the visual impact of the site through rehabilitation of all disturbed land and residue deposits;
- Rehabilitation that results in landforms that emulate the surroundings and would facilitate drainage and ensuring that all other remaining embankments are shaped and trimmed and that these are free draining; and
- Rehabilitate all disturbed land and residue deposits to a state where post-closure management is minimised.

15.3 Final land closure

Post closure land use (PCLU) is determined in consultation with stakeholders so that the PCLU meets the requirements of the stakeholders, within the context of what can reasonably be achieved on site. This activity is undertaken for the whole mine lease area affected by mining activities and integrates stakeholder requirements with risk mitigation. As specific consultation regarding PCLU has not been undertaken at this stage of the closure process for the Der Brochen-Mototolo Mine Complex, for purposes of current planning and liability costing for the Der Brochen-Mototolo Mine Complex various assumptions relating to closure have been developed.

The TSFs and CDF will remain permanently in the landscape with these unlikely to have associated closure alternatives that could be utilised sustainably by the community. However, where infrastructure is demolished (Borwa and Lebowa mine, stockpiles, roads, conveyors, Mototolo Concentrator), there are opportunities that the footprints could be utilised for sustainable post closure uses.

Based on the limitations presented by the permanence of the disturbances associated with the mining activities, the overall post closure land use for the mine has been determined to be:

- Landforms, that sustain indigenous vegetation which limits water and wind erosion.
- Mosaic of nodes where existing infrastructure is utilised by stakeholders for a variety of post closure activities, surrounded by areas rehabilitated back to a land capability possible of supporting indigenous vegetation, as well as land capable of supporting the various community initiatives in which the mine is involved.

The land capability developed on the footprints where covers are placed, and vegetation established will be a land capability defined as grazing by the Chamber of Mines⁶, with these covers expected to support landforms that support indigenous vegetation.

As the demographics of the areas surrounding the mine may change at closure as communities potentially move out to seek other livelihoods, pressures on the land may change. This may, however, be countered by population growth between now and when the mine closes. It is likely that for the next 20 to 30 years, land use will be associated with mining and will remain so until closure. After closure, the mine is likely to enter into a period of care and maintenance on the rehabilitated areas, further limiting opportunities for community use. However, once sufficient data has been obtained to indicate that the mine has met its relinquishment criteria, use of rehabilitated areas may commence.

15.4 Closure cost estimate approach

A dual approach has been utilised to assess the closure liability associated with the various aspects of the Der Brochen-Mototolo Mine Complex. The closure costs of the aspects already constructed have been assessed using what SRK believes to be a fair reflection of commercial rates utilising the Standardised Reclamation Cost Estimator (SRCE) model, while aspects not yet constructed but for which authorisation have been obtained have been assessed using the Department of Mineral Resources and Energy (DMRE) Guideline. Once all aspects have been constructed, the liability for these will be assessed and updated using the SRCE model.

15.4.1 Approach for aspects already operational

The estimate of liability, for the aspects already operational, has been prepared using an Excel based model known as the Standardised Reclamation Cost Estimator (SRCE). This model was developed by SRK North American staff in conjunction with Regulators and Industry to provide a consistent basis for estimating reclamation costs for mining operations in Nevada with the goals of ensuring that mine reclamation cost estimates meet the applicable regulatory requirements and can be quickly reviewed by regulatory agencies. The SRCE utilises standardised reclamation calculation methods, data and procedures to estimate the cost of reclaiming a mine site as if a third-party contractor for the State of Nevada is performing the reclamation. As the model has been constructed with user-editable files, it has been possible to customise the model to suit South African conditions and to populate the model with data relevant to the AAP-RPM operations. This includes customising the model to describe the current physical characteristics of the operation as well as the intended closure actions.

The purpose of the model is to provide a tool to assist mining professionals improve the consistency and accuracy of reclamation and closure cost estimates. Although the model was developed to provide standardised approaches to reclamation and closure cost calculations, the need to account for diverse approaches to mine closure, and differences between mining operations and regulatory requirements, required that the model also provide a reasonable amount of flexibility.

⁶ Now known as Minerals Council South Africa

The methods of calculation used in the model are based on first-principle approaches for volume and distance calculations, and productivity estimation, with productivity calculations largely derived from published sources such as the Caterpillar Performance Handbook (ed. 46). The model calculations and processing are not available to the users, with access to the areas where calculations are undertaken being protected and or locked. The model has been constructed in this manner to retain the model's integrity as required by the USA Sarbanes–Oxley Act.

All calculations in the Model used to determine the quantity of seeded area and the volume of cover material are based on true surface area (3-Dimensional area) rather than footprint areas.

15.4.2 Approach for aspects still to be constructed

The liability for aspects still to be constructed has been estimated using the approach documented in the “DMRE Guideline” (Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine – 2005). Rates have been annually updated with the prevailing Consumer Price Index (CPI) as obtained from StatsSA. The rates included in the assessment are those relevant for 2020.

The approach to calculating the closure quantum is that specified in the DMRE Guideline and summarised below.

Step 1: Determine the Mineral Mined

In the first step the mineral mined has been identified in the tables provided in the DMRE Guideline (Table B.12) as “**Platinum**”.

Step 2A: Determine Primary Risk Class

The “Primary Risk Class” has been determined from Table B.12 of the DMRE Guideline as “**Class B**”.

Step 2B: Revision of Primary Risk Class

The Primary Risk Class can be revised on the basis of saleable by-products if required. However, this is not applicable at Der Brochen

Step 3: Determine Environmental Sensitivity

The “Environmental Sensitivity” has been determined by reference to Table B.4 of the DMRE Guideline as “**High**”.

Step 4.1: Determine level of information available

The Mine has an approved EMPr and a good environmental data base. The level of information available is therefore considered to be “**Extensive**”.

Step 4.2: Identify closure components

The closure components have been identified.

Step 4.3: Unit rates of closure

The unit rates of closure have been identified from Table B.6 of the DMRE Guideline and have been integrated into the closure cost calculations.

Step 4.4: Weighting factors

The weighting factors have been determined from Tables B.7 and B.8 of the DMRE Guideline.

Weighting Factor 1 = 1.10 (Undulating terrain).

Weighting Factor 2 = 1.10 (Remote)

The areas to be disturbed for infrastructure still to be constructed were determined from the design drawings. Quantities for the South Decline Shaft were obtained from similar shaft layouts where SRK has determined quantities associated with similar infrastructure.

15.5 Closure costing summary

The closure costs calculated in terms of the dual approach taken, as detailed in Section 15.4 above, are summarised below.

15.5.1 Closure costing for aspects already operational

Liabilities, for the aspects already in operation, have been divided into decommissioning, restoration and post closure costs, as described below, with the output from the SRCE model summarised below in Table 15-1. As AAP-RPM undertakes annual assessments, the figures reported below are those calculated during the 2020 assessment.

Decommissioning costs: Demolition and Rehabilitation costs pertaining to the removal of plant and infrastructure and the rehabilitation of the surface following demolition. Decommissioning costs include footprint rehabilitation (backfilling, top soiling, profiling, and vegetating) at the shafts, concentrators, offices etc.; and

Restoration: Costs pertaining to the rehabilitation of areas impacted on by processing, outside of infrastructure footprint. Restoration costs would involve rehabilitation on peripheral footprints, dams outside of the fence etc

Table 15-1: Summary of closure liability on the Day of Assessment (ZAR)

	Decommissioning		Restoration	TOTAL
	Demolition	Rehab		
DOA - Concentrator and Helena				
Tailings Dam		87 918	17 272 708	17 360 626
Buttress Dam - Helena			5 302 163	5 302 163
Road			545 674	545 674
Concentrator	23 541 646	17 006 614	0	40 548 260
Water Management Infra		1 062 295	6 039 718	7 102 013
Miscellaneous			458 215	458 215
TSF Water Management			11 984 179	11 984 179
Monitoring			11 529 781	11 529 781
Planning and Authorisation			14 850 000	14 850 000
Maintenance			4 206 733	4 206 733
Total	23 541 646	18 156 827	72 189 171	113 887 644
DOA - Mareesburg				
Tailings Dam		143 527	18 195 722	18 339 249
Road			333 122	333 122
Water Management Infra			1 865 661	1 865 661
TSF Water Management			5 000 000	5 000 000
Monitoring			3 611 289	3 611 289
Maintenance			686 372	686 372
Planning and Authorisation			10 000 000	10 000 000
Total	0	143 527	39 692 166	39 835 693
DOA - Borwa				
Road			749 443	749 443
Water Management Infra			252 649	252 649
Shafts	15 838 918	1 183 967	1 108 557	18 131 442
Stockpiles		201 531	393 886	595 417
Associated mining infrastructure		203 159	29 139	232 298
Monitoring			3 743 158	3 743 158
Maintenance			84 023	84 023
Total	15 838 918	1 588 657	6 360 855	23 788 430
Lebowa				
Road			261 454	261 454
Water Management Infra			362 886	362 886

Shafts	12 344 490	1 705 000		14 049 490
Associated mining infrastructure		1024123	102 258	1 126 381
Monitoring			3 743 158	3 743 158
Maintenance			104 439	104 439
Total	12 344 490	2 729 123	4 574 195	19 647 808

Table 15-2 presents a summary of the liability associated with closure of the existing aspects and aspects currently under construction in respect of the Der Brochen-Mototolo Mine Complex.

Table 15-2: Summary of closure liability on the Day of Assessment (ZAR)

Aspect	Cost
Der Brochen Expansion*	79 546 139
Borwa Expansion*	1 321 056
Concentrator and Helena**	113 887 644
Mareesburg	39 835 693
Borwa	23 788 430
Lebowa	19 647 808

* Includes, P&G, Contingency and VAT as per the DMRE Guideline

** Does not include P&G, Contingency and VAT

15.5.2 Closure costing for aspects still to be constructed

Although the final closure quantum for areas yet to be constructed will only be assessed once the project is completed, commissioned and fully operational, SRK is of the opinion that the estimate of liability presented in Table 15-3 for infrastructure at the Der Brochen section and Table 15-4 for infrastructure at Mototolo Mine's section are a reasonable reflection of the anticipated closure costs and is of the opinion that the liability is sufficient for the operation to adhere to the closure objectives that are documented in Section 15.2.

In particular the appropriate implementation of closure actions will:

- Decommission surface infrastructure that has no beneficial post-closure use;
- Identify potential post-closure uses of the land occupied by mine infrastructure in consultation with the surrounding land owners and land users. Should a suitable use for mine infrastructure not be found, it will be removed;
- Rehabilitate all disturbed land to a state that is suitable for its post-closure uses;
- Rehabilitate all disturbed land to a state that facilitates compliance with applicable environmental quality objectives (air quality objectives and water quality guidelines);
- Reduce the visual impact of the site through rehabilitation of all disturbed land and residue deposits;
- Rehabilitation that results in landforms that emulate the surroundings and would facilitate drainage and ensuring that all other remaining embankments are shaped and trimmed and that these are free draining; and
- Rehabilitate all disturbed land and residue deposits to a state where post-closure management is minimised.

Table 15-3: Closure quantum for the proposed authorised activities at Der Brochen still to be constructed (calculated based on DMRE Master Rates adjusted to 2020)

No.	DMRE Description	Unit	A	B	C	D	E=A*B*C*D
	DBMMC		Quantity	Master rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m ³	12 411	16.80	1	1.1	229 379
2(A)	Demolition of steel buildings and structures	m ²	2 922	234.01	1	1.1	752 143
2(B)	Demolition of reinforced concrete buildings and structures	m ²	8 067	344.79	1	1.1	3 059 560
3	Rehabilitation of access roads	m ²	34 440	41.90	1	1.1	1 587 349
4(A)	Demolition and rehabilitation of electrified railway lines	m		406.41	1	1.1	
4(B)	Demolition and rehabilitation of non-electrified railway lines	m		221.68	1	1.1	
5	Demolition of housing and/or administration facilities	m ²	1 148	467.99	1	1.1	590 980
6	Opencast rehabilitation including final voids and ramps	ha	31	238 176.33	1	1.1	8 121 813
7	Sealing of shafts, adits and inclines	m ³	60	125.61	1	1.1	8 290
8(A)	Rehabilitation of overburden and spoils	ha	119	163 546.09	1	1.1	21 408 183
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic salt-producing waste)	ha	12	203 693.69	1	1.1	2 688 757
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha		591 623.06	0.9	1.1	
9	Rehabilitation of subsided areas	ha		136 945.22	1	1.1	
10	General surface rehabilitation	ha	22	129 556.11	1	1.1	3 135 258
11	River diversions	ha		129 556.11	1	1.1	
12	Fencing	m	4 000	147.82	1	1.1	650 417
13	Water management	ha	184	49 260.87	0.67	1.1	6 680 168
14	Maintenance and aftercare	ha	184	17 241.30	1	1.1	3 489 640
					Sub Total 1		52 401 936
					Weighting factor 2	1.1	57 642 130
1	Preliminary and General				6.0% of Subtotal 1 > 100 000 000		6 288 232
					12.0% of Subtotal 1 < 100 000 000		
2	Contingency				10.0% of Subtotal 1		5 240 194
					Sub Total 2		69 170 556
					Add Vat (15%)		10 375 583
					GRAND TOTAL		79 546 139

Table 15-4: Closure quantum for the proposed expansion activities at Borwa Shaft (calculated based on DMRE Master Rates adjusted to 2020)

	Main Description (if not applicable, indicate as N/A)	Units	Fill in Amount	DMR Master Rate	DMR Multiplication Factor	Weighing Factor 1	Amount
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m ³	100	16.80	1.00	1.20	R 2 016.00
2 (A)	Demolition of steel buildings and structures	m ²		234.01	1.00	1.20	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m ²		344.79	1.00	1.20	R 0.00
3	Rehabilitation of access roads	m ²	1 525	41.90	1.00	1.20	R 76 677.00
4(a)	Demolition and rehabilitation of electrified railway lines	m		406.41	1.00	1.20	R 0.00
4(b)	Demolition and rehabilitation of non-electrified railway lines	m		221.68	1.00	1.20	R 0.00
5	Demolition of housing and facilities	m ²	1 384	467.99	1.00	1.20	R 777 301.00
6	Opencast rehabilitation including final voids and ramps	ha		238 176	0.52	1.20	R 0.00
7	Sealing of shafts, adits and inclines	m ²		125.61	1.00	1.20	R 0.00
8(a)	Rehabilitation of overburdens and spoils	ha		163 546	1.00	1.20	R 0.00
8(b)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt producing waste)	ha		203 694	1.00	1.20	R 0.00
8(c)	Rehabilitation of processing waste deposits and evaporation ponds (acid, metal rich waste)	ha		591 623	0.80	1.20	R 0.00
9	Rehabilitation of subsided areas	ha		136 945	1.00	1.20	R 0.00
10	General surface rehabilitation, including grassing of all denuded areas	ha	Note 1	129 556.11	1.00	1.20	R 0.00
11	River diversions	ha		129.556.11	1.00	1.20	
12	Fencing	m		147.82	1.00	1.20	R 0.00
13	Water management (separating clean and dirty water, managing polluted water and managing the impact on ground water, including treatment when required)	ha	Note 1	49 260.87	0.67	1.20	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	Note 1	17 241.30	1.00	1.20	R 0.00
						Sub Total 1	R 855 994.00
					Weighting Factor 2	1.10	R 941 593.40
1	Preliminary and General			12% of Sub Total 1 if less than R100 mill 6% of Sub Total 1 if more than R100 mill			R 112 991.21
2	Contingency			10 % of Sub Total 1			R 94 159.34
						Sub Total 2	R 207 150.55
						Sub Total 3	R 1 148 743.95
						VAT @ 15%	R 172 311.59
						Grand Total - Sub Total 3	R 1 321 055.54

Note 1 – as these structures are to be constructed in a brownfields footprint, the footprint rehabilitation, water management and monitoring costs are already estimated and included in the costs reported in Table 15-4. These costs are therefore not included here.

16 Water use licence requirements

AAP-RPM has four approved WULs in terms of the NWA relating to the Der Brochen-Mototolo Mine project. Three of these relate to the original Der Brochen Project and Mototolo Concentrator and one relating to the acquired Mototolo Mine. Refer to Table 4-1 for the main activities covered per WUL.

No new or additional activities have been included as part of the EMPr consolidation process, hence no new or amended WUL is required or anticipated.

17 Implementation of the EMPr

17.1 Responsibility for EMPr implementation

Responsibility for implementation of the Consolidated EMPr rests with the General Manager of the Der Brochen-Mototolo Mine Complex, who has appointed a Safety, Health, Environmental and Quality (SHEQ) Managers and Environmental Control Officers (ECOs) who are based at the shaft operations and the Mototolo Concentrator Plant operation. The General Manager, ECO and SHEQ Managers subscribes to AAP's safety, health and environmental (SHE) policies and procedures, which are implemented throughout the operation. The ECO & SHEQ Managers, with the support of their respective departments, must ensure that all commitments of the Consolidated EMPr are implemented and that all activities delegated to contractors operating on site are carried out in accordance with this EMPr.

It is furthermore the responsibility of the Environment & SHEQ Managers to resolve any issues that may arise between AAP-RPM and contracting parties regarding implementation of the EMPr.

- AAP-RPM will ensure that the responsibility for implementing and adhering to the commitments of the Consolidated EMPr forms part of the conditions of appointment of all contractors;
- AAP-RPM will ensure that all contracting companies tendering for work receive a copy of this Consolidated EMPr and understand their responsibility to operate within the framework of the measures defined in this EMPr. When adjudicating tenders, AAP-RPM will ensure that contractors have made appropriate allowance for management of environmental matters and that, upon appointment, they adhere to the requirements of this EMPr;
- AAP-RPM will ensure that the contractor induction includes environmental and social issues and awareness training to build capacity of contract personnel regarding management of the environment;
- The Environment & SHEQ Managers, or their designated delegate(s), will brief contractors about no development / no-go areas. These to include:
 - No access to neighbouring properties without prior approval; and
 - No access to designated sensitive areas.
- AAP-RPM will from time to time appoint an external independent environmental practitioner to audit the implementation of, and adherence to, this EMPr; and
- The Environment & SHEQ Managers will bring to the attention of the General Manager any major environmental incident or breach of the commitments stipulated in this EMPr, within 24 hours of occurrence of such event. The General Manager will notify the controlling authority within 48 hours of such an incident, if the environmental incident constitutes a breach of any permit or licence condition.

17.2 Responsibility of contractors

The following measures will be implemented in respect of any contractor appointed by the mine to operate on site:

- All contracting companies will receive a copy of the Consolidated EMPr at time of tender. Each contractor is to familiarise him- or herself with the environmental management measures for the site and ensure that contracting prices allow for environmental costs;

- At appointment, the contractors should have their copies of the Consolidated EMPr on site. It is the responsibility of the contractors to ensure that all of their staff are aware of the environmental management measures applicable to their area of work; and
- It is the responsibility of the contractor to bring to the attention of the Environment & SHEQ Managers, or their respective department, any environmental incident or breach of the commitments stipulated in the Consolidated EMPr, within 24 hours of occurrence of such event, through the company's incident reporting system.

18 Summary of environmental impacts and monitoring actions

The key to the success of environmental management lies in the effective implementation of the proposed mitigation and management measures. Monitoring the implementation of these measures provides qualitative and quantitative information pertaining to the possible impacts of the mine's operation on the environment, and the effectiveness of the measurement measure to avoid, control or minimise any environmental impact.

18.1 Mechanisms of monitoring compliance

To ensure that the management measures outlined throughout this Consolidated EMPr are implemented effectively, it will be necessary to monitor the implementation of the EMPr and evaluate the success of achieving the objectives listed in the EMPr through internal and external audits.

18.1.1 Internal Audits

During the operational phase, and construction phase of any pending infrastructure, the Environmental Control Officer will be responsible for undertaking internal audits and regular inspections (at least once a year) to assess compliance with the Consolidated EMPr, and any conditions stipulated in all environmental related licences pertaining to the Der Brochen-Mototolo Mine Complex, such as the WULs, EAs and other licences. Any non-compliance noted during the audits or inspections should be recorded and reported on to the General Mine Manager. Tracking records of compliance should be produced and discussed during EHS toolbox talks with the relevant personnel and contractors.

All internal audit reports should be made available to external auditors and the DMRE, if requested.

18.1.2 External Audits

AAP-RPM must appoint an independent external auditor to conduct an audit on compliance with the Consolidated EMPr, any conditions stipulated in all environmental related licences pertaining to the Der Brochen-Mototolo Mine Complex and closure plan(s) (where applicable).

The external EMPr compliance audit will be conducted as per the requirements of Regulation 34 of the 2014 EIA Regulations (as amended in 2017).

AAP-RPM has a requirement to undertake a Regulation 34 audit by an external independent auditor on an annual basis

18.2 Monitoring and reporting

Various environmental related monitoring programmes are implemented and will continue to be implemented throughout the LoM of the Der Brochen-Mototolo Mine Complex's operation. Table 18-1 provides a summary of the environmental aspects that are monitored, the frequency of monitoring and the responsible person to ensure monitoring is undertaken at the mine.

Table 18-1: Environmental Monitoring Programmes for the Der Brochen-Mototolo Mine Complex

Environmental Aspect	Monitoring objectives	Parameters	Monitoring and reporting frequency	Responsible person
Surface Water Quality	To ensure that: <ul style="list-style-type: none"> The water management systems perform according to specifications; To act as an early warning system for pollution; and To check compliance with license requirements and for reporting purposes. 	<ul style="list-style-type: none"> pH; Electrical Conductivity (EC); Total Dissolved Solids (TDS); Suspended solids; And others as required by the WUL 	<ul style="list-style-type: none"> Monthly monitoring (unless otherwise detailed in the WULs) Quarterly report as well as annual reporting (submitted to DWS) 	<ul style="list-style-type: none"> Environmental Officer
Groundwater	To ensure that: <ul style="list-style-type: none"> The water management systems perform according to specifications; To act as an early warning system for pollution; and To check compliance with license requirements and for reporting purposes. 	<ul style="list-style-type: none"> Groundwater level Groundwater quality <ul style="list-style-type: none"> Physico-chemical parameters (pH, EC, TDS); Major anions (F, Cl, NO₃, SO₄, HCO₃); Major cations (K, Na, Mg, Ca); ICP scan for metals; and And others as required by the WUL 	<ul style="list-style-type: none"> Quarterly monitoring (unless otherwise detailed in the WULs) Quarterly report as well as annual reporting (submitted to DWS) 	<ul style="list-style-type: none"> Environmental Officer
Biodiversity	To ensure that there is a continual flow of data, enabling all parties involved to accurately assess and manage biodiversity related progress and issues.	<p>Aquatic ecosystems:</p> <ul style="list-style-type: none"> pH; Conductivity; Dissolved oxygen; Temperature; Index of Habitat Integrity (IHI) Present Ecological State (PES); Aquatic macro invertebrates (SASS5); Macro-invertebrate Response Assessment Index (MIRAI); Habitat Cover Rating (HCR) and Fish Habitat Assessment (FHA); Fish Response Assessment Index (FRAI) 	<ul style="list-style-type: none"> Reporting to DWS once a year in line with RSIP requirements. • Biomonitoring - Bi-annually (Wet and Dry season monitoring) 	<ul style="list-style-type: none"> Environmental Officer
Air Quality	<ul style="list-style-type: none"> The objectives of the Air Quality monitoring programme are to: Establish a regular and up-to-date monitoring programme for significant emissions (point and fugitive) arising from the 	Dust fallout, PM ₁₀ and PM _{2.5} As per the operation's Air Quality Management Plan	<ul style="list-style-type: none"> Monthly monitoring and reporting on dust levels 	<ul style="list-style-type: none"> Environmental Officer

Environmental Aspect	Monitoring objectives	Parameters	Monitoring and reporting frequency	Responsible person
	<p>operations activities, products and services;</p> <ul style="list-style-type: none"> • Monitor emissions to air; and • Monitor the ambient concentrations of the air pollutants of concern in locations where members of the public may be exposed at a frequency or duration which could influence averaging periods of the EC Limit Values. 			
Noise	<p>The objectives of the noise monitoring programme are to:</p> <ul style="list-style-type: none"> • Monitor noise for the first year of operation; • Monitor noise at locations of the closest noise-sensitive developments; and • Monitor noise every time a noise complaint is registered. 	<ul style="list-style-type: none"> • L_{AeqT}: The Equivalent A-weighted noise level (dBA), similar to an average noise level during the measurement period (T); • L_{A90}: The noise level exceeded for 90% of the time, general representative of the steady background noise at a location. • L_{Amax}: the instantaneous maximum sound level (dBA) measured during the sample period; • L_{Amin}: the minimum sound pressure (dBA) measured during the sample period; • Average wind speed (m/s); and • Max wind speed (m/s). 	<ul style="list-style-type: none"> • Annual monitoring and reporting (unless alternatively required for construction activities) 	<ul style="list-style-type: none"> • Environmental Officer • SHE Manager
Post Rehabilitation	<p>The objective of the post rehabilitation programme is to track the recovery of the site towards the long-term post-closure land use goals, in accordance with the overall closure objectives. The monitoring programme will be designed to collect information to demonstrate that the Relinquishment criteria have been achieved.</p>	<p>Surface water:</p> <ul style="list-style-type: none"> • As required by WULs <p>Groundwater:</p> <ul style="list-style-type: none"> • Shallow and deep aquifers against parameters required by WUL <p>Erosion:</p> <ul style="list-style-type: none"> • Determine erosion rate <p>Vegetation establishment:</p> <ul style="list-style-type: none"> • Standard field techniques used to determine whether the vegetation has been established with a species composition 	<p>Annually for a period of 10 years unless alternative period is required by the DMRE and DWS</p>	<ul style="list-style-type: none"> • Environmental Officer

Environmental Aspect	Monitoring objectives	Parameters	Monitoring and reporting frequency	Responsible person
		and density similar to that of a reference analogue site established in a similar ecotype		
		Biomonitoring: <ul style="list-style-type: none"> • Upstream and downstream of mining activities • Monitor physico-chemical and biological components of the aquatic ecosystems within the mining area. An appropriate biological index will also be included in order to quantify and classify the longer-term changes in biotic integrity 		

18.3 Specific environmental monitoring requirements

Further details of the specific environmental monitoring programmes currently undertaken at the mine in respect of air quality, surface and groundwater quality and biodiversity is provided below.

18.3.1 Air Quality

The dust fall monitoring network for the Der Brochen-Mototolo Mine Complex consists of 34 dust fall monitoring points located within and around the operation (Figure 7-3). Details of the dust fallout monitoring points are summarised in Table 18-2.

Table 18-2: Der Brochen-Mototolo Mine Complex's dust fallout monitoring points

Locality	Latitude	Longitude	Description
Monitoring points around the Der Brochen Project area			
S1	S25.03136	E30.11573	Near planned North Pit area
S2	S25.02513	E30.11031	Between planned North Pit area and Cicada primary habitat area
S3	S25.04232	E30.11512	Near planned waste rock dump
S4	S25.02826	E30.11791	Near main access road
S5_ Relocated	S25.00809	E30.15068	Directly north of Mareesburg TSF
S6	S25.03119	E30.12510	East of Der Brochen Site office (old farm house)
S7	S24.98054	E30.08749	Near historical Trail Mining Project on farm Richmond 370 KT
S8	S25.06090	E30.11743	At Der Brochen Dam, near planned South Pit area
S9	S25.02029	E30.14353	Located south of Mareesburg TSF
S10	S25.01189	E30.14170	Located west of Mareesburg TSF
S11	S25.02217	E30.14283	Located south of the Mareesburg TSF
S12	S25.01638	E30.14376	Located west of the Mareesburg TSF
S13	S25.00477	E30.12098	Compliance locality next to dust watch bucket D2 in the northern valley
S14	S25.00031	E30.13169	Located northwest of the Mareesburg TSF

Locality	Latitude	Longitude	Description
S15	S25.01440	E30.15408	Located southeast of the Mareesburg TSF
S16	S24.99844	E30.14132	Located north of the Mareesburg TSF
D1	S25.07117	E30.1191	Southern end of the valley
D2	S25.00485	E30.12100	Northern end of the valley
D3	S25.01088	E30.1415	Located next to S10 west of the Mareesburg TSF
Monitoring points around the Mototolo Mine area			
MOTO 01	S25.00915	E30.11148	Eskom Substation
MOTO 02	S25.00921	E30.11691	PCD 1
MOTO 03	S25.01790	E30.11674	Between Dam A & B1
MOTO 04	S25.01230	E30.10942	Slimes dam B
MOTO 05	S25.02018	E30.11235	Slimes dam A
MOTO 06	S25.01105	E30.11421	Offices
MOTO 07	S25.01006	E30.11125	Crusher Plant
MOTO 08	S25.00549	E30.11416	Plant main access road
MOTO 09	S25.01158	E30.11437	Return Water Dam A
MOTO 10	S25.02072	E30.11721	Return Water Dam B
MOTO 11	S25.01116	E30.11072	Behind Stockpile
MOTO 12	S25.01016	E30.11008	Behind ROM Silo
MOTO 13	S25.01436	E30.11715	Between Dam A & B2
MOTO 14	S25.00911	E30.11565	PCD 2
MOTO 15	S25.01583	E30.11094	TSF hillside

18.3.2 Water Quality Monitoring

18.3.2.1 Surface, potable and process water monitoring

Quality of surface, potable and process water are currently monitored at the Mototolo Mine area and Der Brochen Project area, respectively. Details of the monitoring points relating to surface, potable and process water sources are provided in Table 18-3 and illustrated in Figure 18-1.

Table 18-3: Surface, potable and process water quality monitoring points of the Der Brochen-Mototolo Mine Complex

Point ID	Coordinates (WGS84)		Relative location of monitoring point
	Latitude	Longitude	
MOTOTOLO MINE'S SURFACE AND PROCESS WATER MONITORING POINTS			
Surface water monitoring points			
SWM1	-24.99937	30.11301	Non-perennial upstream of Borwa Shaft
SWM2	-24.99084	30.11133	Non-perennial upstream of Lebowa Shaft but downstream of Borwa Shaft
SWM3	-24.9823	30.11061	Non-perennial downstream of Mototolo Mine (Borwa and Lebowa Shafts)
Potable water monitoring points			
PWRMN	-25.00076	30.10909	Lebowa Potable Water Reservoir
PWRMS	-25.00072	30.10778	Borwa Potable Water Reservoir
Lebalelo Pipeline	-24.98446	30.111	Lebalelo Pipeline Water
Process water monitoring points			
PWDMS	-25.0013	30.10915	Process water dam at Borwa Shaft
PWDMN	-24.98587	30.10602	Process water dam at Lebowa Shaft
SWDMN	-24.98518	30.10863	Storm water dam Lebowa Shaft
SWDMS	-25.00089	30.11171	Storm water dam Borwa Shaft
SKMS	-24.99905	30.11265	Sewage works at Borwa Shaft
SKMN	-24.98337	30.10892	Sewage works at Lebowa Shaft
DER BROCHEN PROJECT'S SURFACE AND PROCESS WATER MONITORING POINTS			

Point ID	Coordinates (WGS84)		Relative location of monitoring point
	Latitude	Longitude	
Surface water monitoring points			
PCD Drainage Line 1	-25.00864	30.11565	Downgradient of PCD at Mototolo Concentrator
PCD Drainage Line 2	-25.00888	30.12093	Downgradient of PCD at Mototolo Concentrator
TSF Drainage Line 1	-25.02206	30.11835	Downstream (south) of Helena TSF along Der Brochen access road
Dwars upstream	-25.02360	30.11963	Upstream of Mototolo Concentrator operations and Helena TSF drainage line
Dwars downstream	-25.01064	30.12122	Downstream of Mototolo Concentrator operations but upstream of Mototolo Concentrator PCD drainage line
Dwars upstream PCD drainage line	-25.00998	30.12193	Upstream of Mototolo Concentrator PCD drainage line
Dwars downstream PCD drainage line	-25.00907	30.12201	Downstream of Mototolo Concentrator PCD drainage line
Dwars upstream TSF drainage line BC	-25.02192	30.12013	Upstream of Helen TSF drainage line
Dwars downstream TSF drainage line AC	-25.02137	30.12029	Downstream of Helena TSF drainage line
G_Drs2	-25.04964	30.12057	Groot Dwars upstream of Der Brochen Project area and below the Der Brochen Dam
G_Drs3	-24.99895	30.13244	Downstream Helena TSF and upstream Mareesburg TSF, before confluence of Groot Dwars River and Mareesburg stream
G_Drs4	-24.96257	30.13767	Groot Dwars downstream of confluence with Mareesburg stream
G_Drs5	-25.00608	30.12488	Groot Dwars upstream of G-Drs3
K_Drs1	-25.01235	30.07225	Upstream of the mining activities on the farm Richmond (border of the farm Richmond and St George)
K_Drs2	-24.98573	30.08122	Downstream of Richmond farm (border with the farm Dwars River - upstream of Inyoni Dam)
M1	-24.99450	30.14362	Mareesburg Stream before confluence with Groot Dwars River. Downstream of Mareesburg TSF
M2	-25.02252	30.14583	Upstream of Mareesburg TSF complex, within Mareesburg Stream
M3	-25.00446	30.14262	Immediately downstream of Mareesburg TSF complex, within Mareesburg Stream
Potable water monitoring points			
Main Kitchen	-25.01055	30.11451	Mototolo Concentrator's Main Kitchen (Drinking water)
Security Kitchen	-25.01036	30.11528	Mototolo Concentrator's Security Kitchen (Drinking water)
Engineering Green Area	-25.01084	30.11360	Mototolo Concentrator's Engineering Green Area (Drinking water)
Production Green Area	-25.01015	30.11369	Mototolo Concentrator's Production Green Area (Drinking water)
Top House	-25.07385	30.11469	Der Brochen Project's Drinking water (stream)
Managers House	-25.02244	30.14211	Drinking water (Mareesburg ELU borehole)
Anglo House	-24.99043	30.08485	Drinking water (Richmond ELU borehole)
Office Block	-25.03648	30.11825	Drinking water (Helena ELU borehole)
Process water monitoring points			
RWD A	-25.01110	30.11499	Helena TSF RWD A
SW01	-25.01150	30.11802	RWD A seepage sump
RWD B	-25.02018	30.11603	Helena TSF RWD B
SW02	-25.02178	30.11672	RWD B seepage sump
PCD	-25.00984	30.11593	Dirty process water containment at Mototolo Concentrator
Raw Water Dam	-25.00891	30.11307	Clean process water at Mototolo Concentrator
Sewage Effluent	-25.01008	30.11593	Clean process water at Mototolo Concentrator

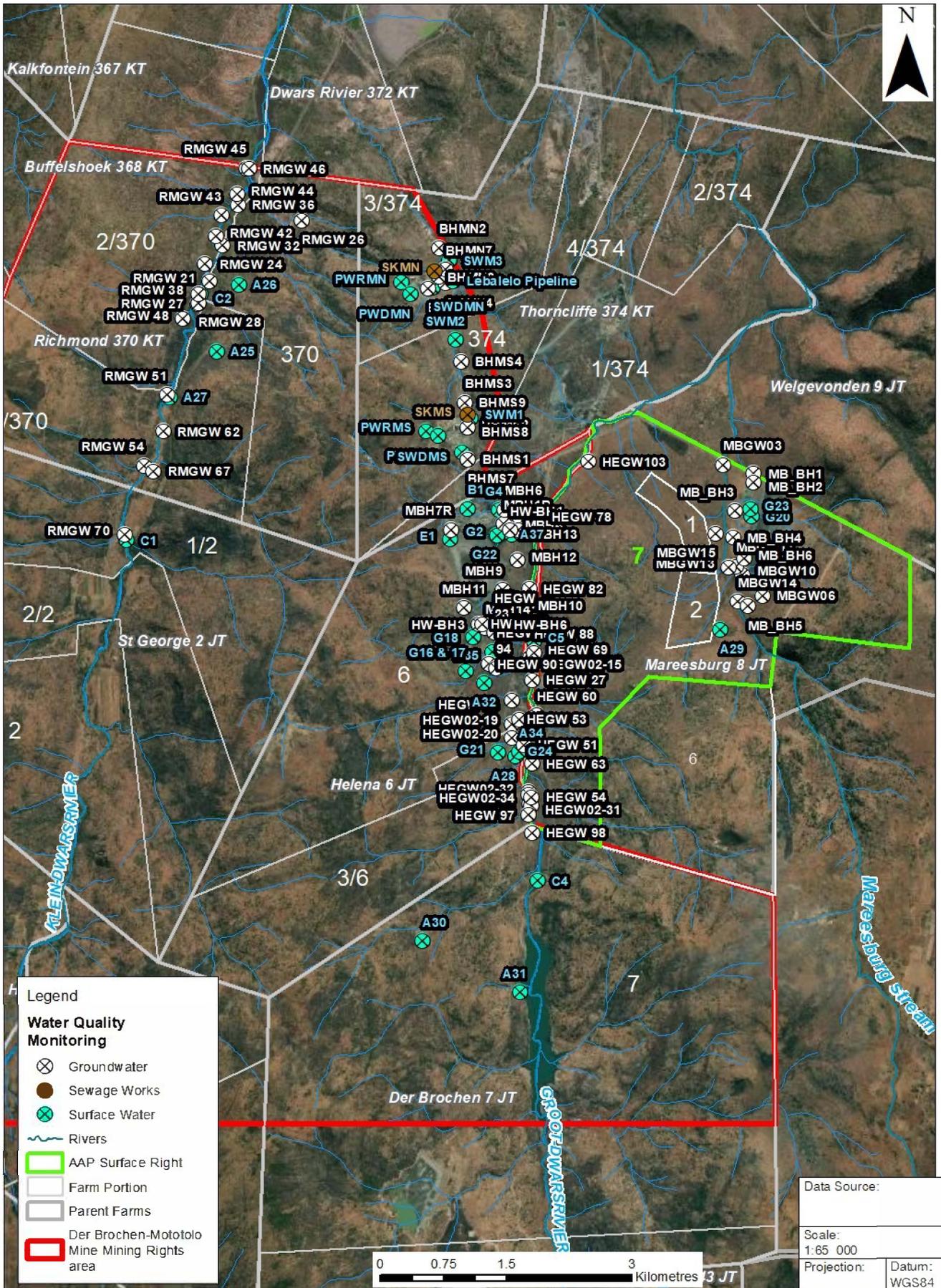
18.3.2.2 Groundwater monitoring

Groundwater monitoring is currently undertaken respectively at the Mototolo Mine and Der Brochen Project area, as detailed in Table 18-4 and illustrated in Figure 18-1.

Table 18-4: Der Brochen-Mototolo Mine Complex's groundwater monitoring points

Point ID	Coordinates (WGS84)		Purpose of monitoring point
	Latitude	Longitude	
MOTOTOLO MINE'S GROUNDWATER MONITORING POINTS			
Borwa Shaft			
BHMS1	-25.003850	30.112700	Monitor groundwater quality and WL's downstream from SWDMS
BHMS2	-25.000450	30.112700	Monitor groundwater quality and WL's downstream from WRDMS
BHMS3	-24.997670	30.112390	Monitor groundwater quality and WL's downstream from WRDMS
BHMS4	-24.993220	30.111970	Monitor groundwater quality (potable water) and WL's
BHMS5	-24.002350	30.112420	Monitor groundwater quality and WL's downstream from mine
BHMS6	-24.003830	30.111900	Monitor groundwater quality and WL's downstream from mine
BHMS7	-25.003850	30.112700	New Mon BH drilled to monitor emergency ore stockpile
BHMS8	-25.000450	30.112700	New Mon BH drilled to monitor emergency ore stockpile
BHMS9	-24.997670	30.112390	New Mon BH drilled to monitor emergency ore stockpile
Lebowa Shaft			
BHMN2	-24.980880	30.109470	Potable water/ Mine use
BHMN4	-24.984740	30.110190	Monitoring
BHMN5	-24.985250	30.108110	Monitoring
BHMN6	-24.983990	30.109470	Monitoring
BHMN7	-24.983240	30.110150	Monitoring
DER BROCHEN PROJECT'S GROUNDWATER MONITORING POINTS			
Mototolo Concentrator & Helena TSF			
MBH1R	-25.01089	30.11689	Plume monitoring
MBH2	-25.0112	30.11692	Not specified
MBH3	-25.02144	30.11663	Plume monitoring
MBH4	-25.01103	30.11851	Plume monitoring
MBH5	-25.0217	30.11804	Plume monitoring
MBH6	-25.00933	30.117	Plume monitoring
MBH7R	-25.01147	30.11069	Plume monitoring
MBH8R	TBC	TBC	Plume monitoring
MBH9	-25.018	30.11669	Plume monitoring
MBH10	-25.01936	30.11919	Plume monitoring; baseline
MBH11	-25.01997	30.11211	Plume monitoring
MBH12	-25.014869	30.118461	Plume monitoring down-gradient of the TSF, east of MBH8
MBH13	-25.011561	30.118589	Plume monitoring down-gradient of RWD A
MBH14	-25.022181	30.114569	Telemetry (level and EC logger) for HWELL-B1
MBH15	-25.0205,	30.11746	Plume monitoring downgradient of seepage sump at RWD B
MBH17R	TBC	TBC	Plume monitoring and for scavenging.
MBH18	-25.0222	30.11766	Plume monitoring downgradient of seepage sump at RWD B
HEGW 78	-25.01017	30.12088	Plume monitoring; baseline
HEGW 82	-25.01795	30.11981	Plume monitoring; baseline
HEGW 88	-25.02287	30.11947	Upstream monitoring (also covers North pit area)
HW-BH1	-25.01154	30.11766	Plume monitoring
HW-BH3	-25.02175	30.11388	Scavenger monitoring for HWELL-B1
HW-BH4	-25.02172	30.11430	Telemetry (level logger) for HWELL-B1
HW-BH6	-25.02184	30.11699	Telemetry (level logger) for HWELL-B2
Helena wellfield / Der Brochen			
HEGW02-14	-25.02537	30.11994	Production BH
HEGW02-15	-25.02566	30.12014	Observation for HEGW02-14 and standby production BH
HEGW02-19	-25.03261	30.11766	Production BH
HEGW02-20	-25.03407	30.11769	Observation for HEGW02-19 and standby production BH
HEGW02-21	-25.04128	30.11969	Production BH
HEGW02-31	-25.04146	30.11989	Observation for HEGW02-21 and standby production BH

Point ID	Coordinates (WGS84)		Purpose of monitoring point
	Latitude	Longitude	
HEGW02-32	-25.04000	30.119539	Production BH
HEGW02-34	-25.04022	30.11958	Observation for HEGW02-32 and standby production BH
HEGW 51	-25.03487	30.11905	Wellfield monitoring
HEGW 53	-25.03207	30.11853	Observation for HEGW02-19
HEGW 54	-25.04051	30.11996	Wellfield monitoring
HEGW 60	-25.03167	30.12066	Wellfield monitoring (baseline)
HEGW 63	-25.03689	30.12007	Wellfield monitoring (baseline)
HEGW 69	-25.0249	30.12033	Observation for HEGW02-14
HEGW 90	-25.02608	30.115	Observation for HEGW94 and standby production BH
HEGW 93	-25.03005	30.11774	Wellfield Monitoring and standby production BH
HEGW 94	-25.0265	30.11588	Production BH
HEGW 97	-25.04246	30.11962	Production BH
HEGW 98	-25.04439	30.11994	Wellfield Monitoring
Richmond wellfield			
RMGW 07R	-24.9844	30.082424	RMGW07 collapsed; redrill as standby production BH
RMGW 21	-24.98437	30.08233	Observation for RMGW 07R
RMGW 24	-24.98246	30.08179	Wellfield monitoring
RMGW 26	-24.97784	30.09319	Wellfield monitoring
RMGW 27	-24.98676	30.08087	Observation for RMGW 28
RMGW 28	-24.98669	30.08092	Production BH
RMGW 32	-24.98047	30.08387	Observation for RMGW 07R
RMGW 36	-24.97606	30.08571	Observation for RMGW 44
RMGW 38	-24.98568	30.08094	Baseline
RMGW 42	-24.97948	30.0831	Production BH
RMGW 43	-24.97722	30.08375	Standby production BH)
RMGW 44	-24.97493	30.08564	Production BH
RMGW 45	-24.97211	30.08678	Production BH
RMGW 46R	TBC	TBC	Observation for RMGW 44 and RMGW45
RMGW 48	-24.98841	30.07913	Production BH
RMGW 51	-24.99661	30.0772	Baseline and production BH
RMGW 54	-25.0043	30.07436	Production BH
RMGW 62	-25.00061	30.07672	Wellfield monitoring
RMGW 67	-25.00492	30.07554	Wellfield monitoring
RMGW 70	-25.01177	30.07201	Upstream of wellfield
Der Brochen North Open Pit and WRD area			
HE27	-25.0299	30.112661	Internal monitoring
HEGW 03	-25.02346	30.11762	Internal monitoring
HEGW 23	-25.022639	30.115661	Compliance monitoring for WRD before tributary
HEGW 27	-25.027631	30.120219	Compliance monitoring downstream
HEGW 28	-25.032689	30.1172	Monitoring
Mareesburg TSF complex			
MBGW03	-25.0046	30.14283	Plume monitoring; baseline
MBGW06	-25.01886	30.14741	TSF footprint, temporary baseline monitoring
MBGW10	-25.01654	30.14508	Plume monitoring; remove bees.
MBGW11	-25.01564	30.14428	Plume monitoring
MBGW13	-25.01575	30.14344	Plume monitoring; baseline
MBGW14	-25.01948	30.14446	Plume monitoring
MBGW15	-25.01207	30.14189	Plume monitoring; baseline
MB_BH1	-25.00560	30.14645	Tier 1 source monitoring
MB_BH2	-25.00655	30.14645	Tier 1 source monitoring
MB_BH3	-25.00961	30.14423	Tier 1 source monitoring
MB_BH4	-25.01254	30.14393	Tier 1 source monitoring
MB_BH5	-25.01998	30.14567	Tier 1 source monitoring
MB_BH6	-25.01481	30.14525	Tier 1 source monitoring
HEGW103	-25.00417	30.1269	Downstream of TSF



Legend

Water Quality Monitoring

- Groundwater
- Sewage Works
- Surface Water
- Rivers
- AAP Surface Right
- Farm Portion
- Parent Farms
- Der Brochen-Mototolo Mine Mining Rights area

Data Source:	
Scale: 1:65 000	
Projection:	Datum: WGS84
Central Meridian/Zone:	

18.3.3 Biodiversity

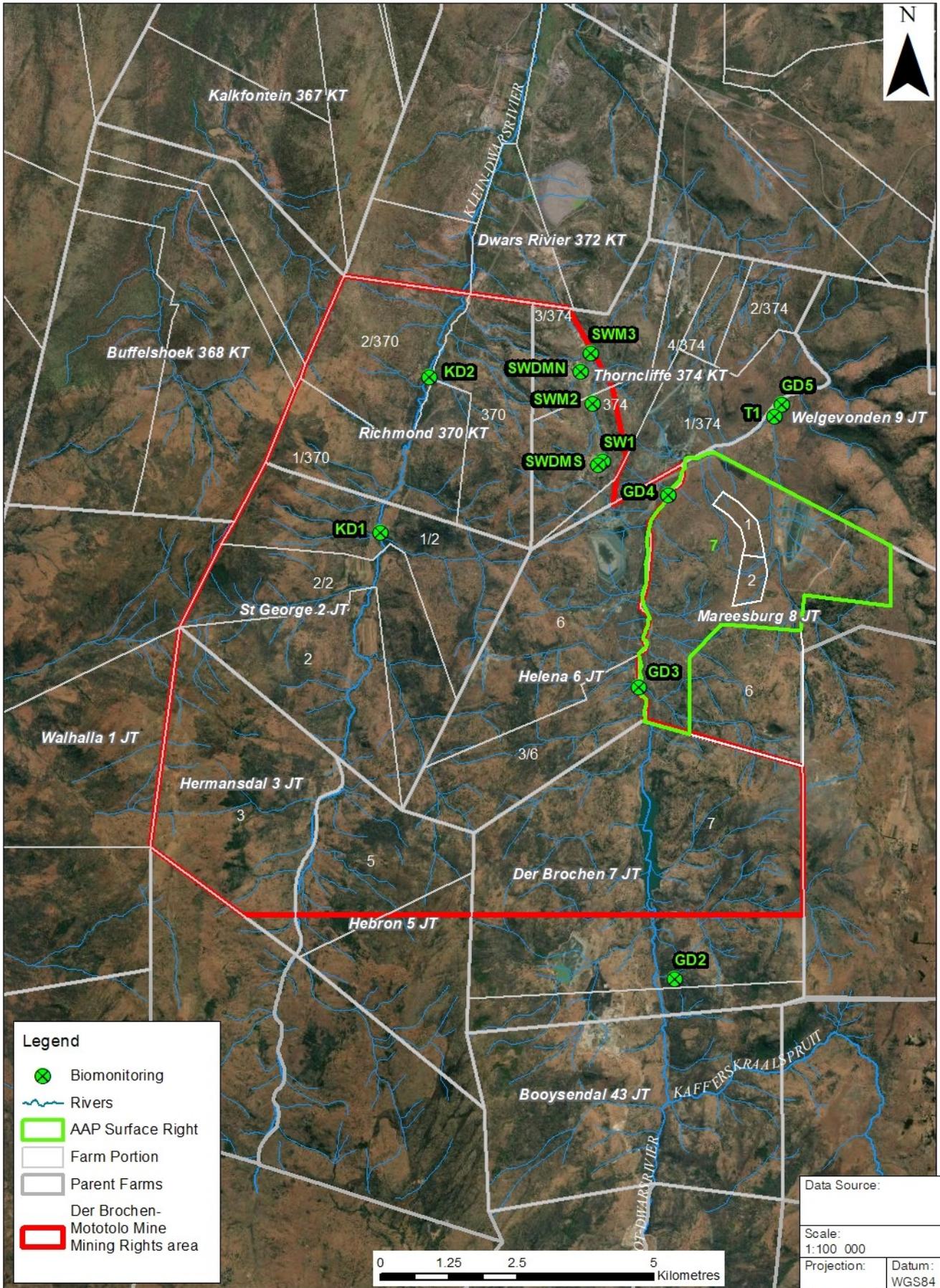
Biomonitoring is undertaken in summer and winter on an annual basis in order to monitor changes in the aquatic ecological integrity of the Groot Dwars River catchment in relation to the Der Brochen-Mototolo Mine Complex's activities.

Biomonitoring includes visual assessment techniques, *in situ* water quality measurements, habitat assessments and assessments of the aquatic macro-invertebrate and fish community integrity according to assessment indices advocated by the river health program.

The biomonitoring points assessed are presented in Table 18-5 and depicted in Figure 18-2.

Table 18-5: Biomonitoring points of the Der Brochen-Mototolo Mine Complex

Point ID	Coordinates (WGS84)		Purpose of monitoring point
	Latitude	Longitude	
MOTOTOLO MINE'S BIOMONITORING POINTS			
SW1	-25.00029	30.11265	Non-perennial upstream of Mototolo (Option A)
SWM2	-24.99057	30.11088	Non-perennial upstream of Mototolo (Option B)
SWM3	-24.9823	30.11061	Downstream
SWDMN	-24.98527	30.10863	Storm water dam Mototolo North (Lebowa Shaft)
SWDMS	-25.00089	30.11171	Storm water dam Mototolo South (Borwa Shaft)
DER BROCHEN PROJECT'S BIOMONITORING POINTS			
GD3	-25.034072°	30.117022°	Upstream of the Mototolo Concentrator operations
GD4A	-25.001333°	30.117769°	Downstream of the Mototolo Concentrator operations
RWD A	-25.021083°	30.116283°	Helena TSF's Return Water Dam A
RWD B	-25.011300°	30.116850°	Helena TSF's Return Water Dam B
SWD MC	-25.009017°	30.116583°	Storm Water Dam at Mototolo Concentrator



Legend

- Biomonitoring
- Rivers
- AAP Surface Right
- Farm Portion
- Parent Farms
- Der Brochen-Mototolo Mine Mining Rights area



Data Source:	
Scale: 1:100 000	
Projection:	Datum: WGS84
Central Meridian/Zone:	



**DER BROCHEN-MOTOTOLO
MINE CONSOLIDATION
BIOMONITORING**

Date: 28/01/2021	Compiled by: SCHB
Project No. 554304	Fig No. 18-2

19 Environmental Awareness Planning

AAP-RPM is committed to identifying training needs and ensuring that all personnel whose work may create a significant impact upon the environment receive appropriate training. The Environmental Awareness Plan describes the training available and the manner in which environmental training needs are identified and continually reassessed.

The purpose of the Environmental Awareness Plan is as follows:

- To ensure that staff are competent through Environmental training. Competence will only be proven through assessments;
- Training is essential to ensure that the responsibilities in the Environmental Management System (EMS) can be fulfilled at each relevant function and level, and to meet the challenge of continual improvement. It is essential that key personnel whose work may create a significant impact on the Environment be trained;
- Resources for training should ensure that adequate competent personnel are available to cover any eventuality;
- To explain and aid personnel involved in training with regards to the EMS; and
- To clarify the EMS training and ensure that all employees are correctly instructed with regards the environment.

19.1 Scope of the Environmental Awareness Plan

This section sets out the mine's training objectives with regard to environmental awareness and EMS (Table 19-1). It contains no detail on the actual training initiatives, but rather serves to ensure that a responsible person is appointed to deal with and increase environmental awareness on the mine.

Table 19-1: Environmental Awareness Plan

No	Activity / Procedure	Roles and responsibility
1	<u>GENERAL</u>	
1.1	Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities.	
1.2	Training will be appropriate to the activity of individual employees.	
2	<u>INDUCTION PROGRAMME</u>	
2.1	Training programmes shall, be established and maintained for personnel contractors and visitors, refer to Training, Competency & Awareness IIMS SP 1.006. Training shall include the following: Administrative requirements and procedures which will include the Emergency Procedures. Resource conservation and environmental reporting and general environmental awareness for mine related environmental issues.	Environmental Coordinator & Training Manager
2.2	Contractors that are employed to undertake work at the mine must, prior to any starting of working activities, complete the contractor's pack. This package requires the contractor to perform Safety, Health and Environment (SHE) Risk assessments on the activities to be undertaken. The entire risk assessment process and the applicable EMS procedures are referenced within the contractor's package.	
2.3	Environmental Induction slides/presentation shall be revised annually. Induction is valid for the period of one year hence refresher shall be done after 365 days or following annual leave.	All employees and contractors
2.4	Reporting of oil spills and incidents shall form part of induction program.	Environmental Coordinator
3	<u>TRAINING NEEDS</u>	

No	Activity / Procedure	Roles and responsibility
3.1	<p>Training and awareness needs shall be identified as per the significant impact per job category.</p> <ul style="list-style-type: none"> • Training needs shall be identified through: • Performance appraisal; • Analysis of non-conformances and incidents; • Audit findings and recommendations; • At time of recruitment (in the work place); • Training needs analysis; • Impact/Aspect Register • Additions to scope in services provided; • The updating of procedures (quality, technical and administrative). <p>Training needs will also be identified through work performance, request by employee and work area review as per to Training, Competency & Awareness IIMS SP 1.006.</p>	Training Manager and Section Heads
3.2	Once training needs have been established it is up to the supervisor to notify the Training Department of the requirements. The training department will then identify pertinent and relevant courses (if not already done so by employee/supervisor) and schedule training accordingly.	Training Manager and Section Heads
3.3	A training matrix will be generated from Training needs analysis. Monthly Environmental Theme will be distributed to all in the mine including contractors.	Environmental Co-ordinator, Section Heads & SHE Document Controller
3.4	Environmental Days celebrations are done to enhance awareness to employees and local communities (Water week, environmental Week, Arbour week etc.)	Environmental Co-ordinator
4	<u>TRAINING PLANNING</u>	
4.1	Identified and agreed training needs shall be included in budgets and processed as described below. Course attendance (other than at the internal induction courses) shall be scheduled on the basis of the importance of task contribution to the maintenance, effectiveness and improvement of the objectives.	Section Heads
4.2	Training expenses, including conferences and symposia would be checked and approved by the Head of Department. The Training Department shall complete a course authorisation form and ensure that the procedures are followed regarding course bookings, confirmations and payments.	Section Heads & Training Department
4.3	The Trainee shall : <ul style="list-style-type: none"> • Obtain approval from the Head of Department Request Training Department to make official booking.	HODs
4.4	External training courses shall be assessed through : <ul style="list-style-type: none"> • Attendance by, and the formal reports and recommendations of, staff • Recommendation by known competent external personnel Review of course content, presenters, location and facilities by knowledgeable personnel	Training Manager And Section Heads
5	<u>EMS TRAINING</u>	
5.1	<p><i>Mine Personnel:</i></p> <p>All employees, current or new, and contractors will undergo induction, a part of which is environmental awareness training and includes the Safety, Health and Environmental policy. Depending on a person's job category training will be performed on significant aspects pertinent to his/her area of work. At the end of this training, personnel will be required to complete the awareness test and the level of awareness assessed by the Training Department. Re-testing or induction may be required if test was failed.</p> <p>All personnel performing tasks which can cause significant or major environmental impacts shall be competent on the basis of training, education and/or experience.</p>	Training Manager

No	Activity / Procedure	Roles and responsibility
5.2	<p>Visitors: All visitors to any controlled access areas of the mine will undertake a short "visitors' induction", which highlights the main safety and environmental aspects relevant to short term visitors at the mine.</p>	Training Instructor
5.3	<p>EMS Representatives: The EMS Representatives shall have additional EMS knowledge requirements. The EMS Representatives shall receive the training required to manage the EMS efficiently in their areas of responsibility. Such skills include the operation of the SHE legal register and the electronic database, as well as thorough knowledge of the environmental procedures.</p>	Section Heads
5.4	<p>Standard Procedures: Employees and contractors shall be made aware of Environmental Standard Operating procedure related to their activities which might have environmental impacts e.g. waste management, oil management etc.</p>	Environmental Coordinator
5.5	<p>Evaluation and Competence: Definition: The Training Department and Line Management's role is to ensure that all mine regulations and procedures required by the various indicated legislation (paragraph 6) are such that theoretical knowledge and operational skills all pivot around competency. A competent person means a person who:</p> <ol style="list-style-type: none"> 1. a) is qualified by virtue of his/her knowledge, training, skills and experience to organise the work and its performance; <li style="margin-left: 20px;">b) is familiar with the provisions of legislation applicable to his/her work; <li style="margin-left: 20px;">c) has been trained to recognise any potential or actual danger (significant aspects) to the environment, but also safety and health, in the performance of the work; and/or 2. is in the possession of the appropriate certificates of competency where such certificate is required by these regulations or legislations. <ul style="list-style-type: none"> • Competency does not merely mean showing or training an employee on a task so that he knows how to do it. • Proving competency, the employee must know the Who, What, When, How and Why pertaining to the task as well as the hazards and risks associated with performing the task. <p>Capacity and awareness training will be carried out by Environmental Coordinator and Training Manager and evaluation of awareness and competency training (implementation of training in the work place) will be carried out by the Line Managers through PTOs or through approved accredited training providers. Awareness and competence will also be reviewed during audits, events of an emergency, and incident. Typical competence assessments include training programmes both formal and informal, PTOs, questioning employees, experience, checklists, qualifications and ability to do the work. Gaps identified shall be referred to Training department.</p>	Section Heads
5.6	This awareness plan shall be kept up to date.	Training Manager and Environmental Coordinator

19.2 Records

The following records will be maintained by the Training Department:

- Personnel qualifications;
- Training needs and Training Matrix;
- Certificates;
- Licenses;
- Training programmes/courses attended; and
- Staff induction.

Copies of checklists and Planned Task Observation will be kept by the relevant sections and the training department.

All foregoing records will be maintained in the employee's personnel files, Training Department records section and Site Manager's records where applicable.

Induction training is the responsibility of the Training Manager as well as all other forms of external training facilities/courses/venues etc. EMS training is co-responsibility shared with the Environmental Co-ordinator

20 Specific information required by the Competent Authority

The purpose of this document is to compile and present a consolidated report of all the previously approved EMPr's associated with the Der Brochen Project and the Mototolo Mine.

Since the submission of the required environmental authorisation amendment application to the DMRE on 26 February 2020, no request for additional or specific information has been received from the DMR to date.

No new, or proposed activities, and/or management measures, has been provided for, and consequently there is no need for new authorisations.

21 Undertaking

The environmental assessment practitioner hereby confirms:

- The correctness, to the best of their knowledge, of the information contained within the referenced previously approved Environmental Management Programmes and on recent information provided by AAP-RPM. The information was accepted as being as reliable;
- Comment and inputs from the Interested and Affected parties will be appended to the final Consolidated EMPr upon completion of the consultation period; and
- The acceptability of AAP-RPM's activities in relation to the assessed impacts and mitigation measures implemented.

22 Conclusions and Recommendations

Anglo American Platinum – Rustenburg Platinum Mines Limited (AAP-RPM), established the Mototolo Mine Joint Venture (JV) with Glencore Operations South Africa (Pty) Ltd (Glencore) in 2003. The Mototolo Mine JV is located approximately 25 km south-west of the town of Steelpoort and 40 km west of Mashishing (Lydenburg) on the Eastern Limb of the Bushveld Complex in Limpopo, South Africa.

As part of the JV arrangement, AAP-RPM and Glencore each contributed a similar amount of in-situ platinum group metals (PGM) reserves and resources from Glencore's Thorncliffe farm (farm Thorncliffe 374 KT), adjacent to its Thorncliffe Chrome Mine and AAP-RPM's bordering farm Richmond (farm Richmond 370 KT), part of its Der Brochen Project's mining right area.

In November 2018, AAP-RPM acquired Glencore's shares in the Mototolo Mine JV with the intention to combine the Mototolo Mine with the downdip and adjacent Der Brochen resource to create a major platinum hub for the company, referred to in this report as the Der Brochen-Mototolo Mine Complex.

As part of the acquisition, AAP-RPM intends to consolidate the approved Environmental Management Programmes (EMPr's) associated with the Der Brochen Project and the Mototolo Mine into a single

concise EMPr that will provide AAP-RPM with a more effective environmental management tool to manage their current and latest acquired operations.

The consolidation process involved the assessment of all existing and approved EMPrs and consolidating the relevant information, specialist studies/ findings and management measures into a comprehensive document. The consolidated EMPr includes all environmental and socio-economic commitments contained in the existing EMPrs.

All aspects of the previous EMPrs have been included into this consolidated report. These management recommendations will be undertaken during the construction, operation and closure/ post-closure phases of the Der Brochen-Mototolo Mine Complex operation and activities.

As the consolidation process involves the consolidation of existing and understood impact and mitigation measures, no impact assessment has been undertaken as part of the consolidation process. The consolidation process does not provide for any new/additional infrastructure or activities not currently contained in the approved Der Brochen Project’s or Mototolo Mines approved EMPr’s.

This consolidated EMPR provides management measures in order to reduce the potential negative environmental impacts whilst positive impacts are strived to be enhanced as a result of the continued mining and processing operations at the Der Brochen-Mototolo Mine Complex.

Prepared by

Reviewed by

[Author]

[Project Reviewer]

[Title (Optional)]

[Title (Optional)]

Project Partner

Project Manager

[Project Partner]

[Project Manager]

[Title (Optional)]

[Title (Optional)]

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

Appendices

Draft

Appendix 1: EAP Qualifications

13/12/2019

**CERTIFIED A TRUE COPY
OF THE ORIGINAL**



**Die Raad en Senaat van die
RANDSE AFRIKAANSE UNIVERSITEIT
verklaar hiermee dat die graad**

**The Council and the Senate of the
RAND AFRIKAANS UNIVERSITY
hereby certify that the degree**

BACCALAUREUS ARTIUM

met studierigting with field of study

**Geografie en Omgewingsbestuur
Geography and Environmental Studies**

met al die regte en voorregte daaraan
verbonde kragtens die Statuut van die
Universiteit toegeken is aan

with all its associated rights and privileges
in accordance with the Statute of the
University has been awarded to

SELMA ROODE

by geleentheid van 'n kongregasie
van die Universiteit

at a congregation of the
University

Rektor/Rector

Viserektor (Navorsing en Akademiese Bestuur)
Vice-Rector (Research and Academic Management)

19 APRIL/APRIL 2004
Johannesburg
ID 8010110014082



 13/12/2019

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RAND AFRIKAANS UNIVERSITY
hereby certify that the degree**

BACCALAUREUS ARTIUM CUM HONORIBUS

met studierigting with field of study

**Geografie en Omgewingsbestuur
Geography and Environmental Management**

met al die regte en voorregte daaraan
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University



Rektor/Rector



**Viserektor: Navorsing en Akademiese Bestuur
Vice-Rector: Research and Academic Management**

**10 DESEMBER/DECEMBER 2004
Johannesburg
ID 8010110014082**





RITESH DHRONEY
Commissioner of Oaths
HR Professional (HRA)
Member number: 11128
14 Klaar Street
Midrand
1085

[Signature] 13/2/2019

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OF THE ORIGINAL**



**UNIVERSITY
OF
JOHANNESBURG**

The Council and the Senate of the
UNIVERSITY OF JOHANNESBURG
hereby certify that the degree

MAGISTER ARTIUM

with field of study

Environmental Management

with all its associated rights and privileges
in accordance with the Statute of the
University has been awarded to

SELMA NEL

at a congregation of the University

[Signature]

Vice-Chancellor

[Signature]

Registrar

06 MARCH 2008
Johannesburg
ID 8010110014082



23984

Appendix 2: EAP CVs

Selma Nel

Principal Scientist



Profession	Scientist
Education	MA, Environmental Management, University of Johannesburg, 2007 BA (Hons), Geography and Environmental Management, Rand Afrikaanse Universiteit, 2004 BA, Geography and Environmental Management, Rand Afrikaanse Universiteit, 2003
Registrations/ Affiliations	Member, IAIAAsa
Awards	None

Specialisation

Environmental impact assessments, basic assessments, environmental management plans/programmes, environmental due diligence auditing, project management, environmental, management assessments, specialist coordination, stakeholder engagement.

Expertise

Selma Nel has been involved in the field of environmental management for the past 14 years. Her expertise includes:

- project management and coordination of integrated environmental impact assessments, environmental management programmes;
- environmental impact assessments and basic assessments for mining and energy related projects in South Africa;
- specialist team co-ordination and drafting Terms of Reference (ToR);
- compliance audits in respect of environment, waste and water as well as international standards;
- analysis of environmental and social impacts assessment (ESIA) and environmental and social management plan/programmes (ESMP) prepared by other consultancies (outside South Africa) for African projects to determine level of upgrading required to meet international standards;
- compilation of technical environmental documents, programmes and reports;
- conducting environmental control officer work environmental projects;
- environmental pre-feasibility and feasibility assessment input;
- site selection assessment input;
- environmental compliance audits in terms of NEMA, MPRDA, NEM: WA and NWA;
- stakeholder engagement; and
- vendor due diligence.

Employment

2010 – present	SRK Consulting (Pty) Ltd, Principal Scientist, Water Department, Johannesburg
2007 – 2010	GCS Consulting, Environmental Scientist, Environmental Department, Rivonia
2003 – 2007	University of Johannesburg, Academy for Information Technology, Administration Assistant
1999 – 2000	ABSA (Rivonia), Client Services Administrator

Publications

None

Languages

English – read, write, speak
Afrikaans – read, write, speak

Selma Nel

Principal Scientist

Key Experience: Project management: impact assessment projects

Location: Emalahleni, Limpopo
 Project duration & year: June 2020
 Client: Anglo American Coal South Africa
 Name of Project: Greenside Colliery Dewatering Project
 Project Description: Basic Assessment and Water Use Licence for the dewatering of underground mining areas relating to the Greenside Colliery for continuation of the underground mining operation.
 Job Title and Duties: Principal Scientist - Project Manager

- Project management
- Coordination and management of specialists
- Technical review of project against current environmental related legislation
- Compilation of technical environmental document and public participation documentation
- Stakeholder engagement
- Client liaison

Value of Project: R 430 000

Location: Emalahleni, Limpopo
 Project duration & year: March 2020
 Client: Anglo American Coal South Africa
 Name of Project: SACE Complex – Clydesdale Pit Project
 Project Description: Pre-Feasibility study in terms of Anglo's IDM requirement
 Job Title and Duties: Principal Scientist - Project Manager

- Project management
- Coordination and management of specialists
- Technical review of project against client document requirements
- Compilation of technical documentation aligned with certain IDM Chapter requirements
- Stakeholder engagement
- Client liaison

Value of Project: R 500 000

Location: Steelpoort, Limpopo
 Project duration & year: January 2020
 Client: Anglo American Platinum – Rustenburg Platinum Mines Limited: Der Brochen and Mototolo Complex
 Name of Project: Der Brochen and Mototolo Mine Consolidation
 Project Description: Consolidation of Der Brochen Mine's and Mototolo Mine's EMPs
 Job Title and Duties: Principal Scientist - Project Manager & EAP

- Project management
- Technical review of project against current environmental related legislation
- Compilation of technical environmental document and public participation documentation
- Stakeholder engagement
- Client liaison

Value of Project: R 390 000

Selma Nel

Principal Scientist

Key Experience: Project management: impact assessment projects

Location: Lebowakgomo, Limpopo
Project duration & year: July 2019
Client: Sibanye Stillwater – Lonmin Operations
Name of Project: Research Crusher Plant Project Extension
Project Description: Extension of Environmental Authorisation process in terms of a temporary research crusher plant project
Job Title and Duties: Principal Scientist - Project Manager & EAP

- Project management
- Technical review of project against current environmental related legislation
- Compilation of technical environmental document and public participation documentation
- Stakeholder engagement
- Client liaison

Value of Project: R 40 000

Location: Steelpoort, Limpopo
Project duration & year: July 2018
Client: Anglo American Platinum – Rustenburg Platinum Mines Limited: Der Brochen Mine
Name of Project: Der Brochen Amendment Project
Project Description: Integrated Environmental Authorisation process in terms of the proposed amendment to the Der Brochen Mine Project
Job Title and Duties: Principal Scientist - Project Manager & EAP

- Project coordination and management
- Technical review of project against current environmental related legislation
- Compilation of technical environmental documents, programmes and reports;
- Coordination and management of specialists
- Authority and Stakeholder consultation
- Client liaison

Value of Project: R 1 500 000

Selma Nel

Principal Scientist

Key Experience: Project management: impact assessment projects

Location:	Lebowakgomo, Limpopo
Project duration & year:	April 2017
Client:	Anglo American Platinum – Rustenburg Platinum Mines Limited: Rustenburg Section – Mogalakwena Mine
Name of Project:	Research Crusher Plant Project
Project Description:	Environmental Authorisation process in terms of a temporary research crusher plant project
Job Title and Duties:	Senior Environmental Scientist - Project Manager & EAP <ul style="list-style-type: none"> • Project coordination and management • Technical review of project against current environmental related legislation • Compilation of technical environmental documents, programmes and reports; • Coordination and management of specialists • Authority consultation • Client liaison
Value of Project:	R 250 000
Location:	Mokopane, Limpopo Province
Project duration & year:	March 2016, 6 months
Client:	Anglo American Platinum – Rustenburg Platinum Mines Limited: Rustenburg Section – Mogalakwena Mine
Name of Project:	Mogalakwena Mine: Environmental Authorisation Amendment
Project Description:	Amendment of Mogalakwena Mine's approved Environmental Authorisation for the inclusion of an additional pebble storage area, through the undertaking of a NEMA EIA Regulation 29 amendment process
Job Title and Duties:	Senior Environmental Scientist - Project Manager & EAP <ul style="list-style-type: none"> • Project coordination and management • Compilation of technical environmental documents, programmes and reports
Value of Project:	R 135 000
Location:	Mokopane, Limpopo Province
Project duration & year:	April 2016
Client:	Anglo American Platinum – Rustenburg Platinum Mines Limited: Rustenburg Section – Mogalakwena Mine
Name of Project:	Mogalakwena Mine: Environmental Authorisation Amendment
Project Description:	Amendment of Mogalakwena Mine's approved Environmental Authorisation in respect of prospecting rights acquired, through the undertaking of a NEMA EIA Regulation 31 amendment process
Job Title and Duties:	Senior Environmental Scientist - Project Manager & EAP <ul style="list-style-type: none"> • Project coordination and management • Compilation of technical environmental documents, programmes and reports
Value of Project:	R 345 000

Selma Nel

Principal Scientist

Key Experience: Project management: impact assessment projects

Location: Mokopane, Limpopo Province
 Project duration & year: June 2015
 Client: Anglo American Platinum – Rustenburg Platinum Mines Limited:
 Rustenburg Section – Mogalakwena Mine
 Name of Project: Tailings Scavenger Plant
 Project Description: The authorisation of a new Tailings Scavenger Plant in terms of NEMA and MPRDA
 Job Title and Duties: Senior Environmental Scientist – Project Manager

- Project coordination and management
- Compilation of technical environmental documents, programmes and reports
- Coordinate and facilitate public participation activities
- Client liaison
- Authority consultation

Value of Project: R 270 000

Location: Rustenburg, North West Province
 Project duration & year: June 2014
 Client: Anglo American Platinum – Rustenburg Platinum Mines: Rustenburg Section
 Name of Project: Domestic Waste Recycling Facility
 Project Description: The licensing of the new Domestic Waste Recycling Facility for the sorting and recycling of general waste in terms of NEM: WA
 Job Title and Duties: Senior Environmental Scientist – Project Manager

- Project coordination and management
- Compilation of technical environmental documents, programmes and reports
- Coordinate and facilitate public participation activities
- Authority consultation
- Client liaison

Value of Project: R 200 000

Location: Mokopane, Limpopo Province
 Project duration & year: March 2014
 Client: Anglo American Platinum – Mogalakwena Platinum Mine
 Name of Project: Blinkwater Tailings Storage Facility Extension and Attenuation Dam
 Project Description: EMP Amendment to include the extension of the Blinkwater Tailings Storage Facility as well as the construction and operation of a new attenuation dam
 Job Title and Duties: Senior Environmental Scientist – Project Manager

- Project coordination and management of integrated environmental impact assessment
- Coordination and management of multi-disciplinary specialists
- Coordinate public participation activities
- Compilation of technical environmental documents, programmes and reports
- Authority consultation
- Client liaison

Value of Project: R 4 150 000

Selma Nel

Principal Scientist

Key Experience: Project management: impact assessment projects

Location: Mokopane, Limpopo Province
 Project duration & year: January 2014
 Client: Anglo American Platinum – Mogalakwena Platinum Mine
 Name of Project: Environmental Impact Assessment for the infill drilling operation on the farms Drenthe and Witrivier including a waste rock dump on the farm Witrivier
 Project Description: Section 102 Application and EMPr Amendment to include the farms Drenthe and Witrivier into the Mining Right as well as the construction and operation of a new waste rock dump
 Job Title and Duties: Senior Environmental Scientist – Project Manager

- Project coordination and management of integrated environmental impact assessment
- Coordination and management of multi-disciplinary specialists
- Coordinate public participation activities
- Compilation of technical environmental documents, programmes and reports
- Authority consultation
- Client liaison

Value of Project: R 3 900 000

Location: Mokopane, Limpopo Province
 Project duration & year: October 2013
 Client: Anglo American Platinum – Mogalakwena Platinum Mine
 Name of Project: Mogalakwena Platinum Mine's Environmental Management Programmes (EMPrs) Consolidation and Alignment
 Project Description: Consolidation and alignment of the Mogalakwena Platinum Mine's EMPrs
 Job Title and Duties: Senior Environmental Scientist – Project Manager

- Project coordination and management
- Environmental compliance audit in terms of NEMA, MPRDA, NEM:WA and NWA
- Compilation of technical environmental documents, programmes and reports;
- Authority consultation
- Client liaison

Value of Project: R 4 200 000

Selma Nel

Principal Scientist

Key Experience: Project management: impact assessment projects

Location: Rustenburg, North West Province
 Project duration & year: May 2013
 Client: Anglo American Platinum – Rustenburg Platinum Mine: Kwezi & K6 Operations
 Name of Project: Addendum to Anglo American Platinum’s Rustenburg Platinum Mine’s EMP – to include additional ventilation shafts at the Kwezi and K6 Shaft Operations
 Project Description: Addendum to the Rustenburg Platinum Mine’s EMP to include the construction and operation of additional ventilation shafts at the Kwezi and K6 Shaft Operations
 Job Title and Duties: Senior Environmental Scientist – Project Manager

- Project coordination and management
- Compilation of technical environmental documents, programmes and reports;
- Coordination and management of multi-disciplinary specialists
- Coordinate and facilitate public participation activities
- Authority consultation
- Client liaison

Value of Project: R 175 000

Location: Hattingspruit, KwaZulu Natal
 Project duration & year: October 2009
 Client: Shanduka Coal
 Name of Project: Springlake Colliery
 Project Description: Environmental Risk Assessment
 Job Title and Duties: Environmental Project Manager

- Project coordination and management
- Compilation of technical environmental documents, programmes and reports;
- Coordination and management of multi-disciplinary specialists
- Authority consultation
- Client liaison

Value of Project: R 350 000

Location: Hattingspruit, KwaZulu Natal
 Project duration & year: October 2009
 Client: Shanduka Coal
 Name of Project: Springlake Colliery
 Project Description: Environmental Impact Assessment and Environmental Management Programme for additional conveyors and ventilation shafts
 Job Title and Duties: Environmental Project Manager

- Project coordination and management of integrated environmental impact assessments
- Coordination and management of multi-disciplinary specialists
- Compilation of technical environmental documents, programmes and reports
- Coordinate and facilitate public participation activities
- Authority consultation
- Client liaison

Value of Project: R 980 000

Selma Nel

Principal Scientist

Key Experience: Project management: impact assessment projects

Location: Black Rock, Northern Cape
Project duration & year: April 2009
Client: Eskom & Assmang Limited: Black Rock Mine
Name of Project: Construction of a 132kV Power line for the Black Rock Mine
Project Description: Environmental Impact Assessment and Environmental Management Programme for the construction of a 132kV Power line for the Black Rock Mine
Job Title and Duties: Environmental Scientist - Project Manager

- Project coordination and management
- Site selection assessment input
- Coordination and management of multi-disciplinary specialists
- Coordinate and facilitate public participation activities
- Compilation of technical environmental documents, programmes and reports;
- Authority consultation
- Client liaison

Value of Project: R 1 200 000

Location: Kendal, Mpumalanga
Project duration & year: February 2009
Client: Shanduka Coal
Name of Project: Lakeside and Leeuwfontein Colliery
Project Description: Environmental Impact Assessment and Environmental Management Programme for new opencast mining operations at Lakeside and Leeuwfontein Colliery
Job Title and Duties: Environmental Project Manager

- Project coordination and management
- Coordination and management of multi-disciplinary specialists
- Coordinate and facilitate public participation activities
- Compilation of technical environmental documents, programmes and reports;
- Authority consultation
- Client liaison

Value of Project: R 1 200 000

Selma Nel

Principal Scientist

Key Experience: **Project management: impact assessment projects**

Location: Middelburg, Mpumalanga
 Project duration & year: February 2009
 Client: Shanduka Coal
 Name of Project: Middelburg Townlands Colliery
 Project Description: Environmental Impact Assessment and Environmental Management Programme for new opencast mining operation at Middelburg Townlands Colliery
 Job Title and Duties: Environmental Project Manager

- Project coordination and management
- Coordination and management of multi-disciplinary specialists
- Coordinate and facilitate public participation activities
- Compilation of technical environmental documents, programmes and reports;
- Authority consultation
- Client liaison

Value of Project: R 1 500 000

Location: Middelburg, Mpumalanga
 Project duration & year: March 2008
 Client: Londani Coal
 Name of Project: Nndanganeni Colliery
 Project Description: Environmental Impact Assessment and Environmental Management Programme for the new Nndanganeni Colliery
 Job Title and Duties: Environmental Scientist - Project Manager

- Project coordination and management
- Coordination and management of multi-disciplinary specialists
- Coordinate and facilitate public participation activities
- Compilation of technical environmental documents, programmes and reports;
- Authority consultation
- Client liaison

Value of Project: R 1 200 000

Location: Delmas, Mpumalanga
 Project duration & year: November 2007
 Client: Umthombo Resources
 Name of Project: Schoongezicht Colliery
 Project Description: Environmental Impact Assessment and Environmental Management Programme for the new Schoongezicht Colliery
 Job Title and Duties: Environmental Scientist - Project Manager

- Project coordination and management
- Compilation of technical environmental documents, programmes and reports;
- Coordination and management of multi-disciplinary specialists
- Coordinate and facilitate public participation activities
- Authority consultation
- Client liaison

Value of Project: R 950 000

Selma Nel

Principal Scientist

Key Experience: Project manager: Gap analysis projects

Location: Zimbabwe
 Project duration & year: April – May 2019
 Client: Prospect Lithium Zimbabwe (Pvt) Limited
 Name of Project: Gap Analysis of Environmental & Social Impact Assessments for Arcadia Lithium Mining Project in Zimbabwe
 Project Description: Reviewed of the Zimbabwean ESIA's to determine level of information to meet the required international standards
 Compiled Gap Analysis Report including an action plan outlining the way forward to address any identified gaps in meeting international environmental and social requirement.
 Job Title and Duties: Principal Scientist – Project Manager

- ESIA's review
- Compilation of Gap Analysis Report including action plan
- Client liaison

 Value of Project: R 90 000

Location: Steelpoort, Limpopo
 Project duration & year: August – October 2017
 Client: Anglo American Platinum – Rustenburg Platinum Mines: Der Brochen Section
 Name of Project: Gap Analysis for environmental authorisation of proposed Der Brochen Expansion Project
 Project Description: Review of proposed project against South African legislation to determine level and number of authorisations required and preliminary authorisation timeframes.
 Conduct key specialist studies to determine areas of concern in terms of the placement of proposed project related infrastructure and activities.
 Job Title and Duties: Senior Scientist – Project Manager

- Specialist coordinating
- Compilation of technical report including sensitivity maps
- Client liaison

 Value of Project: R 380 000

Key Experience: Project manager: Gap analysis projects

Location: Kriel, Mpumalanga
 Project duration & year: March 2013
 Client: Eskom
 Name of Project: Kriel and Matla Power Stations Integrated Water and Waste Management Programmes
 Project Description: Compilation of Kriel and Matla Power Stations Integrated Water and Waste Management Programmes in accordance with the National Water Act, Act 36 of 1998, requirements.
 Job Title and Duties: Environmental Scientist – Project Coordinator and Assisting Project Manager

- Environmental and Water Site Assessor and Advisor
- Compilation of technical programmes
- Client liaison

 Value of Project: R 380 000

Selma Nel

Principal Scientist

- Key Experience:** **Project manager: Gap analysis projects**
- Location:** Marikana, North West
- Project duration & year:** January 2011
- Client:** Aquarius Platinum South Africa
- Name of Project:** Environmental Authorisation for the Marikana Open Pit Rehabilitation and Surface Tailings Storage Facility
- Project Description:** Environmental Impact Assessment and Environmental Management Programme for the Marikana Open Pit Rehabilitation and Surface Tailings Storage Facility
- Job Title and Duties:** Environmental Scientist – assisting project manager
- Coordination and management of multi-disciplinary specialists
 - Site selection assessment input
 - Coordinate and facilitate public participation activities
 - Compilation of technical environmental documents, programmes and reports
 - Authority consultation
 - Client liaison
- Value of Project:** R 5 000 000
- Location:** Mafikeng, Limpopo
- Project duration & year:** June 2008
- Client:** Bigen Africa
- Name of Project:** Maandagshoek Road Upgrade
- Project Description:** Environmental Impact Assessment and Environmental Management Programme for the Maandagshoek Road Upgrade
- Job Title and Duties:** Environmental Scientist – assisting project manager
- Project coordination and management
 - Authority consultation
 - Client liaison
 - Compilation of technical environmental documents, programmes and reports
- Value of Project:** R 350 000
- Location:** Mokopane, Limpopo
- Project duration & year:** February 2008
- Client:** Londmin Akanani Platinum Mine
- Name of Project:** Lonmin Akanani Platinum Mine – Mine Facilities Site Selection
- Project Description:** Site Selection for Mine Facilities
- Job Title and Duties:** Environmental Scientist
- Coordination and management of multi-disciplinary specialists
 - Site selection assessment
 - Compilation of technical environmental documents, programmes and reports
 - Client liaison
- Value of Project:** R 280 000

Selma Nel

Principal Scientist

Key Experience: Environmental advisory projects

Location: Lebowakgomo, Limpopo
 Project duration & year: January 2018, 3 months
 Client: DRA Global
 Name of Project: Baobab Mine Pilot Crusher Plant Environmental Protection and Response Plan
 Project Description: Development of the construction phase's Environmental Protection and Response Plan in respect of Baobab Mine Pilot Crusher Plant
 Job Title and Duties: Senior Environmental Scientist – Project Manager

- Compilation of an Environmental Protection and Response Plan

 Value of Project: R 380 000

Location: Steelpoort, Limpopo
 Project duration & year: 2016-2017
 Client: Anglo American Platinum: Der Brochen Mine
 Name of Project: Execution of the approved Der Brochen Project EMPr
 Project Description: Providing environmental advice in terms of the execution of the approved Der Brochen Project EMPr, with specific reference to the tailings storage facility
 Job Title and Duties: Environmental Advisor and Environmental Control Officer

- Compilation of environmental and social execution procedures
- Conducting site inspections and environmental audits against EMPr

 Value of Project: n/a

Location: Mokopane, Limpopo
 Project duration & year: 2016-2017
 Client: Anglo American Platinum – Mogalakwena Platinum Mine
 Name of Project: Blinkwater Tailings Storage Facility Expansion
 Project Description: Pre-feasibility assessment of the proposed Blinkwater Tailings Storage Facility Expansion Project
 Job Title and Duties: Senior Environmental Scientist – Environmental Advisor

- Technical review of project against current environmental related legislation
- Compilation of technical environmental documents

 Value of Project: n/a

Location: Johannesburg, Gauteng
 Project duration & year: October 2016
 Client: Amalgamated Beverage Industries
 Name of Project: Community Water Initiatives towards the aid of the Water Crisis
 Project Description: Identify and develop implementation plan for community water initiatives in aid of the water crisis
 Job Title and Duties: Senior Environmental Scientist – Environmental Advisor

- Identify and develop community initiatives implementation plan
- Trade off study inputs
- Compilation of technical environmental documents
- Client liaison

 Value of Project: n/a

Selma Nel

Principal Scientist

Key Experience: Environmental advisory projects

Location: Richards Bay, KwaZulu Natal Province
 Project duration & year: August 2015
 Client: Elegant Line Chemicals (Pty) Ltd
 Name of Project: Pre-feasibility assessment of a proposed Chlor-alkali Plant
 Project Description: Chlor-alkali Plant Pre-feasibility Study and guidelines for preparation of Feasibility Study
 Job Title and Duties: Senior Environmental Scientist – Environmental Advisor

- Technical review of project against current environmental related legislation
- Compilation of technical environmental documents

Value of Project: n/a

Key Experience: Environmental advisory projects

Location: Hitosa, Ethiopia
 Project duration & year: December 2020 - Current
 Client: Tulu Moye Geothermal Operations PLC
 Name of Project: TMGO Environmental and Social Audit
 Project Description: Environmental and Social audit in respect of TMGO's E&S Management Plan and international standards
 Job Title and Duties: Lead Environmental Auditor

- Coordination with in-country consultants
- Client liaison
- Compilation of audit report

Value of Project: R 780 000

Location: Steelpoort, Limpopo
 Project duration & year: June 2017 - Current
 Client: Anglo American Platinum – Der Brochen Project
 Name of Project: Mareesburg Tailings Storage Facility
 Project Description: Execution of the Mareesburg Tailings Storage Facility
 Job Title and Duties: Senior Environmental Scientist

- Environmental Control Officer during construction phase
- Compilation of ECO compliance report

Value of Project: R 280 000

Location: Mokopane, Limpopo
 Project duration & year: July 2014, Sept 2015, Nov 2016, Oct 2017 & Nov 2018
 Client: Anglo American Platinum – Mogalakwena Mine
 Name of Project: Annual External Performance Assessment on Mogalakwena Mine's EMPr's
 Project Description: External EMPr Performance and Compliance assessment of Mogalakwena Mine
 Job Title and Duties: Senior Environmental Scientist - Lead Auditor

- Project coordination and management
- Compilation of audit report
- Environmental compliance audit in terms of NEMA, MPRDA and NEM:WA
- Training and mentoring

Value of Project: R 200 000

Selma Nel

Principal Scientist

Key Experience: Environmental advisory projects

Location: Middelburg, Mpumalanga
 Project duration & year: May 2016
 Client: Clewer Sand and Stone Quarry
 Name of Project: EMPr Compliance Audit of Clewer Sand and Stone Quarry
 Project Description: EMPr Compliance Audit of Clewer Sand and Stone Quarry as part of the quarry's mining right renewal process
 Job Title and Duties: Environmental Scientist – Lead Auditor

- Compliance audit in terms of the NWA
- Compilation of report on audit findings

 Value of Project: R 128 000

Location: Phalaborwa, Limpopo
 Project duration & year: May 2012
 Client: Rio Tinto
 Name of Project: Palabora Mining Company - Water Use License Compliance Audit
 Project Description: Water Use License Compliance Audit
 Job Title and Duties: Environmental Scientist – Assisting Auditor

- Project coordination and management
- Environmental compliance audit in terms of MPRDA
- Compilation of report on audit findings

 Value of Project: R 128 000

Location: Rustenburg, North West
 Project duration & year: February 2012
 Client: Royal Bafokeng Platinum
 Name of Project: Styldrift & Frischgewaagd Mines - Prospecting EMPs Compliance Audit
 Project Description: External Prospecting Right EMPs Compliance Audit
 Job Title and Duties: Environmental Scientist - Lead Auditor

- Project coordination and management
- Environmental compliance audit in terms of MPRDA
- Training and mentoring

 Value of Project: R 280 000

Location: Kroondal, North West
 Project duration & year: October 2011
 Client: Aquarius Platinum South Africa
 Name of Project: Kroondal and K5 Water Use License Audit
 Project Description: Water Use License Compliance Audit
 Job Title and Duties: Environmental Scientist - Assisting Auditor

- Compliance audit in terms of the NWA
- Compilation of report on audit findings

 Value of Project: R 400 000

Selma Nel

Principal Scientist

Key Experience: Environmental advisory projects

Location: Roosenekal, Mpumalanga Province
 Project duration & year: July 2011
 Client: Aquarius Platinum South Africa
 Name of Project: Walhalla and Chieftains Plain –Prospecting EMPr audit and consolidation under MPRDA
 Project Description: Amendment of Prospecting EMP under MPRDA
 Job Title and Duties: Environmental Scientist – Project Coordinator

- Project coordination and management
- Environmental compliance audit in terms of MPRDA
- Compilation of technical environmental documents, programmes and reports;
- Coordinate and facilitate public participation activities
- Client liaison

Value of Project: R 350 000

Location: Lydenburg & Delmas (Mpumalanga) & Bronkhortspruit (Gauteng)
 Project duration & year: November 2010
 Client: Aquarius Platinum South Africa
 Name of Project: AQPSA Prospecting EMPs Compliance Audit
 Project Description: External Prospecting Right EMPs Compliance Audit
 Job Title and Duties: Environmental Scientist - Auditor

- Project coordination and management
- Environmental compliance audit in terms of MPRDA
- Compilation of report on audit findings

Value of Project: R 400 000

Location: Cairo, Egypt, Africa
 Project duration & year: February 2010
 Client: Cadbury Africa
 Name of Project: Cadbury Africa: Health, Safety and Environmental Audit
 Project Description: Health, Safety and Environmental Audit
 Job Title and Duties: Environmental Scientist – Assisting Auditor

- Compliance audit in terms company procedures, international standards and relevant legislation
- Compilation of report on audit findings

Value of Project: R 600 000

Location: Tanzania, Africa
 Project duration & year: January 2010
 Client: RSK
 Name of Project: ETANA BP Environmental Site Assessment and Vendor Due Diligence
 Project Description: Environmental Site Assessment and Vendor Due Diligence
 Job Title and Duties: Environmental Scientist

- Project coordination and management
- Compilation of technical environmental documents and reports;
- Client liaison

Value of Project: R 3 800 000

Selma Nel

Principal Scientist

Key Experience: Bio-monitoring projects

Location: Steelpoort, Mpumalanga
 Project duration & year: Since July 2017
 Client: Anglo American Platinum: Twickenham Mine
 Name of Project: Twickenham Mine: Bio-monitoring and Toxicity monitoring programme
 Project Description: Biannual Bio-monitoring and toxicity sampling in and around the Twickenham Mine Complex (Motse & Moopetsi Rivers)
 Job Title and Duties: SASS Practitioner – Project manager

- Project coordination and management
- Bio-monitoring
 - Training and mentoring
 - Conducting aquatic invertebrate and habitat assessment surveys
 - Conducting aquatic invertebrate, habitat assessment and toxicity surveys
- Compilation of report on findings

Value of Project: R 120 000

Project duration & year: Since February 2013
 Client: Sonae Novoboard
 Name of Project: Sonae Novoboard: Bio-monitoring
 Project Description: Biannual Bio-monitoring (Tributary of the Sand River)
 Job Title and Duties: SASS Practitioner – Project manager

- Project coordination and management
- Bio-monitoring
 - Training and mentoring
 - Conducting aquatic invertebrate and habitat assessment surveys
 - Conducting aquatic invertebrate, habitat assessment and toxicity surveys
- Compilation of report on findings

Value of Project: R 120 000

Location: Steelpoort, Limpopo
 Project duration & year: Since July 2011
 Client: Impala Platinum's Marula Mine
 Name of Project: Marula Platinum Mine's: Bio-monitoring
 Project Description: Biannual Bio-monitoring (Moopetse & Tshwenyane Rivers)
 Job Title and Duties: SASS Practitioner – Project manager

- Project coordination and management
- Bio-monitoring
 - Training and mentoring
 - Conducting aquatic invertebrate and habitat assessment surveys
 - Conducting aquatic invertebrate, habitat assessment and toxicity surveys
- Compilation of report on findings

Value of Project: R 140 000

Selma Nel

Principal Scientist

Key Experience: **Bio-monitoring projects**

Location: Bethal, Mpumalanga
 Project duration & year: June 2009 till Oct 2010
 Client: Total Coal
 Name of Project: Total Coal Springbok Siding: Bio-monitoring
 Project Description: Biannual Bio-monitoring (Tributaries of the Olifants River)
 Job Title and Duties: SASS Practitioner – Project manager

- Project coordination and management
- Bio-monitoring
 - Training and mentoring
 - Conducting aquatic invertebrate and habitat assessment surveys
 - Conducting aquatic invertebrate, habitat assessment and toxicity surveys
- Compilation of report on findings

Value of Project: R 62 000

Location: Bethal, Mpumalanga
 Project duration & year: June 2009 till Oct 2010
 Client: Total Coal
 Name of Project: Total Coal Forzando Coal Mine: Olifants River Bio-monitoring
 Project Description: Biannual Bio-monitoring (Olifants River and tributaries)
 Job Title and Duties: SASS Practitioner – Project manager

- Project coordination and management
- Bio-monitoring
 - Training and mentoring
 - Conducting aquatic invertebrate and habitat assessment surveys
 - Conducting aquatic invertebrate, habitat assessment and toxicity surveys
- Compilation of report on findings

Value of Project: R 62 000

Location: Kriel, Mpumalanga
 Project duration & year: June 2009 till Oct 2010
 Client: Total Coal
 Name of Project: Total Coal Dorstfontein East Coal Mine: Olifants River Bio-monitoring
 Project Description: Biannual Bio-monitoring
 Job Title and Duties: SASS Practitioner – Project manager

- Project coordination and management
- Bio-monitoring
 - Training and mentoring
 - Conducting aquatic invertebrate and habitat assessment surveys
 - Conducting aquatic invertebrate, habitat assessment and toxicity surveys
- Compilation of report on findings

Value of Project: R 62 000

Selma Nel

Principal Scientist

Key Experience: Bio-monitoring projects

Location: Mtubatuba, Kwa-Zulu Natal
Project duration & year: December 2009
Client: Tendele Coal
Name of Project: Teldele Somkele Mine: Bio-monitoring - Umfolozi, Kwaluhlanga and Nkolokotho Rivers.
Project Description: Biannual Bio-monitoring
Job Title and Duties: SASS Practitioner – Project manager

- Project coordination and management
- Bio-monitoring
 - Conducting aquatic invertebrate and habitat assessment surveys
 - Conducting aquatic invertebrate, habitat assessment and toxicity surveys
- Compilation of report on findings

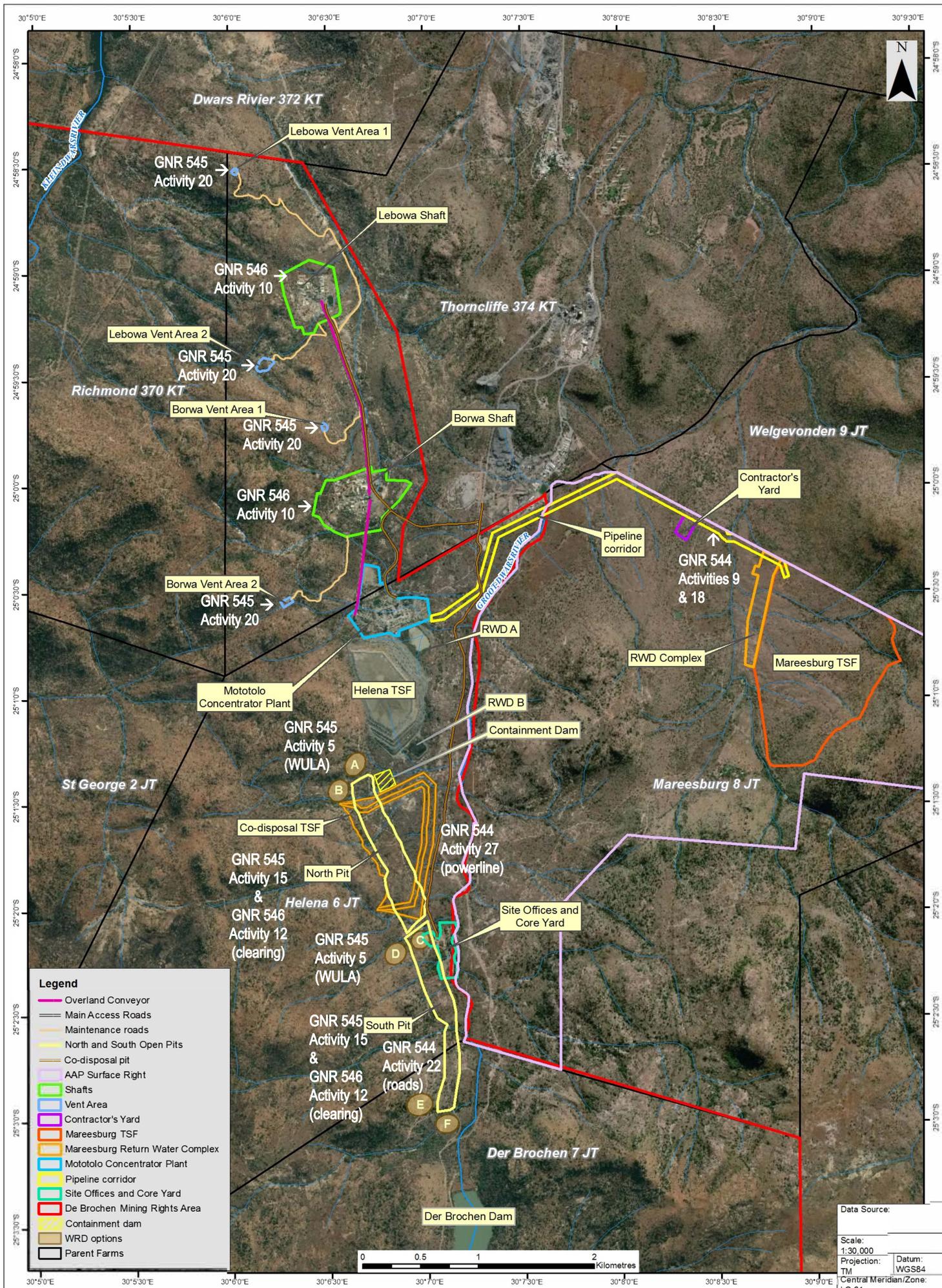
Value of Project: R 52 000

Location: Pilgrims Rest, Limpopo
Project duration & year: February 2009
Client: Assmang
Name of Project: Assmang Dwars River Chrome Mine: Groot Dwars River Bio-monitoring
Project Description: Summer Survey Bio-monitoring Blyde River
Job Title and Duties: SASS Practitioner Specialist

- Project coordination and management
- Bio-monitoring
 - Conducting aquatic invertebrate and habitat assessment surveys
 - Conducting aquatic invertebrate, habitat assessment and toxicity surveys
- Compilation of report on findings

Value of Project: R 20 000

Appendix 3: Listed Activities Map



- Legend**
- Overland Conveyor
 - Main Access Roads
 - Maintenance roads
 - North and South Open Pits
 - Co-disposal pit
 - AAP Surface Right
 - Shafts
 - Vent Area
 - Contractor's Yard
 - Maresburg TSF
 - Maresburg Return Water Complex
 - Mototolo Concentrator Plant
 - Pipeline corridor
 - Site Offices and Core Yard
 - De Brochen Mining Rights Area
 - Containment dam
 - WRD options
 - Parent Farms

Data Source:	
Scale:	1:30,000
Projection:	TM
Datum:	WGS84
Central Meridian/Zone:	LO 31
Date:	05/04/2020
Compiled by:	FOWL
Project No.:	554304
Fig No.:	App 3

Appendix 4: Mototolo Mine's Waste Management Licences



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447 · PRETORIA · 0001 · Fedsure Building · 315 Pretorius Street · PRETORIA
Tel (+27 12) 310 3911 · Fax (+2712) 322 2682

Ref: 12/9/11/L224/5

Enquiries: Ms K. Ntoampe

Tel. 012 310 3920 Fax: 12 310 3753 Email Address: kntoampe@deat.gov.za

Xstrata Alloys Mototolo South mine
P.O Box 403
Lydenburg
1120

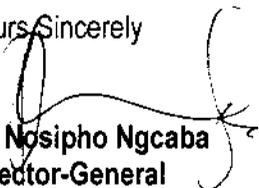
Fax: 086 672 3595

Dear permit holder

Please find hereto attached a waste licence issued in terms of S.20 of the National Environmental Management: Waste Act, 2008, (Act 59 of 2008) "NEMWA".

This is to advise you that applications for authorisation of licence variation, waste delisting, emergency and or once off authorisations will be processed only if the Department of Environmental Affairs is in receipt of the latest external audit report, and any other reports required to be submitted to the department in terms of the attached licence. Please note section 54 of NEMWA for any amendments.

Yours Sincerely


Ms Nosipho Ngcaba
Director-General

Department of Environmental Affairs

Letter signed by Ms K Ntoampe

Designation: Director: Authorisations and Waste Disposal Management

Date: 23 MARCH 2010



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Ref. 12/9/11/L224/5

Enquiries: Ms. K. Ntoampe

Tel: (012) 310-3920

Fax: (012) 310-3753 Email: kntoampe@deat.gov.za

www.deat.gov.za

LICENCE NUMBER: 12/9/11/L224/5

CLASS: H:H (GENERAL AND HAZARDOUS WASTE
TEMPORARY STORAGE FACILITY)

WASTE STORAGE FACILITY: MOTOTOLO SOUTH SALVAGE YARD

LOCATION: PORTION 7 OF THE FARM THORNCLIFFE 374KT,
LIMPOPO PROVINCE

LICENCE HOLDER: XSTRATA ALLOYS MOTOTOLO SOUTH MINE

ADDRESS: P.O BOX 403, LYDENBURG, 1120

LICENCE IN TERMS OF SECTION 20(b) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT NO. 59 OF 2008)

I, Joanne Yawitch, in my capacity as Deputy Director-General: Environmental Quality and Protection of the National Department of Environmental Affairs (hereinafter referred to as "the Department"), in terms of Section 20(b) of the National Environmental Management: Waste Act, 2008 (Act, No. 59 of 2008), hereby authorise the abovementioned licence holder to temporarily store waste at facility mentioned in condition 1.1.2 below, subject to the conditions specified herein.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

In this Licence, "Director" means the Director: Authorisations and Waste Disposal Management of the National Department of Environmental Affairs who may be contacted at the address below:

Director: Authorisations and Waste Disposal Management
Department of Environmental Affairs
Private Bag X 447
PRETORIA
0001

In this Licence, "Director: RPW" means the Director: Resource Protection and Waste: Department of Water Affairs who may be contacted at the address below:

Director: Resource Protection and Waste
Department of Water Affairs
Private Bag X 313
PRETORIA
0001

1 SITE DETAILS

1.1 LOCATION

1.1.1 This Licence authorises the treatment and transfer of general and hazardous waste on Remaining extent of the farm Thomcliffe 374KT within the jurisdiction of Greater Tubatse Local Municipality, Limpopo Province (hereinafter referred to as "the Site") according to the Application for Exemption under Section 20 of the Environment Conservation Act, 1989 (Act 73 of 1989) for Xstrata Alloys Mototolo South Mine Waste Storage Facility compiled by AGES, dated July 2008 (herein referred to as "the Report"), submitted by the Licence holder.

1.1.2 The location of the site must be according to co-ordinates indicated on the Licence application form, submitted by the Licence holder which is defined as follows:

Number of corner	Latitude	Longitude
A	25° 00' 06"	30° 06' 37"
B	25° 00' 06"	30° 06' 38"
C	25° 00' 07"	30° 06' 38"
D	25° 00' 07"	30° 06' 37"

1.2 DOCUMENTS CONSIDERED

1.2.1 Permit Application Motivation Report for Xstrata Alloys Mototolo South Mine, dated July 2008;

1.2.2 Permit application form, dated 09 April 2009; and

1.2.3 A Record of Decision (RoD) issued by the Department of Water Affairs, dated 23 September 2009.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

LICENCE CONDITIONS

1.3 SITE SECURITY AND ACCESS CONTROL

- 1.3.1 The Licence holder must ensure effective access control on the Site to reasonably prevent unauthorised entry. Signs indicating the risks involved in unauthorised entry must be displayed at each entrance.
- 1.3.2 The Licence holder must prevent the storage of waste that is not authorised for storage at the Site as per condition 3.1 below.
- 1.3.3 Weatherproof, durable and legible notices in at least three official languages applicable in the area must be displayed at each entrance to the Site. These notices must prohibit unauthorised entry and state the hours of operation, the name, address and telephone number of the Licence holder and the person responsible for the operation of the Site.

2 MANAGEMENT

2.1 GENERAL MANAGEMENT

- 2.1.1 The activities must be managed and operated:
- (a) in accordance with an Environmental Management System (EMS), that inter alia identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents and non-conformances and those drawn to the attention of the licence holder as a result of complaints;
 - (b) in accordance with conditions of this licence and any other written instruction by the Director; and
 - (c) by sufficient persons who are competent in respect of the responsibilities to be undertaken by them in connection with the operation of the activities.
- 2.1.2 Any persons having duties that are or may be affected by the matters set out in this Licence must have convenient access to a copy of it, kept at or near the place where those duties are carried out. A copy of this licence may be published on any website deemed fit by the Department.
- 2.2 DESIGNATION OF WASTE MANAGEMENT CONTROL OFFICER**
- 2.2.1 A Waste Management Control Officer (WMCO) must be designated, who will monitor and ensure compliance and correct implementation of all conditions and provisions as stipulated in the licence. The WMCO must:
- (a) Report any non-compliance with any licence conditions or requirements or provisions of NEM: WA to the licensing authority through the means reasonably available.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

2.2.2 The duties and responsibility of the WMCO should not be seen as exempting the licence holder from the legal obligations in terms of the NEM: WA.

2.3 EMERGENCY PREPAREDNESS PLAN

2.3.1 The Licence Holder must maintain and implement emergency preparedness plan and review it annually when conducting audit and after each emergency and or major accident. The plan must, amongst others, include:

- a) Site Fire
- b) Spillage 9on route and on site)
- c) Natural disasters such as floods
- d) Industrial action
- e) Contact details of police, ambulances and any emergency centre closer to the site

3 PERMISSIBLE WASTE

3.1 Any portion of the Site which has been constructed or developed according to condition 4 of this Licence may be used for storage of batteries, pallets, scrap metal and used oil and general waste generated as part of day-to-day operations of Xstrata Alloys Mototolo South mine.

3.2 All waste types which are classified as general waste according to the latest edition of the 1998 DWAF "Minimum Requirements" series of documents (hereinafter referred to as the "Minimum Requirements series"), and which is suitable for disposal at a general landfill site.

3.3 The classification, acceptance and disposal criteria as listed in the latest edition of the document "Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste, Waste Management Series, Department of Water Affairs and Forestry or by the Department in future, (hereinafter referred to as the "Minimum Requirements Series"), must be conformed to.

4 CONSTRUCTION AND COMMISSIONING OF THE ACTIVITY

4.1 The Site construction (existing and new) must be approved by a registered professional engineer and compliant with recognised civil engineering standards and adequately lined as per condition 4.3 below to protect surface and ground water resources.

4.2 The site plan must only be changed under the supervision of a registered professional engineer and upon approval by the Director.

4.3 The storage area must have a firm, impermeable, and chemical resistant floors and a roof to prevent direct sunlight and rain water from getting in contact with the waste.

4.4 The storage must have bunded walls with adequate capacity to contain the maximum volume that is stored in the area. The area must have adequate drainage system in line with condition 4.3 above. Uncontaminated storm water must be prevented from coming into contact with the waste and must be diverted away from the site.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

4.5 The Licence holder must construct and maintain on a continuous basis a drainage and containment system capable of collecting and storing all runoff water arising from the site, which could be expected as a result of the of the 1 in 50 years flood over a period of 24 hours to prevent such runoff water from coming into contact with waste. The system must under the said rainfall event, maintain a freeboard of half a metre.

4.6 The licence holder must make provision for sanitation facilities on site in line with the Occupational Health and Safety Act, 1993 (Act 85 of 1993).

5. GENERAL OPERATION AND IMPACT MANAGEMENT

5.1 IMPACT MANAGEMENT

5.1.1 Waste, which is not permissible under condition 3, must be dealt with according to relevant legislation or the Department's policies and practices.

5.1.2 Licence Holder must prevent spillages; where they happen nonetheless, condition 2.3.1 above should be improved and the licence holder must ensure the effective and safe cleaning of such spillages.

5.1.3 Licence Holder must prevent nuisance conditions or health hazards, or the potential creation of nuisance conditions or health hazards.

5.1.4 Licence Holder must ensure that all non recyclable waste are disposed of at waste management facilities licenced to handle such wastes and all recyclable waste are collected by licenced waste management facilities for recycling, reuse or treatment.

5.1.5 Licence Holder must ensure that all liquid wastes, whose emissions to water or land could cause pollution is diverted to sewer only after testing water quality and receiving written approval from the relevant local authority.

5.1.6 Licence Holder must ensure that emissions from the activities are free from odour at levels likely to cause annoyance outside the site, as perceived by an authorised officer of the Department and interested and affected parties.

5.1.7 Licence Holder must ensure that all personnel who work with hazardous waste are trained to deal with these potential hazardous situations so as to minimise the risk involved. Records of training and verification of competence must be kept by the licence holder.

5.1.8 In order to prevent nuisance conditions the Licence holder must ensure that all storage skips and bins are not overfilled.

5.2 OPERATION

5.2.1 Licence Holder must make sure that all the hazardous waste are stored in sealed containers or drums stored under roofed and well ventilated areas prior to disposal.

5.2.2 Licence Holder must ensure that the storage area is surrounded by an interception trench with a sump or outlet valve for intercepting and recovering potential spills.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

- 5.2.3 All solid waste must be stored in sealed steel drums; liquid wastes must be stored in leak resistant liquid waste storage containers and must be inspected daily for leaks.
- 5.2.4 The Licence Holder must ensure that the integrity of the waterproof base and bund walls are routinely monitored and corrective measures are taken before containment integrity is breached.
- 5.2.5 Wastewater resulting from the cleaning of floors and machinery and storm-water from the site must only be discharged into the natural environment after testing that it conforms to this Department's requirements and discharge into sewer must also be after testing and obtaining written authorisation from the relevant local authority.
- 5.2.6 Dry hazardous waste, oily sludge and other hazardous waste streams must be stored in appropriate containers and collected by licensed waste recycling or treatment company for further treatment or be disposed of at a licensed H:H waste disposal facility or alternatively if the waste de-list on a licensed G:L:B+ waste disposal site.
- 5.2.7 Licence holder must ensure the health and safety of workers and employees on site, in terms of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).
- 5.2.8 Sixteen point Material Safety Data Sheets (MSDSs) must be available on site for all chemicals and hazardous substances stored or used on-site.

6 MONITORING

6.1 MONITORING METHODS AND PARAMETERS

- 6.1.1 The Licence holder must carry out all tests required in terms of this Licence in accordance with methods prescribed by and obtainable from the South African Bureau of Standards (SABS), referred to in the Standards Act, 2008 (Act 08 of 2008).
- 6.1.2 The Licence Holder may only use another method of analysis if written proof is submitted to this Department specifying that the method to be used is at least equivalent to the SABS method.
- 6.1.3 The licence holder must put in place a monitoring and measurement plan that must amongst others include storm water quality monitoring.

6.2 WATER MONITORING

- 6.2.1 Surface water monitoring must be performed within the rain in all storm water drains outlets that discharge into the natural environment based on the relevant parameters provided in the most current water quality guidelines published by the Department of Water Affairs.
- 6.2.2 Monitoring for treated effluent including contaminated runoff water, which is discharged into sewer must be conducted at the point where it exits the treatment facility and/or enters sewer network based on parameters provided by the relevant local authority.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

8.3 DEPARTMENTAL AUDITS AND INSPECTIONS

- 8.3.1 The Department reserves the right to audit and/or inspect the Site without prior notification at any time and frequency as may be determined by the Director.
- 8.3.2 The Licence holder must make any records or documentation available to the Director upon request, as well as any other information he/she may require.
- 8.3.3 The findings of these audits or inspections must be made available to the Licence holder within 30 days of the end of the audit or inspection. Information from the audits must be treated in accordance with the Promotion of Access to Information Act, 2000 (Act 2 of 2000).

9 RECORDING

- 9.1 The Licence holder must keep records and update all the information referred to in Annexure II and submit this information to the Director and the Director: RPW on an annual basis.
- 9.2 All records required or resulting from activities required by this Licence must:
- a) be legible;
 - b) be made as soon as reasonably practicable and should form part of the external audit report;
 - c) if amended, be amended in such a way that the original and any subsequent amendments remain legible and are easily retrievable; and
 - d) be retained in accordance with a documented procedures which is approved by the Department.
- 9.3 Records demonstrating compliance with condition 2.1.1 must be maintained.

10 REPORTING

- 10.1 The Licence holder must, within 24 hours notify the Director of the occurrence or detection of any incident on the Site, or incidental to the operation of the site, which has the potential to cause, or has caused pollution of the environment, health risks, nuisance conditions or water pollution.
- 10.2 The Licence holder must, within 14 days, or a shorter period of time, if specified by the Director from the occurrence or detection of any incident referred to in condition 10.1, submit an action plan, which must include a detailed time schedule, and resource allocation signed off by top management, to the satisfaction of the Director and/or the Director: RPW of measures taken to –
- a) correct the impact resulting from the incident;
 - b) prevent the incident from causing any further impact; and
 - c) prevent a recurrence of a similar incident.

- 10.3 In the event that measures have not been implemented within 21 days of the incident to address impacts caused by the incident referred to in condition 10.1, or measures which have been implemented are inadequate, the Director may implement the necessary measures at the cost and risk of the Licence holder.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

6.3 INVESTIGATIVE MONITORING

6.3.1 If in the opinion of the Director and Director: RPW, a water quality variable at any monitoring point referred to in condition 6.2 above, shows an increasing trend, the licence holder shall report in terms of condition 10 below.

7 INVESTIGATIONS

7.1 If, in the opinion of the Director, environmental pollution, nuisances or health risks may be or is occurring on the Site, the Licence Holder must initiate an investigation into the cause of the problem or suspected problem.

7.2 If, in the opinion of the Director and/or Director: RPW, water pollution may be or is occurring the licence holder must initiate an investigation into the cause of the problem or suspected problem. Such investigation must include the monitoring of the water quality variables, at those monitoring points and such frequency as may be specified by Chief Director: RPW.

7.3 Investigations carried out in terms of conditions 7.1 and 7.2 above must include the monitoring of the relevant environmental pollution, nuisance and health risk variables, at those monitoring points and such frequency to be determined in consultation with the Director.

7.4 Should the investigation carried out as per conditions 7.1 and 7.2 above reveal any unacceptable levels of pollution, the Licence Holder must submit mitigation measures to the satisfaction of the Director.

8 AUDITING

8.1 INTERNAL AUDITS

8.1.1. Internal audits must be conducted quarterly by the licence holder and on each audit occasion an official report must be compiled by the relevant auditor to report the findings of the audits, which must be made available to the external auditor specified in condition 8.2.1.

8.2 EXTERNAL AUDITS

8.2.1 The Licence holder must appoint an independent external auditor to audit the site biennially and this auditor must compile an audit report documenting the findings of the audit, which must be submitted by the Licence holder according to condition 10.9, below.

8.2.2 The audit report must:

- a) specifically state whether conditions of this licence are adhered to.
- b) include an interpretation of all available data and test results regarding the operation of the site and all its impacts on the environment.
- c) Specify target dates for the implementation of the recommendations by the Licence holder to achieve compliance.
- d) contain recommendations regarding non-compliance or potential non-compliance and must specify target dates for the implementation of the recommendations by the licence holder and whether corrective action taken for the previous audit non conformities was adequate.
- e) show monitoring results graphically and conduct trend analysis



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

- 10.4 The Licence holder must keep an incident report and complaints register, which must be attached available to the external auditor, Departmental and DWA Auditors for the purpose of audit.
- 10.5 The Department must be notified without delay in the case of the following:
- a) any malfunction, breakdown or failure of equipment or techniques, accident or fugitive emission which has caused, is causing or may cause significant pollution;
 - b) the breach of this Licence; and
 - c) any significant adverse environmental and health effects.
- 10.6 Prior written notification must be given to the Director of the following events and in the specified timescales.
- a) as soon as practicable prior to the permanent cessation of any operational activities
 - b) full or partial cessation of the operational activities for a period likely to exceed 3 months
 - c) full or partial resumption of the operation of all or part of the activities after a cessation notified under (b) above
- 10.7 The Department must be notified within 7 days of any changes to the management of the site including the name of the incoming person together with evidence that such person has the required technical competence.
- 10.8 The Department must be notified within 14 days of the following changes:
- a) Licence holder's trading name, registered name or registered office address;
 - b) Particular's of the Licence holder's ultimate holding company (including details of an ultimate holding where a Licence holder has become a subsidiary; and
 - c) steps taken with a view to the Licence holder, or any one of them, going into bankruptcy, entering into composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.
- 10.9 Each external audit report referred to in condition 8.2 must be submitted to the Director within 30 days from the date on which the external auditor finalised the audit.

11 REHABILITATION AND CLOSURE OF THE SITE

- 11.1 The licence holder must rehabilitate the site or any portion thereof, in accordance with a closure report and rehabilitation plan, which must be submitted to the Director for approval at least one year prior to the intended closure of the Site, or any portion thereof.
- 11.2 The Licence holder will remain responsible for the Site, and/or any of its impacts on the environment, after operations on the site have ceased.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

12 LEASING AND ALIENATION OF THE SITE

12.1 Should the Licence holder want to alienate or lease the site, he/she shall notify the Director in writing of such an intention at least 120 days prior to the said transaction. Should the approval be granted, the subsequent licence holder shall remain liable to compliance with all licence conditions.

13 TRANSFER OF WASTE MANAGEMENT LICENCE

13.1 Should the licence holder want to transfer holder-ship of this, he/she must apply in terms of Section 52 of the National Environmental Management: Waste Act, 2008 (Act No 59 of 2008).

13.2 Any subsequent licence holder shall be bound by conditions of this licence

14. GENERAL

14.1 The construction of the licensed activity may not commence within thirty (30) days of the date of signature of this licence.

14.2 Should you be notified by the Minister of a suspension of the licence pending any appeals decision, you may not commence with the activities licensed by the Minister in writing.

14.3 After an appeal period has expired and no good cause to extend the appeal period has been submitted, the activity may commence provided a notice has been submitted to the Department. The notice must include a date on which it is anticipated that the activity will commence.

14.4 The activity must commence within a period of two (2) years from the date of issue. If commencement of the activity does not occur within that period, the licence lapses and a new application for a licence must be made in order for the activity to be undertaken.

14.5 If the Licence Holder anticipates that commencement of the activity would not occur within two (2) year period, he / she **must** apply and **show good cause** for an extension of the license six (6) months prior to its expiry date.

14.6 This licence shall not be transferable unless such transfer is subject to condition 13.1

14.7 This licence shall not be construed as exempting the licence holder from compliance with the provisions of the National and Provincial Legislation and any relevant Ordinance, Regulation, By-laws and relevant National Standards and norms.

14.8 Transgression of any condition of this licence could result in the validity of the licence being terminated by the Department.

14.9 Non-compliance with a condition of this license may result in criminal prosecution or other actions provided for in Section 67(1) of the National Environmental Management: Waste Act, 2008.



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

14.10 Any committees appointed in terms of the application or any other public authority or organization shall not be held responsible for any damages or losses suffered by the Licence Holder or his/her successor in title in any instance where construction or operation are to be temporarily or permanently stopped for reasons of non-compliance

14.11 In terms of section 28 and 30 of the National Environmental Management Act No. 107 of 1998, and section 19 and 20 of the National Water Act No. 36 of 1998, any costs incurred to remedy environmental damage must be borne by the person responsible for the damage. It is therefore imperative that the Licence Holder reads through and understand the legislative requirements pertaining to the project. It is the Applicant's responsibility to take reasonable measures which include informing and educating contractors and employees about environmental risks of their work and training them to operate in an environmental acceptable manner.

14.12 This licence is valid for a period of twenty (20) years and the licence holder must initiate a licence review process 10 years from the date of issue. Based on the results of the review, compliance to licence conditions or recommendations from audit reports and or changing legislation, the licence could be amended or withdrawn or validity thereof extended.

15 APPEAL OF LICENCE

15.1 The licence holder must notify every registered interested and affected party, in writing and within five (5) days, of receiving the Department's decision.

15.2 The notification referred to in 15.1. must –

15.2.1 Specify the date on which the licence was issued;

15.2.2 Inform the registered interested and affected party of the appeal procedure provided for in Chapter 7 of the GN No. R 385 of 21 April 2006 in terms of National Environmental Management Act, 1998, as amended (see Annexure 1).

15.2.3 Advise the interested and affected party that a copy of a licence and reasons for the decision will be furnished on request.

15.2.4 An appeal against the decision must be lodged in terms of chapter 7 of the GN No. R 385 of 21 April 2006 in terms of NEMA 1998, as amended, from the date of this license, with: The Minister, Department of Environmental Affairs, Private Bag X 447, PRETORIA, 0001, Tel No.: (012) 310 3705, Fax No.: (012) 320 7561

Ms Joanne Yawitch
DEPUTY DIRECTOR-GENERAL

DATE: 19/03/2010



H:H: Licence – Mototolo South Mine Temporary Waste Storage Facility

ANNEXURE I

APPEALS PROCEDURE IN TERMS OF CHAPTER 7 OF R. 385 OF 2006 TO BE FOLLOWED BY THE APPLICANT AND INTERESTED AND AFFECTED PARTIES UPON RECEIPT OF NOTIFICATION OF A WASTE MANAGEMENT LICENCE

APPLICANT	INTERESTED AND AFFECTED PARTIES (IAPs)
1. Receive a notification of a Waste Management Licence from the relevant Competent Authority	1. Receive a notification of a Waste Management Licence from Applicant/Consultant
2. Within 10 days of receipt of notification, notify the relevant Competent Authority and all IAPs of intention to appeal	2. Within 10 days of receipt of notification, notify the relevant Competent Authority of intention to appeal
3. Notification served by the Applicant must include: 3.1. A copy of the notice of intention to appeal; and 3.2. A notice indicating where and for what period the appeal submission will be available for inspection by all IAPs	3. Appellant must serve on the Applicant 3.1. A copy of the notice of intention to appeal 3.2. A notice indicating where and for what period the appeal submission will be available for inspection by the applicant
4. The appeal must be submitted to the relevant Competent Authority or delegated organ of State within 30 days of lodging of the notice of intention to appeal	4. The appeal must be submitted to the relevant Competent Authority or delegated organ of State within 30 days of lodging of the notice of intention to appeal
5. A person or organ of state that receives notice of an appeal may submit a responding statement to the relevant Competent Authority or delegated organ of state within 30 days from the date that the appeal submission was made available for inspection by the appellant	5. An Applicant that receives notice of an appeal may submit a responding statement to the relevant Competent Authority or delegated organ of State within 30 days from the date the appeal submission was made available for inspection by the appellant

NOTES:

1. An appeal against a decision must be lodged with:-

- a) the Minister of Water and Environmental Affairs if the decision was issued by the Director-General of the Department of Environmental Affairs (or another official) acting in his/ her capacity as the delegated Competent Authority;
- b) the MEC if the decision was issued by the Head of Department (or another official) acting in his/ her capacity as the delegated Competent Authority;
- c) the delegated organ of state where relevant.

2. An appeal lodged with:-

- a) the Minister of Water and Environmental Affairs must be submitted to the Department of Environmental Affairs by means of one of the following methods:

By facsimile: (012) 320 7561

By post: Private Bag X447, Pretoria, 0001; or

By hand: 2nd Floor, Fedsure Forum Building, North Tower, cnr. Pretorius and van der Walt Streets, Pretoria.



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- b) the MEC must be submitted to the provincial department responsible for environmental affairs;
- c) the delegated organ of state, where relevant, must be submitted to the delegated organ of state.

3. An appeal must be:-

- a) on an official form obtainable or published by the relevant department;
- b) accompanied by:
 - a statement setting out the grounds of appeal;
 - supporting documentation which is referred to in the appeal and is not available to the relevant Competent Authority;
 - a statement that the appellant has complied with regulation 62 (2) or (3) together with copies of the notices referred to in regulation 62;
 - the prescribed appeal fee, if any.

4. A copy of the official appeal form can be obtained from:

Mr PKM Relief, Appeals Administrator, Tel: 012 310 3705, pretief@deat.gov.za ; or
Mr H Grovè, Appeals Administrator, Tel: 012 310 3070, hgrove@deat.gov.za, at the Department.



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ANNEXURE II

INFORMATION WHICH SHALL BE SUBMITTED ON AN ANNUAL BASIS CONDITION 9.1

* = Indicate with an X. Please print legibly.

NAME OF SITE: _____ DATE OF REPORT: _____ (y/m/d)

1. Registered owner(s) of property on which disposal site is situated:

Name	Telephone	
Postal Address	Fax	
	Postal Code	

2. Operator in control of storage site:

Name	Telephone	
Identity number	Tel. After hours	
Educational Qualifications		
Other Relevant competencies:		

3. Indicate the type of waste and approximate quantities of waste accepted during the year:

Type of waste (Specify)	Quantity (m ³ annum ⁻¹)	Source
TOTAL		

4. Indicate the type of waste and approximate quantities of waste reused, recycled, recovered, treated, or disposed of during the year:

Type of waste	Quantity (m ³ annum ⁻¹)	reused disposed	recycled	recovered	treated	or
TOTAL						

I, the undersigned, declare that the information stated above and the risk assessment below is to my knowledge a true reflection of the status at the _____ waste storage facility.

Signature: _____

Name: _____

Capacity: _____

Place: _____ Date: _____



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447 · PRETORIA · 0001 · Fedsure Building · 315 Pretorius Street · PRETORIA
Tel (+ 27 12) 310 3911 · Fax (+ 2712) 322 2682

Ref: 12/9/11/L225/5

Enquiries: Ms K. Ntoampe

Tel. 012 310 3920 Fax: 12 310 3753 Email Address: kntoampe@deat.gov.za

Xstrata Alloys Mototolo South mine
P.O Box 403
Lydenburg
1120

Fax: 086 672 3595

Dear permit holder

Please find hereto attached a waste licence issued in terms of S.20 of the National Environmental Management: Waste Act, 2008, (Act 59 of 2008) "NEMWA".

This is to advise you that applications for authorisation of licence variation, waste delisting, emergency and or once off authorisations will be processed only if the Department of Environmental Affairs is in receipt of the latest external audit report, and any other reports required to be submitted to the department in terms of the attached licence. Please note section 54 of NEMWA for any amendments.

Yours Sincerely

Ms Joanne Yawitch
Deputy Director-General
Department of Environmental Affairs
Letter signed by Ms N Cobbinah
Designation: Chief Director: Pollution and Waste Management
Date: 29/03/16



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Ref. 12/9/11/L225/5

Enquiries: Ms. K. Ntoampe

Tel: (012) 310-3920

Fax: (012) 310-3753

Email: kntoampe@deat.gov.za

www.deat.gov.za

LICENCE NUMBER: 12/9/11/L225/5

CLASS: H:H (GENERAL AND HAZARDOUS WASTE
TEMPORARY STORAGE FACILITY)

WASTE STORAGE FACILITY: MOTOTOLO NORTH SALVAGE YARD

LOCATION: PORTION 3 OF THE FARM THORNCLIFFE 374KT,
LIMPOPO PROVINCE

LICENCE HOLDER: XSTRATA ALLOYS MOTOTOLO NORTH MINE

ADDRESS: P.O BOX 403, LYDENBURG, 1120

**LICENCE IN TERMS OF SECTION 20(b) OF THE NATIONAL ENVIRONMENTAL
MANAGEMENT: WASTE ACT, 2008 (ACT NO. 59 OF 2008)**

I, Joanne Yawitch, in my capacity as Deputy Director-General: Environmental Quality and Protection of the National Department of Environmental Affairs (hereinafter referred to as "the Department"), in terms of Section 20(b) of the National Environmental Management: Waste Act, 2008 (Act, No. 59 of 2008), hereby authorise the abovementioned licence holder to temporarily store waste at facility mentioned in condition 1.1.2 below, subject to the conditions specified herein.



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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In this Licence, "Director" means the Director: Authorisations and Waste Disposal Management of the National Department of Environmental Affairs who may be contacted at the address below:

Director: Authorisations and Waste Disposal Management
Department of Environmental Affairs
Private Bag X 447
PRETORIA
0001

In this Licence, "Director: RPW" means the Director: Resource Protection and Waste: Department of Water Affairs who may be contacted at the address below:

Director: Resource Protection and Waste
Department of Water Affairs
Private Bag X 313
PRETORIA
0001

1 SITE DETAILS

1.1 LOCATION

1.1.1 This Licence authorises the temporary storage of general and hazardous waste on Remaining extent of the farm Thomcliffe 374KT within the jurisdiction of Greater Tubatse Local Municipality, Limpopo Province (hereinafter referred to as "the Site") according to the Application for Exemption under Section 20 of the Environment Conservation Act, 1989 (Act 73 of 1989) for Xstrata Alloys Mototolo North Mine Waste Storage Facility compiled by AGES, dated July 2008 (herein referred to as "the Report"), submitted by the Licence holder.

1.1.2 The location of the site must be according to co-ordinates indicated on the Licence application form, submitted by the Licence holder which is defined as follows:

Number of corner	Latitude	Longitude
A	24° 59' 12"	30° 06' 23"
B	24° 59' 12"	30° 06' 24"
C	24° 59' 13"	30° 06' 24"
D	24° 59' 13"	30° 06' 23"

1.2 DOCUMENTS CONSIDERED

1.2.1 Permit Application Motivation Report for Xstrata Alloys Mototolo North Mine, dated July 2008;

1.2.2 Permit application form, dated 09 April 2009; and



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- 1.2.3 A Record of Decision (RoD) issued by the Department of Water Affairs, dated 23 September 2009.

LICENCE CONDITIONS

1.3 SITE SECURITY AND ACCESS CONTROL

- 1.3.1 The Licence holder must ensure effective access control on the Site to reasonably prevent unauthorised entry. Signs indicating the risks involved in unauthorised entry must be displayed at each entrance.
- 1.3.2 The Licence holder must prevent the storage of waste that is not authorised for storage at the Site as per condition 3.1 below.
- 1.3.3 Weatherproof, durable and legible notices in at least three official languages applicable in the area must be displayed at each entrance to the Site. These notices must prohibit unauthorised entry and state the hours of operation, the name, address and telephone number of the Licence holder and the person responsible for the operation of the Site.

2 MANAGEMENT

2.1 GENERAL MANAGEMENT

- 2.1.1 The activities must be managed and operated:
- (a) in accordance with an Environmental Management System (EMS), that inter alia identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents and non-conformances and those drawn to the attention of the licence holder as a result of complaints;
 - (b) in accordance with conditions of this licence and any other written instruction by the Director; and
 - (c) by sufficient persons who are competent in respect of the responsibilities to be undertaken by them in connection with the operation of the activities.
- 2.1.2 Any persons having duties that are or may be affected by the matters set out in this Licence must have convenient access to a copy of it, kept at or near the place where those duties are carried out. A copy of this licence may be published on any website deemed fit by the Department.

2.2 DESIGNATION OF WASTE MANAGEMENT CONTROL OFFICER

- 2.2.1 A Waste Management Control Officer (WMCO) must be designated, who will monitor and ensure compliance and correct implementation of all conditions and provisions as stipulated in the licence. The WMCO must:



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- (a) Report any non-compliance with any licence conditions or requirements or provisions of NEM: WA to the licensing authority through the means reasonably available.

2.2.2 The duties and responsibility of the WMCO should not be seen as exempting the licence holder from the legal obligations in terms of the NEM: WA.

2.3 EMERGENCY PREPAREDNESS PLAN

2.3.1 The Licence Holder must maintain and implement emergency preparedness plan and review it annually when conducting audit and after each emergency and or major accident. The plan must, amongst others, include:

- a) Site Fire
- b) Spillage (on route and on site)
- c) Natural disasters such as floods
- d) Industrial action
- e) Contact details of police, ambulances and any emergency centre closer to the site

3 PERMISSIBLE WASTE

3.1 Any portion of the Site which has been constructed or developed according to condition 4 of this Licence may be used for storage of batteries, pallets, scrap metal and used oil and general waste generated as part of day-to-day operations of Xstrata Alloys Mototolo North mine.

3.2 All waste types which are classified as general waste according to the latest edition of the 1998 DWAF "Minimum Requirements" series of documents (hereinafter referred to as the "Minimum Requirements series"), and which is suitable for disposal at a general landfill site.

3.3 The classification, acceptance and disposal criteria as listed in the latest edition of the document "Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste, Waste Management Series, Department of Water Affairs and Forestry or by the Department in future, (hereinafter referred to as the "Minimum Requirements Series"), must be conformed to.

4 CONSTRUCTION AND COMMISSIONING OF THE ACTIVITY

4.1 The Site construction (existing and new) must be approved by a registered professional engineer and compliant with recognised civil engineering standards and adequately lined as per condition 4.3 below to protect surface and ground water resources.

4.2 The site plan must only be changed under the supervision of a registered professional engineer and upon approval by the Director.



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- 4.3 The storage area must have a firm, impermeable, and chemical resistant floors and a roof to prevent direct sunlight and rain water from getting in contact with the waste.
- 4.4 The storage must have bunded walls with adequate capacity to contain the maximum volume that is stored in the area. The area must have adequate drainage system in line with condition 4.3 above. Uncontaminated storm water must be prevented from coming into contact with the waste and must be diverted away from the site.
- 4.5 The Licence holder must construct and maintain on a continuous basis a drainage and containment system capable of collecting and storing all runoff water arising from the site, which could be expected as a result of the of the 1 in 50 years flood over a period of 24 hours to prevent such runoff water from coming into contact with waste. The system must under the said rainfall event, maintain a freeboard of half a metre.
- 4.6 The licence holder must make provision for sanitation facilities on site in line with the Occupational Health and Safety Act, 1993 (Act 85 of 1993).

5. GENERAL OPERATION AND IMPACT MANAGEMENT

5.1 IMPACT MANAGEMENT

- 5.1.1 Waste, which is not permissible under condition 3, must be dealt with according to relevant legislation or the Department's policies and practices.
- 5.1.2 Licence Holder must prevent spillages; where they happen nonetheless, condition 2.3.1 above should be improved and the licence holder must ensure the effective and safe cleaning of such spillages.
- 5.1.3 Licence Holder must prevent nuisance conditions or health hazards, or the potential creation of nuisance conditions or health hazards.
- 5.1.4 Licence Holder must ensure that all non recyclable waste are disposed of at waste management facilities licenced to handle such wastes and all recyclable waste are collected by licenced waste management facilities for recycling, reuse or treatment.
- 5.1.5 Licence Holder must ensure that all liquid wastes, whose emissions to water or land could cause pollution is diverted to sewer only after testing water quality and receiving written approval from the relevant local authority.
- 5.1.6 Licence Holder must ensure that emissions from the activities are free from odour at levels likely to cause annoyance outside the site, as perceived by an authorised officer of the Department and interested and affected parties.
- 5.1.7 Licence Holder must ensure that all personnel who work with hazardous waste are trained to deal with these potential hazardous situations so as to minimise the risk involved. Records of training and verification of competence must be kept by the licence holder.



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5.1.8 In order to prevent nuisance conditions the Licence holder must ensure that all storage skips and bins are not overfilled.

5.2 OPERATION

5.2.1 Licence Holder must make sure that all the hazardous waste are stored in sealed containers or drums stored under roofed and well ventilated areas prior to disposal.

5.2.2 Licence Holder must ensure that the storage area is surrounded by an interception trench with a sump or outlet valve for intercepting and recovering potential spills.

5.2.3 All solid waste must be stored in sealed steel drums; liquid wastes must be stored in leak resistant liquid waste storage containers and must be inspected daily for leaks.

5.2.4 The Licence Holder must ensure that the integrity of the waterproof base and bund walls are routinely monitored and corrective measures are taken before containment integrity is breached.

5.2.5 Wastewater resulting from the cleaning of floors and machinery and storm-water from the site must only be discharged into the natural environment after testing that it conforms to this Department's requirements and discharge into sewer must also be after testing and obtaining written authorisation from the relevant local authority.

5.2.6 Dry hazardous waste, oily sludge and other hazardous waste streams must be stored in appropriate containers and collected by licensed waste recycling or treatment company for further treatment or be disposed of at a licensed H:H waste disposal facility or alternatively if the waste de-list on a licensed G:L:B+ waste disposal site.

5.2.7 Licence holder must ensure the health and safety of workers and employees on site, in terms of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

5.2.8 Sixteen point Material Safety Data Sheets (MSDSs) must be available on site for all chemicals and hazardous substances stored or used on-site.

6 MONITORING

6.1 MONITORING METHODS AND PARAMETERS

6.1.1 The Licence holder must carry out all tests required in terms of this Licence in accordance with methods prescribed by and obtainable from the South African Bureau of Standards (SABS), referred to in the Standards Act, 2008 (Act 08 of 2008).



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6.1.2 The Licence Holder may only use another method of analysis if written proof is submitted to this Department specifying that the method to be used is at least equivalent to the SABS method.

6.1.3 The licence holder must put in place a monitoring and measurement plan that must amongst others include storm water quality monitoring.

6.2 WATER MONITORING

6.2.1 Surface water monitoring must be performed within the rain in all storm water drains outlets that discharge into the natural environment based on the relevant parameters provided in the most current water quality guidelines published by the Department of Water Affairs.

6.2.2 Monitoring for treated effluent including contaminated runoff water, which is discharged into sewer must be conducted at the point where it exits the treatment facility and/or enters sewer network based on parameters provided by the relevant local authority.

6.3 INVESTIGATIVE MONITORING

6.3.1 If in the opinion of the Director and Director: RPW, a water quality variable at any monitoring point referred to in condition 6.2 above, shows an increasing trend, the licence holder shall report in terms of condition 10 below.

7 INVESTIGATIONS

7.1 If, in the opinion of the Director, environmental pollution, nuisances or health risks may be or is occurring on the Site, the Licence Holder must initiate an investigation into the cause of the problem or suspected problem.

7.2 If, in the opinion of the Director and/or Director: RPW, water pollution may be or is occurring the licence holder must initiate an investigation into the cause of the problem or suspected problem. Such investigation must include the monitoring of the water quality variables, at those monitoring points and such frequency as may be specified by Chief Director: RPW.

7.3 Investigations carried out in terms of conditions 7.1 and 7.2 above must include the monitoring of the relevant environmental pollution, nuisance and health risk variables, at those monitoring points and such frequency to be determined in consultation with the Director.

7.4 Should the investigation carried out as per conditions 7.1 and 7.2 above reveal any unacceptable levels of pollution, the Licence Holder must submit mitigation measures to the satisfaction of the Director.



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8 AUDITING

8.1 INTERNAL AUDITS

8.1.1. Internal audits must be conducted quarterly by the licence holder and on each audit occasion an official report must be compiled by the relevant auditor to report the findings of the audits, which must be made available to the external auditor specified in condition 8.2.1.

8.2 EXTERNAL AUDITS

8.2.1 The Licence holder must appoint an independent external auditor to audit the site biennially and this auditor must compile an audit report documenting the findings of the audit, which must be submitted by the Licence holder according to condition 10.9, below.

8.2.2 The audit report must:

- a) specifically state whether conditions of this licence are adhered to.
- b) include an interpretation of all available data and test results regarding the operation of the site and all its impacts on the environment.
- c) Specify target dates for the implementation of the recommendations by the Licence holder to achieve compliance.
- d) contain recommendations regarding non-compliance or potential non-compliance and must specify target dates for the implementation of the recommendations by the licence holder and whether corrective action taken for the previous audit non conformities was adequate.
- e) show monitoring results graphically and conduct trend analysis

8.3 DEPARTMENTAL AUDITS AND INSPECTIONS

8.3.1 The Department reserves the right to audit and/or inspect the Site without prior notification at any time and frequency as may be determined by the Director.

8.3.2 The Licence holder must make any records or documentation available to the Director upon request, as well as any other information he/she may require.

8.3.3 The findings of these audits or inspections must be made available to the Licence holder within 30 days of the end of the audit or inspection. Information from the audits must be treated in accordance with the Promotion of Access to Information Act, 2000 (Act 2 of 2000).

9 RECORDING

9.1 The Licence holder must keep records and update all the information referred to in Annexure II and submit this information to the Director and the Director: RPW on an annual basis.



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- 9.2 All records required or resulting from activities required by this Licence must:
- a) be legible;
 - b) be made as soon as reasonably practicable and should form part of the external audit report;
 - c) if amended, be amended in such a way that the original and any subsequent amendments remain legible and are easily retrievable; and
 - d) be retained in accordance with a documented procedures which is approved by the Department.
- 9.3 Records demonstrating compliance with condition 2.1.1 must be maintained.

10 REPORTING

- 10.1 The Licence holder must, within 24 hours notify the Director of the occurrence or detection of any incident on the Site, or incidental to the operation of the site, which has the potential to cause, or has caused pollution of the environment, health risks, nuisance conditions or water pollution.
- 10.2 The Licence holder must, within 14 days, or a shorter period of time, if specified by the Director from the occurrence or detection of any incident referred to in condition 10.1, submit an action plan, which must include a detailed time schedule, and resource allocation signed off by top management, to the satisfaction of the Director and/or the Director: RPW of measures taken to –
- a) correct the impact resulting from the incident;
 - b) prevent the incident from causing any further impact; and
 - c) prevent a recurrence of a similar incident.
- 10.3 In the event that measures have not been implemented within 21 days of the incident to address impacts caused by the incident referred to in condition 10.1, or measures which have been implemented are inadequate, the Director may implement the necessary measures at the cost and risk of the Licence holder.
- 10.4 The Licence holder must keep an incident report and complaints register, which must be attached available to the external auditor, Departmental and DWA Auditors for the purpose of audit.
- 10.5 The Department must be notified without delay in the case of the following:
- a) any malfunction, breakdown or failure of equipment or techniques, accident or fugitive emission which has caused , is causing or may cause significant pollution;
 - b) the breach of this Licence ; and
 - c) any significant adverse environmental and health effects.



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- 10.6 Prior written notification must be given to the Director of the following events and in the specified timescales.
- a) as soon as practicable prior to the permanent cessation of any operational activities
 - b) full or partial cessation of the operational activities for a period likely to exceed 3 months
 - c) full or partial resumption of the operation of all or part of the activities after a cessation notified under (b) above
- 10.7 The Department must be notified within 7 days of any changes to the management of the site including the name of the incoming person together with evidence that such person has the required technical competence.
- 10.8 The Department must be notified within 14 days of the following changes:
- a) Licence holder's trading name, registered name or registered office address;
 - b) Particulars of the Licence holder's ultimate holding company (including details of an ultimate holding where a Licence holder has become a subsidiary; and
 - c) steps taken with a view to the Licence holder, or any one of them, going into bankruptcy, entering into composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.
- 10.9 Each external audit report referred to in condition 8.2 must be submitted to the Director within 30 days from the date on which the external auditor finalised the audit.

11 REHABILITATION AND CLOSURE OF THE SITE

- 11.1 The licence holder must rehabilitate the site or any portion thereof, in accordance with a closure report and rehabilitation plan, which must be submitted to the Director for approval at least one year prior to the intended closure of the Site, or any portion thereof.
- 11.2 The Licence holder will remain responsible for the Site, and/or any of its impacts on the environment, after operations on the site have ceased.

12 LEASING AND ALIENATION OF THE SITE

- 12.1 Should the Licence holder want to alienate or lease the site, he/she shall notify the Director in writing of such an intention at least 120 days prior to the said transaction. Should the approval be granted, the subsequent licence holder shall remain liable to compliance with all licence conditions.



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13 TRANSFER OF WASTE MANAGEMENT LICENCE

13.1 Should the licence holder want to transfer holder-ship of this, he/she must apply in terms of Section 52 of the National Environmental Management: Waste Act, 2008 (Act No 59 of 2008).

13.2 Any subsequent licence holder shall be bound by conditions of this licence

14. GENERAL

14.1 The construction of the licensed activity may not commence within thirty (30) days of the date of signature of this licence.

14.2 Should you be notified by the Minister of a suspension of the licence pending any appeals decision, you may not commence with the activities licensed by the Minister in writing.

14.3 After an appeal period has expired and no good cause to extend the appeal period has been submitted, the activity may commence provided a notice has been submitted to the Department. The notice must include a date on which it is anticipated that the activity will commence.

14.4 The activity must commence within a period of two (2) years from the date of issue. If commencement of the activity does not occur within that period, the licence lapses and a new application for a licence must be made in order for the activity to be undertaken.

14.5 If the Licence Holder anticipates that commencement of the activity would not occur within two (2) year period, he / she **must** apply and **show good cause** for an extension of the license six (6) months prior to its expiry date.

14.6 This licence shall not be transferable unless such transfer is subject to condition 13.1

14.7 This licence shall not be construed as exempting the licence holder from compliance with the provisions of the National and Provincial Legislation and any relevant Ordinance, Regulation, By-laws and relevant National Standards and norms.

14.8 Transgression of any condition of this licence could result in the validity of the licence being terminated by the Department.

14.9 Non-compliance with a condition of this license may result in criminal prosecution or other actions provided for in Section 67(1) of the National Environmental Management: Waste Act, 2008.



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- 14.10 Any committees appointed in terms of the application or any other public authority or organization shall not be held responsible for any damages or losses suffered by the Licence Holder or his/her successor in title in any instance where construction or operation are to be temporarily or permanently stopped for reasons of non-compliance
- 14.11 In terms of section 28 and 30 of the National Environmental Management Act No. 107 of 1998, and section 19 and 20 of the National Water Act No. 36 of 1998, any costs incurred to remedy environmental damage must be borne by the person responsible for the damage. It is therefore imperative that the Licence Holder reads through and understand the legislative requirements pertaining to the project. It is the Applicant's responsibility to take reasonable measures which include informing and educating contractors and employees about environmental risks of their work and training them to operate in an environmental acceptable manner.
- 14.12 This licence is valid for a period of twenty (20) years and the licence holder must initiate a licence review process 10 years from the date of issue. Based on the results of the review, compliance to licence conditions or recommendations from audit reports and or changing legislation, the licence could be amended or withdrawn or validity thereof extended.

15 APPEAL OF LICENCE

- 15.1 The licence holder must notify every registered interested and affected party, in writing and within five (5) days, of receiving the Department's decision.
- 15.2 The notification referred to in 15.1. must –
- 15.2.1 Specify the date on which the licence was issued;
- 15.2.2 Inform the registered interested and affected party of the appeal procedure provided for in Chapter 7 of the GN No. R 385 of 21 April 2006 in terms of National Environmental Management Act, 1998, as amended (see Annexure 1).
- 15.2.3 Advise the interested and affected party that a copy of a licence and reasons for the decision will be furnished on request.
- 15.2.4 An appeal against the decision must be lodged in terms of chapter 7 of the GN No. R 385 of 21 April 2006 in terms of NEMA 1998, as amended, from the date of this license, with: The Minister, Department of Environmental Affairs, Private Bag X 447, PRETORIA, 0001, Tel No.: (012) 310 3705, Fax No.: (012) 320 7561


Ms Joanne Yawitch
DEPUTY DIRECTOR-GENERAL
DATE: 23/03/2010



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ANNEXURE I

APPEALS PROCEDURE IN TERMS OF CHAPTER 7 OF R. 385 OF 2006 TO BE FOLLOWED BY THE APPLICANT AND INTERESTED AND AFFECTED PARTIES UPON RECEIPT OF NOTIFICATION OF A WASTE MANAGEMENT LICENCE

APPLICANT	INTERESTED AND AFFECTED PARTIES (IAPs)
1. Receive a notification of a Waste Management Licence from the relevant Competent Authority	1. Receive a notification of a Waste Management Licence from Applicant/Consultant
2. Within 10 days of receipt of notification, notify the relevant Competent Authority and all IAPs of intention to appeal	2. Within 10 days of receipt of notification, notify the relevant Competent Authority of intention to appeal
3. Notification served by the Applicant must include: 3.1. A copy of the notice of intention to appeal; and 3.2. A notice indicating where and for what period the appeal submission will be available for inspection by all IAPs	3. Appellant must serve on the Applicant 3.1. A copy of the notice of intention to appeal 3.2. A notice indicating where and for what period the appeal submission will be available for inspection by the applicant
4. The appeal must be submitted to the relevant Competent Authority or delegated organ of State within 30 days of lodging of the notice of intention to appeal	4. The appeal must be submitted to the relevant Competent Authority or delegated organ of State within 30 days of lodging of the notice of intention to appeal
5. A person or organ of state that receives notice of an appeal may submit a responding statement to the relevant Competent Authority or delegated organ of state within 30 days from the date that the appeal submission was made available for inspection by the appellant	5. An Applicant that receives notice of an appeal may submit a responding statement to the relevant Competent Authority or delegated organ of State within 30 days from the date the appeal submission was made available for inspection by the appellant

NOTES:

1. An appeal against a decision must be lodged with:-

- a) the Minister of Water and Environmental Affairs if the decision was issued by the Director- General of the Department of Environmental Affairs (or another official) acting in his/ her capacity as the delegated Competent Authority;
- b) the MEC if the decision was issued by the Head of Department (or another official) acting in his/ her capacity as the delegated Competent Authority;
- c) the delegated organ of state where relevant.

2. An appeal lodged with:-



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- a) the Minister of Water and Environmental Affairs must be submitted to the Department of Environmental Affairs by means of one of the following methods:

By facsimile: (012) 320 7561

By post: Private Bag X447, Pretoria, 0001; or

By hand: 2nd Floor, Fedsure Forum Building, North Tower, cnr. Pretorius and van der Walt Streets, Pretoria.

- b) the MEC must be submitted to the provincial department responsible for environmental affairs;
- c) the delegated organ of state, where relevant, must be submitted to the delegated organ of state.

3. An appeal must be:-

- a) on an official form obtainable or published by the relevant department;
- b) accompanied by:
- a statement setting out the grounds of appeal;
 - supporting documentation which is referred to in the appeal and is not available to the relevant Competent Authority;
 - a statement that the appellant has complied with regulation 62 (2) or (3) together with copies of the notices referred to in regulation 62;
 - the prescribed appeal fee, if any.

4. A copy of the official appeal form can be obtained from:

Mr PKM Retief, Appeals Administrator, Tel: 012 310 3705, pretief@deat.gov.za ; or
Mr H Grové, Appeals Administrator, Tel: 012 310 3070, hgrove@deat.gov.za, at the Department.



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ANNEXURE II

INFORMATION WHICH SHALL BE SUBMITTED ON AN ANNUAL BASIS CONDITION 9.1

NAME OF SITE: _____	DATE OF REPORT: _____ (y/m/d)
---------------------	-------------------------------

1. Registered owner(s) of property on which disposal site is situated:

Name	Telephone	
Postal Address	Fax	
	Postal Code	

2. Operator in control of storage site:

Name	Telephone	
Identity number	Tel. After hours	
Educational Qualifications		
Other Relevant competencies:		

3. Indicate the type of waste and approximate quantities of waste stored during the year:

Type of waste (Specify)	Quantity (m ³ annum ⁻¹)	Source
TOTAL		

4. Indicate the type of waste and approximate quantities of waste reused, recycled, recovered, treated, or disposed of during the year:

Type of waste	Quantity (m ³ annum ⁻¹)	reused	recycled	recovered	treated	or disposed
TOTAL						

I, the undersigned, declare that the information stated above and the risk assessment below is to my knowledge a true reflection of the status at the _____ waste storage facility.

Signature: _____

Name: _____

Capacity: _____

Place: _____

Date _____

Appendix 5: I&AP Database

554304_Der Brochen-Mototolo Mine EMPr Consolidation Interested and Affected Parties Database

Mr/Ms	First Name	Last Name	Company	Stakeholder Category
	Whitey	Masilela	Protea Farms	Adjacent community
Mr	Mpho	Matensi	Shaga Community	Adjacent community
Mr	Mokone	Maphopha	Ga Maphopha Community	Adjacent community
Mr	M	Mohlala	Bakoni ba Mashishi community Forum- Shaga Community	Adjacent community
	Kagiso	Mosotho	Skaapkraal	Adjacent community
Mr	Jimmy	Mahlela	Protea Farms	Adjacent community
Mr	Japhtha	Makidla	Shaga Community	Adjacent community
Ms	Brenda	Makuwa	Draaikraal CPA - Setageng Trust	Adjacent community
	Wendy	Unknown		Adjacent Land owner/occupier
Mr	Tebogo	Leshaba	Moletsi Community	Adjacent Land owner/occupier
Mr	Sonnyboy	Mankge	Moletsi Community	Adjacent Land owner/occupier
Mr	Silas	Phetla	Moletsi Community	Adjacent Land owner/occupier
Mr	Senyeki Judas	Mankge	Booysendal Claimant	Adjacent Land owner/occupier
Ms	Sarah	Leshaba	Moletsi Community	Adjacent Land owner/occupier
Ms	Ronelle	Frylinck	Welgevonden Farm	Adjacent Land owner/occupier
Mr	Reverend	Mamonyane	Booysendal 43Jt	Adjacent Land owner/occupier
Mr	Paul	Nicholson	Sheeprun Boedery Edms Epk	Adjacent Land owner/occupier
Mr	Paul	Grobler		Adjacent Land owner/occupier
Ms	Marisa	Grobler		Adjacent Land owner/occupier
	M	Prinsloo		Adjacent Land owner/occupier
Mr	Jim	Masotho	Protea Farms	Adjacent Land owner/occupier
Mr	Jannes	Van Rooyen		Adjacent Land owner/occupier
Mr	Gert	Viljoen		Adjacent Land owner/occupier
	Gawie/Susan			Adjacent Land owner/occupier
	E	Hiemstra		Adjacent Land owner/occupier
Mr	Dirk	Grobler		Adjacent Land owner/occupier
Ms	Dikeledi	Mankge	Protea Farms- Skaapkraal 42 JT	Adjacent Land owner/occupier
Mr	Carel	Frylinck	Owners of Welgevonden Farm	Adjacent Land owner/occupier
Ms	Audrey	le Grange	ECSAL / WJ Steenkamp Trust	Adjacent Land owner/occupier
	Ankia/Hano	van der Merwe		Adjacent Land owner/occupier
Ms	Alma	Grobler		Adjacent Land owner/occupier
Mr	Steven	Vermaak	TAU-SA	Agriculture
Mr	Robert	Davel	Agri-SA (Mpumalanga)	Agriculture
Mr	Ludewyk	De Jager	Lydenburg Agricultural Union	Agriculture
	Drikus	Botha	TAU-SA	Agriculture
			Steenkamps Berge Farmers' Union and De Kafferskraal Portion 7	
Mr	David	Jacobs		Agriculture
Mr	Bennie	Van Zyl	Transvaal Agricultural Union Sa	Agriculture
Mr	Andre	Venter	LWGV and AfriLimpopo	Agriculture
			National African Federation Chamber Of Commerce And Industry (Nafcoc)	
Mr	Tim	Marobane		Business & Commerce
Mr	Maseme	Masha	Steelpoort Business Forum	Business & Commerce
Mr	Jandr�	Stander	Phoenix Security	Business & Commerce
			National African Federation Chamber Of Commerce And Industry (Nafcoc)	
Mr	Isaac	Masekwameng		Business & Commerce
			National African Federation Chamber of Commerce and Industry (NAFCOC)	
Mr	Gilbert	Nosena		Business & Commerce
Ms	Linky	Smith	Rossenekal	Commercial farmer
Mr	Brian	Nicholson	Farmer	Commercial farmer
Mr	Ben	Grobler	Sheeprun Rossenekal	Commercial farmer
Mr	Tms	Molapo	Ngwaabe Tubatse Community Forum	Community forum
Mr	Tlake	Sepudumo	Tubatse Steelpoort Foundation	Community forum
Mr	TJ	Moganeshi	Ngwaabe Tubatse Community Forum	Community forum
Mr	Sphiwe	Mahlangu	Draaikraal CPA- Setageng Community Forum	Community forum
Mr	Philips	Mankgane	SCA	Community forum
Mr	Philip	Phetla	Cpa Chairperson (Bbpcpa)	Community forum
Mr	Mamsy	Mdhluli	Community Forum	Community forum
Mr	Khakha	Chidi	Mapodile Development Forum	Community forum
Mr	Hellen	Mmusgi	Community Forum	Community forum
Mr	Gosebo	Ratau	Baroka Ba Ratau	Community forum
Ms	Dimakatso	Tshehla	Tubatse Steelpoort Foundation	Community forum
			Institute Of Conservation And Natural History Of Soutpansberg (Icons)	
Mr	Norbet	Hahn		Conservation
Mr	Mark	Botha	Conserbation Strategy, Tactics & insight	Conservation
Mr	Johan	Eksteen	Mpumalanga Tourism And Parks Agency (Mtpa)	Conservation
Mr	Hannes	Botha	Mpumalanga Tourism and Parks Authority	Conservation

Mr	Andre	Hoffman	Mpumalanga Parks Board	Conservation
Ms	Mahlatse	Kekana	Sekhukhune District Municipality	District Municipality
Mr	Mahlabana	Kgoloko	Sekhukhune District Municipality	District Municipality
Ms	Enica	Mabena	Sekhukhune District Municipality	District Municipality
Mr	Bongane	Molefe	Sekhukhune District Municipality	District Municipality
Ms	Peggy	Ngutshane	Kiwi Primary School	Education
	Captain	Matlala	Lydenburg SAPS	Emergency Services
Mr	Captain	Chuene	South African Police Service (SAPS)	Emergency Services
Mr	SM	Mathunyane	Greater Tubatse Local Municipality	Local Authority
Ms	RM	Magooa	Fetakgomo - Tubatse Local Municipality	Local Authority
Mr	Tshepo	Mahlakoane	Pakaneng Choma Community	Local Community
Mr	Troxel	Mashilangoako	Gamawela Mankge Community (Gmc)	Local Community
Mr	Tmw	Magolego	Dithamaga Communal Association	Local Community
Mr	Tjilenyane	Komane	Greater Tubatse Local Municipality Ward 29	Local Community
			Gamawela Mankge Communal Property Association	
Ms	Tiny	Mankge	(GMCPA)	Local Community
Mr	Steve	Mmako	Pakaneng Choma Community Trust	Local Community
Mr	Steve	Mashilangwako	Ma Seven Kutullo Community	Local Community
Mr	Simon	Lelengoa	Gamawela Mankge Community (Gmc)	Local Community
Mrs	Selinah	Magane	Gamawela Mankge Community (Gmc)	Local Community
Ms	Sarah	Tshehla	Ma Seven Kutullo Community	Local Community
			Gamawela Mankge Communal Property Association	
Mrs	Sarah	Moshilangoako	(Gmcpa)	Local Community
Ms	Sarah	Mashilanoke	Ma Seven Kutullo Community	Local Community
Mr	Sam	Choma	Pakaneng Choma Community Trust	Local Community
Ms	Sabinah	Mohlahlo		Local Community
Mr	Rn	Mmadi	Moletsi Dwars River	Local Community
Mr	Richard	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Mr	Pity	Mothupi	Mawela Community Council	Local Community
Mr	Phillip	Choma	Pakaneng Choma Community	Local Community
Mr	Phillimon	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Mr	Philliemon	Maimela	Bakone Tau Phuthi Communal Property Association	Local Community
Mr	Petrus	Mashilangoako	Gamawela Mankge Community (Gmc)	Local Community
Mr	Petrus	Mankge	Mareesburg Community	Local Community
Mr	Petrus	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Ms	Ngwatshipane Eneria	Makua	Pakaneng	Local Community
			Gamawela Mankge Communal Property Association	
Mr	NG	Letageng	(Gmcpa)	Local Community
Mr	Mosotho	Letsele	Gamawela Mankge Community (Gmc)	Local Community
Mr	Moncheng	Magane	Gamawela Cpa Committee	Local Community
Ms	Mona	Marungoana	Pakaneng Choma	Local Community
Mr	Molebaleng	Tsabadi	Tswako Maepa Community	Local Community
Ms	Mokgome Shirley	Mokolane		Local Community
Mr	Mmanonyane	Tema		Local Community
Mr	Mi	Machipa	Moletsi Community	Local Community
Mr	Mdu	Magane	Gamawela Mankge Community (Gmc)	Local Community
Ms	Maria	Leshaba	Ma Seven Kutullo Community	Local Community
Mr	Maphage	Nkgadime	Pakaneng Choma Community	Local Community
Mr	Makgoke Phillimon	Mmadi	Pakaneng Choma	Local Community
Mr	Madimabe	Moenyane	Pakaneng Choma Community Trust	Local Community
Ms	Mabotswane Jeanet	Matlala	Pakaneng	Local Community
Mr	Lucas	Tshehla	Gamawela Mankge Community (Gmc)	Local Community
Mr	Lucas	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Ms	Lerato	Ratau	Ga-Ratau Community	Local Community
Mr	Lazarus	Mabilu	Greater Tubatse Local Municipality Ward 31	Local Community
Ms	Kukie	Mankge	Moletsi Community	Local Community
Mr	Koos	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Mr	Joseph	Makwana	Pakaneng Choma	Local Community
Mr	Joseph	Machipa	Ga-Phasha Community	Local Community
Mr	Joseph	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Mr	Joseph	Dlamini	Pakaneng Choma Community	Local Community
Mr	Jolly	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Mr	Johannes	Mashilangwako	Ma Seven Kutullo Community	Local Community
Mr	Johannes	Leshaba	Gamawela Mankge Community (GMC)	Local Community
Ms	Johanna	Mogashoa	Ma Seven Kutullo Community	Local Community
Mr	Jerry	Rashiho	Pakaneng Choma Community	Local Community
Mr	Jacobus	Magane	Gamawela Community	Local Community
Mr	Jacobus	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Mr	Jacob Koketso	Lekgwathi	Choma Pakaneng	Local Community

Mr	Isaac	Machipa	Moletsi Community	Local Community
Mr	Isaac	Leshaba	Moletsi Community	Local Community
Mr	Gabriel	Choma	Pakaneng Choma Community	Local Community
Mr	Finkie	Malaka	Pakaneng Choma Community	Local Community
Ms	Eva	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Ms	Ephenia	Monate	Pakaneng Choma Community	Local Community
Mr	Elias	Mankge	Gamawela Mankge Community (Gmc)	Local Community
Mr	Edwards Luthe	Mabona	Pakaneng Choma Community	Local Community
Mr	Dennies	Mogashoa	Gamawela Mankge Community (Gmc)	Local Community
Mr	David	Malata	Mawela Community	Local Community
Mr	Class	Leshaba	Gamawela Mankge Community (Gmc)	Local Community
Ms	Clarah	Mahlakoane	Pakaneng Choma Community	Local Community
Mr	Brian	Tsiane	Pakaneng Choma Community	Local Community
Mr	Armstrong	Tshehla	Gamawela Mankge Community (Gmc)	Local Community
Mr	April	Magane	Gamawela Mankge Community (Gmc)	Local Community
Mr	Andries	Leshaba	Gamawela Mankge Community (GMC)	Local Community
Mr	Andries	Lelengwa	Moletsi Community	Local Community
Ms	Alice	Matjomane	Ga Rantho Community	Local Community
Mr	Victor	Lekwadu	Greater Tubatse Local Municipality	Local Municipality
Mr	Themba	Gogwane	Ehlanzeni District Municipality	Local Municipality
	Tebogo	Mathebula	Thaba Chweu Local Municipality	Local Municipality
Mr	Sf	Mkhabela	Greater Tubatse Local Municipality	Local Municipality
Mr	Serotho	Serothwana	Greater Tubatse Local Municipality	Local Municipality
Mr	Nicholas	Janse Van Rensburg	Thaba Chweu Municipality	Local Municipality
Councillor	NC	Mathebe	Sekhukhune District Municipality	Local Municipality
Mr	Mxolisi	Sibanyoni	Thaba Chweu Local Municipality	Local Municipality
Mr	Mrg	Nkosi	Thaba Chweu Local Municipality	Local Municipality
Mr	Molelekwa	Makine	Greater Tubatse Local Municipality Ward 2	Local Municipality
Ms	Mamsie	Mahlangu	Thaba Chweu Local Municipality - Ward 5	Local Municipality
Mr	Ma	Monyepao	Greater Tubatse Local Municipality	Local Municipality
Mr	M	Lingwati	Greater Tubatse Local Municipality	Local Municipality
Ms	Khukhunana	Magapa	Greater Tubatse Local Municipality Ward 27	Local Municipality
Ms	Kholofelo	Mahlangu	Thaba Chweu Local Municipality	Local Municipality
Councillor	Jl	Kgwedi	Greater Tubatse Local Municipality	Local Municipality
Ms	Jane	Malepe	Thaba Chweu Local Municipality	Local Municipality
Mr	Jacob	Phala	Thaba Chweu Local Municipality	Local Municipality
Ms	Dk	Boshigo	Greater Tubatse Local Municipality	Local Municipality
Mr	Choris	Phokwane	Fetakgomo - Tubatse Local Municipality	Local Municipality
Mr	Buti	Hlatswayo	Greater Tubatse Local Municipality Ward 6	Local Municipality
Mr	Brig	Ledwaba	Greater Tubatse Local Municipality	Local Municipality
Mr	Allen	Magane	Greater Tubatse Local Municipality	Local Municipality
Mr	Xhanti	Mfazwe	Mototolo Joint Venture Concentrator	Mining and Industry
Mr	William	Masha	Northam Platinum Limited Booyesendal	Mining and Industry
Mr	Vik	Cogho	Optimum Colliery	Mining and Industry
Mr	V	Makuni	Glencore Eastern Chrome Mines	Mining and Industry
Ms	Tendani	Mukona	Samrec	Mining and Industry
Mr	Takalani	Telekisa	Tubatse Chrome Mine	Mining and Industry
Mr	T	Hunter	Xstrata	Mining and Industry
Mr	Sunnyboy	Chiloane	Mototolo Joint Venture Concentrator	Mining and Industry
Mr	Shane	Laubscher	Samancor Chrome Limited	Mining and Industry
Mr	Shal Re	Shai	Eastern Platinum Mine	Mining and Industry
Ms	Sanet	Booyesen	Samancor Chrome Limited	Mining and Industry
Mr	S	Steenkamp	Dwarsrivier Mine	Mining and Industry
Mr	S	Mudau	Chamber Of Mines	Mining and Industry
Ms	S	Baxter	Modikwa Platinum Mine	Mining and Industry
Mr	Puis	Monyela	Dwarsrivier	Mining and Industry
Mr	Pieter	Schoeman	Dwarsrivier Chrome Mine	Mining and Industry
Mr	P	Otto	Twickenham Platinum Mine	Mining and Industry
Mr	N	Makhihlisa	Mapoch Mine	Mining and Industry
Mr	Moses	Sithole	Sbbf On Point	Mining and Industry
Ms	Marelize	Voster	Glencore Eastern Chrome Mines	Mining and Industry
Ms	Maggie	Von Ronge	Northam Platinum Limited Booyesendal	Mining and Industry
Mr	Macmillan	Motimele	Samancor Chrome Limited	Mining and Industry
Mr	M	Luphoko	Marula Platinum Mine	Mining and Industry
Mr	M	Kasselman	Asa Metals - Dilokong Chrome Mine	Mining and Industry
Mr	M	Humbelani	Dwarsrivier	Mining and Industry
Ms	M	Dorey	Glencore Eastern Chrome Mines	Mining and Industry
Ms	Lydia	Mphumela	Samancor Chrome Limited	Mining and Industry
Ms	Lucia	Masuku	Implats	Mining and Industry

Mr	Louis	Van Der Walt	Kuka Mining Logistics Pty Ltd	Mining and Industry
Ms	Leeann	Ryan	Glencore Eastern Chrome Mines	Mining and Industry
Mr	L	Tungwane	Xstrata	Mining and Industry
Ms	L	Terblanche	Glencore Eastern Chrome Mines	Mining and Industry
Ms	L	Schutte	Bokoni Platinum Mines	Mining and Industry
Ms	L	Manthata	Marula Platinum Mine	Mining and Industry
Ms	L	Makua	Glencore Eastern Chrome Mines	Mining and Industry
Mr	L	Grobler	Lonmin Platinum Mines	Mining and Industry
Mr	Kenedy	Owuor	Xstrata Lion Ferrochrome	Mining and Industry
Mr	K	Sengani	Glencore Eastern Chrome Mines	Mining and Industry
Mr	K	Horn	Eastern Chrome Mines (Samancor)	Mining and Industry
Mr	Johannes	Senyane	Twickenham Platinum Mine	Mining and Industry
Mr	Japie	van der Berg	Glencore Eastern Chrome Mines	Mining and Industry
Mr	Jakes	Jacobs	Two Rivers Platinum Mine	Mining and Industry
Mr	Jacques	Van Niekerk	Samancor Chrome Limited	Mining and Industry
Mr	Jabulani	Maluleke	Implats	Mining and Industry
Mr	J	Combrink	Glencore Eastern Chrome Mines	Mining and Industry
Ms	Inge	Du Toit	Lion Smelter	Mining and Industry
Mr	I	Ryan	Xstrata	Mining and Industry
Ms	Heather	Booyesen	Samancor Chrome Limited	Mining and Industry
Mr	H	Ramokgadi	Asa Metals - Dilokong Chrome Mine	Mining and Industry
Mr	Graham	Munro	Booyesendal Mine	Mining and Industry
Mr	G	Van Niekerk	Modikwa Platinum Mine	Mining and Industry
Mr	G	Opperman	Eastern Chrome Mines (Samancor)	Mining and Industry
Mr	F	Van Heerden	Two Rivers Platinum	Mining and Industry
Mr	F	Reinecke	Marula Platinum Mine	Mining and Industry
Mr	Eric	Thabo	Samancor Chrome Limited	Mining and Industry
Mr	Dumetse	Masha	Sbbf On Point	Mining and Industry
Mr	Dj	Stander	Bokoni Platinum Mines	Mining and Industry
Mr	Dirk	Hatting	Northam Platinum Limited Booyesendal	Mining and Industry
Mr	D	Sammons	Glencore Eastern Chrome Mines	Mining and Industry
Mr	C	Mouton	Glencore Eastern Chrome Mines	Mining and Industry
Mr	B	Olivier	Eastern Chrome Mines (Samancor)	Mining and Industry
Mr	B	Brink	Eastern Chrome Mines (Samancor)	Mining and Industry
Mr	An	Jones	Northam Platinum Limited Booyesendal	Mining and Industry
Mrs	Aili	Zeeman	Samancor	Mining and Industry
Ms	A	Van Der Merwe	Northam Platinum Limited Booyesendal	Mining and Industry
Ms	A	Strauss	Modikwa Platinum Mine	Mining and Industry
Mr	A	Mbule	Smokey Hills Mine	Mining and Industry
Ms	Thoko	Buthlezi	Department of Agriculture, Forestry and Fisheries	National Authority
Mr.	Thizwikoniq	Ramavhona	Department of Environmental Affairs (DEA)	National Authority
	T	Nyathi	Sanbi	National Authority
Mr	Samuel	Mathavhela	Dept Od Mineral Resources	National Authority
Ms	Nyiko	Nkosi	Department of Environmental Affairs (DEA)	National Authority
Ms	Nokukhanya	Khumalo	SAHRA	National Authority
Mr	Mathodi	Mphaka	South African National Biodiversity Institute	National Authority
Mr	Lucas	Mahlangu	Department of Agriculture and Environmental Affairs	National Authority
Ms	Lt	Kobe	Department Of Water And Sanitation (Dws)	National Authority
Ms	Itumeleng	Masiteng	South African Heritage Resources Agency (Sahra)	National Authority
Mr	Yolan	Friedmann	Endangered Wildlife Trust (EWT)	NGO
Mr	Willem	Hazenwindus	WESSA North Chairperson	NGO
Mr	Victor	Mavhidula	South African Human Rights Commission	NGO
	Robin	Peterson	SANParks	NGO
Mr	Pieter	Van Niekerk	Ecological Recovery (Pty) Ltd	NGO
Mr	Patrick	Maatsie	Limpopo Economic Development Agency	NGO
Ms	Melissa	Fourie	Centre of Environmental Rights (CER)	NGO
Ms	Mariette	Liefferink	Federation for Sustainable Environment (FSE)	NGO
Dr	Koos	Pretorius	Escarpment Environment Protection Group / SEF	NGO
Dr	Hannelie	Smit-Robinson	Birdlife-SA	NGO
Mr	Dominique	Doyle	Earthlife Africa	NGO
Mr	Dan	Mahlangu	MPTA: Verlorenvalei: Protected Areas Management	NGO
Mr	Christopher	Rutledge	Actionaid South Africa	NGO
Ms	Carol	Ngwenyama	South African Human Rights Commission (Mpumalanga)	NGO
Ms	Carel	Schmal	Lepelle Water Board	NGO
	BK	Reilly	Buttonshope Trust	NGO
Mr	William	Ledimo		Other
Mr	P	Mosehla	Ga-Masha	Other
Mr	Nw	Masha	Kusile	Other

Mr	Motsepe	Matlala	National African Farmers Union	Other
Mr	M	Smuts	Sheeprun Portion 2	Other
Mr	La	Masha	Nthekgeng Mining Supplies	Other
Mr	Kp	Pasha	Roka Pasha Bhokwane Tribal Authority	Other
Mr	Elias	Mokwane	Sca	Other
Mr	Zach	Chuenyane	National Development Agency (NDA)	Parastatal
Mr	Xander	Neethling	Eskom	Parastatal
Ms	Mpati	Makoa	South African National Road Agency (Sanral)	Parastatal
Mr	Mbhazima	Shivambu	Road Agency Limpopo (Ral)	Parastatal
Mr	Bali	Mamabolo	Independent Development Trust (Idt)	Parastatal
Mr	Willie	Moeng	Department Of Agriculuture Rural Development And Land Reform	Provincial Authority
Mr	Wallies	Matlala	Department of Roads and Public Transport Limpopo	Provincial Authority
Mr	Tinomudashe	Dube	Limpopo Department Of Agriculture	Provincial Authority
Mr	Thivhulawi	Kolani	Department Of Mineral Resources (Dmr)	Provincial Authority
Mr	Tele	Maphoto	Limpopo Land Claims Commission	Provincial Authority
Mr	Tebatso	Mabitsela	Limpopo Office of the Premier	Provincial Authority
Mr	Sydeny	Nkuna	Department Of Water And Sanitation (Dws)	Provincial Authority
Mr	Sw	Mothapo	Limpopo Department Of Economic Development Environment And Tourism (Ledet)	Provincial Authority
Mr	Stanford	Macevele	DWAF - Mpumalanaga Regional Office	Provincial Authority
Mr	Sam	Thobakgale	Limpopo Department of Economic Development Environment and Tourism (LDEDET)	Provincial Authority
Mr	Sam	Nkosi	Department of Rural Development and Land Reform - Land Restitution Support	Provincial Authority
Mr	S	Mnisi	Road Agency Limpopo	Provincial Authority
Mr	Russel	Pillay	Mpumalanga Department Public Works, Roads and Transport	Provincial Authority
Ms	Portia	Munyai	Department of Water and Sanitation	Provincial Authority
Mr	Pieter	Ackerman	Department of Water and Sanitation (DWS)	Provincial Authority
Mr	Okwethu	Fakude	MDARDLEA: Mpumalanga Department of Agriculture, rural Development, Land and Envi	Provincial Authority
Mr	Okkie	Van Den Berg	Department Of Water And Sanitation (Dws)	Provincial Authority
Ms	Nonceba	Noqayi	Department Of Water And Sanitation (Dws)	Provincial Authority
Ms	Nicholene	Mahlakoana	Limpopo Department of Economic Development Environment and Tourism (LDEDET)	Provincial Authority
Ms	Nhlanhla	Phakathi	Department Of Mineral Resources (Dmr)	Provincial Authority
Mr	Nemaulumma	Nkhetheni	Limpopo Heritage Resources Authority (Lihra)	Provincial Authority
Dr	Nancy	Nyathikazi	Department of Health & Social Development	Provincial Authority
Ms	Millicent	Maisela	Department Of Health	Provincial Authority
Mr	Mf	Nkatingi	Limpopo Land Claims Commission	Provincial Authority
Mr	Mervyn	Lötter	Mpumalanga Tourism and Parks Agency (MTPA)	Provincial Authority
Mrs	Maylene	Broderick	Limpopo Department Of Economic Development Environment And Tourism (Ledet)	Provincial Authority
Dr	Matome	Masipa	Department Of Health & Social Development	Provincial Authority
Ms	Marcia	Malapane	Department Of Water And Sanitation (Dws)	Provincial Authority
Ms	Mamogoto	Leutle	Department Of Agriculture	Provincial Authority
Ms	Mabel	Makibelo	Department of Roads and Public Transport Limpopo	Provincial Authority
Mr	M S	Thobakgale	Department Of Public Works	Provincial Authority
Ms	Lufuno	Rambau	Department Of Water And Sanitation (Dws)	Provincial Authority
Ms	Lorraine	Mosebedi	Limpopo Land Claims Commission	Provincial Authority
Ms	Lina	Maepa	Department Of Health	Provincial Authority
Mr	Ledile	Mashilwane	Limpopo Office of the Premier	Provincial Authority
Mr	Khathu	Tshikolomo	Limpopo Department of Agriculture	Provincial Authority
Mr	K	Lithole	SAHRA: Limpopo - LIHRA	Provincial Authority
Mr	Jt	Maredi	Limpopo Department Of Agriculture	Provincial Authority
Mr	John	Motimele	LEDET	Provincial Authority
Mr	Johan	Van Aswegan	Department Of Water And Sanitation (Dws)	Provincial Authority
Mr	Jerry	Phukubye	Department Of Rural Development And Land Reform (Drdlr)	Provincial Authority
Dr	Hlamalani	Manzini	Office Of The Premier	Provincial Authority
Ms	Faith	Khethani	Department Of Cooperative Governance And Traditional Affairs (Cogta)	Provincial Authority
Ms	Evah	Seepa	Co-Operative Governance Human Settlement And Traditional Affairs (Coghsta)	Provincial Authority
Ms	Esther	Mogale	Department Of Agriculture	Provincial Authority
Ms	Ephinia	Kekana	Department Of Agriculture	Provincial Authority
Ms	Doreen	Sithole	DAFF	Provincial Authority
Ms	Bukeka	Hlathi	Department of Rural Development & Land Reform	Provincial Authority

Mr	Brian	Morris	Mpumalanga Tourism and Parks Agency (MTPA)	Provincial Authority
Mr.	Bigman	Maloa	Department of Agriculture Limpopo	Provincial Authority
	Betty	Mnguni	Department of Water Affairs (DWS)	Provincial Authority
Mr	Benjamin Tsietsi	Moduka	Mpumalanga Heritage Resources Authority	Provincial Authority
	Alidzulwi	Mudau	Limpopo Office of the Premier	Provincial Authority
			Department Of Cooperative Governance Human	
Mr	Ab	Makwela	Settlements And Traditional Affairs	Provincial Authority
Mr	A	Tshivhandekano	Department Of Mineral Resources	Provincial Authority
Ms	Thabita	Mangane	Mare	Registered I&AP
Mr	Solas	Machipa		Registered I&AP
Mr	Samuel Tlou	Mmadi	Ga-Ranthe Village, Ngwaabe, 1058	Registered I&AP
Ms	Poppy	Poppy	Bangwenyama Community	Registered I&AP
Mrs	Maria	Manamela	Anc Womens League	Registered I&AP
Mr	Joseph	Malatji	Kiwi Farm	Registered I&AP
Mr	Johannes	Mogashwa	Richmond	Registered I&AP
Mr	Jj	Joubert Sr.	Johannesberg	Registered I&AP
Mr	Jj	Joubert Jr.	Johannesberg	Registered I&AP
Mr	Jeff	Mabuza	Private	Registered I&AP
Mr	Greg	Beyers		Registered I&AP
Mr	Gabriel	Mathamsela	Protea Farms	Registered I&AP
Mr	Colbert	Makgoka	Environmental Scientist Burgersfort	Registered I&AP
Mr	Allie	Ratau	Kiwi Farm	Registered I&AP
Ms	Akelang	Moropane	Bangwenyama Community	Registered I&AP
Mrs	A	Fenyane	Mampuru Development Committee	Registered I&AP
Ms	Ria	Groenewald	De Kafferskraal Portion 13	Surrounding land owner/occupier
			Kliprivier 73 JT Remainder of Portion 15 (Stonybrook	
			Farm)	Surrounding land owner/occupier
Mr	PJ	Price		Surrounding land owner/occupier
	Pitman	Blake	Skuinsplaas 56 JT	Surrounding land owner/occupier
	Piet/Elize	Rabie	Kraaibosch 55 JT	Surrounding land owner/occupier
Mr	Mp	Maimela	Buffelshoek	Surrounding land owner/occupier
Ms	Louise	Geldenhuys	Kliprivier 73Jt	Surrounding land owner/occupier
Mr	Louis	Gendenhuys	Farmer	Surrounding land owner/occupier
Mr	Js	Maimela	Buffelshoek	Surrounding land owner/occupier
Mr	Johannes	Boshoff	Farmer	Surrounding land owner/occupier
Ms	Jo	Hayden-Smith	Kliprivier 73 JT Portions 31,32,14, 33,21,13,29,50	Surrounding land owner/occupier
Mr	Japie	Grobler	Kliprivier 73 JT	Surrounding land owner/occupier
Mr	Jan	Blake	Skuinsplaas 56 JT and De Kafferskraal Portion 6, 12	Surrounding land owner/occupier
Mr	Harold	Frylinck	Welgevonden Farm	Surrounding land owner/occupier
Mr	George	Malatjie	Kraaibosch 55 JT	Surrounding land owner/occupier
	FR	Sephton		Surrounding land owner/occupier
Mr	Ezekiel	Malatjie	De Kafferskraal 53 JT	Surrounding land owner/occupier
Mr	Danie	Nel	De Kafferskraal 53 JT	Surrounding land owner/occupier
Mr	Chris	van Vuuren	De Kafferskraal Portion 11	Surrounding land owner/occupier
Mr	Cf	Davel	Draaikraal	Surrounding land owner/occupier
	Cecilia/John	Riekert	De Kafferskraal Portion 2 and 11	Surrounding land owner/occupier
Ms	Annatjie	van Vuuren	De Kafferskraal Portion 13	Surrounding land owner/occupier
Mr	Andrew	Fussel	Oshoek 69 JT	Surrounding land owner/occupier
Mr	Andre	Delport	Blueberry Farm	Surrounding land owner/occupier
	A.	Roeloffze		Surrounding land owner/occupier
Mrs	Virginia	Maepa	Gamaepa Traditional Authority	Traditional Authority
Mr	Timothy	Ranthe	Bahlakwana Ba Ranthe Traditional Authority	Traditional Authority
Mr	Thabo	Maleka	Makua Traditional Council	Traditional Authority
Mr	Stephen	Ranthe	Garanthe Community	Traditional Authority
Kgoshi	Shorwane	Maepa	Tswako Maepa Traditional Council	Traditional Authority
Mr	Samuel	Ratau	Baroka Ba Ratau Traditional Council	Traditional Authority
Kgoshi	Phatane	Masha	Masha Ntake Community	Traditional Authority
Kgoshi	Ntoampe	Makua	Bakwena Ba Makua Council	Traditional Authority
			Bahlakwana Ba Malekane Traditional Council & Tubatse	
Kgoshi	Nkoane	Malekane	Steelpoort Foundation	Traditional Authority
Kgoshi	Ngwanatsomane	Ranthe	Bahlakwana Ba Ranthe Traditional Council	Traditional Authority
Mr	Mohubedu	Ranthe	Bakwena Ba Makua Traditional Authority	Traditional Authority
Mrs	Mivi	Maepa	Tswako Maepa Traditional Council	Traditional Authority
Kgoshi	Mb	Maphopha	Bahlakwana Ba Maphopha Traditional Council	Traditional Authority
Mr	Mathope	Maimela	Bakone Tau Phuthi Communal Property Association	Traditional Authority
Kgoshi	Mashego	Makua	Bakwena Ba Makua Traditional Authority	Traditional Authority
Kgoshi	Maseke	Magolego	Magolego Community	Traditional Authority
Kgoshigadi	Mante	Masha	Mante Masha Community Of Ga Masha Nkotane	Traditional Authority
Kgoshigadi	Mamoshiane	Maphopha	Bahlakwana Ba Maphopha Traditional Council	Traditional Authority

Kgoshigadi	Mamogodi	Masha	Masha Phathane Traditional Council & Tubatse Steelpoort Foundation	Traditional Authority
Kgoshi	Makopole	Mampuru	Babina Ba Mampuru Traditional Council	Traditional Authority
Kgoshi	Makhosini	Nkosi	Bengwenyama Ya Maswazi	Traditional Authority
Kgoshi	Letuana	Ratau	Garatau Community	Traditional Authority
Kgoshi	Lengwai	Masha	Masha Makopole Traditional Council	Traditional Authority
Mr	Kgakishe	Ranthe	Bahlakwana Ba Ranthe Traditional Authority	Traditional Authority
Mr	Johannes	Mmushi	Makua Traditional Council	Traditional Authority
Mr	Jerry	Segara	Maepa Community	Traditional Authority
Mr	Jacob	Monoge	Kalkfontein 367Kt	Traditional Authority
Mr	Isaac	Masha	Gamasha Community (Kalkfontein Office)	Traditional Authority
Ms	Florah	Tshabadi	GaMaepa Community	Traditional Authority
			Baroka Ba Phasha Traditional Council & Tubatse Steelpoort Foundation	Traditional Authority
Kgoshi	Dick	Phasha	Steelpoort Foundation	Traditional Authority
Mr	Daniel	Nkosi	Tukagomo Community	Traditional Authority
Mr	Mark	Drasler	African Rainbow Minerals	Water Forum
Mr	Hbh	Rossouw	Lebalalo Water Users Association (Lwua)	Water Forum
Ms	Amanda	Britz	Lebalelo Water User Association	Water Forum
Ms	Phumla	Nkosi	Mpumalanga Tourism and Parks Agency (MTPA)	
Mr	Peter	Malata	Gamawela Mankge Community (Gmc)	
Mr	Markus	Basson	De Berg Conservancy	
Mr	Johan	Spangler	Farmer	
Mr	Frans	Krige	Mpumalanga Tourism and Parks Agency	
Mr	Francois	Roux	Mpumalanga Tourism and Parks Agency	

Appendix 6: Impact Assessments

Der Brochen-Mototolo Mine Complex Consolidated EMPr – Impacts identified and assessed in the 2015 Der Brochen EMPr and Mototolo Mine EMPr

1. IMPACTS ASSESSMENT IN TERMS OF THE DER BROCHEN PROJECT

1.1. Assessment methodology used for the identification and rating of the impacts that may be associated with the Der Brochen Project

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE					
Use these definitions to define the consequence in Part B					
Impact characteristics	Definition	Criteria			
MAGNITUDE	Major	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded			
	Moderate	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded			
	Minor	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded			
	Minor+	Minor improvement; change not measurable; or threshold never exceeded			
	Moderate+	Moderate improvement; within or better than the threshold; or no observed reaction			
	Major+	Substantial improvement; within or better than the threshold; or favourable publicity			
SPATIAL SCALE OR POPULATION	Site or local	Site specific or confined to the immediate project area			
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic			
	National/ International	Nationally or beyond			
DURATION	Short term	Up to 18 months.			
	Medium term	18 months to 5 years			
	Long term	Longer than 5 years			
PART B: DETERMINING CONSEQUENCE RATING					
Rate consequence based on definition of magnitude, spatial extent and duration					
		SPATIAL SCALE/ POPULATION			
		Site or Local	Regional	National/ international	
MAGNITUDE					
Minor	DURATION	Long term	Medium	Medium	High
		Medium term	Low	Low	Medium
		Short term	Low	Low	Medium
Moderate	DURATION	Long term	Medium	High	High
		Medium term	Medium	Medium	High
		Short term	Low	Medium	Medium
Major	DURATION	Long term	High	High	High
		Medium term	Medium	Medium	High
		Short term	Medium	Medium	High
PART C: DETERMINING SIGNIFICANCE RATING					
Rate significance based on consequence and probability					
		CONSEQUENCE			
		Low	Medium	High	
PROBABILITY (of exposure to impacts)	Definite	Medium	Medium	High	
	Possible	Low	Medium	High	
	Unlikely	Low	Low	Medium	

The following impacts have been identified per project phase, namely Construction, Operation and Decommissioning and Closure, in respect of each main activity associated with the Der Brochen Project.

1.1 Construction Phase

1.1.1 Construction of the Northern and Southern Open Pits

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
No impacts are envisaged during the Construction Phase.					
Topography					
No impacts are envisaged during the Construction Phase.					
Soils, land capability and land use					
C1	<p>Loss of soil resources due to clearing activities</p> <p>Due to the preparation for open pit mining, soils resources will be lost during vegetation clearing and stockpiling of topsoil. An area of 58 ha is expected to be cleared and topsoil stockpiled.</p> <p>The Project area is characterised by Mispah, Arcadia, Glenrosa, Hutton and Clovelly soils, all which have grazing land capabilities. However no grazing or agricultural practices are currently taking place in the area and therefore if managed, will be a low impact.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Soils should be stripped and stockpiled for use during rehabilitation. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	New impact.
C2	<p>Contamination of soil resource due to hydrocarbon spills during construction</p> <p>The potential contamination of soils as a result of hydrocarbon spills from construction vehicles.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Conduct daily site inspections to detect leaks on equipment which may lead to hydrocarbon spills. Regular maintenance of vehicles. Placement of drip trays under vehicles when parked and during fuel transfer. Undertake on-site bioremediation or remove contaminated soils and dispose of at a licensed hazardous waste storage facility. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Unlikely <p>Significance: LOW (-)</p>	New impact.
Biodiversity					

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
C3	<p>Removal and loss of vegetation communities with a High / Medium- High Significance including wetland/ephemeral systems</p> <p>Removal /loss of vegetation communities as well as a change to community structure within and surrounding the activity. Removal/destruction of CI species such as numerous SCE endemics and Protected species including species such as the Not Threatened (NT) species Jamesbrittenia macrantha and DDT species Myrothamnus flabellifolius Welw, as well as endemic/near endemic species. Possibly Resnova af. pillosa within the drainage lines. This will result in a regional impact due to the fact that the Der Brochen Project lies within the SCPE, which is considered a conservational area of importance.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • The Open Pit footprint areas should be clearly marked to contain activities within the designated area. • Prior to construction, fences should be erected surrounding each footprint area to prevent further destruction of the surrounding vegetation communities, specifically near the riparian areas (i.e. off road driving affects vegetation community structure as well as faunal habitat). • Consideration will be given to the harvesting of vegetation (trees and medicinal plants) by stakeholders prior to final stripping of vegetation. Such a programme will be developed in consultation with stakeholders and access to the mine area will be controlled by RPM. • Raise biodiversity awareness with construction crew and Environmental Control Officer (ECO) on site through induction and training. • All CI species identified within the footprint of the Open Pits that can grow successfully ex situ must be translocated and the necessary permits must be applied for. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Definite <p>Significance: HIGH (-)</p>	Der Brochen Platinum Mine Floristic Assessment (Natural Scientific Services (NSS) Report 1995, May 2014)
C4	<p>Increase in alien invasive species impacting on natural plant community structures</p> <p>An increase in alien invasive species, impacting on plant</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Possible 	<ul style="list-style-type: none"> • Ensure excavation equipment entering the site are cleaned and free of any seed propagules (this includes soil imports into the area- 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Possible 	Der Brochen Platinum Mine Floristic Assessment (Natural Scientific Services

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	community structure as a result of the removal of vegetation and storage of topsoil stockpiles.	Significance: HIGH (-)	<p>certificates required from source).</p> <ul style="list-style-type: none"> An Alien Invasive Management Plan is required for all current and future operations. Educate the Construction crew on the identification and eradication of the top 10 alien species found within the area. Create an induction programme at commencement of the project. 	Significance: MEDIUM (-)	(NSS) Report 1995, May 2014)
Wetlands					
C5	<p>Increase in erosion and sediment loads</p> <p>Site clearing and grubbing of the footprint area associated with the Open Pits may result in an increased potential for erosion, leading to increased sediments loads entering the drainage line and riparian habitats. This may result in the loss of wetland habitat and ecoservices, impacting on hydrology and sediment balance.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Local Consequence: Low Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Clearly demarcate areas to be cleared and ensure that vegetation clearing only occurs within the demarcated areas. Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Local Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Wetland and Aquatic Ecological Assessment for the Proposed Anglo Platinum Der Brochen Project, Limpopo Province (Scientific Aquatic Services (SAS), SAS Report No. 214035, April 2014.
C6	<p>Impact on riparian zones</p> <p>Vegetation removal and increased surface area of impermeable surfaces leading to increased risk of erosion, as well as disturbance to soil as a result of movement of motor vehicles within or near drainage lines/ riparian zone.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Local Consequence: Low Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Ensure that contractor laydown areas are included in the initial areas demarcated for clearing, to minimise vegetation loss. Contractor laydown areas should not encroach into drainage line / riparian areas or their respective buffer zones. Vehicles must remain on demarcated roads and not encroach into drainage line / 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Local Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Wetland and Aquatic Ecological Assessment for the Proposed Anglo Platinum Der Brochen Project, Limpopo Province (Scientific Aquatic Services (SAS), SAS Report No. 214035, April 2014.

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			riparian areas or their respective buffer zones.		
C7	<p>Impact on drainage line vegetation habitats</p> <p>The drainage lines will be impacted upon due to removal of drainage line habitat during construction-related earthworks. This will lead to an increased risk of erosion due to substantial disturbances to soils as a result of earthworks and movement of construction vehicles. The stockpiling of topsoil may increase the risk of sediment deposition into adjacent drainage lines / riparian areas.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Definite • Significance: HIGH (-) 	<ul style="list-style-type: none"> • Where possible, infrastructure should be placed outside of drainage line areas to reduce loss of habitats. • Topsoil stockpiles must not be placed directly adjacent to drainage line or riparian features and measures such as berms and hessian curtains must be implemented to prevent erosion and sedimentation. • Clear separation of clean and Dirty water must take place and diversion of clean water around operational areas must ensure minimisation of the loss of catchment yield. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Local • Consequence: Low • Probability: Possible • Significance: LOW (-) 	Wetland and Aquatic Ecological Assessment for the Proposed Anglo Platinum Der Brochen Project, Limpopo Province (Scientific Aquatic Services (SAS), SAS Report No. 214035, April 2014.
	Surface water				
C8	<p>Increase in erosion from areas of exposed soils during site clearing and grubbing</p> <p>An increase in erosion from cleared areas, topsoil stockpiles or any other area where there are exposed soils can occur during storm events (direct impact). Increased erosion can result in an increase in turbidity, suspended solids and sedimentation in the Groot-Dwars River and tributaries (indirect and cumulative impact).</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Regional • Consequence: Medium • Probability: Possible • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • Flood protection berms should be constructed at the area where the Southern pit footprint falls within the 1:100 year floodline. • Erosion control measures in the form of temporary erosion prevention berms should be implemented during construction. • Clean water diversion bunds should be constructed upstream of the construction site prior to clearing areas for new infrastructure. • Paddocks should be constructed downstream of the working activities to 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Local • Consequence: Low • Probability: Possible • Significance: LOW (-) 	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>minimise uncontrolled runoff from the site.</p> <ul style="list-style-type: none"> Areas disturbed by construction activities should be rehabilitated immediately on completion of construction of each area. 		
C9	<p>Increased potential for damming and flooding and subsequent damage to property and infrastructure due to increased hard-standing areas</p> <p>Provision of hardstanding areas will reduce infiltration and increase the volume and velocity of stormwater runoff with subsequent potential for damming of water and flooding. Increased runoff velocity and volume could increase the potential for erosion.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Local Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> Stormwater measures should be appropriately designed to allow for free flow of water. Areas should be appropriately graded to prevent ponding. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Local Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<p>Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)</p>
C10	<p>Deterioration in surface water quality due to spillages and accidental discharges</p> <p>Spillages and accidental discharges could result in the contamination of surface water resources. Localised accidental spillages of hydrocarbons (diesel, oils etc.) from earthmoving and construction equipment, hazardous substances (ammonia nitrates for blasting) and other potentially polluting materials including human waste, could result in contaminated runoff. This could result in indirect contamination of the surface</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Local Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> Clean water diversions should be constructed prior to clearing areas for new infrastructure. Hazardous substances and potentially polluting materials (hydrocarbons) should be stored in appropriately bunded areas located outside of the riparian zone. Bunds should be designed for a capacity of 110% of the stored material. Servicing and maintenance of vehicles and equipment should be done outside the riparian zone in appropriate facilities designed for this purpose. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Local Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<p>Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)</p>

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	water resources down gradient of the contractor laydown area.		<ul style="list-style-type: none"> Contractors should be adequately trained in handling of hazardous substances and potentially polluting materials especially during transport in the vicinity of the riparian zone, e.g. over river crossings. Contractors should be made aware of the WUL conditions that apply during construction and made liable for environmental damages caused by spillages. Emergency action plans should be drawn up to deal with spillages. Contaminated runoff should be contained and reused as necessary e.g. for dust suppression. Chemical toilets should be provided at construction sites. 		
C11	<p>Alteration of catchment hydrology causing change in watercourse functionality and increased risk of flooding and scouring</p> <p>Due to placement of infrastructure within drainage lines and containment of dirty runoff in the box cut., changes to surface water hydrology may occur.</p> <p>Surface drainage paths exist within the footprint area of the open pit and Co-Disposal Facility which capture water during rainfall events.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Regional Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Runoff from the catchment should be diverted away from the open pit areas by cut-off channels and diversion berms designed to handle the 1:50 year storm event. Energy dissipaters should be constructed in areas of concentrated flows. Routine inspections and maintenance should be conducted to keep the diversions free of debris (silt build up, vegetation etc.) and areas suitably graded. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
Groundwater					
No impacts are envisaged during the Construction Phase.					

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Air Quality					
C12	<p>Increase in nuisance dust potentially impacting sensitive receptors</p> <p>Dust will be generated by construction activities. Exposed surfaces from the removal of vegetation are susceptible to erosional forces including wind. Construction vehicles and machinery moving along roads will generate dust.</p> <p>The Leshaba household lies approximately 5 kms from the proposed Pits area and were identified as the nearest sensitive receptors. It is expected that there will be a low impact due to the distance from the Pits and dominant wind direction.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Local Consequence: Low Probability: Possible Significance: LOW (-) 	<ul style="list-style-type: none"> Dust suppression where feasible on stockpiles and materials handling activities. Dust suppression or chemical stabilization of unpaved roads. Haul trucks to be restricted to specified haul roads. Speed limit on unpaved roads not to exceed 40 km/hr. Stabilisation of unpaved roads (chemical, rock cladding or vegetative). 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Local Consequence: Low Probability: Unlikely Significance: LOW (-) 	Air Quality Specialist Report for the Der Brochen EMP Alignment and Amendment (Airshed Report No. 13SRK25, September 2014)
Noise					
C13	<p>Increase in ambient noise levels potentially affecting community well-being</p> <p>During construction, there is an expected increase in ambient noise levels as a result of clearing, activities and vehicles. However, this impact is likely to be low due to the distance of the closest sensitive receptor (Leshaba household, 5 kms).</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Local Consequence: Low Probability: Possible Significance: LOW (-) 	<ul style="list-style-type: none"> Construction activities will be confined to daylight hours. Construction vehicles will be serviced at regular intervals to minimise noise generation. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Local Consequence: Low Probability: Unlikely Significance: LOW (-) 	Noise Impact Study for Environmental Impact Assessment (M ² Environmental Connections cc, February 2012)
Cultural heritage					
C14	<p>Demolition or relocation of cultural heritage sites resulting in the disturbance of significant sites and graves</p> <p>Several heritage sites with medium to high significance have been identified within the</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Local Consequence: High Probability: Definite Significance: HIGH (-) 	<ul style="list-style-type: none"> Graves within cemeteries in the footprint area are to be removed and relocated, and must be removed and reburied following the mandated procedure by a qualified Archaeologist. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	Der Brochen Project and Mototolo Complex- An Integrated Report prepared for Anglo American Platinum Limited (Archaeological Resources

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	<p>proposed Open Pits footprint areas. These include cemeteries, pot shards and ruins (hotel complex). The clearing and construction activities will impact on the identified significant sites, as they will have to be demolished or relocated.</p>		<ul style="list-style-type: none"> Heritage sites within the footprint area rated low to high significance, require a permit from SAHRA for the demolition thereof. The necessary permits for grave relocation must be obtained from the South African Heritage Resources Agency (SAHRA). The identified ruins (hotel complex (AA110)) should be mapped by a qualified Archaeologist and permits should be obtained prior to demolition. Undertake a Phase 2 Heritage Impact Assessment to further assess heritage sites found within the development footprint. 		Management, April 2012)
Visual					
C15	<p>Decrease in visual aesthetics of the area The Open Pits cover an area of 58 ha, from which vegetation will be removed and topsoil stockpiled. This is likely to have an impact on the natural aesthetics of the environment.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Minimise vegetation clearing to the demarcated footprint area of the Open Pits. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	New impact.
Traffic and transportation					
C16	<p>Increased generation of traffic on existing road networks potentially resulting in an increase in road traffic Construction activities will generate additional traffic along the Mine Access Road, the R557, D1261 and the R555 as well as some other roads within the study area.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Regional Consequence: Low Probability: Possible Significance: LOW (-) 	<ul style="list-style-type: none"> Traffic conditions to be monitored annually, should traffic congestion increase, appropriate mitigation measures will need to be explored and implemented. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Regional Consequence: Low Probability: Unlikely Significance: LOW (-) 	Specialist Traffic and Transportation Study for the Proposed EMP Alignment and Amendment of the Der Brochen Project to include open cast mining, tailings storage facilities and associated infrastructure (Aurecon,

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Although there will be an increase in traffic flows along these roads, the increase is rated low and the road network capacity can accommodate the expected increase due to the relatively low existing traffic flows on these roads compared to their capacity.				Report No. 9522, October 2014)
C17	<p>Impact on pedestrians and cyclists</p> <p>The increase in light and heavy vehicles generated by Construction activities will have minimal impact on the existing road space available for pedestrians and cyclists. There is minimal pedestrian activity and no cycle activity in the immediate vicinity of the Der Brochen Project.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Regional • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • None required 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Regional • Consequence: Low • Probability: Unlikely <p>Significance: LOW (-)</p>	Specialist Traffic and Transportation Study for the Proposed EMP Alignment and Amendment of the Der Brochen Project to include open cast mining, tailings storage facilities and associated infrastructure (Aurecon, Report No. 9522, October 2014)
C18	<p>Impact on road safety conditions resulting in a potential increase in road accidents</p> <p>The increase in traffic generated is expected to have an increase in heavy vehicle traffic flows on the surrounding road network. Heavy vehicles have been identified as one of the major causes of accidents and incidents including fatalities on this road network.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Regional • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • Drivers of heavy construction vehicles should attend a road safety and driving course to sensitise them to the impact they have on driving conditions for other drivers on the road. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Regional • Consequence: Low • Probability: Unlikely <p>Significance: LOW (-)</p>	Specialist Traffic and Transportation Study for the Proposed EMP Alignment and Amendment of the Der Brochen Project to include open cast mining, tailings storage facilities and associated infrastructure (Aurecon, Report No. 9522, October 2014)
C19	<p>Decreased condition of the road network</p> <p>The increase in heavy vehicles will accelerate the deterioration of the R555 and R557 roads as the result of heavy vehicles</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Regional • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • A standard operating procedure is developed for all mine drivers to identify and report potholes and edge breaks to the operations manager who in turn will 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Regional • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	Specialist Traffic and Transportation Study for the Proposed EMP Alignment and Amendment of the Der Brochen Project to include open cast

Construction of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	using this road network during construction.		report it to the relevant authorities.		mining, tailings storage facilities and associated infrastructure (Aurecon, Report No. 9522, October 2014)

1.1.2 Construction of the Co-Disposal Facility

Construction of the Co-Disposal Facility					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Geology				
	No impacts are envisaged during the Construction Phase.				
	Topography				
	No impacts are envisaged during the Construction Phase.				
	Soils, land capability and land use				
C20	Refer to Impact Reference C1 and C2 for impacts associated with the Construction Phase. An additional area of 35 ha will be cleared for the Construction of the Co-Disposal Facility. The total footprint of the Co-Disposal Facility will be 60 ha.				
C21					
	Biodiversity				
C22	Refer to Impact Reference C3 and C4 for impacts associated with the Construction Phase. An area of 30 ha will be cleared for the Construction of the Co-Disposal Facility.				
C23					
	Wetlands				
C24	Refer to Impact Reference C5 and C6 for impacts associated with the Construction Phase.				
C25					
C26	<p>Loss of habitat and increased erosion during construction of the starter wall</p> <p>Earthworks within and in the vicinity of drainage line / riparian features, leading to loss of habitat, increased erosion and sedimentation of adjacent features.</p> <p>Disturbances of soils due to earthworks and movement of construction vehicles leading to increased risk of erosion and sedimentation</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Wherever possible, infrastructure should be placed outside of drainage line areas to reduce loss of habitats. Topsoil stockpiles must not be placed directly adjacent to drainage line or riparian features and measures such as berms and hessian curtains must be implemented to prevent erosion and sedimentation. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	Wetland and Aquatic Ecological Assessment for the Proposed Anglo Platinum Der Brochen Project, Limpopo Province (Scientific Aquatic Services (SAS), SAS Report No. 214035, April 2014.
	Surface water				
C27	Refer to Impact Reference C8, C9 and C10 for impacts associated with the Construction Phase.				

Construction of the Co-Disposal Facility					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
C28					
C29					
C30	<p>Alteration of catchment hydrology causing change in watercourse functionality and increased risk of flooding and scouring</p> <p>Changes to surface water hydrology could result due to placement of infrastructure within drainage lines and containment of dirty runoff in the Co-Disposal area. Surface drainage paths exist within the footprint area of the Co-Disposal Facility which capture water during rainfall events.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Runoff from the catchment should be diverted away from the open pit areas by cut-off channels and diversion berms designed to handle the 1:50 year storm event. • Energy dissipaters should be constructed in areas of concentrated flows. • Routine inspections and maintenance should be conducted to keep the diversions free of debris (silt build up, vegetation etc.) and areas suitably graded. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
C31	<p>Deterioration of surface water quality due to use of waste rock in construction</p> <p>It is expected that there may be a potential impact arising from the generation of contaminated runoff from the use of waste rock in construction.</p> <p>Although leachate from the waste rock is generally considered to be non-acid generating, trace elements aluminium and iron were found to exceed the SANS241: 2011 drinking water limits in several standards, and manganese was found to exceed the stringent WUL limit of 0.07 mg/l but complied with the SANS241: 2011 limit.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Dirty water that is generated should be contained on site for reuse. • Provide chemical toilets at construction sites. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Unlikely <p>Significance: LOW (-)</p>	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
	Groundwater				
	No impacts are envisaged during the Construction Phase.				
	Air Quality				
C32	Refer to Impact Reference C12, for air quality impacts associated with the Construction Phase.				

Construction of the Co-Disposal Facility					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Noise					
C33	Refer to Impact Reference C13, for air quality impacts associated with the Construction Phase.				
Cultural heritage					
C34	Refer to Impact Reference C14, for air quality impacts associated with the Construction Phase.				
Visual					
C35	<p>Decrease in visual aesthetics of the area</p> <p>The Co-Disposal Facility will cover an area of an additional 35 ha from which vegetation will be removed and topsoil stockpiled. This is likely to have an impact on the natural aesthetics of the environment.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Minimise vegetation clearing to the demarcated footprint area of the Co-Disposal Facility. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	New impact.
Traffic and transportation					
C36	Refer to Impact Reference C16, C17, C18 and C19 for impacts associated with the Construction Phase.				
C37					
C38					
C39					

1.1.3 Construction of the Mareesburg TSF

Construction of the Mareesburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Geology				
	No impacts are envisaged for the Construction Phase.				
	Topography				
	No impacts are envisaged for the Construction Phase.				
	Soils, land capability and land use				
C40	<p>Loss of soil resources at sites where Tailings Dam starter walls will be located</p> <p>General clearing of vegetation and stripping of soil will lead to loss/disturbance of usable soil (existing grazing and arable land). A total area of 150 ha will be cleared for the Tailings Dam complex, resulting in a significant loss of soil resource. The dominant soils found on site include Mispah (with high percentage of rock outcrops), Glenrosa and Arcadia. All these soils have a high inherent fertility and moderate erodibility.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: High Probability: Definite Significance: HIGH (-) 	<ul style="list-style-type: none"> Rehabilitation of soils. Soil will only be cleared from those areas to be affected immediately by construction. Soil for the purpose of rehabilitation will be stripped from cleared areas that can be rehabilitated soon after construction activities have been completed. This soil will be stockpiled and stored. Construction of water management infrastructure will commence prior to the Tailings Storage Facility to prevent soil erosion. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
C41	<p>Loss of land of arable/grazing potential</p> <p>Clearing of the TSF site will lead to loss of land of arable potential and grazing potential and an associated general loss of agricultural production potential. 74% of the 120 ha of the Tailings Dam site has grazing potential (88.4 ha), as well as 3.9% of arable land (4.7 ha). The remainder of the Mareesburg site consists of erosion and streambeds.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: High Probability: Definite Significance: HIGH (-) 	<ul style="list-style-type: none"> The footprint extent of the project has been designed to where possible, only impact on the Tailings Storage Facility and associated infrastructure. Minimise the area that can be potentially impacted on (eroded, compacted, sterilised or de-nitrified). 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
	Biodiversity				
C42	<p>Loss of natural habitat</p> <p>General clearing of the area for the construction of the</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Regional 	<ul style="list-style-type: none"> The area of land disturbed and isolated for the purpose of construction, mining and 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Regional 	Environmental Management Programme Report for

Construction of the Mareesburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	<p>Mareesburg TSF resulting in noise and dust will lead to the disturbance and loss of surrounding habitats, as well as inhibit movement of animals within these habitats.</p> <p>As the Der Brochen Project area falls within the Sekhukuneland Centre of Endemism (SCE), habitats have a high sensitivity and conservation status. Due to the various individual mining developments in the area, cumulatively this may lead to habitat loss or species and endangerment.</p>	<ul style="list-style-type: none"> • Consequence: High • Probability: Definite • Significance: HIGH (-) 	<p>processing activities will be limited, as far as is practical, to the minimum required for safe and efficient operation</p> <ul style="list-style-type: none"> • No unnecessary destruction of vegetation will be allowed and, in particular, construction workers will not be allowed to harvest any trees for use as firewood or any other purpose. • The required biodiversity specialists has surveyed the marked out surface infrastructure in detail prior to clearing to identify plants (number and location) ahead of clearing for purposes of the permit applications. • The necessary permits will be obtained before any clearing of the site takes place. • Plants that are to be translocated for conservation purposes will be removed under the guidance of a recognized taxonomist/ecologist and planted in a conservation area of similar habitat. • Plants that are to be removed for rehabilitation purposes will be removed and replanted in a nursery under the guidance of a recognized landscaper. The mine should be responsible for the operation of the nursery until such time as rehabilitation has been completed. 	<ul style="list-style-type: none"> • Consequence: High • Probability: Possible • Significance: HIGH (-) 	<p>the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p>

Construction of the Mareesburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
C43	<p>Disturbance/loss of vegetation species and communities of conservation importance, loss of biodiversity and the risk of losing unknown biodiversity due to clearing of vegetation</p> <p>Clearing of the area for construction of the Mareesburg TSF will lead to destruction of vegetation, as well as possible loss of plant diversity and important plant communities within the immediate TSF footprint.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • Any decisions regarding the fate of populations of these priority species will only be made after consultation with the vegetation specialists. • Vegetation specialists will be employed to identify individual specimens or populations for possible relocation. Specialists will be involved in establishing a relocation procedure that will include timing and selecting new locations for the plants. • The necessary permits for removal of CI plants should be obtained before any clearing of the site takes place. • Plants that are to be translocated for conservation purposes will be removed under the guidance of a recognized taxonomist/ecologist and planted in a conservation area of similar habitat. • Plants that are to be removed for rehabilitation purposes will be removed and replanted in a nursery under the guidance of a recognized landscaper. The mine should be responsible for the operation of the nursery until such time as rehabilitation has been completed. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Possible <p>Significance: HIGH (-)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p>
C44	<p>Displacement or disturbance of animal life (and their migration paths) as a result of construction activities</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite 	<ul style="list-style-type: none"> • The area of habitat disturbed and isolated for the purpose of mining and processing activities will be limited, as far as is practical, to the 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible 	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK</p>

Construction of the Mareesburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Site clearance will lead to a disturbance of the fauna on site. Herpetofauna, birds, small mammals and insects will be displaced locally due to an increase in dust, noise and illumination during construction of the Mareesburg TSF.	Significance: MEDIUM (-)	<p>minimum required for safe and efficient operation.</p> <ul style="list-style-type: none"> The Mareesburg TSF footprint area should be clearly demarcated to contain construction activities within the designated area. Create biodiversity awareness with construction crew and ECO on site. 	Significance: MEDIUM (-)	Consulting Report No. 295606/4/ November 2002)
C45	<p>Disturbance/loss of insect species/communities of conservation value due to loss of habitat and habitat fragmentation</p> <p>Increased dust, fuel emissions and loss of habitat during construction may lead to the disturbance and possible loss of cicadas, <i>Pycna sylvia</i> species.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Site specific Consequence: High Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> Following construction, all disturbed areas will be rehabilitated. The cicada population will be monitored during the mining phases. The mine is participating in ongoing studies of the invertebrate fauna. If possible, Vitex species identified within the footprint of the Mareesburg TSF should be translocated. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
C46	<p>Loss of communities that have a National, Provincial and Local significance and Conservation Importance species</p> <p>The clearing of vegetation will result in the loss of vegetation communities that cannot be successfully rehabilitated and will result in the loss of important upstream wetland/riparian habitat. This will have an impact on the catchment and the Groot-Dwars River as a Freshwater Ecosystem Priority Area (FEPA). The clearing of vegetation will also result in the loss of CI</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: National Consequence: High Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> Consider offsets which will require a detailed investigation to find similar habitat to conserve. Appoint a biodiversity specialist to identify CI species that can grow successfully ex situ. These species must be translocated and the necessary permits from DWS must be applied for. Obtain the necessary regulatory authorisation for crossing any of the streams / drainage lines or wetlands. Where the road/Pipeline traverses a wetland, 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Regional Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	Der Brochen Platinum Mine Floristic Assessment (Natural Scientific Services (NSS) Report 1995, May 2014)

Construction of the Maresburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	species, including numerous SCE endemics and the relatively unknown <i>Cyphostemma wilmsii</i> & undescribed <i>Resnova</i> af. <i>pillosa</i> (<i>R. megaphylla</i>) thereby reducing their overall population numbers.		measures are required to ensure that the road has minimal effect on the flow of water through the wetland, e.g. by using box culverts rather than pipes.		
C47	Increase in Alien invasive species An increase in alien invasive species. Refer to Impact Reference C4.				
Wetlands					
C48	Increase in erosion and sediment loads resulting in the loss of wetland habitats and ecoservices Site clearing and grubbing of the footprint area associated with the Maresburg TSF may result in an increased potential for erosion, leading to increased sediments loads entering the drainage line and riparian habitats. This may result in the loss of wetland habitat and ecoservices, impacting on hydrology and sediment balance.	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Local Consequence: Low Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Clearly demarcate areas to be cleared and ensure that vegetation clearing only occurs within the demarcated areas. Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities. Minimise the footprint and control edge effects. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Local Consequence: Low Probability: Possible Significance: LOW (-) 	Wetland and Aquatic Ecological Assessment for the Proposed Anglo Platinum Der Brochen Project, Limpopo Province (Scientific Aquatic Services (SAS), SAS Report No. 214035, April 2014)
C49	Impact on riparian zone Refer to Impact Reference C6.				
C50	Impact on drainage line habitat Refer to Impact Reference C7.				
Surface water					
C51	Deterioration of surface water quality due to increased sediment loads as a result of erosion Clearing of vegetation and earthworks at the Tailings Dam site will leave soils bare and exposed to erosion agents, as well as potentially increase the	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> A stormwater management plan, including watercourse diversion, will be implemented at the onset of construction. Construction of water management infrastructure will commence prior to the TSF. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible Significance: LOW (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Construction of the Maresburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	<p>volume and flow rate of surface runoff entering surface water bodies. This will in turn result in an increase in sediment loads in these water bodies.</p> <p>Should there be no settlement facilities or stormwater diversion works established prior to the major construction activities commencing, it can be expected that surface water bodies in the area will receive high silt loads (particularly downstream of the Tailings Dam).</p>				
C52	<p>Deterioration of surface water quality due to contamination of runoff by oil and fuel spills and leaks, and other construction activities</p> <p>Impact on surface water during construction from potential construction vehicles spillage. Increased fuels, oils, cements and other waste from construction activities and vehicles may contaminate surface water bodies.</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Short term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Construction areas and construction campsites will be provided with earth berms which will divert clean stormwater runoff and prevent this water from entering such working areas. • Re-vegetation of all denuded area. • A leak/spill detection plan will be devised and implemented for all possible areas of leak/spillage within the construction site. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p>
C53	<p>Deterioration of surface water quality due to erosion, spillages and accidental discharges at the Pipeline crossings</p> <p>Changes to the hydrology within the Maresburg Stream catchment combined will impacts on the Groot-Dwars River from the open pit activities will result in cumulative impacts on the hydrology of the Groot-Dwars River.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Clean stormwater cut-off drains with diversion berms will be positioned to divert stormwater from the sites. The drains will be designed to accommodate a 1:50 year storm and diversion berms will assist to divert a 1:100 year storm. Stormwater diverted by these drains and berms will be redirected towards the natural watercourses in the area. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Unlikely <p>Significance: LOW (-)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002).</p> <p>Der Brochen Project Environmental Impact Assessment/ Environmental</p>

Construction of the Maresburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Direct contamination of the Groot- Dwars River or its tributaries at the Pipeline crossings can occur due to spillages and accidental discharges or due to erosion of disturbed areas during construction in the riparian zone. Contamination of surface resources could also impact on downstream users, such as the Leshaba family.		<ul style="list-style-type: none"> Construction should take place in the low flow period (dry season). Stormwater culverts at watercourse crossings should be designed and constructed to accommodate the 1:50 year storm event. Areas disturbed by linear construction activities should be rehabilitated immediately on completion of construction of each area. Erosion protection and energy dissipaters should be constructed at the crossings as applicable Contractors should be made aware of the WUL conditions that apply during construction and made liable for environmental damages caused by spillages. Emergency action plans should be drawn up to deal with spillages. Chemical toilets should be provided at construction sites. 		Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
C54	Refer to Impact Reference C8, C9 and C10, for impacts associated with the Construction Phase.				
C55					
C56					
	Groundwater				
	There are no impacts envisaged during the Construction Phase.				
	Air Quality				
C57	Increased dust levels during construction of infrastructure and roads Construction equipment will generate dust from cleared, exposed surfaces such as the	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Definite 	<ul style="list-style-type: none"> The contractors and the mine will control dust on the site and access roads to acceptable levels, with water, chemical soil stabilisers or temporary surfacing. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No.

Construction of the Maresburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Tailings Dam site. Excessive dust will impact on surrounding vegetation and indirectly on animals feeding on vegetation.	Significance: MEDIUM (-)	<ul style="list-style-type: none"> The mine will undertake monthly dust monitoring at various locations along the main access road and shaft access roads until these are tarred. A dust monitoring programme will be implemented to monitor the impacts from dust. Dust suppression will be undertaken of the service roads and Tailings Facility where required. Only the immediate footprint of the area will be cleared. Movement of vehicles on site will be restricted. 	Significance: LOW (-)	295606/4/ November 2002)
C58	Refer to Impact Reference C12, for impacts associated with the Construction Phase.				
Noise					
C59	<p>Increase in ambient noise levels to surrounding communities (Leshaba family) as a result of construction activities</p> <p>Construction activities such as movement of trucks and earthmoving equipment and machinery will cause an increase in ambient noise levels.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> Machinery and vehicle silencer units will be maintained in good working order. Non-compliant machinery and/or vehicles will be removed from service until repaired. Should community complaints be received with regard to noise generation, mine management will, at the discretion of the ECO, investigate this, model the noise against the baseline information obtained during the specialist survey and implement appropriate measures. Possible best practice management measures regarding noise mitigation include: 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Unlikely <p>Significance: LOW (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Construction of the Mareesburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> Construction activities will be confined to daylight hours. A noise monitoring programme will be implemented prior to construction. Construction vehicles will be serviced at regular intervals to minimise noise generation. 		
Cultural heritage					
C60	<p>Disturbance or destruction of historical and cultural sites</p> <p>Disturbance to graveyards in close proximity (outside project boundary) to the Mareesburg TSF site.</p> <p>Several heritage sites with medium to high significance have been identified within the proposed Mareesburg TSF footprint area. These include grindstones, Eiland, Leolo and Marateng pottery, cemeteries with graves, terraces, foundation and kraals.</p> <p>The clearing and construction activities are likely to impact on the identified significant sites.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Local Consequence: High Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> The South African Heritage Resources Agency (SAHRA) has recommended a holistic conservation strategy including the conservation of cultural heritage resources. The following geologically and archaeologically important sites should be included in the holistic conservation management plan. Graveyards need to be fenced to ensure their protection. Heritage sites within the footprint area rated low to high significance, require a permit from SAHRA for the demolition thereof. Graves identified within the footprint area need to be removed and relocated, following the mandated procedure by a qualified Archaeologist. The necessary permits for grave relocation must be obtained from the South African Heritage Resources Agency (SAHRA). 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Construction of the Maresburg TSF					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> Undertake a Phase 2 Heritage Impact Assessment to further assess heritage sites found within the development footprint. 		
Visual					
C61	<p>Decrease in visual aesthetics of the area</p> <p>The Maresburg TSF will cover an area of approximately 150 ha, from which vegetation will be removed and topsoil stockpiled. This is likely to have an impact on the natural aesthetics of the environment, particularly for the Leshaba household located 1 km away from the proposed TSF.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Minimise vegetation clearing to the demarcated footprint area of the Maresburg TSF. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	New impact.
Traffic and transportation					
C62	Refer to Impact Reference C16, C17, C18 and C19, for impacts associated with the Construction Phase.				
C63					
C64					
C65					

1.1.4 Construction of the Maresburg TSF Pipeline

Construction of the Maresburg TSF Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
There are no impacts envisaged during the Construction Phase.					
Topography					
There are no impacts envisaged during the Construction Phase.					
Soils, land capability and land use					
C66	<p>Loss of soil resources as a result of sterilisation from Pipeline and road</p> <p>The loss of soil resources due to sterilisation where the Pipeline and maintenance road will be constructed.</p> <p>The Project area is characterised by Mispah, Arcadia, Glenrosa, Hutton and Clovelly soils, all which have grazing land capabilities. However no grazing or agricultural practices are currently taking place in the area and therefore if managed, will be a low impact.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Place Pipeline on plinths to avoid compaction of soils. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	New impact.
C67	Refer to Impact Reference C2, for impacts associated with the Construction Phase.				
Biodiversity					
C68	Refer to Impact Reference C4, for impacts associated with the Construction Phase.				
C69					
Wetlands					
C70	<p>Impact on drainage line features and riparian areas on the Pipeline route</p> <p>Construction of Pipeline route will traverse several drainage lines, the Maresburg stream and the Groot-Dwars River. This is expected to impact upon the various riparian habitats along the Pipeline route due to potential erosion and sedimentation of drainage lines.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Support structures for the Pipelines should, if possible, be placed outside of drainage line or riparian habitat. The crossing designs of any bridges must ensure that the creation of turbulent flow in the system is minimised in order to prevent downstream erosion. No support pillars should be constructed within the active channels. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	New impact.

Construction of the Maresburg TSF Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> The Pipeline should be constructed as close as possible to existing or planned roads in order to minimise the need for maintenance personnel to access the Pipeline. 		
Surface water					
C71	<p>Deterioration of surface water quality due to erosion, spillages and accidental discharges at the Pipeline crossings</p> <p>Changes to the hydrology within the Maresburg Stream catchment combined will impacts on the Groot-Dwars River from the open pit activities will result in cumulative impacts on the hydrology of the Groot-Dwars River.</p> <p>Direct contamination of the Groot- Dwars River or its tributaries at the Pipeline crossings can occur due to spillages and accidental discharges or due to erosion of disturbed areas during construction in the riparian zone.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Stormwater culverts at watercourse crossings should be designed and constructed to accommodate the 1:50 year storm event. Areas disturbed by linear construction activities should be rehabilitated immediately on completion of construction of each area. Erosion protection and energy dissipaters should be constructed at the crossings as applicable Contractors should be made aware of the WUL conditions that apply during construction and made liable for environmental damages caused by spillages. Emergency action plans should be drawn up to deal with spillages. Chemical toilets should be provided at construction sites. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
Groundwater					
There are no impacts envisaged during the Construction Phase.					
Air Quality					
C72	Refer to Impact Reference C12, for impacts associated with the Construction Phase.				
Noise					
C73	Refer to Impact Reference C13, for impacts associated with the Construction Phase.				
Cultural heritage					
C74	Refer to Impact Reference C60, for impacts associated with the Construction of the Pipeline.				

Construction of the Mareesburg TSF Pipeline

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Visual					
There are no significant impacts envisaged during the Construction Phase.					
Traffic and transportation					
C75	Refer to Impact Reference C16, C17, C18 and C19, for impacts associated with the Construction Phase.				
C76					
C77					
C78					

1.1.5 Removal of the existing 132kV Powerline Route and Construction of the Powerline on the proposed new route

Removal of the 132kV Powerline and Construction of the Powerline on the proposed new route					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
There are no impacts envisaged during the Construction Phase.					
Topography					
There are no impacts envisaged during the Construction Phase.					
Soils, land capability and land use					
C79	<p>Impact on soil resources</p> <p>The removal of the Powerline poles will expose soils and could result in erosion of soil resources.</p> <p>The development of the new Powerline route will also involve the placement of poles on undisturbed areas. Excavated soils will be deposited next to the foundation holes prior to backfilling and surplus soil is usually spread evenly around the construction site.</p> <p>No grazing or agricultural practices are currently taking place in the area and therefore if managed, will be a low impact.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Local • Consequence: Low • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Topsoil must be stockpiled separately and spread around the foundation last to facilitate natural revegetation processes. • Backfilled material should be compacted to limit the possibility of erosion. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Local • Consequence: Low • Probability: Unlikely <p>Significance: LOW (-)</p>	New impact.
Biodiversity					
C80	<p>Loss of vegetation along the re-routed Powerline route</p> <p>Minimal loss of vegetation communities due to the limited footprint of each Powerline pole. However, the Powerline servitude (8 m wide) would need to be cleared of shrubs and trees and only grass species will remain.</p> <p>The servitude where the existing Powerline will be removed, will be left to naturally rehabilitate. No sensitive receptors are within the powerline footprint.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM(-)</p>	<ul style="list-style-type: none"> • Ensure pole construction remains out of any wetland/ riparian areas. • Limit access to pole positions through existing road networks. • Remove and replant any CI species within the direct footprint of the pole. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Medium term • Scale: Local • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	Der Brochen Platinum Mine Floristic Assessment (Natural Scientific Services (NSS) Report 1995, May 2014)
C81	Refer to Impact Reference C4, for impacts associated with the Construction Phase.				

Removal of the 132kV Powerline and Construction of the Powerline on the proposed new route					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Wetlands					
C82	<p>Impact on riparian habitats due to demolition and construction activities</p> <p>The demolition of the existing Powerline may result in the disposal of waste into drainage lines/ riparian habitats, as well disturbances to vegetation and soils due to the movement of demolition vehicles within the vicinity.</p> <p>Placement of infrastructure related to the new re-routed Powerline within or in the vicinity of drainage lines/ riparian habitats leading to loss of habitat, altered flow patterns and increased erosion due to vegetation removal.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Local • Consequence: Low • Probability: Definite <p>Significance: MEDIUM(-)</p>	<ul style="list-style-type: none"> • All waste resulting from the demolition of the existing Powerline must be removed from site and disposed of at a Licensed Waste Disposal Facility. • Inspect all adjacent drainage lines/ riparian habitats on both the former and new routes for sedimentation on a weekly basis. • Ensure that support structures for the new Powerline poles are not placed within drainage line areas and their associated buffers. • Re-profile topsoil and revegetate disturbed areas once demolition is complete. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Local • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	Wetland and Aquatic Ecological Assessment for the Proposed Anglo Platinum Der Brochen Project, Limpopo Province (Scientific Aquatic Services (SAS), SAS Report No. 214035, April 2014.
Surface water					
C83	<p>Increase in erosion from areas of exposed soils exacerbated by increased runoff volume and velocity from soil compacted areas</p> <p>Soil compaction during demolition and construction may cause an increase in runoff velocity and volume during rainstorm events.</p> <p>An increase in runoff velocity and volume may result in an increased potential for erosion in disturbed areas with subsequent increase in turbidity, suspended solids and sedimentation in the Groot-Dwars River and tributaries</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Local • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • Areas disturbed by demolition and construction activities should be rehabilitated immediately on completion in each area. • Areas disturbed by linear infrastructure should be rehabilitated progressively as construction progresses. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Local • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
Groundwater					

Removal of the 132kV Powerline and Construction of the Powerline on the proposed new route					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	There are no impacts envisaged during the Construction Phase.				
	Air Quality				
C84	Refer to Impact Reference C12, for impacts associated with the Construction Phase.				
	Noise				
C85	Refer to Impact Reference C13, for impacts associated with the Construction Phase.				
	Cultural heritage				
C86	<p>Disturbance or destruction of historical and cultural sites</p> <p>Several heritage sites with medium to high significance have been identified around the proposed new Powerline route. These include Stone lines marking African tenants, Tenant household in good state of preservation with mud walls and front lapa walls, as well as cemeteries.</p> <p>The clearing and construction activities associated with the new re-routed Powerline are likely to impact on the identified significant sites.</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Long term • Scale: Local • Consequence: High • Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • Graveyards need to be fenced to ensure their protection. • Consider realigning powerline to avoid cemeteries and graves, and other heritage sites identified. If unavoidable, graves within cemeteries will be removed and relocated by a qualified Archaeologist in accordance with the mandated procedure • The necessary permits for grave relocation must be obtained from the South African Heritage Resources Agency (SAHRA). • Heritage sites that were rated low to medium require a permit from SAHRA for the demolition thereof, if required. • Undertake a Phase 2 Heritage Impact Assessment to further assess heritage sites found within the development footprint. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Unlikely <p>Significance: LOW (-)</p>	New impact.
	Visual				
C87	<p>Impact on the visual aesthetics of the area</p> <p>The new Powerline route will be constructed in an undisturbed area and the clearing of the servitude will make the Powerline more visible to road</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • Ensure that the servitude area is maintained and kept neat by clearing the area on a regular basis. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Possible <p>Significance: LOW (-)</p>	New impact.

Removal of the 132kV Powerline and Construction of the Powerline on the proposed new route

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	users, vehicles using the access road en-route to Booyssendal Mine.				
Traffic and transportation					
No additional impacts other than those that have been mentioned previously are expected.					

1.1.6 Socio-economic impacts associated with the Construction Phase

Socio-economic impacts during Construction					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
C88	<p>Socio-economic</p> <p>Contribution to the local and regional economy</p> <p>The Der Brochen Project will make a positive contribution at both the macro- and micro-economic level. This contribution to the national, regional and local economy includes a boost to the Gross Geographical and Domestic Product through the creation of jobs during construction and the associated improvement in the annual per capita and household income of these workers and their families.</p> <p>In addition, the project will provide new business opportunities, improved physical infrastructure and social services.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Regional • Consequence: Low • Probability: Possible <p>Significance: LOW (+)</p>	<ul style="list-style-type: none"> • The mine has developed a SLP which will guide the operation on social issues. This is updated every five years. • Der Brochen will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. Der Brochen will ensure that as much of this as possible is directed to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. • AAP will inform businesses when appropriate through business fora about available opportunities and how business may access these. For example the Steelpoort Business Forum will be used to engage with businesses in the local and regional areas. • The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Regional • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (+)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p> <p>Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)</p>

Socio-economic impacts during Construction					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>part of AAP's SLP reporting to Government.</p> <ul style="list-style-type: none"> Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy. This strategy will be reviewed and monitored for implementation. 		
C89	<p>Contribution to national economic growth Some goods and services will be procured from national suppliers. Further, Der Brochen will contribute income taxes and royalties during the LOM. Timeous payment of taxes will contribute towards the ability of government to pursue national development objectives.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Medium term Scale: National Consequence: Medium Probability: Unlikely Significance: LOW (+) 	<ul style="list-style-type: none"> Der Brochen will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. Der Brochen will ensure that as much of this as possible is directed to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. AAP will inform businesses when applicable through appropriate business fora about available opportunities and how business may access these. For example, the Steelpoort Business Forum can be used to engage with businesses in the local and regional areas. The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Medium term Scale: National Consequence: Medium Probability: Possible Significance: MEDIUM (+) 	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)

Socio-economic impacts during Construction					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>local suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as part of AAP's SLP reporting to Government.</p> <ul style="list-style-type: none"> Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy. This strategy will be reviewed and monitored for implementation. 		
C90	<p>Social disruption Temporary social disruption is to be expected during the Construction Phase, due to the presence of a non-local workforce, an influx of job seekers (including family visits), increased traffic and temporary disturbance of access roads. General physical disruption could be further aggravated by a perceived threat by the local community to existing safety and security levels.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Contractors will be required to find their own accommodation. Der Brochen will provide appropriate policies and procedures with regards to employee accommodation and related transport assistance. Construction contractors will not be housed on the Der Brochen Property Complaints from neighbours and the public with regard to interference from contractors' or mine staff will be promptly addressed, and due process followed. Der Brochen should implement management commitments with respect to noise, dust, safety, blasting and vibrations and other activities in line with recommendations made by the specialists. Der Brochen should consult with CPAs and tribal 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Possible Significance: LOW (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Socio-economic impacts during Construction					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>authorities to discuss possibilities of the influx of people into the area.</p> <ul style="list-style-type: none"> Implementation of an HIV/AIDS awareness campaign targeting construction workers, employees and surrounding communities. 		
C91	<p>Disturbance of the local community, social infrastructure and services</p> <p>It is expected that there will be an increased pressure on local and sub-regional services and facilities such as temporary housing, recruitment and employment procedures), as well as public transport, electricity and roads.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Regional Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Employ as many people from the local area as possible to avoid increased pressure on local and sub-regional services and facilities. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Regional Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
C92	<p>Generation of jobs</p> <p>Temporary jobs will be created during construction. It is expected that there will be a moderate number of jobs created (magnitude), in the short term and regionally.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Medium term Scale: Regional Consequence: Medium Probability: Definite <p>Significance: MEDIUM (+)</p>	<ul style="list-style-type: none"> Employ as many locals as possible so that mining in the area maximises benefits to immediate affected communities. If possible identify temporary employees for further training and recommendation for incorporation in the longer term staff complement. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Medium term Scale: Regional Consequence: Medium Probability: Definite <p>Significance: MEDIUM (+)</p>	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)
C93	<p>Procurement of goods and services</p> <p>Procurement of goods and services during construction will result in maintaining and possibly creation of jobs since those companies providing goods and services will have contracts.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Medium term Scale: National Consequence: Medium Probability: Definite <p>Significance: MEDIUM (+)</p>	<ul style="list-style-type: none"> Procure as many goods and services as possible from local communities and the local municipal area so that the project benefits immediate affected communities. Identify potential service providers for longer term procurement. Advise and support these companies so 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Medium term Scale: National Consequence: Medium Probability: Definite <p>Significance: MEDIUM (+)</p>	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)

Socio-economic impacts during Construction					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			that they can be incorporated as long term suppliers.		
C94	<p>Influx of job seekers</p> <p>The arrival of non-locals in the area can result in negative health consequences and the increase in risky behaviour.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Possible • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • Enhance employment of people and procurement of service providers in the study area and the region. • Accommodation should preferably be provided in towns in close proximity to the project area and workers bussed in. • Should accommodation be required in close proximity to Der Brochen: <ul style="list-style-type: none"> ○ RPM should require the contractors to promote HIV/AIDS prevention amongst employees. ○ RPM and the contractors should work with the health authorities to provide HIV/AIDS prevention and treatment interventions in a culturally appropriate manner. AAP will confirm if this is possible. ○ Sub-contractors should adhere to the contract with the contractor. ○ A strategy and protocol for camp management should be developed and implemented, should an existing worker accommodation facility be used. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Possible • Significance: MEDIUM (-) 	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)
C95	<p>Impacts on medicinal plants during land clearing activities during the Construction Phase</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site • Consequence: Medium 	<ul style="list-style-type: none"> • A land access protocol for visiting graves is currently in place and AAP Land Use Management will explore the 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site • Consequence: Low 	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report

Socio-economic impacts during Construction

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	<p>Clearing the land during construction will destroy a proportion of valuable community resources, medicinal plants.</p> <p>Gamawela Mankge CPA highlighted the variety of medicinal plants in the valley that needed to be preserved. Der Brochen infrastructure, however, will occupy a small proportion of the land under the mining right.</p>	<ul style="list-style-type: none"> Probability: Possible Significance: MEDIUM (-) 	<p>possibility of extending this protocol for enabling the collection of medicinal plants on the property.</p>	<ul style="list-style-type: none"> Probability: Possible Significance: LOW (-) 	<p>No. 469113/SIA, September 2014)</p>

1.2 Operational Phase

1.2.1 Operation of the Northern and Southern Open Pits

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
O1	<p>Impact on Geology Opencast mining methods will permanently alter the geological strata in the proposed Northern and Southern Pit areas. This includes the removal of waste rock and platinum ore.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Local Consequence: High Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> Waste rock from the Northern Pit will be used to construct the embankment for the proposed Co-Disposal Facility. Should the Co-Disposal Facility be deemed not feasible, waste rock will be backfilled to the Northern pit concurrently to mining. Ongoing rehabilitation of the Southern Pit area will take concurrently as the operation phase progresses. The Southern Pit will be backfilled with waste rock material. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	New impact.
Topography					
O2	<p>Change in local topography During Operation, the Northern Pit will be excavated and waste rock used to construct the embankment wall for the Co-Disposal Facility. The Northern Pit will be filled with tailings and the Co-Disposal Facility will be constructed on top of the filled Northern Pit. This will have an impact on the natural topography of the site. The Southern Pit will be backfilled concurrently with waste rock during the Operational Phase, therefore little impact on the topography is expected.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Upon Closure, the Co-Disposal Facility and backfilled Southern Pit should be shaped to be free-draining. Should the Co-Disposal Facility be deemed not feasible, waste rock will be backfilled to the Northern pit concurrently to mining. The backfilled pit should be shaped to be free-draining, covered with topsoil and revegetated. Stockpiled topsoils should be used to cover the closed Co-Disposal Facility and backfilled Southern Pit and should be revegetated. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	New impact.
Soils, land capability and land use					

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
O3	No additional impacts are envisaged during the Operational Phase, however management measures for topsoil stockpiling are included.	Not applicable.	<ul style="list-style-type: none"> • Soil for the purpose of rehabilitation that has been stripped from cleared areas during the Construction Phase will be stockpiled. The following conservation principles will apply: <ul style="list-style-type: none"> ○ Stripped soil should be stored with as little compaction as possible; ○ Stockpile areas should have their soil stripped to conserve the seed bank; ○ Single handling should be practiced where possible; ○ Stockpiles that are likely to remain undisturbed for 12 months or more should be revegetated; and ○ Usable soil will be respread with as little compaction as possible. ○ Land to which soil has been applied will be revegetated 	Not applicable.	Not applicable.
Biodiversity					
O4	No additional impact expected after the Construction Phase (clearing of vegetation), however the surrounding natural area should not be further impacted upon.	Not applicable.	<ul style="list-style-type: none"> • Continuous education of staff – both permanent, and contractors is required on the importance of biodiversity in the region and why it should be conserved. • Regular wetting of the roads are required. • No off road driving permitted. • No harvesting of species from any natural areas. • Long term monitoring of the Groot- Dwars River is 	Not applicable.	Not applicable.

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>required both in terms of habitat/community structural changes as well as bio-monitoring of the system.</p> <ul style="list-style-type: none"> Ensure the Alien and Invasive Management Plan and Biodiversity Action Plan is continuously updated. 		
Wetlands					
O5	No additional impact expected after the Construction Phase (clearing of vegetation), however the surrounding natural area should not be further impacted upon.	Not applicable.	<ul style="list-style-type: none"> Clear separation of clean and dirty water must take place and diversion of clean water around the operational areas must ensure minimisation of the loss of catchment yield. 	Not applicable.	Not applicable.
Surface water					
O6	<p>Reduced availability of water to surrounding water users due to physical obstruction from the Open Pits resulting in loss of Mean Annual Runoff (MAR)</p> <p>The rainfall water within the designated dirty water area of the Open Pits that forms part of the MAR to the local water courses will be removed from the catchment and may reduce the quantity of water available to downstream users.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Appropriately placed clean water diversions, designed to handle the 1:50 year storm event, should be constructed to divert water away from the Pits and return it to the natural environment. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
O7	<p>Alteration of catchment hydrology causing increased risk of flooding and scouring</p> <p>Changes to surface water hydrology due to continued development of the open pit and the associated risk of flooding and scouring will continue from the Construction Phase.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Runoff from the catchment should be diverted away from the open pit areas by cut-off channels and diversion berms designed to handle the 1:50 year storm event. Energy dissipaters should be constructed in areas of concentrated flows. Routine inspections and maintenance should be 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			conducted to keep the diversions free of debris (silt build up, vegetation etc.) and areas suitably graded.		
O8	<p>Deterioration in water quality in the Dwars River due to release of contaminated water from the open pit operations</p> <p>The need to capture and contain dirty water generated in the Open Pits will increase the volume of contaminated water that needs to be managed on the mine. Release of dirty water can occur if the containment facilities are not appropriately managed or during periods of extended high rainfall. Overflow from the dirty water containment facilities can result in the formation of channels and the formation of drainage lines resulting in the water reaching the Groot-Dwars River.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Dirty water should be contained in pollution control or return water dams designed to enable settlement of solids and handle the 1:50 year event with a minimum freeboard of 0.8 metres above full supply level. • Routine inspections and maintenance should be conducted. • The contained dirty water should re-used as process water make-up. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
Groundwater					
O9	<p>Dewatering of mine void (Reduction in borehole yield and river baseflow)</p> <p>Groundwater inflows into the northern and southern pit will necessitate continuous dewatering of the Pits during life of mine with associated decline of groundwater levels in the vicinity and a reduction of groundwater baseflow towards the Groot-Dwars River.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Continuous water level monitoring. • No groundwater users within the dewatering cone. • Replacement of water supply boreholes in event of yield losses. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Medium term • Scale: Local • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	Der Brochen Project-Groundwater Investigation and Model Report (Delta H Report No. 2013.027-01, October 2014)
O10	<p>Impact on groundwater quality</p> <p>The Open Pits will intercept ambient groundwater flow. Groundwater flowing into the</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local • Consequence: Medium 	<ul style="list-style-type: none"> • Excess groundwater in the Pits should either be used in the Mototolo Concentrator or 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Local • Consequence: Medium 	Der Brochen Project-Groundwater Investigation and Model Report (Delta H Report

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Pits could potentially be contaminated.	<ul style="list-style-type: none"> Probability: Definite Significance: MEDIUM (-) 	contained in the pollution control dam.	<ul style="list-style-type: none"> Probability: Unlikely Significance: LOW (-) 	No. 2013.027-01, October 2014)
Air Quality					
O11	<p>Increase in nuisance dust during operations</p> <p>Dust will be generated by materials handling activities, windblown dust from drilling and blasting activities, crushing activities, vehicle tailpipe and vehicle entrainment. The main source of particulate impacts was due to vehicle entrainment. The simulated PM₁₀ and PM_{2.5} impacts at the closest identified sensitive receptors were within the National Ambient Air Quality Standards (NAAQS). Dust fallout within the closest identified sensitive receptors were within the dust control regulation limits of 600mg/m²/day.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Medium term Scale: Local Consequence: Low Probability: Possible Significance: LOW (-) 	<ul style="list-style-type: none"> Regular water sprays preferably combined with chemicals on unpaved haul roads. Speed limit on haul roads not to exceed 40 km/hr. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Medium term Scale: Local Consequence: Low Probability: Possible Significance: LOW (-) 	Air Quality Specialist Report for the Der Brochen EMP Alignment and Amendment (Airshed Report No. 13SRK25, September 2014)
Noise					
O12	<p>Increase in ambient noise levels</p> <p>The operation of the Open Pits will significantly increase noise levels in the areas. The impact would be highest at night time. The total noise levels are however limited to the activities and directly adjacent surrounding area due to the topography in the valley, which will prevent significant propagation of sound. The surrounding terrain will significantly assist in the attenuation of ambient sound levels with the high hills</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Ensure that all equipment and machinery are well maintained and equipped with silencers where possible. Environmental awareness training should include a noise component allowing employees and contractors to realise the potential noise risks that activities pose to the surrounding environment. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-) 	Noise Impact Study for Environmental Impact Assessment (M ² Environmental Connections cc, February 2012)

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	effectively acting as sound areas between the operation and potential noise sensitive developments.				
Cultural heritage					
O13	No additional impacts are envisaged during the Operational Phase, however there are cultural heritage sites identified around the Open Pits area. Management measures should apply to these heritage sites.	Not applicable.	<ul style="list-style-type: none"> Fence heritage sites with a significance rating of low to high. Provide access to cemeteries and graves to families of the deceased. 	Not applicable.	Not applicable.
Visual					
O14	Decrease in visual aesthetics of the area Visual intrusion to the surrounding areas will be limited due to the surrounding terrain and topography in the valley which will provide a visual barrier.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-) 	No mitigation applied.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-) 	New impact.
Traffic and transportation					
O15	Increased generation of traffic on existing road networks during operations Operation activities will generate additional traffic along the Mine Access Road, the R557, D1261 and the R555 as well as some other roads within the study area.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Regional Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Traffic conditions to be monitored annually, should traffic congestion increase, appropriate mitigation measures will need to be explored and implemented. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-) 	Specialist Traffic and Transportation Study for the Proposed EMP Alignment and Amendment of the Der Brochen Project to include open cast mining, tailings storage facilities and associated infrastructure (Aurecon, Report No. 9522, October 2014)
O16	Impact on pedestrian and cyclists The increase in light and heavy vehicles generated by Operational activities will have minimal impact on the existing	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Regional Consequence: Low Probability: Possible Significance: LOW (-) 	<ul style="list-style-type: none"> None required 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Regional Consequence: Low Probability: Unlikely Significance: LOW (-) 	Specialist Traffic and Transportation Study for the Proposed EMP Alignment and Amendment of the Der Brochen Project to

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	road space available for pedestrians and cyclists. There is minimal pedestrian activity and no cycle activity in the immediate vicinity of the Der Brochen Project.				include open cast mining, tailings storage facilities and associated infrastructure (Aurecon, Report No. 9522, October 2014)
O17	Impact on road safety conditions The increase in traffic generated is expected to have an increase in heavy vehicle traffic flows on the surrounding road network. Heavy vehicles have been identified as one of the major causes of accidents and incidents including fatalities on this road network.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Regional Consequence: Medium Probability: Unlikely Significance: LOW (-) 	<ul style="list-style-type: none"> Drivers of heavy Operation mining vehicles should attend a road safety and driving course to sensitise them to the impact they have on driving conditions for other drivers on the road. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Regional Consequence: Medium Probability: Unlikely Significance: LOW (-) 	Specialist Traffic and Transportation Study for the Proposed EMP Alignment and Amendment of the Der Brochen Project to include open cast mining, tailings storage facilities and associated infrastructure (Aurecon, Report No. 9522, October 2014)
O18	Decreased condition of the road network The increase in heavy vehicles will accelerate the deterioration of the R555 and R557 roads as the result of heavy vehicles using this road network during operations.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Regional Consequence: Medium Probability: Unlikely Significance: LOW (-) 	<ul style="list-style-type: none"> A standard operating procedure is developed for all mine drivers to identify and report potholes and edge breaks to the operations manager who in turn will report it to the relevant authorities. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Regional Consequence: Medium Probability: Unlikely Significance: LOW (-) 	Specialist Traffic and Transportation Study for the Proposed EMP Alignment and Amendment of the Der Brochen Project to include open cast mining, tailings storage facilities and associated infrastructure (Aurecon, Report No. 9522, October 2014)
Blasting and Vibration					
O19	Ground vibration disturbance to Mototolo Concentrator and Helen TSF due to blasting in the Northern Pit Blasting in the Northern Open Pit could have an impact on the Mototolo Concentrator and Helena TSF. Disturbance levels at the Mototolo Concentrator will be	<ul style="list-style-type: none"> Magnitude: Major Duration: Medium term Scale: Local Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Undertake survey to determine shear strength of tailings sediments. Develop a blast design report adjusting the maximum "no go" PPV limit according to survey results. Monitoring of the blasting and vibration levels. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Medium term Scale: Local Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	Assessment of Blasting Related Disturbances on the Infrastructure Adjoining the Der Brochen Planned Open Pits and Declines (Cambrian CC, Report Reference: Der Brochen/ Risk

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	noticed but within acceptable limits, however the impact on the Helena TSF could potentially be significant due to possible liquefaction of tailings sediment when subjected to ground vibrations. Blasting in the Southern Pit is unlikely to have an impact on the above mentioned infrastructure.				Assessment, June 2012)
O20	Ground vibration disturbance to geology offices and coresheds due to blasting in the Northern Pit Blasting in the Northern Open Pit could have a severe impact on the AAP office buildings and coresheds. Ground vibration levels at the offices will exceed the recommended United States Bureau of Mines (USBM) limits. In addition, the offices will fall within the 500 m safety blasting radius. This will have a potential impact on employees within these offices. Blasting in the Southern Pit is unlikely to have an impact on the above mentioned infrastructure.	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Definite Significance: MEDIUM (-)	<ul style="list-style-type: none"> • Evacuate AAP offices during blasting activities when blasting takes place in the centre and southern areas of the pit. • Consider relocation of AAP offices. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Unlikely Significance: LOW (-)	Assessment of Blasting Related Disturbances on the Infrastructure Adjoining the Der Brochen Planned Open Pits and Declines (Cambrian CC, Report Reference: Der Brochen/ Risk Assessment, June 2012)
O21	Ground vibration disturbance to the Der Brochen dam wall due to blasting in the Open Pits Blasting in the Open Pits should have minimal effect on the Der Brochen dam wall as the spillway structure should be able to withstand vibration amplitudes of 200 mm/sec and the earth wall should be able to withstand	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Possible Significance: MEDIUM (-)	<ul style="list-style-type: none"> • Ensure individual hole firing using electronic detonators. • Monitor ground vibrations at the dam wall. • Survey dam wall to determine present elevation and path of the top of the wall. Repeat this survey after last blasts to confirm that no movement has taken place. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Unlikely Significance: LOW (-)	Assessment of Blasting Related Disturbances on the Infrastructure Adjoining the Der Brochen Planned Open Pits and Declines (Cambrian CC, Report Reference: Der Brochen/ Risk Assessment, June 2012)

Operation of the Northern and Southern Open Pits					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	ground vibrations of 45 mm/sec without damage. Vibration levels predicted within the Blasting study were well within the thresholds, however given that the dam wall has shown signs of settlement, it would be prudent to minimise vibration levels.				
O22	Airblast and unwanted side effects such as flyrock during blasting of the Open Pits Airblast activities during the blasting of the Open Pits could potentially result in unwanted side effects such as flyrock affecting surrounding communities. The closest community is the Mankge family, residing 3 kms away from the Northern Pit, and should therefore not be impacted by blasting.	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Possible Significance: MEDIUM (-)	<ul style="list-style-type: none"> • Airblast levels to be kept under 130 dB. • Evacuate AAP offices during blasting activities. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local • Consequence: Medium • Probability: Unlikely Significance: LOW (-)	Assessment of Blasting Related Disturbances on the Infrastructure Adjoining the Der Brochen Planned Open Pits and Declines (Cambrian CC, Report Reference: Der Brochen/ Risk Assessment, June 2012)

1.2.2 Operation of the Co-Disposal Facility

Operation of the Co-Disposal Facility					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
No impacts are envisaged for the Operational Phase.					
Topography					
O23	<p>Permanent alteration of topography due to the Co-Disposal Facility</p> <p>The Co-Disposal Facility will be located within the Groot-Dwars River valley and will have an elevation between 1075 masl and 1119 masl.</p> <p>The Co-Disposal Facility will reach a maximum height of approximately 70 metres above ground level (magl) will marginally influence topography and drainage patterns in the area. The ability of the area to free drain will decrease.</p> <p>The Co-Disposal Facility will become a permanent feature of the landscape.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> On closure, the Co-Disposal Facility should be shaped to be free draining. Erosion protection should be provided. The Co-Disposal Facility will be re-vegetated to blend into the natural environment. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	New impact.
Soils, land capability and land use					
O24	No additional impacts are envisaged during the Operational Phase, when tailings will be deposited as topsoil would have been removed and stockpiled in the Construction Phase. Management measures for stockpiling should take place.	Not applicable.	<ul style="list-style-type: none"> Refer to management measures in Impact Reference O3. 	Not applicable.	Not applicable.
Biodiversity					
O25	No additional impacts are envisaged during the Operational Phase, when tailings will be deposited as vegetation would have been cleared during the Construction Phase. However, the	Not applicable.	<ul style="list-style-type: none"> Refer to management measures in Impact Reference O4. 	Not applicable.	Not applicable.

Operation of the Co-Disposal Facility					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	surrounding natural area should not be further impact upon. Management measures for the surrounding natural area should be implemented.				
Wetlands					
O26	No additional impacts expected after the Construction Phase. However, the surrounding natural area should not be further impact upon. Management measures for the surrounding natural area should be implemented.	Not applicable.	<ul style="list-style-type: none"> Clear separation of clean and dirty water must take place and diversion of clean water around the operational areas must ensure minimisation of the loss of catchment yield. 	Not applicable.	Not applicable.
Surface water					
O27	<p>Deterioration in water quality in the Dwars River due to release of tailings, return water or leachate to the natural environment</p> <p>Changes to surface water hydrology due to development of the Co-Disposal Facility will continue from the Construction Phase. The rainfall water within the designated dirty water area of the Open Pits and Co-Disposal Facility that forms part of the MAR to the local water courses will continue to be removed from the catchment and may continue to reduce the quantity of water available to downstream users.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Regional Consequence: High Probability: Possible <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> Routine inspections and maintenance should be conducted on all TSF infrastructure including Pipeline routes and crossings. Surface water quality, and quantity, monitoring systems should be established for the open pit and Co-Disposal Facility. Emergency action plans should be drawn up to deal with spillages. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)
Groundwater					
O28	<p>Contaminant plume migration (deterioration of groundwater and surface water quality)</p> <p>The simulated leachate plumes emanating from an unlined CDF and the de-commissioned</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Install a lining system of either composite clay or HDPE. Seepage collection drains should be installed to collect seepage. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project-Groundwater Investigation and Model Report (Delta H Report No. 2013.027-01, October 2014)

Operation of the Co-Disposal Facility					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Helena TSF will in all likelihood reach the Groot-Dwars River. While the installation of a lining system would limit the seepage rate and subsequently the spreading of potential contaminants (both laterally and vertically) emanating from the CDF, the plume is not likely to reach the Groot-Dwars River in the northern section.		<ul style="list-style-type: none"> Rehabilitation and capping of the facility to reduce seepages after closure. Infiltration of process water towards the aquifer should be reduced to a minimum. 		
Air Quality					
O29	Refer to Impact Reference O11, for impacts associated with the Operational Phase.				
Noise					
O30	Increase in ambient noise Noise impacts during the operation of the Co-Disposal Facility are considered negligible.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-)	No mitigation measures required.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-)	Not applicable.
Cultural heritage					
O31	No additional impacts are envisaged during the Operational Phase, however there are cultural heritage sites identified around the Open Pits area. Management measures should apply to these heritage sites.	Not applicable.	<ul style="list-style-type: none"> Fence heritage sites near infrastructure with a significance rating of low to high. Provide access to cemeteries and graves to families of the deceased. 	Not applicable.	Not applicable.
Visual					
O32	Decrease in visual aesthetics of the area The Co-Disposal Facility will have a final height of 70 metres which may have a marginal impact on the visual aesthetics of the area. Although the Co-Disposal Facility is visible from certain vantage points on the western and eastern mountain range	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Definite Significance: MEDIUM (-)	<ul style="list-style-type: none"> Vegetate Co-Disposal walls to blend into the natural environment at closure. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local area Consequence: Medium Probability: Definite Significance: MEDIUM (-)	New impact.

Operation of the Co-Disposal Facility

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	slopes, facing the TSF, at a distance of between 6 and 10 km, the view will be outside of the "background" and views will be limited to indistinct at best.				
Traffic and transportation					
O33	Refer to Impact reference O15, O16, O17 and O18, for impacts associated with the Operational Phase.				
O34					
O35					
O36					

1.2.3 Operation of the Mareesburg TSF and Pipeline

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
No impacts are envisaged during the Operational Phase.					
Topography					
O37	<p>Changes in topography as a result of the Tailings Dam</p> <p>The Tailings Dam will be situated in a valley dam on the Mareesburg farm. The dam will be situated against the side of a hill with the toe position beyond the 1:100 year floodline of the adjacent stream.</p> <p>An initial starter wall will be constructed at the toe position of the Tailings Dam. The starter wall will have a maximum outer slope of 1:3, will be covered with soil and will be grassed. Once tailings deposition has reached the top of the starter wall, the wall will be raised using tailings in the conventional Tailings Dam wall construction method and will rise to approximately 110 m in height.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Rehabilitation and vegetation of tailings walls: <ul style="list-style-type: none"> ○ The outer slope of the Tailings Dam wall will be covered with soil and will be grassed. ○ On closure, the top surface of the Tailings Dam will be covered and grassed. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
Soils, land capability and land use					
O38	<p>Loss of soil resources in the area to be covered by the Tailings Dam</p> <p>During the Operational Phase, 200 000 m³ of soil will be required for the ongoing rehabilitation of the Tailings Dam.</p> <p>Soil will be stripped sequentially ahead of each area to be covered. The total area disturbed will be 120 ha.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • A soil stripping, stockpiling and utilisation plan should be developed. Soil can be stripped sequentially ahead of areas being flooded such that the whole basin does not have to be stripped at the outset. • Soil stripped will either be used immediately for rehabilitation of the outer slope of the wall or will be stockpiled for later use. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> • Soil placed in stockpiles will not be compacted. It is anticipated that natural re-vegetation will provide an adequate cover to protect these stockpiles against erosion. In the event that this does not occur the areas will be seeded. • Stripped soil not used for the starter wall and rehabilitation of the outer slope of the wall will be stockpiled for later use. 		
O39	<p>Loss of soil resources due to erosion</p> <p>Concentrated water discharges at the return water dam could cause erosion due to the topography of the area, nature of rainfall and medium to high erodibility of the soil.</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Short term • Scale: Site specific • Consequence: Medium • Probability: Definite • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • Erosion control measures will have to be implemented throughout the site for the entire life of the mine. • Drainage facilities will be designed to minimise the potential for soil erosion. • Energy dissipaters will be provided in areas where concentrated discharges could cause significant erosion, such as the Tailings Dam, return water dam and the access/service roads. • All drainage facilities will be checked at approximately three monthly intervals during the rainy season and any undue erosion or siltation, especially at discharge points, will be noted and repaired. Der Brochen will identify the cause of such undue erosion or siltation and suitable remedial measures will be implemented. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible • Significance: LOW (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
O40	<p>Soil contamination due to leaching of contaminants and seepage</p> <p>Contaminants from the return water dam and Tailings Dam could penetrate adjacent soils close to the foot of the return water dam and Tailings Dam.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • Water pollution management measures are designed to contain all polluted water, thereby minimising the potential for soil contamination from this source. • Any spillage will be cleaned up and remediated. • Monitoring will be implemented downstream of all Pipeline watercourse crossings to detect any impacts. • A leak/spill detection plan will be devised and implemented for all possible areas of leak/spillage. • An inspection and maintenance plan will be implemented to ensure that the Tailings Storage Facility and Pipelines always operate within specifications. • Storm water containment is planned for the Tailings Storage Facility as per the Stormwater Management Plan. • Continuous rehabilitation on tailings walls during operation. 	Negligible	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
Biodiversity					
O41	<p>Changes in community structure and population dynamics of floral species</p> <p>Increased tailings deposition within the rocky drainage lines will affect conservation important species population growth.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Possible <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • Continuous education of staff – both permanent, and contractors is required on the importance of biodiversity in the region and why it should be conserved. • Regular dust suppression on gravel roads and TSF. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Possible <p>Significance: HIGH (-)</p>	Der Brochen Platinum Mine Floristic Assessment (Natural Scientific Services (NSS) Report 1995, May 2014)

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Disturbance of drainage line areas may result in a change in structure of species composition in the long term. An increase in alien species around the footprint of the Mareesburg TSF due to unsuccessful rehabilitation of disturbed areas is also anticipated.		<ul style="list-style-type: none"> No off road driving should be permitted. Long term monitoring of the Groot- Dwars River is required both in terms of habitat/community structural changes as well as bio-monitoring of the system. Ensure the Alien and Invasive Management Plan and Biodiversity Action Plan is continuously updated and implemented. Revegetate areas on the TSF as soon as possible. Rehabilitation must include indigenous species of the area. Collection of seed and storage of plants would have occurred prior to vegetation clearing in the Construction Phase. 		
O42	<p>Displacement or disturbance of animal life (and their migration paths) as a result of operation activities</p> <p>Herpetofauna, birds, small mammals and insects will be displaced locally due to an increase in dust, noise and illumination during the operation of the Mareesburg TSF.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite Significance: MEDIUM (-) 	<ul style="list-style-type: none"> The delineated footprint of the Mareesburg TSF should not be exceeded. Dust suppression on the gravel roads and TSF should be implemented to minimise dust fallout on vegetation surrounding the TSF. The area of habitat disturbed and isolated for the purpose of mining and processing activities will be limited, as far as is practical, to the minimum required for safe and efficient operation. Noise disturbance to wildlife will be limited by using only pre-determined access routes 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Maresburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			and restricting noise to operational sites.		
O43	<p>Cumulative impacts on biota The cumulative increase in mining developments in the Sekhukhune area has led to a cumulative loss of habitat and species. Natural areas of closed savanna and open savanna will remain intact, but disturbance and edge effects will increase, and the survival of species sensitive to disturbance cannot be ensured.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • To manage the area as a game farm / natural area, the carrying capacity of the total fenced area will be determined by evaluating the veld condition and available water. • The animal populations in the area will be monitored and managed (excess stock sold / culled / harvested). 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible • Significance: MEDIUM (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
O44	<p>Disturbance/loss of aquatic animal species due to deterioration in surface water quality due to contamination from various forms of pollution from operational activities, increased sediment loads, oil and fuel spills and leaks. Impact on surface water during operations from potential spillage. Increased fuels, oils, cements and other waste from operational activities and vehicles may contaminate surface water bodies.</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Short term • Scale: Site specific • Consequence: Medium • Probability: Definite • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • All effort will be made to maintain this "good" biotic status and continuous seasonal biological monitoring will be performed when mining operation commences. Such future monitoring together with the already gathered baseline information will then be used for early detection of possible future biotic degradation to enable mitigation measures. • A long term monitoring programme will be implemented to monitor physico-chemical and biological components of the aquatic ecosystems within and below the mining area. The monitoring programme will commence as soon as mining operations start. This would enable the timely identification of required mitigation/environmental management procedures to 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible • Significance: LOW (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>maintain the high quality of this ecologically important aquatic ecosystem.</p> <ul style="list-style-type: none"> Erosion control measures in the form of temporary erosion prevention berms should be implemented during construction. Clean water diversion bunds should be constructed upstream of the construction site prior to clearing areas for new infrastructure. Emergency action plans should be drawn up to deal with spillages. Chemical toilets should be provided at operations sites. 		
Wetlands					
O45	No additional impacts expected after the Construction Phase. However, the surrounding natural area should not be further impact upon. Management measures for the surrounding natural area should be implemented.	Not applicable.	<ul style="list-style-type: none"> Clear separation of clean and dirty water should take place and diversion of clean water around the operational areas must ensure minimisation of the loss of catchment yield. 	Not applicable.	Not applicable.
Surface water					
O46	<p>Alteration of drainage patterns caused by mining activities</p> <p>The Tailings Dam site will be across minor drainage lines, causing them to disappear. This may result in the loss of a resource and contamination of runoff.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Clean stormwater diversions will assist in directing water to natural river courses. River diversions will be implemented, where necessary. All rainfall runoff originating on top of the Tailings Dam will be discharged via a penstock to the return water dam. This water, together with all rain falling on the return water dam, will therefore be 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>removed from the catchment. The water will, however, be utilised in the mine's process water circuit thus reducing demand on the mine's primary raw water source.</p> <ul style="list-style-type: none"> • The slope faces will be topsoiled and re-vegetated. • Water management and erosion control measures will be inspected regularly, and appropriate remedial measures will be implemented where necessary. • Contaminated runoff from the Tailings Dam will be collected on the dam and recycled to the process water circuit via the penstock and return water dam. • Clear separation of clean and dirty water must take place and diversion of clean water around the operational areas must ensure minimisation of the loss of catchment yield. 		
O47	<p>Deterioration in surface water quality due to increased sediment load</p> <p>Ineffective runoff control, for example from the Tailings Dam may lead to erosion and siltation of water bodies. Increased sediment loads may cause damage to the aquatic ecosystem due to substances in the discharge. Large volumes of water being discharged from small conduits will have a</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Long term • Scale: Site specific • Consequence: High • Probability: Possible <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • Re-vegetation of all denuded areas. • Water management and erosion control measures will be inspected regularly, and appropriate remedial measures will be implemented where necessary. • Clear separation of clean and dirty water must take place and diversion of clean water around the operational areas 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p>

Operation of the Maresburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	scouring effect on stream banks and beds. Erosion of the sides of the Tailings Dam will lead to siltation of watercourses and loss of fauna and flora in the vicinity.		must ensure minimisation of the loss of catchment yield.		
O48	Contamination of surface water bodies due to diffuse pollution Seepage from the Tailings Dam directly to surface water bodies can cause contamination.	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Long term • Scale: Site specific • Consequence: High • Probability: Possible Significance: HIGH (-)	<ul style="list-style-type: none"> • Stormwater runoff from the small catchment area above the dam, rainfall on the Tailings Dam and supernatant water will be decanted through penstocks and an underdrain into a lined return water dam, from where it will be recycled back into the process. An emergency spillway will be provided to deal with extreme storm events. • Runoff from the side slopes of the dam will be caught on the step-in areas where solids will be trapped and the water evaporated. The step-in areas are designed to contain the 1:50 year storm. • The Tailings Dam will be provided with underdrains and a solution trench along the full length of the toe of the starter wall. Seepage water collected in this trench will be discharged to the return water dam. • Revegetation of the Tailings Dam both during the Operational Phase and following closure will greatly reduce groundwater recharge as the resultant evapotranspiration. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible Significance: MEDIUM (-)	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> Monitoring will be implemented downstream of all Pipeline watercourse crossings to detect any impacts. A leak/spill detection plan will be devised and implemented for all possible areas of leak/spillage. An inspection and maintenance plan will be implemented to ensure that the Tailings Storage Facility and Pipelines always operate within specifications. Storm water containment is planned for the Tailings Storage Facility as per the Stormwater Management Plan. Continuous rehabilitation on tailings walls during operation. Implementation of good housekeeping practices at operational sites. 		
	Changes to the hydrology within the Mareesburg Stream catchment will continue from the Construction Phase. No additional mitigation is indicated. Refer to Impact Reference C8, C9 and C10.				
O49	<p>Contamination of surface water quality at Mareesburg stream</p> <p>Spillage of tailings and/or return water from the piped transfer systems has the potential to impact directly on the Mareesburg Stream and Groot-Dwars River via spills in the riparian zone at watercourse crossings or indirectly via runoff. The greatest consequence is for</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Medium term Scale: Local Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Regular inspections of the Pipeline route should be undertaken in order to detect leaks/ spillages timeously. Monitoring should be implemented downstream of all Pipeline watercourse crossings to detect any impacts. A leak/spill detection plan should be devised and implemented for all possible areas of leak/spillage. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Medium term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-) 	Der Brochen Project Environmental Impact Assessment/ Environmental Management Plan Amendment and Alignment: Surface Water Specialist Report (SRK Report No. 469113/SW, October 2014)

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	spillage occurring at the watercourse crossings.		<ul style="list-style-type: none"> An inspection and maintenance plan should be implemented to ensure that the Tailings Storage Facility and Pipelines always operate within specifications. 		
Groundwater					
O50	<p>Deterioration of groundwater quality at the Tailings Dam</p> <p>Deterioration of groundwater quality by downward recharge from surface to the underlying aquifers and contamination of surface water by spillage/overflow from the Pipeline/drain/ storage dams at the Tailings Dam and return water dams.</p> <p>Due to the large volumes of potentially contaminant material generated, the Tailings Dam is likely to provide the greatest risk to contamination of the risk to contamination of the underlying weathered bedrock aquifer, local primary aquifer and Mareesburg surface flow, due to the shallow nature of the aquifers and their hydraulic continuity.</p> <p>The main source of contamination in the Tailings Dam will be the slurry water and this may enter the groundwater system by vertical and lateral infiltration from the base and perimeter of the Tailings Dam and return water dam.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Site specific Consequence: High Probability: Possible Significance: HIGH (-) 	<ul style="list-style-type: none"> The Tailings Dam design will take into consideration the shallow depths to groundwater and close proximity to the Mareesburg river and associated primary aquifer. The available runoff and downward/lateral infiltration available to recharge the aquifers and surface flow will be reduced to a minimum through proper Tailings Dam design. Due to the shallow depth of the groundwater aquifer, if the detailed geotechnical work proves the soil permeability to be a problem (<10⁻⁶ cm/s), the following management measures will be implemented to reduce seepage: <ul style="list-style-type: none"> The topsoil will be removed; Any clayey subsoil will be removed; Implementation of a groundwater monitoring programme to monitor the boreholes at the Tailings Dam. The water management plan for the tailings will be a closed 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>circuit system with no discharge to the environment.</p> <ul style="list-style-type: none"> The return water from the Tailings Dam will be pumped in a closed circuit to the Concentrator process water tank. Monitoring of water levels in monitoring boreholes as per the groundwater monitoring programme. Should the groundwater monitoring programme indicate that groundwater resources have been affected by dewatering, indicate alternative supply of water will be made available. 		
O51	<p>Contaminant plume migration (deterioration of groundwater and surface water quality)</p> <p>The simulated leachate plumes emanating from an unlined or lined Mareesburg TSF will in all likelihood reach the Mareesburg Stream due to its close proximity to the surface water course (~110 m towards the southern TSF wall).</p> <p>Although it's expected that the overall salt load reporting to the Mareesburg Stream will significantly be reduced by a lining system the spreading of the plume can be effectively be contained (from reaching the Mareesburg Stream) through the implantation of a hydraulic containment system.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Local Consequence: High Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> Installation of a lining system, either composite clay or HDPE. Seepage collection drains should be constructed to collect seepage emanating from the TSF. Seepage should be pumped to the Pollution Control Dam to be contained. Hydraulic containment system should be implemented during Operational and Closure Phases. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project-Groundwater Investigation and Model Report (Delta H Report No. 2013.027-01, October 2014)
Air Quality					
O52	Increased dust levels due to mining operations	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term 	<ul style="list-style-type: none"> During this operation the top of the crest wall will either be 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term 	Environmental Management

Operation of the Mareesburg TSF and Pipeline					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Prevailing wind directions are north-westerly and south-easterly due to the topographical orientation of valleys and ridges in the area. As a result, dust from the Tailings Dam will be blown to the north-west and south-east.	<ul style="list-style-type: none"> Scale: Site specific Consequence: Medium Probability: Possible Significance: MEDIUM (-)	<p>similarly treated or provided with some other suitable form of cover such as a waste rock.</p> <ul style="list-style-type: none"> As areas dry out on the top of the Tailings Dam, a light crust will form. Provided the side walls and the tops of the crest walls are adequately protected, this crust is expected to remain largely intact for several weeks to months, depending on the prevailing weather conditions. This should therefore provide adequate protection against excessive dust generation. Vegetation of the sides of the Tailings Dam wall to reduce surface erosion. A dust monitoring programme is in place. Dust suppression will be undertaken of the service roads and Tailings Facility where required. 	<ul style="list-style-type: none"> Scale: Site specific Consequence: Low Probability: Possible Significance: LOW (-)	Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
Noise					
O53	Increase in ambient noise Noise impacts during the operation of the Mareesburg TSF are considered negligible.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-)	No mitigation measures required.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely Significance: LOW (-)	Not applicable.
Visual					
O54	Decrease in visual aesthetics of the area The Mareesburg TSF will reach a height of 115 m which may have an impact on the visual aesthetics of the area.	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Definite Significance: MEDIUM (-)	<ul style="list-style-type: none"> Vegetate tailings walls to blend into the natural environment. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local area Consequence: Medium Probability: Definite Significance: MEDIUM (-)	Not applicable.

Operation of the Mareesburg TSF and Pipeline

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Cultural heritage resources					
O55	No additional impacts are envisaged during the Operational Phase, however there are cultural heritage sites identified around the Mareesburg TSF area. Management measures should apply to these heritage sites.	Not applicable.	<ul style="list-style-type: none"> • Fence heritage sites near infrastructure with a significance rating of low to high. • Provide access to cemeteries and graves to families of the deceased. 	Not applicable.	Not applicable.
Traffic and transportation					
Refer to Impact Reference O15, O16, O17 and O18 for traffic impacts associated with the Operational Phase.					

1.2.4 Operation of the Helena TSF

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
Geology					
No impacts are envisaged during the Operational Phase.					
Topography					
O56	<p>Permanent alteration of topography due to the raising of the TSF</p> <p>The existing Helena TSF is located within a small valley adjacent to the Groot-Dwars River to an elevation between 1082 masl in the east and 1124 masl in the west. The final elevation of the Helena TSF will be 1145 masl. The increase in height of approximately 21 m will marginally influence topography and drainage patterns in the area. The ability of the area to free drain will decrease. The raised Helena TSF will become a permanent feature of the landscape.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> On closure, the TSF should be shaped to be free draining. Erosion protection should be provided. The TSF will be re-vegetated to blend into the natural environment. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
Soils, land capability and land use					
O57	<p>Loss of soil resources</p> <p>Due to the infilling of tailings material between the rockfill walls, 3 ha of soil resources will be lost. This area is, however, on a steep slope and only suitable for grazing.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Soils should be stripped and stockpiled for use during rehabilitation. Shaped TSF to be covered in topsoil from stockpiles. Revegetate topsoiled TSF. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
O58	<p>Contamination of soil resource</p> <p>The potential contamination of soils as a result of seepage from deposited tailings and Pipeline spills.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Soils will be stripped and stockpiled for use during rehabilitation. Conduct weekly site inspections along the Pipeline to detect any spills or leakages. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> • Immediate remediation of tailings spillages along Pipeline routes. • An inspection and maintenance plan will be implemented to ensure that the TSF and Pipelines operate within specifications. 		
Biodiversity					
O59	<p>Loss of insect species / communities of conservation value due to direct impacts such as loss of habitat or habitat fragmentation and indirect impacts such as dust and noise</p> <p>The Cicada (<i>Pycna sylvia</i>) is of conservational importance and found within the Der Brochen Project area, on Helena farm. Cicada are sensitive to pollution, both dust and noise.</p> <p>It is expected that operational activities of the Tailings Dam will affect Cicada populations that are endemic to this area. However, this impact will be minimised as a result of the provision of the buffer zone between the Tailings Dam and Cicada habitat, as well as allocation of conservation areas for the species.</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Long term • Scale: Site specific • Consequence: High • Probability: Definitely <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • Regular monitoring of the Cicada population, as per the Biodiversity Action Plan. • Implementation of measures to reduce dust and noise impacts, including grassing and vegetation of the Tailings Dam and regular maintenance of operational vehicles and equipment. • Areas of disturbance will be limited to the footprints and vehicular movement outside of these demarcated areas will be restricted. • Method statements will be supplied to the ECO before commencement of any disturbing/destructive construction/operational activities such as removal/disturbance of trees or important species, vegetation, disturbance of streams, dry watercourses, drainage lines or riparian areas). • Sufficient conservation areas, including all cicada habitat, will remain intact, as part of an integrated conservation 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005)

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
			management plan for the area.		
O60	<p>Loss of biodiversity Loss of vegetation as a result of clearing activities for the area earmarked for additional deposition of tailings material.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM(-)</p>	<ul style="list-style-type: none"> • Plants that are to be removed for rehabilitation purposes will be removed and replanted in a nursery under the guidance of a recognized landscaper. The mine will be responsible for the operation of the nursery until such time. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM(-)</p>	Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
Surface water					
O61	<p>Deterioration of stormwater and surface water quality due to operations of the Tailings Dam and related activities Spillages and leakages of engine oils and diesel/petrol from vehicles, as well as spills/leaks from the Tailings Dam during the Operational Phase may potentially decrease stormwater and surface water quality. This impact is reduced due to engineering designs during the construction for the Helena TSF which included cut-off trenches and walls to separate clean water from the Tailings Dam. However should a spill occur, it would Cicada habitat and the Groot-Dwarsrivier, which is in close proximity to the Tailings Dam.</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Short term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Engineering designs include: <ul style="list-style-type: none"> ○ Cut-off trenches and walls above the Tailings Dam to separate clean water from the Tailings Dam. ○ Paddocks and solution trenches between the foot of the Tailings Dam and the Maresburg stream channel to intercept migrating slurry water along the soil profile/bedrock contact zone. ○ Decanting of stormwater runoff from the small catchment area above the dam, rainfall on the Tailings Dam and supernatant water through penstocks and an underdrain into return water dams from where it will be recycled back into the process. ○ An emergency spillway to deal with extreme storm events. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005)

Operation of the Helena TSF and associated infrastructure

Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> ○ Collection of runoff from the side slopes of the dam on step-in areas where solids will be trapped and collection of seepage from beneath the Tailings Dam in drains down slope of the dam to be returned into the process. • Good housekeeping practices will be maintained, including but not limited to separation of clean and dirty water, limiting exposed dirty surfaces and maximizing opportunities for re-use of water. • Linear infrastructure such as roads and Pipelines should be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion. • A fenced boundary has been constructed for the Tailings Dam site which is located 100 m beyond the 1:100 year floodline of the valley tributary, ensuring the upper catchment runoff is not affected. • Stormwater runoff from the small catchment area above the dam, rainfall on the Tailings Dam and supernatant water is decanted through penstocks and an underdrain into return water dams from where it is 		

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
			<p>recycled back into the process.</p> <ul style="list-style-type: none"> An emergency spillway is provided to deal with extreme storm events. Runoff from the side slopes of the dam is collected on the step-in areas where solids are trapped. Seepage from beneath the Tailings Dam is collected in drains down slope of the dam and returned into the process. The Tailings Dams slopes/walls will be continuously revegetated to reduce surface areas exposed to runoff. 		
O62	<p>Decrease of surface water quality Existing clean water diversions currently divert runoff along the western boundary of the Helena TSF. The TSF will expand in a westerly direction therefore cut-off trenches will need to be re-aligned.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Re-align cut-off trench to divert clean stormwater around the TSF. Manage separation of clean and dirty water as per the Stormwater Management Plan. Update water balance on an annual basis. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local area Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
	Groundwater				
O63	<p>Discharge and development of seepage zones along the banks of the Groot-Dwars River channel Process water/tailings slurry may potentially infiltrate downwards and enter the soil profile and shallow groundwater system directly from the Tailings Dam, particularly from the perimeter zones of the Tailings Dam, Perimeter Drain, Return</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Cut-off trenches and walls above the Tailings Dam divert clean water from the Tailings Dam, decanting runoff and supernatant water through penstocks and an underdrain into return water dams from where it is recycled back into the process. An emergency spillway to deal with extreme storm events and collection of seepage from beneath the Tailings Dam in drains down 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005)

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
	<p>Water Dams and from leakage/overflow events. Potential down slope migration of contaminated slurry water may take place along the contact zone between the soil profile and underlying bedrock (at depths of 0.5-2 m). Contaminated water could be expected to migrate rapidly to the valley bottom and enter the Groot-Dwarsrivier (via discharge into the surface environment down slope or direct bank seepage into the river valley).</p>		<p>slope of the dam to be returned into the process.</p> <ul style="list-style-type: none"> • Paddocks and solution trenches have been constructed between the foot of the Tailings Dam and the Mareesburg stream channel to intercept migrating slurry water along the soil profile/bedrock contact zone. • Regular monitoring through monitoring boreholes to ensure working of the tailings Pipelines through flow metres and visual inspections. Should seepage be detected, the repair of any damage will be undertaken. • Regular sampling of soils around the Tailings Dam to detect seepage and immediate clean-up and remediation of tailings spillage. • Continuous vegetation of Tailings Dam walls. 		
O64	<p>Contaminate plume migration (deterioration of groundwater and surface water quality) Downward infiltration of contaminated process/slurry water will increase groundwater recharge and eventual contamination of the shallow weathered fractured bedrock aquifer in the proposed TSF footprint area. However, due to the low bedrock permeability and the presence of dolerite dykes which represents a boundary condition between</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Definite • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • Cut-off trenches and walls above the Tailings Dam divert clean water from the Tailings Dam, decanting runoff and supernatant water through penstocks and an underdrain into return water dams from where it is recycled back into the process. • An emergency spillway to deal with extreme storm events and collection of seepage from beneath the Tailings Dam in drains down 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Definite • Significance: MEDIUM (-) 	Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005)

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
	the TSF area and Groot-Dwarsrivier channel, the impact is likely to be small.		<p>slope of the dam to be returned into the process.</p> <ul style="list-style-type: none"> • Paddocks and solution trenches have been constructed between the foot of the Tailings Dam and the Mareesburg stream channel to intercept migrating slurry water along the soil profile/bedrock contact zone. • Regular monitoring through monitoring boreholes to ensure working of the tailings Pipelines through flow metres and visual inspections. Should seepage be detected, the repair of any damage will be undertaken. • Regular sampling of soils around the Tailings Dam to detect seepage and immediate clean-up and remediation of tailings spillage. • Continuous vegetation of Tailings Dam walls. 		
O65	<p>Impact on groundwater quality The leachate plume emanating from the Helena TSF will continue to encroach towards the Groot-Dwars River. According to simulations conducted, the sulfate seepage plumes from the Helena TSF extend to approximately 300 metres towards the Groot-Dwars River. The simulated plume migration is relatively slow due to the prevailing gradients, low aquifer conductivities and</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local area • Consequence: Medium • Probability: Definite • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • Continue with groundwater monitoring on a quarterly basis to detect groundwater contamination. Should groundwater be contaminated, it will be pumped to the TSF for recirculation. • Assessment and facilitation of nitrate degradation or retardation within the TSF or shallow aquifer. • Hydraulic plume containment or reactive barriers to arrest emanating plume. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite • Significance: MEDIUM(-) 	<p>Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014) Der Brochen Project-Groundwater Investigation and Model Report (Delta H Report No. 2013.027-01, October 2014)</p>

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
	dispersion of constituents of concern along the flow path. The tailings stream is the overall elevated expected salt load and nitrate concentration in the process water. The TSF is considered to pose the greatest pollution risk to the underlying aquifers as well as potential long-term liabilities.				
Air Quality					
O66	<p>Decreased ambient air quality due to wind-blown respirable particulates (increased PM₁₀ concentrations) affecting Cicada habitats</p> <p>Increase in wind-blown dust from the Tailings Dam resulting in a decrease in air quality affecting Cicada habitat east of the Tailings Dam.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> The outer side slopes of the Tailings Dam will continuously be vegetated. The top of the Tailings Dam will be vegetated during closure and the side slopes fully vegetated to ensure a wilderness land capability. Two single dust buckets will If dust is noted on the access roads, applicable measures such as a watercart or chemical dust suppression will be implemented. Frequent monitoring of dust buckets downwind of the Tailings Dam, as well as between the Tailings Dam and Cicada habitat to monitor dust fallout. Should dust monitoring determine that dust fallout levels exceed the limits, dust suppression measures will be put in place. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Unlikely <p>Significance: LOW (-)</p>	Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005)
O67	<p>Decreased ambient air quality due to increased wind-blown dust fallout</p> <p>Total Suspended Particulates (TSP) concentrations within the Der Brochen Project area fall</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> The outer side slopes of the Tailings Dam will continuously be vegetated. The top of the Tailings Dam will be vegetated during closure and the side slopes 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
	within the heavy fallout class (500-1 200 mg/m ² /day). Given that no human receptors are in close proximity to the Tailings Dam, Cicada habitats are expected to be affected.		<p>fully vegetated to ensure a wilderness land capability.</p> <ul style="list-style-type: none"> Two single dust buckets will be placed on the eastern and south eastern sides of the Tailings Dam between the dam and the Cicada habitat, with a third bucket downwind (NW-WNW) of the dam, to monitor dust fallout. If dust is noted on the access roads, applicable measures such as a watercart or chemical dust suppression will be implemented. Frequent monitoring of dust buckets downwind of the Tailings Dam, as well as between the Tailings Dam and Cicada habitat to monitor dust fallout. Should dust monitoring determine that dust fallout levels exceed the limits, dust suppression measures will be put in place. 		Consulting Report No. 343158/ April 2005)
O68	<p>Increase in nuisance dust</p> <p>Deterioration of air quality (dust fallout) as a result of dust generation from deposition of tailings material.</p> <p>There are no sensitive receptors in close proximity to the Helena TSF, except for the Mototolo Concentrator and Der Brochen Project offices.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Continue with dust fallout monitoring programme. Use of dust suppression and watering on TSF area to reduce dust. Vegetate side slopes of TSF continuously during operations. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Local area Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
	Noise				
O69	<p>Increase in ambient noise</p> <p>Noise impacts during the operation of the Helena TSF are considered negligible.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium 	No mitigation measures required.	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium 	Not applicable.

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
		<ul style="list-style-type: none"> Probability: Unlikely Significance: LOW (-) 		<ul style="list-style-type: none"> Probability: Unlikely Significance: LOW (-) 	
	Visual				
O70	<p>Reduced integrity of scenic views from roads in the surrounding area</p> <p>The maximum height of the Tailings Dam at the end of the operations is anticipated to be 43 magl (increased to 63 magl after heightening of Helena TSF, Refer to O61) and will be visible within a 1 km buffer distance, mainly from the north-east and south-east areas adjacent to the Tailings Dam site. However, the topography consists of the Groot-Dwarsrivier valley which provides a natural visual buffer to Der Brochen Project area and therefore the visual impact of the TSF is likely to be minimal.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	<ul style="list-style-type: none"> Progressive rehabilitation and dust control will be undertaken regularly. Vegetate tailings walls to blend into the natural environment. The outer slope of the rockfill starter wall will be topsoiled and vegetated. The outer side slopes of the Tailings Dam will continuously be vegetated. The top of the Tailings Dam will be vegetated during closure and the side slopes fully vegetated to ensure a wilderness land capability. If dust is noted on the access roads, applicable measures such as a watercart or chemical dust suppression will be implemented. Land to which soil has been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Rehabilitation will be progressive throughout the life of the mine, and vegetation will be established as soon as a disturbing activity has ceased, to stabilize soils and re-establish 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely Significance: LOW (-) 	Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005)

Operation of the Helena TSF and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Mitigation Measure	Significance rating post-mitigation	Source document
			habitats. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. <ul style="list-style-type: none"> • Areas of disturbance will be limited to the footprints given on the final layout drawings and vehicular movement 		
O71	<p>Decrease in visual aesthetics of the area</p> <p>The Helena TSF will increase by 21 metres which may have a marginal impact on the visual aesthetics of the area. Although the TSF is visible from certain vantage points on the western and eastern mountain range slopes, facing the TSF, at a distance of between 6 and 10 km, the view will be outside of the “background” and views will be limited to indistinct at best. No additional visual impacts are expected.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Local area • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Vegetate tailings walls to blend into the natural environment. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Local area • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
Cultural heritage resources					
No impacts are envisaged during the Operational Phase.					
Traffic and transportation					
No impacts are envisaged during the Operational Phase.					

1.2.5 Operation of the Mototolo Concentrator and Chrome Plant

Operation of the Mototolo Concentrator and Chrome Plant					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
No impacts are envisaged during the Operational Phase.					
Topography					
O72	<p>Increased visibility and change in topography due to placement of Chrome Plant infrastructure</p> <p>The spiral plant has reached a height of 26.8 magl. The visibility of the plant is however disguised from the west by its location adjacent to the Concentrator infrastructure, of which the ROM silo is 40 magl.</p> <p>To the south, the Mototolo Tailings Dam (Helena TSF) has reached a height of 42 m (raised to 63 m). On a broader scale, the Chrome Plant is located adjacent to the Groot-Dwarsrivier valley, which is flanked by steep mountains on either side.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> All infrastructure should be demolished on closure of the Chrome Plant and all disturbed areas will be reinstated and rehabilitated to a known past state or to an approximation of the natural condition. Land to which soils have been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Chrome Plant- Helena 6 JT, Eastern Limb of the Bushveld Complex, Mpumalanga, South Africa Final EIAR and EMP (ERM, May 2006)
Soils, land capability and land use					
O73	<p>Loss of soil resources due to erosion</p> <p>Concentrated water discharges at the plant could cause significant erosion. This impact has the potential to be significant due to the topography of the area and the nature of rainfall in the area.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Site specific Consequence: High Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> Special erosion control measures will have to be implemented should erosion be detected. Drainage facilities will be designed to minimise the potential for soil erosion. Energy dissipaters will be provided in areas where concentrated discharges could cause significant erosion, such as the plant. All drainage facilities will be checked at approximately 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mototolo Concentrator and Chrome Plant					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>three monthly intervals during the rainy season and any undue erosion or siltation, especially at discharge points, will be noted and repaired. Der Brochen will identify the cause of such undue erosion or siltation and suitable remedial measures will be implemented.</p> <ul style="list-style-type: none"> No random driving across the terrain (outside of authorised routes) will be allowed – this will destroy the soil structure, cause unsightly tracks and lead to unnecessary soil erosion 		
O74	<p>Disturbance/Loss of soil resources due to accelerated/human induced soil erosion, or due to contamination of soils from spillages of fuels, oils, chemicals or waste</p> <p>The soils in the Chrome Plant area have a moderate erosion potential. Operational mining activities could cause erosion of these soils only along the access roads, as the remainder of the footprint will be hardstanding. Spillages of oils and fuels at the workshop and from hauling vehicles during operations, could further lead to a loss of soils due to contamination.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> The clean and dirty water management and separation at the Chrome Plant will form part of the overall Concentrator water management system. Maintenance of vehicles in good running order. Disturbance will be restricted to footprint areas depicted with no random driving across the terrain allowed All infrastructure will be demolished on closure of the Chrome Plant and all disturbed areas will be reinstated and rehabilitated to a known past state or to an approximation of the natural condition. During reinstatement, surfaces will be ripped and stockpiled soil will be graded over previously disturbed/ 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Chrome Plant- Helena 6 JT, Eastern Limb of the Bushveld Complex, Mpumalanga, South Africa Final EIAR and EMP (ERM, May 2006)

Operation of the Mototolo Concentrator and Chrome Plant

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>stripped areas with as little compaction as possible, with vehicles avoiding running over stockpiles by spreading from one side only.</p> <ul style="list-style-type: none"> • Land to which soils have been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. • Separate clean and dirty water systems will be constructed and will be maintained throughout the life of the Chrome Plant. • Drainage, stormwater and erosion control measures/structures will be checked at three monthly intervals and after significant rainfall events for siltation and effectiveness in preventing erosion. Silted, damaged or ineffective structures will be cleaned, repaired or replaced regularly. • Energy dissipaters will be constructed at sites of concentrated stormwater discharge. • Silt and oil traps, and drip trays will be inspected 		

Operation of the Mototolo Concentrator and Chrome Plant					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>frequently for effectiveness and cleaned/repaired/replaced regularly. Impermeable hazardous waste containers will be disposed of as required to prevent spillage. All water pumps will be maintained to prevent spills/leaks, and placed in impermeable sumps to contain possible leakage.</p> <ul style="list-style-type: none"> Vehicles will be inspected regularly and kept in good running order, and leaks repaired immediately. 		
Biodiversity					
O75	<p>Effects of fugitive dust on vegetation Fugitive dust from the plant will lead to the degradation of surrounding vegetation.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Dust monitoring to be undertaken as per the Dust Monitoring Plan. Dust suppression to be undertaken on gravel roads. Water sprayers or dust plants, or other suitable methods, will be used to minimise dust at sources. The effect will be monitored and adjusted accordingly. The conveyor will be fitted with doghouse sheeting. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
Surface water					
O76	<p>Disturbance/loss of aquatic animal species due to a deterioration in surface water quality due to contamination from various forms of pollution from operational activities, increased sediment loads, oil and fuel spills and leaks. Impact on surface water during operations from potential</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Regular inspections should be undertaken in order to detect spillages timeously. Monitoring of Groot-Dwars River should be implemented upstream and downstream of the Concentrator and Chrome Plant to detect deterioration. A spill detection plan should be devised and implemented 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mototolo Concentrator and Chrome Plant

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	<p>spillage from the Concentrator plant. Increased fuels, oils, cements and other waste from operational activities and vehicles may contaminate surface water bodies.</p>		<p>for all possible areas of spillage.</p> <ul style="list-style-type: none"> • An inspection and maintenance plan should be implemented to ensure that the Concentrator and Chrome Plant are operated within specifications. • All effort will be made to maintain this “good” biotic status and continuous seasonal biological monitoring will be performed when mining operation commences. Such future monitoring together with the already gathered baseline information will then be used for early detection of possible future biotic degradation to enable mitigation measures. • A long term monitoring programme will be implemented to monitor physico-chemical and biological components of the aquatic ecosystems within and below the mining area. The monitoring programme will commence as soon as mining operations start. This would enable the timely identification of required mitigation/environmental management procedures to maintain the high quality of this ecologically important aquatic ecosystem. • An appropriate biological index based on fish (such as the Fish Assemblage Integrity 		

Operation of the Mototolo Concentrator and Chrome Plant					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			Index, Kleynhans, 1997 or Sensitivity-weighted Index of Biotic Integrity will also be included in order to quantify and classify the longer-term changes in biotic integrity.		
O77	<p>Deterioration of stormwater and surface water quality due to operational activities at the Chrome Plant</p> <p>Spillages and leakage of engine oils and diesel/petrol will mainly originate from the dump trucks used to transport chrome concentrate.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • The area around the Mototolo Concentrator, within which the Chrome Plant is positioned, is within a controlled stormwater area. All process water will be recycled and re-used within the Mototolo Concentrator and Chrome Plant, with a zero discharge policy being maintained. • Measure and monitor surface water quality in the Groot-Dwarsrivier, within and below the Chrome Plant area. • Groundwater quality and quantity will be measured and monitored as per the monitoring protocol. • The dispersion of wastewater will be limited by using soak-away drains in the wash bay and domestic wash water discharge areas. Wastewater will be returned to the process. • Separate clean and dirty water systems will be constructed and will be maintained throughout the life of the Chrome Plant. • Drainage, stormwater and erosion control measures/structures will be checked at 3 monthly 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely • Significance: LOW (-) 	Chrome Plant- Helena 6 JT, Eastern Limb of the Bushveld Complex, Mpumalanga, South Africa Final EIAR and EMP (ERM, May 2006)

Operation of the Mototolo Concentrator and Chrome Plant

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>intervals and after significant rainfall events for siltation and effectiveness in preventing erosion. Silted, damaged or ineffective structures will be cleaned, repaired or replaced regularly.</p> <ul style="list-style-type: none"> • Energy dissipaters will be constructed at sites of concentrated stormwater discharge. • Silt and oil traps, and drip trays will be inspected frequently for effectiveness and cleaned/repared/replaced regularly. Impermeable hazardous waste containers will be disposed of as required to prevent spillage. All water pumps will be maintained to prevent spills/leaks, and placed in impermeable sumps to contain possible leakage. • Vehicles will be inspected regularly and kept in good running order, and leaks repaired immediately. • Any spillage will be reported, cleaned up and soils remediated immediately. Any pollution or spills will be reported to the DWS regional director within 24 hours of the occurrence. • Drivers will be trained on how to deal with spillage of ore, hydrocarbons and other potential contaminants. 		

Operation of the Mototolo Concentrator and Chrome Plant					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
O78	<p>Contamination of surface water bodies due to diffuse pollution</p> <p>Seepage/spills from plant that can give rise to diffuse pollution.</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Short term • Scale: Site specific • Consequence: Medium • Probability: Definite • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • Implement good housekeeping at operational sites. The final dirty water stream fed from the spiral plant reports to the Concentrator process water tank. • Monitor pollution control infrastructure and the surrounding boreholes. • Much of the terrace areas will be paved with concrete and tar. Remaining areas will be planted to lawns and gardens. • Individual components such as stores, sub-stations, stockpiles, workshops and the Concentrator will be individually banded to contain spills. Banded areas will be designed to contain at least 110% of the volume of the maximum potential spillage. Spilled material will be recovered and either returned to the process or will be disposed of to an appropriate site. • A drain will be provided upslope of the plant terrace to divert clean stormwater runoff away from the terrace. This drain will be designed to cater for the 1:50 year return period flood. The discharge point will be designed to allow for the safe discharge of water without causing any erosion. • A drain designed to cater for the 1:50 year return period flood event will be 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible • Significance: LOW (-) 	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p>

Operation of the Mototolo Concentrator and Chrome Plant					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>constructed downslope of the terrace to direct contaminated water discharges from this area to the settlers.</p> <ul style="list-style-type: none"> Water from the immediate plant area will drain to a lined sump designed to retain wash down water and water from small rainfall events. All runoff from terraces not catered for by the sumps will flow to lined settlers. This settler system will be designed to provide sufficient capacity to allow for the settlement and containment of the 1:50 year return period flood event. A spillway sized for the 1:50 year event will be provided. Settled water will be recycled for use in the process water circuit. The sumps and settlers will be checked regularly. Silt will be removed and disposed of on the Tailings Dam, as required, in order to retain sufficient capacity in these ponds. The quality of the water in the settlers will be monitored. 		
Groundwater					
O79	<p>Deterioration of groundwater quality</p> <p>Potential deterioration of groundwater quality by downward recharge from surface to the underlying aquifers and contamination of surface water by spillage/overflow from</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Continue with groundwater monitoring on a quarterly basis to detect groundwater contamination. Should groundwater be contaminated, it should be pumped to the Helena TSF for recirculation. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Mototolo Concentrator and Chrome Plant					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Pipeline/drains/storage dams from the Concentrator plant.				
Air Quality					
O80	<p>Decreased ambient air quality due to the operation of the Chrome Plant</p> <p>There are no point source emissions associated with the Chrome Plant, however fugitive dust may arise from transport of the chrome concentrate to the chrome stockpile area and trucking of chrome concentrate to the Xstrata Thorncliffe processing facilities.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Dust generated on access roads will be managed through appropriate measures such as a watercart or chemical dust suppression. • Reinstatement and rehabilitation of all disturbed areas at closure. • Dust will be controlled on site with water carts or dust suppressants. • A speed of 40 kmph will be strictly enforced on all mine access roads. • All infrastructure will be demolished on closure of the Chrome Plant and all disturbed areas will be reinstated and rehabilitated to a known past state or to an approximation of the natural condition. • Land to which soils have been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. • Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely <p>Significance: LOW (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
Noise					

Operation of the Mototolo Concentrator and Chrome Plant					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
O81	<p>Increase in ambient noise levels due to operation of the Chrome Plant</p> <p>Noise will be generated during operation of the spiral plant and transport of chrome concentrate.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM(-)</p>	<ul style="list-style-type: none"> • Keeping vehicles silencer units in good working order and restricting activities to the dedicated mining areas. • Should community complaints be received with regard to noise generation, mine management will investigate these and implement appropriate management measures. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely <p>Significance: LOW (-)</p>	Chrome Plant- Helena 6 JT, Eastern Limb of the Bushveld Complex, Mpumalanga, South Africa Final EIAR and EMP (ERM, May 2006)
	Visual				
O82	Refer to impact on Topography, Impact Reference O70, for visual impacts during the Operational Phase.				
	Cultural heritage resources				
	No impacts are envisaged during the Operational Phase.				
	Traffic and transportation				
	No impacts are envisaged during the Operational Phase.				

1.2.6 Operation of the Access Roads

Operation of the Access Roads					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Geology				
	No impacts are envisaged during the Operational Phase.				
	Topography				
	No impacts are envisaged during the Operational Phase.				
O83	<p>Loss of soil resources due to erosion</p> <p>Concentrated water discharges at the road could cause significant erosion. This impact has the potential to be significant due to the topography of the area, the nature of rainfall in the area and the medium to high erodibility of the soil. The cleared areas will also be more susceptible to erosion due to the lack of vegetation binding the soils.</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Long term • Scale: Site specific • Consequence: High • Probability: Possible <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • Erosion control measures will have to be implemented throughout the site for the entire life of the mine. • Drainage facilities will be designed to minimise the potential for soil erosion. • Energy dissipaters will be provided in areas where concentrated discharges could cause significant erosion, such as access/service roads. • All drainage facilities will be checked at approximately three monthly intervals during the rainy season and any undue erosion or siltation, especially at discharge points, will be noted and repaired. The mine will identify the cause of such undue erosion or siltation and suitable remedial measures will be implemented. • Unused roads will be rehabilitated after exploration, while high traffic roads will be surfaced. Other roads still used will be maintained and any new roads will have proper engineered designs to prevent erosion. No random driving across the terrain (outside of authorised routes) will be allowed – this will 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Operation of the Access Roads					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			destroy the soil structure, cause unsightly tracks and lead to unnecessary soil erosion.		
O84	<p>Soil contamination due to spillage of fuel, oil and chemicals</p> <p>Spills of oil, fuel and chemicals may emanate from vehicles travelling along the main services road.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Water pollution management measures are designed to contain all polluted water, thereby minimising the potential for soil contamination from this source. Any spillage will be cleaned up and remediated Any spills will be cleaned up. More serious spills will be reported and treated. An inspection and maintenance plan will be implemented to ensure that the ore transportation operate within specifications. Regular servicing of vehicles in well-constructed, bunded areas. Regular cleaning and maintenance of drains and storm water control facilities. Containment and management of spillage. Spill kits will be provided on site for ad hoc spill clearing. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: MEDIUM (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
Biodiversity					
No impacts are envisaged during the Operational Phase.					
Surface water					
O85	<p>Deterioration of surface water quality due to erosion, spillages and accidental discharges on roads</p> <p>Direct contamination of the Groot- Dwars River or its tributaries at road crossings can occur due to spillages and</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Stormwater culverts at watercourse crossings should be designed and constructed to accommodate the 1:50 year storm event. Erosion protection and energy dissipaters should be 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	New impact.

Operation of the Access Roads					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	accidental discharges or due to erosion of disturbed areas alongside the roads.		constructed at the crossings as applicable. • Emergency action plans should be drawn up to deal with spillages.		
Groundwater					
No impacts are envisaged during the Operational Phase.					
Air Quality					
No impacts are envisaged during the Operational Phase.					
Noise					
O86	Increase in ambient noise levels on the surrounding communities as a result of mining activities Road haulage of concentrate and daily transport of mine personnel is expected to increase ambient noise on the access road during operations.	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible Significance: MEDIUM (-)	<ul style="list-style-type: none"> • Regular servicing and maintenance of vehicles. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely Significance: LOW (-)	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)
Visual					
No impacts are envisaged during the Operational Phase.					
Cultural heritage resources					
No impacts are envisaged during the Operational Phase.					
Traffic and transportation					
O87	Refer to Impact Reference O15, O16, O17 and O18, for impacts associated with the Operational Phase.				
O88					
O89					
O90					

1.2.7 Operation of the Wellfield and ongoing prospecting boreholes

Operation of the Wellfield and ongoing prospecting boreholes					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Geology				
	No impacts are envisaged during the Operational Phase.				
	Topography				
	No impacts are envisaged during the Operational Phase.				
	Soils, land capability and land use				
O91	<p>Soil erosion due to operational activities</p> <p>The soils in the area are all have a moderate-high erodibility. The strongly structured clayey nature of the soils also increases surface runoff and the potential for erosion.</p> <p>During operation, erosion can be caused by driving of vehicles along the main access tracks to the boreholes, Pipelines and reservoir. Topsoil will also be removed at ongoing drillsites, which can cause erosion if not managed properly.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Stormwater control measures will be implemented along all access roads, and will include energy dissipaters such as contour anti-erosion berms. The Pipelines will be trench buried for most of their length except for areas where topography only allows for aboveground structures. Frequent inspection of the effectiveness of stormwater control measures, as well reinstatement and rehabilitation of unused or disturbed areas. Impermeable plastic liners should be placed on site during drilling to avoid pollution and contamination of soil. In the event that a spill occurs, spilled material is dug up and placed in spill bin specific for contaminated soil and disposed of. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Addendum to the Environmental Management Programme Report for the Der Brochen Mine to include a Wellfield in the Klein-Dwarsrivier Valley on the Farms Richmond 370 Kt and St George 2 Jt (SRK Consulting Report No. 335470/1, April 2004) Environmental Management Programme (EMP): Amendment to the approved Environmental Management Programme Report (EMPR) for ongoing prospecting in support of current Mining Operations (ERM, 2007).
	Biodiversity				
O92	<p>Disturbance/loss of plant species of conservation importance, habitat, endemism and biodiversity</p> <p>Various plant species of conservation importance, as well as species endemic to the SCE, occur on Richmond and St</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> All temporary infrastructure will be demolished on mine closure (where not required for communities), and all disturbed areas reinstated and rehabilitated to a known past state or to an approximation of the 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Addendum to the Environmental Management Programme Report for the Der Brochen Mine to include a Wellfield in the Klein-Dwarsrivier Valley on the Farms

Operation of the Wellfield and ongoing prospecting boreholes					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	George. All of these species are however found on surrounding farms. The frequency of the disturbing activities will be for the life of the operation.		<ul style="list-style-type: none"> natural condition. Infrastructure for which post-mining and approved uses have been identified, will not be demolished. During reinstatement, surfaces will be ripped and stockpiled soil will be graded over previously disturbed/ stripped areas with as little compaction as possible, with vehicles avoiding running over stockpiles by spreading from one side only. Land to which soil has been applied will be rehabilitated under instruction and supervision of the ECO, through revegetation with indigenous species removed to nurseries and/or a combination of hydroseeding or other appropriate methods. Rehabilitation will be progressive throughout the burying of the Pipelines and throughout the life of the mine, and vegetation will be established as soon as a disturbing activity has ceased, to stabilise soils and re-establish habitats. Following revegetation, the site will be monitored and maintained until an acceptable vegetation cover has been achieved. Energy dissipaters will be constructed at sites of concentrated stormwater discharge. 		Richmond 370 Kt and St George 2 Jt (SRK Consulting Report No. 335470/1, April 2004) Environmental Management Programme (EMP): Amendment to the approved Environmental Management Programme Report (EMPR) for ongoing prospecting in support of current Mining Operations (ERM, 2007).

Operation of the Wellfield and ongoing prospecting boreholes					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> • Drainage, stormwater and erosion control measures/structures will be checked at 3 monthly intervals and after significant rainfall events for siltation and effectiveness in preventing erosion. Silted, damaged or ineffective structures will be cleaned, repaired or replaced regularly. • Disturbance of vegetation cover and soils will be restricted to footprint areas with no random driving across the terrain allowed. • Vehicles will be inspected regularly and kept in good running order, and leaks repaired immediately. • Any spillage will be reported, cleaned up and soils remediated immediately. • After drilling is completed, sites should be rehabilitated and seeded. 		
O93	<p>Proliferation of alien vegetation and associated impacts on groundwater</p> <p>Two category 1 weeds, and four category 2 and 3 invaders were found along the Klein-Dwars River on Richmond and St George. The only specie currently affecting groundwater supplies is the large stand of <u>Populus sp</u> on St George. Due to disturbing activities during operations, alien/invasive species might spread and impact</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • All weeds and invaders will be eradicated to prevent impacts on natural vegetation and groundwater supplies. • Natural eradication methods, and replacement of the reed with indigenous Phragmites reeds will be investigated. • Regular monitoring and eradication of weeds and invaders along any newly disturbed areas. All disturbed areas will be progressively reinstated and rehabilitated with indigenous species. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely <p>Significance: LOW (-)</p>	Addendum to the Environmental Management Programme Report for the Der Brochen Mine to include a Wellfield in the Klein-Dwarsrivier Valley on the Farms Richmond 370 Kt and St George 2 Jt (SRK Consulting Report No. 335470/1, April 2004)

Operation of the Wellfield and ongoing prospecting boreholes					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	natural vegetation and groundwater supplies.				
O94	<p>Disturbance/loss of animals of conservation importance</p> <p>The Cicada <i>Pycna sylvia</i> shows a clear preference for <i>Vitex obovata</i> subsp. <i>wilmsii</i> observed along the first 500 m along the Klein-Dwarsrivier on the northern boundary of Richmond and some scattered specimens along the central and southern parts of St George. The frequency of the disturbing operational activities on the cicada habitat will last for the life of the operation.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible • Significance: MEDIUM 	<ul style="list-style-type: none"> • Cicada will continuously be monitored in the Klein- and Groot-Dwarsrivier valleys during the life of the mine and therefore the life of the Wellfield. • Progressive reinstatement and rehabilitation of disturbed areas will reduce the likelihood of the impact further. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely • Significance: LOW 	Addendum to the Environmental Management Programme Report for the Der Brochen Mine to include a Wellfield in the Klein-Dwarsrivier Valley on the Farms Richmond 370 Kt and St George 2 Jt (SRK Consulting Report No. 335470/1, April 2004)
Surface water					
O95	<p>Reduction in baseflow of the Klein-Dwars River</p> <p>Due to the nature of the geology and thus aquifers in the area, recharge to the shallow weathered bedrock aquifer is primarily from downward leakage from the overlying alluvial primary aquifer. Due to low bedrock transmissivity and the presence of dolerite dykes which behave as barriers to groundwater flow, lateral flow and recharge from the mid- and upper valley sides is minimal. Boreholes will all abstract from this storage in this target aquifer. Water will not be abstracted from the primary alluvial aquifer (between the Klein-Dwars River and the shallow weathered aquifer). Recharge for this</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible • Significance: MEDIUM (-) 	<ul style="list-style-type: none"> • The mine will measure and monitor surface water levels and quality in the Klein-Dwars River, within and below the Wellfield area, and compare these with the baseline data. Any indication of lowering of surface water levels due to groundwater abstraction will be reported and adequate mitigation measures implemented. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely • Significance: LOW 	Addendum to the Environmental Management Programme Report for the Der Brochen Mine to include a Wellfield in the Klein-Dwarsrivier Valley on the Farms Richmond 370 Kt and St George 2 Jt (SRK Consulting Report No. 335470/1, April 2004)

Operation of the Wellfield and ongoing prospecting boreholes					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	primary alluvial aquifer is primarily from the downward discharge from the overlying Klein-Dwars River, which is a losing system during high flow periods, as well as from direct rainfall. The frequency of the activity of abstracting groundwater is the life of the operation.				
Groundwater					
O96	<p>Reduction in the water table levels of the alluvial aquifer</p> <p>Water will be abstracted from storage in the weathered bedrock aquifer and not the alluvial aquifer. The alluvial aquifer is recharged primarily from the downward discharge from the overlying Klein-Dwarsrivier, which is a losing system during high flow periods, as well as from direct rainfall. The aquifer will thus be recharged whether water is abstracted from the aquifer below it or not. The frequency of the activity is the life of the operation.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely • Significance: LOW (-) 	<ul style="list-style-type: none"> • Various monitoring boreholes in both aquifers are/will be installed and data will continuously be monitored at the central control room at the Mototolo Concentrator. Data will be compared with the wealth of baseline data and any sign of lowering water table levels in either aquifer will be reported. • Due to the management of the Wellfield, and variable abstraction from a large number of boreholes to obtain minimum drawdown, the duration of the impact at one given point (borehole) will also be reduced. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely • Significance: LOW (-) 	Addendum to the Environmental Management Programme Report for the Der Brochen Mine to include a Wellfield in the Klein-Dwarsrivier Valley on the Farms Richmond 370 Kt and St George 2 Jt (SRK Consulting Report No. 335470/1, April 2004)
O97	<p>Contamination of groundwater resources during ongoing prospecting</p> <p>During ongoing prospecting, there may be potential contamination of groundwater resources during drilling.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible • Significance: LOW (-) 	<ul style="list-style-type: none"> • Impermeable plastic liners will be used beneath drill rigs and in drilling-mud sumps to prevent seepage of any liquids on site to water resources. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Unlikely • Significance: LOW (-) 	Environmental Management Programme (EMP): Amendment to the approved Environmental Management Programme Report (EMPR) for ongoing prospecting in support of current Mining

Operation of the Wellfield and ongoing prospecting boreholes					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
					Operations (ERM, 2007).
Air Quality					
O98	<p>Increase in nuisance dust during ongoing prospecting</p> <p>During prospecting, it is expected that there will be an increase in nuisance dust due to drilling activities and clearing of vegetation to prepare drill sites. The dust emissions will be minimal and of short duration and contained in the valley.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> Dust suppression through watering as necessary. Employees should wear appropriate Personal Protective Equipment (PPE) 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Unlikely <p>Significance: LOW (-)</p>	Environmental Management Programme (EMP): Amendment to the approved Environmental Management Programme Report (EMPR) for ongoing prospecting in support of current Mining Operations (ERM, 2007).
Noise					
No impacts are envisaged during the Operational Phase.					
Visual					
O99	<p>Reduced quality of scenic value from vantage points</p> <p>There will be small structures at each of the boreholes to protect the power feed and telemetry system, but the remainder of the borehole infrastructure such as the submersible pumps will be underground. Pipelines and powerlines will be trench buried for most of their route, except for a 1 km length on the steeper rock outcropping section of the mountain range between St George and Helena. Here the Pipeline and powerline will be installed on plinths. The central control room for borehole management will be located within the Helena plant area, and will thus have no additional visual impact.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> The aesthetic quality of the site will be minimised through limiting areas of disturbance, and progressive reinstatement and rehabilitation of disturbed areas. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Addendum to the Environmental Management Programme Report for the Der Brochen Mine to include a Wellfield in the Klein-Dwarsrivier Valley on the Farms Richmond 370 Kt and St George 2 Jt (SRK Consulting Report No. 335470/1, April 2004)

Operation of the Wellfield and ongoing prospecting boreholes					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Cultural Heritage					
O100	<p>Disturbance/destruction of archaeological and cultural significant sites</p> <p>Most of the sites along the Klein-Dwars River valley on Richmond and St George are of low significance due to the fact that to large parts of the valley floor had been intensively used for agricultural purposes and that much of these areas are now densely vegetated by invader plants and/or have dense grass coverage. However, there are graves on Richmond that need to be avoided.</p> <p>None of the significant sites will be disturbed by any Wellfield development, but as these sites are located in close proximity to the Wellfield development area, there will still be a slight likelihood of the impact occurring due to driving across the terrain during the life of the operation.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • No random driving will be allowed on site and vehicles will be restricted to designated access roads. • Relevant contractors and mine personnel will be trained in the identification of significant archaeological sites. These will immediately be reported to the relevant mine manager and a specialist archaeologist will be informed. • Sites of medium and high significance will be avoided (fenced if deemed necessary), while sites to be disturbed along the trench will be inspected and sampled by a specialist during trench excavations. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely <p>Significance: LOW (-)</p>	Addendum to the Environmental Management Programme Report for the Der Brochen Mine to include a Wellfield in the Klein-Dwarsrivier Valley on the Farms Richmond 370 Kt and St George 2 Jt (SRK Consulting Report No. 335470/1, April 2004)
Traffic and transportation					
No impacts are envisaged during the Operational Phase.					

1.2.8 Socio-economic impacts associated with the Operational Phase

Socio-economic impacts during Operations					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Socio-economic				
O101	<p>Prolonged employment opportunities The raising of the height of the Helena TSF will prolong its life and that of the Mototolo Concentrator. This will have an ongoing beneficial impact on the socio-economic environment.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Regional area • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (+)</p>	<ul style="list-style-type: none"> • Enhance local employment and procurement opportunities where possible 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Regional area • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (+)</p>	Der Brochen Project EMP Amendment: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
O102	<p>Contribution to the local and regional economy The Mototolo Joint Venture makes a significant positive contribution at both the macro- and micro-economic level. This contribution to the national, regional and local economy includes a substantial boost to the Gross Geographical and Domestic Product through the creation of new jobs and the associated improvement in the annual per capita and household income of these workers and their families. In addition, the anticipated multiplier effect of the proposed mining project through new business opportunities and the provision of improved physical infrastructure and social services, underline the significant long-term and cumulative positive impact the proposed project will have on the local and regional socioeconomic structure in particular and the regional economy in general.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Regional area • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (+)</p>	<ul style="list-style-type: none"> • Participation in Local Economic Development Programmes. • Der Brochen will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. Der Brochen will ensure that as much of this as possible is directed to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area. • AAP will inform businesses, where appropriate, through appropriate business fora about available opportunities and how business may access these. For example the Steelpoort Business Forum could be used to engage with businesses in the local and regional areas. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Regional area • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (+)</p>	Chrome Plant- Helena 6 JT, Eastern Limb of the Bushveld Complex, Mpumalanga, South Africa Final EIAR and EMP (ERM, May 2006) Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005) Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)

Socio-economic impacts during Operations					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<ul style="list-style-type: none"> The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as part of AAP's SLP reporting to Government. AAP will identify potential service providers for longer term procurement. Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy According to the Anglo Social Way, all AAP mines are now required to develop long term strategies so that when the mine closes, the mine leaves a positive legacy where mine communities continue to be economically and socially sustainable. These strategies will be reviewed and monitored for implementation. 		
O103	<p>Contribution to national economic growth</p> <p>Some goods and services will be procured from national suppliers. Further, Der Brochen will contribute income taxes and royalties during the LOM. Timeous payment of taxes will contribute towards the ability of government to pursue national development objectives.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Medium term Scale: National Consequence: Medium Probability: Unlikely Significance: LOW (+) 	<ul style="list-style-type: none"> Der Brochen will inject investment into the local and regional economy through the employment of labour, use of local support services and the use of local infrastructure. Der Brochen will ensure that as much of this as possible is directed to the local economy. Since it is unlikely that suppliers from within the study area (local level) will be 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Medium term Scale: National Consequence: Medium Probability: Possible Significance: MEDIUM (+) 	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)

Socio-economic impacts during Operations

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
			<p>suitable, goods should be preferentially procured in the immediate focus area and, if unsuccessful, only then in the broader focus area.</p> <ul style="list-style-type: none"> AAP will inform businesses, where appropriate, through appropriate business fora about available opportunities and how business may access these. For example the Steelpoort Business Forum could be used to engage with businesses in the local and regional areas. The revised SLP should reflect the targets for procuring goods locally and regionally, and to develop local suppliers. Contractors will be required to submit annual reports on how they are attaining these targets as part of AAP's SLP reporting to Government. AAP will identify potential service providers for longer term procurement. Develop a social strategy, once mining has commenced, in line with the life of mine plan to assist in leaving a positive legacy. 		
O104	<p>Social disruption Some social disruption is to be expected during the project, due to the presence of a non-local workforce, an influx of job seekers (including family visits), increased traffic and temporary disturbance of access roads. General physical disruption</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> If managed correctly, the proposed development could contribute towards improved social and physical mobility in the medium to long term, as well as a general improvement in safety and security measures. This includes policing services and 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Local Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	Chrome Plant- Helena 6 JT, Eastern Limb of the Bushveld Complex, Mpumalanga, South Africa Final EIAR and EMP (ERM, May 2006)

Socio-economic impacts during Operations					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	could be further aggravated by a perceived threat by the local community to existing safety and security levels.		<p>patrolling by mine security personnel, as well as improved health, education and related social services, and the provision of public transport and telecommunications.</p> <ul style="list-style-type: none"> • Development and implementation of a Social and Labour Plan (SLP). • Local economic development plans, which will include infrastructure and poverty eradication projects in line with the area's Integrated Development Plan. 		
O105	<p>Generation of jobs Temporary jobs will be created during operations. It is expected that there will be a moderate number of jobs created (magnitude), in the short term and regionally.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Regional • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (+)</p>	<ul style="list-style-type: none"> • Employ as many locals as possible so that mining in the area maximises benefits to immediate affected communities. • Identify temporary employees for further training and incorporation in the longer term staff complement. 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Regional • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (+)</p>	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)
O106	<p>Procurement of goods and services Procurement of goods and services during operations will result in maintaining and possibly creation of jobs since those companies providing goods and services will have contracts.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Medium term • Scale: National • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (+)</p>	<ul style="list-style-type: none"> • Procure as many goods and services as possible from local communities and the local municipal area so that the project benefits immediate affected communities. • Identify potential service providers for longer term procurement. Advise and support these companies so that they can be incorporated as long term suppliers. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Medium term • Scale: National • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (+)</p>	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)
O107	<p>Influx of employees The arrival of non-local employees in the area may have</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Long term • Scale: Regional 	<ul style="list-style-type: none"> • Enhance employment of people and procurement of 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Regional 	Social Baseline and Impact Assessment for the Der Brochen EMP

Socio-economic impacts during Operations					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	negative health consequences. Some employees brought in by contracting companies may be sourced nationally; making it possible that the diseases may be transmitted nationally.	<ul style="list-style-type: none"> Consequence: High Probability: Possible Significance: HIGH (-) 	<p>service providers in the study area and the region.</p> <ul style="list-style-type: none"> Accommodation should preferably be provided in towns in close proximity to the project area and workers bussed in. Should accommodation be required in close proximity to Der Brochen: <ul style="list-style-type: none"> RPM should require the contractors to promote HIV/AIDS prevention amongst employees. RPM and the contractors should work with the health authorities to provide HIV/AIDS prevention and treatment interventions in a culturally appropriate manner. AAP will confirm if this is possible. Sub-contractors should adhere to the contract with the contractor. A strategy and protocol for camp management should be developed and implemented, should an existing worker accommodation facility be used. 	<ul style="list-style-type: none"> Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	Alignment (SRK Report No. 469113/SIA, September 2014)
O108	<p>Collection of medicinal plants during the Operational Phase</p> <p>There are potential risks associated with community members collecting medicinal plants on the Der Brochen Project property. Although the property is privately owned and</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site Consequence: Medium Probability: Possible Significance: MEDIUM (-) 	<ul style="list-style-type: none"> A land access protocol for visiting graves is currently in place and AAP Land Use Management will explore the possibility of extending this protocol for enabling the collection of medicinal plants on the property. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site Consequence: Low Probability: Possible Significance: LOW (-) 	Social Baseline and Impact Assessment for the Der Brochen EMP Alignment (SRK Report No. 469113/SIA, September 2014)

Socio-economic impacts during Operations					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	fenced off people may still access the area. This increases their potential exposure to hazards as a result of mining activity. It is understood that a small number of community members are collecting medicinal plants from the property.				

1.3 Decommissioning and Closure

1.3.1 Decommissioning and Closure of the Mareesburg, Helena and Co-Disposal TSFs

Decommissioning and Closure of the Mareesburg, Helena and Co-Disposal TSFs					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
No impacts are envisaged during Decommissioning/ Closure Phase.					
Topography					
D1	<p>Changes in topography Mareesburg TSF The change in topography as a result of the Mareesburg Tailings Dam will be definite and will be a permanent visual impact on the environment, even after revegetation. As the disused infrastructure will be demolished, there is potential for the creation of dangerous excavations and steep embankments which will need to be backfilled and landscaped.</p> <p>Helena TSF Surface level after rehabilitation is not expected to change. The Helena TSF is likely to become a permanent feature of the landscape.</p> <p>Co-Disposal After Closure, the Co-Disposal Facility will become a permanent feature of the landscape and will therefore permanently change the natural topography of the area.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Re-vegetation and slope establishment to ensure the TSF is free draining and blends in with the natural environment. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p> <p>Der Brochen Project EMP Amendment: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)</p>
Soils, land capability and land use					
D2	<p>Loss of soil resources due to erosion As buildings and infrastructure are demolished, large areas denuded of vegetation will develop. These freshly disturbed areas will be potentially vulnerable to soil erosion.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Compilation/ update of a detailed Closure Management Plan. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p>

Decommissioning and Closure of the Maresburg, Helena and Co-Disposal TSFs					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Sections of the Maresburg Tailings Dam requiring revegetation will be susceptible to wind and water erosion. This impact will be applicable for the Helena TSF and Co-Disposal Facility during the Closure Phase.				
D3	<p>Contamination of soils</p> <p>Potential contamination from hydrocarbons due to accidental spillages from vehicles, during demolition activities. This impact will be applicable for the Maresburg TSF and Co-Disposal Facility during the Closure Phase.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Conduct daily site inspections to detect leaks on equipment which may lead to hydrocarbon spills. • Regular maintenance of vehicles. • Placement of drip trays under vehicles when parked and during fuel transfer. • Undertake on-site bioremediation or remove contaminated soils and dispose of at a licensed hazardous waste storage facility. • Contaminated soils will be remediated or removed off site where required. • Soils will be remediated and used in rehabilitation activities as per the Closure Plan 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Medium term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	Der Brochen Project EMP Amendment: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
Biodiversity					
D4	<p>Loss of aquatic life due to deterioration of water quality</p> <p>There might be a continual loss of aquatic animal species due to continual deterioration in water quality due to pollution from seepage of facilities such as the Maresburg Tailings Dam. This impact will be applicable for the Helena TSF and Co-</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • Monitoring will be conducted until it can be proven that no more seepage and deterioration in water quality will take place. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Decommissioning and Closure of the Mareesburg, Helena and Co-Disposal TSFs					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Disposal Facility during the Closure Phase.				
Wetlands					
No impacts are envisaged during Decommissioning and Closure.					
Surface water					
D5	<p>Contamination of surface water resources</p> <p>Deterioration of surface water quality as result of seepage from the TSF and RWDs. Platinum tailings are usually found to be non-acid generating, although have a potential to generate alkaline, salt-rich drainage dominated by calcium, magnesium, sodium and potassium. In some cases it may contain nitrate, sulfate and chloride. The mobility of chromium is an environmental risk often associated with leachate.</p> <p>During Rehabilitation and Closure activities, there is a risk of spills of hydrocarbons from equipment undertaking rehabilitation work.</p> <p>This impact will be applicable for the Helena TSF, Mareesburg TSF and the Co-Disposal Facility during the Closure Phase.</p>	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: High Probability: Possible <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> During Closure, inflows into the return water dams will be reduced to seepage from the TSF together with direct rainfall onto the TSF. Remaining volumes be pumped to the Concentrator to allow for additional storage for any major storm event. Maintain stormwater control to divert clean water away from the TSF. Monitoring of seepage from the TSF and the return water dams, together with water quality should be undertaken for a period of ten years after closure. Hydrocarbon spillages will be remediated immediately. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
Groundwater					
D6	<p>Contamination of groundwater</p> <p>Continued deterioration of groundwater quality due to volume of leachate seeping into the underlying aquifer from the TSF and Return Water Dams. Platinum tailings are usually found to be non-acid generating,</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Long term Scale: Local area Consequence: High Probability: Possible <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> Continue with groundwater monitoring after rehabilitation to detect groundwater contamination, as per the closure plan. Detailed measures to arrest any unacceptable seepage during this monitoring period will be implemented in 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Long term Scale: Local area Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project EMP Amendment: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)

Decommissioning and Closure of the Maresburg, Helena and Co-Disposal TSFs					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	<p>although have a potential to generate alkaline, salt-rich drainage dominated by calcium, magnesium, sodium and potassium. In some cases it may contain nitrate, sulfate and chloride. The mobility of chromium is an environmental risk often associated with leachate.</p> <p>This impact will be applicable for the Helena TSF, Maresburg TSF and the Co-Disposal Facility during the Closure Phase.</p>		<p>consultation with the Competent Authorities</p>		
Air Quality					
D7	<p>Increase in nuisance dust Dust from rehabilitation activities may increase dust fallout in the immediate area of the activities. This impact will be applicable for the rehabilitation of the Helena TSF, Maresburg TSF and the Co-Disposal Facility during the Closure Phase.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Local area • Consequence: Low • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Re-vegetate levelled and top-soiled areas as soon as possible. • Continue to use dust suppression on unpaved roads. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Local area • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<p>Der Brochen Project EMP Amendment:: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)</p>
D8	<p>Dust generation from the Maresburg and Helena TSFs The Tailings Dams are a potential significant source of wind-blown dust impacting intermittently on the land in and around the Tailings Dam complex from sections that still require vegetation. Dust blown from the Tailings Dams will not be continuous and will be very much dependent on the wind conditions. This impact will also be applicable for the Co-Disposal Facility during the Closure Phase.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Short term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Cladding/ vegetation and rehabilitation of Tailings Storage Facility. • Regular inspection of vegetation establishment. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p> <p>Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005)</p>

Decommissioning and Closure of the Mareesburg, Helena and Co-Disposal TSFs					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	Noise				
D9	<p>Increase in ambient noise levels</p> <p>An increase in ambient noise levels as a result of demolishing and rehabilitation activities and vehicles.</p> <p>There are no sensitive receptors in close proximity to the Helena TSF, except for the Concentrator and Der Brochen offices.</p> <p>This impact will also be applicable for the Mareesburg TSF and the Co-Disposal Facility during the Closure Phase.</p> <p>The Leshaba family lives approximately 1 km away from the Mareesburg TSF and therefore may be directly affected by an increase in noise levels.</p> <p>There are no sensitive receptors in close proximity to the Co-Disposal Facility, except for the Concentrator and Der Brochen offices located to the North.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • Demolition and rehabilitation activities will be confined to daylight hours. • Vehicles will be serviced at regular intervals to minimise noise generation. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Unlikely <p>Significance: LOW (-)</p>	Der Brochen Project EMP Amendment: Raising of Helena Tailings Storage Facility EIA and EMP (SRK Consulting Report No. 475423/EIA/EMP; September 2014)
	Cultural heritage				
	No additional impacts are envisaged during Decommissioning/Closure Phase.				
	Visual				
	No additional impacts are envisaged during Decommissioning/Closure Phase.				
	Traffic and transportation				
	No significant additional impacts are envisaged during Decommissioning/Closure Phase.				

1.3.2 Decommissioning and Closure of the Der Brochen Project and associated infrastructure

Decommissioning and Closure of the Der Brochen Project and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Geology					
No impacts are envisaged during the Decommissioning/ Closure phase.					
Topography					
D10	<p>Changes in topography The Southern Pit will be rehabilitated concurrently during the Operational Phase, where waste rock will be backfilled into the Pit. At the end of the Operational Phase, the Pit would be filled with waste rock, creating a mound dome due to the swelling factor of the waste rock. During Closure, the mound dome will be shaped to be free-draining, thereafter it will be topsoiled and revegetated. This will result in a minimum impact on topography. Demolition of the Mototolo Concentrator, Chrome Plant and offices will have a negligible impact on the topography.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Possible <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Shape mound dome to be free-draining. Cover the mound dome with topsoil and revegetate. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Long term Scale: Site specific Consequence: Medium Probability: Unlikely <p>Significance: LOW (-)</p>	New impact.
Soils, land capability and land use					
D11	<p>Loss of soil resources due to erosion As buildings and infrastructure are demolished, large areas denuded of vegetation will develop. These freshly disturbed areas will be potentially vulnerable to soil erosion. Denuded areas surrounding the Concentrator plant as a result of pollutant spills contaminating the soil during the Operational Phase are susceptible to erosion during the decommissioning phase.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> Compilation/ update of a detailed Closure Management Plan. Building foundations will be removed to a depth of 1 m. All land exposed by the demolition of infrastructure and other land disturbed by the mine's activities will be rehabilitated. Rehabilitation of the surfaces which are disturbed within the proposed Mining Authorisation area will be carried out in compliance with 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)

Decommissioning and Closure of the Der Brochen Project and associated infrastructure

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	This impact is also applicable for the Chrome Plant and offices.		<p>the Environmental Management Plan (as detailed in the Environmental Management Plan Report (EMPR)) and in terms of Anglo Platinum's environmental policy and procedures. This will entail both an ongoing process as well as specific work during and after mine closure.</p> <ul style="list-style-type: none"> • On closure, disused infrastructure will be demolished and the site will be rehabilitated. The available stockpiled soil will be used during this rehabilitation exercise. • Disturbed areas will be rehabilitated through landscaping, soil replacement and the establishment of vegetation. Where practical, rehabilitation will take place during the life of the mine (construction, operational and decommissioning phases). • The soil which has been conserved in stockpiles will be used strategically in the rehabilitation of disturbed land. • Vegetation establishment in disturbed areas will be undertaken as soon as is practical, with growing season and water availability being the primary time constraints. 		

Biodiversity

No additional impacts are envisaged for the Decommissioning and Closure Phase.

Decommissioning and Closure of the Der Brochen Project and associated infrastructure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
Wetlands					
No additional impacts are envisaged for the Decommissioning and Closure Phase.					
Surface water					
D12	<p>Deterioration of surface water quality due to increased sediment loads as a result of erosion</p> <p>Demolition of infrastructure and earthworks will leave soils bare and exposed to erosion agents, as well as potentially increase the volume and flow rate of surface runoff entering surface water bodies. This will in turn result in an increase in sediment loads in these water bodies.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> A stormwater management plan should be implemented up until Closure Phase. This should include diversion of clean water around demolition sites and containment of dirty water on site. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	New impact.
D13	<p>Deterioration of surface water quality due to contamination of runoff by oil and fuel spills and other demolition activities</p> <p>Impact on surface water from heavy vehicles during demolition due to spillage of hydrocarbons. This may contaminate surface water bodies.</p>	<ul style="list-style-type: none"> Magnitude: Major Duration: Short term Scale: Site specific Consequence: Medium Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> A leak/spill detection plan will be devised and implemented for all possible areas of leak/spillage within the demolition site. 	<ul style="list-style-type: none"> Magnitude: Moderate Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	New impact.
Groundwater					
No additional impacts are envisaged for the Decommissioning and Closure Phase.					
Air Quality					
D14	<p>Increased nuisance dust during Decommissioning and Closure</p> <p>Dust will be generated by rehabilitation activities. Exposed surfaces are susceptible to erosional forces including wind. Vehicles and machinery moving along roads will generate dust.</p>	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> Water sprays where vehicle activity is high. 	<ul style="list-style-type: none"> Magnitude: Minor Duration: Short term Scale: Site specific Consequence: Low Probability: Possible <p>Significance: LOW (-)</p>	Air Quality Specialist Report for the Der Brochen EMP Alignment and Amendment (Airshed Report No. 13SRK25, September 2014)
Noise					

Decommissioning and Closure of the Der Brochen Project and associated infrastructure

Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
D15	<p>Increase in ambient noise levels as a result of demolition activities Demolition activities such as movement of trucks and earthmoving equipment and machinery will cause an increase in ambient noise levels.</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Possible <p>Significance: LOW (-)</p>	<ul style="list-style-type: none"> • Demolition activities will be confined to daylight hours. • A noise monitoring programme will be implemented during Decommissioning and Closure activities. • Heavy vehicles will be serviced at regular intervals to minimise noise generation. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Short term • Scale: Site specific • Consequence: Low • Probability: Unlikely <p>Significance: LOW (-)</p>	New impact.
Visual					
No additional impacts are envisaged during the Decommissioning/Closure phase.					
Cultural heritage					
No additional impacts are envisaged during the Decommissioning/Closure phase.					
Traffic and transportation					
No additional impacts are envisaged during the Decommissioning/Closure phase.					

1.3.3 Socio-economic impacts associated with the Decommissioning and Closure Phase

Socio-economic impacts during Decommissioning and Closure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
D16	<p>Sustainability of livelihoods at mine closure</p> <p>The closure of the mine is likely to have a negative impact on the local communities. During the decommissioning phase and closure, staff will be retrenched or re-deployed and thus result in significant job losses.</p> <p>The effects of job loss could spill over into the informal economy, as the cash flow from mine employees is terminated. Any businesses providing services to the mine may also lose their income source with associated job losses. Mine closure could thus lead to a destabilisation of the local economy and may result in a rise in incidence of poverty.</p> <p>Mining infrastructure would reduce the available agricultural and grazing land in the area, however land taken by the tailings facility would be permanently lost and cannot be rehabilitated to its current land use capability.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Definite <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • Der Brochen will commission a socio-economic investigation of the impact of mine closure in advance of the event to estimate short term, medium term and long terms impacts of mine closure. The recommendations of the study will be implemented. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Regional • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<p>Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)</p> <p>Chrome Plant- Helena 6 JT, Eastern Limb of the Bushveld Complex, Mpumalanga, South Africa Final EIAR and EMP (ERM, May 2006)</p>
D17	<p>Negative social and socio-economic impacts as a result of mine decommissioning and closure</p> <p>Decommissioning and closure of the mine will negatively impact on the mine service providers and their employees. Large-scale retrenchments can flood the job markets and result in people being unable to find new</p>	<ul style="list-style-type: none"> • Magnitude: Major • Duration: Long term • Scale: Regional • Consequence: High • Probability: Definitely <p>Significance: HIGH (-)</p>	<ul style="list-style-type: none"> • The Social and Labour Plan (SLP) developed by Der Brochen includes management measures for downscaling and retrenchment. Management includes the establishment of forums, mechanisms to ameliorate social and economic impacts on individuals and contractors 	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Regional • Consequence: High • Probability: Possible <p>Significance: HIGH (-)</p>	<p>Der Brochen Mine: Environmental Impact Assessment Report and Environmental Management Programme (SRK Consulting Report No. 343158/ April 2005)</p>

Socio-economic impacts during Decommissioning and Closure					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	positions for long periods of time. This will not only affect direct employees of the mine, but also their dependants as well as informal business sectors in the area that had been dependent on the employees' buying power. People who have derived income directly and indirectly from the mine activities may be inclined to leave the region and this could result in a further decline in the economy of the region as well as abandonment of infrastructure.		considering mechanisms for creating alternative solutions for creating job security on closure.		

1.4 Post-Closure

1.4.1 Post-Closure impacts at Der Brochen

Post closure impacts at Der Brochen						
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document	
	Geology					
	No impacts are envisaged during Post-closure.					
	Topography					
	No additional impacts are envisaged during Post-closure.					
	Soils, land capability and land use					
PC1	<p>Long-term stability of rehabilitated land</p> <p>The areas which will be rehabilitated include Tailings Dams, the Concentrator area and other areas where surface infrastructure is demolished. At mine closure, surface infrastructure will either be demolished or an alternative use for the infrastructure will be decided upon by a regional planning committee to be established for the area.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely • Significance: LOW (-) 	<ul style="list-style-type: none"> • The mine intends to revegetate the Tailings Dam utilising a practical revegetation programme which will ensure adequate rehabilitation and stability of the dams. • Monitoring of the Tailings Dams will be carried out to ensure overall stability. Areas where instability is encountered will be addressed by the mine in an appropriate manner. 	Negligible	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)	
	Biodiversity					
	No impacts are envisaged during Post-closure.					
	Wetlands					
	No impacts are envisaged during Post-closure.					
	Surface water					
PC2	<p>Potential for acid mine drainage or poor quality leachate emanating from mine residue deposits</p> <p>Rain falling on the Tailings Dam facilities is considered to become "dirty", resulting seepage from these residue deposits is also considered to be potentially polluting. The Tailings Dams are likely to generate saline leachate, the</p>	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely • Significance: LOW (-) 	<ul style="list-style-type: none"> • Acid Mine Drainage (AMD) tests will be undertaken on tailings material in the mine lease area. • The acid generation potential of the tailings is to be tested to confirm AMD potential, together with the potential for salinity production by the proposed tailings. 	Negligible	Environmental Management Programme Report for the Der Brochen Mine Volume 1 of 3 (SRK Consulting Report No. 295606/4/ November 2002)	

Post closure impacts at Der Brochen					
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document
	duration and magnitude of which will depend on the salts present in the dam and on management activities to control infiltration and seepage.				
	Groundwater				
PC3	<p>Contaminant plume migration (deterioration of groundwater and surface water quality)</p> <p>The simulated leachate plumes emanating from a Co-Disposal Facility (CDF) and the decommissioned Helena TSF will in all likelihood reach the Groot-Dwars River. While the installation of a lining system would limit the seepage rate and subsequently the spreading of potential contaminants (both laterally and vertically) emanating from the CDF, the plume is not likely to reach the Groot-Dwars River in the northern section. Concentrations during post-closure the simulated contaminant plume will reach the Groot-Dwars River by 2044. The remainder of the plume (post-2044) (with lower expected concentrations) will undergo natural attenuation.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Install a lining system of either composite clay or HDPE. • Seepage collection drains should be considered. • Rehabilitation and capping of the facility to reduce seepages after closure. • After closure will be an effective remedial option. • Infiltration of process water towards the aquifer should be reduced to a minimum. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Possible <p>Significance: MEDIUM (-)</p>	Der Brochen Project-Groundwater Investigation and Model Report (Delta H Report No. 2013.027-01, October 2014)
PC4	<p>Dewatering of mine void (Reduction in borehole yield and river baseflow)</p> <p>Groundwater inflows into the northern and southern pit will necessitate continuous</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Medium term • Scale: Local site • Consequence: Medium • Probability: Definite 	<ul style="list-style-type: none"> • Continuous water level monitoring. • Replacement of water supply boreholes in event of yield losses. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Medium term • Scale: Local site • Consequence: Low • Probability: Possible 	Der Brochen Project-Groundwater Investigation and Model Report (Delta H Report No. 2013.027-01, October 2014)

Post closure impacts at Der Brochen						
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document	
	dewatering of the Pits during life of mine with associated decline of groundwater levels in the vicinity and a reduction of groundwater baseflow towards the Groot-Dwars River. However, Decommissioning and post-closure of the Open Pits will lead to recovery of groundwater levels. This will lead to the re-establishment of groundwater levels, flow directions and flow gradients to near pre-mining levels.	Significance: MEDIUM (-)		Significance: LOW (-)		
PC5	<p>Contaminant plume migration (deterioration of groundwater and surface water quality)</p> <p>The simulated leachate plumes emanating from an unlined and lined Mareesburg TSF will in all likelihood reach the Mareesburg Stream due to its close proximity to the surface water course (~ 110 m towards the southern TSF wall). Although it's expected that the overall salt load reporting to the Mareesburg Stream will significantly be reduced by a lining system the spreading of the plume can be effectively be contained (from reaching the Mareesburg Stream) through the implantation of a hydraulic containment system.</p>	<ul style="list-style-type: none"> • Magnitude: Moderate • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Definite <p>Significance: MEDIUM (-)</p>	<ul style="list-style-type: none"> • Install a lining system of either composite clay or HDPE. • Seepage collection drains should be considered. • Rehabilitation and capping of the facility to reduce seepages after closure. • Infiltration of process water towards the aquifer should be reduced to a minimum. 	<ul style="list-style-type: none"> • Magnitude: Minor • Duration: Long term • Scale: Site specific • Consequence: Medium • Probability: Unlikely <p>Significance: LOW (-)</p>	Der Brochen Project-Groundwater Investigation and Model Report (Delta H Report No. 2013.027-01, October 2014)	
	Air Quality					
	No impacts are envisaged Post-closure.					
	Noise					

Post closure impacts at Der Brochen						
Impact Reference No.	Impact	Significance rating pre-mitigation	Recommended management measures	Significance rating post-mitigation	Source document	
	No impacts are envisaged Post-closure.					
	Visual					
	No impacts are envisaged Post-closure.					
	Cultural heritage resources					
	No impacts are envisaged Post-closure.					
	Traffic and transportation					
	No impacts are envisaged Post-closure.					

2. IMPACTS ASSESSMENT IN TERMS OF THE MOTOTOLO MINE

2.1. Assessment methodology used for the identification and rating of the impacts that may be associated with the Mototolo Mine

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives under study for meeting a project need. Assessment of impacts was based on the Department of Environmental Affairs Guideline Document: EIA Regulations 2010. The significance of the aspects/impacts of the process was rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process.

These matrices use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the impacts was determined through a synthesis of the criteria below:

- **Probability**

- *This describes the likelihood of the impact actually occurring.*

Improbable: The possibility of the impact occurring is very low, due to the circumstances, design or experience.

Probable: There is a probability that the impact will occur to the extent that provision must be made therefore.

Highly Probable: It is most likely that the impact will occur at some stage of the development.

Definite: The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect.

- **Duration**

- *The lifetime of the impact*

Short term: The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.

Medium term: The impact will last up to the end of the phases, where after it will be negated.

Long term: The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.

Permanent: Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

- **Scale**

- *The physical and spatial size of the impact*

Local: The impacted area extends only as far as the activity, e.g. footprint

Site: The impact could affect the whole, or a measurable portion of the above mentioned properties.

Regional: The impact could affect the area including the neighbouring residential areas.

- **Magnitude/ Severity**

- *Does the impact destroy the environment, or alter its function.*

Low: The impact alters the affected environment in such a way that natural processes are not affected.

Medium: The affected environment is altered, but functions and processes continue in a modified way.

High: Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

- **Significance**

- *This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.*

Negligible: The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.

- Low: The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
- Moderate: The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
- High: The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The following weights will be assigned to each attribute:

Aspect	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severity	Low	2
	Medium	6
	High	8
Significance	Sum (Duration, Scale, Magnitude) x Probability	
	Negligible	<20
	Low	<40
	Moderate	<60
	High	>60

The significance of each activity was rated without mitigation (WOM) measures and with mitigation (WM) measures for both operational and closure phases of the Mototolo Mine currently.

The mitigation effect of each impact was indicated without and with mitigation measures as follows:

- Can be reversed
- Can be avoided, managed or mitigated
- May cause irreplaceable loss of resources.

2.2. Assessment of each identified potentially significant impact and risk associated with the mining operation at the Mototolo Mine

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
Geology								
1	Loss of a natural resource	To ensure that underlying mineral resources are considered when positioning infrastructure	To ensure that underlying mineral resources are considered when positioning infrastructure	WOM	44	Moderate	The mine is continuing to mine in accordance with its extraction plan by leaving in situ pillars If any infrastructure is to be considered it will be ensured that it is not located where future mineral resources will be sterilized.	Can be avoided, managed or mitigated
				WM	36	Low		
Topography								
2	Alteration of the natural topography and drainage	To limit impacts on drainage, land capability and the aesthetic quality of the environment	To limit impacts on drainage, land capability and the aesthetic quality of the environment	WOM	56	Moderate	Ensure the ventilation shafts constructed as per design.	Can be reversed
				WM	32	Low	Mine management will ensure that rehabilitation does occur according to the mining plan, concurrent with the mining operations. An annual audit will also be performed to monitor the progress of rehabilitation to ensure that large voids and stockpiles are not created unnecessarily.	Can be avoided, managed or mitigated
Soils								
3	Degradation (chemical, biological & physical properties) due to	Site clearance, removal and stockpiling	To limit soil erosion and consequent degradation of soil and consequent	WOM	44	Moderate	Visually inspect the terrain for signs of erosion and stability of surface run-off control structures (Note to be monitored during scheduled inspections and/or after every severe storm event)	Can be avoided, managed or mitigated

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
	removal and stockpiling		<p>pollution of air and surface water</p> <p>To minimize the pollution of soil by chromite / platinum particles, oils, diesel and other wastes or cleaning materials</p>	WM	22	Low	<p>Usable soil for the purposes of rehabilitation will be stripped from areas to be cleared for construction and operation and stored in designated soil stockpiles.</p> <p>Stripped soil will be stockpiled and stored using the following conservation principles:</p> <ul style="list-style-type: none"> o soil will be stockpiled by means of end-tipping to avoid compaction; o stockpile areas will have their soils stripped to conserve the seed bank; o single handling will be practiced; o stockpiles that are likely to remain unused for more than 12 months will be revegetated to manage dust and erosion and to maintain the soil's viability (further principles regarding rehabilitation will be contained in the soil utilisation plan. o usable soils will be re-spread with a minimum of compaction; o land to which soil has been reapplied will be revegetated; <p>Stockpiles and newly spread soil will be kept clear of invasive vegetation.</p> <p>Minimise the area to be cleared that is safe for construction and operation activities, thereby minimising the disturbed footprint and its vulnerability to erosion, pollution of storm water and dust generation.</p> <p>Areas to be disturbed will be cleared as close to the start of construction as possible so that bare areas are</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>not left exposed for long periods of time.</p> <p>Rehabilitation will be progressive throughout the life of mine and will commence as soon as the disturbing activity has ceased.</p> <p>Roads to be constructed as part of the mine will be designed and built to minimise erosion.</p> <ul style="list-style-type: none"> o Prevent contamination of soils due to leaching of contaminants from the mine residue deposits and plant area during operation and decommissioning 	
4	Pollution of soil by chromite particles, oils, diesel and other wastes or cleaning materials	Vehicle maintenance		WOM	44	Moderate	<p>Visually inspect the terrain for signs of erosion and stability of surface run-off control structures (Note to be monitored during scheduled inspections and/or after every severe storm event)</p> <p>Usable soil for the purposes of rehabilitation will be stripped from areas to be cleared for construction and operation and stored in designated soil stockpiles.</p> <p>Stripped soil will be stockpiled and stored using the following conservation principles:</p> <ul style="list-style-type: none"> o soil will be stockpiled by means of end-tipping to avoid compaction; o stockpile areas will have their soils stripped to conserve the seed bank; o single handling will be practiced; o stockpiles that are likely to remain unused for more than 12 months will 	Can be avoided, managed or mitigated
				WM	22	Low		

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>be revegetated to manage dust and erosion and to maintain the soil's viability (further principles regarding rehabilitation will be contained in the soil utilisation plan.</p> <ul style="list-style-type: none"> o usable soils will be re-spread with a minimum of compaction; o land to which soil has been reapplied will be revegetated; <p>Stockpiles and newly spread soil will be kept clear of invasive vegetation. Minimise the area to be cleared that is safe for construction and operation activities, thereby minimising the disturbed footprint and its vulnerability to erosion, pollution of storm water and dust generation. Areas to be disturbed will be cleared as close to the start of construction as possible so that bare areas are not left exposed for long periods of time. Rehabilitation will be progressive throughout the life of mine and will commence as soon as the disturbing activity has ceased. Roads to be constructed as part of the mine will be designed and built to minimise erosion.</p> <ul style="list-style-type: none"> o Prevent contamination of soils due to leaching of contaminants from the mine residue deposits and plant area during operation and decommissioning 	
Land capability								

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
5	Mining	Loss of agricultural land.	To limit permanent destruction of existing land capability To limit the development of incompatible land uses	WOM	55	Moderate	Disturbed land will be rehabilitated as soon as the activities have ceased. The rehabilitation plan will be updated by the mine to reflect changes and closure objectives.	Can be avoided, managed or mitigated
				WM	35	Low		
Natural Vegetation								
6	Land clearance for construction and mining (completed)	Loss of conservation important plant taxa	To create awareness To limit habitat disturbance To rehabilitate disturbed land with indigenous vegetation To remove invasive species	WOM	70	High	Disturbed areas will be rehabilitated as soon as possible in accordance with the rehabilitation principles of the mine. Red data or protected species (All protocols and Acts) must be removed where possible and where not possible must a permit be obtained from the competent authority to remove/destroy it. Ensure the natural vegetation cover between the sections receives the highest level of protection to ensure proper plant material remains. An invasive and alien control programme must be drafted and implemented by the SHEQ department. All illegal exotic or invader plants and weeds shall be eradicated as required in terms of Regulation 15 & 16 of the Act on Conservation of Agricultural Resources, 1983 (Act no. 43 of 1983) which list these plants.	Can be avoided, managed or mitigated

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							Awareness program to all staff must include alien and exotic species identification (species expected on this site only) and eradication measures.	
				WM	48	Moderate	<p>Raise awareness amongst employees by the compilation and onsite posters indicating the names and photos of red data species found on site.</p> <p>The re-vegetation of the disturbed areas will become an integral part of activities during the operational phase.</p> <p>The areas where the buildings and plant area are situated will only be re vegetated once the buildings have been removed during the decommissioning phase.</p> <p>Existing invasive plants will be removed and the mine property will be surveyed at least once a year to check for the return of any new alien invaders. The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) hold landowners legally responsible for the control of invasive alien plants on their properties.</p>	
Fauna								
7	Land clearance for construction and mining (completed)	Loss of habitat and fauna displacement	To limit habitat disturbance and to rehabilitate all disturbed land	WOM	70	High	Re-establish proper specie diverse vegetation cover as soon as possible on rehabilitated areas and bare patches as preventative measurement against erosion,	Can be avoided, managed or mitigated

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>invader specie control and where soil stability is required.</p> <p>Where breeding areas of protected and red data bird and bat species are found, the necessary warning signs must be erected.</p> <p>Killings etc. must be reported in the incident register.</p> <p>Game catching, hunting, traps, snares, poaching and any other unnecessary disturbance of animals inside the boundaries of the operation must be a disciplinary offence.</p> <p>Machine operators and drivers to undergo appropriate level of environmental impact training to ensure they understand their impact on the environment.</p> <ul style="list-style-type: none"> • Implement Environmental Awareness program 	
				WM	48	Moderate	Closure objectives and targets of the Biodiversity Management Plan shall be adhered to.	
Surface water								
8	Site clearance and uncontrolled release of storm water	Sedimentation of surface water	To ensure that the storm water management is in accordance with GN704	WOM	52	Moderate	Storm water control measures must be implemented to divert clean water away from the site and contain contaminated water.	Can be avoided, managed or mitigated
				WM	26	Low		

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
9	Vehicle maintenance, hydrocarbons, fuel, oil and lubricants	Surface water pollution	To ensure that mining activities does not impact negatively on surface water quality and quantity	WOM	52	Moderate	<p>Water control structures must be well designed and constructed to ensure a minimum down wash of topsoil. Stilling ponds, silt traps and energy dissipating structures must be used where and when necessary.</p> <p>The mine will maximise on opportunities to recycle water. It is intended that all process water will be recycled with no direct release to the environment. Storm water will be contained and reused up to the 1:50 year 24 hour storm event in accordance with Regulation 704.</p> <p>Visual inspection to identify any risk. Provision of spill cleaning kits or any other measure to prevent excessive hydrocarbon spillage during accidents or incidents.</p> <p>Training to ensure awareness of this risk and action plans for emergencies.</p> <p>The disturbed surface area must be rehabilitated in accordance with the rehabilitation plan to ensure normal drainage.</p> <p>Minimal clean water run-off should end-up in silt traps and return water dam but will become part of the ground water regime due to seepage. Ensure water management structures are designed, constructed and maintained in such a way as to allow the maximum amount of "clean" water to be diverted away from the</p>	Can be avoided, managed or mitigated
				WM	26	Low		

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>operations and into natural drainage channels.</p> <p>Regular water sampling and monitoring to be done.</p> <p>Mine vehicles to be inspected to ensure no oil and hydraulic fluid leaks occur.</p> <p>All oil spills must be cleaned up immediately.</p> <p>All process water and return water from tailings dams should be contained and reused. All other 'dirty' water generated on site should be used preferentially to 'clean' make up water</p> <p>Linear infrastructure (roads and pipelines) will be inspected on a regular basis.</p> <p>All surface water management infrastructure constructed from soil (berms, canals and bunds) will be inspected on a regular basis, with more frequent inspections during periods of high rainfall and after major rainfall events.</p> <p>All drainage facilities will be checked regularly during the rainy season and any undue erosion or siltation, especially at discharge points, will be noted and repaired. The mine will identify the cause of such undue erosion or siltation and suitable remedial measures will be implemented.</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>Stormwater berms will be provided downslope of areas recently stripped of vegetation to ensure that silt-laden stormwater does not flow directly into the watercourses.</p> <p>Energy dissipaters, such as rock packs and logs, will be placed in footpaths where there are signs of erosion. The footpaths will be inspected on a regular basis, with more frequent inspections during periods of high rainfall and after major rainfall events.</p> <p>Clean water diversions and dirty water collection facilities will be established before land clearing and construction commences, to prevent clean rainfall runoff becoming contaminated by construction activities. The measures envisioned are simple soil berms to prevent clean runoff entering dirty areas and others to divert dirty water to settlement paddocks.</p> <p>Dirty water drains will be sized to manage the 'dirty' water generated by a 1:50 year storm arising on contaminated areas (plant, shaft, pits, tailings dam, waste rock dumps, stockpiles, stores, workshops etc).</p> <p>Dirty water will be directed into sumps or retention ponds, from where it can be returned to the process water circuit. The storage facilities will have a minimum</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>freeboard of 0.8m above full supply level.</p> <p>Dirty water systems will be designed a, constructed and maintained to prevent water containing waste from entering water resources. The dirty water drains will be constructed of concrete or have an impermeable liner to ensure impermeability.</p> <p>Clean water diversion canals will be sized, designed, constructed and maintained to divert runoff from upstream catchments around all contaminated areas. The clean runoff will be released into the natural watercourses downstream or the dirty area. Ideally, the release will be into the same catchment from which the water was diverted.</p> <p>Clean water diversion canals will be sized to safely divert the 1:50 year flood event.</p> <p>Construction material for clean water diversions will be at least compacted earth for areas with level gradients. These will be grassed to limit erosion. In steeper areas, the canals will be constructed from concrete, inert rock or other suitable material to act as erosion control and energy dissipaters.</p> <p>The width and height of the drains will be determined to ensure compatibility with identified hydraulic requirements of the drain.</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>The mine will keep water systems clear of obstructions, so drains will be inspected regularly. Unless problems are encountered during these inspections, the drains will be cleaned and maintained annually, as necessary.</p> <p>The water levels in the dirty water storage facilities will be kept low by recycling into process water circuit. This ensures the facility has enough capacity in the event of another severe rainfall event.</p> <p>Unused roads will be rehabilitated after construction while high traffic roads (access road) will be surfaced. Other roads still used by the mine will be maintained and any new roads will have proper engineered designs to prevent erosion. This may include contour banks, erosion control measures such as stone walls across gullies and dongas and proper stormwater diversion measures. As access roads will stretch along steep topography, road surfaces need to be properly maintained, and any runoff channelled from the surfaces via properly sized and designed culverts, to minimise erosion.</p> <p>Road crossings will be sized to meet the National Drainage Manual requirements.</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>Embankments at watercourse crossings, within the flooding zone, will be protected against erosion.</p> <p>Where culverts are used at crossings, the culverts will have downstream erosion protection and energy dissipaters to reduce flow rates to their original velocities.</p> <p>Mine residue deposits, water storage facilities and plant infrastructure will be located above the 1:100 year floodline or at least 100 m from a watercourse, whichever is the greater.</p> <p>The mine will not conduct any mining within the 1:50 year flood line or 100m of a watercourse, whichever is the greater.</p> <p>All mine residue deposits will be designed and operated in accordance with the requirements of SABS 0286:1998 and the Mandatory Code of Practice for the Operation of Mine Residue Deposits (DME, 2000).</p> <p>The tailings pipeline will be designed to minimise the risk to soils and watercourses along the pipeline route</p> <p>Existing and proposed mine residue deposits and water storage facilities will be designed and constructed under the supervision of appropriately qualified professional engineers. All mine deposits and water storage facilities will be</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>maintained in a stable state and comply with relevant legislation.</p> <p>The return water dams will be sized to accept seepage from the under drainage systems and decant systems for up to the 1:50 year rainfall event, over and above normal operating conditions.</p> <p>Spillways will be constructed in all mine residue return water dams and mine water storage facilities to ensure safe overflow of runoff arising from storm with a recurrence interval greater than 1:50.</p> <p>The mine will not locate any sanitary convenience (sewage works), fuel depot or storage facility for anything which may cause pollution within the 1:50 year flood line of a watercourse.</p> <p>All spillages within the reagent storage and makeup areas will be retained by the construction of bund walls. The bund will be capable of containing the bulk reagents independently and the bund wall will be lined/treated to ensure that the reagents do not affect the integrity of the bund wall (e.g. acid proofing).</p> <p>Spillages within the bund can then be cleaned up and disposed of appropriately.</p> <p>Spillages within the make-up areas will be pumped to the process water system.</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>In principle all storage areas or stockpiles will be kept on concrete or other impermeable hard-standing surfaces, to prevent entry of pollutants into soils and groundwater and through recharge into surface water.</p> <p>Oil/fuel storage facilities will be adequately banded (110%), with no outlets to external drainage systems. Oil/fuel filling points will be located within the bund wall. Spilt or leaked oil will be contained and either reused or disposed of by a suitably qualified waste oil contractor.</p> <p>Workshop areas where oil/fuel spills can occur, will be located within a fully contained catchment area. All drainage from the area will report to an oil/silt separator. 'Treated' drainage will then report to the 'dirty' water system for reuse/recycling. Waste oil collected in the separator must be disposed of by a suitably qualified waste oil contractor.</p> <p>The mine will develop a monitoring programme that defines: a) the objectives of the monitoring exercise; b) the water quality compliance criteria, guidelines or targets to be used as a basis for assessing quality and fitness for use; c) the sampling points to be used; d) the collection method for samples; e) sample storage/preservation procedures; f)</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>constituents to be analysed for; g) quality control procedures for analyses; h) reporting and data storage format.</p> <p>Surface and ground water monitoring sampling points will be sited and monitored to ensure that adequate baseline information can be collected, both upstream/ upgradient of the mine. During operation, the monitoring points will ensure information is collected to enable the mine to determine its potential impacts to surround water users and to identify problems before they occur, if possible.</p> <p>To ensure consistency in monitoring, a sampling protocol will be prepared and adhered to. This will detail: a) where samples will be taken; b) the frequency of sampling; c) how samples will be taken; d) how flows will be measured at the time of sampling; e) the preparation of samples for analysis; f) the range of analysis required; g) the method of analysis; h) quality control on all aspects of the monitoring programme; i) how results will be interpreted, stored and reported.</p> <p>The people taking the samples, the laboratory carrying out the analysis and the people assessing the results will be kept informed of changes to the sampling protocol.</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>An accredited laboratory, with the necessary quality assurance, will carry out analysis of key samples and will have quality control measures in place (blanks, standards, duplicates, cation-anion balances etc). This will ensure consistency in monitoring and the verification and validation of water quality data.</p> <p>Should contamination (concentrations exceeding guideline values) be detected, the mine will immediately notify the Regional Director of DWS. The mine will then:</p> <p>a) identify the source of the contamination; b) identify, and if necessary implement, measures for the prevention of this contamination (short and long term); c) determine, and if necessary implement, any remediation measures.</p> <p>Data from water quality monitoring and flow monitoring will be stored together electronically to enable trend analysis and waste load calculations to be carried out.</p> <p>Monitoring of the water quality will take place until it can be demonstrated that the potential for contamination of the ground water regime is low.</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
10	Contaminated storm water runoff and overtopping of containment dams - operational phase	Surface water pollution		WOM	56	Moderate	<p>In principle the mine will not discharge any water into drainage courses, except where the 1:50 year flood event has been exceeded. Rainfall on site shall be recorded and archived storm water design should be according to the Redco Report – Mototolo Mine Surface Water Planning.</p> <p>The stormwater design report should be updated regularly to ensure it stays current and that the impacts to surface water resources are mitigated.</p>	Can be avoided, managed or mitigated
				WM	24	Low		
11	Stream diversions, stockpiling	Alteration of surface flows and drainage patterns		WOM	65	High	<p>It will be necessary to construct an additional small storm water dam to the northeast of the terrain, because the terrain is situated on a local watershed and a portion of the disturbed area drain north to a different watercourse than for the main SWD.</p> <p>Flow meters to be installed as indicated in the water balance diagram. Measurements shall be taken on a regular basis, archived and used to update the mine water balance. Losses through the system should be investigated.</p> <p>Effluent quality from the sewage works (north and south) shall comply with the General Standard specified by DWS.</p> <p>Operational and Maintenance plan and schedule for management of</p>	Can be avoided, managed or mitigated
				WM	52	Moderate		

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>sewage facilities should be compiled. An emergency plan should be compiled to deal with system failures and should also include a down-stream notification procedure. The sewerage plants shall be operated by a competent person who received the necessary training. Routine checks should be done on all mechanical instruments for problems such as leaks, overheating, vibration, noise or any other abnormalities. All equipment should be free of obstruction, be properly aligned and be moving at normal speed. Mechanical maintenance must be according to the manufacturer's instructions. Pumps should be checked for excessive noise, vibration, overheating and leaks. Lubrication of the pump should be in accordance with the manufacturer's instructions. Surface water analysis will be reported in the annual report to DWS. Any spillages on site will be reported in the quarterly report to DWS detailing corrective actions taken</p>	
Ground water								
12	Blasting explosive residues	Groundwater quality	To confirm that the inflows of groundwater into the underground	WOM	50	Moderate	Groundwater inflows from both shafts shall be monitored - flow meters to be installed as detailed in the water	Can be avoided, managed or mitigated
				WM	40	Low		

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
13	Contaminated run-off and seepage from residue areas	Groundwater quality	workings is low as expected To ensure that the mine does not impact on the health and welfare of surrounding water users through contamination and depletion of groundwater resources	WOM	48	Moderate	balance diagram, data archived and used to update the water balance on a monthly basis. Any losses detected shall be investigated. Water from underground shall be re-used and not discharged. A monitoring protocol should be compiled and implemented. If an incident occurs where water has been contaminated to levels exceeding the maximum acceptable levels agreed to by DWS, RPM will immediately notify the Regional director of DWS. The source of the contamination will be identified and measures will be implemented to prevent further contamination.	Can be avoided, managed or mitigated
				WM	24	Low		
14	Dewatering of the aquifer	Groundwater quantity	workings is low as expected To ensure that the mine does not impact on the health and welfare of surrounding water users through contamination and depletion of groundwater resources	WOM	10	Negligible		Can be avoided, managed or mitigated
				WM	10	Negligible		
Air quality								
15	Mining operations	Impact of mining operations on ambient air quality	To reduce dust to levels that are acceptable in terms of nuisance, road hazards, aesthetics and health hazards	WOM	44	Moderate	Unpaved roads will be maintained and dust suppressant used where necessary. Daily inspections of plant and equipment. Records of dust suppression interventions A dust fall out monitoring network shall be implemented. Fugitive dust from roads is suppressed with water. All employees working in dusty environments shall wear protective equipment.	Can be avoided, managed or mitigated
				WM	22	Low		

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							Employees working with dust and fumes shall receive annual health checks..	
Noise								
16	Operational activities	Ambient noise quality	To limit exposure of the surrounding communities to disturbing noise	WOM	52	Moderate	Should construction noises becomes a problem, will noise generating activities for example braking of concrete, compaction, steel works and heavy vehicle transport along the access road take place during daylight hours when the ambient noise level is higher. Construction equipment will be maintained in good working order. Non-compliance machinery will be removed from service until repaired. All vehicle exhaust units will be maintained in good working order. Non-compliant vehicles will be removed from service until repaired.	Can be avoided, managed or mitigated
				WM	26	Low	A complaints register should be in place. All complaints, solutions and agreements between the mine and complaining parties will be kept in a specific file in the Community Officers office. Noise level readings will be performed on a continual basis at the plant, underground and on mobile machinery. Note is made of any employees not using the hearing protection (earplugs) provided by the mine. Any unacceptable noise levels	

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							are assessed by the safety manager and rectified.	
Cultural Heritage								
17	Site clearance (completed)	Destruction of archaeological sites and graves	Avoid destruction of Heritage resources	WOM	48	Moderate	Heritage resources occur within the proposed project areas and the following recommendations are made based on general observations: The remains of a Historical Period homestead (EXIGO-TH374-HP01) and a large Historical Period settlement area (EXIGO-TH374-HP02, EXIGO-TH374-HP03) are generally of medium-low significance due to poor preservation of the sites. The sites are situated in close proximity of the proposed Borwa South Ventilation shaft access road alignment and it is recommended that the alignment of the proposed road be rerouted as to avoid impact on these sites and that any activities pertaining to the access road construction in the area be closely monitored by an ECO or heritage specialist in order to avoid any possible impact sites of significance in the area, especially previously undetected burials around homesteads. In addition, a conservation buffer zone of at least 20m should be maintained around the sites. However, should the structures be directly impacted by	Can be avoided, managed or mitigated

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					Score	Magnitude		
							<p>development activities, the sites should be documented by means of a limited Phase 2 investigation. A destruction permit from the relevant heritage resources authority (SAHRA) should be obtained subsequent to the documentation of each of the Historical period structures at the impacted sites.</p> <p>Two unmarked graves (EXIGO-TH374-BP01) and a small cemetery (EXIGO-TH374-BP02) carry high heritage significance at all levels for their spiritual, social and cultural values. The sites are situated in close proximity of the proposed Borwa South Ventilation shaft access road alignment and it is primarily recommended that the alignment of the road be rerouted as to avoid impact on the graves. In addition, a conservation buffer zone of at least 30m around the graves, as well as the fencing off of all cemeteries and graves are recommended. However, should the graves or the proposed 30m buffer zone inevitably be impacted in any way by the planned activities, full grave relocations are recommended for these burial grounds. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation and subject to any local and regional provisions</p>	

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							and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials. - It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. Should any subsurface paleontological / archaeological / historical material and /or graves/human remains be uncovered, all activities should be suspended and the archaeological specialist should be alerted immediately. - It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).	
				WM	24	Low	In the event of accidental findings, all excavation shall be stopped, SAHRA and archaeologist notified.	
Socio-Economic, Infrastructure								
18	Construction initiation (complete)	Employment opportunities	To enhance the regional socio-economic	WOM	75	High	Ensure the complaints register is implemented and treated at the highest level. Ensure the SLP is implemented.	Can be avoided, managed or mitigated

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
			benefits of the project				<p>Make sure the community forums are implemented and functional.</p> <p>Ensure all the commitment made during the consultation process are implemented or adhered to.</p> <p>The mine will have a dedicated community liaison officer to co-ordinate communications with the surrounding interested and affected parties. The community liaison officer will: a) be sensitive to socio-economic issues; b) be experienced in community liaison; c) have good communication skills; d) have conflict management and facilitation skills, e) is fluent in the local languages.</p> <p>The mine will participate in relevant local forums and bodies which may be established from time to time.</p> <p>The mine will operate in accordance with the agreed commitments in its SLP.</p>	
				WM	75	High	<p>Local contractors are used where possible for any maintenance or services required</p> <p>The mine will attempt to continue to enhance its beneficial socio-economic input into the region, especially to the local community from where the bulk of the labour force is drawn.</p> <p>The mine will continue to support the surrounding towns of the region where supplies and services are obtained</p>	

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Oil Tanks								
	Replacement of old tanks with steel tanks	Incorrect replacement leading to operational problems	Correct installation of new steel tanks	WM	24	Low	<p>The only activity involved is to remove the empty plastic vessels and replace it with steel tanks. This will be done by parking the oil truck on the existing solid refuel platform and to lift all the existing plastic containers out of the bunded area on the truck.</p> <p>The next step is to lift the prefabricated steel oil tanks from another vehicle which brought them from the oil supplier and to place them inside the bunded area.</p> <p>The next step is to couple the existing piping system onto the new tanks.</p>	
				WOM	10	Negligible		
	Operation of the oil tanks	Spillage and lack of oil for required uses	To avoid spillages To avoid running out of oil	WM	24	Low	<p>Re-order oil when a minimum level is reached and to ensure the transfer of new oil into the tank is done properly. Any accidental spillages at the refill point will be washed down to the oil skimmer where the oil is removed and the wash water recycled.</p> <p>Once the tanks reach as specific limit the oil supplier brings new oil by bowser and fill the tanks up.</p> <p>The lifting of storage vessels must be done in a safe way and any spill must</p>	
				WOM	10	Negligible		

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
							<p>be washed down to the oil skimmer unit and the wash water recycled. Care must be taken that the bund wall and any other structure is not damaged during the refit. Proper lifting equipment and the services of a qualified rigger must be obtained to ensure the work is done with the minimum damage to any structure.</p> <p>Ensure the integrity of all civil structures is intact and ensure any residual oil spillages are washed down to the oil skimmer.</p>	
Decommissioning and closure								
	Closing of the mine	Unsuccessful Closure	The main objective is to leave the affected areas safe and secure	WOM	75	High	The mine structures will be dismantled and removed. Any building not required for post-mining purposes, will be demolished together with all the foundations and	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
			<p>with all entrances to the underground working sealed.</p> <p>To ensure that the dumps has well established vegetation.</p> <p>To rehabilitate all disturbed land to a state that is suitable for post-closure use.</p> <p>Rehabilitate all disturbed land to a state that facilitates compliance with current environmental quality objectives.</p> <p>Rehabilitate all disturbed land to a state where limited or no maintenance is required.</p> <p>Limit the impact on personnel whose positions become redundant on decommissioning</p>	WM	24	Low	<p>rubble will be buried in an area as approved by the relevant authorities</p> <p>Terraces and buildings will be shaped where necessary and prepared for re-vegetation.</p> <p>All land exposed by the demolition of infrastructure and other disturbed land associated with the project will be rehabilitated.</p> <p>Monitoring and maintenance of vegetation cover until a self-sustaining plant community is established</p> <p>The spread of invader species on disturbed land will be controlled until the perennial vegetation cover.</p> <p>Soil that has been contaminated by by spillage seepage and tailings will be sampled and analysed. If required it will be treated, ameliorated or removed to a suitable disposal site.</p> <p>Diversion canals and cut-off trenches will be maintained to ensure that they are both stable and functional.</p> <p>Groundwater will continue to be monitored at potential seepage sources until the levels of the concentrations are in line with the groundwater quality standards.</p> <p>On-going monitoring of seepage water from the RWD and SWD until the levels of the concentrations are in line with the water quality standards.</p> <p>The entrances to the shafts shall be sealed with concrete plugs.</p>	

Nr	Activity	Impact	Objectives	Without or With Mitigation	Significance		Mitigation Measures	Mitigation Effect
					Score	Magnitude		
			and eventually closure				<p>All roads not required for access shall be ripped and planted with endemic vegetation.</p> <p>The mine will continue to submit information for the period after decommissioning activities have ceased, until the time that closure is approved by authorities.</p> <p>After mining operations have ceased, quarterly reports on the progress of the final rehabilitation will be submitted until final closure is approved by the authorities.</p>	

Appendix 7: Assumptions and Knowledge Gaps

Der Brochen-Mototolo Mine EMPr Consolidation

Knowledge Gaps and Limitations

Section 50(g) of the MPRDA requires the applicant to identify knowledge gaps and report on the adequacy of predictive methods, underlying assumptions and uncertainties encountered in compiling the required information.

Der Brochen EIA/EMP

The following gaps and assumptions were highlighted from the Der Brochen EIA/EMP:

During the Impact Assessment Phase of the Der Brochen Project, all specialists conducted their individual specialist assessment and compiled the relevant specialist's reports. However, during the compilation and assessment of their studies, some specialists have identified gaps within the data they worked with, or highlighted some assumptions made during the discussion of their results or discussed some limitations to their studies. Specialists' gaps, assumptions and limitations are summarised below.

Biodiversity

- The ecological assessment is confined to the study area and does not include the neighbouring and adjacent properties; these were, however, considered as part of the desktop assessment;
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most floral communities have been accurately assessed and considered; and
- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa on the study area may therefore have been missed during the assessment.

Water and Aquatics

- The wetland delineation as presented in this report is regarded as a best estimate of the wetland boundary based on the site conditions present at the time of assessment. Global Positioning System (GPS) technology is inherently inaccurate and some inaccuracies, due to the use of handheld GPS instrumentation, may occur. If more accurate assessments are required the wetland will need to be surveyed and pegged according to surveying principles;
- Wetlands and terrestrial zones create transitional areas where an ecotone is formed as vegetation species change from terrestrial to wetland species. Within this transition zone some variation of opinion on the wetland boundary may occur, however, if the DWA 2005 method is followed, all assessors should get largely similar results;
- The composition of aquatic biota in the study area prior to major disturbance is unknown. For this reason, reference conditions are hypothetical, and are based on professional judgement and/or inferred from limited data available;
- The wetland data presented in this report are based on a 2 day site visit, undertaken in March 2014. The effects of natural seasonal and long-term variation in the ecological conditions are therefore unknown; and
- Aquatic and wetland ecosystems are dynamic and complex; it is likely that aspects, some of which may be important, could have been overlooked. A more reliable assessment of the biota would require seasonal sampling with sampling being undertaken under both low flow and high flow conditions.

Groundwater

The following uncertainties have been identified and information will be gathered throughout the Operational Phase through careful monitoring, to amend, where required, the operational activities to reduce the observed impacts.

- Uncertainty of operation of liner option selected; and
- Uncertainties with long term predictions (beyond ten years) of groundwater impacts which may lead to definitive changes in catchment hydrology, land use and mining activities.

Air Quality

The main assumptions, exclusions and limitations for the Air Quality report consisted of the following:

- Use was made of modelled MM5 meteorological data for the Project area as obtained from the air quality assessment previously completed for Der Brochen (von Gruenewaldt, 2012);
- The quantification of sources of emission was restricted to the proposed Project activities, as well as the existing Mototolo Concentrator and TSF only;
- The construction and closure phases were assessed qualitatively due to the temporary nature of these operations, whilst the Operational Phase was assessed quantitatively;
- Background ozone concentrations required for the oxidation of NO to NO₂ were based on literature studies (Zunkel, et al., 2004); and
- No on-site ambient NO₂, SO₂, CO, PM_{2.5} and PM₁₀ baseline measurements were available for cumulative assessment.

Traffic

- The distribution of the traffic generated by the proposed additional activities at the Der Brochen Project, when fully operational, was assumed based on the distribution of existing mine generated traffic that travels on the road network as well as the location of the towns and villages that will provide the accommodation for the additional labour. In addition, the location of potential suppliers and the neighbouring towns as well as the most likely end destination of the mined ore, were also taken into consideration; and
- It was also assumed that the road network that is likely to be used for the transportation of the mined ore from the proposed Der Brochen Open Pits is expected to be north towards the Steelport area, to one of the other existing mines, using the mine access road, R557, D1261, and R555. The final destination of the mined ore, however, was not confirmed at the time of compiling this report.

Heritage

- Heritage sites that were identified as significant during the Impact Assessment Phase will require permits to remove or relocate them. The sites to be removed or relocated will only be determined by a qualified Archaeologist following a Phase 2 Heritage assessment.

Social

The socio-economic study gained information, amongst others, information from communities by means of household surveys. The following limitations and knowledge gaps were identified:

- In light of the dispersed locations of the communities, the difficulties experienced travelling in the area, and in order to avoid any misconceptions that might arise regarding the purposes for the

surveys (e.g. household relocation) surveys were conducted at central venues. Communities were informed about the survey through the public consultation process and through leadership structures. This approach could result in a biased representation of the community, since only certain sectors of the community might have attended, might have been able to afford the time and money to attend, and might have received news of the opportunity to participate. However, results have been triangulated against the focus group discussions, key informant interviews and rural appraisal as well as secondary data sources;

- The intention was to survey the Head of Household (HoH) of each family. Where the HoH was not available, the next of kin (partner or any household member above the age of 18) was interviewed. Results are therefore not consistently representative of the HoH;
- Some households residing on Schaapkraal 42 JT were informed that SRK was registering people for jobs, and therefore some misinformed family members travelled from elsewhere hoping to register. It may therefore be possible that these people were included in the survey which influenced the results; and
- The survey team depended upon the information that was provided by the respondents and assumed that this information was given truthfully.

Mototolo Mine EMPr

- Since the Regulation 29 (b) process does not require public participation to be undertaken as no new information is presented in the Mototolo Mine's EMPr or associated EA, this section is not applicable.
- The following assumptions and limitations specific to the assessment process and mitigation measures were proposed from the specialist studies relating to the Mototolo Mine:

Archaeological Impact Assessment for the proposed Mototolo Ventilation Shafts and Roads (2014)

3.2.1 Access

The study area is accessed directly via the Mototolo Mine. Access control is applied to the property portions relevant to this assessment but no restrictions were encountered during the site visit as the author of this report was accompanied by Mining personnel at all times. A number of service roads provided vehicular access to most areas within the study area.

3.2.2 Visibility

The surrounding vegetation in the study area is composed out of tall grass, trees and shrubs and in some areas surroundings have been altered where mine roads and infrastructure have been constructed. Generally, the visibility at the time of the AIA site inspection (September 2014) was moderate to high (see Figures 3-1 to 3-12) but in undisturbed and pristine areas, especially along the proposed Mototolo Borwa South ventilation shaft access road alignment, visibility was moderate to low. In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.

3.2.3 Limitations and Constraints

The pedestrian site survey for the Ventilation Shaft Roads Upgrade AIA Project primarily focused around areas tentatively identified as sensitive and of high heritage probability (i.e. those noted during the aerial survey) as well as areas of high human settlement catchment.

- Visibility: Visibility proved to be a constraint in more pristine and mountainous areas where documented sites proved to be densely overgrown and obstructed by surface vegetation, especially along the proposed Mototolo Borwa South ventilation shaft access road alignment.

Even though it might be assumed that survey findings are representative of the heritage landscape of the project area for the Ventilation Shaft Roads Upgrade, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

Ecological Impact Assessment for the proposed Mototolo Ventilation Shafts and Roads (2014)

- In order to obtain a comprehensive understanding of the dynamics of the flora of the study area, surveys should ideally be replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible and this floral study was conducted over two seasons;
- The large study area did not allow for the finer level of assessment that can be obtained in smaller study areas. Therefore, data collection in this study relied heavily on data from representative, homogenous sections of vegetation units, as well as general observations, aerial photograph analysis, generic data and a desktop analysis;
- Thus, even though it might be assumed that survey findings are representative of the ecosystem of the project area, it should be stated that the possibility exists that individual plants species might have been missed due to the nature of the terrain (dense vegetation). Therefore, maintaining due cognisance of the integrity and accuracy of the ecological survey, it should be stated that the ecological resources identified during the study do not necessarily represent all the ecological resources present on the property.

Wetland/Riparian Delineation for the for the proposed Mototolo Ventilation Shafts and Roads and Conveyor crossings (2014)

- The large study area did not allow for the finer level of assessment that can be obtained in smaller study areas. Therefore, data collection in this study relied heavily on data from representative sections, as well as general observations and a desktop analysis.

Appendix 8: Closure and Liability Assessment

Rehabilitation and closure plan for the Der Brochen Mototolo Mine Complex EMP Consolidation

DMRE Reference Number: LP 30/5/1/3/2/1 (182) EM

Report Prepared for

**Anglo American Platinum: Rustenburg
Platinum Mines Der Brochen Section**



Report Number 554304/DB Closure

Report Prepared by



November 2020

Rehabilitation and closure plan for the Der Brochen Mototolo Mine Complex EMP Consolidation

Anglo American Platinum: Rustenburg Platinum Mines Der Brochen Section

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by Anglo American Platinum Limited (AAP). The opinions in this Report are provided in response to a specific request from AAP to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

AAP	Anglo American Platinum Limited
ARDML	Acid Rock Drainage Metal Leaching
BPG	Best Practice Guidelines
CMA	Catchment Management Authority
DB	Der Brochen Mine
DBAP	Der Brochen Amendment Project
DMRE	Department of Mineral Resources and Energy
DWAF	Department of Water and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EC	Electrical Conductivity
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
EMS	Environmental Management System
GNR	Government National Regulations
GW	Ground water
HCT	Humidity cell testing
IRP	Integrated Resource Plan
LC	Leachate Concentrate
LCT	Leachable concentration threshold
LEDET	Limpopo Economic Development, Environment and Tourism
LoM	Life of Mine
mamsl	meters above mean sea level
MPRDA	Mineral and Petroleum Resources Development Act (No. 68 of 2002)
Mtpa	Metric tons per annum
NAG	Non-acid generating
NEM:BA	The National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEMA	National Environmental Management Act (No. 107 of 1998)
NEMAA	National Environmental Management Amendment Act (No. 62 of 2008)
NEM:AQA	National Environmental Management Air Quality Act (No. 39 of 2004)
NEM:PA	National Environmental Management: Protected Areas Act (No. 57 of 2003)
NEM:WA	National Environmental Management Waste Act (No. 59 of 2008)
NEM:WAA	National Environmental Management Waste Amendment Act
NP	Neutralisation potential
NNP	Net neutralising potential
NPR	Neutralising potential ratio

NWA	National Water Act (No. 36 of 1998)
PAG	Potentially acid generating
PCD	Pollution Control Dam
PCLU	Post Closure Land Use
PGM	Platinum Group Metals
RSRD	Residue Stockpiles and Residue Deposits
RWD	Return Water Dam
SANS	South African National Standards
SEAT	Socio-Economic Assessment Toolbox
SLP	Social and Labour Plan
SRK	SRK Consulting (South Africa) (Pty) Ltd.
STP	Sewage Treatment Plant
SW	Surface water
TC	Total Concentrate
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
VMP	Vegetation Management Plan
WML	Waste Management Licence
WRD	Waste Rock Dump
WUL	Water Use Licence

1 Introduction

1.1 Background

Anglo American Platinum – Rustenburg Platinum Mines Limited (AAP-RPM), established the Mototolo Mine Joint Venture (JV) with Glencore Operations South Africa (Pty) Ltd (Glencore) in 2003. As part of the JV arrangement, AAP-RPM and Glencore each contributed a similar amount of in-situ platinum group metals (PGM) reserves and resources from the Glencore owned farm Thornccliffe 374 KT. This is adjacent to its Thornccliffe Chrome Mine and AAP-RPM's bordering farm Richmond 370 KT, which is part of its Der Brochen Project's mining right area.

Refer to Figure 1-1 for the location of the Mototolo Mine JV and the Der Brochen Project Mining Right Areas.

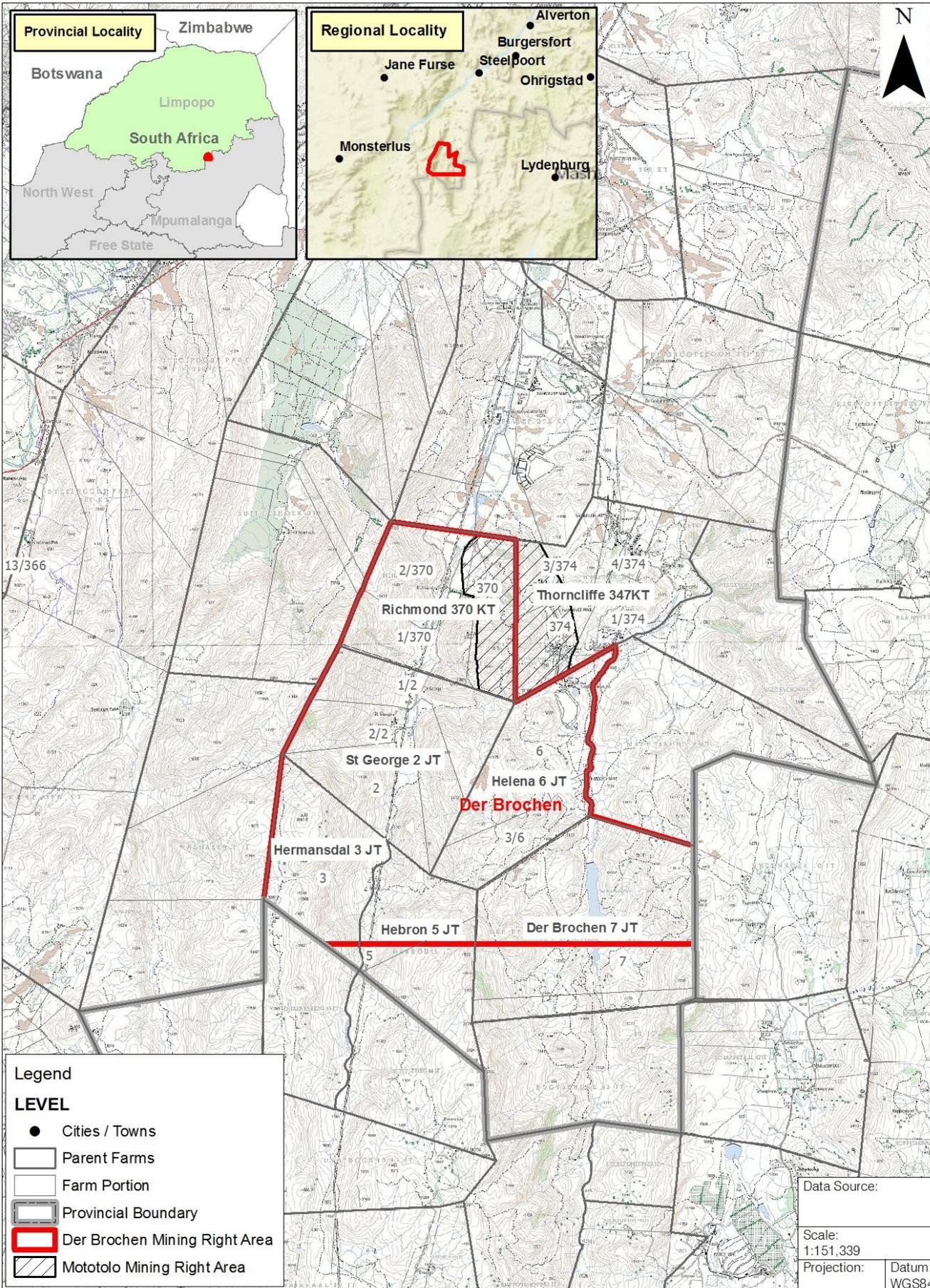
As part of the JV, Glencore developed and operated the underground room and pillar mining operations, while AAP-RPM constructed and managed the PGM concentrator plant (known as the Mototolo Concentrator). In addition, Glencore also constructed a chrome beneficiation plant next to the Mototolo Concentrator to process the Upper Group 2 (UG2) tailings arising from the concentrator plant. The final tailings derived from the Mototolo Concentrator has been disposed onto AAP-RPM's Helena Tailings Storage Facility (TSF), with this reaching capacity at the end of 2020. The Helena TSF has been replaced by the Mareesburg TSF which was commissioned in mid 2019.

In November 2018 AAP-RPM acquired Glencore's shares in the Mototolo Mine JV, with the intention to combine the Mototolo Mine with the downdip and adjacent Der Brochen resource to create a major platinum hub for the company, referred to in this report as the Der Brochen-Mototolo Mine Complex.

As part of the acquisition, AAP-RPM intends to combine the approved Environmental Management Programmes (EMPrs) associated with the Der Brochen Project and the Mototolo Mine into a single concise EMPr. This document will provide AAP-RPM with a more effective environmental management tool to manage their current and latest acquired operations, as it will:

- Describe the existing approved infrastructure and activities associated with the Der Brochen Project and the Mototolo Mine in one document;
- Holistically described the environment within which AAP-RPM will now operate;
- Update the status of environmental impacts and associated management measures based on the current activities associated with each of the operation;
- Allow for a greater level of alignment between the EMPrs in terms of management measures and monitoring reporting requirements;
- Bring the authorised activities in line with what is taking place at each of the operations; and
- Rationalise repeated information and management measures contained within the approved EMPrs.

AAP-RPM appointed SRK Consulting (South Africa) (Pty) Ltd (SRK) as an independent Environmental Assessment Practitioner (EAP) to combine the approved EMPrs of the Der Brochen Project and the Mototolo Mine into one – EMPr. This combined EMPr document will then be submitted to the Department of Mineral Resources and Energy (DMRE) for approval. The combining of the Mototolo Mine and Der Brochen EMPrs is being undertaken in accordance with Regulation 31 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended in 2017) promulgated under the National Environmental Management Act, Act 107 of 1998 (NEMA) as advised by the DMRE.



1.2 Purpose of this report

This conceptual rehabilitation and closure plan for the infrastructure and activities associated with the current mining and processing, as well as with the proposed new mining activities at Der Brochen Project. This project collectively referred to as the Der Brochen Mototolo Mine Complex (DBMMC), has been prepared as a specialist report to inform and accompany the Section 31 application to the competent authorities for the consolidated project.

The purpose of this report is to provide a plan that is measurable and auditable to AAP and the DMRE that includes:

- The proposed post-mining end use;
- Information that is necessary for the definition of the closure vision, objectives and design and relinquishment criteria;
- An indication of what infrastructure and activities will ultimately be decommissioned, closed, removed and remediated;
- The risk drivers determining actions;
- An indication of how the closure actions will be implemented to achieve closure relinquishment criteria; and
- Monitoring, auditing and reporting requirements.

1.3 Project team

This plan was developed by Mr James Lake (Pr Sci Nat/400445/04 with SACNASP¹), a Principal Scientist and Partner at SRK, with 22 years' experience in Environmental Management.

2 Regulatory requirements

The National Environmental Management Act (Act No. 107 of 1998) (NEMA) Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (GNR 1147) were promulgated in November 2015. It required that a final rehabilitation, decommissioning and mine closure plan is developed, which includes the determination of financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of mining. This regulation initially required mines to comply with the legislation by end February 2017. However, certain technical issues with the legislation resulted in an extension of the Transitional Arrangements (GNR 991 of 21 September 2018), to be compliant by 19 June 2021. Since the promulgation of GNR 1147, there have been three versions of possible changes to GNR1147 released for comment (with the last version GN 667 released in May 2019). There is however currently, no definition as to the final version of the regulations and how they, specifically, will differ from GNR 1147.

While there have been changes to the regulations with the drafts promulgated, the requirements of the three plans (Annual Rehabilitation Plan, Final Rehabilitation, Decommissioning and Mine Closure Plan and Environmental Risk Assessment Report) considered under the legislation has remained consistent. This document has been prepared to using the requirements of Appendix 4 of GNR 1147 and Appendix 6 of GNR 1228, with these broadly aligning with the requirements of Appendix 5 of the Environmental Impact Assessment Regulations, 2014 (GN 982).

¹ Registered with the South African Council for Natural Scientific Professions

3 Project description

3.1 Land tenure

The DBMMC is one of AAP-RPM's platinum mine operations located approximately 30 km south of the town of Steelpoort (approximately 40 km by road), and 35 km west of Mashishing (Lydenburg) (approximately 65 km by road), in the Limpopo Province. The project area falls within the Greater Tubatse Local Municipality, under jurisdiction of the Greater Sekhukhune District Municipality.

The DBMMC area extend across seven farms. The ownership of the relevant farm portions are described in Table 3-1.

Table 3-1: Der Brochen-Mototolo Mine Complex property description

Farm name	Portion	Surface Owner
Thornccliffe 374 KT	Remaining portion	Glencore Operations South Africa (Pty) Ltd
	3	Glencore Operations South Africa (Pty) Ltd
	7	Glencore Operations South Africa (Pty) Ltd
Richmond 370 KT	1	Rustenburg Platinum Mines Limited
	2	Rustenburg Platinum Mines Limited
St George 2 JT	Remaining portion	Rustenburg Platinum Mines Limited
	1	Rustenburg Platinum Mines Limited
	2	Rustenburg Platinum Mines Limited
Hermansdal 3 JT	Remaining portion	Johannes Jacobus Joubert
Hebron 5 JT	Remaining portion	Booyensdal Platinum (Pty) Ltd
	1	Booyensdal Platinum (Pty) Ltd
Helena 6 JT	Remaining portion	Rustenburg Platinum Mines Limited
	3	Rustenburg Platinum Mines Limited
Der Brochen 7 JT	Remaining portion	Rustenburg Platinum Mines Limited
Mareesburg 8 JT ²	Ptn 7	Rustenburg Platinum Mines Limited

Grey shade indicates properties associated with the mining right's area of the previously known Mototolo Mine JV, and the **Red line** indicates properties associated with the original Der Brochen mining right's area.

As indicated in Table 3-1, AAP-RPM also holds the surface right to Portion 7 of the farm Mareesburg 8 JT which falls outside, but is adjacent to, AAP-RPM's mining right's area associated with the original Der Brochen Project. The existing authorised Mareesburg tailings storage facility (TSF), associated return water dams (RWDs) and tailings-return water pipeline system, which form part of the Der Brochen Project, are located on this farm and relevant farm portion.

With respect to the farm portions associated with the previously known Mototolo Mine JV, AAP-RPM lodged a Section 102 application in accordance with the requirements of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) with the DMRE on 02 November 2019 to amend the Der Brochen mining right's area to include the farm portions associated with the Mototolo Mine. The transfer of the said farm portions into AAP-RPM's name and into Der Brochen mining right is pending.

² AAP-RPM holds the surface right to Portion 7 of the farm Mareesburg 8 JT which falls outside AAP-RPM's mining right's area.

3.1.1 Surrounding communities and mines

Several communities reside on the Der Brochen mining right area and immediate surrounding area as listed in Table 3-2.

Table 3-2: Communities located within and around the Der Brochen mining right area

Communities	Farm name	Families
The Gamawela and Ditsabeng Tsa Moletsi community	St George 2 JT	Gamawela
	Hermansdal 3 JT	Magane and Leshaba
	Richmond 370 KT	Matjomane and Mogashoa
	Mareesburg 8 JT	Mankge
The Moletsi community	Welgevonden 9 JT	Leshaba
The Pakaneng Choma community	Schaapkraal 42 JT	Pakaneng, Choma
	Vygenhoek 10 JT	

The mining activities at the DBMMC do not occur in isolation in the region, with the mines listed in Table 3-3 being in close proximity to AAP-RPM operations.

Table 3-3: Surrounding mines around the Der Brochen-Mototolo Mine Complex area

Mine	Mine Owner	Distance and direction from Der Brochen-Mototolo Mine Complex
Twefontein Mine	Samancor	14 km north
Dwarsrivier Mine	Assmang	10 km north
Two Rivers Platinum Mine	Impala Platinum-African Rainbow Minerals JV	9 km north-north-west
Magareng Mine	Glencore-Merafe Chrome JV	4 km north-east
Thorhcliffe Mine	Glencore	6 km north-east
Helena Mine	Glencore	2.5 km north-east
Booyensdal Mine	Northam Mines Limited	9 km south

Current operations at DBMMC include the processing of platinum and chrome bearing ore at the existing Mototolo Concentrator that is received from the underground workings at the Borwa and Lebowa shafts via an existing conveyor belt system. The Borwa and Lebowa shafts formed part of the previously known Mototolo Mine.

The final concentrate from the Mototolo Concentrator Plant is transported via trucks to the AAP Polokwane Smelter for further processing, whilst the tailings material from the plant is disposed of on the existing Helena TSF and recently constructed Mareesburg TSF via pipeline systems. The water contained in the tailings' slurry settles on top of the Helena and Mareesburg TSFs, and collects in the existing RWDs associated with the Helena TSF and Mareesburg TSF respectively. From the RWDs the water is pumped back to the Mototolo Concentrator Plant for reuse via return water pipeline systems.

Table 3-4 provides a summary of the main activities and infrastructure associated with the DBMMC as authorised through the Der Brochen Mine's approved Environmental Management Programmes (EMPrs) and associated Water Use Licences (WULs) as well as the Mototolo Mine's EMPr and associated WULs.

Table 3-4: Der Brochen-Mototolo Mine Complex's current and authorised activities and facilities

Historical, current and other authorised activities	
Existing activities and aspects	Activities previously authorised, but which has not yet commenced
<ul style="list-style-type: none"> • Underground mining at the Lebowa and Borwa decline shafts; • Ventilation via separate ventilation shafts; • Taking water from underground and using it for mining purposes; • Operating conveyor systems; • Processing of platinum and chrome bearing ore at the Mototolo Concentrator; • Deposition of tailings material onto the Helena TSF and operating the two associated RWDs; • Deposition of tailings material onto the Mareesburg TSF and operating the four associated RWDs; • Utilisation of the offices and access roads; • Construction and utilisation of contractors' laydown area; • Undertaking prospecting activities comprising of site preparation, drilling of prospecting boreholes, site rehabilitation and monitoring within the mining right area; • Abstraction of water from existing lawful use boreholes; • Abstraction of water from the Der Brochen Dam; • Waste management activities. 	<ul style="list-style-type: none"> • The Helena and Richmond wellfields (<i>only two of the authorised boreholes per well field are currently in use</i>); • Two Open Pits (Northern and Southern Pits), associated waste rock dumps (WRDs) and pollution control dam; • Re-routing of a 132 kV powerline; • Fish raceways; • A Co-Disposal Facility (<i>tailings disposal with a rock embankment in the north pit</i>).

The sections below provides further details of the activities and infrastructure listed above.

3.2 Mining related activities and surface infrastructure

For the purpose of this section the DBMMC has been divided into the following three key areas:

- The underground mining operation;
- The Mototolo Concentrator area; and
- The Der Brochen project.

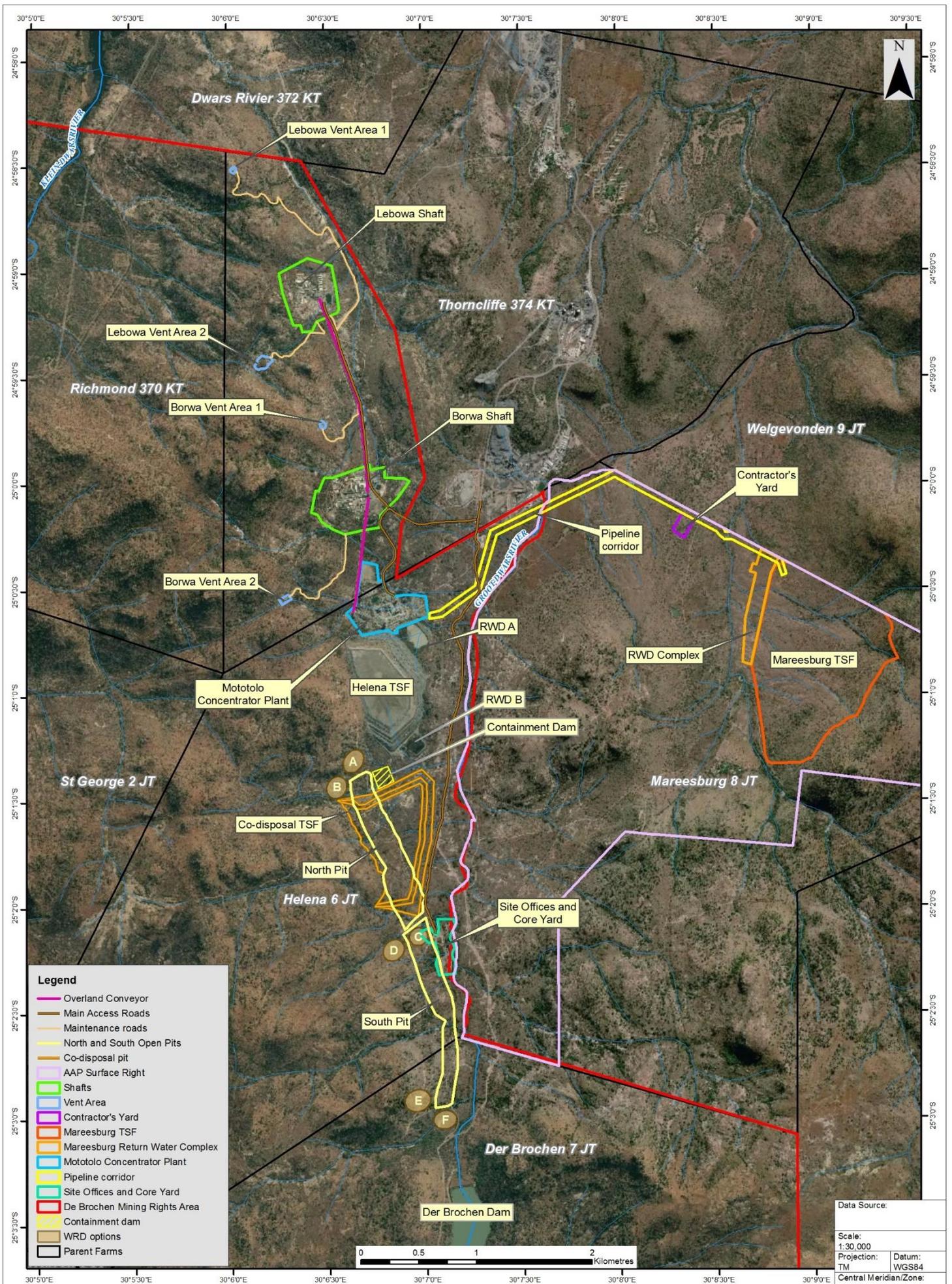
Details of the key activities and infrastructures associated with the above listed areas are provided below and illustrated in Figure 3-1.

3.2.1 Underground mining operation

PGMs and chrome are mined underground through the bord-and-pillar mining method at both the existing Lebowa and Borwa decline shafts. The underground mining operation was designed to produce 132 000 ounces of platinum and 82 000 ounces of palladium per annum over the 20-year life of the mine. Mining commenced in 2005/6, each shaft system produces roughly 100 000 tons per month, and is equipped with two ventilation shafts

Ore abstracted from the two shafts are transported by overland conveyor to the existing Mototolo Concentrator for processing.

Each shaft operations consist of the following infrastructure (the shafts are almost identical in terms of infrastructure):



- Security guard house;
- Parking area with car ports;
- Conference hall;
- Main office buildings (one for each shaft);
- Workshop and wash bays;
- Diesel and oil storage and handling facilities at each shaft;
- The mining complex's with associated infrastructure (e.g. lamp room and change houses);
- Compressor houses;
- Electricity sub-stations at each shaft;
- Overhead powerlines;
- One explosive depot and explosive shaft head delivery bay;
- Emulsion bays;
- Vent fans;
- Laundry;
- A high tension substation;
- Cable yard;
- Transformer bays;
- Salvage yard;
- Overland conveyor systems; and
- Access and maintenance roads.

Proposed new infrastructure at Borwa underground

Borwa mine is also intending to construct four new structures at the shaft bank to assist with the current mining operation. These include (Figure 3-2):

- Proto room and parking (Item 1 on Figure 3-2)
- Mineral Resource Management building (Item 2 on Figure 3-2)
- Medical Clinic and Covid -19 lab/isolation rooms and parking (Item 3 on Figure 3-2)
- Engineering training workshop with front & back canopy (Item 3 on Figure 3-2)

In addition a road extension will be undertaken to provide access to these areas (Item 5 on Figure 3-2).

- A substation;
- Water containment facilities;
- Water and electricity reticulation infrastructure;
- Stormwater management infrastructure;
- Storage facilities for dangerous goods;
- General stores;
- Access and maintenance roads;
- Security and access control points; and
- Sewage treatment plant.

Helena TSF

Tailings from the Mototolo Concentrator Plant is pumped via a slurry delivery pipeline to the Helena TSF. The TSF has cut-off walls and trenches, paddocks and solution trenches, penstocks and under-drains. Seepage water is recycled back to the concentrator.

The water contained in the tailings settles out on top of the TSF where it drains into a penstock where after the water flows into two clay lined return water dams located below the TSF, i.e. RWD A and RWD B. RWD A has a storage capacity of 170 000 m³ and Return Water Dam B has a storage capacity of 35 000 m³.

Seepage from the dams is contained in two seepage sumps. Water from the sumps is pumped back to the return water dams.

Mareesburg TSF

This section provides details on the following infrastructure associated with the Mareesburg TSF operation; Mareesburg TSF and Return water dam complex.

The Mareesburg TSF is a lined hillside tailings storage facility where tailings from the Mototolo Concentrator Plant is deposited onto. The Mareesburg TSF is being developed in phases with Phase 1 of seven phases currently planned, completed and operational. The characteristics of the Mareesburg TSF is described below.

- Total footprint area - 133 ha (excluding return water dam complex).
- Maximum operational deposition area - 76 ha;
- Starter wall height - approximately 14 metres;
- Maximum height at closure - 115 metres;
- Target dry density - 1.86 tonnes per cubic metre;
- Maximum storage capacity - 64.6 million cubic metres or 120.1 million tonnes; and
- Maximum operational life of TSF based on 250 Kt/month - 40 to 41 years (July 2017 – June 2057);

Tailings is delivered to the TSF via a steel pipeline system, consisting of a three pipelines as indicated below:

- Two pipelines dedicated for tailings (one active and one standby pipeline).
- One pipeline dedicated to transport water back from the TSF to the Mototolo Concentrator where the water is reused as process water.
- Scour valves have been placed at intervals along the delivery pipelines to allow for clearing and maintenance purposes.

Water collecting on the surface of the Mareesburg TSF drains via the penstock into four lined return water dams located downslope and west of the TSF footprint area.

3.2.3 Der Brochen Project

The Der Brochen Project consists of existing infrastructure and planned infrastructure for which authorisation have been obtained previously but the activity have not yet commenced.

Existing infrastructure and activities

Office, core yard and access road

An old farm house on the farm Helena 6 JT is being used as the project offices and there is a geological core yard located to the north-west of the offices. This area is accessible via a gravel access road, which is linked to the existing main tar road.

Prospecting

On going prospecting activities are undertaken within the Der Brochen Project's mining right area. The main prospecting activities consist of pre-drilling (site preparation), drilling of exploration boreholes, site rehabilitation and monitoring. Other activities associated with prospecting include construction of temporary roads, clearings and levelling at drill pads and erecting the temporary camp sites (approximately 20 m x 20 m) near drill rigs. Once drilling is completed at a prospecting site, all temporary infrastructures are removed, waste material disposed of in the correct manner and the site rehabilitated.

Planned authorised infrastructure and activities

AAP-RPM is authorised to undertake the certain additional mining related activities, but which have not yet commenced. These activities and the location of such activities are summarised in Table 3-5.

Table 3-5: Authorised activities, not yet commenced, associated with Der Brochen Project

Activity	Farm name and portion
Northern Pit	Helena 6 JT, Portion 3 and Remaining Extent
Southern Pit	Helena 6 JT, Portion 3; and Der Brochen 7 JT, Remaining Extent
Co-disposal Facility (CDF)	Helena 6 JT, Remaining Extent
Re-routing of 132 kV powerline	Helena 6 JT, Remaining Extent; Mareesburg 8 JT, Portion 7; and Der Brochen 7 JT, Remaining Extent

Further details on the above listed authorised activities are provided below.

Open Pits (North and South Pits)

AAP-RPM is authorised to develop two open pits to mine through open-cast mining methods the near-surface layer of the Upper Group 2 (UG 2) Reef. The open pit operation will consist of a North Pit (life of mine 3.5 to 4 years) and a South Pit (life of mine 2 years) and will be operated on a 24 hour operation.

Waste rock from the open pits will be used to construct the embankment for the Co-disposal Facility (CDF) that will be constructed over the backfilled North pit. Alternatively, should the CDF be considered unfeasible, the North Pit will be closed in a similar method to the South Pit. Closure of the South Pit will entail the backfilling of the pit, with overburden stripped ahead of mining. Temporary Waste Rock Dumps (WRDs) to create an initial void will be provided on the edges of the pit highwall side, and the waste rock will be dozed into the pit to fill the final void. The majority of the pit will be backfilled during operations, with this roll over mining method being practiced.

If the CDF is to be constructed, an underdrain system at the highwall/footwall using drainage pipes connected to the second compartment of the sump at the southern corner of the North Pit, will be

installed. The tailings water reporting to the sump will be pumped to the main sump, and from there to the Helena RWDs for recycling to the Mototolo Concentrator.

If the CDF is not to be constructed, the seepage water, considered to be polluted, will be pumped to the surface containment dam situated to the north of the North Pit. From there the seepage water will be transferred to the Mototolo Concentrator after settling, for reuse as process water in the Concentrator.

Co-Disposal Facility (CDF)

AAP-RPM received environmental authorisation for the construction of a Co-disposal Facility (CDF) that will serve as an additional tailings storage facility. The CDF will have a starter wall constructed of waste rock obtained from the North Pit, following which tailings will be deposited within the pit and the surrounding starter wall. The selection and implementation of the CDF will be dependent on cost considerations and the timing of the availability of the completed structure to receive tailings from the Mototolo Concentrator.

4 Environmental context

The broader environmental and social context of the mine is described in detail in the Environmental Impact Assessment & Environmental Management Programme Report and is therefore not repeated here. The subsections that follow have therefore been extracted and summarised to focus on key issues that may/will have relevance to the eventual closure of the DBMMC associated activities and infrastructure.

4.1 Topography

The area is characterised by a rugged topography with the relief measuring between 940 m and over 2 000 m above mean sea level (mamsl). The prominent north-south trending Steenkamps Mountains extend across the study area, with two deeply incised valleys lying in a north-south direction between the mountain ranges. Within these valley floors are the Groot-Dwars River in the east and the Klein-Dwars River in the west (both flowing northwards through the area).

The highest elevation of 2 300 mamsl is located to the extreme south of the project area, and the lowest elevation of 1 035 mamsl is located to the northern drainage path of the Groot Dwars River.

4.2 Climate

DBMMC falls within the Highveld climatic region. This climatic region is associated with warm temperature and summer rainfall. The average daily maximum temperature for the region is 28°C in January and 21.6°C in July.

Rainfall occurs mostly in the summer (85%) from October to March, with a maximum in December. The ten-year average recorded at the Helena TSF of 624 mm (2010-2018). The average annual S-pan evaporation is 1 703 mm.

4.3 Geology

DBMMC overlies intrusive rocks of Bushveld Complex (BC) which intruded into the Transvaal Supergroup on the Kaapvaal Craton at about 2 060 Ma. Of the various layers within the BC, the Project area is underlain by the upper portion of the Critical Zone (Dwars River Sub-suite) which in this area consists of alternating layers of pyroxenites, norites and anorthosites. The igneous layering dips in the order of 9° to 12° to the west. Economic zones of interest include the platiniferous Merensky reef and the UG2 chromitite reef. The former outcrops with a N-S strike on the Der Brochen farm, occupying the mid-slope section west of the Groot-Dwars River. The UG2 lies some 180 to 210 m below the Merensky reef and outcrops in the gently sloping lower-slope section of the Groot-Dwars River valley.

4.4 Land use, land capability and soils

The area is dominated by shallow soils of Mispah/Outcrop, Milkwood, Glenrosa, Bonheim and Mayo soil forms, whilst moderately deep soils of Hutton/Mispah occupies a small proportion of the area. The land capability of the soils and associated landscape is predominantly grazing, although a small proportion (less than 5%) is considered arable.

4.5 Biodiversity

The DBMMC area is predominantly located in areas of high biodiversity and increased sensitivity with four defined habitat units. These habitat units are:

- Freshwater Resources;
- Open Bushveld;

- Sekhukhune Mountain Bushveld; and
- Transformed areas.

The Freshwater Habitat Unit is of high ecological sensitivity and if any activities are to infringe upon this habitat unit there is likely to be a significant impact on floral Species of Conservation Concern (SCC) as well as the diverse floral communities associated with this habitat unit. The Open Bushveld Habitat Unit, with its high floral diversity and association with a high abundance of floral SCC, is considered to be of high ecological importance and sensitivity. From a floral perspective, the Sekhukhune Mountain Bushveld Habitat Unit is of high ecological sensitivity and importance. This habitat unit has the highest diversity of floral SCC; however, these species occur sporadically throughout the habitat unit, many of which being associated with the rockier habitats.

4.6 Surface water

DBMMC falls in the extreme south of the Eastern Limb of the Bushveld Complex within the Klein and Groot Dwars River catchments of the B41G quaternary catchment. This catchment falls within the Olifants River Water Management Area B4.

The area is characterised by rugged topography with prominent north-south trending mountain ranges (the Steenkampsberge) extending across the project area. Two deep valleys extend in a north-south direction between the Steenkampsberge mountain ranges and the Groot-Dwars River (in the east) and the Klein-Dwars River (in the west) are contained within these valley floors.

Surface water flows via a number of unnamed ephemeral tributaries and drainage lines into the perennial Groot-Dwars River. The Der Brochen dam is situated on the Groot-Dwars River upstream of the Der Brochen Project area and proposed activities. The main tributary of the Groot-Dwars River in the project area is the ephemeral Mareesburg Stream, which is adjacent to the partially constructed Mareesburg TSF. The Groot-Dwars River together with the Klein-Dwars River joins the Dwars River on the farm Dwarsrivier 372 KT approximately 10 km north-northwest of Der Brochen. The Dwars River then joins the Tubatse River (formerly Steelpoort River), which in turn feeds into the Olifants River.

The pre-mining baseline water quality data is extracted from the IWWMP Report, (SRK 527471, 2018). The pre-mining surface water quality was determined through sampling at various locations along the Groot Dwars River. The general water quality profile in the site area, obtained during surveys in 2001 and 2002, was described as very good with pristine conditions prevailing. The water is suited for all uses if compared against the SAWQG (DWAf, 1996) and the SANS 241, 2015 for drinking water (excluding bacterial content).

4.7 Groundwater

The major flow paths in the study area are within the upper shallow overburden/weather aquifer, while the fracture zones and dykes across the site act as preferential flow paths for contaminants to travel. It is expected that contamination of the deeper aquifer will be limited due to limited hydraulic connectivity between the shallow and deep aquifers. Flow and transport are furthermore compartmentalized by the more competent dyke structures at depth.

The groundwater type is generally calcium / magnesium – bicarbonate (Ca/Mg-HCO₃) rich, which is typical of shallow groundwater in the Bushveld Complex (BC). The magnesium and calcium dominance for the cations can be directly linked to the underlying geology (with magnesium and calcium rich gabbroic norites), while the bicarbonate anion dominance of the samples indicates relatively young or fresh groundwater in equilibrium with carbon-dioxide in the atmosphere and soil zone.

4.8 Socio-economic aspects

DBMMC is located within the Fetakgomo - Greater Tubatse Local Municipality³ (FGTLM), under jurisdiction of the Greater Sekhukhune District Municipality (GSDM). Thaba Chweu Local Municipality (TCLM) is an important labour sending area for the mine and as such, has been included in this report. The TCLM falls under the Ehlanzeni District Municipality, within the Mpumalanga Province.

50.3% of the population in the FGTLM is unemployed and 62% households are living on less than R76,400 per annum. The TCLM has a much lower unemployment rate (20.5%). 59.6% of economically active youth is unemployed in the FGTLM. More than half of those employed in the FGTLM work in the mining and quarrying sector, while mining, agriculture and trade are significant employment sectors in the TCLM.

43.2% of the FGTLM population have completed some primary school education, while 39.3% completed their secondary school education. Only 0.8% have received higher education, while 1.6% have no schooling. The TCLM has poorer education levels, with 38.6% having some primary school education, 15.4% having completed their secondary school education and slightly more having achieved higher education (1.5%) than the FGTLM.

Sanitation and water delivery is a constant constraint, while over 16.0% of the population do not have access to energy for warmth in the colder months in the FGTLM. Service delivery in the TCLM is better than the FGTLM; however, many rural and informal settlements find themselves with poor service delivery. Minimal health facilities and a growing population will be a cause for concern for both municipalities as populations continue to increase.

Local governance structures in the study area are complex and are likely to become more complex. A number of land claims have been lodged for the same land by a number of claimants, and the final land distribution could lead to violence and conflict between communities.

Three communities reside on farms falling within the Zol, those being the Gamawela, Moletsi and PakanengChoma.

The Choma, Mawela and the Malepa A Makanyane communities together lodged a land claim against these two farm portions. Vygenhoek 10 JT was restituted to the PakanengChoma community in 2010. Schaapkraal 42 JT has not yet been restituted to the PakanengChoma community. However, following the separation between the three families/communities after 2010, the only claim that remains is the Choma claim (Table 5 5). The Mawela and Makanyane families/communities have indicated that they would be lodging a claim against this farm portion as well.

4.8.1 Stakeholder issues and comments

Stakeholder engagement has been conducted during the authorisation process, with the intent of the engagement being to identify stakeholder issues. During the engagement, the comments received related to potential biophysical environmental impacts as well as various opportunities that the communities have indicated they would like access to. No issues relating to closure were raised.

³ The FGTLM was established by the amalgamation of the Fetakgomo and Greater Tubatse Local Municipalities in August 2016, prior to which they were separate entities.

5 Environmental risk assessment findings

The objective of the environmental risk assessment is to:

- Ensure timeous risk reduction through appropriate interventions;
- Identify and quantify the potential 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.

The risk assessment is limited to the mining lease area and the selected off-site infrastructure. The risk assessment considered the following categories: health/safety, environmental, financial, legal/regulatory and social/reputational/community. The external influences include, but are not limited, to the parties that are affected or interested in the closure of the mine; and biophysical influences such as climate, ground and surface water entering the mine lease area.

5.1 Methodology

The risk is described and then a determination is taken to assess the nature of the risk and then the risk is ranked according to predetermined criteria for probability and consequence. Five categories are considered to describe the nature of the risk, with the primary category being the one that the assessors determine is impacted most significantly should the risk be manifest. The nature of the risk is assessed to fall into one of the following categories:

- Health and safety.
- Environment.
- Financial.
- Legal and regulatory obligations.
- Reputational, social or community.

Once the risks had been captured, the probability of the risk occurring as well as the consequence of the risk occurring, were rated according to the criteria presented in Appendix A.

SRK is of the opinion that the health and safety and environmental risks typically represent external risks to the biophysical and socio-economic environment that may exist at closure, and the financial, legal and reputational risks are internal and represent how risks at closure influence AAP.

A matrix (Table 5-1) listing the probability and consequence is then used to numerically rank the risk and determine whether the risk level is:

- High (H).
- Significant (S).
- Medium (M).
- Low (L).

The ranking criteria for consequence is presented in Appendix A.

Table 5-1: Risk assessment matrix

		Consequence (Details to be found in Appendix A)				
		1	2	3	4	5
Safety		Insignificant	Minor	Moderate	High	Major
Occupational Health						
Environment						
Community/Social						
Legal and regulatory obligations						
Material Losses						
Reputational						
Probability		Risk ranking				
Almost certain	5	11 (M)	16 (S)	20 (S)	23 (H)	25 (H)
Likely	4	3 (M)	12 (M)	17 (S)	21 (H)	24 (H)
Possible	3	4 (L)	8 (M)	13 (S)	18 (S)	22 (H)
Unlikely	2	2 (L)	5 (L)	9 (M)	14 (S)	19 (S)
Rate	1	1 (L)	3 (L)	6 (M)	10 (M)	15 (S)

5.2 Outcomes of the risk assessment

Table 5-2 includes the risks that were identified as well as the risk ranking.

5.3 Sensitive indicators

Regulation in 3(c)ii of Appendix 4 [GN 1147] requires 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*”. SRK interprets this to relate specifically to external risks, being those associated with how DBMMC influence the environment, rather than health and safety, financial, legal and reputational, social and community risks. An examination of the risks that fall into the environmental category indicates that the risks relate primarily to material imbalance, biodiversity, land capability and impacts on water quality or quantity. There are a variety of indicators that can be used to indicate how the environment may have been impacted during operations, which can then be used to inform the rehabilitation actions. These indicators include:

- Growth medium balance.
- Formation of rilles and gully's.
- PM₁₀ fallout.
- Water quality of both the surface and groundwater resources that are predicted to be impacted on by the activities by DBMMC.
- Growth medium cover placed to restore land capability.
- Biodiversity – flora and fauna presence, diversity and density.

Based on the current understanding of the closure risks, this monitoring program will be sufficient to collect data to inform further assessment of closure risks and to potentially alter proposed conceptual closure strategies for the management of the risks already identified.

5.4 Residual risk assessment

A risk assessment of the residual risk that remains after the conceptual closure strategies have been implemented was undertaken to determine whether the residual risk is acceptable to AAP. As with the initial risk assessment, this assessment of residual risks was performed using the Anglo American Plc risk assessment approach, based on a 5 x 5 risk matrix, defining probability and consequence. The ranking of all the residual risks is presented in Table 5-2.

Table 5-2: Outcome of risk assessment

Hazard / Risk Source Description	Description of Unwanted Event	Cause of Hazard	Resulting Secondary Hazards	Current Controls	Likelihood of the Event (given current controls)	Consequences						Max Risk Rank	Possible Improvements or Additional Controls	Residual Risk Rating
						(S)	(H)	(E)	(C)	(L & R)	(F)			
All constructed infrastructure at shafts as well as peripheral to shafts (vent shafts, conveyor, dams etc)	Injuries during demolition of infrastructure and/or inadequate maintenance of infrastructure.	Inadequate security and / or safety procedures during decommissioning. Integrity of structures compromised potentially during decommissioning.	Safety and health issues Financial consequences due to theft of equipment.	Maintain safety and security procedures during decommissioning. Also maintain routine inspection and maintenance during decommissioning phase of all infrastructure.	3: Possible	3: Mod	3: Mod					13 (S)	Closure Action: Demolish infrastructure with no 3rd party use immediately after the operation ceases.	6(M)
Pollution Control Dams (PCDs), Storm water dams and Raw water dams	Uncontrolled discharge, overflow during operational life may contaminate the GW and SW.	Reduced dam capacity-silted, highly vegetated; heavy rain event, non-maintenance.	Soil contamination.	Cleaning of dams; construction of silt traps at all the dams; maintenance of dam levels in terms of allowable free board.	4: Likely			3: Mod				17 (S)	Closure actions: Rehabilitate surface sources of contaminated water. Rehabilitate dams not required to manage post closure water balance.	9 (M)
Off-site Service Infrastructure - Roads, Powerlines, Water & Sewage Pipelines etc. Serving only the Mine.	Lack of provision for demolition.	Fate of off-site infrastructure unknown.	Delay in closure due to unavailability of resources.	Inclusion in assessment.	2: Unlikely						2: Min	5 (L)	Operational Management: Understand the mine's responsibility in terms of all the off-site infrastructure maintenance and include the estimated cost in mine's estimated closure provision.	
Surface Water (SW) and Ground Water (GW) contamination	Decant from the underground workings due to aquifer interception potentially contaminating SW and GW.	Rewatering of workings after mining has ceased	Environmental pollution, legal and financial consequences.	None.	3: Possible			3: Mod			3: Mod	13 (S)	Closure Action: Understand the post closure decant volumes and quality and prepare mitigation plan.	9(M)
Surface Water (SW) & Ground Water (GW)	Significant contamination of SW and GW at closure due to regular overflow from the RWD & PCD during operational life.	Overflow of RWD/TSF due to heavy downpour for which dams not designed (1:1000 yr. flood) tailings and RWD pipeline failure resulting in spill.	Environmental and health consequences.	The allowable free-board at the dams is maintained.	3: Possible			4: High			3: Mod	18 (S)	Operational Management: Maintain low levels in the RWD by finding alternative usages (prioritising); Continuous pipeline monitoring and maintenance.	6(M)
Soil Contamination	Soil contamination.	Hydrocarbon spillages at workshops, shaft entrances and parking areas.	Environmental, legal, financial consequences	Limiting work that may spill hydrocarbons to designated areas with appropriate containment. Use of drip trays when work required out of these areas.	4: Likely			3: Mod		3: Mod	2: Min	17 (S)	Closure Action: The extent of soil contamination must be assessed regularly in detail and an adequate provision be placed to address the contamination.	9(M)
Underground mining workings post closure.	People accessing underground workings post closure and injuring themselves.	Illegal mining / access.	Reputational damage.	Security and access control in place during operations.	5: Almost Certain	4: High						23 (H)	Closure Action: 1. Seal access points with covers designed to limit inadvertent access. 2. Remove value infrastructure immediately after the operation ceases. 3. Maintain security and access control until the site is safe for relinquishment.	17(S)
Service Infrastructure - Roads	Injury, death due to accidents caused by bad road conditions post-closure.	Non-maintenance post closure.	Reputational damage	None.	3: Possible	3: Mod		3: Mod				13 (S)	Closure Action: Maintenance of infrastructure during operational phase; and adequate hand-over (proper contract in place) to government or third-parties at closure.	6(M)
Social Issues	Loss of employment/ business.	Dependency of surrounding community and businesses created by mining operations.	Loss of living and basic services to people, unrealistic expectations from communities - resulting in unrest	None.	5: Almost Certain			4: High				23 (H)	Closure Action: 1. Programs to multi-skill/re-skill employees to ensure they are employable in other industries as documented in the SLP. 2. Diversify mining operation to replace jobs as mine moves to closure.	13(S)
Uncertainty about the sufficiency of topsoil for rehabilitation	Topsoil may or may not be sufficient for final rehabilitation- as no assessment has been done.	Lack of a topsoil inventory.	Not being able to meet relinquishment criteria.	None.	3: Possible						2: Min	8 (M)	A topsoil inventory must be completed in relation to the required volume required at closure.	6(M)
WRD Impoundment and North pit	The water associated with the WRD Impoundment as well as any water accumulating in the base of the pit being an attractive nuisance with community members accessing the water and potentially drowning.	Uncontrolled access to water bodies.	Reputational damage associated with potential community harm after closure.	Access control.	4: Likely	4: High						21 (H)	Closure Action: Ensure routine inspection and maintenance of the existing infrastructure post closure. In addition, decommission unsafe infrastructure immediately after the operation ceases.	

Hazard / Risk Source Description	Description of Unwanted Event	Cause of Hazard	Resulting Secondary Hazards	Current Controls	Likelihood of the Event (given current controls)	Consequences						Max Risk Rank	Possible Improvements or Additional Controls	Residual Risk Rating
						(S)	(H)	(E)	(C)	(L & R)	(F)			
DMS Stockpile	Not achieving the success criteria for rehabilitation.	The basis of success criteria i.e. the detailed rehabilitation prescription including the feasible slope angles, ideal topsoil/growth media depth, suitable seed mix etc. has not yet been established.	Dust issues etc.	Continue with long term rehabilitation trials.	4: Likely					4: High	5: Maj	24 (H)	<p>Operational Management:</p> <ol style="list-style-type: none"> Undertake DMS rehabilitation trials to understand which seed mixes work at what slope angles; Undertake a thorough monitoring plan to establish the success/failure of the trials and document it. The DMS placement should be undertaken in a way that enables adequate concurrent rehabilitation opportunities at the DMS side slopes. 	14(S)
Biodiversity	Degradation of land capability due to deteriorated biodiversity during operational phase.	Long term mining pollution and construction activities.	Loss of biodiversity.	Implementation of an Alien species management plan.	3: Possible			4: High				18 (S)	<p>Operational Management:</p> <ol style="list-style-type: none"> Implement the alien invasive species removal plan on regular basis. Develop concurrent closure measures where covers are placed, and indigenous vegetation established to aid ecological recovery. 	8(M)
Surface Water (SW) and Ground Water (GW)	Contamination of SW/GW during operational phase.	Discharges from operational areas.	Environmental and health consequences.	Control are under development for the management of potential contamination associated with the DMS dam.	4: Likely			4: High			3: Mod	21 (H)	<p>Operational Management:</p> <ol style="list-style-type: none"> Understand and address the GW/SW contamination. Cost the remediation plan as liability and make financial provision for. 	8(M)
Air Quality	Dust pollution from uncovered residue (overburden at North Pit and DMS)	Lack of sustainable vegetation on rehabilitation areas.	Surrounding soil contamination and nuisance to surrounding community.	Wet suppression techniques as per authorisation.	3: Possible			3: Mod		3: Mod		13 (S)	<p>Closure Action:</p> <p>Soon after closure, vegetate surfaces sustainably.</p>	8(M)
Social Issues	People injuring themselves while accessing the post closure infrastructure and mining area especially open pits and concentrators.	Value of unreclaimed material in the mining area.	Reputation, legal obligations.	Adequate access control in place during operational life.	5: Almost Certain	4: High			3: Mod		1: Ins	23 (H)	<p>Closure Action:</p> <ol style="list-style-type: none"> Ensure adequate access control around the openpits to discourage access into the pits. maintain security and access control in the rest of the mining area till the area is sustainably rehabilitated and relinquished. 	14(S)
Social Issues	Loss of livelihood of surrounding communities.	Dependency of surrounding community and businesses created by mining operations.	Loss of living and basic services to people, unrealistic expectations from communities - resulting in unrest.	None.	5: Almost Certain				4: High			23 (H)	<p>Closure Action:</p> <ol style="list-style-type: none"> Programs to multi-skill/ re-skill employees to ensure they are employable in other industries. Diversify mining operation to replace jobs as mine moves to closure. 	13(S)

6 Design principles

6.1 Legal and governance framework

There are a number of legal and regulatory frameworks with which AAP must comply. The following presents what SRK considers the key legislation, which could materially affect rehabilitation and closure:

- Constitution of the Republic of South Africa (Act 108 of 1996) (Constitution).
- National Environmental Management Act (Act 107 of 1998) (NEMA).
- National Environmental Management Amendment Act (Act 62 of 2008) (NEMAA).
- National Environmental Management Act: Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (GN 1147) which replaces the Mineral and Petroleum Resources Development Act (Act 68 of 2002) (MPRDA) – closure and financial provision elements repealed.
- Environmental Impacts Assessment Regulations 2014, as amended in 2017.
- Mineral and Petroleum Resources Development Act (Act 68 of 2002) (MPRDA) as it pertains to the social and labour plan.
- National Environmental Management: Waste Act (Act 59 of 2008) (NEM:WA) and supporting regulations.
- Waste Classification and Management Regulations.
- National Environmental Management: Air Quality Act (Act 39 of 2004) (NEM:AQA).
- National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM:BA).
- National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEM:PA).
- National Water Act (Act 36 of 1998) (NWA).
- The Nuclear Energy Act (Act 131 of 1999) and National Nuclear Regulatory Act (Act 47 of 1999).
- The National Radioactive Waste Disposal Institute Act (Act 53 of 2008).
- Mine Health and Safety Act (Act 29 of 1996).

Table 6-1 provides a brief description of the legislation as it pertains to closure.

Table 6-1: Summary of SA legislation and implications for closure

Legislation	Implications for Closure
<p>The Constitution</p> <p>In terms of Section 24 of the Constitution “Everyone has the right to:</p> <ul style="list-style-type: none"> • An environment that is not harmful to their health or well-being. • Have the environment protected, for the benefit of present and future generations.” 	<p>Constitutional requirement to ensure that the Plan includes measures that protect the rights of people to an environment that is not harmful to health or well-being post closure.</p>
<p>National Environment Management Act (107 of 1998)</p> <p>Sections 28 (1) and (3) of NEMA set out the duty of care principle, which is applicable to all types of pollution and must be considered in considering any aspects of potential environmental degradation.</p> <p>Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.</p>	<p>The measures required in terms of subsection (1) may include measures to:</p> <ul style="list-style-type: none"> • Investigate, assess and evaluate the impact on the environment. • Inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed to avoid causing significant pollution or degradation of the environment. • Cease, modify or control any act, activity or process causing the pollution or degradation. • Contain or prevent the movement of pollutants or the causes of degradation. • Eliminate any source of the pollution or degradation. • Remedy the effects of the pollution or degradation.
<p>Environmental Impacts Assessment Regulations, 2014 as amended in 2017</p> <p>These regulations were developed for the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations.</p>	<p>Any new EIAs or BAs for the mine will be required to consider closure during planning and to include a closure plan and closure estimate to support an authorisation application.</p>
<p>National Environment Management: Waste Act (59 of 2008)</p> <p>Part 8 of Chapter 4 of the Act indicates the requirement to identify the status and risk of contaminated sites and provides a legal mechanism for remediation activities to be instigated and controlled.</p>	<p>Contamination resulting from operational activities will require remediation, with the final soil quality meeting requirements as specified in the Acts Regulations.</p>
<p>Waste Classification and Management Regulations</p> <p>The Waste Classification and Management Regulations require that (Chapter 2, 4(2)) all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234 within 180 days of generation and if the waste is to be disposed of to landfill that (Chapter 2 (8)1) (a) the waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal.</p>	<p>The Waste Classification and Management Regulations and the supporting Norms and Standards as well as Regulations regarding the Planning and Management of Residue Deposits and Residue Stockpile do not contain specifications around closure, other than the requirements in Regulations regarding the Planning and Management of Residue Deposits and Residue Stockpile that stockpiles and deposits be closed according to the relevant provisions in the environmental authorisations, an EMPr and any other applicable legislation.</p>

Legislation	Implications for Closure
<p>Regulations Regarding the Planning and Management of Residue Stockpiles and Residue Deposits</p> <p>The regulations specify design approach and considerations for Residue Stockpiles and Residue Deposit (RSRD), but more importantly specify that these facilities must comply with the Norms and Standards.</p>	
<p>Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations</p> <p>The purpose of these Regulations is to regulate the determine and making of financial provision as contemplated in the Act for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, exploration, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future.</p> <p>The Regulations also include detailed descriptions of the wording required in the documentation to support the provisioning for liability using Bank Guarantees and Trust Funds.</p> <p>Finally, the legislation also provides detailed on the information to be contained in the following plans:</p> <ul style="list-style-type: none"> • Annual rehabilitation plan. • Final rehabilitation, decommissioning and mine closure plan. • Environmental risk assessment report. • Care and maintenance plan. 	<p>Closure planning process will need to be expanded to include:</p> <ul style="list-style-type: none"> • Annual rehabilitation plan. • Final rehabilitation, decommissioning and mine closure plan. • Environmental risk assessment report. • Care and maintenance plan.
<p>The National Environment Management: Air Quality Act (39 of 2004)</p> <p>This Act regulates atmospheric pollution and repealed the Atmospheric Pollution Prevention Act. The Act came into full effect on 1 April 2010 and entrusts the Department of Environmental Affairs with the task of preventing pollution and ecological degradation, while at the same time promoting justifiable economic and social development. Metropolitan and District Municipalities are charged with issuing atmospheric emission licenses for certain listed activities. It must be shown that the best practical means are being employed to limit air pollution before these certificates will be issued. Penalties and criminal sanctions are imposed for non-compliance with the National Management: Air Quality Act.</p> <p>On 1 April 2010, the Department of Environmental Affairs established a list of activities, which require atmospheric emission licenses. The Department has published the minimum emission standards resulting from these listed activities. These include the permissible amount, volume, emission rate or concentration of that substance or mixture of substances that may be emitted into the atmosphere and the manner in which measurements of such emissions must be carried out. The consequences of the listing of these activities is that no person may, without a</p>	<p>Other aspects of the NEM:AQA such as monitoring, and application of management/mitigation measures may apply during closure.</p>

Legislation	Implications for Closure
<p>provisional atmospheric emission licence or an atmospheric emission license, conduct an activity listed on the list anywhere in the Republic or listed on the list applicable in a province anywhere in that province.</p>	
<p>The National Environmental Management: Biodiversity Act, (10 of 2004) The Act seeks amongst other things, to manage and conserve biological diversity, to protect certain species and ecosystems, to ensure the sustainable use of biological resources and to promote the fair and equitable sharing of benefits arising from bio-prospecting involving those resources. The NEM:BA includes a Regulation related to the management of threatened and protected species. A similar Regulation is applied to Threatened Ecosystems. NEM:BA has a set of norms and standards for the development of management plans for both species (e.g. Threatened or Migratory Species) and ecosystems (Endangered or Critically Endangered).</p> <p>The National Environmental Management: Protected Areas Act, (57 of 2003) Protected areas such as nature reserves and special nature reserves are declared and managed in terms of this Act. Depending on the nature of the protected area, certain activities (such as mining) may require Ministerial consent or be prohibited outright. The Act also aims to promote the sustainable use of protected areas and the participation of local communities in such areas. In addition, it provides for the continued existence of the South African National Parks.</p>	<p>If relevant species or threatened ecosystems are presence on the mine concession, a management plan must be developed in alignment with these norms and standards.</p>
<p>Mineral and Petroleum Resources Development Act (Act 28 of 2002) The MPRDA makes provision for equitable access to and sustainable development of South Africa's mineral resources. The MPRDA requires that the environmental management principles set out in NEMA shall apply to all mining operations and serves as a guideline for the interpretation, administration and implementation of the environmental requirements of NEMA.</p>	<p>Historically requirements relating to closure planning and provisioning were included in the MPRDA. These have now been replaced by those in the Financial Provision Regulations under NEMA.</p>
<p>MPRDA 2002 Part II Social and Labour Plan (SLP) The objectives of the social and labour plan are to:</p> <ul style="list-style-type: none"> • Promote employment and advance the social and economic welfare of all South Africans. • Contribute to the transformation of the mining industry. • Ensure that holders of mining rights contribute towards the socio-economic development of the areas in which they are operating. <p>A social and labour plan lodged with the Regional Manager is valid until a closure certificate has been issued in terms of Section 43 of the Act.</p> <p>The contents of a social and labour plan relevant to closure includes:</p> <ul style="list-style-type: none"> • A human resources development programme. • A local economic development programme. 	<p>Provisions for the ongoing implementation of SLP commitments across the three core Social and Labour Action Plan content areas must be included in financial and resourcing commitments.</p>

Legislation	Implications for Closure
<ul style="list-style-type: none"> • Processes pertaining to management of downscaling and retrenchment which must include: <ul style="list-style-type: none"> - The establishment of the future forum. - Mechanisms to save jobs and avoid job losses. - Mechanisms to provide alternative solutions and procedures for creating job security where job losses cannot be avoided. - Mechanisms to ameliorate the social and economic impact on individuals. - Regions and economies where retrenchment or closure of the mine is certain. <p>To provide financially for the implementation of the social and labour plan in terms of the implementation of:</p> <ul style="list-style-type: none"> • The human resource development programme. • The local economic development programmes. • The processes to manage downscaling and retrenchment. 	
<p>National Water Act (36 of 1998)</p> <p>Section 19 of the NWA sets out the principles for “an owner of land, a person in control of land or a person who occupies or uses land” to:</p> <ul style="list-style-type: none"> • Cease, modify or control any act or process causing pollution. • Comply with any prescribed waste standard or management practice. • Contain or prevent the movement of pollutants. • Eliminate any source of pollution. • Remedy the effects of the pollution. • Remedy the effects of any disturbance to the bed and banks of a watercourse. <p>It also describes the actions that can be taken by the catchment management agency to enforce the requirements of the NWA.</p>	<p>This places the obligation to mitigate any aspects that cause or have caused pollution as well as to remediate any residual contaminated water at closure.</p>
<p>Mine Health and Safety Act (29 of 1996)</p> <p>This Act deals with the protection of the health and safety of persons in the mining industry but has some implications for environmental issues due to the need for environmental monitoring within mine operations and maintenance of mine residue deposits.</p>	<p>All closure activities will have to be undertaken in a safe manner where the Health and Safety of all workers involved in closure activities is protected.</p>

6.1.1 Environmental regulatory requirements

The EMP and WUL conditions dealing specifically with rehabilitation of the existing Concentrator operation are presented in the 2014 Der Brochen authorisations (SRK 469113) and for the Mines in the 2012 EMP. These have informed the requirements for the DBMMC where relevant.

6.1.2 South African good practice

Due to the fact that the post closure impacts associated with mining operations very often include significant impacts on the water resource, the Department of Water and Sanitation (DWS) has a particular interest in the water management aspects associated with mine closure. Recognising the potential mining impact on water, the DWS formerly known as the Department of Water Affairs and Forestry (DWAF) – commissioned a series of Best Practice Guidelines (BPG) to assist with aspects of DWAF's water management hierarchy. Included in this series of guidelines is BPG5: Water Management Aspects for Mine Closure. The principles in the BPG5 that are appropriate and that have been used to formulate the rehabilitation strategy are:

- Management measures at closure should primarily be of a passive nature with minimal long-term maintenance and operating costs.
- The final landform must be sustainable, must be free-draining, must minimise erosion and avoid ponding.
- Concurrent rehabilitation must be undertaken in a manner that supports the final closure landform in order to ensure that rehabilitation does not need to be redone at a later stage.
- Land use plan which is directly interlinked with water management issues insofar as water is required to support the intended land use and the land use itself may have an impact on the water resource.
- Biodiversity plan will address issues that are interrelated with the mine water management plan, particularly with regard to the environmental water balance and the effects that mining may have thereon.

6.1.3 Corporate Standards

Anglo American Mine Closure Standard (AA TS 701 001)

This Group Technical Standard defines the minimum requirements for mine closure to ensure that all Anglo American projects and managed operations pro-actively plan for closure to manage risks and opportunities.

The Standard incorporates the following requirements:

Planning and design:

- Develop a closure plan that is fundamentally aligned with the Mine Closure Toolbox.
- A closure vision shall be established and maintained with associated specific closure objectives and land-use plans
- A risk assessment and gap analysis aligned with the MCT shall be undertaken in all updates of the closure plan.
- Closure plans shall consider and address regulatory conditions and community and stakeholder commitments.
- Where appropriate, closure liabilities shall be minimised through proactive integrated planning throughout the operational life cycle, involving formal opportunities analysis.
- Closure requirements shall be integrated into the Business Planning and Life of Mine (LoM) planning processes.
- Sites shall have at least a five year concurrent rehabilitation plan with clearly defined targets.

Implementation and management:

- Promote the beneficial re-use of infrastructure post closure wherever possible.
- Demonstrate the existence of a proven rehabilitation technique that meets the closure vision and associated land-use.
- Concurrent rehabilitation shall be planned based on the availability of disturbed areas no longer required for ongoing operations.
- Optimise progressive rehabilitation and develop success criteria as early as possible.
- Minimise post closure active treatment requirements through integrated closure planning.
- Manage and reduce the dependency of relevant surrounding communities through the life cycle of the operation in order to leave behind a positive post closure legacy.
- Include social costs in closure planning as an operational expense until the site is closed when it should be provisioned.
- Calculate both premature and planned closure liabilities utilising the remaining Life of Mine from the approved Life of Mine plan.
- Review and update closure liability estimates (accounting provision) internally at least annually and externally every three years (approval from the Technical Services Mine Closure Department is required for exemptions from the independent review that would only be appropriate for low risk operations or those whose liability has not materially changed).
- Provide a financial provision (cash, guarantee, trust fund) to cover premature closure costs as required by the regulatory requirements of the relevant country.

Performance Monitoring:

- Include all post production monitoring and maintenance costs in the closure liability estimates and allow sufficient time for realistic lease relinquishment (minimum of 10 years post the decommissioning phase unless otherwise agreed with the Group closure team).

Anglo American Rehabilitation Guideline

The purpose of this guideline is to ensure that all Anglo American projects rehabilitate disturbed land safely and responsibly to avoid or mitigate potential adverse impacts on the environment (Anglo American 2009). Rehabilitation of on-site disturbances need to ensure that there is no detrimental effect on future land use, resource access, ground and surface water quality and quantity. Anglo American shall ensure where possible that no residual risks remain without an on-going and sustainable management plan. For the purpose of annual rehabilitation plan, the implementation of environmental programmes and operational controls will include, as appropriate:

- Progressive rehabilitation maintenance, in accordance with the approved closure and post closure plan;
- Measures to prevent rehabilitation, being used for purposes other than its intended use/capability;
- Monitoring programmes to confirm the rehabilitation stability and effectiveness;
- Soil fertility and content for deterioration, vegetation and soil covers will be monitored where appropriate for stability, land use and productivity; and
- Finally progress of, and expenditure on, rehabilitation activities should be monitored.

Anglo American Mine Closure Toolbox

In addition to the Anglo Technical Standards for rehabilitation of disturbed land, a guidance tool was launched in 2008 called Anglo Mine Closure Toolbox. The toolbox details what is needed to achieve a successful mine closure that leaves the positive and sustainable legacy for the host communities after our operations have closed.

6.2 Interpretation of the legislation

Legislation, as described in Table 6-1, influencing closure is varied. However, a common thread, is that after mitigation, the impacts of the operation on the environment need to be mitigated and the solutions implemented are required to be sustainable within the existing constraints presented by the biophysical environment, with there in particular being no significant residual impact that water resources will be impacted on.

As described in Section 7 below, closure objectives have been developed to support the closure vision and to assist with complying with the various requirements of the legislation.

7 Closure vision and objectives

The closure vision for DBMMC is intended to inform the closure objectives. The vision for DBMMC is presented below, with the vision underpinned by the objectives below:

VISION

The overall closure goal for the De Brochen project area is to progressively re-instate an area that is safe, stable, and non-polluting with the final landform not adversely affecting water resources.

The closure objectives which will drive the closure criteria, and which have been developed to support the closure vision are:

- Decommissioning all surface infrastructure that has no beneficial post-closure use;
- Identify potential post-closure uses of the land occupied by mine infrastructure in consultation with the surrounding land owners and land users. Should a suitable use for mine infrastructure not be found, it will be removed;
- Rehabilitate all disturbed land to a state that is suitable for its post-closure uses;
- Rehabilitate all disturbed land to a state that facilitates compliance with applicable environmental quality objectives (air quality objectives and water quality guidelines);
- Reduce the visual impact of the site through rehabilitation of all disturbed land and residue deposits;
- Rehabilitation that results in landforms that emulate the surroundings and would facilitate drainage and ensuring that all other remaining embankments are shaped and trimmed and that these are free draining; and
- Rehabilitate all disturbed land and residue deposits to a state where post-closure management is minimised.

8 Alternatives

A number of potential alternatives for closure of infrastructure associated with the various aspects of the DBMMC can and are likely to be considered as the operation progresses. These alternatives include:

- Rehabilitation methods on the DMS embankments. Given that the soils are limited, growth medium covers are likely to require a combination of in situ soils and other materials that have similar water retention characteristics as the growth media. This could include utilising a combination of stockpiled soil and possibly tailings material.
- There may be opportunities to have multiple slope angles on the DMS, dependent on the slope's aspect, slope length and where individual benches are located on the facility. Reshaping of the entire facility may therefore not be required as the closure strategy.
- There is an expectation that after closure, groundwater levels will recover in the underground workings, albeit that recovery would take approximately 77 years after mining ceases. Although the mine floor elevation of workings is below surface, decant will be driven by the elevation of the portals. Should the rebounding groundwater level in the underground area rise above the elevations of these portals decant can occur. The shaft portals should be sealed-off to avoid any direct surface decant from the workings. However, if required post closure treatment requirements will be considered and where practical and feasible, implemented.
- Post closure water management on the top and side slopes of the two conventional TSF (Helena and Maresburg TSF) as well as on the co disposal facility that may be associated with the North Pit.
- A number of structures may have the potential to be utilised in closure for a variety of activities. These may include medical, educational or light and heavy industry. These opportunities will be explored as the mine develops and the end of LoM approaches.

As further assessment and trials are required to develop the alternatives, and then the required authorisation obtained, the alternatives described above have not been costed in the assessment of liability. Rather the costing is based on the obligations as they currently exist.

8.1 Closure and post closure period

The purpose of implementing closure actions is to reduce closure risk to an acceptable residual risk timeously. Based on the work required, AAP has determined that closure of the aspects considered in the DBMCC, will be implemented over a 5-year period.

Once the closure activities have been completed, the DBMCC aspects will enter a ten-year post closure period. During this time, erosion repair and vegetation establishment will be undertaken, if monitoring activities indicate that it is required. This is within the context that the areas under consideration in this plan are flat and are not likely to be subject to significant erosion.

A post closure period of ten years is considered by AAP to be sufficient time as biological process can be demonstrated to be occurring, leading to vegetation covers being stable and sustainable, within this timeframe. Furthermore, sufficient data can be collected to demonstrate that the achievement of the specific relinquishment criteria comply with the trend for the biophysical category under consideration.

8.2 Closure options research

On-going research and investigations on closure options will be focussed on soil remediation and post closure water management.

8.3 Closure assumptions

This closure plan has been developed based on available information including environmental data. Some of the information currently available may need to be supplemented during the operational

period. Therefore, as outlined below, a number of assumptions have been made about general conditions as well as closure and rehabilitation of the specific facilities at the site (i.e. as they pertain to the DBMMC) to develop proposed closure actions. As additional information is collected during operations, these assumptions will be reviewed and revised as appropriate.

General assumptions used

- The closure period will commence once the last planned ton of ore has been mined at the shafts and milled at the concentrator.
- A detailed closure material balance has not yet been undertaken for the existing operation or the new aspects considered for the DBMMC. An underlying assumption of the costing is that sufficient growth medium material will be sourced within 5 km of where it will be required during closure.
- Security will be required during the closure period to limit access of unauthorized people. Once the closure activities are complete and the operation enters the care, maintenance and monitoring period, security will be withdrawn from the site.
- SRK assumes there is no potential to generate acidity or leach significant metals from any of the residues associated with the DBMCC or from the backfill replaced in the North pit. The lack of acid generating or metal leaching potential on the dumps, implies that low permeability-infiltration reducing covers are not required on the dumps.
- Vegetation establishment will be in line with a project specific Biodiversity Action Plan (BAP) that AAP is expected to develop to manage its impacts on biodiversity.
- Water management infrastructure developed for the operational phase will be retained for closure at the end of the life of the project as necessary.
- There are limited opportunities for post closure infrastructure for community uses. Therefore, all buildings will be demolished.
- All hazardous and domestic waste will be transported offsite for disposal in licenced landfills.
- The roads constructed to access the site will not be needed for post closure monitoring and can be closed as part of normal closure actions.
- Very little soil contamination has occurred. Furthermore, the level of housekeeping currently in place will remain through-out the operation and as a result minimal soil contamination will occur. Therefore, no provision for the disposal of soil as hazardous material has been allowed.
- No residual contamination (e.g. oil spills) will be present requiring remediation.
- The soil and overburden which was removed prior to construction will be replaced as far as practical. The site will not however be returned to its original topography as this could potentially result in erosion of the soil after demolition. Rather, the cut and filling of the terraces will be undertaken to generate flatter slopes at each step in the terrace (slope to nominally be 6°). This will be undertaken only where the underlying rock is not at or immediately below ground level. Where rock is at ground level, these areas will be left as natural irregular topographic areas in the landscape.
- The land capability will be restored, as far as reasonably practicable to its original capability.
- The storm water control dam will not be required at the end of the life of the concentrator, once the plant has been demolished and the area re-landscaped. Therefore, an allowance has been made for the removal of the dam.
- The top of the TSF's will be shaped to maximise runoff, while minimising erosion. This is required to reduce the water infiltrating into the facility and then potentially seeping at the toe.
- The RWD dams will remain post closure to capture and evaporate seepage from the tailings dams, once seepage is no longer significant the dams will be rehabilitated.
- The removal of infrastructure will occur at closure. Special measures to protect adjacent structures which may otherwise remain operational have not been considered.

Water management

- As evaporation exceeds precipitation, SRK assumed that contact water that requires management, can be evaporated from appropriately protected facilities.
- SRK assumes that sediments in the various water management infrastructures are not likely to be classified as hazardous.

Infrastructure

- SRK assumes all demolition rubble, including tar, is considered General Waste as per the definition of demolition waste in Category B of Schedule 3 of the National Environmental Management Waste Amendment Act (NEMWAA) and based on the classification as General can placed on a waste rock dump prior to closure of the dump.

It is important that the validity of these assumptions is re-visited with each upgrade of the closure plan to ensure that the final decommissioning and closure plan is based on a sound baseline description.

9 Final land use

Post closure land use (PCLU) is determined in consultation with stakeholders so that the PCLU meets the requirements of the stakeholders, within the context of what can reasonably be achieved on site. This activity is undertaken for the whole mine lease area affected by mining activities and integrates stakeholder requirements with risk mitigation. As specific consultation regarding PCLU has not been undertaken at this stage of the closure process for the DBMMC, for purposes of current planning and liability costing for the DBMMC various assumptions relating to closure have been developed.

Some structures will remain permanently in the landscape (DMS and the TSF's) with these unlikely to have associated closure alternatives that could be utilised sustainably by the community. However, where infrastructure is demolished (South Decline Shaft, Borwa and Lebowa mine, stockpiles, roads, conveyors, Mototolo Concentrator), there are opportunities that the footprints could be utilised for sustainable post closure uses.

Based on the limitations presented by the permanence of the disturbances associated with the mining activities, the overall post closure land use for the mine has been determined to be:

- Landforms, that sustain indigenous vegetation which limits water and wind erosion.
- Mosaic of nodes where existing infrastructure is utilised by stakeholders for a variety of post closure activities, surrounded by areas rehabilitated back to a land capability possible of supporting indigenous vegetation, as well as land capable of supporting the various community initiatives in which the mine is involved.

The land capability developed on the footprints where covers are placed, and vegetation established will be a land capability defined as grazing by the Chamber of Mines⁴, with these covers expected to support landforms that support indigenous vegetation.

As the demographics of the areas surrounding the mine may change at closure as communities potentially move out to seek other livelihoods, pressures on the land may change. This may however, be countered by population growth between now and when the mine closes. It is likely that for the next 20 to 30 years, land use will be associated with mining and will remain so until closure. After closure, the mine is likely to enter into a period of care and maintenance on the rehabilitated areas, further limiting opportunities for community use. However, once sufficient data has been obtained to indicate that the mine has met its relinquishment criteria, use of rehabilitated areas may commence.

⁴ Now known as Minerals Council South Africa

10 Closure actions/criteria

The rehabilitation actions that the operation intends undertaking at the end of the life of the DBMMC are described below. These actions are designed to comply with the requirements of this rehabilitation plan's objectives and the requirement for the development of risk mitigation closure strategies identified during the risk's assessment (Section 5).

10.1 Open areas

During the operational phase, rehabilitation of the open areas at DBMMC will be in accordance with the BAP. The focus of the BAP is on removal of Invasive alien plants (IAPs), planting of indigenous species, erosion controls and rehabilitation of disturbed areas.

Following re-vegetation, the sites will be monitored and maintained until an acceptable cover has been achieved. The spread of IAPs on disturbed land will be controlled until the vegetation cover is capable of providing sufficient natural weed control.

10.2 Infrastructure

At closure paved areas and associated disused infrastructure will be demolished. Building foundations will be removed to a depth of 0.5 m. All land exposed by the demolition of infrastructure and other land disturbed by the operations will be rehabilitated by shaping, top soiling and vegetation/self-vegetation as appropriate. Vegetation will be monitored and any IAPs that germinate will be removed to ensure indigenous growth in the rehabilitated areas. Compacted areas will be ripped prior to vegetation. Where possible rubble will be disposed of in the mining portals prior to backfilling but once closed a suitable alternative site will be identified. The site will be selected in consultation with DWS and DMRE and will be rehabilitated, as outlined above.

Spills will be cleaned up during the operational phase, where practical. Soil that has been contaminated by spillage, seepage, leachates, waste and tailings dust will be sampled and analysed at closure. If necessary, the contaminated soil will be treated and ameliorated or removed to a suitable site. The site will be selected in consultation with DMRE and DWS.

Contamination of soils with hazardous substances that represent a risk will require remediation prior to the issuing of a closure certificate. If this remediation is not undertaken during life of the operation it will be necessary to make a provision for the rehabilitation of this soil in the closure liability assessment.

All infrastructure will be decommissioned and the footprints rehabilitated for the establishment of vegetation. Infrastructure where there is a third-party use, will be legally transferred to the relevant parties.

Material inventories will be managed near the end of operations to minimize any surplus materials at closure. Fuel, lubricants and other materials needed to support the closure activities will be utilized during the closure period.

All equipment will be rinsed with raw water as necessary to flush sediments and reinstated will be captured in the internal water management infrastructure for evaporation.

Where practicable, equipment and materials with value not needed for post-closure operations will be sold and removed from the site. All other equipment will be demolished and disposed of on-site. Equipment with scrap or salvage value will be removed from the plant and stored either in the existing salvage yard or in a facility designated for this purpose during the closure period.

A soil contamination investigation will be conducted on completion of demolition activities, particularly in excavations remaining open following decommissioning. The purpose of this is to identify areas of possible contamination and design and implement appropriate remedial measures to ensure that the soil closure criteria are obtained.

Excavations remaining following demolition and foundation and slab removal and those where contamination remediation has been undertaken will be filled with waste rock and covered with 250 mm of growth medium.

Closure actions will include:

- All power and water services to be disconnected and certified as safe prior to commencement of any demolition works;
- All remaining inert equipment and demolition debris will be placed into the nearest general waste disposal facility;
- Salvageable equipment will be removed and transported offsite prior to the commencement of demolition;
- All fittings, fixtures and equipment within buildings will be dismantled and removed to designated temporary disposal yards;
- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains;
- All above ground electrical, water and other service infrastructure and equipment to be removed and placed in declines or the designated temporary salvage yards;
- All pond liners to be removed for disposal in designated landfills;
- Electrical, water and other services that are more than 400 mm below ground surface will remain;
- All pipes and structures deeper than 400 mm need to be sealed to prevent possible ingress and ponding of water;
- Concrete slabs and footings will be broken. This concrete (and metal) will be broken up and disposed of in a proximate mining void on a neighbouring mine or if this is not available from the neighbouring mines, disposed of to landfill;
- All conveyor structures will be removed and the superstructures demolished and concrete footings removed. The servitude on which the structures were located will be rehabilitated by ripping the footprint, placing growth medium covers and establishing vegetation;
- All concrete below 1 000 mm depth will remain underground with the invert of all structures broken/sealed to prevent possible ingress and ponding of water;
- Soils beneath the plant, storage tanks and chemical storage areas will be sampled. Any contaminated soils found will be removed for disposal;
- All excavations resulting from demolition of plant, buildings, roads, conveyor platforms, etc. and earth structures will be left in a safe manner; and
- All telecommunication towers and dishes will be dismantled and removed.

The yard areas (e.g. platforms created for buildings, laydown areas and other disturbed areas) will be closed and re-graded to control storm water runoff and erosion. Once the structures and foundations are demolished, removed, or buried, the yard areas will be inspected for any areas of hydrocarbon contamination.

Once demolition is complete the terraces will be reshaped to have an overall slope of no steeper than 6° over that of the natural topography. Where the underlying geology outcrops at surface, this will not be blasted, but will be left as a natural feature in the landscape. Growth medium covers will be placed with the thickness of the covers dependent on the PCLU as well as on the volume of material available for closure. Where geology outcrops, these structures may not be covered, with the decision to cover only made once the placement and structure of these features is understood after exposure during reshaping.

10.3 South Decline, Borwa and Lebowa Shafts

The strategy will be to undertake closure activities that will result in a stable landform, consistent with the post closure land use. This includes all access points to underground such as the declines and, ventilation shafts. The closure actions are:

- Withdraw all equipment with potential resale or scrap value from underground;
- Equipment that will not be pulled out to be drained of all lubricants, hydraulic oils, fuels etc. and the hydrocarbons brought to surface;
- All fluorescent light-bulbs to be brought to surface and crushed in a “tube gobbler” and the residue disposed of appropriately;
- Shaft openings to be sealed with engineered concrete plugs, appropriately constructed to limit access to the underground workings by illegal/artisanal miners. Should there be a risk that groundwater decant from the shafts may occur, the concrete seals may require engineering to withstand the hydraulic pressures associated with re-watered underground workings;
- Rubble to be used as backfill of portals and inclines where after the shafts will be backfilled with material stockpiled around the declines;
- Shaft areas to be profiled to allow for free drainage;
- Topsoil to be replaced at thicknesses required to achieve post closure land use;
- Revegetation to be done consistent with the post closure land capability; and
- All access points to underground mining operations to be sealed.

10.4 Tailings Storage Facilities

10.4.1 Helena TSF

The TSF benches (side slopes) are subject to ongoing re-vegetation, while the surface of the dam will be re-vegetated upon closure. However, a significant portion of the lower benches of Helena TSF previously revegetated have been covered with waste rock. A number of different methods of re-vegetation are available (e.g. hydroseeding, hand seeding and hand sowing) and trials as to the most appropriate method have been conducted by AAP as a group at other tailings facilities. Currently vegetation of the TSF slopes is according to methodology and Environmental Policy, which requires only indigenous species to be used.

The outer slopes have an overall angle of 1:3 (V:H) and are vegetated as the TSF rises to within 6 m to align with the step-in height. Vegetation will only continue in areas not covered by the buttress wall. Compost is applied with the seedlings. Vegetation is irrigated from RWD A and is limited to 15 mm/day for two weeks for seed germination and 10 mm/day thereafter for six weeks.

At closure the TSF penstock will be sealed. Investigations will be carried out to determine the best way of dealing with rainfall runoff accumulating on top of the dam to ensure that such water does not overtop the wall and cause the wall to fail. It is likely that the top surface of the TSF will be reshaped mechanically to obtain a profile where rainfall is shed to discharge to the natural environment. The design of the top surface and areas of discharge will be designed in a manner where erosion of both the top and the side surfaces are limited. Discharge will also be designed in a manner where erosion of the receiving environment is minimised. Potential options will be assessed to identify the most suitable approach.

Monitoring of the water resources (surface and groundwater) around the TSF, vegetation on the TSF and tailings stability will continue post-closure for a time period agreed with the authorities to ensure that residual impacts are managed.

At closure, once seepage from the TSF to the RWD has ceased all drains will be sealed including the penstocks.

The newly constructed buttress walls will be revegetated to limit erosion as well as to improve the aesthetic appearance of the structure. This will require a minimum of 250 mm topsoil spread on the buttress, with vegetation then established in a similar manner to that on the side slopes.

10.4.2 Maresburg TSF

Closure of this facility will be undertaken in a manner similar to that of the Helena TSF, where the philosophy will be to shape the top surface to be free draining via an engineered decant system, with the runoff discharging via dissipaters to the environment. The TSF will be constructed with an overall toe to crest slope of 18°, although the angle of the slopes between the 6 metre wide step-ins provided/installed every 7 m vertical intervals will be 26°. As this configuration is likely to be stable, a sustainable vegetation cover can be established without the need to undertake any reshaping. A vegetation cover will be established to limit both water and wind erosion. The closure actions will involve:

- Draining the pool on top of the tailings dam in a controlled manner into the Maresburg TSF return water dam, using the existing drainage infrastructure constructed for the operation of the dam. Pool draining will be undertaken in a manner where the rate of draining is balanced by evaporation from the pool and return water dam as it is likely that the Mototolo Concentrator will have been decommissioned and will no longer be a water user. No active dewatering is intended to accelerate consolidation of the top surface zone - as this will consolidate naturally to a state on which vegetation can then be established.
- Vegetation will be established on the upper sections (slopes) of the tailings facility, even during the period in which the top surface is consolidating. This includes vegetation on both the benches and inter-bench slopes;
- Once consolidation testing undertaken on the top surface indicates that the surface is safe to be traversed by people, vegetation will be established;
- The return water dams will be retained until the facility has consolidated and the drainage from the toe to the return water dam is negligible. Thereafter, the return water dams will be decommissioned, primarily to reduce the risk of drowning in these facilities post closure. The actions to achieve this are:
 - Demolish all concrete structures with the possible utilisation of rubble for the backfill of excavations resulting from demolition activities;
 - Remove liners and following waste classification testing dispose appropriately;
 - Backfill excavations with material removed during construction which will be located adjacent to the Pollution Control Dam (PCD); and
 - Profile footprint to be free draining with no low-points to accumulate water.
- Vegetation establishment techniques on platinum tailings are well developed and it has been demonstrated on the existing Helena TSF, that vegetation can be established without the need for the placement of growth medium. Fertilizers and organic ameliorants are however required to assist establishment until nutrient cycles in the upper layers of the tailings are regenerated;
- The method of establishment will be to utilize a combination of indigenous grass species to establish a vegetative cover that limits wind and water erosion;
- The dry stone walling constructed for the operational period will be retained to divert runoff from the up contour slopes around the TSF. The runoff will be diverted to a suitable discharge point that will have a dump rock dissipate to reduce erosion during high discharge periods.

10.5 DMS Stockpile

The strategy will be to undertake closure activities that will result in a stable landform, capable of supporting a vegetation community analogous with surrounding grasslands, where the generation of contact water and sediment laden runoff is limited by the incorporation of appropriate covers in the closure design. Aesthetics associated with the dumps will be improved as a consequence of the establishment of vegetation on these facilities.

Trials will be undertaken to identify the optimal closure slope angles, with there being a possibility that different angles can be used on different positions on the dump and on different morphological aspects. It is likely that the closure angles will be between 18° to 24°.

During operations, trials will be conducted to determine whether there is a blend of tailings and soil that can be formed to sustain vegetation, without the blend being dispersive and subject to slumping and erosional influences. The cover placement strategy, after reshaping to the desired angle, is likely to include:

- Growth medium placed. This is required to limit sediment washout from higher up the slopes, migrating to the toe of the facilities. It is also required to limit sediment generation from the lower slopes. Vegetation will be established in line with the Vegetation Management Plan (VMP) that will be developed to support revegetation activities at the mine;
- The top surfaces of all facilities may require cover with growth medium and vegetation establishment to limit dust generation. Trials will be conducted to determine whether tails and soil with appropriate ameliorants will support a vegetation population on these surfaces; and
- Access ramps to the top of the stockpile will remain while the top is being reclaimed. Once complete, ramps will be reshaped to a profile similar to the rest of the stockpile.

As the DMS will consist of material with a uniform grading, the material in the stockpile maybe suitable for use in construction. If there are opportunities to use this material during construction, these will be explored to ensure that reuse can be undertaken without resulting in additional or cumulative impacts. Should these opportunities exist post closure, the DMS stockpiles will remain for use by third parties. In the event that all DMS is removed from the stockpile, the following measures will apply to footprint on which the stockpile was constructed:

- Any residual material in the footprint will be collected and disposed of on an adjacent TSF
- Construction materials used in the footprint below the stockpile will be characterised and disposed of in a manner consistent with the geochemical characteristics of the material;
- The area will be deep ripped to reduce compaction;
- Growth medium will be placed, and vegetation established; and
- AAP does not anticipate that there will be any residual groundwater contamination associated with the stockpile. However, should contamination exist, remedial measures consistent with the nature of the risk that the contamination presents will be developed.

10.6 WRD Impoundment

The WRD Impoundment will be required during the life of the operation to assist with the management of the operational water balance. However, once closure commences it is likely that the water management capacity provided by the WRD Impoundment will not be required and this facility can be decommissioned. The following closure activities are anticipated for closure of this of facility:

- Any residual inventory in the dams will be either pumped into remaining water management infrastructure or will be allowed to evaporate;
- Sediments collecting in the impoundments will be characterised and disposed of according to their geochemical properties;
- Geotextiles or geosynthetic material included in the containment barrier for the various waters, will be removed and disposed of at commercial landfills, with the landfill selected based on the landfills capability to handle the material;
- Rock in the impoundment walls will be backfilled into the North pit. If a material imbalance exists with the result that there is insufficient backfill to limit rainfall collecting on the backfilled pit, AAP will consider utilising some of the DMS in the stockpile to supplement the backfill. This need for this will be determined once a material balance is developed and the risk assessment is updated; and
- Growth medium will be placed over the backfill and vegetation will be established.

10.7 Roads and conveyor servitudes

Roads and servitudes that are not needed for closure and post closure uses at the site (e.g. security and monitoring) will be closed. Closure actions for the roads, laydown and parking areas will include the following:

- Removal of all signage, fencing, shade structures, traffic barriers, etc.
- All 'hard top' surfaces to be ripped and bitumen removed along with any culverts and concrete structures.
- Where possible preserve existing vegetation – native trees and plants that may currently be incorporated in parking areas.
- All concrete lined drainage channels and sumps to be broken up and removed.
- All excavations or vertical walls resulting from removal of foundations or structures are to have sides slopes battered to 2H:1V and are to be made safe pending final reclamation work.
- All potentially contaminated soils are to be identified and demarcated for later remediation.
- All haul routes that have been treated with dust suppression water need to be sampled to determine whether they need to be treated as "sealed" roads with the upper surface ripped and removed and disposed of as per the mines Waste Management Plan.
- Any slag placed as dust suppression medium needs to be lifted and placed at the base of the nearest pit.

10.8 Waste management

Waste will be classified as necessary and then depending on the classification handled according to the mines Waste Management Plan. Likely activities are:

- Designated temporary salvage yards will be developed for the storage of mobile equipment, structural steel and mechanical equipment or other equipment with a potential resale or scrap value. The location of these yards will be dictated by existing permitted land clearance. Material will be stored in these salvage yards until opportunities for resale/reuse are exhausted. Residual material will be disposed of according to the Waste Management Plan.
- It may be necessary for security reasons to fence temporary salvage yards particularly where these are located close to public roads.
- Once material is removed from the yards (either through sale or disposal), temporary infrastructure will be demolished, compaction loosed by ripping and the footprint revegetated as per the VMP.

10.9 Storm water management

Prior to closure, a water management plan will be prepared to identify which structures are required at closure and which can be decommissioned. Ditches decommissioned, will be closed by backfilling the excavations with the material removed and placed adjacent to the structures. Bunds not required, will be flattened by redistributing the material across the footprint used to borrow the material for construction.

10.10 Fencing and walling

Walls will be demolished by breaking the concrete panels or bricks and mortar and removing support posts from the ground. Rubble and scrap metal will be disposed of in the pit and the excavations for support posts will be backfilled with growth medium. The footprints of the demolished walls will then be rehabilitated as per the footprints for other infrastructure being demolished.

Security fencing around individual infrastructure will be removed once fences are redundant. Support posts will be removed by excavating to base level if necessary. Excavations will be backfilled with growth medium and vegetation established.

10.11 Vegetation and wildlife

Successful revegetation will help control erosion of soil resources, maintain soil productivity and reduce sediment loading in streams. As part of biodiversity management, revegetation will enhance the resulting biodiversity opportunities by utilizing non-invasive plants that fit the criteria of the habitat (e.g. soils, water availability, slope and other appropriate environmental factors). Invasive species will be avoided, and the area will be managed to control the spread of these species.

The slopes at the mine residue facilities are likely to be susceptible to erosion, even after reshaping the facilities to a lower gradient. To counter the effects of erosion, naturally occurring grassland species will be planted on the slopes and tops of the facilities. At this time, these species will provide soil holding capacity and reduce runoff velocity. The composition of the natural species and their planting strategy will be determined through revegetation trials conducted concurrently with mining.

The flatter areas, such as those not on mine residue facilities, will be revegetated with the objective of creating a sustainable ecosystem similar to an analogues reference plot.

No specific measures will be taken to reintroduce wildlife as the different animals still occupying the remaining habitat are expected to expand their territories into the MM area.

11 Threats, opportunities and uncertainties

A number of assumptions have been made around the biophysical and socio-economic environment that will exist at the end of the life of operations. These assumptions represent uncertainties, but also represent areas where there may be threats and opportunities that cannot at this stage be adequately defined. The guideline in GNR 1147 requires that a list of these uncertainties and threats and opportunities be identified and maintained during subsequent revisions of the closure plan. AAP understands that the purpose of this list is to inform future revisions of the plan relating to the focus of resources. During these revisions, it is expected that resources can be focused to determine whether either the threats or opportunities are realised and whether uncertainties are addressed. The uncertainties, threats and opportunities are reflected in Table 11-1 below.

Table 11-1: Threats and opportunities relating to closure

	Opportunities	Threats
Biophysical	The remaining LoM is in excess of 50 years which provides time in which to undertake trials to determine appropriate growth media, slope and vegetation requirements.	The low rainfall may hinder vegetation establishment and sustainability. Future regional mining developments may result in significant cumulative impacts occurring if closure occurs simultaneously.
Economic	The DMS available can potentially be utilised as construction aggregate.	The community reliance on the mine for livelihood will impact the workforce and their dependents at closure with little opportunity for livelihood replacement. Simultaneous mine closure resulted in cumulative impact of loss of livelihood on the community.
Social	Existing forums can be utilised to communicate and engage around closure. SLP and Socio-Economic Assessment Toolbox (SEAT) process already in place and can be used to develop projects during operations to alleviate the closure impacts.	Land pressures may result in communities utilising reclaimed footprint inappropriately. The high population density around the mines perimeter may result in numerous community members accessing the mine, increasing health and safety risks.
Other		Legislation changes may result in unrealistic closure requirements.
Uncertainty	Stakeholder requirements at closure.	

12 Final rehabilitation, decommissioning and closure schedule of actions

12.1 Closure schedule

A schedule of actions for final rehabilitation, decommissioning and closure, which will ensure avoidance, rehabilitation and management of impacts will be developed as closure approaches. The schedule will be linked to AAP's intention to undertake rehabilitation activities over a five-year closure period at the end of the Life of Mine.

This schedule will be based on implementing the actions described in Section 10 and relates to the aspects considered in this section.

Appendix 4 of GNR 1147 requires that a spatial map or schedule, showing planned spatial progression throughout operations be included in the plan. This will be developed once the full suite of operational aspects associated with the DBMMC are commissioned.

12.2 Organisational capacity and capacity building

AAP has the in-house capacity to undertake mine closure activities or will ensure that the personnel with the correct capacity and experience will be employed. There is therefore unlikely a need for internal capacity building.

AAP however, recognises that there is likely to be the need to build the capacity of the local communities who are influenced by activities. DBMMC will at the appropriate time, most likely five years before closure, embark on a capacity building program with stakeholders so that stakeholders are in a position to understand the risks that may exist at closure and limitations around risk mitigation strategies and that the stakeholders are able to provide meaningful input to engagements around possible post closure land use.

The diagram in Figure 12-1 provides the current organisational structure in place to ensure the knowledge gaps identified are addressed and the schedule of actions is implemented so that a seamless transition can be achieved at closure. The organisational structure provides a generic structure which is to be adapted as required during the operational period. Two years from planned closure, a closure champion is to be elected who will implement the closure plan to ensure a seamless transition at closure is achieved.

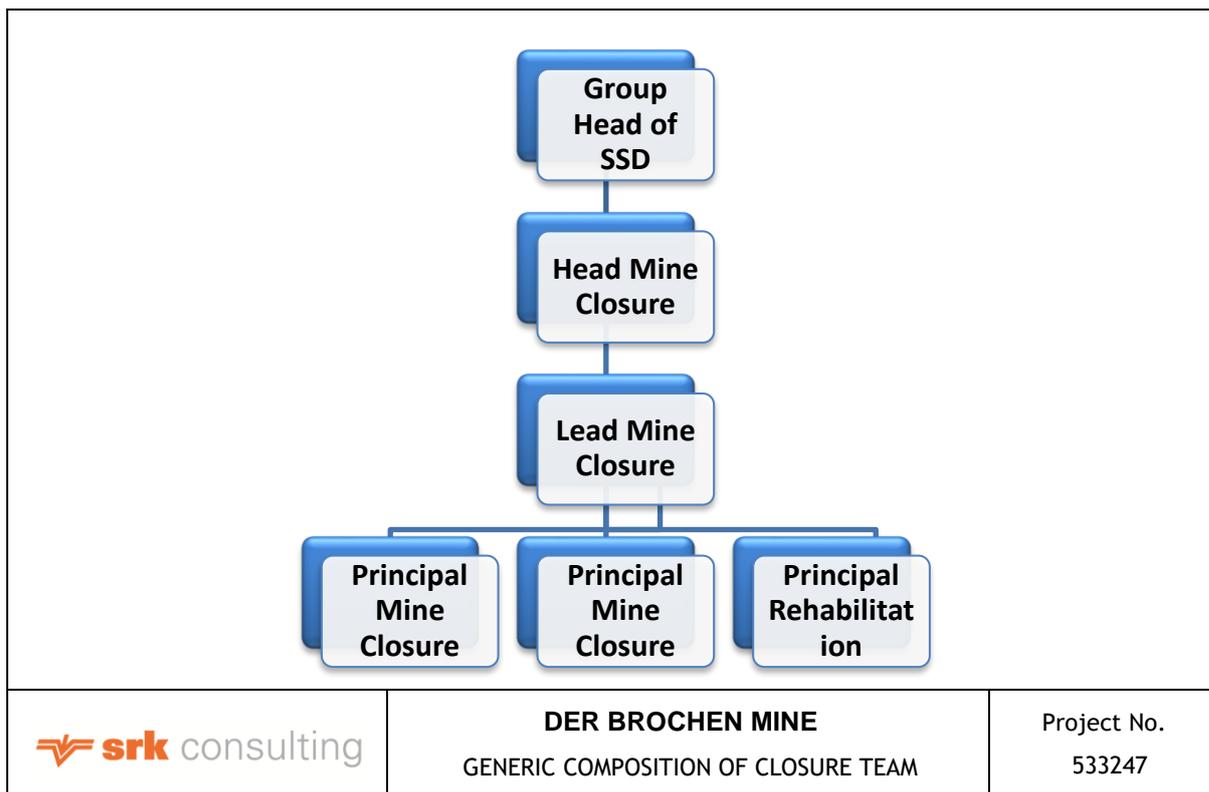


Figure 12-1: Generic composition of closure team

13 Identified gaps in the plan

As documented in Section 8.3, a number of assumptions were required to develop this plan. The existence of these assumptions is that there is not sufficient information for definitive actions to be developed. Information therefore needs to be collected to confirm the assumptions and develop the assumptions into closure actions. These primarily relate to:

- A potential shortfall in growth medium required to support vegetation covers on rehabilitated and restored footprints. Alternative growth media sources need to be explored.
- The final slopes of the DMS need to be determined to identify slopes which are likely to be sustainable in the post closure environment.
- Post closure water management.

14 Relinquishment criteria

Following the implementation of the closure actions described in Section 10, it is necessary to have measurable criteria against which to assess the effectiveness of the plan and its implementation. These criteria will assist the Der Brochen in identifying when the standard of closure achieved is sufficient to relinquish responsibility for a specific area. The site specific relinquishment criteria for the Der Brochen are documented in Table 14-1. Also included in the table are the indicators required to demonstrate achievement with the relinquishment criteria and the reporting requirements. The reporting requirements are those that are expected to fulfil the monitoring requirements set out by legislation.

Table 14-1: Relinquishment criteria

Category	Closure criteria	Indicators	Reporting requirements
Ground and surface water	Compliance with the WUL.	Downstream/gradient water quality monitoring.	Monitoring report.
Air	Compliance with the standards as per the National Environmental Management: Air Quality Act (No. 39 of 2004).	Records of air quality measurements for PM ₁₀ and PM _{2.5} .	Monitoring report.
Soil quality	Soil quality as assessed against the Norms and Standards to support Chapter 8 of NEM:WA.	Soil quality in areas where contamination is identified.	Results of soil quality and risk assessment.
Land productivity	Land capability and productivity similar to that which existed prior to mining.	Land capability and productivity.	Comparison to analogue areas and pre-mining aerial photographs.
Erosion	Implementation or construction of erosion control measures.	Establishment of vegetation.	See vegetation row in this table.
Safety / stability	The site is safe for use by humans and animals, including in the foreseeable future.	Geotechnical and hydrological studies of existing structures.	Evidence in rehabilitation report that appropriate risk assessment has been undertaken and control measures are in place.
Aquatic ecosystem	Wetland and aquatic macro invertebrate populations at crossing using appropriate biomonitoring techniques.	Species and composition.	Monitoring report.
Vegetation	Establishment of self-sustaining vegetation population which stabilizes soils and is not invasive to the region.	Species cover and composition.	Monitoring report.

15 Closure cost estimation

A dual approach has been utilised to assess the closure liability associated with the various aspects of the DBMMC. The closure costs of the aspects already constructed have been assessed using what SRK believes to be a fair reflection of commercial rates utilising the Standardised Reclamation Cost Estimator (SRCE) model, while aspects not yet constructed and largely associated with the Der Brochen Amendment Project have been assessed using the DMRE Guideline. Once the aspects have been constructed, the liability for these will be assessed and updated using the SRCE model.

15.1 Approach for aspects still to be constructed (Der Brochen and Borwa shaft)

The liability has been estimated using the approach documented in the “DMRE Guideline” (Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine – 2005). Rates have been annually updated with the prevailing Consumer Price Index (CPI) as obtained from StatsSA. The rates included in the assessment are those relevant for 2020.

The approach to calculating the closure quantum is that specified in the DMRE Guideline and summarised below.

Step 1: Determine the Mineral Mined

In the first step the mineral mined has been identified in the tables provided in the DMRE Guideline (Table B.12) as “**Platinum**”.

Step 2A: Determine Primary Risk Class

The “Primary Risk Class” has been determined from Table B.12 of the DMRE Guideline as “**Class B**”.

Step 2B: Revision of Primary Risk Class

The Primary Risk Class can be revised on the basis of saleable by-products if required. However, this is not applicable at Der Brochen

Step 3: Determine Environmental Sensitivity

The “Environmental Sensitivity” has been determined by reference to Table B.4 of the DMRE Guideline as “**High**”.

Table B.4 DMRE Sensitivity matrix

Sensitivity	Sensitivity criteria		
	Biophysical	Social	Economic
Low	Largely disturbed from natural state, Limited natural fauna and flora remains, Exotic plant species evident, Unplanned development, Water resources disturbed and impaired.	The local communities are not within sighting distance of the mining operation, Lightly inhabited area (rural).	The area is insensitive to development, The area is not a major source of income to the local communities.
Medium	Mix of natural and exotic fauna and flora, Development is a mix of disturbed and undisturbed areas, within an overall planned framework,	The local communities are in the proximity of the mining operation (within sighting distance),	The area has a balanced economic development where a degree of income for the local communities is derived from the area,

Sensitivity	Sensitivity criteria		
	Biophysical	Social	Economic
	Water resources are well controlled.	Peri-urban area with density aligned with a development framework, Area developed with an established infrastructure.	The economic activity could be influenced by indiscriminate development.
High	Largely in natural state, Vibrant fauna and flora, with species diversity and abundance matching the nature of the area, Well planned development, Area forms part of an overall ecological regime of conservation value, Water resources emulate their original state.	The local communities are in close proximity of the mining operation (on the boundary of the mine), Densely inhabited area (urban/dense settlements), Developed and well-established communities.	The local communities derive the bulk of their income directly from the area, The area is sensitive to development that could compromise the existing economic activity

Step 4.1: Determine level of information available

The Mine has an approved EMPr and a good environmental data base. The level of information available is therefore considered to be “**Extensive**”.

Step 4.2: Identify closure components

The closure components have been identified - shown in the cost table presented in Table 15.2.

Step 4.3: Unit rates of closure

The unit rates of closure have been identified from Table B.6 of the DMRE Guideline and are as shown in the cost table presented in Section 3.

Step 4.4: Weighting factors

The weighting factors have been determined from Tables B.7 and B.8 of the DMRE Guideline.

Weighting Factor 1 = 1.10 (Undulating terrain).

Weighting Factor 2 = 1.10 (Remote)

The areas of disturbance were determined from the design drawings with the areas summarised in Table 15.1. Quantities for the South Decline Shaft were obtained from similar shaft layouts where SRK has determined quantities associated with similar infrastructure.

Table 15-1: Areas used in the liability assessment

Farm name and farm portion	Proposed Infrastructure	Area (Ha) estimated	Total Project area (Ha)
Helena 6 JT, Remaining Extent	Ore Conveyor Section	10.2	53.6
	Der Brochen Gate and Security house	0.2	
	Access and Haul roads	0.7	
	Buttress wall	16.1	
	Filter press plant	0.2	
	DMS plant	0.3	
	ROM stockpiles & silos	0.2	
	DMS conveyor	2.5	
Helena 6 JT, Portion 3	WRD impoundment	23.2	9.23
	Access and Haul roads	1.0	
	Explosive destruction bay	0.5	
	South Shaft Complex including offices	2.8	
	Ore Conveyor Section	5.0	

Farm name and farm portion	Proposed Infrastructure	Area (Ha) estimated	Total Project area (Ha)
Der Brochen 7 JT, Remaining Extent	South Shaft Complex including water management infrastructure, offices and change houses	10.9	14.32
	3 x Ventilation Shafts	0.1	
	Access and Haul roads	1.0	
	Staff accommodation complex	0.6	
	Ore Conveyor Section	1.7	
Mareesburg 8 JT, Portion 1	DMS Stockpile	13.4	13.4
Mareesburg 8 JT, Portion 7	DMS Stockpile	86.6	90.6
	Section of the DMS Conveyor system (located within existing Mareesburg Tailings Pipeline corridor)	2 Km	
	PCD	4.0	
Total area utilised for the Der Brochen Amendment Project			181.11

Although the final closure quantum will only be assessed once the project is completed, commissioned and fully operational, SRK is of the opinion that the estimates of liability presented in Table 15-2 for infrastructure at Der Brochen and Table 15-3 for infrastructure at Borwa Mine are a reasonable reflection of the anticipated closure costs and is of the opinion that the liability is sufficient for the operation to adhere to the closure objectives that are documented in Section 7. In particular the appropriate implementation of closure actions will:

- Decommission surface infrastructure that has no beneficial post-closure use;
- Identify potential post-closure uses of the land occupied by mine infrastructure in consultation with the surrounding land owners and land users. Should a suitable use for mine infrastructure not be found, it will be removed;
- Rehabilitate all disturbed land to a state that is suitable for its post-closure uses;
- Rehabilitate all disturbed land to a state that facilitates compliance with applicable environmental quality objectives (air quality objectives and water quality guidelines);
- Reduce the visual impact of the site through rehabilitation of all disturbed land and residue deposits;
- Rehabilitation that results in landforms that emulate the surroundings and would facilitate drainage and ensuring that all other remaining embankments are shaped and trimmed and that these are free draining; and
- Rehabilitate all disturbed land and residue deposits to a state where post-closure management is minimised.

Table 15-2: Closure quantum for the proposed expansion activities at Der Brochen (calculated based on DMRE Master Rates adjusted to 2020)

No.	DMRE Description	Unit	A	B	C	D	E=A*B*C*D
	DBMMC		Quantity	Master rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m ³	12 411	16.80	1	1.1	229 379
2(A)	Demolition of steel buildings and structures	m ²	2 922	234.01	1	1.1	752 143
2(B)	Demolition of reinforced concrete buildings and structures	m ²	8 067	344.79	1	1.1	3 059 560
3	Rehabilitation of access roads	m ²	34 440	41.90	1	1.1	1 587 349
4(A)	Demolition and rehabilitation of electrified railway lines	m		406.41	1	1.1	
4(B)	Demolition and rehabilitation of non-electrified railway lines	m		221.68	1	1.1	
5	Demolition of housing and/or administration facilities	m ²	1 148	467.99	1	1.1	590 980
6	Opencast rehabilitation including final voids and ramps	ha	31	238 176.33	1	1.1	8 121 813
7	Sealing of shafts, adits and inclines	m ³	60	125.61	1	1.1	8 290
8(A)	Rehabilitation of overburden and spoils	ha	119	163 546.09	1	1.1	21 408 183
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic salt-producing waste)	ha	12	203 693.69	1	1.1	2 688 757
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha		591 623.06	0.9	1.1	
9	Rehabilitation of subsided areas	ha		136 945.22	1	1.1	
10	General surface rehabilitation	ha	22	129 556.11	1	1.1	3 135 258
11	River diversions	ha		129 556.11	1	1.1	
12	Fencing	m	4 000	147.82	1	1.1	650 417
13	Water management	ha	184	49 260.87	0.67	1.1	6 680 168
14	Maintenance and aftercare	ha	184	17 241.30	1	1.1	3 489 640
					Sub Total 1		52 401 936
					Weighting factor 2	1.1	57 642 130
1	Preliminary and General				6.0% of Subtotal 1 > 100 000 000		6 288 232
					12.0% of Subtotal 1 < 100 000 000		
2	Contingency				10.0% of Subtotal 1		5 240 194
					Sub Total 2		69 170 556
					Add Vat (15%)		10 375 583
					GRAND TOTAL		79 546 139

Table 15-3: Closure quantum for the proposed expansion activities at Borwa Shaft (calculated based on DMRE Master Rates adjusted to 2020)

	Main Description (if not applicable, indicate as N/A)	Units	Fill in Amount	DMR Master Rate	DMR Multiplication Factor	Weighing Factor 1	Amount
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m ³	100	16.80	1.00	1.20	R 2 016.00
2 (A)	Demolition of steel buildings and structures	m ²		234.01	1.00	1.20	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m ²		344.79	1.00	1.20	R 0.00
3	Rehabilitation of access roads	m ²	1 525	41.90	1.00	1.20	R 76 677.00
4(a)	Demolition and rehabilitation of electrified railway lines	m		406.41	1.00	1.20	R 0.00
4(b)	Demolition and rehabilitation of non-electrified railway lines	m		221.68	1.00	1.20	R 0.00
5	Demolition of housing and facilities	m ²	1 384	467.99	1.00	1.20	R 777 301.00
6	Opencast rehabilitation including final voids and ramps	ha		238 176	0.52	1.20	R 0.00
7	Sealing of shafts, adits and inclines	m ²		125.61	1.00	1.20	R 0.00
8(a)	Rehabilitation of overburdens and spoils	ha		163 546	1.00	1.20	R 0.00
8(b)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt producing waste)	ha		203 694	1.00	1.20	R 0.00
8(c)	Rehabilitation of processing waste deposits and evaporation ponds (acid, metal rich waste)	ha		591 623	0.80	1.20	R 0.00
9	Rehabilitation of subsided areas	ha		136 945	1.00	1.20	R 0.00
10	General surface rehabilitation, including grassing of all denuded areas	ha	Note 1	129 556.11	1.00	1.20	R 0.00
11	River diversions	ha		129.556.11	1.00	1.20	
12	Fencing	m		147.82	1.00	1.20	R 0.00
13	Water management (separating clean and dirty water, managing polluted water and managing the impact on ground water, including treatment when required)	ha	Note 1	49 260.87	0.67	1.20	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	Note 1	17 241.30	1.00	1.20	R 0.00
						Sub Total 1	R 855 994.00
					Weighting Factor 2	1.10	R 941 593.40
1	Preliminary and General		12% of Sub Total 1 if less than R100 mill 6% of Sub Total 1 if more than R100 mill				R 112 991.21
2	Contingency		10 % of Sub Total 1				R 94 159.34
						Sub Total 2	R 207 150.55
						Sub Total 3	R 1 148 743.95
						VAT @ 15%	R 172 311.59
						Grand Total - Sub Total 3	R 1 321 055.54

Note 1 – as these structures are to be constructed in a brownfields footprint, the footprint rehabilitation, water management and monitoring costs are already estimated and included in the costs reported in Table 15-4. These costs are therefore not included here.

15.2 Approach for aspects already operational

The estimate of liability has been prepared using an Excel based model known as the Standardised Reclamation Cost Estimator (SRCE). This model was developed by SRK North American staff in conjunction with Regulators and Industry to provide a consistent basis for estimating reclamation costs for mining operations in Nevada with the goals of ensuring that mine reclamation cost estimates meet the applicable regulatory requirements and can be quickly reviewed by regulatory agencies. The SRCE utilises standardised reclamation calculation methods, data and procedures to estimate the cost of reclaiming a mine site as if a third-party contractor for the State of Nevada is performing the reclamation. As the model has been constructed with user-editable files, it has been possible to customise the model to suit South African conditions and to populate the model with data relevant to the AAP operations. This includes customising the model to describe the current physical characteristics of the operation as well as the intended closure actions.

The purpose of the model is to provide a tool to assist mining professionals improve the consistency and accuracy of reclamation and closure cost estimates. Although the model was developed to provide standardised approaches to reclamation and closure cost calculations, the need to account for diverse approaches to mine closure, and differences between mining operations and regulatory requirements, required that the model also provide a reasonable amount of flexibility.

The methods of calculation used in the model are based on first-principle approaches for volume and distance calculations, and productivity estimation, with productivity calculations largely derived from published sources such as the Caterpillar Performance Handbook (ed. 46). The model calculations and processing are not available to the users, with access to the areas where calculations are undertaken being protected and or locked. The model has been constructed in this manner to retain the model's integrity as required by the USA Sarbanes–Oxley Act.

All calculations in the Model used to determine the quantity of seeded area and the volume of cover material are based on true surface area (3-Dimensional area) rather than footprint areas.

Liabilities have been divided into decommissioning, restoration and post closure costs, as described below, with the output from the SRCE model summarised below in Table 15-4. As AAP undertakes annual assessments, the figures reported below are those calculated during the 2020 assessment. These figures are included in this assessment as these are the figures that are utilised by AAP to estimate the annual provision adjustment that is made to the DMRE.

- **Decommissioning costs:** Demolition and Rehabilitation costs pertaining to the removal of plant and infrastructure and the rehabilitation of the surface following demolition. Decommissioning costs include footprint rehabilitation (backfilling, top soiling, profiling, and vegetating) at the shafts, concentrators, offices etc; and
- **Restoration:** Costs pertaining to the rehabilitation of areas impacted on by processing, outside of infrastructure footprint. Restoration costs would involve rehabilitation on peripheral footprints, dams outside of the fence etc

This section summarises the closure liability for areas requiring decommissioning and areas requiring restoration. Detailed bills of quantities and cost sheets are in Appendix B and Appendix C for demolition and rehabilitation and restoration, respectively:

Table 15-4: Summary of closure liability on the Day of Assessment (ZAR)

	Decommissioning		Restoration	TOTAL
	Demolition	Rehab		
DOA - Concentrator and Helena				
Tailings Dam		87 918	17 272 708	17 360 626
Buttress Dam - Helena			5 302 163	5 302 163
Road			545 674	545 674
Concentrator	23 541 646	17 006 614	0	40 548 260
Water Management Infra		1 062 295	6 039 718	7 102 013
Miscellaneous			458 215	458 215
TSF Water Management			11 984 179	11 984 179
Monitoring			11 529 781	11 529 781
Planning and Authorisation			14 850 000	14 850 000
Maintenance			4 206 733	4 206 733
Total	23 541 646	18 156 827	72 189 171	113 887 644
DOA - Mareesburg				
Tailings Dam		143 527	18 195 722	18 339 249
Road			333 122	333 122
Water Management Infra			1 865 661	1 865 661
TSF Water Management			5 000 000	5 000 000
Monitoring			3 611 289	3 611 289
Maintenance			686 372	686 372
Planning and Authorisation			10 000 000	10 000 000
Total	0	143 527	39 692 166	39 835 693
DOA - Borwa				
Road			749 443	749 443
Water Management Infra			252 649	252 649
Shafts	15 838 918	1 183 967	1 108 557	18 131 442
Stockpiles		201 531	393 886	595 417
Associated mining infrastructure		203 159	29 139	232 298
Monitoring			3 743 158	3 743 158
Maintenance			84 023	84 023
Total	15 838 918	1 588 657	6 360 855	23 788 430
Lebowa				
Road			261 454	261 454
Water Management Infra			362 886	362 886
Shafts	12 344 490	1 705 000		14 049 490
Associated mining infrastructure		1024123	102 258	1 126 381
Monitoring			3 743 158	3 743 158
Maintenance			104 439	104 439
Total	12 344 490	2 729 123	4 574 195	19 647 808

Table 15-5 presents a summary of the liability associated with closure of the aspects current existing and to be constructed for the DBMMC.

Table 15-5: Summary of closure liability on the Day of Assessment (ZAR)

Aspect	Cost
Der Brochen Expansion ¹	79 546 139
Borwa Expansion ¹	1 321 056
Concentrator and Helena ²	113 887 644
Mareesburg	39 835 693
Borwa	23 788 430
Lebowa	19 647 808

1 – Includes, P&G, Contingency and VAT as per the DMRE Guideline, 2 – Does not include P&G, Contingency and VAT

16 Monitoring, auditing and reporting

AAP's understanding of the regulations is that there are two requirements under this category. The first relates to monitoring, auditing and reporting on future revisions to this plan, which is required annually. The second relates to monitoring and reporting on the monitoring required achieving relinquishment criteria. Both these requirements are discussed in this section.

16.1 Monitoring, auditing and reporting on future revisions

AAP's interpretation of the regulation is that there are three sets of reviews to which the plan must be subjected on an annual basis. These audits and their purpose as understood by AAP are:

- Internal monitoring, auditing and reporting – a review undertaken by AAP or appointed consultant to update the plan to account for changes to the environment and risk profile and to update the liability assessment to reflect liability at that point in time.
- External monitoring, auditing and reporting – a review undertaken by the financial auditors as part of the annual financial/accounting audit to determine that the plan is appropriate, and that the quantum of the liability is included in the operational provisions.
- Legislated audits – these are the auditing requirements of the Act, Regulations, EIA/EMPr and EA. Pertinent aspects relating to closure, such as changes to the risk assessment, changes in closure options and changes in the quantum of the liability will be reported.

The current planning for these audits is presented in Table 16-1. It is currently envisaged that findings of the audit will be reported on within three months of the audit (likely date in Table 16-1).

Table 16-1: Schedule of planned audits

Audit	Internal Responsibility	Frequency	Likely date
Internal	Environmental manager / Closure manager	Annual	Q3
External	Financial manager	Annual	Q4
Legislated	Mine manager	Annual	Q1 of following year

The findings from the various audits will be captured in the operations Environmental Management System (EMS). Responsibilities and timelines will be allocated to the rectification of the findings, as practical. Once addressed, these findings will be closed out in a manner similar to the other findings captured in the EMS and will not be closed out until a second party has assessed that the findings are appropriately addressed.

16.2 Monitoring, auditing and reporting to track relinquishment progress

The objective of the monitoring programme will be to track the recovery of the site towards the long-term post closure land capability goals, in accordance with the overall closure objectives. The monitoring programme will be designed to collect information to demonstrate that the relinquishment criteria have been achieved. The anticipated monitoring will include:

- **Surface water:** Quality monitoring against parameters as required by the WUL. Sampled monthly for a minimum ten-year post closure period and thereafter until relinquishment criteria have been achieved.
- **Groundwater:** Quality monitoring of both the shallow and deep aquifers against the parameters required by the WUL. Sampled quarterly for a minimum ten-year post closure period and thereafter until relinquishment criteria have been achieved.
- **Erosion monitoring:** This will take the form of developing a representative reference site on the disturbed footprint and undertaking visual and topographic assessments to determine erosion rate, using standard erosion monitoring techniques. This will be undertaken once a year at the end of the wet season for a ten-year post closure period.

- **Vegetation establishment:** Vegetation condition will be monitored using standard field techniques to determine whether the vegetation has been established with a species composition and density similar to that of a reference analogue site established in a similar ecotype, conducted annually for a ten-year post closure period.
- **Bio-monitoring:** Upstream and downstream of the mining activities. A long-term operational bio-monitoring programme will be implemented to monitor physico-chemical and biological components of the aquatic ecosystems within the mining area, which will be extended into the closure period. Appropriate biological index will be included in order to quantify and classify the longer-term changes in biotic integrity, with monitoring being undertaken annually.
- Photographic records should be maintained together with findings, follow up actions and close out records as part of the Der Brochen EMS.

Annual reports will be prepared to document the results of the monitoring during the closure and post closure phases. These reports will provide important information required to manage the on-going closure activities, with the data and reports being used to:

- Provide recommendations for improving subsequent rehabilitation activities.
- Indicate where rehabilitation and closure activities have not been successful, requiring a potential change in design criteria.
- Provide information where care and maintenance is required during the post closure period.
- Indicate if relinquishment criteria have been achieved.

17 Plan amendments as a result of monitoring and gaps

This report is the first plan to be compiled and an explanation of 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 will only become applicable in subsequent updates.

18 Conclusions

AAP will provide for the closure liability associated with the project through the purchase of a Bank Guarantee as allowed by the Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, with the Bank Guarantee provided to the DMRE following authorisation of the project.

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Ray Mayne

Project Reviewer

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

19 References

Ages. Consolidated EMPR for Thornccliffe, Borwa, Mototolo and Magareng Mines. 2012; Report: AS-R-2012-03-31.

Anglo American Platinum, 2016, Mogalakwena Mine SEAT Report Update.

SRK Consulting, 2019: Anglo American Platinum Rustenburg Platinum Mines Der Brochen Section – Der Brochen Amendment Project. Environmental Impact Assessment & Environmental Management Programme Report. (Report No. 462905).

SRK Consulting, 2014: Rustenburg Platinum Mines Der Brochen Section – Der Brochen EMP Amendment and Alignment. Rehabilitation and Closure. (Report No. 469113/RCP).

SRK Consulting, 2014: Rustenburg Platinum Mines Der Brochen Section – Der Brochen EMP Amendment and Alignment. Final Environmental Impact Assessment and Environmental Management Programme. (Report No. 469113).

Appendices

Appendix A: Risk Assessment Criteria

	Consequence				
	1	2	3	4	5
	Insignificant	Minor	Moderate	High	Major
Safety / Health	First aid case / Exposure to health hazard resulting in temporary discomfort	Medical treatment case / Exposure to health hazard resulting in temporary alterations/limitations (no lost time)	Lost time/ Exposure to health hazards/ agents (over the OEL) resulting in reversible impact on health (with lost time)	Permanent disability or single fatality/ Exposure to health hazards/ agents (significantly over the OEL) resulting in irreversible impact on health with loss of quality of life or single fatality	Numerous permanent disabilities or multiple fatalities/ Exposure to health hazards/ agents (significantly over the OEL) resulting in irreversible impact on health with loss of quality of life of a numerous group/ population or multiple fatalities
Environment	Lasting days or less; limited to small area (metres); receptor of low significance/ sensitivity (industrial area)	Lasting weeks; reduced area (hundreds of metres); no environmentally sensitive species/ habitat)	Lasting months; impact on an extended area (kilometres); area with some environmental sensitivity (scarce/ valuable environment).	Lasting years; impact on sub-basin; environmentally sensitive environment/ receptor (endangered species/ habitats)	Permanent impact; affects a whole basin or region; highly sensitive environment (endangered species, wetlands, protected habitats)
Financial	No disruption to operation/ 5% of current liability estimate - R7million	Brief disruption to operation/10% of current liability estimate - R13million	Partial shutdown /15% of current liability estimate - R20million	Partial loss of operation/20% of current liability estimate – R26 million	Substantial or total loss of operation / 25% of current liability estimate - R29 million
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
Reputation / Social / Community	Minor impact; awareness/ concern from specific individuals/ Minor disturbance of culture/ social structures	Limited impact; concern/ complaints from certain groups/ organizations (e.g. NGOs) / Some impacts on local population, mostly repairable. Single stakeholder complaint in reporting period	Local impact; public concern/ adverse publicity localised within neighbouring communities / On-going social issues. Isolated complaints from community members/ stakeholders	Suspected reputational damage; local/ regional public concern and reactions / Significant social impacts. Organized community protests threatening continuity of operations	Noticeable reputational damage; national/ international public attention and repercussions/ Major widespread social impacts. Community reaction affecting business continuity. "License to operate" under jeopardy

Probability		
ALMOST CERTAIN	5	The unwanted event has occurred frequently: occurs in order of one or more times per year & is likely to reoccur within 1 year
LIKELY	4	The unwanted event has occurred infrequently: occurs in order of less than once per year & is likely to reoccur within 5 years
POSSIBLE	3	The unwanted event has happened in the business at some time: or could happen within 10 years
UNLIKELY	2	The unwanted event has happened in the business at some time: or could happen within 20 years
RARE	1	The unwanted event has never been known to occur in the business: or it is highly unlikely that it will occur within 20 years

Appendix B: Demolition Costs

MOTOTOLO CONCENTRATOR				
Description	Unit	Quantity	Rate (R)	Amount (R)
R.O.M. Silo				
Concrete silo	m ³	842.00	675.56	568 821.00
Structural steel	t	40.00	2 651.48	106 059.00
Feeders	No	2.00	20 133.31	40 267.00
Elevated conveyor	m	70.00	1 460.94	102 266.00
Conveyor belting	m	140.00	36.42	5 099.00
Oil bunker - concrete	m ²	3.20	579.50	1 854.00
	m ²	16.00	579.50	9 272.00
Waste recycling station (2019)				
Concrete surface bed 200th	m ²	240.00	96.99	23 277.00
Tailings filter plant (2019)				
Structural steel no cladding	m ²		205.84	
Equipment	No	12.00	40 266.62	483 199.00
Steel tank	m ³	320.00	481.58	154 106.00
Steel tank	No	2.00	20 133.31	40 267.00
Concrete floor	m ²	1 088.00	675.56	735 008.00
Elevated conveyor	m	68.00	1 460.94	99 344.00
Conveyor belting	m	136.00	36.42	4 953.00
Container substation	No	1.00	40 266.62	40 267.00
Control room	No	1.00	20 133.31	20 133.00
Concrete plinths	m ³	2.25		
Containers (9m)	No	2.00	20 133.31	40 267.00
Pipeline	m	340.00	106.51	36 213.00
Primary crusher				
MCC	m ²	36.00	318.84	11 478.00
Remove electricals	m ²	36.00	99.11	3 568.00
Transformer bay	m ²	24.00	318.84	7 652.00
Transformer	No	1.00	20 133.31	20 133.00
Concrete bases	m ³	54.00	579.50	31 293.00
Grizzly screen	No	1.00	40 266.62	40 267.00
Belt magnet	No	1.00	10 066.65	10 067.00
Jaw crusher	No	1.00	20 133.31	20 133.00
Elevated conveyor	m	220.00	1 460.94	321 406.00
Conveyor belting	m	440.00	36.42	16 026.00
High mast lights				
	No	2.00	20 133.31	40 267.00
Mill feed silos				
Concrete silos	m ³	7 000.00	675.56	4 728 912.00
Feeders	No	4.00	20 133.31	80 533.00
Elevated conveyor	m	150.00	1 460.94	219 140.00
Conveyor belting	m	300.00	36.42	10 927.00
Structural steel	t	182.00	2 651.48	482 569.00
Steel ball magnets	No	1.00	10 066.65	10 067.00
Steel ball bunker - concrete	m ³	12.00	675.56	8 107.00
Steel ball bunker - structural steel - open with roof	t	9.00	1 749.41	15 745.00
Laboratory	m ²	200.00	318.84	63 768.00
Concrete surface bed (2007)	m ²	140.00	164.88	23 083.00
New changehouse (2019)	m ²	154.00	318.84	49 101.00
New changehouse (2019)	m ²	23.68	318.84	7 550.00
Milling and classification				
Potable water tank - ABECO	No	1.00	10 066.65	10 067.00
Primary mills	No	2.00	293 210.73	586 421.00
Mill motors	No	2.00	20 133.31	40 267.00
Vibratory screens	No	2.00	20 133.31	40 267.00
Classification screen	No	1.00	20 133.31	20 133.00
Cyclone clusters	No	2.00	10 066.65	20 133.00
Steel surge tanks	m ³	200.00	481.58	96 316.00
De-slime feed tank - steel	m ³	50.00	481.58	24 079.00
Structural steel	t	326.00	2 651.48	864 382.00
MCC	m ²	50.00	318.84	15 942.00
Strip electricals	m ²	50.00	99.11	4 955.00
Reinforced concrete	m ³	2 500.00	675.56	1 688 897.00
Lube room	m ²	45.00	318.84	14 348.00
Pumps and motors	No	12.00	20 133.31	241 600.00
Concrete surface bed (2007)	m ²	80.00	96.99	7 759.00

MOTOTOLO CONCENTRATOR				
Description	Unit	Quantity	Rate (R)	Amount (R)
MCC no 2	m ²	140.00	318.84	44 637.00
Strip electricals	m ²	140.00	99.11	13 875.00
Transformer bays	m ²	45.00		
Transformers	No	3.00	20 133.31	60 400.00
Mini sub	No	1.00	10 066.65	10 067.00
Bunker floor	m ²	12.00	675.56	8 107.00
Bunker walls	m ²	7.00	675.56	4 729.00
Spares shed (2019)	m ²	144.00	205.84	29 640.00
Spares shed (2019)	m ²	256.00	205.84	52 694.00
Spares shed (2019)				
Spares shed (2019)	m ²	144.00	205.84	29 640.00
Spares shed (2019)	m ²	256.00	205.84	52 694.00
Pipe bridges and cable racks	t	153.00	1 749.41	267 660.00
Piping	m	390.00	106.51	41 539.00
General concrete surface bed	m ²	4 800.00	96.99	465 534.00
General tarred areas (roads) - 2019	m ²	27 958.00	35.96	
Pipelines - (2019)	m	3 137.00	106.51	
Carports	m ²	600.00	45.77	27 461.00
Carports	m ²	330.00	45.77	15 103.00
Bus shelter	m ²	60.00	94.26	5 656.00
Carports	m ²	60.00	45.77	2 746.00
Slimes thickener				
Steel tank	t	17.00	1 749.41	29 740.00
Reinforced concrete	m ³	238.00	675.56	160 783.00
Pumps and equipment	No	3.00	20 133.31	60 400.00
Reinforced concrete stormwater bridge (2007)	m ³	50.40	675.56	34 048.00
Fire water pump station				
Pump station	m ²	150.00	292.22	43 833.00
Pumps and equipment	No	2.00	20 133.31	40 267.00
Concrete surface bed (2007)	m ²	400.00	96.99	38 795.00
Process water tank				
Concrete reservoir	m ³	108.00	675.56	72 960.00
Pumps and equipment	No	1.00	20 133.31	20 133.00
Tailings thickener				
Concrete tank	m ³	580.00	675.56	391 824.00
Pumps and equipment	No	1.00	20 133.31	20 133.00
Structural steel	t	15.00	34 988.21	524 823.00
Final tailings pump station				
Reinforced concrete	m ³	233.00	675.56	157 405.00
Structural steel	t	38.00	1 749.41	66 478.00
Pumps and equipment	No	3.00	20 133.31	60 400.00
Pipeline	m	300.00	106.51	31 953.00
Concrete surface bed (2007)	m ²	270.00	96.99	26 186.00
Tailings filter feed tanks and pumps (2019)	No	1.00	20 133.31	20 133.00
Pollution control dam (2019)				
Remove dam liner	m ²	7 800.00	19.78	
Backfilling	m ³	11 700.00	19.78	
Silt trap concrete	m ³	1 073.00	675.56	
Primary & secondary roughers				
Roughers (flotation cells)	m ³	910.00	481.58	438 238.00
Reinforced concrete	m ³	372.00	675.56	251 308.00
Structural steel	t	216.00	2 651.48	572 719.00
Pumps and equipment	No	5.00	20 133.31	100 667.00
MCC no 3	m ²	75.00	318.84	23 913.00
Strip electricals	m ²	75.00	99.11	7 433.00
Transformer bays	m ²	45.00	318.84	14 348.00
Transformers	No	4.00	20 133.31	80 533.00
Concrete surface bed (2007)	m ²	75.00	96.99	7 274.00

MOTOTOLO CONCENTRATOR				
Description	Unit	Quantity	Rate (R)	Amount (R)
Concrete surface bed (2007)	m ²	150.00	96.99	14 548.00
Non flammable reagent handling				
Reinforced concrete	m ³	84.00	675.56	56 747.00
Blowers				
Blowers	No	3.00	40 266.62	120 800.00
Reinforced concrete	m ³	87.00	675.56	58 774.00
Structural steel	t	29.00	1 749.41	50 733.00
Primary & secondary cleaners				
Cells	m ³	459.00	481.58	221 045.00
Reinforced concrete	m ³	452.00	675.56	305 353.00
Structural steel	t	148.00	2 651.48	392 419.00
Pumps and equipment	No	5.00	20 133.31	100 667.00
MCC no 4	m ²	75.00	318.84	23 913.00
Strip electricals	m ²	75.00	99.11	7 433.00
Transformer bays	m ²	40.00	318.84	12 754.00
Transformers	No	3.00	20 133.31	60 400.00
Mini sub	No	1.00	10 066.65	10 067.00
Bunker floor	m ²	12.00	675.56	8 107.00
Bunker walls	m ²	7.00	675.56	4 729.00
Flammable reagent handling				
Reinforced concrete	m ³	110.00	675.56	74 311.00
Structural steel	t	5.00	1 749.41	8 747.00
Tanks	m ³	54.00	1 749.41	94 468.00
Pumps and equipment	No	1.00	20 133.31	20 133.00
Concentrates handling				
Reinforced concrete	m ³	965.00	675.56	651 914.00
Structural steel	t	168.00	2 651.48	445 448.00
Steel sheeting	m ²	2 643.00	32.12	84 897.00
Tanks	t	21.00	1 749.41	36 738.00
Pumps and equipment	No	5.00	20 133.31	100 667.00
Concrete surface bed (2007)	m ²	1 560.00	96.99	151 299.00
Larox filter building (included in 444)				
Electrical workshop	m ²	220.00	292.22	64 288.00
Mechanical workshop (2007)	m ²	220.00	292.22	64 288.00
Mechanical workshop lean-to	m ²	220.00	205.84	45 284.00
Rigger workshop (2014)	m ²	67.20	292.22	19 637.00
Stores	m ²	220.00	292.22	64 288.00
Stores extension (2007)	m ²	160.00	205.84	32 934.00
Oil storage bund (2007)	m ²	36.00	96.99	3 492.00
Oil storage bund (2007)	m ³	2.40	579.50	1 391.00
Paint Store (2009)	m ²	8.00	96.99	776.00
Gas Store	m ²	10.00	96.99	970.00
Change house	m ²	180.00	318.84	57 391.00
Chrome stockpile area	m ²	2 450.00	164.88	403 948.00
	m ²	675.56	48.49	32 760.00
Weigh bridge	No	2.00	40 266.62	80 533.00
Concrete	m ³	24.00	675.56	16 213.00
Guard house	m ²	120.00	318.84	38 261.00
Mine offices	m ²	500.00	318.84	159 419.00
Dog Kennels (2009)	m ²	90.00	94.26	8 483.00
Green Area (2009)				
Containers	No	3.00	20 133.31	60 400.00
Artisans spares containers (2009)				
Containers	No	2.00	20 133.31	40 267.00
Main consumer substation (2014)				

MOTOTOLO CONCENTRATOR				
Description	Unit	Quantity	Rate (R)	Amount (R)
Single storey brick IBR roof	m ²	185.00	417.95	77 320.00
Plinths	m ³	4.32	675.56	2 918.00
PFC yard - equipment	No	2.00	20 133.31	40 267.00
Concrete surface bed	m ²	200.00	96.99	19 397.00
Concrete surface bed (2007)	m ²	18.00	96.99	1 746.00
Concrete surface bed (2007)	m ²	18.00	96.99	1 746.00
Security fencing	m	1 345.00	23.93	32 179.00
Electrical cabling	m	170 000.00	0.10	17 000.00
TOTAL CLOSURE COST				21 341 646.00

BORWA				
SHORT DESCRIPTION	RATE	UNIT	TOTAL QUANTITY	AMOUNT
Perimeter fencing	18.36	m	2500	45 898.00
Covered walkway	81.15	m2	532	43 169.00
Containers	9 624.24	No	1	9 624.00
Soccer stand	187.69	m2	50	9 459.00
Covered walkway	81.15	m2	257	20 814.00
Shop	276.24	m2	17	4 641.00
Fencing	18.36	m	65	1 193.00
Soccer stand	187.69	m2	50	9 459.00
Bus shelter	187.69	m2	60	11 261.00
Fencing	18.36	m	95	1 744.00
Carports	39.55	m2	240	9 493.00
Toilet	276.24	m2	55	15 193.00
Carports	39.55	m2	240	9 493.00
Overland conveyor	289.56	m	885	256 258.00
Overland conveyor	1 354.76	m	165	223 535.00
Overland conveyor	30.52	m	2100	64 090.00
Carports	39.55	m2	240	9 493.00
Carports	39.55	m2	168	6 645.00
Carports	39.55	m2	144	5 696.00
Carports	39.55	m2	288	11 391.00
Medical station	276.24	m2	56	15 469.00
Hall	187.69	m2	280	52 552.00
Hall	23.03	m2	82	1 879.00
Lean-to	81.15	m2	18	1 428.00
Sump	632.10	m3	7	4 425.00
Sump	109.35	m3	96	10 497.00
Concrete bases	41.59	m2	13	539.00
Concrete bases	41.59	m2	8	337.00
Pipeline	96.22	m	70	6 736.00
Jo-Jo tanks	4 812.12	No	2	9 624.00
Jo-Jo tanks	9 624.24	No	32	307 976.00
Concrete bases	83.18	m2	180	14 973.00
Lean-to	81.15	m2	31	2 541.00
Screen	632.10	m3	2	1 422.00
Screen	109.35	m3	9	984.00
Pipeline	96.22	m	3	289.00
Fencing	18.36	m	155	2 846.00
Vent Shafts				
Plug 3m dia vent shaft	1 025 700.00	No	0	288 478.00
Remove equipment	38 496.95	No	2	76 994.00
Remove equipment	19 248.48	No	48	923 927.00
Demolish concrete	632.10	m3	100	63 210.00
Fencing	18.36	m	246	4 516.00
Offices	19 248.48	No	7	134 739.00
Offices	9 624.24	No	2	19 248.00
Concrete bases	41.59	m2	450	18 716.00
Parkhomes	19 248.48	No	2	38 497.00
Parkhomes	9 624.24	No	4	38 497.00
Concrete surface bed	41.59	m2	529	22 002.00
Fencing	18.36	m	96	1 762.00
Offices	19 248.48	No	2	38 497.00
Offices	9 624.24	No	2	19 248.00
DB board	4 812.12	No	1	4 812.00

BORWA				
SHORT DESCRIPTION	RATE	UNIT	TOTAL QUANTITY	AMOUNT
Fencing	18.36	m	12	220.00
Minisub	9 624.24	No	1	9 624.00
Bund wall	141.41	m2	0	0.00
Lean-to	81.15	m2	36	2 921.00
Fencing	18.36	m	24	441.00
Concrete walkways	41.59	m2	966	40 177.00
Parkhomes	19 248.48	No	2	38 497.00
Parkhomes	9 624.24	No	6	57 745.00
Concrete surface bed	83.18	m2	330	27 450.00
Offices	276.24	m2	888	245 383.00
Substation	276.24	m2	67	18 508.00
Strip electrics	92.46	m2	67	6 195.00
Offices	19 248.48	No	4	76 994.00
Offices	9 624.24	No	2	19 248.00
Changehouse	276.24	m2	384	106 076.00
First aid	9 624.24	No	1	4 812.00
Parkhomes	19 248.48	No	1	19 248.00
Nil	#N/A	#N/A	0	0.00
Changehouse	276.24	m2	504	139 224.00
Offices	276.24	m2	132	36 464.00
Tuck shop	276.24	m2	25	6 906.00
Toilet	276.24	m2	25	6 906.00
Containers	9 624.24	No	1	9 624.00
Security	276.24	m2	182	50 275.00
Carports	39.55	m2	352	13 923.00
Carports	39.55	m2	176	6 961.00
Workshop	81.15	m2	288	23 370.00
Concrete surface bed	83.18	m2	650	54 069.00
Containers	19 248.48	No	1	19 248.00
Washbay	19 248.48	No	1	19 248.00
LHD parking area	83.18	m2	990	82 351.00
Workshop	273.47	m2	1040	284 412.00
Containers	19 248.48	No	2	28 873.00
Equipment and mechanicals	38 496.95	No	1	38 497.00
Stores	273.47	m2	1394	381 222.00
Brick wall	23.03	m2	396	9 118.00
Stores	187.69	m2	64	12 012.00
Brick wall	23.03	m2	240	5 526.00
Lean-to	81.15	m2	60	4 869.00
Parkhomes	19 248.48	No	1	19 248.00
Lean-to	81.15	m2	9	730.00
Diesel and oil bay	19 248.48	No	6	115 491.00
Bund wall	536.04	m3	59	31 648.00
Bund wall floor	83.18	m2	138	11 446.00
Stores	81.15	m2	45	3 652.00
Adit	109.35	m3	700	76 542.00
Magazine				
Single storey prefabricated structure with corrugated iron roof sheeting on steel trusses on concrete surface bed	168.35	m2	85	14 330.00
Concrete retaining wall	632.10	m3	15	9 211.00
Concrete entrance	632.10	m3	17	10 468.00
Earth bund	109.35	m3	127	13 909.00
Fencing	18.36	m	350	6 426.00
Offices	9 624.24	No	1	9 624.00
Water treatment plant				
Containers	9 624.24	No	1	9 624.00
Pumps and equipment	9 624.24	No	1	9 624.00
Tanks steel	19 248.48	No	1	19 248.00
Tank bases	141.41	m2	855	120 906.00
Lean-to	81.15	m2	16	1 298.00
Fencing	18.36	m	75	1 377.00
Pipeline	96.22	m	125	12 028.00
Concrete surface bed	41.59	m2	25	1 040.00
Fencing	18.36	m	20	367.00
Sump walls	536.04	m3	2	1 115.00
Backfill	109.35	m3	14	1 478.00
Plug 3 no 5m dia shaft	1 025 700.00	No	1	1 201 992.00
Backfill entrance	109.35	m3	55800	6 101 476.00
Abeco tank	38 496.95	No	1	38 497.00
Concrete bases	632.10	m3	38	23 704.00

BORWA				
SHORT DESCRIPTION	RATE	UNIT	TOTAL QUANTITY	AMOUNT
Pumphouse	276.24	m2	38	10 608.00
Pumps and equipment	19 248.48	No	1	19 248.00
Minisub	9 624.24	No	1	9 624.00
Bund	141.41	m2	16	2 263.00
Control room	19 248.48	No	1	19 248.00
Concrete bases	536.04	m3	6	3 216.00
Lean-to	81.15	m2	120	9 737.00
Tanks	19 248.48	No	2	38 497.00
Tank bases	632.10	m3	95	60 070.00
Fencing	18.36	m	100	1 836.00
Dam concrete	632.10	m3	42	26 548.00
Dam backfill	109.35	m3	720	78 729.00
Pump house	81.15	m2	22	1 753.00
Pumps and equipment	9 624.24	No	1	9 624.00
Minisub	9 624.24	No	3	28 873.00
Concrete surface bed	141.41	m2	60	8 485.00
Conveyors	289.56	m	190	55 016.00
Conveyors	30.52	m	190	5 799.00
Chairlift	289.56	m	87	25 191.00
Covered walkway	81.15	m2	0	0.00
Chairlift entrance	273.47	m2	96	26 253.00
Compressor house	187.69	m2	144	27 027.00
Equipment and mechanicals	9 624.24	No	66	635 200.00
Oil trap	632.10	m3	9	5 689.00
Backfill	109.35	m3	195	21 322.00
Paint store	276.24	m2	289	79 855.00
Paint store	168.35	m2	109	18 424.00
Lean-to	81.15	m2	7	592.00
Control room	276.24	m2	11	3 083.00
Take-up tower	187.69	m2	27	4 992.00
Equipment and mechanicals	9 624.24	No	1	9 624.00
Substation	276.24	m2	36	9 945.00
Strip electrics	92.46	m2	36	3 329.00
Control room	497.23	m2	16	7 956.00
Break test ramp	109.35	m3	120	13 121.00
Concrete walls	632.10	m3	60	37 926.00
Explosives delivery bay	187.69	m2	275	51 614.00
Fencing	18.36	m	106	1 946.00
Brick wall	23.03	m2	30	691.00
Remove fill material	109.35	m3	48	5 249.00
LHD parking area	141.41	m2	800	113 129.00
Emulsion bay'	83.18	m2	600	49 910.00
Tanks	19 248.48	No	3	57 745.00
Bund walls	536.04	m3	6	3 216.00
Fencing	18.36	m	100	1 836.00
Container	19 248.48	No	1	19 248.00
Concrete surface bed	41.59	m2	79	3 294.00
Transfer bunker	632.10	m3	324	204 799.00
Gas store	81.15	m2	32	2 558.00
Paint store	9 624.24	No	1	9 624.00
Plug 1 no 3m dia shaft	1 025 700.00	No	0	144 239.00
Equipment and mechanicals	38 496.95	No	1	38 497.00
Equipment and mechanicals	19 248.48	No	6	115 491.00
Concrete surface bed	41.59	m2	60	2 495.00
Containers	9 624.24	No	1	9 624.00
Parkhomes	9 624.24	No	1	9 624.00
Concrete surface bed	41.59	m2	9	374.00
Lean-to	81.15	m2	72	5 842.00
Minisub	9 624.24	No	2	19 248.00
Concrete bases	536.04	m3	50	26 802.00
Fencing	18.36	m	170	3 121.00
Eland yard	187.69	m2	187	35 098.00
Fencing	18.36	m	140	2 570.00
Compressor house	81.15	m2	50	4 057.00
Compressors	9 624.24	No	2	19 248.00
Concrete surface bed	41.59	m2	100	4 159.00
Container	19 248.48	No	1	19 248.00
Fencing	18.36	m	75	1 377.00
Lamproom	276.24	m2	306	84 529.00
Containers	9 624.24	No	2	19 248.00
Fencing	18.36	m	192	3 525.00

BORWA				
SHORT DESCRIPTION	RATE	UNIT	TOTAL QUANTITY	AMOUNT
Workshop	187.69	m2	238	44 670.00
Containers	19 248.48	No	1	19 248.00
Repair bay	81.15	m2	50	4 017.00
Incinerator bay	141.41	m2	875	123 734.00
Fencing	18.36	m	120	2 203.00
Herbicide store	41.59	m2	9	374.00
Fencing	18.36	m	12	220.00
Paint store	9 624.24	No	0	0.00
Stores	187.69	m2	104	19 426.00
Salvage yard	41.59	m2	625	25 995.00
Electrical store	187.69	m2	124	23 179.00
Stores	273.47	m2	0	0.00
Offices	19 248.48	No	1	19 248.00
Stores	187.69	m2	220	41 291.00
Stores	19 248.48	No	1	19 248.00
Concrete surface bed	41.59	m2	182	7 570.00
Lean-to	81.15	m2	59	4 820.00
Containers	9 624.24	No	1	9 624.00
Lean-to	81.15	m2	23	1 899.00
Container	19 248.48	No	1	19 248.00
Container	19 248.48	No	1	19 248.00
Nil	#N/A	#N/A	0	0.00
Pumphouse	81.15	m2	20	1 623.00
Pumps and equipment	9 624.24	No	1	9 624.00
Electrical workshop	81.15	m2	96	7 790.00
Containers	19 248.48	No	2	38 497.00
Containers	19 248.48	No	1	19 248.00
Concrete surface bed	41.59	m2	36	1 497.00
Concrete surface bed	41.59	m2	60	2 495.00
Concrete surface bed	41.59	m2	400	16 637.00
Furrow	41.59	m2	200	8 318.00
Steel tank	19 248.48	No	1	19 248.00
Tank bases	632.10	m3	72	45 239.00
Pumphouse	81.15	m2	20	1 623.00
Pumps and equipment	9 624.24	No	1	9 624.00
Fencing	18.36	m	60	1 102.00
Steel tank	19 248.48	No	2	38 497.00
Tank bases	632.10	m3	72	45 239.00
Fencing	18.36	m	170	3 121.00
Dam	19.74	m2	4200	82 911.00
Tarred roads	34.16	m2	22798	778 691.00
Pipelines	96.22	m	1389	133 656.00
			Total	15 838 918.00

LEBOWA				
SHORT DESCRIPTION	RATE	UNIT	TOTAL QUANTITY	AMOUNT
Perimeter fencing	18.36	m	2 000	36 718.00
Changehouse	276.24	m2	479	132 263.00
Fencing	18.36	m	285	5 232.00
Changehouse	276.24	m2	595	164 362.00
TMM Workshop	273.47	m2	640	175 023.00
Offices	276.24	m2	70	19 337.00
Service ramp	38 496.95	No	2	76 994.00
Container	19 248.48	No	1	19 248.00
Concrete surface bed	141.41	m2	1 255	177 471.00
Vent shaft	1 025 700.00	No	0	144 239.00
Concrete	632.10	m3	50	31 605.00
Equipment	9 624.24	No	1	9 624.00
Fencing	18.36	m	50	918.00
Lean-to	81.15	m2	50	4 057.00
Concrete paving	41.59	m2	790	32 857.00
Tuck shop	276.24	m2	36	9 945.00
HR/Security Offices	276.24	m2	1 692	467 396.00
Parkhomes	19 248.48	No	1	19 248.00
Carpports	39.55	m2	216	8 544.00
Floodlight	9 624.24	No	1	9 624.00
Carpports	39.55	m2	36	1 424.00
Fencing	18.36	m	330	6 059.00

LEBOWA				
SHORT DESCRIPTION	RATE	UNIT	TOTAL QUANTITY	AMOUNT
Concrete surface bed	83.18	m2	3 657	304 200.00
Oil traps concrete (incl retaining wall)	632.10	m3	22	13 590.00
Oil traps concrete	632.10	m3	5	3 287.00
Oil traps backfill	109.35	m3	1	109.00
Managers changehouse	276.24	m2	1	276.00
Carports	39.55	m2	180	7 120.00
Carports	39.55	m2	300	11 866.00
Carports	39.55	m2	90	3 560.00
Carports	39.55	m2	120	4 746.00
Tanks	19 248.48	No	2	38 497.00
Tank bases	632.10	m3	28	17 872.00
Tanks	19 248.48	No	1	19 248.00
Tank bases	632.10	m3	10	6 206.00
Lean-to	81.15	m2	20	1 623.00
Equipment and mechanicals	9 624.24	No	1	9 624.00
Container	9 624.24	No	1	9 624.00
Jo-Jo Tanks	9 624.24	No	5	48 121.00
Tank bases	632.10	m3	97	61 440.00
Septic tank	632.10	m3	8	5 152.00
Backfill	109.35	m3	194	21 191.00
Equipment and mechanicals	9 624.24	No	1	9 624.00
Fencing	18.36	m	90	1 652.00
Electrical workshop	187.69	m2	130	24 399.00
Containers	19 248.48	No	1	19 248.00
Floodlight	19 248.48	No	1	19 248.00
Dam (steel)	19 248.48	No	1	19 248.00
Dam base	83.18	m2	22	1 835.00
Substation	276.24	m2	20	5 525.00
Strip electricals	92.46	m2	20	1 849.00
Covered walkway	81.15	m2	494	40 086.00
Guardhouse	276.24	m2	12	3 384.00
Inspection platform	9 624.24	No	1	9 624.00
Explosives delivery bay	187.69	m2	275	51 614.00
Fencing	18.36	m	106	1 946.00
Brick wall	23.03	m2	30	691.00
Remove fill material	109.35	m3	48	5 249.00
Emulsion bay'	83.18	m2	600	49 910.00
Tanks	19 248.48	No	3	57 745.00
Bund walls	536.04	m3	6	3 216.00
Fencing	18.36	m	75	1 377.00
First aid room	276.24	m2	72	19 889.00
Parkhome	9 624.24	No	2	19 248.00
Fencing	18.36	m	140	2 570.00
Offices	9 624.24	No	7	67 370.00
Offices	19 248.48	No	4	76 994.00
Electrical workshop	187.69	m2	137	25 625.00
Containers	19 248.48	No	1	19 248.00
Lean-to	81.15	m2	86	6 953.00
Break test ramp	109.35	m3	864	94 474.00
Inspection bay	276.24	m2	16	4 420.00
Communication Hall	187.69	m2	294	55 180.00
Brick wall	23.03	m2	84	1 934.00
Floodlight	9 624.24	No	1	9 624.00
Security	276.24	m2	75	20 699.00
Lean-to	81.15	m2	42	3 408.00
Fuel bay	83.18	m2	1 680	139 747.00
Diesel tanks	19 248.48	No	2	38 497.00
Concrete bund	536.04	m3	46	24 443.00
Structural steel structure	187.69	m2	114	21 396.00
Oil tanks	9 624.24	No	1	9 624.00
Concrete bund	536.04	m3	31	16 724.00
Structural steel structure	187.69	m2	78	14 640.00
Waiting place	187.69	m2	36	6 757.00
Brick wall	23.03	m2	31	718.00
Decline No 3	1 025 700.00	No	0	400 664.00
Gas store	9 624.24	No	1	9 624.00
Backfill entrance	109.35	m3	24 780	2 709 580.00
Carports	39.55	m2	825	32 632.00
Carports	81.15	m2	138	11 157.00
Fencing	18.36	m	270	4 957.00
Bus shelter	187.69	m2	117	21 959.00

LEBOWA				
SHORT DESCRIPTION	RATE	UNIT	TOTAL QUANTITY	AMOUNT
Vent shaft	1 025 700.00	No	0	20 284.00
Equipment and mechanicals	19 248.48	No	4	76 994.00
Equipment and mechanicals	38 496.95	No	1	38 497.00
Concrete	632.10	m3	50	31 605.00
Fencing	18.36	m	70	1 285.00
Lean-to	81.15	m2	4	284.00
DB board	4 812.12	No	1	4 812.00
Lean-to	81.15	m2	27	2 227.00
Generator	9 624.24	No	1	9 624.00
Abeco water tank	38 496.95	No	1	38 497.00
Concrete base	632.10	m3	5	3 160.00
Water tank	454.98	m3	204	92 945.00
Concrete base	83.18	m2	144	11 978.00
Brick bund wall	23.03	m2	58	1 326.00
Pumphouse	276.24	m2	43	11 934.00
Equipment and mechanicals	9 624.24	No	1	9 624.00
Water tank	19 248.48	No	1	19 248.00
Concrete base	83.18	m2	14	1 198.00
Brick bund wall	23.03	m2	68	1 569.00
Chairlift	81.15	m2	173	14 022.00
Equipment and mechanicals	289.56	m	54	15 636.00
Equipment and mechanicals	30.52	m	108	3 296.00
Chairlift landing	273.47	m2	102	27 894.00
Chairlift landing	81.15	m2	66	5 319.00
Shaft	1 025 700.00	No	0	400 664.00
Containers	19 248.48	No	1	19 248.00
Lean-to	81.15	m2	12	974.00
Floodlight	9 624.24	No	1	9 624.00
Waiting place	81.15	m2	51	4 138.00
Compressor house	187.69	m2	306	57 432.00
Brick wall	23.03	m2	196	4 518.00
Equipment and mechanicals	19 248.48	No	6	115 491.00
Lean-to	81.15	m2	24	1 947.00
Generator	19 248.48	No	1	19 248.00
Lamproom	276.24	m2	352	97 236.00
Container substation	19 248.48	No	1	19 248.00
Concrete supports	632.10	m3	1	910.00
DB board	9 624.24	No	1	9 624.00
Lean-to	81.15	m2	18	1 420.00
Transformer	19 248.48	No	1	19 248.00
Concrete bund	141.41	m2	16	2 263.00
Settling dam	632.10	m3	65	40 770.00
Backfill	109.35	m3	780	85 289.00
Equipment and mechanicals	19 248.48	No	1	19 248.00
Nil			0	0.00
Containers	9 624.24	No	3	28 873.00
Capital yard	83.18	m2	2 238	186 163.00
Capital yard	81.15	m2	11	909.00
Capital yard	81.15	m2	6	507.00
Capital yard	81.15	m2	23	1 836.00
LHD parking bay	141.41	m2	830	117 371.00
Conveyor	1 611.53	m	150	241 729.00
Conveyor belting	30.52	m	300	9 156.00
Shaft	1 025 700.00	No	0	400 664.00
Transfer bunker	632.10	m3	324	204 799.00
Minisub	9 624.24	No	1	9 624.00
Lean-to	81.15	m2	20	1 623.00
Toilet	276.24	m2	20	5 525.00
Stormwater dam	109.35	m3	8 800	962 240.00
Stormwater dam	19.74	m2	4 400	86 860.00
Concrete spillway	83.18	m2	72	5 989.00
Fencing	18.36	m	220	4 039.00
Furrow	41.59	m2	344	14 307.00
Store	81.15	m2	50	4 017.00
Floodlight	9 624.24	No	1	9 624.00
Settling dam	632.10	m3	10	6 005.00
Backfilling	109.35	m3	126	13 778.00
Capital yard	81.15	m2	32	2 597.00
Containers	9 624.24	No	1	9 624.00
Containers	19 248.48	No	1	19 248.00
Logistics yard - concrete bund	141.41	m2	324	45 817.00

LEBOWA				
SHORT DESCRIPTION	RATE	UNIT	TOTAL QUANTITY	AMOUNT
Logistics yard - concrete surface bed	83.18	m2	216	17 967.00
Store	19 248.48	No	1	19 248.00
Store	9 624.24	No	2	19 248.00
Store	187.69	m2	156	29 279.00
Salvage yard - concrete surface bed	83.18	m2	307	25 537.00
Fencing	18.36	m	91	1 671.00
Salvage yard - concrete surface bed	83.18	m2	216	17 967.00
Fencing	18.36	m	27	488.00
Salvage yard - concrete surface bed	83.18	m2	1	83.00
Containers	9 624.24	No	2	19 248.00
Lean-to	81.15	m2	31	2 544.00
Fencing	18.36	m	130	2 387.00
Capital store	83.18	m2	637	52 987.00
Fencing	18.36	m	104	1 909.00
Dam	38 496.95	No	20	755 886.00
Concrete base	83.18	m2	418	34 770.00
Heli pad	83.18	m2	225	18 716.00
Overland conveyor	289.56	m	1 687	488 483.00
Overland conveyor	30.52	m	3 374	102 971.00
Overland conveyor	1 354.76	m	188	254 694.00
Overland conveyor	30.52	m	376	11 475.00
Tarred roads	34.16	m2	5 160	176 245.00
Pipelines	96.22	m	1 748	168 200.00
			Total	12 344 490.00

Appendix C: Rehabilitation Costs

Facility	Cost Type	Description	Facility/Activity Type	Phases	Locations	DoA Cost
						R
TAILINGS IMPOUNDMENTS						25 367 162
1	DoA	Mototolo Dam Top	Tailings Dam	Rest	Conc	11 492 812
		Surface Regrading				1 472 998
		Growth Media Placement				8 545 059
		Revegetation				1 474 755
2	DoA	Southern Flank - Vegetated	Tailings Dam	Rest	Conc	1 235 912
		Growth Media Placement				804 000
		Revegetation				431 912
3	DoA	Upper lifts	Tailings Dam	Rest	Conc	1 740 911
		Growth Media Placement				1 132 163
		Revegetation				608 748
4	DoA	Southern lift 1	Tailings Dam	Rest	Conc	603 073
		Growth Media Placement				393 796
		Revegetation				209 277
5	DoA	Southern Buttress	Buttress Dam - Helena	Rest	Conc	872 522
		Growth Media Placement				262 531
		Revegetation				609 991
6	DoA	Eastern Buttress	Buttress Dam - Helena	Rest	Conc	3 430 458
		Growth Media Placement				1 017 306
		Revegetation				2 413 152
7	DoA	Northern Buttress	Buttress Dam - Helena	Rest	Conc	999 183
		Growth Media Placement				295 347
		Revegetation				703 836
8	DoA+LOM	Starter Wall	Tailings Dam	Rest	Marees	4 992 291
		Growth Media Placement				1 238 499
		Revegetation				3 753 792
QUARRIES & BORROW PITS						575 356
1	DoA	Borrow Pit 4	Tailings Dam	Rest	Marees	507 028
		Regrading				5 273
		Growth Media Placement				346 554
		Ripping/Scarifying				14 500
		Revegetation				140 701
2	DoA	Borrow Pit 2	Tailings Dam	Rest	Marees	68 328
		Regrading				3 955
		Ripping/Scarifying				5 273
		Revegetation				59 100
ROADS						1 889 693
1	DoA+LOM	Road 1	Road	Rest	Conc	27 384
		Regrading				3 955
		Growth Media Placement				19 567
		Ripping/Scarifying				1 318
		Revegetation				2 544
2	DoA+LOM	Road 2	Road	Rest	Conc	26 065
		Regrading				2 636
		Growth Media Placement				19 567
		Ripping/Scarifying				1 318
		Revegetation				2 544
3	DoA+LOM	Road 3	Road	Rest	Conc	24 747
		Regrading				1 318
		Growth Media Placement				19 567
		Ripping/Scarifying				1 318
		Revegetation				2 544
4	DoA+LOM	TSF Road	Road	Rest	Conc	467 478
		Regrading				5 273
		Growth Media Placement				388 279
		Ripping/Scarifying				3 955
		Revegetation				69 971
5	DoA+LOM	Toe Access	Road	Rest	Marees	333 122
		Regrading				2 636
		Growth Media Placement				214 532
		Ripping/Scarifying				5 273
		Revegetation				110 681
6	DoA+LOM	B Road 1	Road	Rest	Borwa	26 434
		Growth Media Placement				14 302
		Ripping/Scarifying				1 318
		Revegetation				10 814
7	DoA+LOM	B Road 2	Road	Rest	Borwa	129 114
		Growth Media Placement				85 813
		Ripping/Scarifying				1 318
		Revegetation				41 983
8	DoA+LOM	B Road 3	Road	Rest	Borwa	23 253

Facility	Cost Type	Description	Facility/Activity Type	Phases	Locations	DoA Cost
						R
		Growth Media Placement				14 302
		Ripping/Scarifying				1 318
		Revegetation				7 633
9	DoA+LOM	B Road 4	Road	Rest	Borwa	43 281
		Growth Media Placement				28 604
		Ripping/Scarifying				1 318
		Revegetation				13 359
10	DoA+LOM	B Road 5	Road	Rest	Borwa	110 995
		Growth Media Placement				71 511
		Ripping/Scarifying				1 318
		Revegetation				38 166
11	DoA+LOM	L Road 6	Road	Rest	Leb	176 846
		Growth Media Placement				114 417
		Ripping/Scarifying				2 636
		Revegetation				59 793
12	DoA+LOM	L Road 7	Road	Rest	Leb	84 608
		Growth Media Placement				57 209
		Ripping/Scarifying				1 318
		Revegetation				26 081
13	DoA+LOM	Tarred Road	Road	Rest	Borwa	416 366
		Growth Media Placement				271 741
		Ripping/Scarifying				6 591
		Revegetation				138 034
PROCESS PONDS						2 618 079
1	DoA+LOM	Raw Water Dam	Water Management Infra	Rehab	Conc	245 117
		Backfill/Cover 1 Placement				95 076
		Growth Media Placement				42 790
		Revegetation				107 251
2	DoA+LOM	PCD Liner Removal	Water Management Infra	Rehab	Conc	22 891
		Liner Cutting and Folding				22 891
3	DoA+LOM	RWD 1	Water Management Infra	Rest	Marees	993 999
		Backfill/Cover 1 Placement				753 815
		Growth Media Placement				193 013
		Revegetation				47 171
4	DoA+LOM	RWD 2	Water Management Infra	Rest	Marees	871 662
		Backfill/Cover 1 Placement				672 322
		Growth Media Placement				160 844
		Revegetation				38 496
5	DoA+LOM	B PC Dam	Water Management Infra	Rest	Borwa	252 649
		Liner Cutting and Folding				8 835
		Backfill/Cover 1 Placement				183 361
		Growth Media Placement				48 253
		Revegetation				12 200
6	DoA+LOM	L PC Dam	Water Management Infra	Rest	Leb	231 761
		Liner Cutting and Folding				9 036
		Backfill/Cover 1 Placement				210 525
		Revegetation				12 200
YARDS						31 513 739
1	DoA+LOM	Concentrator Footprint	Concentrator	Rehab	Conc	15 921 926
		Regrading				9 966 028
		Growth Media Placement				4 709 142
		Revegetation				1 246 756
2	DoA+LOM	RWD B Pump station	Water Management Infra	Rest	Conc	101 761
		Growth Media Placement				82 041
		Revegetation				19 720
3	DoA+LOM	TSF S Laydown	Misc	Rest	Conc	187 023
		Regrading				41 633
		Growth Media Placement				114 857
		Revegetation				30 533
4	DoA+LOM	Dog Kennel	Misc	Rest	Conc	166 887
		Growth Media Placement				131 265
5	DoA+LOM	RWD A Parking	Misc	Rest	Conc	104 305
		Growth Media Placement				82 041
		Revegetation				22 264
6	DoA+LOM	Prepared Footprint	Tailings Dam	Rest	Marees	2 768 038
		Growth Media Placement				2 068 600
		Revegetation				699 438
7	DoA+LOM	Disturbed area	Tailings Dam	Rest	Marees	503 151
		Growth Media Placement				377 089
		Revegetation				126 062
8	DoA+LOM	Disturbed area 2	Tailings Dam	Rest	Marees	576 810

Facility	Cost Type	Description	Facility/Activity Type	Phases	Locations	DoA Cost R
		Growth Media Placement				430 958
		Revegetation				145 852
9	DoA+LOM	Disturbed area 4	Tailings Dam	Rest	Marees	418 174
		Growth Media Placement				312 445
		Revegetation				105 729
10	DoA+LOM	Disturbed area 5	Tailings Dam	Rest	Marees	130 040
		Growth Media Placement				96 966
		Revegetation				33 074
11	DoA+LOM	Disturbed area 6	Tailings Dam	Rest	Marees	159 993
		Growth Media Placement				118 514
		Revegetation				41 479
12	DoA+LOM	Lined area	Tailings Dam	Rest	Marees	3 027 034
		Growth Media Placement				2 262 532
		Revegetation				764 502
13	DoA+LOM	Servitude & Road	Tailings Dam	Rest	Marees	1 353 796
		Growth Media Placement				1 012 752
		Revegetation				341 044
14	DoA+LOM	Silt trap 1	Tailings Dam	Rehab	Marees	86 604
		Growth Media Placement				64 644
		Revegetation				21 960
15	DoA+LOM	Silt trap 2	Tailings Dam	Rehab	Marees	56 923
		Growth Media Placement				43 096
		Revegetation				13 827
16	DoA+LOM	Staging outside 1	Tailings Dam	Rest	Marees	272 752
		Growth Media Placement				204 705
		Revegetation				68 047
17	DoA+LOM	Staging outside 2	Tailings Dam	Rest	Marees	43 166
		Growth Media Placement				32 322
		Revegetation				10 844
18	DoA+LOM	RWD 3	Tailings Dam	Rest	Marees	243 341
		Growth Media Placement				183 157
		Revegetation				60 184
19	DoA+LOM	RWD 4	Tailings Dam	Rest	Marees	244 697
		Growth Media Placement				183 157
		Revegetation				61 540
20	DoA+LOM	B Stockpile	Stockpiles	Rehab	Borwa	201 531
		Growth Media Placement				150 835
		Revegetation				50 696
21	DoA+LOM	B Footprint	Shafts	Rest	Borwa	1 108 557
		Growth Media Placement				829 595
		Revegetation				278 962
22	DoA+LOM	B Yard	Associated mining infrastructure	Rehab	Borwa	58 820
		Growth Media Placement				43 096
		Revegetation				15 724
23	DoA+LOM	B Salvage	Associated mining infrastructure	Rest	Borwa	29 139
		Growth Media Placement				21 548
		Revegetation				7 591
24	DoA+LOM	B Fan 1	Associated mining infrastructure	Rehab	Borwa	14 569
		Growth Media Placement				10 774
		Revegetation				3 795
25	DoA+LOM	B Fan 2	Associated mining infrastructure	Rehab	Borwa	12 672
		Growth Media Placement				10 774
		Revegetation				1 898
26	DoA+LOM	B Sewage Plant	Associated mining infrastructure	Rehab	Borwa	14 569
		Growth Media Placement				10 774
		Revegetation				3 795
27	DoA+LOM	B Fan 3	Associated mining infrastructure	Rehab	Borwa	30 223
		Growth Media Placement				21 548
		Revegetation				8 675
28	DoA+LOM	B Fan 4	Associated mining infrastructure	Rehab	Borwa	41 811
		Growth Media Placement				32 322
		Revegetation				9 489
29	DoA+LOM	L sewage	Associated mining infrastructure	Rehab	Leb	28 597

Facility	Cost Type	Description	Facility/Activity Type	Phases	Locations	DoA Cost
						R
		Growth Media Placement				21 548
		Revegetation				7 049
30	DoA+LOM	L Helicopter	Associated mining infrastructure	Rest	Leb	28 597
		Growth Media Placement				21 548
		Revegetation				7 049
31	DoA+LOM	L Pond footprint	Water Management Infra	Rest	Leb	131 125
		Growth Media Placement				96 966
		Revegetation				34 159
32	DoA+LOM	L Ore Yard	Associated mining infrastructure	Rest	Leb	58 278
		Growth Media Placement				43 096
		Revegetation				15 182
33	DoA+LOM	L Yard Footprint	Shafts	Rehab	Leb	893 271
		Growth Media Placement				667 986
		Revegetation				225 285
34	DoA+LOM	L Fans	Associated mining infrastructure	Rehab	Leb	29 681
		Growth Media Placement				21 548
		Revegetation				8 133
35	DoA+LOM	Conveyor Reserve	Associated mining infrastructure	Rehab	Leb	965 845
		Growth Media Placement				721 855
		Revegetation				243 990
36	DoA+LOM	L Northern Fan	Associated mining infrastructure	Rest	Leb	15 383
		Growth Media Placement				10 774
		Revegetation				4 609
37	DoA+LOM	B Storage area	Associated mining infrastructure	Rehab	Borwa	30 495
		Growth Media Placement				21 548
		Revegetation				8 947
38	DoA+LOM	Mareesburg Phase 2	Tailings Dam	rest	Marees	1 454 155
		Growth Media Placement				1 088 170
		Revegetation				365 985
HAUL MATERIAL						4 907 198
1	DoA	Removal of stockpile soils	Concentrator	Rehab	Conc	713 159
		Haul Material				713 159
2	DoA	Replace Removed soils	Concentrator	Rehab	Conc	371 529
		Haul Material				371 529
3	DoA	Staging area outside 1	Tailings Dam	Rest	Marees	522 917
		Haul Material				522 917
4	DoA	Staging area outside 2	Tailings Dam	Rest	Marees	169 778
		Haul Material				169 778
5	DoA+LOM	RWD 3	Tailings Dam	Rest	Marees	692 695
		Haul Material				692 695
6	DoA+LOM	RWD 4	Tailings Dam	Rest	Marees	47 538
		Haul Material				47 538
7	DoA	Haul Borwa Stock to TSF	Stockpiles	Rest	Borwa	393 886
		Haul Material				393 886
8	DoA+LOM	Backfill Borwa Portals	Shafts	Rehab	Borwa	1 183 967
		Haul Material				1 183 967
9	DoA+LOM	Backfill Lebowa Portals	Shafts	Rehab	Leb	811 729
		Haul Material				811 729
DIVERSION DITCHES						87 918
1	DoA+LOM	Southern Diversion Trench	Tailings Dam	Rehab	Conc	30 638
		Backfilling/Regrading				30 638
2	DoA+LOM	Northern Diversion Trench	Tailings Dam	Rehab	Conc	57 280
		Backfilling/Regrading				57 280
SEDIMENT PONDS						6 732 244
1	DoA+LOM	RWD A	Water Management Infra	Rest	Conc	4 386 030
		Backfilling/Regrading				3 195 790
		Liner Installation				
		Growth Media Placement				993 759
		Ripping/Scarifying				23 790
		Revegetation				172 691
2	DoA+LOM	RWD B	Water Management Infra	Rest	Conc	1 551 927
		Backfilling/Regrading				1 070 550
		Liner Installation				
		Growth Media Placement				402 875
		Ripping/Scarifying				9 913

Facility	Cost Type	Description	Facility/Activity Type	Phases	Locations	DoA Cost
		Revegetation				R 68 589
3	DoA+LOM	PCD	Water Management Infra	Rehab	Conc	794 287
		Backfilling/Regrading				584 838
		Liner Installation				
		Growth Media Placement				174 579
		Ripping/Scarifying				3 965
		Revegetation				30 905
OTHER USER COSTS						23 248 483
1	DoA	Maintenance of additional Horiz BH	Maintenance	Rest	Conc	1 864 304
2	DoA	Rubble Removal	Concentrator	Decom	Conc	2 200 000
3	DoA	Helena TSF Spillway	Tailings Dam	Rest	Conc	2 200 000
4	DoA	Horizontal Borehole Capex	TSF Water Management	Rest	Conc	1 638 668
5	DoA	Horizontal Borehole Opex 25 years	TSF Water Management	Rest	Conc	10 345 511
6	DoA+LOM	Maintenance of Mareesburg Stormwater diversion	TSF Water Management	Rest	Marees	5 000 000
MONITORING						
Reclamation Monitoring						3 428 685
1	DoA+LOM	Ecological Monitoring	Monitoring	Rest	Conc	1 098 236
2	DoA+LOM	Revegetation Monitoring	Monitoring	Rest	Marees	133 977
3	DoA+LOM	Ecological Monitoring	Monitoring	Rest	Borwa	1 098 236
4	DoA+LOM	Ecological Monitoring	Monitoring	Rest	Leb	1 098 236
Water/Rock Quality Monitoring						19 198 701
1	DoA+LOM	Surface Water	Monitoring	Rest	Conc	7 434 053
2	DoA+LOM	Monthly Monitoring BH	Monitoring	Rest	Conc	2 606 078
3	DoA+LOM	Biannual Well Field	Monitoring	Rest	Conc	391 414
4	DoA+LOM	Surface Water	Monitoring	Rest	Marees	2 950 603
5	DoA+LOM	Groundwater	Monitoring	Rest	Marees	526 709
6	DoA+LOM	Surface Water	Monitoring	Rest	Borwa	2 182 243
7	DoA+LOM	Groundwater	Monitoring	Rest	Borwa	462 679
8	DoA+LOM	Surface Water	Monitoring	Rest	Leb	2 182 243
9	DoA+LOM	Groundwater	Monitoring	Rest	Leb	462 679
Revegetation Maintenance						1 440 963
1	DoA+LOM	Repair on TSF	Maintenance	Rest	Conc	781 410
2	DoA+LOM	Repair on footprints	Maintenance	Rest	Conc	306 052
3	DoA+LOM	Reveg	Maintenance	Rest	Marees	312 564
4	DoA+LOM	Reveg Maintenance Borwa	Maintenance	Rest	Borwa	17 578
5	DoA+LOM	Reveg Maintenance Lebowa	Maintenance	Rest	Leb	23 359
Growth Media Maintenance						5 256 770
1	DoA+LOM	Repair on TSF	Maintenance	Rest	Conc	1 686 409
2	DoA+LOM	Repair on footprints	Maintenance	Rest	Conc	1 686 409
3	DoA+LOM	Growth	Maintenance	Rest	Marees	1 686 409
4	DoA+LOM	Growth medium on footprints	Maintenance	Rest	Borwa	84 823
5	DoA+LOM	Growth medium on footprints	Maintenance	Rest	Leb	112 720
CLOSURE PLANNING						
Closure Plan Studies						1 350 000
1	DoA+LOM	Closure BAP	Planning and Authorisation	Rest	Serv	300 000
2	DoA+LOM	Water management	Planning and Authorisation	Rest	Serv	750 000
3	DoA+LOM	Soil contamination	Planning and Authorisation	Rest	Serv	300 000
Closure Plan Engineering						21 000 000
1	DoA+LOM	Demolition plan	Planning and Authorisation	Rest	Serv	1 000 000
2	DoA+LOM	TSF Closure plan	Planning and Authorisation	Rest	Serv	20 000 000
Closure Plan Permitting						2 500 000
1	DoA+LOM	Decom EIA	Planning and Authorisation	Rest	Serv	2 500 000
GENERAL AND ADMINISTRATION COSTS						
						200 640 045

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